

Forestry and Agriculture in the Scottish Highlands

1700–1850: A Problem in Estate Management

by J. M. LINDSAY

At present the nature of forestry in the Scottish Highlands is governed largely by policies designed to use effectively the type of land most readily available for afforestation: this is usually hill ground, most of which can be expected to produce profitable crops of timber only if certain species are planted after improvement by ploughing, drainage, and fertilization. During this century, extensive upland planting of Sitka spruce, Lodgepole pine, and a number of other exotic conifers has become characteristic of Highland forestry.¹ Land suited to more varied and productive management is seldom available.

The principal factor restricting use of land for forestry is the perceived need to preserve agricultural units. Hill sheep farming predominates; the limited area of low sheltered ground available is vital to hill farmers for winter grazing and production of winter fodder. The same low ground is, however, the most desirable category for afforestation, and thus forestry is seen in some quarters as a threat to the viability of Highland agriculture.² There is therefore a conflict between the interests of farming and forestry which creates management problems on a local scale, and is also an obstacle to the formulation of satisfactory land use policy. At present governmental policy tends to favour agricultural interests; the Forestry Commission, for example, must consult the Department of Agriculture over each proposed acquisition of land for planting.³

¹ H. L. Edlin, 'The Forestry Commission in Scotland, 1919–69', *Scott. Geog. Mag.*, LXXV, 1969, pp. 84–95; D. N. McVean and J. D. Lockie, *Ecology and Land Use in Upland Scotland*, Edinburgh, 1969, p. 58.

² Advisory Panel on the Highlands and Islands, *Land use in the Highlands and Islands*, H.M.S.O., Edinburgh, 1964, pp. 7–8, 32; McVean & Lockie, *op. cit.*, pp. 50–1.

³ McVean & Lockie, *op. cit.*, pp. 58–60; J. T. Coppock, 'Land use policies in Scotland', *Scott. Forestry*, xxvii, 1973, p. 186.

This conflict is not altogether a recent development, and has affected the relationship between agriculture and forestry in earlier periods. Although agriculture tends to receive priority at present, it cannot be assumed that this has always been the case; it is intended here to examine the nature and development of competition between forestry and agriculture in the past, and the ways in which attempts to resolve the conflict have affected the form of land use. Particular attention will be given to the use of the semi-natural deciduous woodland of the southern Highlands during the period 1700–1850.⁴ Then, as now, the southern Highland counties contained a few woods of native Scots pine, but they also formed the main centre of development of oak tanbark coppice during that period. As shall be seen later, coppice in particular was incompatible with stock farming, and woodland usually occupied part of the low ground required for wintering.

I

It is first of all necessary to look briefly at the ways in which stock farming made use of wooded ground. Until the middle of the eighteenth century infield-outfield agriculture, associated with joint tenancy, was found throughout Scotland, and forms of infield-outfield organization characterized Highland agriculture well into the next century. These systems have frequently been described; there has, however, been a tendency to over-emphasize the importance of cultivation in the Highlands, and much more attention has been paid to summer

⁴ The southern Highlands are here taken to include the counties of Argyll and Perth, as well as parts of Stirlingshire and Dunbartonshire. The term "semi-natural" is used to describe woodland which is predominantly self-sown rather than planted.

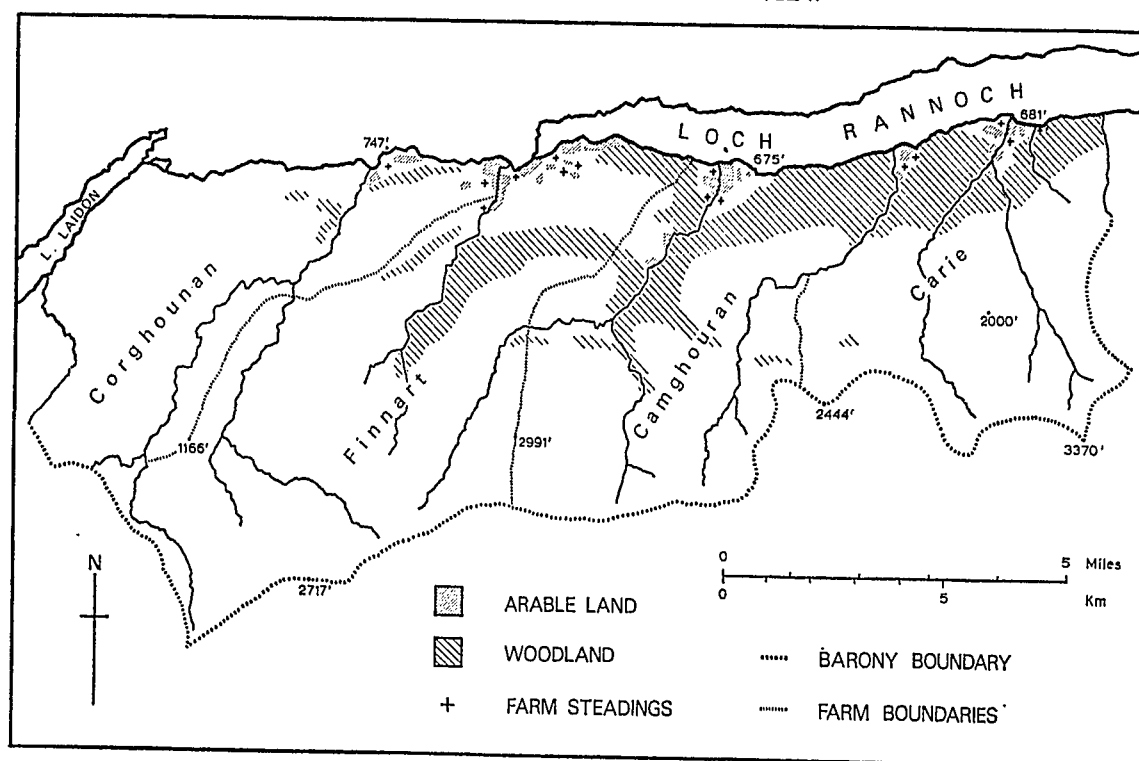


FIG. 1. The barony of Slisgarrow, 1756.

transhumance than to other aspects of the pastoral regime.⁵

Animal husbandry was of primary importance in the traditional Highland economy. Figure 1 illustrates the land use of part of the north Perthshire estate of Struan in 1756. The barony of Slisgarrow was divided into four farms, each subdivided into two or more groups of joint tenancies. Rough pasture accounted for 79.6 per cent of the total area, and most of the remainder (19.8 per cent) was under woodland of pine and birch; infield, outfield, and riverine meadow together amounted to no more than 0.6 per cent.⁶ Cultivation was perforce very

limited; as in many other parts of the Highlands the paucity of the grain supply made it necessary to import meal regularly from the Lowlands.⁷

Highland grazing stocks consisted of cattle, sheep, horses, and goats, but cattle were economically most important. The export of store cattle was the only major source of cash in the Highland economy, providing a means of paying for meal and other imports, while dairy produce formed a substantial part of the diet.⁸ The traditional small Highland sheep were not regarded as hardy; they were kept in relatively small numbers, and the meat and wool were mainly used domestically.⁹ Small horses (garrons) were used for a number of purposes; in some districts they were semi-feral and broken for work only when necessary. Goats too were semi-feral, and important to an extent which has only recently been appreciated; they provided both milk and meat for domestic use, and

⁵ For descriptive accounts see M. Gray, *The Highland Economy, 1750-1850*, Edinburgh, 1957, pp. 11-41; J. A. Symon, *Scottish Farming Past and Present*, Edinburgh, 1959, pp. 12-26, 119-33; T. C. Smout, *A History of the Scottish People, 1560-1830*, 1969, pp. 119-34. For an evolutionary approach see R. A. Dodgshon, 'The nature and development of Infield-Outfield in Scotland', *Trans. Inst. Brit. Geog.*, LIX, 1973, pp. 1-23.

⁶ Fig. 1 is based on a plan of Struan by John Lesslie, 1756, Scottish Record Office (hereafter S.R.O.) RHP.3480. The proportions are derived from Lesslie's memoir accompanying the survey, S.R.O. Exchequer Papers E.783/98, fol. 31.

⁷ S.R.O. E.783/28/1; see also Gray, *op. cit.*, pp. 42-4.

⁸ Gray, *op. cit.*, pp. 37-8; Symon, *op. cit.*, pp. 132-3.

⁹ I. F. Grant, *Highland Folk Ways*, 1961, p. 79.

were also very efficient grazers capable of thriving on vegetation inaccessible or unpalatable to other domesticated animals.¹⁰

Animals were pastured on the uplands in summer, and in some, but not all cases, much of the community spent a few weeks after mid-summer on isolated pastures (shielings) with the milch cows. Summering on hill pasture is usually explained as a means of conserving low pasture and, more important, protecting the unfenced crops from damage: the period between sowing and harvest could last from late April to early November. In the barony of Slisgarrow detailed regulations of the 1770's controlled the movement of stock on upland pastures between 1 April and late August annually, but the movement of animals was not restricted in the winter half of the year.¹¹

After harvest it was no longer necessary to keep the stock away from the crops, and stubble was a useful source of fodder. Large areas of hill pasture were in any case almost valueless by the beginning of winter; their vegetation could sustain only those animals capable of ranging rapidly over wide areas. Even red deer winter if possible on sheltered sites with access to valley grass and arable land, especially when snow is lying at the higher levels.¹² The wintering range consisted of the lower hill pastures and the valley bottoms; the use of hay and other types of cut fodder was limited, and the methods of winter feeding and seasonal movement between districts, later developed in extensive sheep farming, were not then practicable.¹³

The stocking of farms was controlled by

customary methods of "sourcing," in which the carrying capacity of common pasture was assessed in terms of "souns" or "sowms." Handley has suggested that the basic soum was the grass required by one cow or four or five sheep, whereas a horse required two souns.¹⁴ Tenants were allocated souns on summer pasture in proportion to the sizes of their arable holdings;¹⁵ distribution was therefore roughly related to tenants' shares of wintering capacity. A formalization of this principle can be seen in the legal action of "sowming and rowming," in which the use of certain types of common grazing was granted to landowners in proportion to the wintering capacity of their lands.¹⁶

It is probable that wintering capacity determined the total number of souns allocated on a farm as well as their distribution among tenants. The degree to which summer pasture was used depended on the number of animals which could be brought through the winter alive, and it may be suggested that the ceiling imposed by sourcing was intended not to check overgrazing of summer pasture but to remove any incentive for tenants to retain far too many animals at the beginning of winter in the hope that enough would survive to produce a large summer stock. Rennie nevertheless observed in 1814 that although summer pasture was used only to 10 per cent of its capacity in the Highlands as a whole, more animals were wintered than could adequately be fed.¹⁷ It is probable that the number of beasts retained was generally set at or above the maximum which in local experience could be expected to survive a normal winter. It has been estimated that in the early eighteenth century the average winter mortality of Highland cattle stocks was 20 per cent; according to Rennie 30 to 50 per cent of

¹⁰ Gray, *op. cit.*, pp. 40-1; M. Campbell, 'Goat-keeping in the old Highland Economy—3', *Scott. Studies*, ix, 1965, pp. 182-4; B. R. S. Megaw, 'Goat-keeping in the old Highland Economy—2', *Scott. Studies*, viii, 1964, pp. 215-16, provides an assessment of the numerical importance of goats.

¹¹ S.R.O. E.788/20/1, E.788/20/4.

¹² A. S. Mather, 'Red deer land use in the northern Highlands—1', *Scot. Geog. Mag.*, lxxxviii, 1972, pp. 42-4.

¹³ J. A. S. Watson 'The Rise and Development of the Sheep Industry in the Highlands and North of Scotland', *Trans. R. Highld. Agric. Soc. Scotl.*, 5th ser., xlv, 1932, p. 8; W. J. Carlyle, 'The Away-wintering of Ewe Hoggis from Scottish Hill Farms', *Scott. Geog. Mag.*, lxxxviii, 1972, pp. 105-7.

¹⁴ J. E. Handley, *Scottish Farming in the Eighteenth Century*, 1953, p. 100. There was some regional variation, and the basic ratios were modified to make allowance for animals of different ages and types.

¹⁵ Smout, *op. cit.*, p. 130.

¹⁶ W. Bell, *A Dictionary and Digest of the Law of Scotland*, rev. edn, Edinburgh, 1861, p. 773.

¹⁷ R. Rennie, 'Of those Obstacles to Improvement which are Local', pp. 393-413, in Sir John Sinclair (ed.), *General Report of the Agricultural State and Political Circumstances of Scotland*, v, Edinburgh, 1814, p. 398.

the whole stock might die in a harsh winter with heavy snow, while the remaining cattle would be too emaciated for profitable sale.¹⁸

As the availability of wintering determined stocking capacity, it was clearly necessary that wintering ground should be fully utilized. Animals were allowed to range freely over grass, stubble, and any other vegetation available; death from exposure was common. The limited supply of cut fodder was reserved for the few animals enclosed overnight or housed indoors; milch cows were given preferential treatment, and sheep were also often housed for at least part of the winter. At the end of winter came "lifting day," when the enclosed animals were assisted or carried to the first spring growth; after an exceptionally hard winter cattle in Slisgarrow were said still to be weak in early June.¹⁹

A major modification of the Highland grazing regime took place after the introduction of extensive sheep farming in the eighteenth century. The first flocks appeared in the south-western Highlands shortly before 1760, some were established north of the Great Glen by 1790, and few parts of the Highlands remained unaffected in 1820.²⁰ The effects of sheep farming on a society and economy ill equipped for radical change have been fully described elsewhere.²¹ Small tenants could not participate to any extent, and their pastoral requirements conflicted with those of sheep. In the north eviction and displacement were common; mass clearance was less evident in the south, where the scale of operations was smaller.

The main element in Highland sheep husbandry was the wedder stock, pastured on the upland in summer and wintered at lower levels;

breeding stocks of ewes were generally much smaller, and remained on the lower pastures throughout the year.²² Wintering capacity continued to limit the size of stocks, and summer pastures were still under-utilized. In many parts of the Highlands large populations of small tenants remained after the establishment of sheep farming, grazing smaller stocks than before on more limited pastures. Wintering continued to be vital, both for the introduced stock and for the remnants of traditional Highland husbandry.

II

A number of misconceptions cloud the history of Highland forestry. Thus it is commonly accepted that the deforestation of the Highlands resulted largely from commercial exploitation. According to a widely held belief, much of the Highland area was formerly covered by pine-dominated forest, and despite a long history of sporadic exploitation and other types of damage this was supposedly still largely intact in 1600. After that date, however, there is said to have been an invasion of English iron-smelters who caused considerable damage. The rate of destruction supposedly accelerated greatly, especially after the Highlands were finally pacified in 1745, and in the following hundred years ironmasters and timber merchants from England almost completed the process of deforestation.²³

There are many reasons why this explanation should be rejected. These cannot be reviewed fully here, but it may be noted that although commercial activity does indeed seem to have increased as the eighteenth century advanced, woodland covered little of the Highland area, perhaps 5 per cent, when the first reliable survey of the Scottish mainland was carried out about 1750.²⁴ If this proportion of woodland was able to support the commercial felling which took place during the phase of greatest activity which

¹⁸ D. S. MacLagan, 'Stock-rearing in the Highlands, 1720-1820', *Trans. R. Highld. Agric. Soc. Scotl.*, 6th ser., II, 1958, pp. 66-7; Rennie, *loc. cit.*, p. 398. For a detailed example see J. Henderson, *General View of the Agriculture of the County of Sutherland*, 1812, p. 174.

¹⁹ Grant, *op. cit.*, pp. 75, 79; Smout, *op. cit.*, p. 131; S.R.O. E.783/60/257 (1).

²⁰ Watson, *op. cit.*, pp. 6-8; MacLagan, *loc. cit.*, p. 68; Gray, *op. cit.*, pp. 87-8, 96-7.

²¹ See for example Gray, *op. cit.*, pp. 86-104; A. J. Youngson, *After the Forty-five—the Economic Impact on the Scottish Highlands*, Edinburgh, 1973, pp. 170-9.

²² Watson, *loc. cit.*, p. 9; MacLagan, *loc. cit.*, p. 69.

²³ Thus see F. F. Darling, 'History of the Scottish Forests', *Scott. Geog. Mag.*, LXV, 1949, pp. 133-4.

²⁴ For a map based on this survey, see A. C. O'Dell, 'A View of Scotland in the Middle of the Eighteenth Century', *Scott. Geog. Mag.*, LXIX, 1953, pp. 58-63.

followed, it is difficult to accept that commercial felling had an important role in the overall deforestation of the Highlands, and little satisfactory evidence has in fact been offered to support the sweeping claims made about its destructiveness.

Woodland may be subject to management or exploitation; these terms are here used to denote utilization respectively with and without regard to the subsequent productivity of the woodland involved. The established view of Highland woodland history emphasizes exploitive felling of pinewood; the history of deciduous woodland is thus largely disregarded, and management is evidently assumed to have been absent or insignificant.

Contemporary and modern evidence, however, indicates that although a certain amount of native pinewood remained by 1700, particularly in the central Highlands, deciduous woodland was more extensive; birch was common everywhere, and oak was also prominent, especially in the south and west.²⁵ At that time the deciduous woodland of the Highlands was largely open to casual domestic use, but after 1700 there was a growing incentive for landowners to cut and manage their woods of oak and other species as coppice for commercial markets.

Coppicing utilizes the tendency of many trees to produce supplementary shoots, and ordinarily a series of crops can be obtained from each cut stump or "stool." Varied markets were available for coppice timber between 1700 and 1850. In Scotland the best oak was largely used to produce wheel spokes; inferior oak and other timber went largely for use as domestic or industrial fuelwood or charcoal. Bark was, however, the most important product of oak coppice as it was the principal British tanning agent until the late nineteenth century. In Scotland bark prices rose slowly from about £2.50 per ton in 1700 to £6 in 1790, but during the period of wartime demand and inflation of the next twenty-five years prices rose as high as £20 per

ton; other barks could also be sold at prices consistently lower than those of oak. All bark prices fell after 1815, and by 1850 oak prices were again around the level reached in 1790.²⁶

Coppice was consequently very important for some time, and much of the oakwood of the southern Highlands and other districts came under coppice management. During the eighteenth century the value of other types of woodland also rose, although less markedly, and it is then that conflict between the interests of forestry and agriculture seems first to have become a matter of general concern to landowners. Small as the total area was, Highland woodland being mainly distributed along ocean and lake shores, on the lower sides of river valleys, and along watercourses was thus concentrated on land suitable for wintering.

All grazing animals can cause damage to woodland if given access to it. Natural regeneration may be halted if seedlings, saplings, or coppice shoots are eaten or trampled, and mature trees may be damaged by gnawing or rubbing of bark and low branches. The most effective form of protection is enclosure, although the type employed depends on the nature of the woods to be protected. Young growth particularly needs enclosure; in the case of plantation it may be necessary only during the first few years, but permanent enclosure may be advisable for the protection of young growth in semi-natural woodland maintained by regular or intermittent natural regeneration. The pinewood of Rannoch in the barony of Slisgarrow belonged to this second category.

In coppice the whole stock is periodically returned to a vulnerable juvenile condition, and unless protection is provided for at least a few years immediately after every cutting, coppiced wood tends to deteriorate into persistent but valueless scrub. The hazards of grazing were fully realized in Scottish forestry: it was observed that young coppice was especially liable to injury, and that even a few hours of grazing

²⁵ D. N. McVean, 'Woodland and scrub', pp. 144-65, in J. H. Burnett (ed.), *The Vegetation of Scotland*, Edinburgh, 1964.

²⁶ J. M. Lindsay, 'The use of woodland in Argyllshire and Perthshire between 1650 and 1850', unpublished Ph.D. thesis, University of Edinburgh, 1974, pp. 392-434.

could cause lasting damage.²⁷ In Scotland most oak coppice was cut over at intervals ranging from nineteen to twenty-five years, and Robert Monteath, a practising forester experienced in coppice cutting, recommended enclosure for at least ten years after cutting.²⁸ Plantations required a short period of protection in relation to the lifetime of the timber crop, but if a coppice was cut every twenty years and enclosed for ten years after cutting, the availability of pasture in the wood was halved, and the protection of woodland dependent on natural regeneration from seed could require complete exclusion of grazing animals.

III

Forest management was not a traditional part of the Highland economy, and its adoption therefore required a positive decision on the landowner's part. By the end of the eighteenth century coppice management and other systems were being applied widely in the Highlands but not uniformly, and some landowners continued to exploit their woods.²⁹ Even in the southern Highlands adequate coppice management was not invariably applied. Attitudes there changed over time. In Dunbartonshire, for example, it was commonly introduced only when prices improved greatly towards 1800, and some landowners in Argyllshire still neglected their woods even then.³⁰

The irregular application of management, even where activity was most intense, plainly indicates that there was no consensus about its value. It is important to understand the criteria on which decisions about the adoption and nature of management were based, although

certain difficulties present themselves. Each decision depended on an assessment of the factors seen as relevant, but it cannot be assumed that landowners shared a common perception of the relative importance of different factors.³¹ Decisions must also be seen in context, and it is likely that they tended more towards uniformity as local norms developed. Economic factors were undoubtedly important, but it is possible that as local experience accumulated management was guided more by technical criteria than by the economic circumstances of specific cases.³² Some factors contributing to decision-making were non-economic in nature, and some were intangible; economic factors, as landowners understood them, were important, but a strictly economic approach to the problem is nevertheless inappropriate. The problem is perhaps best approached by the use of a broad cost-benefit framework.³³

The capital and labour costs of forestry were those most easily perceived. The capital cost of establishment was small or absent when semi-natural wood was brought under management, but enclosure was expensive, and a large enclosure scheme could cost several hundred pounds.³⁴ It was also necessary to consider the wages of foresters and others employed occasionally or permanently in the woods. A third major cost, land rent, was represented by the loss of revenue from other land uses and particularly wintering. The immediate danger in reducing wintering capacity was that tenants, unable to maintain stocks at the levels to which

²⁷ R. Monteath, *The Forester's Guide and Profitable Planter*, 2nd edn, Edinburgh, 1824, p. 144; A. Gilchrist, 'On the Treatment and Management of Oak Coppice in Scotland', *Trans. R. Highld. Agric. Soc. Scotl.*, 4th ser., vi, 1874, p. 126.

²⁸ M. L. Anderson, *A History of Scottish Forestry*, 1, Edinburgh, 1967, p. 467; Monteath, *op. cit.*, p. 144.

²⁹ J. Robertson, *General View of the Agriculture of the County of Inverness*, 1808, pp. 209-10.

³⁰ A. Whyte and D. Macfarlan, *General View of the Agriculture of the County of Dunbarton*, Glasgow, 1811, p. 150; J. Smith, *General View of the Agriculture of the County of Argyll*, 1805, pp. 138-9.

³¹ Some decisions, of course, were taken not by landowners but by their agents, factors, and other authorized persons; a governmental commission managed Struan and several other Highland estates between 1749 and 1784. Such decisions were, however, rarely taken by tenant farmers, to whom the nature of tenure and the Scottish law of landownership gave little opportunity or incentive to use woodland commercially on their own account.

³² Such a tendency has been held to be widespread in British private forestry. See D. R. Johnston, A. J. Grayson, and R. T. Bradley, *Forest Planning*, 1967, pp. 43-5.

³³ For a discussion of costs and benefits in forestry see *ibid.*, pp. 41-53.

³⁴ S.R.O. E.788/22/2; E. R. Cregeen (ed.), *Argyll estate instructions—Mull, Morvern, Tiree, 1770-1805*, Scottish History Society (hereafter S.H.S.), 4th ser., 1, Edinburgh, 1964, pp. 132-4.

their rents were related, would fall into arrears. Landowners could rectify or avoid this situation by lowering rent to compensate for the loss of pasture; this process was known in the Highlands as "giving abatement." Alternatively, the mean rent *per caput* could be maintained but the number of tenants reduced. Use of one or both solutions necessarily reduced revenue from agricultural rents; the second also entailed eviction or displacement, which were undesirable in an economy with few other sources of employment.

Abatement will be examined later. There is no evidence of extensive eviction or displacement associated with forestry, but holdings were sometimes modified, and it was not unknown for tenants to protest that enclosure would destroy their livelihood. Thus in 1758 the tenants of Craigrostan on Loch Lomond submitted a petition to their landowner, stating that tenancy would become impossible if woods which provided them with their sole source of pasture during most of the year were enclosed. Similarly the tenants of Camghouran in Slisgarrow claimed in 1780 that enclosure of the pinewood of Rannoch would deprive them of their best pasture and their only wintering. The cattle, it was said, could not survive without the wood pasture, and they themselves would be destitute without their cattle; complete enclosure would also block the paths leading to their hill pasture and supplies of peat.³⁵

In these cases woodland is known to have formed an unusually high proportion of the pasture, and in any case the claims may have been deliberately overstated. Nor were they invariably successful: thus the Camghouran tenants' petition for abatement for the wood pasture was dismissed, although a means of access to the hill land was found.³⁶ It is nevertheless apparent that the reduction of revenue from grazing might be accompanied by social disturbance. The principal costs of forestry could be assessed in terms of capital, labour, and land

rent; social costs were also perceptible even if they could not be quantified.

On the benefit side, woodland had a tangible value for landowners. Assessment of this value in general terms is far from easy. In the case of coppice, for example, bark prices were subject to temporal and regional variation, and the type of demand for timber changed frequently. Figure 2 shows the income obtained from the sale of approximately equal annual sections or "haggs" of oak coppice on one Perthshire estate. The account series on which it is based is unfortunately incomplete, but it is still apparent that the value of coppice to the estate rose very strikingly between about 1790 and 1815.³⁷ At the end of that period it was thought that in the Highlands as a whole coppice provided a higher income per acre than any land use, except, or even including, cultivation.³⁸

It is important to note that the value of woodland to a landowner and the benefits of management were not synonymous. Management was likely to provide a yield of produce higher than the potential yield of exploitation over a given period, and the major benefit of management was the value of this additional yield. Unlike exploitation, however, management entailed costs of the types outlined above, and only if the value of the additional yield exceeded these costs was it economically preferable to exploitation over a given period. It is unlikely that this benefit could be precisely calculated at the time. Only in controlled conditions would it be possible to establish what proportion of the yield of managed woodland might have been lost had exploitation been preferred.

The receipts of benefits was also delayed in most cases. Yield could be measured at a given time, and a value calculated accordingly in terms of prices at that time, but future yields and values could not reliably be predicted. Yield was affected by the way the wood was treated,

³⁵ S.R.O. Montrose Muniments, GD.220, Wood contracts box, 'Statement of the tenants of Craigrostan with regard to their barren timber, 1758'; S.R.O. E.783/60/253, 257 (1).

³⁶ S.R.O. E.783/60/300, E.783/76/11.

³⁷ Fig. 2 is based on estate accounts, S.R.O. GD.220/6 (46, 47, 49, 50, 56), wood contracts, and related documents. Contracts for periods of several years were in use in the eighteenth century, but price fluctuation encouraged the introduction of annual auctions before 1814.

³⁸ Smith, *op. cit.*, p. 138; Whyte and Macfarlan, *op. cit.*, p. 156; Monteath, *op. cit.*, pp. 111-12.

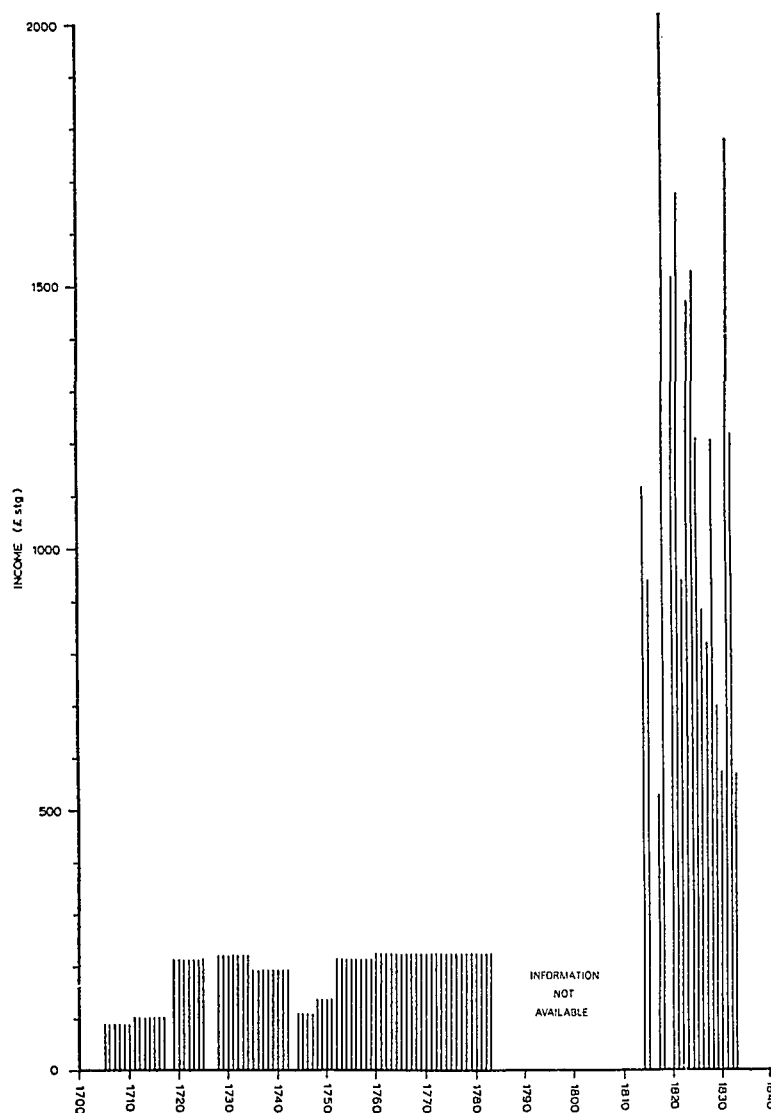


FIG. 2. Gross income from the coppice of Menteith, 1705-1833.

and value depended both on yield and on external market factors. In most forms of management, including the coppice cycle, the principal costs were incurred in the first few years, but the value could not be certain until the bulk of the produce was ready for sale after twenty or more years. Forestry was to this extent a speculative activity.

The less tangible benefits may have had effects; thus those who introduced management to their estates may have anticipated prestige as enlightened and efficient landowners. Even so, it may be suggested that landowners were un-

likely to manage rather than exploit their woods unless they believed that the yield at the cutting date would be at least sufficient, at the prices then available, to cover all costs. Management was likely to seem more attractive in circumstances which indicated that prices would rise or remain stable. Exploitation was likely to seem more attractive when trends were uncertain; if the yield and value of an area of woodland were lower after a period of exploitation this could be regarded as a loss of casual income rather than invested capital. Even in favourable conditions the costs of formal woodland man-

agement were more immediately evident than the benefits, and it could be argued that the expenditure was unnecessary. Thus in 1780 the tenants of Camghouran claimed that "... since the memory of man, the fir wood has been growing & thriving when expos'd to every form of cattle. . ."³⁹ Landowners who shared this sanguine view of the tenacity of Highland woodland are unlikely to have been enthusiastic about management. However, they may still have made some concessions to the needs of forestry, and it is necessary to examine the ways in which the interests of forestry and animal husbandry were reconciled.

IV

The existence of woodland management, even on a small scale, indicates modification of the form or scale of animal husbandry, but there is no reason to believe that those landowners who managed their woods invariably gave precedence to forestry when a conflict of interests became apparent: there is no evidence of the area of protected woodland being anywhere extended sufficiently to disrupt the local pastoral system. A compromise of some type seems to have been the means of resolving conflicts whenever management was undertaken.

Prevention or limitation of grazing in woodland was clearly a concession to the demands of forestry, and the granting of abatement was an acknowledgement that management could be carried on only at the expense of stock farming. The form taken by abatement can be seen in the case of the Duke of Argyll's coppices in Morvern. After the woods were enclosed in 1786 the Duke approved a plan in which it was estimated that enclosure with stone walls would cost about £470, with deduction or abatement of £56.⁴⁰ The outlay on enclosure was a fixed cost, but the cost of abatement recurred annually as long as the woods were protected; in this case the consequent loss of revenue would exceed the initial expense of enclosure within nine years. On some estates tenants had leases incor-

porating guarantees that abatement would be granted if land was taken for planting or other purposes.⁴¹ Although common, abatement was not universal; written leases were rare and tenants without such support could not be certain of abatement.⁴²

Another concession, perhaps less immediately obvious, was removal from grazing stocks of the animals thought most damaging to woodland: the principal victim of this policy was the goat. The relative importance of goats in the old Highland economy has already been noted, and some indication of the number kept is provided by the Scottish export of goatskins, which reached about 50,000 per annum towards the end of the seventeenth century.⁴³ Because of their agility and voraciousness goats have traditionally been regarded as especially harmful to trees, in Scotland as elsewhere. In north Perthshire, for example, concern about damage by goats was evident at the beginning of the eighteenth century, and a report on grazing in the wood of Rannoch in 1779 noted that "... goats ought to be particularly prohibited & the prohibition strongly enforced."⁴⁴ There is also evidence that this concern had a basis in reality. Thus the author of proposals for the management of the Montrose estate woods on Loch Lomond stated in 1757 that "... particularly he would banish goats out of Craigrostan, where the ash, which was considerable at last cutting, is intirely destroyed by them."⁴⁵

By 1812, when Walker observed that coppice was safe from goats only if they were totally banished, many landowners had evidently reached similar conclusions. An early example was Sir Alexander Murray of Stanhope, who tried with limited success to protect woods by removing goats from his north Argyllshire

³⁹ S.R.O. E.783/85/4.

⁴² As in the case of the Camghouran tenants: see S.R.O. E.783/76/9.

⁴³ T. C. Smout, 'Goat-keeping in the old Highland Economy—4', *Scott. Studies*, ix, 1965, p. 187.

⁴⁴ Edinburgh University Library, Athole Papers, Dc.I.37 1/3, fol. 12; C. Innes (ed.), *The Black Book of Taymouth*, Edinburgh, 1855, p. 428; S.R.O. E.783/76/9.

⁴⁵ S.R.O. GD.220, wood contracts box, "Memorial and proposals for John Muirhead in relation to the woods of Buchanan, 1757."

³⁹ S.R.O. E.783/60/253.

⁴⁰ Cregeen, *op. cit.*, pp. 132-4.

estate after 1723.⁴⁶ They were said still to be common in the Highlands about 1750, and in 1770 Bishop Forbes saw huge herds in north Argyllshire, but within a few decades a general and extensive reduction had taken place throughout the south and central Highlands.⁴⁷ Goats had almost disappeared from upland Perthshire and Angus. No more than 10,000 were thought to survive in Inverness-shire and mainland Argyllshire, and this number may be compared to the 60,000 sheep said to be present in the single parish of Ardgour in 1793.⁴⁸

Reduction of the goat population was attributed not only to protection of woodland but also to the requirements of sheep farming.⁴⁹ The presence of goats was not in itself harmful to sheep; a few goats were indeed thought to be useful additions to an upland sheep stock.⁵⁰ They were, however, most closely associated with small tenant farming, and were kept for domestic use rather than sale. It appears that reduction in the size of stocks held by small tenants made it advisable to concentrate on animals more valuable in terms of cash or rent in kind, particularly if sheep monopolized the upland pastures on which goats had formerly spent much of the year. In examining the decline of goat populations it is not possible to differentiate between the effects of forestry and sheep farming; some contemporary observers thought that the decline was initiated by fores-

try and completed by pressure from sheep farming, but the relative importance of the two factors is very likely to have varied both on regional and on local scales.⁵¹

Compromise also plainly involved modification of systems of woodland management. In this case concessions to animal husbandry related mainly to enclosure: the criteria on which the selection of areas for protection was based, the period during which protection was maintained, and the strictness with which the security of the enclosure was preserved during that time all tended to be unsatisfactory in relation to contemporary principles of management. Writers on forestry advocated the extension of the wooded area, not only by planting of new ground but also by the restocking of existing woodland, and by the application of protection and coppice management in order to restore deciduous scrub and poor coppiced woodland to a useful state.⁵² In practice, however, Highland landowners seem to have been concerned less with extension of the area of woodland, managed or otherwise, than with the selection of a small proportion which was to benefit from management. The demand for pasture made it practicable to confine attention to woodland of relatively high value; configuration, species composition, quality, and location all played some part in the process of selection.

Compact woodland can be enclosed more cheaply and easily than fragmented wood or scattered trees. An area of woodland consisting of two or more distinct sections tends to have a longer perimeter than one wood of equivalent area, and separate enclosure of these sections will usually be more expensive. The cost of protecting scattered trees individually is similarly greater than would be the case if an equal number were grouped as a wood. Enclosure costs may be reduced by erection of a single fence around several small woods or isolated trees, but in such cases unwooded ground is inevi-

⁴⁶ J. Walker, *Economical History of the Hebrides and Highlands of Scotland*, II, 1812, p. 169; B. R. S. Megaw, 'Goat-keeping in the old Highland Economy', *Scott. Studies*, VII, 1963, pp. 202-3.

⁴⁷ J. Campbell, *A Full and Particular Description of the Highlands of Scotland*, 1752, p. 7; J. B. Craven (ed.), *Journals of the Episcopal Visitations of the Rt. Rev. Robert Forbes . . . 1762 & 1770*, 1886, pp. 318-9.

⁴⁸ W. Marshall, *General View of the Agriculture of the Central Highlands of Scotland*, 1794, p. 43; J. Robertson, *General View of the Agriculture of the Southern Districts of the County of Perth*, 1794, p. 69; J. Headrick, *General View of the Agriculture of the County of Angus or Forfarshire*, Edinburgh, 1813, pp. 449-50; Smith, *op. cit.*, p. 282; Robertson, *Inverness*, pp. 260-1; Sir J. Sinclair (ed.), *A statistical account of Scotland*, VIII, Edinburgh, 1793, p. 424.

⁴⁹ Robertson, *S. Perthshire*, p. 69; Smith, *op. cit.*, p. 282; Headrick, *op. cit.*, pp. 449-50.

⁵⁰ Anon. (ed.), *The New Statistical Account of Scotland*, x (Perth), Edinburgh, 1845, p. 571 (hereafter N.S.A.S.); M. Campbell, *op. cit.*, p. 183.

⁵¹ Robertson, *S. Perthshire*, p. 69; Smith, *op. cit.*, pp. 186-7.

⁵² Monteath, *op. cit.*, pp. 22-30; R. Monteath, *Miscellaneous Reports on Woods and Plantations*, Dundee, 1827, pp. 50-1; J. Brown, *The Forester*, 3rd ed., Edinburgh, 1861, pp. 524-8; Gilchrist, *loc. cit.*, p. 126.

tably included and grazing rent is lost. This was evidently a principal reason for the decision to enclose only the compact central part of the pinewood of Rannoch in 1779, leaving about 30 per cent of the wood open. Similarly, when means of enclosing the wood of Tombea near Callander were considered in 1771, it was noted that scattered trees could not be included without also enclosing about 20 acres of pasture; it was thought that if protection was confined to the compact wood, enclosure would be cheaper and abatement unnecessary.⁵³ When the woods of Morvern were surveyed in 1786 similar problems emerged: in several cases it was thought inadvisable to protect open or scattered wood which might require expensive enclosure, heavy abatement, or both.⁵⁴

There was also a tendency to protect only woodland of the more valuable species. Thus when the pinewood of Rannoch was enclosed the possibility of including the adjacent woods of birch and alder was not considered. Coppice of the less valuable species was rarely enclosed, and the Morvern surveyors did not favour protection of "barren" woods without oak or ash.⁵⁵ In the early nineteenth century change in the law concerning construction of herring barrels permitted the use of native timber; one consequence, according to contemporary reports, was that large areas of birchwood not previously used commercially were cut and left unprotected.⁵⁶ At the middle of the century birchwood remained unmanaged even in parishes where oak coppice was carefully conserved.⁵⁷ Coppicing provided a means of reclaiming scrub, but attention was usually devoted to stands which were already in good condition. The Morvern surveyors recommended protection of "good" or "thriving" wood, and much

of the rest was left exposed. Even when coppice prices were highest large areas of scrub and brushwood were still in evidence in the Highlands.⁵⁸

Finally, all else being equal, management was more likely to be applied to the more accessible stands. This was the case in Morvern, and on the Montrose lands in south-west Perthshire the only oakwoods excluded from regular coppice rotation were those on the inaccessible shore of Loch Katrine.⁵⁹ In summary, management was usually confined to compact, healthy, and accessible areas of the more valuable species. In the case of coppice the difference between managed and untended woods was emphasized, particularly around 1800, by planting and restocking with oak at the expense of "barren" species.⁶⁰ A comparable distinction was made in other semi-natural woods; attempts to assist or improve regeneration in the pinewood of Rannoch were confined to the enclosed section.⁶¹ When plantations were established it was relatively easy to design them to meet the requirements outlined above.

The period of protection was usually short. Some foresters thought that hardwood plantations should be enclosed for about forty years, but Highland plantations were usually opened to grazing after twenty-five years or less.⁶² Coppice was seldom enclosed for as long as the ten years recommended by Monteath, and in the earlier part of the eighteenth century a period of four years or less was not uncommon.⁶³ By the beginning of the next century managed coppice was more often protected for six or seven years; some observers thought that this period was still too short to prevent dam-

⁵³ S.R.O. E.783/76/9; E.777/136/1(2).

⁵⁴ Cregeen, *op. cit.*, pp. 127-32.

⁵⁵ See particularly reports of the period 1778-81, S.R.O. E.783/76/6, 7, 9, 13, E.788/22/2; Cregeen, *op. cit.*, pp. 130-1.

⁵⁶ Monteath, *Forester's Guide*, pp. 198-9; J. MacCulloch, *The Highlands and Western Islands of Scotland*, 1, 1824, p. 438; C. H. Herford (ed.), *Journal of a Tour in Scotland in 1819 by Robert Southey*, 1929, pp. 146-7.

⁵⁷ Thus N.S.A.S., vii (Argyll), p. 364.

⁵⁸ Cregeen, *op. cit.*, pp. 128-9, 131; Smith, *op. cit.*, pp. 154-5; Walker, *op. cit.*, 11, pp. 276-80.

⁵⁹ Cregeen, *op. cit.*, pp. 129-30; Lindsay, *op. cit.*, pp. 505-7.

⁶⁰ Monteath, *Forester's Guide*, pp. 176-7.

⁶¹ S.R.O. E.783/16/1, E.783/76/9, 13, E.788/22/2.

⁶² Brown, *op. cit.*, pp. 58-9; Headrick, *op. cit.*, p. 376; N.S.A.S., vii (Argyll), p. 150.

⁶³ S.R.O. GD.220, Wood contracts box, 'For master and byer of woods' (n.d., c. 1700), and 'Contract for the wood of Blarinross, 1744'; Whyte & Macfarlan, *op. cit.*, p. 150; Megaw, 'Goat-keeping', *Scott. Studies*, vii, 1963, p. 203.

age, but relatively few landowners enclosed coppice for longer periods.⁶⁴

Coppices could be cut in rotation; a wood cut at twenty-four-year intervals might thus be divided into twenty-four approximately equal sections cut in sequence. Each year one section was cut, a set number were at different stages of enclosure, and the rest were available as pasture; application of this system to the Montrose woods in the south-west Highlands, coupled with a six-year enclosure period, made about 70 per cent of the pasture available in each year of the rotation.⁶⁵ Smaller woods which could not reasonably be subdivided to the same degree were commonly cut on incomplete rotations or divided into a few relatively large blocks. Such systems were not invariably less efficient in providing pasture during the rotation as a whole, but they offered less regular annual quotas, and in some cases no wood pasture at all was available during part of the cycle.⁶⁶

Tenants were sometimes allowed to cut hay within enclosed woods. The Morvern surveyors suggested that abatement could be reduced in some cases if tenants were permitted to cut hay and also cultivate small areas within the enclosures. It was possible that seedlings and saplings might be destroyed by this, though in the early eighteenth century hay cutting was allowed in the enclosures of the wood of Kincardine in Perthshire, but only when inspection had shown that no young growth would be endangered. The quality of woodland pasture was low in any case, and the grass could not easily be dried in the woods; this was found on the Breadalbane estate in north Perthshire, where the grass of woodland and scrub was being cut for hay about 1770.⁶⁷

Extensive sheep farming provided higher rents than traditional stock farming, and largely in cash rather than in produce as before. After sheep farming was introduced the ability of forestry to compete with agriculture appears to have been reduced, even though the prices of woodland produce were also high during the decades when sheepwalks were established. Management was applied even more selectively than previously, and large tracts were evidently abandoned; by 1827, according to Monteath, the permanent sheep pasture of most Highland counties contained extensive former coppices of oak and other species.⁶⁸ In relation to that which was still managed, woodland excluded from management is likely to have deteriorated further under continued grazing pressure. Unprotected woodland was also liable to damage in the course of burning intended to improve heathland pasture. One enthusiastic supporter of the sheep movement complained in 1799 that certain landowners in Argyllshire refused to burn heath which carried scattered birch-wood.⁶⁹ Destruction of woodland by poorly controlled burning had already been recorded, however, and it is probable that burning was the main agent alluded to by another observer who stated a few years later than the woods of the Highlands were disappearing to make way for sheep.⁷⁰

The situation was not dissimilar around 1850. Selective management was still employed. It was said in Morvern parish that oak and ash coppice was still carefully preserved, although other species were being destroyed "... for the benefit of the much-indulged sheep."⁷¹ The period of protection remained short. In the neighbouring parish of Ardnamurchan, for ex-

⁶⁴ Smith, *op. cit.*, p. 138; Robertson, *Inverness*, p. 210; Whyte & Macfarlan, *op. cit.*, pp. 151-2; Robertson, *S. Perthshire*, p. 98.

⁶⁵ For a description see P. Graham, *General View of the Agriculture of Stirlingshire*, Edinburgh, 1812, pp. 213-18.

⁶⁶ W. Nicol, *The Practical Planter*, Edinburgh, 1799, p. 300; Monteath, *Forester's Guide*, pp. 114-15. The last form was common in Argyllshire: see Smith, *op. cit.*, pp. 138-9, 141.

⁶⁷ Cregeen, *op. cit.*, pp. 130-1; S.R.O. GD.220, Wood contracts box, 'contract of wood betwixt James Marquis

of Montrose and John Sheddan, 1725'; M. M. MacArthur (ed.), *Survey of Lochtayside, 1769*, S.H.S., 3rd ser., xxvii, Edinburgh, 1936, pp. 47, 169; Whyte & Macfarlan, *op. cit.*, p. 157.

⁶⁸ Monteath, *Reports*, pp. 53-6.

⁶⁹ D. Smith, 'On the Propriety of Burning Heath Grounds, for the Improvement of Pasture', *Trans. R. Highld. Agric. Soc. Scotl.*, 1, 1799, p. 237.

⁷⁰ *Ibid.*, p. 249n; W. Singers, 'On the introduction of Sheep-farming into the Highlands', *Trans. R. Highld. Agric. Soc. Scotl.*, III, 1807, p. 553.

⁷¹ N.S.A.S., VII (Argyll), p. 176.

ample, it was thought bad farm management to withhold wintering by prolonging the period of enclosure, and James Brown found that in Scotland as a whole it was commonly assumed that after a short period of enclosure the grazing rent of woodland was greater than any further increase in the value of timber likely under continued protection.⁷² The prices of native woodland produce continued to fall during the later nineteenth century; the substitution of imported materials for domestic oak bark in tanning was particularly significant. Forms of management based on semi-natural woodland were gradually abandoned, and although some woods were still coppiced in the 1890's formal coppicing seems to have become extinct in Scotland soon afterwards. Imported timber dominated the softwood market, and only after 1914 did conditions become favourable for extensive planting of the mid-altitude coniferous forest now typical of the region.⁷³

V

Both forms of land use were modified to some extent. The main concession made by animal husbandry was a temporary reduction in stocking capacity, cancelled sooner or later when woodland was once more opened to grazing; the decline of the goat may also be attributed in part to forestry. More significant concessions were made by forestry. The semi-natural woodland of the Highlands was a suitable base for management, and coppicing was a particularly appropriate treatment for poor woodland and scrub. However, management was applied to a relatively small part of the woodland of the Highlands, and the standard was generally low and the forms employed modified in ways which suggest a consistent wish to minimize the loss of pasture. Much of the remainder was subject to treatment which probably reduced its value for both commercial and local use. Large areas of semi-natural woodland were left exposed to grazing and casual or

commercial exploitation, and as management declined more was similarly treated. In view of the danger than woodland might deteriorate into scrub or fail to regenerate under such conditions, this cannot be regarded as a reversible process like the reduction of stocking capacity.

Landowners therefore gave animal husbandry general precedence. This cannot be attributed to concern for the welfare of the community: the readiness with which landowners accepted sheep farming on a scale incompatible with the operation of the old system does not indicate a uniformly high level of social concern. On the other hand, economic factors, as they were understood by landowners, were undoubtedly important: forest management was generally adopted only when the prices of produce rose markedly, and abandoned during their fall. However, as has been pointed out already, it was very difficult to evaluate the benefits of forestry in specific cases. In such circumstances it might be expected that economic and technical generalities would provide guidelines, but opinion was sharply divided, and in contemporary works on the subject such generalizations were presented in terms which evidently owed little to economic objectivity.

It may be suggested that the adoption or rejection of management was a matter of faith rather than the result of careful appraisal; economic and technical generalities were considered in relation to local resources, and the choice was conditioned by the social, educational, and individual character of the landowner. To those who did not believe that the benefits of management would outweigh the costs, the traditional exploitation of woodland for materials, pasture, and shelter was preferable to a land use which would encroach on valuable wintering ground. Those who for some time at least accepted that the expense of management was justified, and were willing to lose some grazing rent on this account, were compelled to recognize that only a limited amount of wintering ground could be appropriated without disrupting the whole pastoral system. In the absence of a radical change in the economic base of the

⁷² N.S.A.S., VII (Argyll), p. 150; Brown, *op. cit.*, p. 58.

⁷³ A. Schwappach, 'Report on a Visit to the Forests of Scotland in August 1896', *Trans. R. Scott. Arboric. Soc.*, xv, 1898, p. 15; Anderson, *op. cit.*, II, pp. 313-14.

Highlands forestry could be only a subsidiary use of land.

It should be pointed out, finally, that the common view of Highland forestry before 1850 as an exploitive and highly destructive form of land use cannot remain unchallenged. It has been shown that management, however far removed from the ideal form, was not uncommon in the Highlands. The charge of destructiveness cannot be examined here. However, it has been argued elsewhere that the iron-smelters, often cited as principal offenders,

caused little damage, and in at least one case brought about a localized increase in the wooded area.⁷⁴ It may be more appropriate to seek the major cause of deforestation in the less conspicuous but more sustained pressure to which stock-rearing communities subjected the woods during the long period before the advent of commercial use.

⁷⁴ J. M. Lindsay, 'Charcoal Iron Smelting and its Fuel Supply; the example of Lorn furnace, Argyllshire, 1753-1876', *J. Hist. Geog.* 1, 1975, pp. 283-98.

Notes and Comments

INCREASE IN ANNUAL SUBSCRIPTION

Members will have received the notice informing them of an increase in the subscription to the Society with effect from 1 February 1977. It would greatly assist the Treasurer if members who have not amended their banker's orders would do so as soon as possible.

UPLAND LANDSCAPES STUDY

The Countryside Commission has ordered a research study of upland farming areas of England and Wales with a view to formulating future policy for these areas. Members who have relevant information or who wish to draw attention to particular issues should write to Richard Westmacott, The Upland Landscapes Study, 3 St Martin's Road, London SW9 0SP.

CLEVELAND AND TEESIDE LOCAL HISTORY SOCIETY

The Society continues to publish short articles dealing with the Cleveland and Teesside region, many of which are of interest to agricultural historians. Bulletin No. 31, Summer 1976, contains details of articles published in Bulletins 11 to 20, and may be obtained from the Secretary, Miss M. Barclay, 3 Penrith Close, Redcar.

CHARLES DARWIN

The American Council of Learned Societies is sponsoring the production of a comprehensive edition of the letters written by and to Charles Darwin. Per-

sons with special knowledge of Darwin's correspondence are asked to help by communicating with Dr Sydney Smith, St Catharine's College, Cambridge.

FARMING BOOKLETS FOR CHILDREN

Members may be interested to know of two illustrated booklets for children, entitled *The Farmer* and *Farming*, published by Dinosaur Publications, Beechcroft House, Over, Cambridge, CB4 5NE. *The Farmer* may be obtained from the publishers, price 75p, and *Farming* from National Trust, Queen Anne's Gate, London SW1, price 40p.

RESEARCH IN HISTORICAL GEOGRAPHY

The Institute of British Geographers has published a *Register* of current research in Historical Geography. Many of the research topics listed in the *Register* will be of interest to agricultural historians, and members interested in obtaining copies of it should write to Mr Harold Fox, Department of English Local History, University of Leicester, Leicester LE1 7RH. The *Register* is priced at £1.25.

DOCUMENTATION NEWSLETTER

This is a new publication from the Department of Manuscripts and University Archives of the Cornell University Libraries. Archival processes, problems, and solutions are discussed, and also included are notices of recent accessions, and descriptions of selected collections. For information, or to be placed on the mailing list, write to the Department, 101 Olin Library, Cornell University, Ithaca, N.Y. 14853.

(continued on page 52)