GRASSLAND

JOURNAL

OF THE

SOUTH WEST

AND

CENTRAL SCOTLAND

GRASSLAND SOCIETIES

No. 16

MAY 1973

CONTENTS

PUTTING IT SIMPLY . . .

Another number of our journal has been put to bed. It follows the pattern of previous numbers with most of its pages devoted to reports on the activities of our two societies. My colleagues, John Frame, Ron Harkess, Ian Mitchell, Martin Wrathall and George Norris helped in preparing reports on the eight or nine meetings of our combined winter programmes. John Cunningham was delegate from the S.W.S.G.S. to the British Grassland Society's Winter meeting and has produced an excellent report. Roy Miller recorded our own summer tour in the North East of Scotland.

A few pages only are concerned with other matters. Malcolm Castle and John Watson of the Hannah provide an article describing the results of their investigation into the 'Wye College Simple Grazing System' whilst John Watson puts in a plea for a silage competition.

Room has been found for five Research Reviews. Since our last issue, a thousand and more research articles have been published. My own department has been responsible for a dozen or so. It would be fine to be able to comb through all these research papers, digest them and print their conclusions in our journal. We are continually being told that lines of communication from the research worker to the farmer are too slow. Much thought is going into methods of speeding up the passing of these gems into practice.

All in all, our journal is packed with meaty information. Within its pages twenty-one farms are described, each one with a clear message concerning the practical application of research findings.

Are they read ? Who reads them ? Are they understood ? Do they help in farmers decision making or do they confuse ?

I read the contents of each journal many times in the course of preparation but wonder whether any other person does.

Farmers are busy. We are all busy. Reading takes time. The 'whizz-kids' of 'communication' say that we must use words of one or two syllables in short sentences because a farmer cannot read more than one page on any subject without going to sleep.

Over and over again the same message comes through. *You cannot get the best out of grass until you raise overall stocking rate.*

High as it is, the output of milk from Malcolm Castle's S23 paddocks could be raised by increasing stocking rates from 2 cows per acre through the summer to $2\frac{1}{2}$ or maybe 3 cows per acre

through the summer. Then and then only will one get full benefit from rate of N applied, choice of good grasses, topping or conserving grazing surpluses. The target for milk production must now be 1500 gallons per acre (75 gallons per week).

Such intensifying is unnecessary and wasteful unless more stock are carried on the same acreage of grass or the same stock are held on fewer acres and the acres saved put to good use.

If such increases in stock are not possible then forget about zero grazing, manuring and operate on inputs to match stock outputs.—I. V. HUNT.

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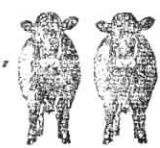

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JOHN WADDELL

Members of the Central Scotland Grassland Society were grieved to hear of the untimely passing of their treasurer, Mr John Waddell, on March 27th, 1973 at the age of 44 years. John had been in indifferent health for the past few years but his strength of character and fortitude made him continue to perform his duties as Head of the Clyde Area of the Advisory and Development Service and treasurer of our Society until a few weeks before his death.

John went about his duties quietly but diligently and was most punctilious in all that he did. His farming friends, particularly those in Lanarkshire, will miss his wise counsel and friendly smile. We, in the Grassland Society know how much he did for our Society in keeping our books healthy since its inception in 1963, and in promoting our membership as witnessed by the excellent Lanark membership. Those of us who worked closely with him know how sound and helpful were his views and how much he will be missed. To his widow Anne and the three boys, the sympathy of the Society has been expressed.

EVENING FARM WALK at ROBERTON, BORGUE

(South West Scotland Grassland Society — 21st June, 1972)

On one of the rare sunny evenings of June, 1972, thirty-eight members attended a walk on the three farms owned by one of our Kirkcudbrightshire committee members, Mr Andrew Brown.

The farms — Corseyard, Roberton and Barlocco — total 612 acres in all and carry 100 dairy cows, 80 beef cows and 200 Mule ewes (Blue-Faced Leicester X Swaledale). The land runs down to the seashore and is typical Borgue country; that is, pockets of good ploughable soil, seldom more than two or three acres at one stretch, lying between rocky outcrops. This land tends to poach in wet weather and readily burns during drought. Its proximity to the sea does, however, make it an early area for grass growth, it being possible to turn the dairy herd at Corseyard out to grass on 24th March this year. Grass is obviously the main crop on the three farms, but in addition 6 acres of turnips, 20 acres of kale, 12 acres of oats, and 25 acres of barley were grown in 1972.

The walk started with an examination of the low cost cubicle and easy-feed set-up for the 80 cow suckler herd at Roberton. The buildings for this unit were erected in 1970/71 and cost £11 per cow net of grant, this including concreting. The suckler cows were, in the main, bred from the dairy and included some Charolais X Ayrshires. A Hereford and a Lincoln Red Bull run

with these beef cows. Approximately half calve in the spring, the remainder in the autumn. The cows do not calve in the house due to disease risks. A calf creep is incorporated for the autumn-born calves. The spring calvers are drawn out as they come to the calving and calve outside.

From the Roberton steading, the party moved up to an excellent leafy permanent pasture. This was carrying 30 suckler cows and their calves, a bull, 45 Mule gimmers and 84 Suffolk and Dorset Down cross lambs all on 24 acres. This stock had been on from April and were expected to stay to early July. Fertilizer treatment for this field had been 50 unit dressings of straight "N" per acre in March, April and May. A further dressing was anticipated in August. This nitrogen is applied in granular form and the whole area is dressed each time. The stock are left in the field during and after application. Being pasture it was found unnecessary to apply potash, but lime and slag are applied as necessary, roughly every 6-7 years.

The party then moved on to Corseyard. Here we saw what must surely be one of the most ornate steadings in the country, being built at the turn of this century. Into the original byre has been fitted a modern 5/10 herringbone parlour and other dairy facilities. The old building with its glazed tiles from floor to ceiling, has given a very clinical atmosphere to this set-up. The dairy herd management board using golf-tee pegs of different colours for markers is housed in a glazed brick dairy office. Concentrates are augered from a bulk feed store to the feed hoppers in the parlour. Some problems had been experienced with this auger system.

The dairy breeding policy has been to put more than 50% of the cows to the Hereford bull. All the rest go to the Friesian bull with the exception of a few of the best Ayrshires, these being bred pure through A.I.

The dairy grass for both silage and pasture is based on three year leys, some tetraploid grasses are included in the seeds mixtures. The rotation:—three years grass, spray with paraquat mid-summer and direct drill marrowstem kale for strip-grazing in autumn and winter. The kale ground is ploughed for undersown cereals the following spring, and so back into grass, based on Italian and Perennial Ryegrasses. The dairy herd grazing system is to sub-divide existing fields into large paddocks, and then strip graze these, using the electric fencing unit.

After a thorough examination of the steading, new and old sections, and the almost filled self-feed open silage clamp, it was time to head back along the shore fields to Roberton, but not before the more adventurous members had climbed to view the Isle of Man from the top of the 1913 folly water tower.

The members were then entertained to an excellent supper provided by Mr and Mrs Brown.—M. J. WRATHALL.

NOTES ON OUR SUMMER TOUR, 1972

by Roy Miller

South West Scotland Grassland Society

The 1972 Summer Tour consisted of a series of visits to a number of extremely interesting farms in central and northern Scotland, also a most refreshing visit to a distillery. Each farm illustrated a different type and system of management which made it in itself quite unique and of great interest.

Shearerston Farm, Perthshire, owned by Charles Connell Ltd.

The farm extends to some 1500 acres. Stocking 200 dairy cows (all the calves are reared), 320 fattening cattle, 280 breeding ewes (half north country Cheviot to Border Leicester and the other half half-bred Suffolk) and 1600 fattening lambs. There is an extensive broiler production enterprise which carried approximately 680,000 birds with an annual turnover of three million.

There are approximately 950 acres of cereals grown which comprise 652 acres of barley, 110 acres of oats and 188 acres of wheat. Marketing opportunities are the first consideration for cereals. Malting barley is sold and feed grain is bought in. 145 acres of potatoes are grown for seed, 50 per cent of the acreage is let to a potato merchant.

There is an extensive range of modern farm buildings, the most recent addition being that of the Masstock building which was erected in 1971. This building was designed by McGuckian and is for use in a zero grazing system. It consists essentially of two opposing kennels with a ridge opening approximately 9" in width. The house is of timber construction with standard corrugated asbestos roofing. Pen floors are slatted (low level) and a central passage-cum-feed trough to facilitate the feeding of grass and silage runs through the building. The cattle are restrained by a tensioned single steel cable barrier above the trough. Concentrates are fed in high level troughs at right angles to the centre passage and water troughs are provided at the outer end of these troughs.

The total cost of the Masstock house including water supply, electricity, gates, fencing, protective barriers, etc., is in the region of £12,500 gross. Grant Aid was available at the rate of 40%. The cattle enter the Masstock house at approximately 560lbs. and are housed until fat. The cattle are fed on a zero grazing system with cut grass which is renewed every 12 hours. Unless the grass is treated with Add F or some suitable preservative, it will heat after approximately 12 hours. In this case, it was decided due to cost of the additive that this would not be done and the grass would be cut twice a day. The only concentrate which is fed is barley. The average live weight gain last winter was 1.7lbs. per

day, the calves being Ayrshire X Hereford. Recently, experiments have been carried out using Devon and Hereford bulls on beef cows, the comparable live weight gains are 2.47 lbs. per day for Devon X and 1.76lbs. per day for the Hereford X.

Silage is the basis of the conservation policy and most stock are paddock grazed with the exception of the cattle in the Masstock house. A considerable amount of labour is involved in carting the grass to the Masstock house but we were informed that this fits in well with the summer duties of the stockman at Shearerston Farm. So far this year, the Masstock unit has yielded 7½cwts. of beef per acre of land used and it would appear that the final figure this year will be in the region of 10 cwts. Grain produced on the farm is dried through a very large and impressive in-bin grain drying and handling set-up.

Mains of Moy, Forres, Morayshire, managed by Adam Anderson.

This farm is a stock rearing type which extends to approximately 282 acres. The farm carries 183 suckler cows with followers and approximately 100 wintering sheep. Cropping is 27 acres of potatoes, 40 acres of roots and 20 acres of barley. The aim of this farm is to produce good suckler calves from dairy shorthorn cows. Mr Anderson purchased dairy shorthorn cows and had the most beef like of these reclassed as beef shorthorns. These cows are crossed with Hereford bulls to provide strong weaned calves for autumn sales and heifers for breeding to use on an upland unit. It is interesting to note that Mr Anderson recently received the top price at the beef shorthorn cattle sale in Perth of 1,300gns., and this calf was produced from one of the cows which was originally a dairy shorthorn. Considerable discussions took place regarding a suitable crossing bull to use on shorthorn cows. We were informed that shorthorn X Charolais was not satisfactory due to the size of the calf. Simmenthal was tried and both the best and the worst calves were produced by this cross, with no consistency or uniformity and so it was decided not to use this bull. It appeared that the Hereford X produced the most acceptable calf under the circumstances. Attempts had been made to grow carrots, cabbages and brussel sprouts; the most successful of these very unsuccessful crops was brussel sprouts ! Considerable time was spent discussing labour and its availability in an area which is becoming increasingly industrialised. Good conditions, good salary and responsibility would solve the difficulties. Wild oats was becoming a problem in barley in the area. The most effective way to clear the land of wild oats is to pull up the plants by the root before they seed, but because seed lies dormant in the soil, it is necessary to repeat the remedy many years in succession. The majority of the grazing area on this farm was in ryegrass mixtures. The swards showed considerable evidence of aerial

tillering, which along with patchiness, winterkill and loose turf, seem to be associated with perennial ryegrass. Aerial tillering is caused by under grazing in May and June, but its practical importance is as yet uncertain but it appears that heavy rolling can help this problem.

Logie Farm, Logie, Morayshire, managed by Adam Anderson.

The land extends to approximately 952 acres and stock is 125 dairy cows, 128 dairy followers, 194 beef cows, 200 calves and 37 calving heifers. The size of the farm has increased over the last three years from approximately 120 acres; the present aim being to lay the farm down to grass using turnips as a break crop. Autumn calving is being replaced by spring calving because all cattle are out-wintered. All fields grazed by the dairy herd are strip grazed. Any cow under 1,000 gallons per annum is culled. Before being sold they are put to a shorthorn bull. Considerable discussions were had regarding the pros and cons of having an Ayrshire or a Friesian herd and Mr Anderson explained that his reasons for having Ayrshire cattle were firstly, that he preferred them to Friesians and secondly, there was less capital required to purchase an Ayrshire herd. In his opinion they were as good as Friesians although he agreed that over the next few years the capital appreciation of Friesians cattle will be substantially greater than that of Ayrshire ?

Blackhills, Dalys, Morayshire, tenanted by Mr M. Munro.

A visit was made to this farm to inspect Mr Munro's suckled calves which are reputed the best in the County of Moray. The cows are blue/grey cross Angus and are served by an Angus bull, the majority of the calves being three-quarters Angus. Mr Munro won the Championship at all but one of the local sales last year and the calves were certainly the best which we have seen for quite some time. The farm is approximately 947 acres and carried 140 cows and followers. 100 acres of roots and bindered oat hay are grown for winter feeding.

Dalys Farm, Morayshire, managed by Adam Anderson.

This farm extends to approximately 602 acres and carried 275 beef cows and followers. The farm is at present being built up and the land is being laid down to grass and will eventually carry 360 beef cows and followers. Farm staff will be three men, each man looking after 120 cows. There is approximately 140 acres of silage grown, 90 acres of turnips and rape crop and 123 acres of barley and oats.

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Edderton Farm, Tain, Ross-shire, tenanted by R. D. G. Clark.

The farm extends to 2,668 acres which comprises 400 acres arable, 800 acres reclaimed pasture and 1,468 acres hill grazing (mainly heather). The reclaimed land was of great interest. Half of this was achieved by ploughing and cultivation between 1950 and 1960 and is largely on mineral soil while the other half has been reclaimed by surface seeding between 1970 and 1972 and lies on shallow peat.

The farm carries approximately 190 beef cows and followers and approximately 1,000 black faced ewes. It is a livestock rearing unit in which arable and hill land are complementary to each other. The arable land is used for the production of winter keep, winter grazing of cattle and fattening of lambs; while the higher grazing is used for summer grazing as well as carrying permanent sheep stock. The unit demonstrates the integration of low ground arable with a larger area of reclaimed pasture and hill land. It may be said to be a revival of the old sheiling system on a more intensive scale because of the extensive reclamation work undertaken.

The surface seeding which was carried out in 1971 was completed in three operations. Firstly, the area to be reclaimed was sprayed with Paraquat and the heather burnt. Then it was disced and three tons of lime, half a ton of basic slag and three cwts. compound fertilizer plus seed applied. This is then rolled. The work was done in May and it was possible to graze the land in September/October. The approximate cost of carrying out this work is in the region of £17 per acre. The seed mixture used was a ryegrass/timothy/white clover mixture with some rough seeds (cleanings) and sown at the rate of 21 lbs per acre. Grant Aid was available at 60%.

A three mile long road was necessary for access to this grazing. A loan was received for its cost from the Highlands and Islands Development Board which has recently started giving loans to the agricultural sector where no other form of aid is available.

The proposed stocking rate for the reclaimed area is 1 cow and 1 ewe per acre and the fertilizer programme allows 70 units N per acre after initial sowing. The white clover could eventually become dominant as there would not be sufficient nitrogen to sustain growth of the other grasses. 70/100 units would be too little nitrogen application to supply grass for the proposed stocking 1 cow, calf and sheep per acre. The grass would die out if it was grazed too hard. The provided rate is not an optimum fertilizer rate, it would be better to cut back the fertilizer use to an absolute minimum or increase it 150 or 200 units. Peat contains nitrogen but this is not available to plants.

Castle Craig Farm, Nigg, tenanted by J. Robertson.

The farm extends to 745 acres of which 200 acres are grazing, 225 acres silage and 320 acres rough grazing. The stock comprises 420 cows — mostly Friesian — and 8 bulls (7 Friesian and 1 Hereford). There are 300 young stock, 200 at grass. This is an extremely large herd of dairy cows and at the date of the visit there were approximately 320 in milk. There are three dairymen who carry out milking on shift system. Milking is through a 10-point herringbone parlour beginning at midnight and mid-day. At its peak it takes 4 hours but at the moment it can be completed within 3 hours. There are three 500 gallon bulk tanks.

The cows graze in one group in 7 acre paddocks and are allowed 4 acres of grazing in the morning and 3 acres in the afternoon. The grass receives 300 units of Nitrogen per year (50 units after each grazing, there are 28 paddocks). It also receives 100 units of muriate of potash. The grassland is mainly permanent pasture ploughed every 9/10 years. The dairy system is on low cost basis, the average yield per cow being 900 gallons. Barley is the only concentrate fed in the parlour and we were informed that Mr Robertson is at present considering installing liquid feed as cattle can consume twice as much food in the same period of time when in liquid form. The cows are housed in cubicles: feeding is by forage box into feed box. Add F is used on silage but only on second and third cuts. The winter feeding ration for M+2 is 32 lbs of draff per cow per day plus ad lib easy fed silage. 4 lbs barley per gallon is fed to M+7. Mr Robertson informed us that he is at present considering a zero grazing system for his cattle.

Dalmore Distillery, Alness.

A most interesting and amusing visit was made to Dalmore Distillery. We were very fortunate to be shown the whole process of whisky making from bringing in barley to sampling the final product which proved to be a most fitting end to a tour which all those present agreed had been one of the best.—R.M.

TENTH BIRTHDAY OF THE SOUTH WEST SCOTLAND GRASSLAND SOCIETY

Guest speaker: Iain Cairns, Balbirnie Home Farms, Fife.

The South West Scotland Grassland Society held their 11th Annual General Meeting at Castle Douglas on Thursday, 16th November. Allan Buchan relinquished the Chairmanship after two terms of office. Under his guidance the Society's affairs had been conducted competently and vigorously. Membership currently stands at 320. In the winter months, 4-5 evening meetings with invited speakers or discussion panels of speakers were held in rotation round the counties served by the Society, namely Ayrshire Dumfriesshire, Kirkcudbrightshire and Wigtownshire. In the summer months, an instructive and enjoyable series of farm walks were held in various localities of the Society's area. Many of these activities have been fully reported by the "Scottish Farmer" in the past. In September of this year, a party of members together with some from the Central Scotland Grassland Society made a three-day tour of farms in Inverness-shire and Morayshire. The Society also sponsors visits by individual members to the Winter and Summer Meetings of the parent Society, the British Grassland Society. Under the Editorship of I. V. Hunt, West of Scotland Agricultural College, Auchincruive, the Society has its own Journal in which the proceedings of the Society are summarised.

The new Chairman is Robert Graham, Kirkland, Courance, Lockerbie. Having served an "apprenticeship" as Vice-Chairman for the past two years, he will no doubt lead the Society ably and enthusiastically in the future. The A.G.M. was the first meeting of five arranged for the 1972/73 winter.

THE BIG DAIRY FARM

After the A.G.M., the speaker for the evening was Mr Iain Cairns, Farm Manager for Balbirnie Home Farms, Markinch, Fife (Partners Mr and Mrs J. C. Balfour). First of all, he briefly outlined the reasons for aiming at a "maxi" dairy unit. The main one was a desire to simplify an existing multi-enterprise farming system. Now there are three main enterprises, a 370-cow dairy unit, 1,200 beef cow enterprise and over 1,000 acres of cereals — mainly grain barley for malting.

The Largest Unit in Scotland

The dairy unit, probably the largest in Scotland, became operational in winter 1969. It was developed on a new site at Pitillock, Balbirnie, when the land which carried the old dairy unit (150 cows) was taken over, including the steading, for urban development. It was felt that 370 was a reasonable target number

to graze from a central building complex.

The main components of the dairy unit are two cubicle houses containing 367 cubicles, a 12-unit milking point herringbone parlour for 24 cows, adjacent roofed silage clamps for storage of up to 4,000 tons of silage and two slurry silos. Subsidiary components are facilities such as calf housing, isolation cubicles, loose boxes and a collecting area with covered handling facilities. The cubicle partitions are of rectangular hollow-section steel and the beds are basically concrete with sawdust on top.

Winter Feeding

The herd, 240 Friesians, 130 Ayrshires, is grouped into three lots during winter according to calving date so that there are high-yielding, medium-yielding and low-yielding groups. These are group-fed by transporting silage in forage boxes from the pits to central passages for feeding behind tombstone barriers. Potatoes and draff are also fed behind the barriers via the forage boxes. High yielders are concentrate-fed for yield but in addition are given 6 lbs concentrate per head extra daily over the first 100 days of lactation. The medium yielders are given no supplementary concentrates. Cubed barley and low-protein cake are fed in the milking parlour but the higher yielders consuming up to 24-26 lb of concentrates, get part of this ration behind the tombstone barriers. In 1971, an average of 2.46 lb concentrates per gallon milk was fed and 0.75 acres/cow for grazing and silage. Milk produced per cow was 890 gallons and the margin over bought feed was £170. Since the forage boxes are used to cart silage in summer, 10 months' use is obtained from costly equipment. The forage box/barrier feeding set-up gives the option of zero grazing should this eventually be deemed worthwhile or even of zero grazing in wet spring and autumn periods

One Million Gallons of Slurry !

A notable feature is the slurry-handling facility. The problem was to shift one million gallons of slurry per annum ! (Three times the milk produced !) The cubicle passages are scraped twice daily at milking times towards a central slatted passage which runs across the whole building. The slurry channel under the passage empties into a sump from which it is pumped into one of the pit slurry silos (each 51 ft diameter × 12 ft high holding 150,000 gallons) or directly to a tanker-spreader. There is sufficient storage for 3½ months with the channels themselves sufficient for 10-14 days.

The slurry channel is divided by two sluice gates into three sections at different levels to help the flow. Washing water from the milking parlour and slurry from the collecting area helps to

flush the channel. Silage effluent is also funnelled into the slurry channel. Slurry is put on to arable ground prior to ploughing, and also on to grassland but only at times when grass leafage is minimal, so that tainting is avoided, e.g. prior to the growing season or immediately after cutting/grazing. The slurry is spread by tankers and a bonus is paid to the driver for each tanker emptied. Forty to fifty thousand gallons can be spread in a day on short hauls or around fifteen thousand gallons on long hauls. The slurry problem on many farms was, according to Mr Cairns, due to bad or inadequate planning and grossly underestimating quantities involved.

Labour

The labour in the dairy unit comprises 4 dairymen and one tractorman. The dairymen work a 6 days on-2 days off system and are rotationally relieved for holidays. At milking, the 2-man team milk 300 or so cows in 2½-3 hours starting at 4 a.m. and 2.30 p.m. Approximately 550 gallons of milk is bottled on the farm and sold at the farm gate to independent milk retailers. The remainder of the milk goes to the Scottish Milk Marketing Board.

Summer Management

Cows are divided into high and low-yielding groups. Each group is grazed on a paddock grazing system involving 2-day grazing periods on 5-acre paddocks. The grazing interval is about 22 days in May/June but is lengthened as necessary later in the season when use is made of conservation aftermath grazing. The grazing block is 160 acres and the cutting block 100 acres. The two blocks are sown with a similar seeds mixture, based on tetraploid perennial ryegrass. A 5-man team operates the silage making. The silage is wilted and precision-chopped. It is blown into the pit and the clamp built up on the Dorset Wedge principle and covered with a plastic sheet each night. No rolling is done. In past years, up to 400 units of nitrogen per acre has been applied to the grassland in addition to three to five thousand gallons of slurry per acre. However, taking cognizance of the nitrogen content in slurry, the fertilizer nitrogen usage has been reduced to around 275-300 units per acre.

Mr Cairns concluded by saying that one of the major ways of meeting the challenge posed by entry into the E.E.C. was to make the fullest use of grass in the feeding of dairy cows and posed the question " why do we suffer 30% losses."

DISCUSSION

Questions, answers and comments raised during the very lively discussion have been summarised under a number of headings as follows.

Feeding and Milking. Two men cope with 300 cows through the parlour in 3 hours. They are no more liable to boredom in this time than the men ploughing. Dialomatic feeders are used and barley is cubed to aid feed intake and reduce dust. Mineralised, cubed barley is equal to low protein cake. Purchased cake of low protein (12%) is also fed and this year the high yielders will receive 20-24 lb. Gold Label cake behind the barriers to reduce delay in the parlour. Draff and brock potatoes are also fed along with silage. If draff becomes unavailable it will be replaced by silage.

The high yielding cows are milked first at 4 a.m. The second milking starts at 2.30 p.m. with the low yielders, the high yielding cows then follow at about 4 p.m.

Breeding. Best Ayrshires are crossed with the Friesian, the poorest with the Hereford. Calving interval is 375 days. The head dairyman is responsible for feeding and calving cows and he marks any cows coming into heat. Herd replacement rate is about one fifth per year, that is 70 cows. The move to Friesians is because the calf is worth £40 compared to the Ayrshire at £4 and the cast cow is worth considerably more than an Ayrshire. There is little to choose between breeds in milk production or quality.

Grazing Management. We don't use the follower system of high/low yielders but use completely different grazing areas as problems can arise with cows in neighbouring paddocks. Roads to paddocks are adequate but not specially laid. The one field that has to be crossed does become churned up. Cows moved to silage regrowths from the paddocks. Paddocks are never topped or cut for silage. Zero grazing could be undertaken in wet spring or autumn periods., but to haul grass 7 days a week seems to pose many additional management problems.

Grass conservation. Grass drying would involve expensive plant and there is too much "weather water." Of course, it would reduce losses. Additives for silage seem expensive and I prefer to buy cake. However, there may be a place for an additive when conditions are poor in spring or autumn. The silage is wilted and tetraploid varieties can help fermentation because of greater sugar contents. Since the silage is chopped and blown into the silo, no rolling is carried out. The forage boxes are self emptying into the chopper/blower. Polythene sheets are used every night. Haylage towers were considered but ruled out on account of cost and also the fact that wilted material is a must — the clamp gave more leeway in this last matter.

Group handling of cattle. Cows are freeze branded at side of tail. Stock are fed as groups. Individual colour tapes are too time consuming. Low yielders receive draff, silage and potatoes, middle yielders receive roughage plus low protein cake whilst high yielders receive less roughage and are fed in the parlour and in their group trough. Movement of stock between groups is kept to absolute minimum because it does cause upsets. The cows are in groups according to calving date rather than level of milk production.

Manurial value of slurry/fertiliser use. Levels of 20,000 gals./acre are applied to acres scheduled for ploughing — oats undersown and cut green. On grazing areas 4 - 5,000 gals. are applied over the year. Fertiliser from the bag is being reduced so that 300 units N applied instead of 400 units. If 200 units N are allowed for slurry, then there has been wasteful use of N in the past. The use of compounds is also now reduced. Grazing fields near the steading receive slurry plus Nitram. Silage ground receives slurry plus 2 cwt. of No. 2 or No. 4 compound and 2 cwt. Nitram per acre.

Slurry and N seem to suppress clovers, so next year we are leaving clovers out of the seeds mixture and save ourselves around £1.50 per acre.

Slurry handling. Slurry goes on stubble till Feb./March. In March it goes on to grazing ground before leaf growth starts — never put it on growing grass. Slurry also goes on immediately after a cutting or grazing. Soft ground can be a problem but we keep off the land then unless the storage capacity is full. Straw is not used in the housing because it would gum up the slurry system. Sawdust is used in the cubicles. Scraping of floors always takes place during the milking when cows are in the collecting yard — never when the cows are around. Two pulls per passage cleans and this is done twice per day. Water in the milking pit goes to the sewage system but water where the cows stand goes to the slurry channels.

Labour. It has been suggested that three units each of 120 cows might be better, but this is too much for one man, hence 6 men would be needed. We manage at present with 4 dairymen. If we advertise for a dairyman we usually receive 10/12 replies, half from "townies," half from farms. The manager is responsible for the dairy enterprise and drying and selling the grain. The assistant manager looks after arable crops and the harvesting of the crops. Both are involved in beef cow work.

Finance and efficiency. The milk is disposed of as follows:— 550 gals. daily, bottled and sold at farm gate. The balance goes to the Board which in spring amounts to 500-600 gals and in autumn to 300 gals. per day. The £170 margin is based on milk at pool price and includes the quality premium. To improve efficiency of grass use, a move to summer milk may help — the conservation process is a worry despite our efforts to be reasonably efficient. — John Frame, R. D. Harkess.

NOTES ON OUR CHAIRMAN

Allan Buchan

Vice-Chairman 1969-70

Chairman 1970-72

Allan handed over the chairmanship of South West Scotland Grassland Society to Robert Graham in November 1972 after having served the society well as vice-chairman and then chairman.

He was our first non-farming chairman but none the worse for that. As a member of an estate management group in Ayrshire with interests all over the country and in other countries he had to become thoroughly immersed in farming.

He started out on an entirely different tack taking classics and modern languages in St. Andrews University and rapidly moving into the Airborne Division during the war serving in Europe and the Middle and Far East. Two years convalescence in Switzerland left him with a need for an open air life. So, the languages were exchanged for the study of land agency followed by a period on a Cumberland Estate before joining H. J. Bell & Co. in Ayrshire about 12 years ago. He is now a partner in Bell-Ingram and although farm estate management is his prime interest is concerned in the wider aspects of estate management. In a day, he could be selling a hotel, arranging compensation claims for pipe track, and straight farm management.

He is a keen Grassland Society member, believing strongly that farmers must be more prepared to help themselves than they have in the past. The Grassland Society is one way of doing this. During his chairmanship we have increased our membership, widened our activities, started demonstration meetings, accepted a need to promote technical activities, doubled the subscription and successfully maintained our membership.

Allan has always been willing to help others and members wanting a prediction as to the future could not do better than have a crack at it with Allan. He believes, that we are going to see a return to tenanted farms, an interesting possibility to discuss at one of our future meetings.—I. V. HUNT.

DAIRY FARMING IN GLASGOW

Visit of the Central Scotland Grassland Society to Drumpark Farms, Bargeddie, 30th November, 1972.

Hugh Blackwood Farms Ltd., Drumpark, Bargeddie, was the venue for the farm visit preceding the A.G.M. of the Central Scotland Grassland Society on 30th November, 1972. Over 70 members of the society met at the " home steading " where they were welcomed by Mr Hugh Blackwood, who gave a brief review of the farm activities before members " embarked " on the milk floats for a tour of the farms.

Ellismuir was the first port of call where a shift system of dairy cow feeding is in operation. The high yielders spend half their time in the byre where 15 lbs. draff, 8 lbs. barley and 5 lbs. hay are fed, and the other part of the day in cubicles with access to self feed silage of which they consume 60 lbs. Concentrates are fed in the parlour for cows yielding over 3 gallons. The low yielders and dry cows are loose housed at all times. This system of utilisation has allowed maximum use to be made of the existing buildings without an extensive building programme. Ellismuir also houses the calf unit and the dairy in which 500 gallons is bottled for the retail round. The surplus gallonage from the 250 cow unit is sold to the S.M.M.B. in the normal way.

During the tour back to Drumpark steading, the difficulties of farming an area of 850 acres so broken up by roads, the A.74 motorway and housing, were brought home to those of us who farm in the more rural setting. Cereal harvesting and silage making have hazards of litter, while open gateways and straying men and dogs are a recurrent problem. Such hazards preclude sheep and thus full advantage cannot be taken of backend grass and stubbles.

The cropping programme consists of 250 acres barley (200 tons in a moist grain tower and the remainder propcorn treated). 50 acres potatoes and the remaining acreage in grass. Silage is the main system of conservation with 1600 tons being ensiled at Ellismuir and 1200 tons at Drumpark. Hay occupies 50 acres mainly for the high yield cows and the calves.

With all the dairy followers now being home reared, the bullocks for beef and the heifers for replacement or sale, grassland production and utilisation have to be of a high order. A stocking rate of 1.22 acres per cow equivalent was achieved in 1972. N.P.K. usage was 200, 40 and 50 respectively over all the grass. Grass is reseeded under either 100 lbs. barley/acre or 12 lbs./acre Westerwolth ryegrass and the resultant crop ensiled. Pasture tetraploid ryegrasses are the basis of the grazing areas with timothy added to the cutting mixtures. Incorporation of later strains for the cutting areas to spread the period of harvest and still

achieve silage of a high digestibility has been an increasing practice.

The excellent new steading at Drumpark with its series of large sheds housing the beef and young stock on an easy feed system raised many envious eyes. Here the party were also entertained on an easy feed system and most welcome this was on that cold November day.

Following the business of the A.G.M., Messrs. Alastair Tinto and George Blackwell ably and wittily answered the many and varied questions put to them.

DISCUSSION

Type of grass. G. Blackwell favoured the Dutch varieties of ryegrass because of their winter hardiness and liked the tetraploids even though they had low DM%. The mixture he recommended on these farms included mixed tetraploid ryegrass, some timothy, a pinch of smooth stalked meadow grass and white clover. Many members questioned the use of tetraploids for hay-making but Mr Tinto said he was quite pleased with 50 acres used for hay at Bothwell.

Stage of growth for silage. What should be the policy for date of silage making. Generally farmers are said to cut too late giving an over mature product. If it is cut early it is admittedly leafy and nutritious but also very wet. Is it not better to go for the more mature 1st cut and a leafier younger second crop. Mr Tinto favoured an early start since a big quantity was necessary. George Blackwell said ear emergence was the ideal stage but if an extensive area was to be cut, it was necessary to choose varieties with different date of ear emergence so that high quality could be ensured over a prolonged harvesting period.

A member suggested that to have equal milk production potential, grass should be harvested for silage at the stage suitable for grazing even if this means monthly harvesting.

The appreciation of the membership was voiced by Mr James Tinto not only to the panel and our Chairman, Mr Lex Smith for the first-rate discussion, but to Mr Hugh Blackwood for placing his farms before the society, for the excellent arrangements he and Mr Alastair Tinto had made for the visit, and for Mr Hugh Blackwood's generosity to the visitors. — Ian Mitchell.

NOTES ON OUR CHAIRMAN

W. B. R. Elder

Chairman Central Scotland Grassland Society 1969-71

William Balfour Ross Elder completed a successful two year chairmanship of the Central Scotland Grassland Society in 1971. This follows a similar period as vice-chairman and membership of the committee so that the society has had his valuable services during a substantial proportion of the Societies' life. Despite the pressure of other activities of a similar nature and of his job he has been able to hold the society to its course of providing for the needs of the membership.

He is Managing Director of Midglen Farms Ltd., Langbank, Renfrewshire which involves responsibility for 3 units:—
Midglen, Renfrewshire.—203 acres of near marginal land carrying 145 self-fed parlour milking pedigree Ayrshire and Friesian cows. Shorthorn beef crosses may be finished or sold as in-calf heifers.
Knockmountain, Renfrewshire.—640 acres carry 260 single sucklers, mostly housed in winter. 300 suckled calves and dairy crosses from Midglen are housed on high level slats and fed with haylage.
Shancastle and Crossford, Dumfriesshire.—350 single sucklers and 15 score Blackface ewes. 100 calves are on high level slats and lambs are finished on turnips. The sucklers are Irish bulling heifers.

Each of these units is managed and costed separately. The company started in the 1950's as a small dairy farm at Midglen but has now grown to over 2000 acres with a forestry area in Argylishire.

Bill Elder was educated at Waid Academy, Edinburgh University and the West of Scotland Agricultural College and served with the Black Watch as a Captain. In addition to his service with the Central Scotland Grassland Society, he has been a member of the Executive Committee of the British Grassland Society, president of Renfrew Area Executive, vice-convener of N.F.U. Milk Committee, chairman of West of Scotland Farm Management Association. He is currently president of Kilmacolm Agricultural Society and a member of the Secretary of State's Panel of Arbiters and consultant to a number of estates in England. He finds relaxation in shooting, fishing and sailing.

THE INTENSIFICATION OF LOWLAND SHEEP PRODUCTION

British Grassland Society Winter Meeting, 1972.

by John Cunningham.

The first speaker, J. L. Read of the Meat and Livestock Commission, sought to identify the factors leading to success in grassland and arable flocks. Armed with the average gross margins for M.L.C.'s recorded flocks for 1970 and 1971, he broke down the figures to show the differences within the average and the reasons why some flocks were better than the rest. The top third had a gross margin per acre of £37 as against the average of £27. The reasons for this seemed to be a little bit of everything — a higher lambing percentage, a higher stocking rate, and a bigger weight of lamb, produced per 100 ewes and per acre, with fertiliser usage being about the same. All of these differences were quite small and their relative importance perhaps depended on the point of view of the listener, who incidentally had to be listening hard, as Mr Read was fighting a dose of flu that left him almost speechless. My impression was that the vital factors were good stockmanship and extreme reluctance to buy fertiliser unless it was obviously going to pay for itself.

Mr Read mentioned two additional results of his investigations. First, there was evidence to show that men with small ewes, and he instanced Welsh Halfbreds, don't graze them thickly enough to produce the same weight of lamb per acre as those with middle sized or big ewes, on the same kind of land. The implication was that the stocking rate for small ewes should be increased by 1½ or 2 ewes per acre to make up the difference in output of lamb, but it seemed to me that a lot of other factors like cost of land, sheep and feeding needed to be taken into account.

Secondly, in spite of the clear pattern of the right techniques giving the best results, demonstrated by his previous figures, he found that on two similar farms, with the same physical figures for lambing percentage, stocking rate, fertiliser usage, etc., the gross margins were £43 and £29, a difference entirely due to one farmer being a better buyer and seller than the other. A less scrupulous man might have been tempted to keep quiet about possible shortcomings of the rest of the data. Some of us found this rather comforting. Perhaps because, either knowing that our own figures were below average, or not knowing what they were at all, we believed we could save the situation by some wise or even lucky marketing.

However, the next speaker fairly set us back on our heels. He was Colin Spedding, who administered the technological *coup de grace* with such skill and charm that no pain was felt at

all. Dr. Spedding illustrated his talk with a series of coloured diagrams. The subject was: "The Intensification of Lamb Production Systems," and the diagrams were circular — beginning simply and gaining one or more segmented outer rings at each change until the final one was like a round but patternless mosaic. If I understood him correctly, the centre of the circle represented "more lambs" and the coloured segments round about it were the factors affecting "more lambs" for good or ill, or other factors affecting these primary ones. Dr. Spedding compared it to the plumbing system of a house, arguing that it would be foolish to start putting the plumbing into a new house, or indeed to start building the house itself, without a plan. The circular diagram was therefore a basic plan for sheep systems and the likely performance and results of system X could be predicted by altering the size of the relevant coloured segments of the many concentric circles to fit the details of system X and then observing the effect on the central "more lambs" bullseye. Or one could forecast the effect of a change in an existing system.

Or, on the other hand, perhaps he was talking about darts. Anyway, it demonstrated the extreme difficulty that a research worker finds in composing, for a sheep system, a paper plan that includes every conceivable possibility; if it misses one out then it is not able to cope with every practical situation; if it includes them all, it becomes an unwieldy maze.

Although it seemed unlikely to be useful to me, or indeed anyone, as a practical farming aid, it was a mental tonic to have one's brains stimulated by Dr. Spedding.

He was followed by the Presidential address of Mr W. R. Smith in which we heard his personal opinion of the farming future. Being head of ADAS, his personal opinion is of course better informed than most people's.

His general theme was that we were doing all right and would go on making sensible progress, by means of a return to basic principles of husbandry, less monoculture and mixed farming with more livestock on all but the best arable land. He also thought that there was an assured future for the middle sized family farm, which would probably become more self sufficient and more diverse in its production. Sheep generally had a good future and particularly, we should try to recapture the lamb market in May, June and July. For hill land he predicted larger units which however would still be family farms rather than company farms. I found this all very heartening, especially the good forecast for medium sized family farms, but wondered a bit about how he saw the future tax and estate duty situation which, with the rise in land values, seems to be a potential destroyer of family farms.

Mr Smith spoke farmer's language and persuaded this listener at any rate that there was after all a connection between the rows

of suited gents isolated in our hall in the middle of the urban jungle, and the grass, the sheep and the soft rain back home.

We then went away for an hour and a half for lunch and came back to find Mr Boaz, from the Department of Animal Physiology and Nutrition, Leeds, filling the first afternoon slot with 'Consequences of Increasing Prolificacy in Sheep Production Systems.' Here I find myself short of notes as I see that our present chairman found himself at the same stage of the 1970 meeting. It must be something to do with the lunch. Mr Boaz, apart from confirming that the natural time of mating gives a bigger lamb crop than the unnatural, and that the body conditions of the ewes also affects it, has done a good deal of work with artificial methods of inducing oestrus particularly vaginal sponges. One feature of this generally unprofitable business which I did grasp is that if the ewes are not mated at the first oestrus after treatment they are likely to have fewer lambs next time round than untreated ewes. So the final outcome over the whole flock is likely to be a more uneven and only slightly bigger, lamb crop.

The following paper was read by John Round, now deputy farm director at High Mowthorpe, but previously at Rosemaund in Hereford. It was there that he conducted a six year experiment described as 'Nitrogen and Stocking Rate for Lowland Sheep,' a very careful and thorough piece of work, inspiring immediate confidence in the results.

To summarise:

1. There were nine small flocks of 24 ewes and 1 tup each.

2. There were three levels of nitrogen application, 0, 120 and 240 units N/acre.

3. Stocking rates were as follows, one rate being common to all nitrogen levels. These differences were achieved by altering the sizes of the paddocks and not by slicing up the ewes.

Table 1. N levels and sheep stocking rates, Year 1 and 2.

Nitrogen u/ac	Stocking rate ewes/ha				
0	6.9	8.6	10.4		
120		8.6	10.4	12.1	
240			10.4	12.1	13.8

After two years he found that the grass was too much for the sheep and so for the next four years the stocking rates were increased and the nitrogen rates reduced as you can see in Table 2.

Table 2. Nitrogen levels and sheep stocking rates, Year 3 to 6.

Nitrogen kg/ha Next 4 years	Stocking rate ewes/ha Next 4 years			
0	8.9	11.1	13.3	
90		11.1	13.3	15.6
180			13.3	15.6	17.8

The results for the last four years, are summarised in yet another table:—(Table 3).

Table 3. Outputs of lamb and conserved grass.

Nitrogen	Stocking	Lambing% (Lambs alive at 1 month)	Total Lamb lb/acre	% Sold Fat	Grass Conserved lb DM per ewe
	8.9	161	436	93	293
0	11.1	155	522	81	143
	13.3	158	626	70	64
	11.1	137	453	86	444
90	13.3	160	624	64	319
	15.6	160	739	55	180
	13.3	154	646	91	420
180	15.6	156	732	74	332
	17.8	156	797	58	288

The main conclusions are that the highest stocking rate and highest nitrogen level together give the biggest weight of lamb; for any one stocking rate, increases of nitrogen increases the number of lambs sold fat; for any one level of fertilizer nitrogen, increase of stocking rate gives a bigger weight of lamb, but not so many fat. If this last situation suits you, and personally it suits me as I like to produce store lambs and fatten them later off turnips, then I also concluded that we should pay more attention to efficiently using the nitrogen, and the grass that the nitrogen grows. But that depends on how convenient it is to use up the surplus as silage or hay.

Mr Round had also studied the effects of the treatments on ewe prolificacy, which was almost constant at all levels, and on the changes in composition of the originally Perennial Ryegrass/ White Clover sward. I was not clear how much clover was originally sown, but at the end of six years, the sward in the no nitrogen fields was 35% clover, in the medium rate fields 10% clover, and in the high fields only 1%.

Finally Mr Geoffrey Hyde from Dorset spoke on Marketing. He is a keen groups marketer and chairman of the South West Quality

Lamb Producers. He claims that the advantage of selling through such a group is as much as 45p per lamb, which is a lot.

The important factors in marketing are in his view Classification, Promotion, Research and Producer Discipline. A classification table, by MLC now almost complete based on fat content and carcase conformation should enable a buyer to order what he wants by code number. For example, an A3c carcase should be the same at one end of Britain or Europe, as at the other. This seems sensible if it can be made as exact as that.

Is promotion worth doing and if so, who does it and who pays for it. Mr Hyde is convinced it is worth doing and quotes the importers of New Zealand lamb and the Wool Board as good examples. Hitherto it has been done by M.L.C., S.Q.L.A. and N.S.A. and paid for by producers and by meat wholesalers.

The New Zealand Meat Board has completed very thorough market research recently in Japan and U.S.A. and in our case, he feels, it is a job for wholesalers — while we lack a Meat Board.

The heart of the matter, to Mr Hyde, is Producer Discipline. It affects us more directly than the others. He thinks that the best answer is a statutory Meat Marketing Authority, and I feel he is right. But as we are unlikely to get one for a bit, and maybe never, he maintains that there must be something else meanwhile and that the producer marketing group is the best current bet.

I mentioned the 45p per lamb carrot. The stick, in his own words, was as follows: "Producer discipline rests solely in our hands. We stand or fall by this. If we ignore it, we as producers will be individually carved up or taken over, vertically integrated or what have you. There is no option. We get down to organising ourselves or we commit economic suicide."

Fighting words — but at 3.30 p.m. the audience had grown amazingly sluggish and hardly an eyebrow, or in some cases an eyelid, was raised in response.

It is hard to disagree with Mr Hyde, and also hard, to be convinced that we really need a lamb selling group in an area like South West Scotland. No single buyer seems big enough or savage enough or particularly inclined to carve up or take us over. It's probably true to say that most serious producers are on friendly terms with their buyers. So it seems foolish to upset the situation by aggressive grouping. We might find that the only result was to destroy any mutual trust that had existed and to reduce the number of buyers. No doubt time will tell who is right.

Henry Fell from Lincolnshire opened the discussion. In forthright terms, he put forward his own views — stockmanship was vital — turnips were better than grass after June — and the jacking up of lowland lamb production was not so difficult as it had been made to look. What a relief ! — J.C.

FODDER CONSERVATION CONFERENCE

South West Scotland Grassland Society

Ayr, 14th December, 1972

The conference consisted of four parts:

1. A farm visit to Drumore, Kirkmichael (Hugh Limond Esq.).
2. A talk by Robert Irvine, Toppin Castle, Carlisle.
3. A talk by Alistair McGuckian, County Antrim, N.I.
4. Discussion with a panel of the speakers plus Ken Hall of the College Farm, Auchincruive and Fraser Evans, Penkiln, Garlieston, Wigtownshire. Robert Graham was in the chair.

1. **Drumore,** Kirkmichael.

Towers: Mr Limond was one of the earliest Ayrshire farms to go into haylage production putting in his first tower (Harvestore) in 1968. A second tower was set up in 1972. Both towers are 20′ diameter and 66′ high each with a capacity of 300 tons. In addition, there is a moist barley tower (120 tons) and a slurry tower (75,000 gallons capacity). Both haylage towers are fitted with bottom unloaders. A Gehl blower fills them and a Reco belt system carries the silage to livestock.

Field Equipment: Fahr Turbomower, Centripede and Helipede. New Holland 717 precision chop forage harvester. Two MF tractors, 135 and 168 h.p. Three trailers.

Acreage: 250 acres of which 50 acres is rented and used for grazing; 50 acres is in Golden Promise Barley and goes into the moist grain tower; 90 acres is grazed; 60 acres is cut twice to fill the two towers thus giving yields of 12 tons per acre.

Livestock: 90 Friesian and Friesian X Ayrshire cows; 140 followers. 50 cross-bred ewes summered away after lambing in May. 100 cross ewe hoggs are taken for wintering.

Staff: Mr Limond, his father, plus a seasonal worker for the summer. During silage making, he and his brother who is farming nearby share the work.

Housing: Cows are housed in cubicles and milk in an Alfa-Laval 6-point parlour. Slurry is scraped with a Delta into a 90 x 10 x 6′ slatted tank and pumped by Tide-water pumps to the slurry tower. A 750 gallon Onelly spreader takes it to the fields.

Feeding: Each cow gets 40 lb. silage per day with either 2lb/day barley + draff or barley + minerals and 12lb/day of a mixture of moist barley with a 34% protein pellet.

Production: 919 gallons of milk sold per cow last year. Haylage costs £13 per cow including depreciation on tower and feeders. The margin over concentrates last year was £153/cow.

Silage analyses: Dry matter for 1971/72 were 38.3—45.7% and this last year crops gives a first analysis of 35.1% DM. Digestibilities vary. Last year they fell from 70.3% for the bottom of the tower to 60.6% at the top.

2. **Robert Irvine**

Mr Irvine's story was that of progress in 21 years from being a cowman to owning 255 acres, renting a further 70 acres and keeping 120 dairy cows, 50 bullocks and 1000 sheep. Four major stages marked his progress.

1951: A land settlement small holding producing pigs, poultry, lettuces and tomatoes.

1955: Quick return dairy farming on 90 acres based on cows in milk only.

1964: Took over Toppin Castle with 190 acres carrying 60-70 cows which were quickly pushed to 100. The work load was reduced by setting up cubicle sheds.

1968: Further 65 acres taken up. With over 100 cows in a variety of buildings, it became necessary to establish a simpler management system. Self-feed silage would have reduced the work load but this was not acceptable to Mr Irvine. He settled for investing in towers to conserve the full feeding value of his crops and skimped on the housing, using a converted 180′ × 50′ army building.

A single tower 24′ × 66′ was used, which was considered to be cheaper than the two 20′ × 66′ towers that Mr Limond used. The capacity of Mr Irvine's single tower is 30,000 cubic feet against Mr Limond's 41,000 cubic feet.

Growing grass: All the grass is given 1000 gal/acre of slurry plus low grade basic slag every other year at 10 cwt/acre. Nitrogen at 75 units/acre is given for the first crops and at 70 units/acre for later crops sometimes along with P and K. About 80 acres of 1st cut and 50 acres of 2nd cut are needed to fill the silo.

Stones were a menace to the forage harvester and one precaution was to give up setting off and finishing when ploughing and using a one-way plough. The next precaution was to roll both ways at the beginning of each season.

He wilts for 24 hours, uses a 717 precision chop forage harvester and a Reco dump box and blower. Since a second crop goes into the silo the first must be sealed. He formerly used a polythene sheet covered with some grass to weigh it down but this leaves a mouldy layer. Now he uses two half-hoops of bent scaffolding tube which sit on the polythene and are easily picked up. The silage is taken out with a top unloader (Mole). The cows are given 45 lb/head per day in a trough which along with 9 lb barley mix gives the first 3

gallons of milk and then 3½lb/gallon of a high protein cake. On this management, 110 cows average 1330 gallons milk per year at 3.7% B.F.

Of his 325 acres, 200 acres are in grass, 80 in barley, 12 in kale and 18 in turnips. Grass seed is sown after roots or kale. The kale was formerly strip grazed but now it is harvested with a Taarup off-set forage harvester and graped out to the cows. This is much more efficient than moving fences, taking cows out and bring them back to be washed.

3. **Alistair McGuckian**

There have been no breakthroughs in conservation for many years. The nearest has been the development of additives such as formic acid. Conservation as silage is still a matter of using up energy within the plant by fermentation to produce a situation in which decomposition is halted. Whatever method of conservation is employed, the choice appears to be between high capital cost to secure highly efficient conservation or low capital cost with lower efficiency. Grass under grazing can put 3 lb liveweight gain per day on an animal but when conserved it is a long way short of this.

Massareene Park lies about 15 miles from Belfast and comprises 530 acres + another 160 acres of rough land. Many silage methods have been tried over the years even comparisons between AIV silage (the Scandinavian method developed by Prof. Virtanen using strong acid) and molasses. The early form of self feed silage called " Bed and Breakfast ' was tried. In this the silage was covered with straw, cattle slept on top of the silo and walked down to the feeding face. In the search for quality, tripod hay had a vogue. To cut down waste, even bigger heaps of silage were made using flail harvesters, large loaders and bull dozers to push up the heap. There was too much soil contamination, the herbage was stemmy and of low digestibility and the silage of low value. Barn dried hay was also tried and was fine but only about 2 batches could be put through the drier each season and the total quantity which could be made was limited.

From 1950 - 1960, we were operating with 500 - 600 cattle but in the 1960's we began to consider the potential of our grassland. 250 units of N should produce 30 tons fresh herbage/acre enough to feed 5 cattle from November to June. Our grassland should be carrying 2500 cattle.

Once this fact was grasped the rest followed. It was essential to consider very carefully labour, capital and management implications. Hay was out of the question for the scale of operation since there are insufficient numbers of suitable days to handle the total quantity needed. The most suitable forms of conservation seemed to be two extremes of

low capital cost silage or high cost high output dehydration (= dried grass etc.).

10,000 tons of silage would be needed for the winter. This means taking out 70 - 80 tons every day through the winter. Between May and September, there are about 40 - 60 suitable silage making days so the field work team must bring in at least 200 tons/day. These 40-60 days are not consecutive. We rarely have more than 2 - 3 days together, generally just single days. Wilting of silage on this scale for tower silage is impossible because of uncertainty.

Our present harvesting system was evolved to save time during silage making. The silo is a big flat concrete slab. A big Krone 11 ft. mower is followed by a big forage harvester with trailers running alongside. Unhitching and hitching trailers wastes time. The silage is built up to as high as possible, at least to 25 - 30 ft. This achieves the benefits of towers in terms of consolidation and reduced surface waste.

The scale of the operation reduces costs. Production of silage averaged £1.38 per ton of which nearly half was wages. Equipment at 20% depreciation per year cost a total of £3,260 per year but spread over the mass of silage totalled no more than £0.54/ton giving a final product cost of £1.92/ton.

Low production costs can be achieved on a smaller scale with the advantages of low equipment costs by co-operative ownership or by contracting. There are many examples including a young man of 19 keeping 530 cattle on 120 acres with contract-made silage. Various feeding systems have been tried including making a barley gruel of tooth paste or thick soup consistency for pipe-line transport. But feeding passages and barriers are now used.

4 Discussion

Some of the main points arising from a lengthy discussion were as follows:

Increasing the number of knives on the 717 from 6 to 9 gave more economical use of tower capacity, and trailers and resulted in better silage.

Dry cows are fed alone whilst cows are out of cubicles for milking. Kale lasted Mr Irvine's cows till January using it for half the morning feed each day.

Barley is not fed with silage by conveyor because efficient rationing per animal is not possible. The argument between tower (Irvine) supported by Fraser Evans and clamp (McGuckian) was unresolved. With land values likely to soar to £600 per acre a clamp system allowed more capital to be invested in stock rather than buildings. The tower is justified by low labour cost, pleasant labour conditions and reduced wastage. Where 500 acres of grassland are harvested, 8%

waste in silage means that 40 acres of grassland valued at £600/acre are producing nothing at all.

The turbomower was criticised because it produced a swath with variable moisture content. The flail still had its uses but increased soil contamination of silage. The product had to be judged on its performance and the panel claimed the equivalent of from M + 1½ to M + 3 for their various types of silage.

For example (a) Hereford cross steers weighing 4-6 cwt received ad lib silage plus 4 lb up to 8 lb barley and gave liveweight gains of 1.9 lb/day. Bulls gave 2.3 lb/day.

(b) Mr Irvine used paddocks for beef on the 18 month system. At grass, 2.2 lb liveweight gain per day was achieved but with 32 lb tower silage plus 8-11 lb barley, 3 lb/day was achieved with no added protein.

(c) The value of haylage for animal performance can be deduced as follows:—40 lb haylage + 4 lb barley = M + 3, (M + 1½ from haylage); 70 lb silage + 8 lb hay = M + 2: 40/45 lb haylage + 9 lb barley = M + 3 (M + 1½ from haylage).

Mr McGuckian's rules for good silage making were: fine chopping, rapid filling and a suitable cover. Speed and efficient operation are essential. When silage is left in blocks as cut and removed from the pits with the fore loader, loss by heating is reduced. In the evening remaining silage is spread out in the feeding passage. Silage is fed daily. One man takes about ¾ hour to feed 2,500 head.

As regards haymaking we look for the development of additives and the new ½ ton bale. Grass drying costs £26 per ton. With the high moisture conditions in Northern Ireland, 95 gallons of fuel oil were required to produce a ton of dried grass. This would be the main factor determining cost in Scotland.

Mr Tom Clark concluded the proceedings by proposing a vote of thanks to Messrs Limond, Irvine, McGuckian, Hall and Evans.—I. V. Hunt, J. Frame and R. D. Harkess.

BEEF AND SHEEP

Lex Smith and Iain Dickson

South West Scotland Grassland Society

Dumfries, January 11, 1973

This was a well attended meeting held in the Embassy Hotel, Newbridge, Dumfries, January 11, 1973 under the chairmanship of Robert Graham.

Lex Smith who spoke on "Marketing" is chairman of the Central Scotland Grassland Society, farmer in Lanarkshire and a member of a well known firm of livestock dealers who specialize in meeting European demands for British meat.

Iain Dickson who spoke on "Production" is a member of the Animal Husbandry Department of the College where he has been especially concerned with experiments on more intensive sheep husbandry. He took a post graduate degree at Purdue University U.S.A. and during 1969/70 spent 6 months in the Falkland Islands, South Atlantic Ocean studying problems of sheep husbandry.

1. Lex Smith on Marketing.

British meat marketing is in a period of change and will largely be modified by our entry into the Common Market and by changes in methods of retailing meat in Britain. In the past, we have had live auctions with the carcases going through Commission agents to the shops and the offal going through other channels. Within 2 or 3 years, the Commission agent will disappear and meat will go direct to fewer extremely large retail outlets. The meat will be regraded with upgrading of the value of offal and meat formerly used for pet food to be prepared for human consumption.

The export meat trade formerly passing through specialist importers within the common market countries will tend to move through specialist export agencies in this country directly to the continental wholesaler or more directly to a retailer. In general, the main requirement is for lean meat and lighter carcases.

The demand for beef and lamb experienced these past years is one which has taken advantage of the cheaper meat available in Britain has been controlled by the French Government with substantial import duties so that it does not upset the traditionally high prices enjoyed by the French farmer. At the moment, the duty is £6.50 per cwt for Beef and 10p/lb for lamb. Our own costs of production will rise and meat prices will approach those on the continent.

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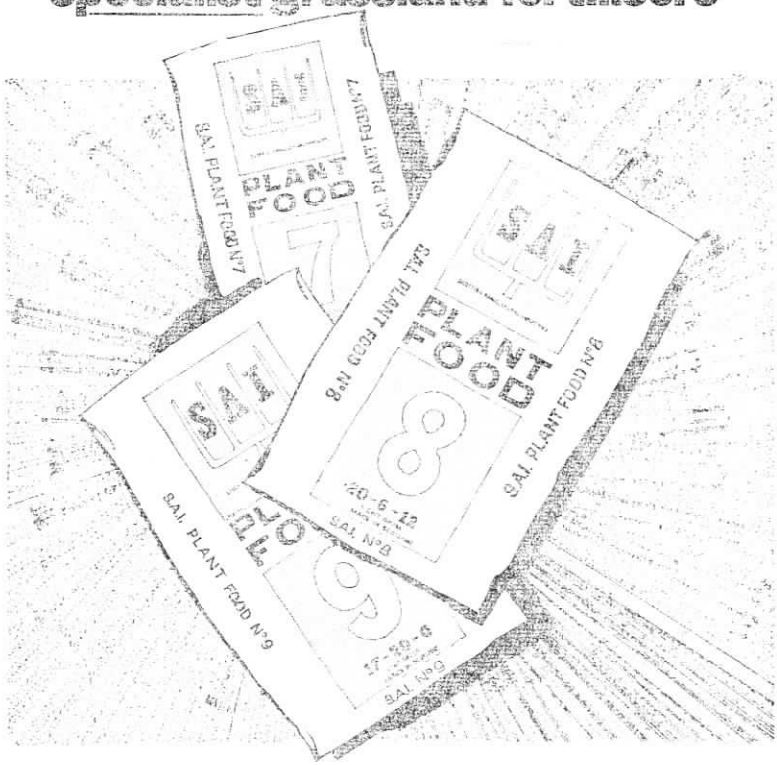

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SCOTTISH AGRICULTURAL INDUSTRIES

It is quite certain that continental buyers will not be able to buy cheap meat from Britain since duties such as the French operate will be retained. This applies particularly to lamb for which there is a rising French demand. The present 20% duty on lamb is to be phased out over 5 years but a duty of $1\frac{1}{2}$-3 Fr/kilo (5p-12p/lb) will remain.

There is a world shortage of beef and tremendous opportunities for Scottish farmers to meet the rising demand within the Common Market for lamb. It is necessary for producers and merchants in this country to get together and devise a satisfactory pricing system which will provide stability over many years rather than experience the chaos which will follow a short steep rise in prices.

2. Production — Iain Dickson.

Land values are rising and with the approach of a general level of £1,000 per acre requiring a rental charge of at least £25-30 per acre per year, it is essential to put up livestock output. We know from M.L.C. recorded flock information that there is a distinct trend for gross margin per acre to rise as stocking rate of lambs per acre rises. Taken overall one more lamb per acre increased Gross Margin by £9 per acre in the 1971 results.

Theoretically, stocking rates per acre can be raised almost indefinitely, but two contrasting effects are found. Firstly, there is a rise in liveweight gain per acre but secondly a fall in liveweight gain per head.

Liveweight gain per head passes through four phases as stock numbers per acre are raised.

1. Whilst grass is plentiful liveweight gain/head is not affected.
2. As stock numbers rise and the amounts of grass available per head fall, liveweight gain will begin to fall.
3. A point is reached at which stock neither gain nor lose weight.
4. At still higher stocking rates, annual liveweight begins to fall off — and stock get thinner.

Liveweight gain per acre also passes through four phases.

1. Whilst grass is plentiful and liveweight gain per head is not affected liveweight gain per acre rises rapidly.
2. Liveweight gain per acre continues to rise even though performance per animal is falling.
3. Liveweight gain per acre reaches a maximum when the rising number of animals and falling gain per head balance each other.

4. Liveweight per acre falls when stocking rate is so high that raising the number of animals does not compensate for the low performance per head.

The ideal objective is the particular stocking rate resulting in maximum output per acre of a particular class of animal which suits the market. If the two contrasting trends are graphed, this optimum could lie where the lines cross. The ideal stocking rate will therefore vary with the objective whether store or fat stock, light or heavy carcase beasts.

One of the practical limitations to increasing stocking rate is the lack of uniform grass growth. In any one field there will be a surplus of growth in early summer and thereafter much less growth and some possible reductions in herbage quality. It is becoming recognised that spring lambs are a closer match to grass growth because they are sold off as growth is reduced. Beef cattle on the other hand increase their demand on grass during this period. Nevertheless raising lambing percentages brings its difficulties and a stocking rate of 7 ewes with twins could become too much for midsummer grass growth. Weaning reduces demand temporarily but sales must be made to reduce demand further. These sales should be of finished lamb.

Nitrogenous fertilizer levels can be increased but there are limits beyond which no further grass can be produced and a somewhat lower limit at which we fear there could be risk from accumulation of " nitrate " within the herbage.

There is much debate on suitable grazing methods. Set stocking is the simplest. To raise stocking rate above the ceiling of set stocking one must consider rotational grazing with or without creep grazing. Some of the complications of these rotational grazing systems are not worth the bother.

A particularly interesting sidelight is the effect of lambing percentages on the ease of management of these systems. Because of the different nutritional needs of singles and twins the ratio between them is critical. For example, on average a 133% lambing means that twins and singles are equal in numbers and so separate grazing can be considered. 150% lambing becomes very difficult to cope with because there is a large batch of twins and about half as many singles. At 170% lambing, the problem becomes easier because the majority of the ewes could have twins (twins to singles are 4 : 1).

Regarding beef production much has been written and said about 18 month beef and about the problems of the major types of suckler herd enterprise. From an intensification viewpoint, the most successful enterprises could be those involving better use of grazing rather than silage, because of high losses in silage making.

Mixed grazing of beef and sheep was formerly common and has many features of interest which could bring it to the fore in the future. At Auchincruive, some new experiments are being planned to measure the economics and output data. A rotation of beef based on conservation crops and sheep could lead to better animal performance than either animal by itself. The difficulty with sheep alone is that they make little use of conserved grass, the spring peak tends to be under-used and worm problems may increase.

DISCUSSION

Q: What is the right type of carcase for the market ? Should not the buyer state his demands ?

A: Yes, buyer should dictate. The farmer has produced virtually any type of carcase in the past. In Europe, the Paris market may require 35-44 lb lamb, with no fat. In Lyons it is 26-35 lb. The UK market has similar variations. Large outlets usually build up associations with groups of producers. In future, more farmers should build up these associations.
Lambs will soon be classed as 35-38 lb for jointing in the Continent and 45-55 lb for boning out in the supermarkets. Supermarkets want 37-43 lb lambs at the moment but smaller for particular areas e.g. Manchester.

Q: If lamb is sold boneless, labour charge/lb lamb is 50% greater for 37 lb carcase than for 55 lb carcase. Therefore, will the supermarket not go for heavier lambs ?

A: No, middle-weight lambs will be wanted (but probably heavier-weight beef).

Q: Are butchers necessarily good judges of what constitutes quality ?

A: Leanness is currently all-important. In the UK too much emphasis is placed on whether the meat is bullock/heifer/bull, etc.

Q: Is it necessary to produce quality meat considering how much offal-type products are being upgraded for human consumption ?

A: Quality is important—quality is what the consumer wants. At the moment it is lean meat.

Q: Are there not far too many breeds of cattle and sheep. Should somebody, e.g. the colleges, MLC or a new body not make a study of which breeds are most suited for development ?

A: There is probably room for most of the breeds we already have. They are stratified in that certain breeds or crosses suit uplands and poor conditions whilst others suit lowlands and intensification. The main factor to eliminate is overfatness regardless of breed. It is up to the retailer who should not buy what doesn't suit his market.

Q: Is bull beef a feasible proposition in the UK ?

A: Traditionally, it has not been acceptable in the UK but there is a strong demand for it in Italy for example. It will be acceptable soon in the UK. It has production advantages in the form of faster liveweight gain. Avoidance of accidents is important since bulls are less manageable.

Q: What is the advantage of killing heifers after calving i.e. to get a calf and then reduce overhead of keeping the heifer ?

A: At present, with the eradication of brucellosis all-important, few people will want to kill brucellosis-free breeding stock.

Q: How serious is the threat from synthetic beef/lamb ?

A: It could be serious if it is acceptable flavourwise, reasonably priced and there is adequate publicity given to selling it. The answer to the threat is to educate the public taste towards fresh meat. Price is important and should not be excessive. It is up to producers to produce quality fresh meat.

Q: What future research work do you envisage for sheep ?

A: If sufficient incentives, financial and otherwise, almost limitless e.g. lambs from ewes every 7 months, hormones to stimulate ovulation, use of light to control breeding cycle, concentrate fattening of lambs.

Q: Around 300-350 units N/ac was used in experiments quoted by IAD. Does the optimum amount of N vary with class of land ?

A: Yes, the optimum level varies. Hill land with a shorter growing season requires less N for example. The important point to remember is that the grassland should first be stocked to capacity before increasing the N level. The latter can then be gradually pushed up as needed.

I. V. Hunt.

SILAGE MAKING SYSTEMS

Ian McCullough

Greenmount Agricultural College, Northern Ireland

Central Scotland Grassland Society

East Kilbride, 17 January, 1973

Systems for improving output from grassland, especially incorporating the use of silage making, are being investigated at Greenmount in three phases:

1. Small scale experiments i.e. small airtight silos of 100 lb capacity. The advantages are that 300 such silos can be handled in one year and allow a comparison of many treatments. The major disadvantage is that no animal feeding trials are possible.

2. Large scale experiments i.e. 4 × 60 ton roofed trench silos which enable feeding trials of limited silage treatments to be undertaken.

3. Systems incorporating silage i.e. 24 open silos made from RSJ's and sleepers enable the comparison of complete grassland utilisation systems including grazing and conservation.

Results from small scale experiments.

Table 1. The effect of time of application of N on quality of silage.

Time and Units N/ac			Silage quality	
7 weeks before cutting		2 weeks before cutting	pH	Ammonia
100	+	0	4.2	0.12
50	+	50	4.5	0.22
100	+	50	4.7	0.45

This shows that late N gave poorer pH's and more loss of ammonia as a result of protein breakdown.

Table 2. Rate of N and quality

Unit N/ac	May Silage		August Silage	
	pH	Ammonia	pH	Ammonia
50	4.0	0.14	3.9	0.23
100	4.3	0.27	4.0	0.32
150	4.5	0.31	5.3	0.50
200	4.8	0.44	5.5	0.74

Thus high levels of N can lead to unsatisfactory silage fermentation. 200 units of N/acre is rarely applied as fertilizer but could easily come from slurry plus fertilizer. For a four cut system the use of 100 + 100 + 60 + 60 unit N will be quite sufficient to stimulate yield and encourage reasonable silage fermentation.

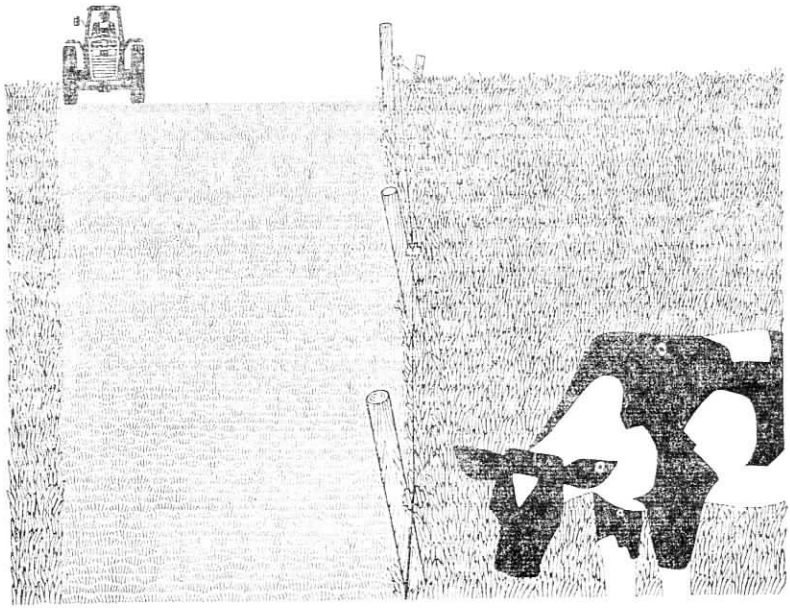

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Table 3. The effect of cattle slurry in addition to fertilizer on pH of silage.

Units N/ac (Nitrochalk)	No slurry	Slurry at 2000 gls/ac
0	3.9	3.9
50	3.9	4.2
75	4.0	4.7
100	4.2	4.8

Slurry is a useful way of maintaining potash status, bearing in mind that a normal cut of silage will also remove 40 units P_2O_5 and 100 units K_2O. Animals only retain a small proportion of P and K so the use of slurry at 2000 gals can supply some of this and a saving in bought fertilizer is possible. However slurry should be returned spread over all fields rather than onto one small patch.

Large scale experimental results

Table 4. The effects of additives 1971

	Fresh Grass	Control	Silage Shield	Kylage Extra	Add F
%DM (Dry Matter)	14.4	16.6	16.9	17.3	16.5
%WSC (Water Soluble Carbohydrates)	16.8	0.6	1.5	1.2	2.0
pH	—	4.1	4.0	4.0	4.1
Ammonia	—	0.20	0	0.17	0.23
Daily Liveweight gain No barley	—	0.7	1.1	1.5	1.5
Daily Liveweight gain with 4lb barley	—	1.3	1.4	1.7	2.0

These were all September silage which had received 60 units N some seven weeks before cutting. The silages were all fairly similar and well fermented. 12 animals were allocated to each silage, 6 received no barley and 6 were given 4 lb barley per day. Note that all additives improved liveweight gain. The daily liveweight gain (DLWG) over the 14 week feeding period was better for Kylage and Add F in the no supplementation groups but Add F was best when fed along with the barley. Of special interest in this experiment was the fact that although the silages all analysed out much the same, there were differences in animal production. With the 'no barley' group differences in DLWG are attributed to increased intake as digestibility was also similar for each silage. With Add F, the extra intake did not fully explain the better DLWG. Some improvement in digestive efficiency must be involved. Feeding barley with silage resulted in lower silage intake with the Silage Shield and Kylage treatment. Add F silage maintained high DLWG and silage intake was only slightly reduced by accompanying barley.

Silage systems experimental results

Three systems are being studied.

(i) Field grazing with surplus grass put in silos.

(ii) Zero grazing, surplus is ensiled.

(iii) Total conservation of all grass, cattle fed silage for 12 months.

The total conservation system should give more grass due to longer growth intervals, less wastage in the field, and high utilisation (better than the 60-70% reported for grazing systems). If "in-silo" losses are kept reasonable then the total conservation system is promising. It cuts out the daily cutting necessary for zero grazing: the animals receive a more constant feed. The task is easier if silage is cut out of the trenches in blocks three times a week.

The results of an experiment using 15 acres S.24 perenial ryegrass and 2 groups of 15 animals on the 18 month beef system starting at 16 months old are given in Table 5.

Table 5. Results of total conservation systems

Yield of herbage	Herbage Dry Matter acre	Herbage Digestibility (D)%	Livestock output DLWG (1lb.)
Cut 1 — 12 May	32 cwt.	70	1.9 no barley
Cut 2 — 16 June	19 cwt.	67	
Cut 3 — 28 July	25 cwt.	62	1.2 + 4lb. barley
Cut 4 — 21 Sept.	20 cwt.	62	
Total	96 cwt.		

The amount of silage dry matter consumed was 74 cwt/acre which gives a utilisation of 77%. Of the 23% dry matter loss, 18% took place in the silo and 5% at feeding. The feeding loss is necessary to allow some selective feeding and to keep silage intake up. The May silage was fed 2 weeks after it was ensiled.

The yield of 96 cwt/acre of dry matter is only moderate compared with the possible production from swards managed on a 4 cut system. The sward remained fairly pure S.24 although it was opened up at the base.

The animal performance on the silage from the four cuts showed good results from the May/June silage without extra barley but production from cuts 3 and 4 was disappointing despite barley supplementation.

Table 6. **Comparing total conservation, zero grazing + C and field grazing + C.**

(Data kindly supplied by Ian McCullough)

	System Grazing Field	Grazing Zero	Conservation Total
Total area (ac)	7.5	7.5	7.5
Stocking rate (acres/head)	0.5	0.5	0.5
Weight stock			
April 71 (lb.)	374	377	375
April 72 (lb.)	903	920	926
Gain per animal (lb.)	529	543	551
Gross return/animal (£)	113	118	121
Variable costs/animal (£)	72	79	75
Gross margin /animal (£)	41	48	46
Gross margin/acre (£)	82	96	92
Details of variable costs/ animal (£)			
Fertilizer	7.60	8.59	9.20
Silage additive	1.80	1.79	4.64
Polythene covers	0.18	0.18	0.37
Barley	9.62	8.38	9.12
Medicines	1.17	—	—
Calf	31.00	31.00	31.00
Rearing	20.45	20.45	20.45
Total VC	71.82	70.39	74.78

The complete results of this experiment are due to be published shortly.

DISCUSSION

Q1: From your table of liveweight gains, it appears that 4lb. barley is about equal to the use of add F on silage ?
Yes, it was profitable to use Add F at £2/head rather than barley at £7/head. However, this was just 1 experiment.

Q2. How does liquid N affect silage ?
A little lower yield and a poorer spread of production compared with frequent applications of bag N has been shown for anhydrous ammonia and is probably the same for liquid N. Anhydrous ammonia gives better silage preservation than bag N.

Q3: What do you consider a reasonable farmers' target for yield of herbage ?
The 96 cwt/acre obtained is equal to about 25 tons/acre fresh grass. The potential is about 50% higher depending

on level of N, climate, length of rest interval, etc. The efficiency of silage making will influence how much of this comes out of the silo.

Q4: Can you add some information on stocking rate?
The systems experiments were stocked at 2 per acre over the whole year. This would be equal to 4 per acre during the summer grazing season. Stocking rate could be adjusted further according to size of animal. Obviously a 900 lb animal will eat more than a 400 lb animal.

Q5: Was zero grazing successful?
Yes, but it was a high cost system requiring an extra £10/acre to operate. Problems arose in working the trial. 15 acres was too small an acreage. In the spring we couldn't start cutting as the grass was too short to cut but we could start grazing. Growth was rapid and soon beat the system with the result that regrowths were slow to recover. Daily routine was not easily maintained in our wet area.

R. D. Harkess.

GRASS PRODUCTION AND UTILISATION

P. G. Shaw

Chief Grassland Officer, Fisons Ltd.

Central Scotland Grassland Society at Stirling,

22 February, 1973.

N.P.K. and grass growing

Nitrogen (N), the key to grass growth, was available to the grass plant from four sources.

(a) **From the soil,** 20 to 150 units N/acre would be available to grass according to previous history and fertility levels.

(b) **From accompanying clover,** which could add to a grass production system the equivalence of up to 150 units N/acre. A mixed sward given 150 units fertilizer N could draw an additional 50-80 units N from clover.

(c) **From applied N,** which could be as straight fertilizer N, as compounds or as slurry.

(d) **From recycling** through the urine and dung of the grazing animal. Providing no grass was removed as silage or hay about 30% of the fertilizer N applied in the course of a year would be used again in the course of a year.

Satisfactory response can be obtained in grass dominant swards up to 300 units of fertilizer N/acre each year. The dry matter response is slow to develop and no yield advantage of high dressings is noticeable until about the 10th day after application. The advantage from 100 units N compared to 60 units N/acre would not be obtained in less than 25 days. Despite the slowness of response as grass growth, the plant very rapidly took up any N which was applied. Heavy dressings of N combined with short growth intervals could be wasteful. A simple rule to follow was to apply 2 units N/acre/day of the expected growth interval.

Thus for a 21 × daily paddock system doses of 42 units N/acre for each grazing would be recommended.

Slow acting N is not economically practical and regular application for each grazing or each harvest is to be preferred.

Readily available phosphate (P) was important in establishing grass and in maintaining a vigorous clover growth but on well managed grassland, responses to applied P were small and P

application should be regarded as a question of maintaining a satisfactory situation. On poorer land, hill land and other marginal areas, regular P was essential to maintain herbage production levels.

Potash (K) was essential to grass production. It was provided by soil resources supplemented by fertilizer application, FYM and slurry or by recycling as dung and urine through the grazing animal. The animal has little use for K and about 80% of the K eaten is returned as urine and to a lesser extent in the dung. Unfortunately, this is not efficiently distributed, and at low levels of stock density recycling of K is unimportant. However, as grazing stock densities rise the area covered by urine increases and the fertilizer requirement falls.

A bulky cut grass crop would remove about 300 units/K_2O each year. The soil could supply 125 units/acre leaving a balance of 175 units/acre to come from fertilizer. A grazing animal on a similar grass sward would return 125 units in the course of the year. Consequently under grazing there would be a need for just 50 units K_2O/acre/year.

Utilising grass

Grazing pressure. The efficiency with which grass is grazed is directly related to the grazing pressure, i.e. the number of animals per unit of herbage present. At high stock densities, and consequently high grazing pressures, efficient utilisation can be obtained.

The method of grazing control adopted should, if high production levels are required, be such that a high grazing pressure is maintained through the season. This can be achieved by strip grazing, or less laboriously, by a paddock system from which some conservation is taken during periods of flush growth to restrict the area grazed. Subsequently the inclusion of the conserved area in the grazing plan will allow the grazing pressure to be maintained at an even rate during periods of low grass growth.

Increased grazing pressures by increasing utilisation efficiency allow an increase in overall stocking rate and consequently a greater return from grassland production.

Paddock design. At North Wyke, the dairy herd grass area is divided into blocks which are subdivided by electric fencing as necessary according to the amount of grass present. Normal practice is to allow one area for 24 hours feed, the size of the area being adjusted by a factor of 2 or 3 according to the season.

Other cattle are grazed in 10 paddock systems which allow a grazing period of 3-5 days per paddock, the number of days is determined by the number of paddocks available for grazing and the number intended for conservation.

Rotation speed. The rate of rotation around a paddock grazed system affects the level of grass production and hence the stocking rate which can be established. At North Wyke, interest is being shown in the use of 30 day rotations. Such rotations on swards of S.23 ryegrass allow very high levels of production per acre and per animal, but because of the high peak of growth in June are most appropriate for systems where some conservation is taken from the grazed area.

Conservation. A simple and flexible conservation system is essential in a system demanding high levels of grass production. At North Wyke, the use of Dorset Wedge silage with formic acid as an additive has been extremely successful.

Grazing management. The ideas of leader/follower systems for heifer rearing developed at the N.I.R.D. at Reading have been adopted at North Wyke with success. The possibilities of a similar system for beef production with two seasons at grass is currently under examination.

Many questions were put to Mr Shaw and there is no doubt that they would best be answered by a visit to their Experimental Station during the summer.—I. V. Hunt.

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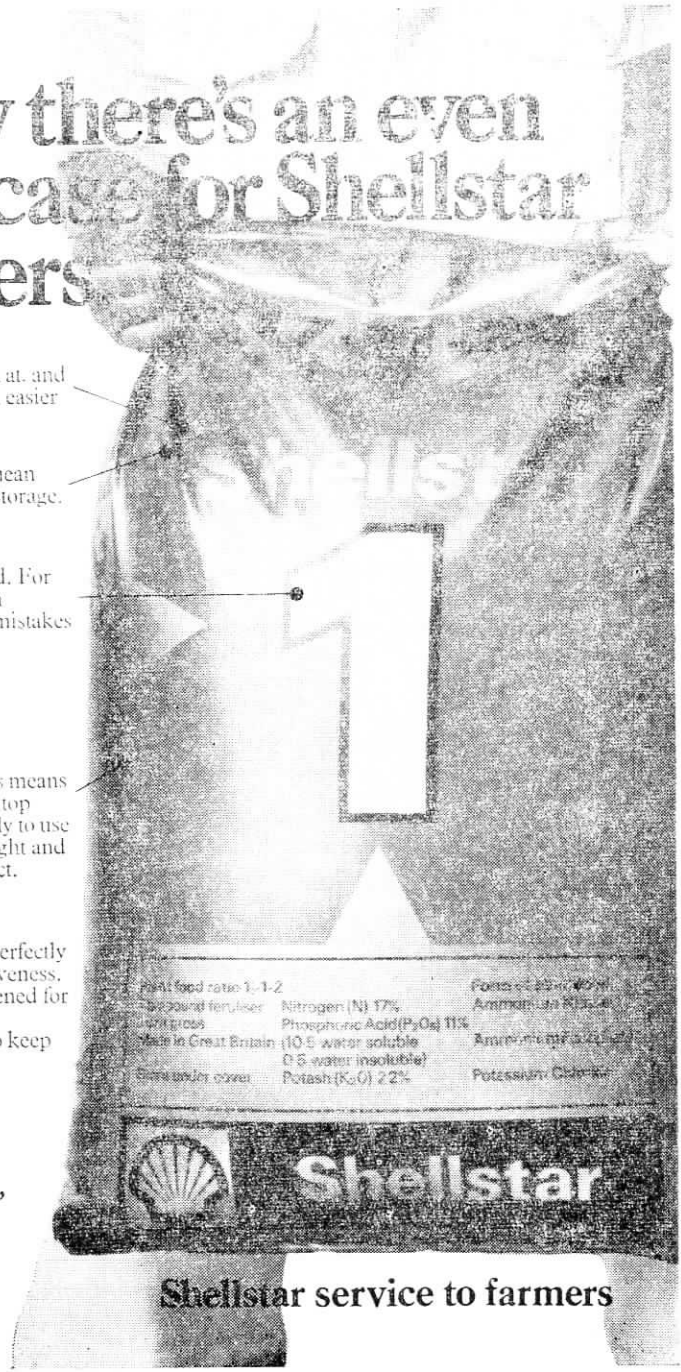

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SEED MIXTURES FOR PRESENT DAY NEEDS

E. F. Pugh

Nickersons, Lincolnshire

South West Scotland Grassland Society

Glenluce, Wigtownshire, 1 March, 1973

While farmers have increased stocking rates and fertilizer usage in order to obtain greater production from the sward, the ability of the sward to stand up under such intensive treatment has received little attention. Experimental work at Nickersons is designed so that seeds mixtures can be formulated to suit various conditions of management. Plant characteristics which are examined include leaf production, leaf/stem ratio, palatability, response to N, regrowth after defoliation, persistence, drought resistence, winter hardiness, uniformity of heading and digestibility.

Variety evaluation provides information on those varieties which are most suitable for different types of ley and which will perform consistently and reliably in different conditions. For example, in a persistency trial, the first stage trials compare varieties cut every 10 days. Those passing this test are tested by grazing for successive 48-hour periods using sheep or dairy cows.

Varieties showing promise under such tests are examined in seeds mixtures sown out on 43 farms and mown and grazed according to normal farm management. Characteristics such as annual and seasonal yield, winter hardiness, percentage weed cover, are rated against controls.

Persistency depends on several factors which may be interrelated. Early perennial ryegrasses usually have an upright habit of growth and are not so persistent as late ryegrasses such as S.23 or Melle, which hug the ground. Continental varieties of Italian ryegrass from Holland or Belgium last two full years while S.22 does not. Melle, Lamora, Pelo and Perma have been shown to be persistent pasture grasses when tested under intensive management by maintaining 78, 77, 76 and 75% ryegrass respectively after 2 years. The least persistent varieties were Petra, S.321, S.101, Kent and Glasnevin with 65, 64, 64, 61 and 57% ryegrass respectively.

Aerial tillering has been noted in many varieties. It is usually associated with lax grazing but has also been found on pasture grazed down to 1".

Pure perennial ryegrass may be unpalatable. Timothy, white clover and tetraploid ryegrasses are added in mixtures to improve palatability. Seasonality of production is less pronounced when varieties and species are blended although more uniform herbage production can be ensured by the use of fertilizer.

Good establishment is the basis of any successful ley. A finely prepared, well consolidated seedbed is essential. Lack of consolidation is a frequent cause of failure. Grass species vary in establishment vigour and some advantage can be obtained by drilling the more vigorous kinds and broadcasting the slower growers such as timothy and clover in the surface afterwards.

Given good soil conditions sowing without a cover crop in late August or early September is the best time to start off a new ley. Late sowings tend to reduce establishment of timothy and clover. Spring sowing without a cover crop can be very successful providing it is not too early, but has the disadvantage of taking land out of production during a potentially productive time and also there is a risk of a dry spell at a critical time. Such spring sown leys will be very vigorous in June and July when established pasture is beginning to fall in both quality and yield. Successful under-sowing depends on the choice of the cover crop. A stiff strawed spring cereal at a lower than normal seed rate is suitable. Lodging of the cover crop must be avoided as this will present harvesting problems and smother the ley.

Hay taken in the first year of a long ley hinders the development of some species and leads to rapid deterioration.

The importance of the grass crop in the feeding of cattle is illustrated by the fact that grazing and conserved feed account for 66% of the starch equivalent needs, the remainder being made up of 4% roots and kale, 15% home grown cereals and 15% compound feeds.

Discussion

The reasons why continental bred grass varieties seemed to be gaining ground at the expenses of British bred were not readily apparent. The main advantages shown by the more popular continental varieties were earliness and cold tolerance. Their cold tolerance or winterhardiness could be due to selection and breeding under the normally cold winter conditions of the continent, as opposed to British mildness. Other questions concerned red clover, oestrogenic activity of red clover, breeding of palatable grasses and the special virtues of Blanca white clover. The speaker also outlined the progression from breeders basic seed to field certification and commented on the effect of EEC on the seed trade in general.—F. G. Norris.

THE FUTURE OF HILL SHEEP

Central Scotland Grassland Society, 7 March, 1973

This meeting consisted of a visit to Carmacoup, Lanarkshire (Mr J. Lindsay) in the afternoon with a discussion meeting at the Silver Bell, Lanark, in the evening, at which a panel consisting of Mr J. Lindsay, Dr Ian Cunningham, Director of Hill Farming Research Organisation, Dr J. Maxwell, H.F.R.O. and Mr Auld, F.M.C. (Meat) Ltd. faced the audience.

Carmacoup. The present owner Mr Jim Lindsay is the second generation at the farm. Of the 3,500 acres about half was sold off and an attempt has been made to maintain stock numbers by improving grass production and by changing from the traditional outwintering of the ewe flock to complete inwintering.

Three aspects were of interest. 1. The shed recently enlarged to inwinter 1,800 ewes. 2. The changes in the flock, moving from the original Blackface sheep type towards a more productive ewe to take full advantage of the inwintering. 3. Grassland improvement.

Cadzow Improver, Texel and Oldenburg breeds figure in this policy. At the moment the main flock is the original BF but experimental crosses are being tried.

The shed is big and high costing £4.30 per ewe including storage space for hay down the central passage. The ewes are in the house from January through to lambing from 13th April when singles go back to the hill whilst the twins are fed on. Lambing paddocks are erected down the central passage. The floor space is divided into pens for groups of 30 ewes with troughs in each pen made of bent weldmesh sheets suspended in a wooden frame. Before the ewes came into the house a 9″ layer of sawdust is laid down and is covered with fresh sawdust in March. After the ewes are out, the whole lot is stirred up to dry out the sawdust ready for the following winter.

Large water troughs are provided so that there is easier access for the rather tightly packed ewes. The problem of freezing is countered by heating up an electric kettle full of water and pouring it into the frozen trough. This is considered to be less expensive than fitting coils into each trough. It takes just 5 hours to feed the ewes twice a day with hay and concentrate.

About 190 acres is in grass fields and reclaimed land. Silage is made for 60 cows. Hay is bought in.

Discussion

Dr Cunningham of the Hill Farming Research Organisation opened the discussion by pointing to the tremendous opportunities now presented to the hill farmer to develop his resources and take

up the technical developments being proved at the HFRO and elsewhere. Jim Lindsay had managed to maintain his income by land improvement of his remaining land and increasing the summer carrying capacity of his hill land by taking his ewes indoors. Land improvement to be worthwhile must generate a better lamb crop and/or increased stocking rate. Inwintering is one method although the cost is high at £2 or more per ewe.

However, where capital is limited, it may be necessary to choose between land improvement and an inwintering shed. He had no doubt that land improvement should be the first step and would justify the rest of the programme. Mr Lindsay chose to develop his sheep enterprise rather than cattle. In the event of a future without subsidy, his choice was wise.

What output of lamb or mutton can be achieved per acre?

This depends on the land and on the costs of land improvement. For example, at Sourhope output of 14,000 lb from 700 acres was raised to 30,000 lb at a cost of £500 for fencing to control grazing. On Lephinmore, the land is poorer and a 160 acre area fenced into 2 paddocks carried 300 ewes at a cost of £1,500 for the fence. Output from the whole 1,000 acre hill was raised from 6,000 to 16,000 lbs. There was much discussion about the effect of intensification of hill land output on eligibility for subsidy.

The problem of breed was discussed from two points of view. With the development of inwintering, the hardiness of the BF was not required. The 'inwintering' required a more productive less hardy breed if that combination existed.

A peculiarity of inwintering was that wool was more easily cast because of the density of living or from physical friction with the walls or because of the warmer, moister atmosphere.

With regard to the future market for hill lambs, the need to choose the lambing date to achieve the best market for the lamb was stressed. Lambing on 1 May would be useful as lambs could be marketed Xmas to March the following year but greater attention to ventilation of the shed would be required.

I. V. Hunt.

WEEDS IN GRASSLAND

M. G. Allen

Shellstar Ltd. Perth

South West Scotland Grassland Society

Irvine 29 March, 1973

Following a new film produced by Shellstar Ltd. "Pesticides in Focus." Mr Allen outlined the major grassland weed problems and the characteristics of five types of herbicide produced by his company.

The film set out the advantages accrueing to mankind on a world scale from the chemical control of weeds, insects, pests and fungal disease and contrasted these advantages with the disadvantages. These latter largely arise from abuse of the products and as might be expected the advantages were considered to far outweigh the disadvantages. The company was engaged in a very costly research programme in which the products were tested for effectiveness against pests and thoroughly checked in regard to side effects on humans and on livestock and on the cropping potential of the soil. Undoubtedly, individuals could be badly affected by abuse of the "cides" but the world in general could not be fed without the protection of these same substances when properly used.

During the talk, Mr Allen considered some of the major types of weed control which one met in "grassland" with special reference to five of the firms products, Brush-Killer, effective against bramble and gorse; Bandock for docks and thistles; Nettleban for nettles, sorrel and ragwort; D.50 for buttercups and daisies and Trifolex for pasture weeds where clover had to be protected. All worked in a somewhat similar fashion. They were "Hormone killers," effective on growing plants by causing the plant to push sugar out into the growing areas of the plant, encourage rapid and uneven growth leading to the familiar distortion of affected weed plant.

Scrub, i.e. bramble and whinns, was readily killed by "Brush Killer" based on 245T. It should be specially noted that this 245T was the amine-formulation and not the ester-formulation which had drawn such a bad press when used in Vietnam. The ester formula was not manufactured in Britain because of its unpredictable drift effects. Drift was imperceptible with the amine.

The alternatives to 245T were slashing or burning but the plants regrew after both. Burning gorse could leave a worse problem since heat could encourage seeds to germinate leading to 20 plants where there were 6 previously.

Rough land could be tackled by hand carried lance at about 1 acre/day per man or by helicopter at 1 acre/minute. During

autumn and early spring, the weedkiller could be applied in a water/oil mixture whilst in winter an oil emulsion could be used.

Permanent pasture. The problems are nettles, docks, thistles rushes and daisies or buttercups. Nettleban is a mixture of 245T, Dicamba and 24D. It is necessary to get the spray down to the base of the Nettle clump and it may be necessary to mow the nettles before spraying.

Bandock is the firm's dock killer. It is a mixture of 245T, dicamba and CMPP. The dicamba is the really effective dock killer but mixtures are used so that docks and other weeds can be killed off at the same time. Rushes are easily killed off with 24D but to be effective, the spray should be used when the rushes are flowering. Really old established rush plants are best tackled by mowing first and spraying the regrowth. Younger rush plants are best sprayed and then mown about 4 weeks later.

Chickweed seems to be a growing menace in pastures. Where clover is not important it can be killed off with Mecaprop (CMPP) sprays such as Propanex plus.

Mr Allen demonstrated the use of a Prefix gun which spurts out a few pellets of weed killer at any target and is effective against docks and couch grass and practically all plants. It should be used only where complete removal of plants is needed. It is effective in clearing couch grass from hedge bottoms.

During the discussion members' own weed problems were considered. Gorse on steep banks can be tackled by using a knapsack (mistblower) spray. The difficulty about carrying large bulks of water (15 gallons/acre) may be solved in the future by the development of finer mists requiring only $\frac{1}{2}$ gal/acre. So far these are only practical in small enclosed areas such as greenhouses.—I. V. Hunt.

A SIMPLE GRAZING SYSTEM FOR DAIRY COWS

Malcolm E. Castle and John N. Watson

The Hannah Research Institute, Ayr

A successful grazing system for dairy cows should provide a regular and adequate supply of nutritious herbage for a long grazing season at low cost. In addition, maximum use should be made of the herbage with only the minimum reliance on supplementary concentrate feeding. There are several systems of grazing management which can achieve these aims but, on average, there is still a low output of milk from grassland. One reason for this low production is that many efficient grazing systems for dairy cows are considered to be much too complex for general use, and there could be tremendous merit in a simple system of grazing if it also produced a high output per acre.

The Wye College system

One particularly simple grazing system for dairy cows, called the Wye College system, has been developed by Professor W. Holmes and his colleagues at Wye College in Kent. Briefly, the system is based on a rigid and predetermined rotational grazing system which is operated with the minimum of decision making. Some aspects of the system may appear to be somewhat unconventional but it is extremely easy to operate and has produced high yields of milk per acre at both Wye College and at the Hannah Institute. The system was developed primarily for use in the east of the country, but, because of the many attractive features of the system, not least its simplicity, it was decided to use it at the Hannah Institute for the three years 1970-72.

Layout and Grassland Management

A perennial ryegrass (S23) sward sown in 1969 was grazed, and the layout of the system is shown in Fig. 1. Essentially there are four plots of equal size, fenced with semi-permanent electric fencing consisting of light wooden posts (2 × 2 in.) supporting the wire. Each one of the four plots supplies grazing for exactly 7 days, and a fresh strip of grass is made available daily within each plot by moving forward an electric wire on light metal fencing posts. No back fence is used and thus the cows have access to the previously grazed area which also contains the gate and the water supply. Each Monday afternoon, the cows enter another one of the four main plots, and fertilizer is applied immediately to the recently grazed plot. Fertilizer supplying 52 units N per acre is applied in the spring, and thereafter at intervals of 28 days to

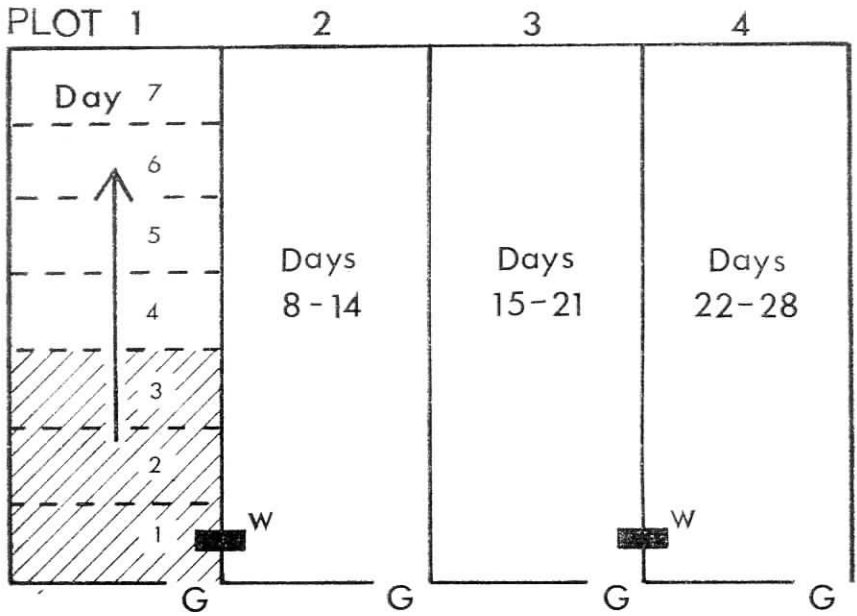

Fig. 1. The layout of the four plots and the fences for the Wye College grazing systems for dairy cows. Main fences ——— ; Movable forward fence – – – –;

Area available for grazing on the third day is cross hatched; W, water trough; G, gate.

give a total application of 260 units N per acre during the season. With this amount of fertilizer and the 3-weeks rest period there is a high yield of leafy herbage. A compound supplying P and K is applied in mid-season.

Grazing and stocking rate

Apart from moving the electric fence forward once per day, and changing from plot to plot once per week there is virtually no grazing management or indeed any major decision making; a truly simple system. The grazing sequence is absolutely rigid, and is pre-determined at the beginning of the grazing season. Without doubt, the one major decision is when exactly grazing should first start in the spring, and this date should normally be 28 days before the last strip in plot 4 reaches the stage when flower heads can be seen. At this stage of growth the herbage is still of high nutritive value although the yield of herbage is apparently excessive. At certain periods of the year the cows do not graze all

the herbage on offer but this surplus herbage is consumed at later grazings either 4 or 8 weeks later. Topping the swards to improve their appearance is not done since ultimately little herbage is wasted if the rate of stocking is correct. The rate of stocking depends largely on the amount of fertilizer nitrogen applied and must be decided at the start of the grazing season. At the Hannah Institute with an application of 260 units N per acre, one cow was carried on 0.5 acre in 1970 and 1972 and on 0.4 acre in 1971. With a lower input of fertilizer nitrogen a somewhat larger acreage would be required, but undoubtedly the Wye College system responds to a high rate of stocking.

Milk Production

In the three grazing seasons of 1970, 1971 and 1972, the Wye College system produced average daily milk yields of 34, 40 and 39 lb per cow respectively over the 20-week grazing periods from spring-calved Ayrshire cows receiving no supplementary concentrates. The annual output of milk was 1,140 gallons per acre from early May until late September which is similar to the yield recorded at Wye in the original experimental work. Clearly an extremely simple grazing system has produced high yields, both per cow and per acre, with no concentrate feeding and with the minimum of decision making during the grazing season. Virtually every management decision for the entire grazing season was made before the grazing started and yet the output of milk was extremely high.

Compared with the well-known 1-day paddock system, the Wye College system offers savings in the cost of fencing, gates and water trough, and little land need be wasted on access races. The Wye College system also has the important merit of simplicity, ease of layout, and operation, yet it can produce high yields of milk, both per cow and per acre.

From three years experience of one extremely simple system it would appear that the main requirements of any grazing system are that there should be adequate herbage, a high rate of stocking, and a rest period between grazings. Without doubt, systems such as the Wye College one are both workable and highly productive, and deserve wider study and application.

Acknowledgement

The authors thank Her Majesty's Stationery Office, Edinburgh for permission to reproduce Fig. 1.

Editors note

This article is based on one which was first published in " Scottish Agriculture " and then reprinted in the SMMB Bulletin.

The Wye College system can be seen in operation at the Hannah Institute on the Open Day, on Wednesday, 5 September, 1973.

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Hannah Dairy Research Institute work in the Journal of the British Grassland Society, 1970.

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SHOULD WE HAVE A SILAGE COMPETITION?

J. N. Watson

Hannah Research Institute, Ayr

South West Scotland Grassland Society

Why have I asked this question ? The answer is because I think we should have a competition in South West Scotland and because I judged the silage competition of the Cumberland and Westmorland Grassland Society last winter.

Obviously members enter any competition in the hope of winning, but by entering this competition they stimulate interest in the subject, and this interest and exchange of ideas, results in an improvement in the silage being made.

The competition

Perhaps a few remarks on how the competition in Cumberland and Westmorland was organised will be of interest to members. At the start of the winter, entry forms were sent to all members. Once these were returned, the sampling of the silage was carried out by a College officer, probably accompanied by a Committee Member of the Grassland Society. The silage samples were then analysed and the results returned to the Secretary of the Society. A system of scoring based on analysis was drawn up and by this method the top five or six entries were selected. The scoring was based on silage dry matter, % crude protein, pH and " D " value.

Up to this point there were six silage samples assessed on chemical analysis only. These results were given to a judge from outside the area who was asked to visit each farm and make a visual assessment of the silage taking account of such things as leafiness, fermentation and absence of waste. The marks he awarded were added to the marks obtained from analysis and so the winner was selected. At this point I feel I should say that in my opinion towers and clamps should be judged in two separate classes.

The meeting

To make known the winner, an evening meeting was held at which over 50 members turned up; perhaps because there was a bar at the back of the hall ! The chemist responsible for the analysis of the silage and the outside judge were seated at the top of the hall, with the Society Chairman, who called on the latter to comment on the top three silages, in reverse order of merit. A bit like judging Miss World although not as interesting ! As well

as discussing the silage quality the judge was asked to comment on the fitness of the cows, any novel ideas, or general matters of interest to members, for example the use of additives, length of chop etc. The meeting was then open to questions thrown at both judges. This proved to be a very lively affair and much information was passed in both directions.

By the obvious keenness of members present, it was clear that the Cumberland and Westmorland Grassland Society certainly consider their silage competition worthwhile and I hope our Society, after its first competition, feels likewise.

RESEARCH REVIEWS

154. FEEDING HIGHLY PRODUCTIVE DAIRY COWS DURING THE GRAZING SEASON

H. Katoen

Bedrijfsontwikkeling 3 (3) 237-241

A dairy herd feeding trial was conducted during the grazing season May to October in the province of Drenthe, The Netherlands, to investigate whether the relatively low milk yields of potentially highly productive cows were due to insufficient summer pasture. In the trial, there were three matched groups each of 50 cows in a total of 27 herds. The cows were all older than 5 years and were in early lactation at the start of the experiment. There were three feeding treatments:

(1) The cows were grazed in the normal local way without any attempt at grassland improvement, and supplementary concentrates were fed according to the yield of the cows.

(2) The cows were grazed as in treatment (1) but without any concentrate feeding.

(3) The cows were grazed during the summer on pastures which had been improved and which were well managed.

The average daily milk yields during the period May to October on treatments 1, 2 and 3 were 38.6, 34.2 and 35.7 lb per cow respectively. It is concluded from this experiment that in the region concerned, greater attention should be paid to grassland management and the grazing system.—M. E. Castle.

155. INTENSIVE GRAZING METHODS ON SCOTTISH DAIRY FARMS

Based on Surveys reported

The Structure of Scottish Milk Production, SMMB, 1972

Dairy Facts and Figures 1971, UK MMB

	No. of Dairy Farms	Average herd size	% of total Scottish milk production (1971)	% using intensive grazing methods (1972)
West College Region				
Ayr	1044	59	18.8	37
Dumfries	538	62	10.8	61
Kirkcudbright	330	68	7.5	60
Wigtown	443	73	11.0	61
Argyll	207	44	2.6	65
Bute	104	40	1.1	63
Clackmannan	12	42	0.2	58
Dumbarton	96	53	1.4	31
Lanark	629	60	11.5	47
Perth	99	74	2.4	63
Renfrew	201	56	3.5	56
Stirling	136	51	2.0	31
Scotland	5027	62	100%	55
	(= 245 million gals)			

Moray, Banff, Nairn and Inverness show the highest percentage intensive methods at 90, 86, 85 and 85%, but their total milk production was small.

Types of Grazing — Zero grazing 0.1%
Strip grazing 33.7%
Paddock grazing 16.4%
Strip and Paddock 4.8%

Types of Bulk Feed —

79% hay
25% hay only
60% barn dried hay
36% silage
13% silage only
50% kale and roots

Herds relying on silage only are generally larger (85-112 cows) than those relying on hay only (51-54 cows). 75% of those using silage only are also intensive graziers.

The questionnaire produces a rather high estimate of intensive grazers but it should be realised that the question asked whether a farmer used intensive grazing sometime in the season. It was only necessary to put a fence up for a short time to qualify.—R. D. Harkess.

156. STOCKING RATE + NITROGEN = MILK

The use of high nitrogen levels and stocking ratio for increasing milk production from grassland

F. J. Gordon

Rep. agric. Res. Inst. Nth. Ire. 1971-72 (45th) pp. 12-15

A 3-year trial was conducted using two stocking rates, 2 or 3 cows/ac for the grazing season, at each of two fertilizer N levels, 320 or 560 units N/ac per annum. The cows were grazed on a fixed rotational paddock grazing system with a 22-day grazing cycle. One pound of barley meal was given both morning and evening to each cow to act as a carrier for calcined magnesite. In each year the experiment continued for a period of 22 weeks. Milk yields were:—

Mean data/grazing season of 22 weeks

Stocking rate (cows/acre)	N level (units/ac)	Milk/cow (gals)	Milk/ac (gals)	Bodyweight + (lb)
2	320	537	1074	+ 46
2	560	535	1070	+ 42
3	320	464	1392	− 40
3	560	501	1503	− 59

The results clearly demonstrate the high milk producing potential of grass and indicate the need for a high stocking rate to achieve high milk output/ac. It was concluded that more than 320 units N/ac was unnecessary when stocking rates of about 2 cows/ac are used. It was only at the beginning of July that the milk yield/cow at the higher stocking began to fall much below that at the lower stocking rate.—J. Frame.

157. MILK FROM GRASS.

F. J. Gordon.

Agricultural Research Institute of Northern Ireland

Proceedings of British Society of Animal Production, 1972.

pp. 79- 84.

This is a review of research work in various parts of Britain on improving the utilisation of the herbage grown.

Cost of grass production per unit of dry matter is half that of cereals and one eighth that of roots. Output from grass depends on yield or quality and seasonal distribution of herbage as well as on the efficiency of converting this grass into livestock products in this case into milk. Efficiency of using grass will depend on the "intake" or amount of grass harvested by the animal and also on the animals' ability to make use of the eaten herbage.

Intake. This is the amount of herbage eaten per day. This depends on the amount available, its quality and appeal to the animal, the condition of the animal and the size of the animal. Two distinct situations are found:—

A. When grass is plentiful. For example, at low stocking rates. Intake depends on quality of herbage and condition of animal.

B. When grass is short. For example, at high stocking rates. Intake depends on amount of grass available.

Several experiments have shown this relationship. Most of them involve offering fixed amounts of cut grass to the animal Dr Greenhalgh and his colleagues at the Rowett Institute, Aberdeen, adjusted the area of grassland available to cows.

100% use of the available grass is only possible by stepping up the number of animals so much that none of them can get their theoretical needs. Each animal suffers a reduced intake of 11 to 15%. The effect of this reduction in intake on milk production of cows varied.

Low yielders might not suffer a reduction in milk yield but would lay on less body fat. Higher yielders would certainly show reduced milk yields.

Such a problem must be solved by management. We cannot achieve 100% utilisation of grass and at the same time obtain the full milk production potential of the top yielding cows.

This dilemma does not face the average dairy farmer who operates on an extremely low stocking rate. It is a problem that must be solved by the farmer looking for maximum use of grass.

Three possible managements which will resolve the dilemma are : (a) Subdividing the herd so that low yielders can be used at higher intensity. (b) By adjusting calving patterns so that the minimum number of animals would be at peak lactation at the awkward times of the grazing season. (c) Supplementary feeding the higher producers is a logical possibility but it must be arranged so that the supplementary feed tops up the grass intake rather than replacing it. So far, this has not been achieved.

Conversion of grass to milk. This depends on the capability of individual animals, the level of available feed and the quality of consumed feed. For any given yield of grass, output of milk can be considerably raised if high yielding cows are used. Dr Malcolm Castle has shown this from the records of the Hannah Research Institute farm.

Animal Potential. Dr Gordon presented a diagram based on experimental grass production to show the effects of potential milk yields from 1 to 6 gallons/head per day on annual output of milk per acre.

Milk yield potential Gals/day	1	2	3	4	5	6
Milk output,Gals/acre	750	1200	1550	1700	1850	1900

Levels of feeding. Changes in amount of feed eaten have been shown to alter both milk yield and/or body fat when various dry feeds or roughages have been offered but there is little information on the effects in terms of fresh herbage taken by the animal. These effects have been shown with dried grass and it can be assumed that grazed herbage will also have similar effects. For each animal in the herd, the optimum intake will be the maximum up to the level at which the marginal efficiency of the individual does not fall below the overall herd efficiency. The highest efficiency will arise from individual feeding. The most practical methods of achieving this would be to use groups of animals of matching potential at different stocking rates to achieve optimum efficiency. Zero-grazing is an obviously simple approach.

Herbage quality. We still lack information on many aspects of quality in relation to milk production. The effects of digestibility and metabolisable energy content are clear. Milk production is not reduced until digestibilities below 65% DOM are reached. Spring and autumn herbage still show marked differences as demonstrated for fattening cattle in the Rowett but at Hillsborough, Northern Ireland, milk production was practically the same.

I. V. Hunt.

158. HOW MANY DAIRY FARMS ARE INTENSIVE ?

A paddock grazing investigation 1969/70

Agricultural Development and Advisory Service (Wales)

Min. Agric. Fish. Food 1972, pp. 55

It has been estimated that 7-8% of the total registered milk producers in Wales use some form of rotational paddock grazing. The commonest form is the 21 one-day paddock system. The use of separate grazing and cutting areas had advantages because topography and farm structure made it difficult to integrate grazing and cutting on the same area. In herds of less than 30 cows, two-day paddocks are used to limit fencing and obtain areas large enough for cutting and fertilizer application.

The paddock grazing systems of six dairy farms were monitored. Fertiliser N usage was between 250-300 units/annum. Herbage dry matter yields showed considerable variation between farms and paddocks on individual farms. It was concluded soil and rainfall had more influence on yield than proportion of perennial ryegrass. Milk yields/acre per grazing season averaged around 800-900 gal. with a range of 507-1350 gals. There was wasteful use of concentrates on some farms, particularly in June/July as judged by herbage available for grazing. Where supplementation was indicated, e.g. in very early spring or during herbage production troughs in autumn, the protein level in the herbage was high enough that only a low protein mineralized cereal type of concentrate was necessary. Calcium and sodium levels in grass were generally adequate but phosphorus was often below a desirable level and magnesium was low in early season. —J. Frame.

"Advertiser" Office, Ayr.