Agricultural Change in Southern Derbyshire 1770 to 1870 with Special Reference to the Dairy Industry

by

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Thesis submitted to the University of Nottingham for the Degree of Doctor of Philosophy, October 1995

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Abstract

The aim of this thesis is to investigate spatial and temporal aspects of agricultural change in southern Derbyshire between 1770 and 1870. During this period it is argued that the progress of dairying showed strong continuity with the developments of preceding centuries and experienced growth ahead of the reorientation towards liquid milk production in the latter nineteenth century. Contemporary and modern sources have been consulted, important among which are sale advertisements and other agricultural reportage published in the Derby Mercury newspaper.

A significant outcome has been the elaboration of the prime role of dairying and the production of farmhouse cheese in the southern Derbyshire farm system with cattle and pig fattening, sheep rearing and grain production as subsidiary enterprises. Dairying was most intensively developed on heavier land: marls of the Mercian Mudstone, shales of the Westphalian and glacial till sheets but less so to the south of the Trent where soil conditions are more varied. Between 1770 and 1870 dairy production increased substantially as the proportion of land in arable declined. Contributory factors discussed include farm enlargement, higher stock rates and improved cattle breed. Of particular note was the feeding of brewers' grains from Burton. It is argued that as a consequence pastures may have been sustained above the common low level of management characteristic of the times.

The dairy system emerges as a progressive feature of clayland sector agriculture and while not generally 'revolutionary' some farmers achieved a degree of refinement to match the concept of 'High Farming'.

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Acknowledgements

This thesis would not have been completed without the help and assistance of many people over an extended period of time. In the early stages Drs Catherine Delano Smith and Philip Wheeler gave perceptive tutorial guidance. Subsequently Professor John Cole provided much sound advice but most importantly created the necessary impetus towards writing and eventual completion. Derby University has made financial support and micro processor facilities available both of which are gratefully acknowledged. Colleagues at the university in Derby have given a diverse range of significant assistance. My immediate colleagues in the Geography Division have made time available to discuss a number of points of significance but in particular mention must be made of Oliver Tomlinson for computing advice, Andrew Skinner and Ann Aderogba for help with cartography and David Clark for library searches. Anthea Peters typed an initial manuscript and deserves special thanks for her patience with my drafting.

Various institutions have assisted with the collection of data. The help of the staff of the Derbyshire Record Office, the Derby Local History Library, the Staffordshire Record Office, the Lichfield Diocesan Record Office and the Chatsworth Archives are recognised in this connection. The Administrator of Sudbury Hall and the Lord Vernon freely allowed access to maps and documents.

At home the forbearance and encouragement of my family is acknowledged. Special thanks are due to Tigger and Jed, canine companions in the exploration of the Derbyshire landscape.

CHAPTER 1

INTRODUCTION: RESEARCH CONTEXT AND PROBLEM DEFINITION

It is the purpose of this thesis to examine the agricultural geography of the southern part of Derbyshire over the period 1770 to 1870 with particular reference to the dairy industry. The specific area to be considered is usefully shown on the eighteenth century county map of 1767 originally published at one inch to one mile and surveyed by P Burdett of Foremark [see Figure 1.1]. This represents the county in a substantially preindustrial form with the boundary in its earlier arrangement whereby Derbyshire parishes stood as islands within Leicestershire. Otherwise southern Derbyshire can be viewed profitably from two defining perspectives. The first relates to the major data source used in this study with respect to livestock in general and dairying in particular namely farm sale advertisements published in the Derby Mercury newspaper and the second to the physical character of the landscape of southern Derbyshire.

It was not until the annual agricultural census of 1866 that official statistical data is available at parish level for livestock, crops and grass. Indeed 1870 has been adopted as a terminal point for the study partly because of significant change in the dairy industry at this time but principally as the census gives a secure statistical anchor for earlier material. Such material has been derived mainly from advertisments in the Derby Mercury which began to appear from about 1770 onwards and thus provides a rationale for the selection of this year as a start point for the study. The merit of the newspaper as a data source is a frequency of occurrence and level of detail of advertisments which offers some basis for cartographic and quantitive analysis. In addition there is a valuable range of comment on the agricultural scene. The area covered by the farm sale advertisements in the Derby Mercury includes the southern part of Derbyshire plus contiguous parts of Staffordshire in

the vicinity of Burton upon Trent and north west Leicestershire around Ashby. In so doing the advertising area provides an effective working definition of southern Derbyshire for the purposes of this study. Coincidentally this area is broadly comparable with a definition based on locational and geological considerations. It follows that the study is concerned with that part of Derbyshire south of a line drawn west to east through Ashbourne and incorporates, as appropriate, consideration of adjacent parts of east Staffordshire and north west Leicestershire. In topographic terms the valleys of the Trent and its tributaries are important focal features. Geologically the area is diverse and while there are localised patches of light land the dominant soil types are towards the heavier end of the textural spectrum in character. The most extensive formation is the Triassic Mercian Mudstone which was styled the red marl by the early agricultural commentators in response to its distinctive impact on the landscape [see Pilkington J, 1787, Brown T, 1804, and Fairey J, 1815 1 1815 2 and 1817].

The Research Context

While it will be demonstrated that dairying and the associated making of farmhouse cheese was the key agricultural enterprise in southern Derbyshire throughout the study period it is not to be argued that it was a discrete dairy region nor that dairying was the only source of farm income. It is better viewed as but one focal area within a broad tract of England in which dairying had general significance and which extended from Lancashire and Cheshire in the north west through Staffordshire and Derbyshire into Leicestershire. In national terms this tract was complemented by comparable dairying activities in the south west in such locations as the Vale of Berkeley in Gloucestershire, north Wiltshire and parts of Somerset and Dorset.

For all these areas which achieved a degree of specialisation in dairying the period 1770 to 1870 is characterised by four notable features emanating from national economic developments.

The first is that of a rapidly expanding market for agricultural products occasioned by the trebling of the population of England as a whole with comparable change at regional and local level. Secondly there was increased productivity in response to the favourable market as a consequence of agricultural advance on a range of fronts including structure, land management, new developments with respect to crops and livestock, and the application of science and technology to agricultural problems. Thirdly the period was marked by fluctuating economic conditions, the most substantial of which were the boom and slump of the Napoleonic wars. Later the repeal of the Corn Laws in 1846 opened the way for agriculture in Britain to be subjected to the full force of free market conditions although the impact of this was substantially delayed until the 1870's. Indeed in the interim agriculture is said to have enjoyed a period of productivity and prosperity in an age of 'High Farming'. Finally the century up to the 1870's saw the end of the dominance of the dairy trade by farm manufactured products such as butter and cheese with liquid milk being mainly obtained from urban dairies. Change began in the 1850's and really took hold in the 1870's and moved the dairy farmer towards the production of liquid milk for mass sale. At the same time dairying expanded beyond the traditionally established localities such as southern Derbyshire so that by the turn of the nineteenth century it had become the leading enterprise in English agriculture.

Apart from contextual considerations as outlined above predominance of heavier soils is also a characteristic shared by all the focal areas of dairying which had evolved to the close of the eighteenth century. The analysis of the development of dairying, and indeed agriculture in general, is therefore coloured by the long running debate about sectoral advance. This concept was founded upon a perceived dichotomy between agricultural change as it occurred on light soils where progressive and productive mixed farming systems became characteristic and the heavier lands where farming was relatively backward at least until extensive underdrainage was

possible from the 1840's. The strong emergence of dairying in the localities so defined indicates its validity as a response to heavy land given the market conditions of the time. The extent to which dairy regions may or may not have been relatively backward is an important consideration for this study. Whatever the answer the significance of dairying as an element of English agriculture is not in dispute. Although not so great in earlier times, the contribution of milk production has been calculated by Taylor following Ojala at 14.7% of Gross Agricultural Production in the United Kingdom during the 1860's as compared with 15.2% for beef and veal and 15.4% for wheat [Taylor D, 1971 p.12]. This is broadly in line with Grigg's tabulation for the changing structure of British agricultural output where 15% is the proportion attributed to milk and dairy products for the period 1867-73 [Grigg D, 1989 p.13]. Grigg also indicates in the same table a major shift in emphasis in British agriculture from the late eighteenth century when about one third of output related to livestock products and two thirds to crops to the late nineteenth century when almost exactly the reverse situation applied.

Given the emergence of such strong relative standing of milk and dairying as compared with other products, including wheat as the premier grain crop, it is surprising that dairying has featured so little in modern agricultural research and writings until the 1960's and particularly until the work of Taylor [Taylor D, 1971, 1974, 1976 and 1987]. Taylor's essential concern was with the rise of the liquid milk trade in the latter nineteenth and the early twentieth centuries so it is his introductory comment which is of greatest relevance to the present study. Taylor himself discusses the unbalanced treatment of the dairy industry with respect to texts dealing with the economic history of the country as a whole as well as those which were strictly agricultural in their concerns. By 1987 however Taylor felt able to state that 'after years of neglect the English dairy industry is now receiving the recognition it deserves from historians' [Taylor D, 1987 p.47]. It must be underlined that while this may indeed be true for the

period from the mid nineteenth century onwards it is not so evident with respect to earlier times which remain relatively neglected. In addition Taylor makes the point strongly that a common characteristic of writings on agricultural change in England has been an uncritical focus on grain even during the latter decades of the nineteenth century when dairying was growing in prominence - 'all too frequently one finds agriculture discussed as if it were synonymous with corn' [Taylor D, 1971 p.6]. A clear example of this bias comes from Lord Ernle who generally makes only rare passing references to dairying. In a review of the period of high farming covering the years from 1837 to 1874 Ernle's sole comment is that 'during the period from 1853 to 1874 little attention was paid to improvements in dairying' [Lord Ernle, 6th ed 1961 p.375].

In seeking to understand the lack of appreciation of dairying the comments of Orwin and Whetham [Orwin C S and Whetham E H, 1964 p.35] are helpful. They point out that dairy farms were small family affairs which were of low social position relative to big sheep and corn men and therefore received scant recognition. Additional factors bearing on the situation revolved around the actual process of cheese making which was extremely demanding and 'remained a tedious burden on the energies of farm families'. Taylor [Taylor D, 1971 p.14] also recognises the significance of the poor social standing of dairying in that 'despite the long tradition of dairy farming it was not considered to be a legitimate branch of farming by many members of the agricultural community in the nineteenth century'.

Orwin and Whetham [ibid 1964 p.36] further recognise that an important consequence of this lack of contemporary interest in dairying is the general absence of discussion and data. This being particularly so for the years before the agricultural census of 1866 where the most useful records survive from large arable farmers and the experimentally minded land owners. On the other hand 'of the mainly grassland farms whether dairy or fattening or stock rearing we have still less in the way of

reliable accounts, whether financial or physical'. The need to evaluate 'contemporary opinion' is acknowledged with reference to matters as fundamental as the expected annual cheese make per dairy cow which was variously quoted at between 2.5 and 5cwt in a season. Orwin and Whetham's account of progress in dairying from the 1870's is much more secure. The move to the milk trade is clearly identified and also the attempt pioneered in Derbyshire and Staffordshire to set up a factory based cheese manufacturing system in association with local dairy farms as an alternative to farmhouse cheese making and the sale of liquid milk. In addition Orwin and Whetham [ibid p.136-7] propose a classification of cattle enterprises on a county basis using data from the 1870 agricultural census in which Derbyshire with neighbouring Staffordshire are in a group of ten English counties classified as mainly dairying.

The only substantial volume devoted to the history of dairying in England by Fussell [Fussell G E, 1966] demonstrates similar problems in assessing dairying before the 1860's. Fussell deals with various facets of the work of the farmer in a systematic manner and achieves an extensive review of early agricultural writings. However Fussell does not present a clear analysis of the evolving spatial and temporal characteristics of the dairy industry or the processes operating to bring about change. Yet it is apparent that he had difficulty in quantifying the various aspects of the industry and had to infer the likely course of events. Thus with respect to the period 1750 to 1850 Fussell argues that 'the growth of population and the comparatively small proportion of imports indicate that the home dairy industry....so far from decreasing must have expanded to quite a notable degree. Unfortunately this is another problem to which no exact or arithmetical answer can be given' [ibid p.284].

Fussell shared with all researchers the problem created by the need to rely on the surviving statements of early commentators. The prime difficulty is to know how typical an observation might be of the area to which it refered let alone its wider significance. Such observations also tend to reflect best or

experimental practice rather than that of the ordinary farmer. Fussell does identify the run of the mill dairy farmers as conservative and even backward in their productivity and technique. Some fundamental matters were not yet understood so that 'even by 1870 no regular principles of feeding had been established' [ibid p.55]. A comment which is underlined in remarks about grassland to the effect that 'the majority of ordinary farmers.... continued to manage their grassland as their forefathers had done for centuries that is if they managed it at all' [ibid p.91] The overwintering of cows on spoiled pastures was seemingly common practice [ibid p.114] while the housing of stock also appears to have been inadequate through 'the use of rough and ready sheds and barns'[ibid p.146]. Dairy technique generally lacked finesse so that in the 1850's in Derbyshire 'their utensils would have been few and primitive' [ibid p.241].

Little is added to Orwin and Whetham's writings on the specific issue of dairying in the analysis of the agricultural revolution by Chambers and Mingay [Chambers J D and Mingay G E, 1966]. However the identification of the period 1750 to 1880 for such a revolution reminds of a potential dynamic backcloth for the present study, the authors describing the processes of change involved as geographically diverse and highly complex [ibid p.v]. Chambers and Mingay's book is one of a cluster of publications at this time which focused attention on the differential advance achieved on light land as against heavy land soils. The relevance of this debate to studies of agricultural development in the north Midland area was later clearly demonstrated by studies of Nottinghamshire and Staffordshire by Phillips [Phillips A D M, 1973 and 1976]. A key issue of debate concerned the role of underdrainage as a mechanism for freeing up heavy land agricultural systems to take advantage of root crop based rotations and to be less prone to damage from trampling by livestock such that their productivity would be enhanced. The debate is not only important in its own right, especially as it reflects upon the validity of the concept of an age of 'High Farming', but also because the role

of dairy farming in the process of agricultural advance on heavy land is discussed in some detail.

The initial contribution to a particularly vigorous phase of discussion during the 1960's was made by Sturgess [Sturgess R W, 1966] who argued that a significant increase in the general productivity of clayland was achieved in the period 1840 to 1870 such that an agricultural revolution took place comparable to that which had previously occurred on light soils. The effective drainage of land enhanced the output of corn and fodder crops and enabled more and better fed stock to be kept. In so doing Sturgess acknowledges that the character of both light soil and the clays were internally variable so that general trends may have been differential in their effect. Elaboration of the problems for clayland farmers prior to 1840 focuses on the issue of poor grassland management given that in stock based systems the grassland was required to fulfil a dual function of providing forage in summer and also meadow land for hay for winter feed. The two functions were not easily compatible and in combination effectively limited the amount of stock that could be supported unless supplementary feed could be purchased from off the farm. Additionally much grassland was neglected and therefore had limited value as feed. Sturgess cites the dairy district of Gloucestershire as being of this character. Also of general significance for dairy districts, including the Trent valley areas of Nottinghamshire and Derbyshire, is the recognition that pastures became phosphate deficient as this element was progressively removed from the system in liquid milk and dairy products. Only in parts of Cheshire and other districts where boning of pastures had been adopted was there evidence of the problem being rectified. Inputs such as boning were one of the 'revolutionary' improvements noted by Sturgess as being adopted from about 1840 onwards, others being the dressing of pastures with manufactured superphosphate and the feeding of stock with oilcake and both brewers' and home grown grains. Sturgess identifies the potential significance of brewers' grains which were widely available in the vicinity of Burton on Trent [ibid, p.112]. While valuable as a

supplementary feed, particularly in the winter, the resultant richer dung was seemingly a key factor in land improvement in the Trent valley, a matter which will be elaborated later in this study. Sturgess's conclusion is that a combination of effective underdrainage and improved feed enabled the agricultural systems of the claylands to become progressive in a manner similar to that of lighter soil districts.

Despite making a case founded upon writings contemporary to the period under consideration Sturgess was directly challenged in his conclusion that revolutionary progress had occurred on the clays by Collins and Jones [Collins E J T and Jones E L, 1967]. There is no dispute as to the basic dichotomy between light land and heavy land agriculture nor as to the difficulties of the clayland system as practised before 1840. The essential argument is about the extent of effective land drainage without which no real change would have occurred. Collins and Jones cited evidence that by 1880 only 16% of the land in England requiring drainage had been dealt with and that through inadequacy of technique much land which had been drained had not been greatly improved. Additionally the costs of implementing drainage schemes are cited as having been higher than either rents or farm incomes. The continuing poor quality of grasslands which was remarked by significant agricultural writers from the 1860's and 1870's such as Chalmers Morton [Morton J C, 1865], Carrington [Carrington W T, 1865] and Thompson [Thompson H S, 1872] is also used by Collins and Jones as evidence of lack of any widespread advance. Further support for this view is garnered from opinion that viewed both livestock numbers and milk yields as static. The move to livestock and dairying together with the making over of land to pasture, which Collins and Jones acknowledge as having occurred, is regarded as having been expedient in the light of prevailing price trends. The argument is summed up: 'there was no revolution in technique merely a series of rather unsatisfactory adaptations in the swings in the market towards livestock products' [op cit, 1967 p.81].

Sturgess felt sufficiently sure of his case to make an immediate response [Sturgess R W, 1967]. His conclusion is interesting in that there emerges a clearer definition of his view as to the spatial occurrence of significant change on the clays to apply to those areas better suited climatically to the growth of grass. 'Over the fifties and sixties there occurred a technical revolution on the clays of the north and the west of the country which consisted in the conversion in cornland to an intensive grassland husbandry on newly drained farms. This new intensity was gained by the feeding of cows with grains and oil cake which released much of the meadowland for summer grazing and permitted expanding herds of dairy and beef cattle to be carried on summer pasture' [ibid p.86].

Subsequently Sturgess received support from Whetham [Whetham E H, 1968] who asserted that Collins and Jones had overstated their case. Generally underdrainage did work and improved techniques in feeding were influential in increasing yields. Clays too were variable in their response so that 'the lighter the clay the more flexible its economy' [ibid p.47]. Sturgess also received indirect support from Thompson [Thompson F M L, 1968]. Thompson argued for a 'second agricultural revolution' which took place between 1815 and 1880. The essence of this revolution 'was that it broke the closed circuit system and made the operations of the farmer much more like those of the factory owner' [ibid p.64]. The key elements to the revolutionary process identified by Thompson were increasing inputs of an expanding range of purchased feedstuffs and fertilisers, land drainage, improved buildings and the substitution of manual labour with machinery. Such changes were brought about by the investment of capital on a substantial scale. Thompson treats his subject on a national basis drawing upon nineteenth century agricultural writings plus supporting statistical compilations for the production and import of feed and fertiliser. In essence his argument for effective capitalisation is on the same lines as that advanced by Sturgess.

Several significant points can be made on the basis of this

debate which has been discussed in some detail, the first of which is methodological. The various protagonists dipped into the pool of recorded contemporary agricultural comment and were able to arrive at contrasting interpretations. It may have been that they were predisposed so to do but it is evident that there may be no unambiguous direction pointed by the writings of nineteenth century agriculturalists. It follows that care must be used in the interpretation of what was written. It is also the case however that there is important material in these writings relating to the nature of the dairy industry in the latter decades of the period selected for this study.

Secondly the debate reflects upon the parallel issue as to whether the 1850's and 1860's were in any respect a notable period in the development of agriculture in the nineteenth century such as to merit the label 'High Farming'. This concept originated with the nineteenth century commentator James Caird [Caird J, 1849] and subsequently became translated into the notion of a kind of agricultural golden age which combined high prices with productivity and hence prosperity. Ernle [Lord Ernle, 1961] promoted the idea and used the term 'High Farming' as a chapter heading in his book. Chambers and Mingay [op cit 1966] adopted a similar strategy. They describe High Farming as being 'synonymous with high production, achieved by the judicious application of the new knowledge and equipment available to farmers' [ibid p.171]. They also use the concept of 'High Feeding' to mean that the better fed livestock produced more meat and manure so the output of the arable increased in consequence. The argument is thus essentially similar to that used in relation to clayland improvement. In many ways it had been rehearsed earlier by Jones [Jones E L, 1962] and also in a series of articles by Fussell [see Fussell G E, 1948a, 1948b and 1949] The view taken thus resolves itself into one as to how high was 'High Farming' or even how golden was the 'Golden Age' such that it will be necessary to consider the evolution of southern Derbyshire farming in the context of ideas of this kind.

A third issue concerns the need to see claylands as heterogeneous rather than homogeneous in character and usage. Harley for example regards the claylands from two perspectives [Harley J B, 1976 p.248]. Firstly there are the clay vales of the English scarplands and also areas such as south Cheshire where two thirds of the land was in grassland much of which was in need of improvement. Harley contrasted these with his second grouping of claylands which included those in south east Nottinghamshire which retained a significant interest in cereals and the farming system remained relatively traditional. Additionally Harley notes the less tenacious character of the marls in comparison to the truly sticky clays. This marks a significant matter for consideration in this study given the predominance of marls in southern Derbyshire. Phillips [Phillips A D M, 1976 p.290] in his study of the Nottinghamshire also discusses variations in response to clays. He points out that the tithe surveys show that heavy clays in the south east of the county still had 54% of land in arable while mixed soils located adjacent to the line of the Trent Valley had 44% of land in arable. The process of putting down to grass had clearly progressed further in southern Derbyshire, for example, where just 30% of land was in arable.

The comments of Harley and Phillips give important pointers to the complexity of the situation on the ground with respect to both light and heavy soils. The matter is discussed by Pickersgill in an investigation of landed estates in north Nottinghamshire. He notes the uneven agricultural progress of the eighteenth and nineteenth centuries as complicated by the merging together of good land, light soils and loams, and poor land, heavy clays, in the same parish, the same farm or even the same field [Pickersgill A C, 1979 p.21].

A further issue arising from the debate about advance on the claylands concerns the extent to which land drainage was really achieved and made to be effective. This has been addressed by Phillips [Phillips A D M, 1969 and 1989]. In 1969 as a further response to the interchanges between Sturgess and Whetham on the

one hand and Collins and Jones on the other Phillips asked key questions of the arguments which had been advanced. He carefully analysed the estimates which were available at that time as to the area drained and demonstrated that they were highly unreliable. He was thus able to point out that the gaps in knowledge as to the area and location of land drainage were such that neither of the cases which had been advanced could be substantiated. Phillips also considered whether drainage necessarily led to agricultural change and again found that the general propositions that drainage led to the conversion of arable to grassland in the north and west of the country did not necessarily hold good.

The major gap in knowledge which Phillips so identified was filled in his own book published in 1989 [Phillips A D M, op cit 1989]. This is based upon an exhaustive appraisal of nineteenth century writings on the subject set alongside detailed investigations of the records of major landed estates and the public loan companies set up under Act of Parliament and which operated between 1847 and 1899. The outcome is a comprehensive statement of the temporal and spatial development of land drainage as it occurred from the 1840's. It is worth noting at this point that Derbyshire is identified as a county where relatively little drainage was effected under loan schemes. On a national basis Phillips [ibid p.242] calculates that 4.5 million acres were drained between 1847 and 1899 under loan schemes which represents 35% of the wetland area, the term wetland being used because not all drainage was on clay based land. This is a significantly greater figure than that of 16% derived from Bailey Denton and used by Collins and Jones [op cit 1967]. At the same time it is considerably less that the 12 million acres of old drains calculated by Robinson [Robinson M, 1986] from an analysis of modern drainage records.

The discussion developed above with respect to sectoral advance and its relationship with high farming makes reference to dairying alongside other enterprises. The work of Taylor [op cit 1971, 1974, 1976 , 1987] focuses directly upon this sector and

coincides with the present work in so far as the period of change from traditional butter and cheese making to liquid milk sales is concerned. It is evident that the two decades of the 1850's and 1860's were indeed a period of advance and change. Taylor argues [1971 p.48] that farmhouse cheese production saw a definite increase from about 1850 still using traditional methods with 70% of milk output being processed. The mechanism by which this was achieved appears multifaceted. At this time the Shorthorn was having a significant impact upon the quality of the national dairy herd but as will be suggested more in the role of effective crossing with local stock than the establishment of a predominance of pedigree animals. In addition the merits of supplementary feed and grassland management were increasingly appreciated although the perceived value of old undressed pastures remained high and was perhaps a significant break on productivity. Moreover Taylor argues that the average yield of milk per cow in 1860 was 330 gallons which is significantly less than many contemporary estimates. The implication is that increase in productivity would have arisen from greater specialisation at farm level and/or higher stock rates.

The bulk liquid milk trade which is the focus of Taylor's researches has been a major subject of investigation in the modern period [see Whetham E H, 1961 and Atkins P J, 1978]. The trade began in the 1850's with London as the principal market with the first adaptation of the railway system to milk carriage. It was accompanied by a progressive shift in profitability away from cheese and towards milk. Taylor uses contemporary sources to show that during the 1860's Derbyshire farmers began to be involved in this change so that by the early 1870's a fundamental transformation was under way which was to lead to the rapid demise of the farmhouse cheese industry. According to Atkins [op cit p.225] the Midland Railway transported Derbyshire milk to London at preferential rates as a result of its high quality. It is evident however that the rise of other urban markets in the Midlands and south Yorkshire were also involved in providing motivation for change in dairying.

The essential points made by Taylor are reiterated in Grigg's review of the evolution of modern agriculture in England [Grigg D B, 1989]. A strength of this volume is the careful compilation of national statistics to demonstrate trends through time although again the tenuous nature of the data available prior to 1866 is evident. A further significant contribution to the statistical base for agricultural study is that made in the volume of the Agrarian History of England and Wales covering the period 1750 to 1850 and edited by Mingay [Mingay G E, ed 1989]. In this volume Holderness [Holderness B A, 1989] attempts a review of the progress of the dairy industry. He suggests that improvement in productivity did take place and that the gradual elimination of poor quality animals was one important factor in this process. Others were the introduction of better feeding systems based upon improved grassland management, the use of green crops and the purchase of supplementary feed such as brewers' grains. Holderness argues that annual milk yields per cow could well have risen from 330 to 440 gallons and that farm accounts suggest that dairy herds increased from a broad average of 12 milkers to somewhere between 15 and 18. While acknowledging that 'the total output of dairying in Britain is nowhere stated and seldom even guessed at before the mid nineteenth century' [ibid p.165]. Holderness goes on to suggest a possible scenario. He proposes that the national herd stood at 740,000 in the 1770's and that it rose to 1.2 million by the 1840's, figures which would link on to the recorded 1.5 million in 1870. The calculation is then made, allowing for changes in the proportion of milk converted into cheese combined with greater productivity, that a total output of cheese of 765,000 cwt in 1750 had increased to 1,700,000 cwt by 1850. There would thus have been a more than doubling in production over the hundred year period. Even if it is recognised that Taylor advances good evidence for milk yields not exceeding 330 gallons in 1870 the case for a substantial advance in output still holds.

The overview of research writings as presented so far has been

focused mainly but not exclusively on the national scene so that a number of important characteristics of dairying in Derbyshire have also emerged. It has demonstrated that much material exists for the latter two decades of the study period for this thesis but that prior to 1850 matters appear less secure. The possibility of carrying out some form of effective investigation of these earlier times is confirmed, however, by three pieces of writing which relate exclusively to Derbyshire. Considered in chronological order the first to be published was in 1932 by Bond, an officer of the Derbyshire agricultural committee, who was clearly aware of the central position achieved by dairying in the agriculture of the county during the nineteenth century [Bond J R, 1932]. His account of 'Derbyshire Farming : Past and Present' is based upon a limited review of contemporary sources in combination with official statistics for the latter decades of the nineteenth century.

Bond is somewhat vague about the origins of dairying and the farmhouse cheese industry and sees the trade as emerging in the latter eighteenth century as river and canal communications improved access to markets beyond the north Midlands. He sees the period from about 1800 to 1870 as one of modernisation in so far as the superior Shorthorn breed replaced traditional Longhorns, the total number of dairy cows in the county increased and the numbers of sheep declined. In the southern parts of Derbyshire fattening of cattle was restricted to those farms which had access to riverside feeding meadows. As specialisation in dairying grew so did the number of pigs. Even in the 1930's Bond saw Derbyshire as a county of small estates and with only a small area of land in the hands of owner occupiers [ibid p.185]. Farms were therefore generally small and under capitalised, a comment which probably had validity for earlier times. Bond is clear however that the potential of the land, particularly the red marl, was considerable and not restricted to dairying in that 'where properly drained and manured it is capable of growing enormous crops of wheat, mangold and cabbage' [ibid p.186].

In 1951 Fussell undertook a similar review of the evolution of farming in Derbyshire which was based upon a chronological and wide ranging survey of contemporary writings [Fussell G E, 1951]. It is interesting that Fussell regards Arthur Young's response to the farming which he observed in Derbyshire in 1770 as lacking 'a real appreciation of the necessities of the breeding and grazing districts that were remote from London' [ibid p.12] because in the succeeding analysis of a range of late eighteenth and nineteenth century commentators Fussell himself makes only modest reference to the livestock side. This is particularly the case for the period prior to 1870 for which arable rotations such as that discussed by Smith [Smith W, BPP 1833] receive due emphasis and modest progress with land drainage is also considered. Fussell concludes that the indication of a general rise in the standards of Derbyshire farming during the decades of the so called High Farming are 'just as nebulous as elsewhere' [Fussell G E, op cit p.36].

The basis of agricultural literature relevant to Derbyshire used by Fussell is even better exploited by Henstock in his article on the farmhouse cheese industry of Derbyshire and adjacent parts of Staffordshire for the period 1670 to 1870 [Henstock A, 1969]. In many respects Henstock's work is the start point for the present study especially as the findings are based upon well referenced primary and secondary research materials. For the seventeenth and eighteenth centuries Henstock summarises the farming of the region as comprising 'a large number of farmers occupying small or medium sized holdings who were engaged in mixed farming but with an emphasis on dairying that gradually increased' [ibid p.35]. This is supported by analysis of probate inventories which consistently refer to cheese or cheese making apparatus, a finding strongly confirmed by Hey [Hey D, 1984]. Henstock argues on the basis of contemporary writings that an expansion of dairying occurred in the nineteenth century across southern Derbyshire but that grain remained important in the red marl areas. He regards the rise of dairying as a movement towards that branch of farming for which the land in the region was most suited. Henstock also

investigates the economic aspects of the dairy industry, his conclusion being that the true level of productivity which may have been achieved could only be understood in outline from the evidence that he was able to assemble. Henstock has skeletal data on price trends but sufficient to show that there were substantial variations through time. It is clear that the better quality cheese had long been marketed on a national rather than a local basis but that ideas as to the total production and the amount sold out of Derbyshire are very much in the realms of guesswork. It is also the case that marketing was in the hands of a well organised group of middlemen or factors who took advantage of improvements in river, canal and rail transport to develop the trade in farmhouse cheese.

Problem Definition

In the preceding review of contemporary research related to dairying prior to 1870 the broad outline of development of ideas has been indicated at both national and county levels. Given that uncertainties have been identified it emerges that the range of issues which will need to be addressed in this study is considerable and that some of these are quite basic. It will be important to try to determine the character of dairying at scales from the individual farm to that of southern Derbyshire as a whole. In so doing it is important to try to achieve a clear view as to the dimension of the various elements which make up the mosaic of the agricultural landscape and to determine the evolving characteristics of the farm system. It is to be anticipated that this will not be uniform not simply as a result of variation in farm size but also because the natural environment and proximity to urban and industrial markets were also variable. It will also be important to achieve some overview as to the size and productivity of dairy herds and the extent to which changes in breed preference and the adoption of pedigree stock may have influenced that productivity. The issue of productivity and the extent to which it may have increased needs to be determined at the regional scale if at all possible. While the focus will be on the dairy industry it will be equally

necessary to consider the relative importance or degree of interdependence of dairying as compared with alternative or complementary enterprises such as grain production and sheep raising.

In an area where livestock were clearly the dominant element of the agricultural scene the investigation of feed systems is an imperative. In preceding discussion it has been signalled that the quality of grass, particularly in dairy districts, was problematic and was closely linked to improvement in the form of drainage and the feeding of cake and grains. It will be necessary therefore to investigate the extent and effectiveness of land improvements in southern Derbyshire, notably drainage and the development of feed regimes which made use of significant supplementary feed.

A further range of issues is concerned with the economic and social driving forces which lay behind the agricultural system. The dairy farmer was dependent upon the market price for his product which in the case of cheese was complicated by the role and conventions associated with the factors or middle men. The function of the market is therefore a matter of significance as will be the oscillations of that market through time. Cheese prices will need to be considered against those of other products of the farm system with a view to gaining perspective on the income side of the farm balance sheet. Ideally this should be matched against the outgoings in the form of rents, the purchasing of feed, seed and fertiliser and the maintenance of equipment. The great majority of dairy farmers were tenants operating on holdings below the average size for the country as a whole. As has been suggested above they may have lacked social standing and consequently the ability to be noticed and to manage the course of events.

Perspectives gained from consideration of these basic issues need to be drawn together to enable a holistic approach to the farming scene to be developed. This can then be set in the wider context of agricultural developments as they occurred in the

period of 1770 to 1870. The problems of interpreting the past have already emerged strongly in the preceding review but it will be essential to consider agriculture in southern Derbyshire in terms of the extent to which it may have evolved in a revolutionary manner which may reflect upon the wider improvements on the English clays. This implies that some judgement will be necessary as to the degree of agricultural advance which may have taken place between 1770 and 1870 and whether it occurred uniformly or whether there were phases of notable progress. In this context there is the more particular issue of the period of High Farming of the 1850's and 1860's. Although this term may be variously used to emphasise the evolution and perfection of systems characterised by high inputs or alternatively a mixed economy in which livestock and arable farming were mutually supportive the essential thrust of the concept was one of productivity and profitability. High Farming has not normally been considered in connection with dairying and perhaps this is a further measure of the neglect of this facet of agriculture. It will be appropriate therefore to determine whether southern Derbyshire dairying in the final stages of its association with the production of farmhouse cheese showed a degree of development which in any sense might be regarded as 'high'.

Figure I.1 Southern Derbyshire as shown on P.P.Burdett's Map of 1789.

Note:

Burdett's map of Derbyshire was first published in 1767 as a county map at the scale of one inch to one mile. The photocopy overleaf is from the second edition of 1789. The map was printed at this reduced scale for incorporation into volume 1 of James Pilkington's 'A View of the Present State of Derbyshire.' (Pilkington J 1789)

Print bound close to the spine

DERBY SHIRE,

from an ACTUAL SURVEY by

P.P.BURDETT:

with Corrections & Improvements.

1789.

STAFFORD SHIRE

YORK SHIRE

NOTTING HAM SHIRE

LEICESTER SHIRE

CHEADLE

Ellaston

Okeover

Mathfield

Hanging Bridge

ASHBORNE

Clifton

Snelston

Norbury

Roston

Darley Moor

Yeaveley

Shirley

Brailsford

Edlaston

Wyaston

Hale Green

Kingston

Mercaston

Weston

Hollington

Burroughs

Lees

Longford

Rodsley

Bradley

Cubley

Marston Montgomery

Wardlow

Potter

Somersall Herbert

Somersall Hill

Boylston

Barton

Trusley

Osleston

Radburn

Sutton on the Hill

Dalbury

Marston

Etwall

Hilton

Scropton

Sutton

Hatton

Tutbury Castle

Rolleston

Repton

Newton Solney

Winshill

Burton

Stapenhill

Drakelow

Walton upon Trent

Rosliston

Catton

Coton Park

Linton

Croxall

Lullington

Eldinghill

Clifton

Chilcot

Stretton

Fisherwick Park

LITCHFIELD

Derby

Allestry

Darley

Mackworth

Markeaton

Duffield

Quarndon

Kedleston

Morley

Stanley

Ockbrook

Borrowash

Spondon

Chaddesden

Alvaston

Elvaston

Boulton

Normanton

Osmaston

Little Over

Mickle Over

Findern

Twyford

Willington

Egginton

Barrow

Aston

Weston

Shardlow

Wilne

Thulston

Dunnington

Dunnington Park

Chelaston

Sawley

Long Eaton

Wilsthorpe

Breaston

Draycote

Sandiacre

Stanton

Dale Abbey

Risley

Stapleford

Wollaton

Nottingham

Bulwell

Basford

Arnesley

Selston

Pentridge

Butterley

Ripley

Codnor

Heanor

Eastwood

Greasley

Watnall

Langley

Shipley

Kirk Hallam

Ilkeston

Brewsall River

Derwent River

Trent River

Dove River

Soar River

Erewash River

Mease River

Repton

Ingleby

Milton

Foremark

Melbourn

Donington Park

Lascoe

Grysick Hill

Castle Lay

White Hollow

Calke

Stanton Harold

Hartshorn

Smisby

Stanton

Broom Platt

Church Gresley

Castle Gresley

Blackfordby

Park Hall

Ashby de la Zouch

The Wolds

Overseal

Donisthorpe

Packington

Wiley

Measham

Snarestone

Appleby

Swepston

No Man's Heath

Ticknall

Calke Common

Castle

Derbyshire

Leicestershire

Longit: West 55′ from London. 50′

2° 45′ 40′ 35′ 30′ 25′ 20′ 15′ 10′

53° 55′ 50′ 45′ 40′

CHAPTER 2

A METHODOLOGICAL APPROACH AND DATA SOURCES FOR THE STUDY OF THE AGRICULTURAL GEOGRAPHY OF SOUTHERN DERBYSHIRE 1770-1870

The purpose of this chapter is to set out the methodological approach which has been adopted in this study. A further aim is to present a comprehensive statement of limitations and possibilities with respect to the qualitative and quantitive sources which have been consulted and which may be problematic in their interpretation. Baker has indicated the primacy of sources in historical geographical study in stating that 'the approach of the historical geographer towards a given theme....is largely conditioned by the source materials available' [Baker A H R, 1972 p.110]. Some further qualification is appropriate for the investigation of agriculture as Wheeler has underlined the 'extraordinarily complex' range of material with which the researcher may be confronted. He has further emphasised the consequent need to draw upon the work of many other specialists in order to understand the processes which have led to the mapped distributions which characterise geographical work [Wheeler P T, 1973 p.35]. It follows that it is critical to understand the strengths and weaknesses of data and the methods by which it may be analysed least the validity of the outcome be compromised.

As has been indicated in Chapter 1 the data sources which have been investigated are both qualitative and quantitive in character. Some sources fit clearly into one of these categories but others straddle both. The aim has been to integrate analysis of source material with comment from contemporary research to allow a chapter framework which deals initially with the environmental, economic and social background to southern Derbyshire and then progresses to a consideration of a range of matters concerned with land and livestock which then leads to discussion, contextualisation and conclusion. To a considerable degree the methodological approach is source driven within this framework. The extent of availability of sources relating to the various chapters is uneven and the different sources

themselves demand individual consideration in terms of their usage.

Grigg [Grigg D B, 1967] has made a wide ranging summary of sources available for the study of historical aspects of agricultural geography during the period considered here. At many points he underlines the essential difficulties that arise given the rich range of material available. These may include the subjectivity of a source, the difficulty of comparison between sources on the basis of differing or unknowable methods of compilation and the intermittent survival of sources which give patchy cover both in space and in time. In the event it is a matter of working with what there is and trying to avoid the pitfalls so as to arrive at justifiable if heavily qualified conclusions. As Penelope Lively [Lively P, 1987 p.9] has put it 'the voice of history.....is composite - many voices: all the voices that have managed to get themselves heard. Some louder than others naturally'. In this study a central problem of data can be summarised as the failure of some voices to get themselves effectively heard at all in that the journal of an average tenant farmer or the diary of a cheese factor would make interesting and important reading.

Sources which are substantially qualitative in nature have been derived from a variety of contexts. Prominent amongst them are the large number of reports from official and unofficial fact finding ventures. Amongst the earliest are those derived from the late eighteeenth century tours of Arthur Young and William Marshall which were soon followed by the Board of Agriculture County Reports. For Derbyshire three such reports were made by Brown [Brown T, 1794], Curtis [Curtis W, 1806] and Farey [Farey J, 1 1815, 2 1815 and 3 1817]. Farey made one of the most substantial contributions to the series as a whole and the material he compiled is capable of some quantitive as well as qualitative interpretation. The reports for adjacent counties by Monk and Pitt for Leicestershire [see Monk J, 1794 and Pitt W, 1809] and Staffordshire [see Pitt W, 1794 and 1808] have also proved valuable. During the period covering the late eighteenth and early nineteenth centuries a number of county topographic studies were written for Derbyshire as for example by Pilkington

[Pilkington J, 1789] and Glover [Glover S, 1829] which provide valuable supplementary perspectives to the Board of Agriculture Reports. The progress and problems of agriculture in the nineteenth century are recorded in a sequence of investigations carried out by Select Committees of both Houses of Parliament. The minutes of committee sessions and summaries of evidence variously provide insights into Derbyshire farming through the eyes of those such as William Smith of Swarkestone [BPP 1833], J J Rowley of Mansfield [BPP 1848], George Culley [BPP 1869] and S B L Druce [BPP 1882] all of whom had direct professional knowledge of the area.

More variable in character are the articles, reports and notes carried by the agricultural journals such as the Farmers' Magazine and the Journal of the Royal Agricultural Society which collectively comprise a significant body of comment and opinion relating to dairying in general and Derbyshire in particular. This has been profitably considered alongside the nineteenth century agricultural texts which are variously general for example Loudon [Loudon J C, 1825], Youatt [Youatt W, 1837] and Morton [Morton J C, 1860] or specific to dairying including Long [Long J, 1885] and Sheldon [Sheldon J P, 1883 and 1893].

A problem common to the use of all these sources is the depth of knowledge and experience of the writers. It is necessary to question the extent of their acquaintance with the topic and localities they were discussing. It is also important to question their motives in going into print - were they attempting to make a factual assessment or were they deliberately or even inadvertently promoting their own prejudices? It is tempting to give weight to local farmers of apparent repute such as Smith of Swarkestone or Carrington of Croxden. Occasional inconsistencies underline the merit of caution. In 1848 in evidence to the House of Lords Select Committee Rowley gave a bleak view of Derbyshire agriculture where for want of capital drainage was needed on both pasture and arable. Five years later in 1853 in his prize essay to the Royal Agricultural Society the county is portrayed as a land of milk and honey with drainage going ahead rapidly [Rowley J J, BPP 1848 and 1853].

Given the extent of the area to be studied the methodological approach adopted has involved operation at two scales. In a number of instances, for example the analysis of enclosure, the 1801 crop returns, tithe files, income tax data and the 1870 agricultural census it has proved possible to represent the situation in southern Derbyshire as a whole. In others however, particularly where detailed consideration of complex data such as Land Tax and Tithe Surveys has been involved, a sample approach has been adopted. A block of parishes to the north of the Dove referred to as the Doveside parishes have been a particular focus of research of this kind. The parishes in question, mapped as Figure 2.1, extend from Doveridge in the west to Mickleover in the east and have the advantages of the survival of a wide range of material plus their encompassment of the three basic landscape types characteristic of southern Derbyshire.

As has been indicated main areas of investigation necessary for the progress of this study include matters relating to land and livestock to which can be added issues pertaining to prices and productivity. These have been adopted as the basis for the methodological discussion of principal sources which follows.

A. Land: Use, Improvement, Ownership and Occupance.

A diverse range of sources are available in the reconstruction of land use patterns. The problems which have been addressed include the determination of the trends through time and the spatial relationships of land use to environmental characteristics such as relief and soil. In so doing it has been necessary to assemble a sequence of material from the seventeenth and eighteenth centuries through to 1870 and to attempt to resolve the discontinuities between scale and method of compilation of these sources. In most cases the parish can be used as the basic unit of study.

The level of survival of estate papers is generally not high in southern Derbyshire which to a degree has restricted the nature of the investigation. This situation is very much a reflection

of the predominance of small estates in the southern part of the county and also restrictions on access to private collections as at Radbourne. However papers from both larger estates such as the Vernon [Sudbury], Devonshire [Marston on Dove], and Crewe [Calke] and smaller estates, Every [Egginton], Fitzherbert [Somersal Herbert] and Moseley [Burnaston], have been found to be valuable. The collections have included terriers providing information on field size, land use and occupance, rents and valuations. Enclosure Awards from the late eighteenth century are more problematic. The same is true of the 1801 Crop Returns, the Tithe Surveys and the 1870 Agricultural Census which merit more systematic discussion.

1.Enclosure Awards

The process of enclosure by Act of Parliament began in 1740 and was completed by the General Act of 1845. It has been a subject of much study and no little controversy. Enclosure attracted the attention of early workers interested in agricultural change such as Lord Ernle [Lord Ernle 1961], the Hammonds [Hammond J L and B, 1911] and Tate [Tate W E, 1978], the last named producing valuable county lists of Acts and the Awards which relate to them. These lists have been complemented by Turner's analyses of the process and pattern of enclosure [Turner M E, 1984]. Yelling [Yelling J A, 1977] has also sought to analyse the enclosure process and present modern interpretations of its historical and spatial significance. Enclosure Awards and Maps are essentially a record of agreed change in the social control of land. Such change involved the transfer of commonly held land be it arable, meadow, heath or common into private ownership. The process was initiated on a parish by parish basis by agreement amongst landowner(s) and was more often justified on economic grounds. The information provided by the map and award is valuable yet limited in the Derbyshire context as Parliamentary Enclosure served mainly to tidy residual patches of unenclosed land.

In the main the award concentrates on those areas within a parish which were directly affected rather than those which had been enclosed by agreement at an early date. In the case of the Doveside parishes investigated this is substantially the case.

The award schedules describe what was to happen and thus set out/define:-
a) the land to be enclosed and the apportionment of that land amongst the new owners - but not necessarily defining all the new field boundaries; b) the obligations of new owners with respect to the erection and maintenance of boundaries; c) any adjustments in the ownership of previously enclosed land which may have been deemed necessary - this led to a series of exchanges; d) description of adjustments to the pattern of roads, bridleways and footways - these were precisely defined in terms of location and width; e) definition of modifications to the pattern of drainage i.e. lesser streams which were technically capable of being realigned.

In interpreting the awards there are substantial problems. The schedules are lengthy unpunctuated legal documents which are often faded or somewhat damaged. The difficulties of transcription can be formidable. The map is the key document but its absence means a major task of reconstruction. This proved to be necessary for Egginton and Willington parishes. The reconstructed enclosure map of Egginton is much the more satisfactory given the greater amount of information concerning field names from later documents upon which to base such a reconstruction [see Dalton R T, 1991]. Award documents for the Doveside parishes have been amalgamated to create a subregional analysis, while Tate's and Turner's parish lists have been used to determine the extent of enclosure in southern Derbyshire as a whole [see Tate W E, 1944/5 and Turner M E, 1983].

2. The 1801 Crop Returns

The 1801 Crop Returns were an attempt by the then Board of Agriculture to discover the exact extent of cropland in England and Wales. They represent an important pioneering attempt to compile agricultural statistics in this country. The Board of Agriculture organised this survey through the church using the bishops and the incumbents of each parish as their agents in the collection of information during the season of 1801. Their study has been facilitated by M E Turner's transcription of the complete record including the added comments by the priest concerned. The resultant data suffers a range of problems which

are important to appreciate in judging the geographical potential of the Returns. The Returns represent what was essentially a parish by parish grain survey which emerges as a crop survey certainly with respect to Derbyshire, Staffordshire and Leicestershire, but significantly sown ley grasses are not identified so the survey is of tillage rather than arable. The Returns raise the question of what was the exact area of a parish. At that time parishes were ecclesiastical units and areas were not always defined. This means that is difficult to relate Crop Return data to the areas of the civil parishes as they emerged through the nineteenth century, a problem to be born in mind in the attempts made to relate the 1801 acreages to those recorded in the 1870 census.

A further issue is that the coverage of the Returns themselves is highly variable as some parish priests were unable or unwilling to make a return. The incumbent at Etwall wrote:
'Your lordship would have long since received the inclosed return of the growing of corn etc. in this parish for the year 1801, but that many of the parishioners refused to make the statement required. I was, however, in hopes that I should be able to induce their ultimate compliance; for which reason the inclosed was not forwarded as I wished it to be; and I am sorry to add that after every strenuous endeavour, I have not been able to make it so accurate as the general purposes for which such statement may be wanted, require. Upon the best information I am able to obtain, I have good reason to believe the enclosed statement to be as nearly accurate as can he had; except for a return by the parties on whose lands the corn was grown' [Turner M E, 1983 part 1 p.112].

Whether from suspicion of the implications for taxation or native individualism this seems typify the reaction of farmers so that for parishes where a return does exist it is thought that there is likely to be an understatement of the acreages of land in crops which is then reflected in any aggregation of the returns at regional or county level. The Board of Agriculture recognised this at the time and it was stated that the returns 'were so extremely erroneous as well as defective that they cannot safely be relied on in forming any general conclusions

respecting the quantities of land sowed with any species of grain' [see Turner M, 1983 Index Introduction].

The 1801 Crop Returns have been used by geographers and historians for many years. Notable pioneering use was made by some geographers in the county reports of the first land use survey of the 1930's. Subsequently a range of county based papers have appeared such as those by Henderson [Henderson H C K, 1957] on Derbyshire, Hoskins [Hoskins W G, 1952] on Leicestershire and Pelham [Pelham R A, 1950] on Staffordshire. A common trait of these papers is the tendency to subdivide the county into regions on a geological basis implying this to be the main determinant of the agricultural environment relevant to the early nineteenth century. Pelham interestingly relates his Staffordshire Survey to Pitt's soil/land use regions included in his Board of Agriculture Report [Pitt W, 1808]. Few of the early studies attempted a cross county boundary regional analysis. Notable among these was Thomas's study of Wales which led to a wider discussion of appropriate techniques of analysis of the data [Thomas D, 1959]. With respect to mapping Thomas prefers the located divided circle technique on a parish by parish basis. This has been generally favoured although Henderson prefers located bar graphs. Thomas also discusses the opportunities of the statistically based crop combination indices pioneered by Weaver [Weaver J C, 1954] but also advocates the straightforward mapping of crops in terms of rank order. These may be used as the basis for a final map in which to summarise conclusions relating to the 1801 Crop Returns. Following the transcription of the returns attention has been given by Turner [Turner M E, 1981] to the compilation of national statistics and by Grigg [Grigg D B, 1989] to their potential use in the wider context of agricultural change in England.

In the present study the 1801 Crop Returns have been used to make distribution maps for wheat, barley, oats and green crops. These are plots of located bar charts. It is not feasible to attempt to relate the crop return data to parish area in the form of percentages given the uncertainties as to what areas might have been at this time. A comparison has been made between

crop return acreages and those included in the 1870 agricultural census in order to gain some insights into change through time.

3.Tithe Surveys

A national survey of tithable lands took place on a parish by parish basis and over a period of years between 1837-52 following the Tithe Commutation Act of 1836. The tithe or proportion of produce within a parish which might be claimed by the priest in charge or by various lay members of society depending on status had been a form of taxation which had been much disliked for decades. In some parishes or tithe districts tithes had been abolished at an earlier date with respect to the whole or a proportion of the parish. This had taken place most frequently at the time of Enclosure so that under some Enclosure Awards the receivers of tithes were allocated a tract of land in compensation for the loss of tithe income. Under the Act of 1836 tithes in kind were commuted and replaced by a money payment. This involved a valuation or Tithe Rent charge being determined for each unit of land - field, garden, pleasure ground which was to be the basis for determining a fluctuating money payment based on the average of corn prices over seven years. [It is interesting to note the dominance of corn orientated thinking even in pastoral areas of the country].

Phillips in detailed studies of Staffordshire [Phillips A D M, 1973] and Nottinghamshire [Phillips A D M, 1974)] has defined three major classes of information contained within the parish tithe scheduled with their accompanying map and file of related notes and correspondence. These may be summarised as:

a) The schedules which set out on a field by field, plot by plot basis - the owner, the occupant, the area, the land use which may or may not specify arable crops or whether grassland was for mowing or grazing, and the amount of the tithe rent charge. The schedule is coded so that it can be cross referenced with the accompanying map. Such data can be used to compile land use maps and tabulations of farm size by land use type/cropping.

b) The preambles to the schedules set out overall acreages of land uses within the parish while summaries of individual farm holdings may be included as an appendix. The former are valuable in discovering the ratios between grassland and arable on a

parish by parish and eventually a regional basis.
c) The tithe files which contain minutes and other material relating to the surveys as carried out for individual parishes and thus comprise important elaborations of the basic statistical information. Unfortunately in many instances tithe file material has been thinned and few Derbyshire files have survived unscathed. Where complete as for Sudbury and Longford parishes valuable insights into the detail of cropping and land management can be obtained.

There are however a range of difficulties associated with the analysis of tithe data which can be summarised as:
a) Within a parish any land which was tithe free was excluded from the survey. The partial information which remains is difficult to use as the proportions of land uses which may be derived may not be representative of the parish as a whole - if say an important area of arable were to be omitted. Phillips [Phillips A D M, 1973] has argued that at least 75% cover is necessary.
b) As the tithe surveys took place over a period of some fifteen years then strict comparison between parishes and across parish boundaries may not be possible.
c) The statements of parish land uses in the preamble to the schedules may be estimated and not an accurate summation of the data included in the schedules.
d) There were real anomalies of rent charge valuation across parish boundaries [Prince H C, 1959] so that adjacent fields with the same agricultural potential could be differently valued if separated by a parish boundary.
e) There are problems in the definition of land use used in the surveys and also variation between parishes in the way land use is defined. In some parishes [e.g., Ash and Sutton on the Hill] the different crops are clearly distinguished while in others cultivated land is simply classed as arable. The treatment of grassland presents further difficulties. Although lands which was customarily mowed are often differentiated in others instances terms like 'old turf' are used presumably to mean pasture. However where 'six years turf' is used the inference is that the particular piece of land was once part of the arable system and may possibly be temporary grazing as part of a ley

system.

f) Frequently land ownership and occupance of land was not confined to one parish or tithe district. The seriousness of this difficulty depends on the study in question but it is highly likely that some farmers held land either as owners or tenants in more than one parish. In southern Derbyshire George Spurrier farmed in Marston on Dove but he also rented land in the neighbouring parish of Hilton which was tithe free and for which no comparable data is available. This problem is dealt with at length and with considerable sophistication in Kain's [Kain R J P, 1975] study of Kent where all schedule data for all parishes, which covers 94% of the county, were cross referenced in a computer based study. Clearly it is not capable of resolution when the level of cover is substantially less than the Kent level. Derbyshire cover is put at about 50.1%.

4. The 1870 Agricultural Census

The annual agricultural census was initiated in 1866 following the outbreak of cattle plague [rinderpest] in 1865. The annual modifications in methods of compilation which took place in the earliest years plus the loss of extensive amounts of data for years such as 1871 and 1872 suggest that 1870 is a sensible year to use in relation to the present study. The existence of consistent survey data giving precise acreages of crops on a parish basis for the entire south Derbyshire area provides a fundamental anchor point for the partial and less secure material from earlier sources. The opportunity has been taken to consider the census data for adjacent parts of Staffordshire and Leicestershire in order to give more security to spatial patterns. The 1870 census has therefore been analysed in its own right to determine significant aspects of land use patterns including those of individual crops. The census has also been used to link back to data from the 1801 Crop Returns and the Tithe Surveys to determine change through time. The opportunities and limitations of the census have been reviewed at length by Coppock [Coppock J T, 1984]. The most significant difficulty to keep in mind is the lack of coincidence between the civil parish and the agricultural parish, the boundaries of which are defined by those of the holdings located in the parish.

5. Land Ownership and Occupance

Ownership and occupance of land are important matters to investigate but are difficult so to do given the disparate range of sources which can be used. At the regional and indeed national scales the 1851 census of population and the 1870 agricultural census provide data concerning farm size at parish level. The former census notes the acreage of holdings against occupation in the case of farmers. There do appear to be problems of under reportage however especially with respect to the smaller agricultural units where farming was combined with another occupation. The 1870 census categorises farms by size group but does so unhelpfully in that all farms of 100 acres and over are combined together. However the 1880 census provides a more detailed categorisation of farm size which has also been incorporated into the analysis. Data from these censuses has been used to generate an overview of southern Derbyshire in relation to the country as a whole.

Census data has also been used in combination with that from other parish based sources but which are limited in coverage such as Estate papers and the Tithe Surveys. Valuable insights into changes through time in respect of individual parishes can be obtained especially if combined with evidence from other sources such as the Land Tax returns. These returns promise much but need to be interpreted with great care and therefore merit more detailed consideration.

The Land Tax originated in 1692 as a tax levied on the owners of land and property in proportion to the value of that land and property [Gibson J and Mills D R, 1987]. It represented a major step forward in the development of uniform taxation systems in this county. The records of Land Tax schedules survive on a parish by parish basis for the period 1780-1832 when the schedules also served a register of electors. Ownership of property worth £2 or more per annum was the base line for voting qualification at this time. The reform of the franchise in 1832 obviated the need for the Land Tax record to be kept as an electoral register. For Derbyshire the record is complete between 1780 and 1832 with the exception of the occasional year.

The Land Tax was based upon an agreed and fixed sum of money to be raised within each parish. This was reapportioned annually by a locally based official in order to take account of changes in ownership and tenancy as compared with the preceding year. The lists were thus subject to continual scrutiny on the part of someone conversant with the local situation. The lists state owners liability followed by a breakdown of the amounts to be passed on to individual tenants. It is thus easy to identify tenants who rented from two or more owners and owners who might themselves be tenants of other owners.

The potential use of the Land Tax Record for historical-geographical purposes has been the subject of discussion and disagreement. The objective has been the use of the land tax record as a means to discovering the turnover rate of ownership and tenancy. Consequently a decline in either or both would be an indication that land was being either concentrated in fewer hands or whether fragmentation was in progress. Such an analysis cannot proceed smoothly as it is not stated what the basis for the land tax assessment for an individual might have been. In a rural area the following possibilities can be envisaged:

a) A large farm including a substantial farm house which is relatively valuable.
b) A farm with a poorly appointed farm house which is relatively less valuable.
c) A country estate comprising home farm, landscaped pleasure grounds and mansion.
d) Farmland which is owned/occupied by a farmer resident outside the parish in question - i.e.the tax would relate to land only.
e) Small holdings with relatively small land area attached.
f) Houses, cottages and village businesses with no land attached.
g) In addition to the above the value placed on farmland may have varied according to its quality.

The core of the argument about the use of Land Tax focuses on the extent to which the values in the schedules can be regarded as a surrogate for the area of land involved - to put it crudely if an individual was assessed for 10% of the tax liability within a parish did that individual occupy 10% of the land area

which might then be determined by simple calculation. A number of papers dating from the early years of this century which use the Land Tax as the basis for investigating aspects of land ownership structure have been reviewed by Beckett and Smith [Beckett J V and Smith D K, 1984]. Despite the cautionary strictures of Mingay [Mingay G E, 1964] subsequent argument by Martin [Martin J M, 1966] and more recently Gibson and Mills [Gibson J and Mills D R, 1983] it has been suggested that land tax schedules should be cross referenced with other information about the land structure of a particular parish such as Enclosure Award, Estate Papers or Tithe Surveys. This is the approach which has been adopted here for a limited number of parishes.

B. Livestock

The major source used with respect to all matters relating to livestock has been the weekly broadsheet newspaper, the Derby Mercury. The Derby Mercury was published from 1723 until the newspaper failed in 1933. From the 1780's the newspaper carried information of great potential value to the study of agriculture as practiced within the advertising/circulation area of the newspaper. Three categories of entry can be recognised: farm sale advertisements, reports on local commodity prices plus miscellaneous advertisement and comment. Farm sale advertisements provide quantitive data which can be usefully considered alongside other sources. Farey's Board of Agriculture Report for the first decade of the nineteenth century lists the stock kept on the farms he visited in a variety of ways which enable useful distributional maps to be drawn. Perhaps more importantly for advertisment data is the need for a secure statistical anchor in the form of the 1870 census, which itself has been analysed to derive basic statistics and mapped distributions.

Sale advertisements have been used by Walton [Walton J R, 1973] with respect to the diffusion of agricultural machinery and by Perry [Perry P J, 1975] in his study of farm bankruptcies. In the context of this study they are used to elaborate the character of the livestock industry by the analysis of data

which derives from the farm level and which is available on a year by year basis over an extended period of time. The writer is not aware of similar data being used by other workers. Given the pastoral character of Derbyshire agriculture the advertisements are clearly an important data source with respect to livestock. The form of the advertisements is generally as follows:

a) The name and location of the farm, the name of the farmer and the name of the auctioneer.

b) The reasons for the sale indicating that the farmer is deceased, leaving the farm, declining in farming, bankrupt or moving to another part of the country. Terminology of this kind indicates clearly that the farm is being vacated. However comment such as 'on the instructions of' or 'in the farmyard of' suggest that a farmer is selling off only part of his stock.

c) Livestock - Cattle. Numbers are given for each type offered in the sale i.e. dairy cows which may be either in calf or not in calf, heifers which may also be in calf, barren cows, stirks, twinters, male and female calves, bulls, fat cows, beasts and bullocks and fat oxen. Dairy cows are invariably first in the list which may be taken as evidence of their importance in the farm economy. Less frequently reference is made to the breed of stock i.e., Longhorn, Shorthorn, Scotch, Hereford or Alderney. Occasionally the auctioneer comments on the quality of the stock on offer with a characteristic lack of modesty: 'the excellence of the Longhorned stock in particular requiring no comment from the salesman' [Sale of J Wilson of Stenson near Derby, January 1835] and 'celebrated stock extraordinary deep milkers: possessing fine symmetry and form with aptitude to fatten to a great and admired weight' [Sale of Thomas Robinson of Tatenhill near Burton February 1835] and 'superior stock as is seldom brought to the hammer' [Sale of Mr. White of Coates near Loughborough September 1825].

d) Livestock - Sheep. Numbers are given for each type offered for sale i.e. breeding ewes, ewes in lamb, whethers, hogs, lambs, theaves, fat sheep and rams. Less frequently breeds are indicated i.e. Leicester, New Leicester or 'the new breed', Southdown, Shropshire, Woodland, Blackface or Merino. The breeding of the sheep is also given emphasis particularly the rams which are most frequently described as Dishley stock.

e) Livestock - Pigs. Relatively little information as compared with cattle and sheep. The number of breeding sows is usually clear but no information as to breed.
f) Livestock - Horses. Much emphasis on the quality of riding and carriage horses as opposed to farm horses.
g) Farm Equipment. Some sales give comprehensive listings of equipment such as wagons, two wheeled ploughs, harrows, turnip cutters but often the phrase 'implements of husbandry' is used. In either case it is clear that the farmer was equipped to cultivate land and had arable on his farm. Dairy equipment is indicated as 'dairy utensils' but occasionally cheese vats, cheese pans, cheese shelves and brass cheese kettles.
h) Farm Produce. Occasionally advertisements indicate quantities of cheese by weight or numbers of cheeses. Ricks of wheat, oats, barley, clover, beans and hay are also given reference.
i) Land. Land area is rarely included in the farm sales which is to be expected with an economy dominated by tenant farmers. Very occasional reference to acres of winter keep or acres of turnips are made.
j) Furniture. Sale advertisements frequently include listings of furniture and personal effects - a clear indicator that the farm is being vacated.

An important range of limitations to the use of sale advertisements must be kept in mind. The first relates to the policy of the newspaper with respect to advertising and the auctioneers who used it. The numbers of advertisements grow steadily through the late eighteenth century into the first decade of the nineteenth century. From then on a steady state is achieved with numbers fluctuating rather than growing. This suggests that some kind of 'advertising' area had been established based on Derby and Burton. This area changed in detail over time however as a result of the growth/demise or internal policy of the various auctioneers who handled agricultural sales. The Derby Mercury consistently carried advertisements from auctioneers in Derby and Burton on Trent. It also advertised for auctioneers in Ashbourne, Wirksworth, Belper, Castle Donnington, Nottingham, Ashby de la Zouch and Barton under Needwood. Some of these appeared regularly over extended periods of time but then do not feature for a number of

years. This means that the advertising area varied at its margins when for example Cheatle of Ashby de la Zouch ceased advertising in the mid 1850's. The matter is illustrated in Figure 2.2 for 1851-52 when auctioneers from a wide area advertised in the Derby Mercury. Very occasionally significant events from wider afield are advertised such as a fatstock sale at Lyme Park in Cheshire or a Ram Sale at Ferrybridge in Yorkshire.

A second limitation relates to the extent to which the information contained in a given advertisement is a complete statement of the amount of stock customarily carried on that farm. This has been discussed by Walton [Walton J R, 1983] who argues this as the main limitation in the use of advertisements. Clearly the matter is of real importance because if stock had been disposed of ahead of the sale then any attempted analysis of farm sale advertisements is likely to understate the numbers of stock. For some advertisements the situation is readily apparent. The advertised sale of the effects of John Hinde of Barrow Wood Farm, Spondon [DM 17.3.1825] who is 'leaving the farm' was confined to furniture and farm utensils, the stock having been 'previously and otherwise disposed of'. Also the sale of the 'remaining fatstock' of Mr Roper of Blakely Lodge, Etwall [DM 24.3.1850] which comprised two dairy cows in calf and six Shropshire ewes. Also the sale of one dairy cow, sixteen lamb hogs and 'a quantity of cheese' the property of T. Hall of Hulland bankrupt. It is relatively easy to eliminate these from any analysis and to focus on those sales which indicate a dairy herd with followers such as:

J Mason Hargate Manor, Egginton: 12 dairy cows in calf, 1 heifer, 4 barren cows, 5 stirkes and 3 calves [DM 16.1.1820)].

However even in this class of advertisement there may be some lingering doubt which is difficult to resolve. It is reasonable to suppose that farmers who were aging or in declining health would run down their stock ahead of an auction to neighbours and relations by private negotiation.

Another potential issue relates to the time of year of the sale, the overall distribution of which is shown in Table 2.1. The vast majority of sales took place in winter with a peak in March

when leases were coming to an end. Fortunately this means that many cows were still in calf and ewes in lamb ahead of the spring season but distortion must occur through the normal cycle of stock sale and disposal.

A further limitation of the Derby Mercury farm sales data is that few advertisments appeared before 1800 with the result that the study as a whole tends to acquire a strong nineteenth century emphasis. To some extent this situation is mitigated by the considerable statistical data to be found in the Board of Agriculture reports of Farey [Farey J, 2, 1815 and 3, 1817] and Curtis [Curtis J, 1806] which although collected in the first decade of the nineteenth century reaches back into the late eighteenth century. Farey, in particular, carried out a large number of farm visits and his listed findings are sufficient to allow distributional characteristics to be mapped. These maps are considered in subsequent chapters concerning cattle, dairy produce and sheep.

Of 1,608 farm sale advertisments which were discovered in the Derby Mercury between 1780 and 1870 1,594 were identified as usable to some purpose on the basis of the inclusion of statistical data. These advertisments were derived by means of a regular sample of four periods of twelve months per decade so that 40% of all issues of the newspaper published during the time period were consulted. For any given decade such as the 1840's the years 1840, 1842/3, 1845 and 1847/8 were included. It is felt that through this arrangement a sufficient body of data has been collected to enable trends through time and spatial patterns to be identified. This is indicated by the strength of the relationships discovered between changes in livestock numbers and time. In considering the possibilities of the usage of advertisments two main categories can be recognised:

a) Advertisments for fatstock sales which were associated with particular farms or landed estates. Typically these are the Chatsworth Annual Christmas Fatstock sale or the Spring Sale at Dunstall Park west of Burton. These sales included surplus stock but were seemingly aimed mainly at the butcher. Occasionally sales of imported Alderney dairy cattle from the Channel Islands were held in Derby or in Nottingham.

b) Sales of stock from tenant farms, where careful inspection suggests that a representative range of stock are offered and that none has been otherwise disposed of prior to the sale. Detailed analysis of such advertisments needs to keep in mind that each year of sale advertisements is made up of a self selected sample of farms which is different from that for any other year. Possible lines of approach include:

1. Matching a farm sale against data from other sources relating to that farm with respect to area and/or land use.
2. Determining the mean and range of size of dairy herd and breeding ewes in any one year and through time.
3. The use of livestock units as a basis for discovering whether the average size of sales increased through time.
4. The categorisation of farms - dairy, mainly dairy, mixed dairy and sheep and the mapping of categories to determine any spatial variation.
5. The analysis of preferred livestock breed for both sheep and cattle.
6. Matching of livestock units per sale against known farm acreages to determine whether there is a relationship between units and farm size.

An important consideration is therefore the need to devise a system of standardised units as has been discussed in contemporary agricultural geography studies [see Ilbery B W, 1985 and Morgan W B and Munton R J C, 1971]. There is an extensive related literature on the subject of agricultural classification, contributions being made by agricultural economists as well as agricultural geographers. The interests of these two groups diverge quite clearly in that the agricultural economists focus on farm management issues while agricultural geographers are searching for statistically sound bases for farm classification at local, regional or even national scales.

The key and pioneer paper in the geographical literature was written by Weaver in 1954 [Weaver J C, 1954]. Weaver's work on agricultural variation in the American Mid-West has been followed up by a number of workers in Britain. Notable amongst these is Coppock's Agricultural Atlas of England and Wales [Coppock J T, 1964] and the similarly constructed farm

classification maps produced by the Ministry of Agriculture, Fisheries and Food. The procedures involved in such classification and listings of the units which may be used are discussed in standard agricultural geography textbooks [Tarrant J R, 1974, Morgan & Munton, 1971, Ilbery B W, 1985]. Four approaches to comparison between agricultural data have been devised each of which involves the adjustment of raw farm data such as numbers of particular livestock or area under specific crops in order to derive a common measure. Standard Output and Standard Gross Margins both reflect the relative cash values of specific agricultural products but are difficult to use over extended time scales given the variable impact of the market and inflation. Standard Man Days have been frequently used. These are notional units of labour input into specific farm activities on an annual basis the care of 1 dairy cow or 1 acre of wheat. However Standard Man Days are difficult to use in the context of studies of change through time as agricultural techniques advance and so labour inputs change. In the sphere of livestock farming the idea of 'livestock units' has received considerable attention. These are essentially ratios based on the varying feed requirements of different ages and types of livestock. Contemporary workers such as Nix [Nix J, 1986] have refined the concept to that of 'relative requirements of metabolised energy'.

There have been few attempts to devise standardised systems for comparison of historical agricultural data. J R Walton [Walton J R, 1973], in his studies of Oxfordshire agriculture in the nineteenth century based upon newspaper advertisements, has proposed a system of livestock units [See Table 2.2]. Given the prospect of regional variation during the eighteenth and nineteenth centuries, however, it is preferable that a local scale of units be devised that can be reasonably applied to data from southern Derbyshire, north Leicestershire and north east Staffordshire. The most promising source of information which might be used as a basis for stock comparison on a feed basis is to be found in Pitt's Board of Agriculture Report for Leicestershire [Pitt W, 1809]. Unlike Farey's Derbyshire Report [Farey J, 1815 2 and 1817] with its emphasis on detail of individual farms Pitt was concerned with the overall situation

in Leicestershire. He made estimates of the land use and stock numbers in the county and translated these into his vision of an ideal 240 acre farm. In the process he made statements about the average amount of land needed to support different types and ages of stock e.g. a dairy cow requires two acres of grazing and an acre of hay i.e. 3 acres of land in total. This enables a table of acreage requirements to be made. In common with modern livestock unit systems a dairy cow can be taken as one unit and all other forms of stock scaled accordingly.

One dairy cow = 3 acres	=1	Livestock unit
One fat cow or beef animal= 2.5 acres	=0.8	Livestock unit
One stirk or heifer = 2 acres	=0.67	Livestock unit
One beef animal 1-2 years old = 2 acres	=0.67	Livestock unit
cattle less than 1 year old = 1 acre	=0.33	Livestock unit
One breeding ewe = 0.37 acre	=0.15	Livestock unit
One hog or whether = 0.25 acre	=0.1	Livestock unit

The units so derived can be compared with those devised by Walton [Walton J R, 1973] and Overton [Overton M, 1986] for the nineteenth century and Coppock [Coppock J T, 1964] Morgan and Munton [Morgan W B and Munton R J C, 1971] and Nix [Nix J, 1986] in more recent times [See Table 2.2]. The interesting feature is the high level of similarity between the tables which suggests that the scale of units here proposed may be applied with some confidence.

C. Prices and productivity

Many of the qualitative sources consulted make reference to the important matters of prices and productivity. The information often relates to particular years and requires careful evaluation and qualification. Series of prices were reported in the Derby Mercury on a weekly basis for wheat, barley, oats and beans. There is some inconsistency in the use of units i.e., strikes, bushels and pounds/hundred weights and it has proved more satisfactory to refer to published data on Derby grain prices [see Mingay G E 1989 p.96]. It has also not proved possible to discover an entry for Derby in the Corn Market returns collected for inland centres from 1828 onwards and

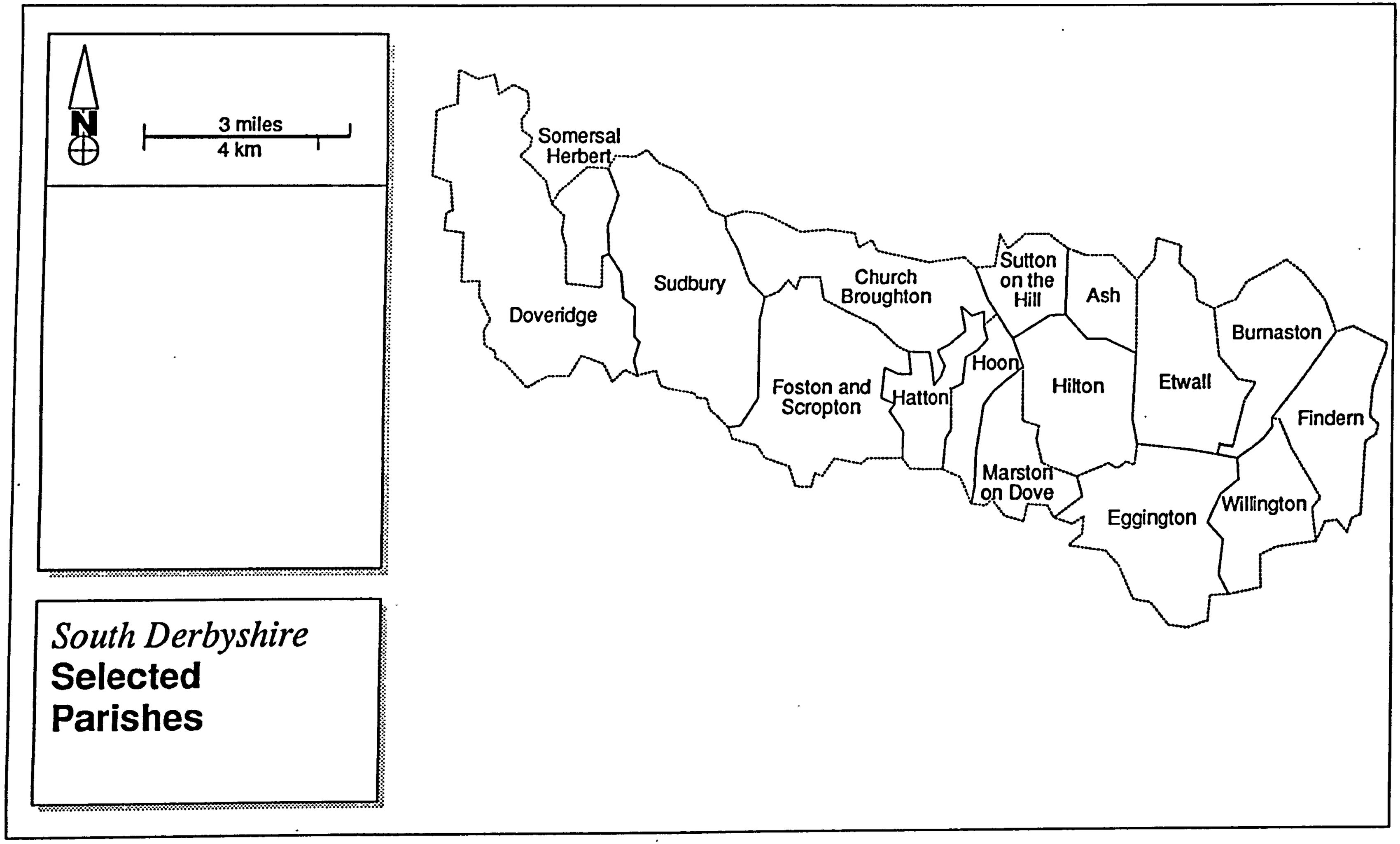
discussed by Vamplew [see Vamplew W, 1980a and 1980b]. This would have provided an indication of local wheat production.

The annual Michaelmas cheese fair held in Derby received special prominence in the Derby Mercury. The range of price of cheese is given and not infrequently compared with fairs elsewhere in the Midlands and beyond. The nature of the trade is also reported in terms of numbers of sellers and buyers and the overall quantity of cheese on sale. Reference to the activities of pick pockets, 'the light fingered gentry', is happily rare. The price series for cheese is of special importance to this study and has been compared with other series in Mingay [Mingay G E, 1989 ed p.1001].

Indirect measures of agricultural productivity relating to southern Derbyshire are land rent and the valuation of land for income tax purposes. Rentals survive for a number of estates and present no real problem in their usage as long as acreages and values can be clearly identified. Regretfully this is not the case with respect to the extensive records of the Vernon Estate at Sudbury. The nineteenth century income tax schedules exist on a parish basis for 1815, 1842/3 and 1859/60 and were essentially statements of land value. The objective of analysis is to determine changes in assessment as an indication of changes in value. Problems associated with their use have been discussed by Grigg in connection with his studies of agricultural change in south Lincolnshire [Grigg D B, 1962 and 1965]. These relate to matters of comparability given the likelihood of differing bases for tax assessment. However Grigg in common with Stamp [Stamp J C, 1911] argues that the method of assessment was sufficiently consistent to allow a cautious comparison to be made. For studies of rural economic activity it is important to eliminate parishes which became urbanised and/or industrialised.

In this methodological review the main concern has been to indicate the range of sources which have been consulted in order to derive as complete a view of the progress of agricultural change in southern Derbyshire as possible. In particular some emphasis has been given to those sources which are quantitive

and which require particular care in their interpretation. In the chapters which follow these sources have been considered alongside the more qualitative writings of eighteenth and nineteenth century agricultural commentators and the findings of twentieth century research. In a number of instances it has proved possible to convert written statements into cartographic representations in addition to those derived from statistical data. This approach has been adopted to represent the perceptions of contemporary observers of the agricultural scene with respect to the agricultural regions of Derbyshire. It is felt that a more accurate demonstration of their views emerges in a manner that meets the spatial concerns of the geographer. As there is a clear geological/topographic basis to such statements these have been considered in association with the review of the character of the physical environment in the chapter which follows.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Sutton on the Hill
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Burnaston
Hoon
Hilton
Etwall
Foston and Scropton
Hatton
Findern
Marston on Dove
Eggington
Willington
South Derbyshire
Selected Parishes

Figure 2.1

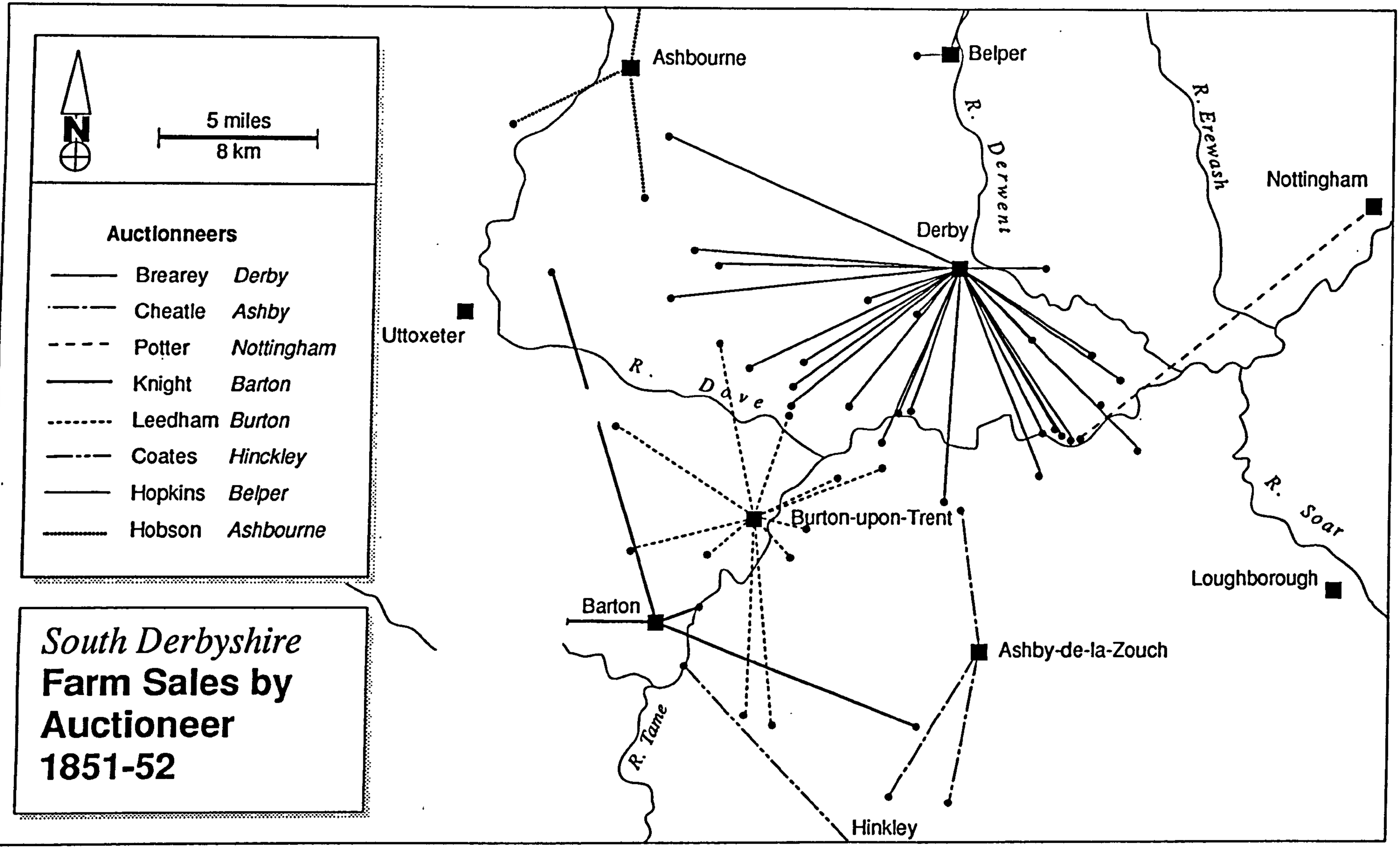


Figure 2.2 *(Source: Derby Mercury)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1792/3	0	2	3	1	1	0	1	0	1	2	0	0	11
1795	1	0	1	1	0	0	0	0	2	0	2	0	7
1797/8	0	6	8	0	0	0	0	0	5	1	0	1	21
1800	0	4	8	1	1	0	0	0	1	1	1	1	18
1802/3	5	2	14	1	1	0	0	1	0	2	8	2	36
1805	3	8	7	1	0	1	1	1	2	4	4	0	32
1807/8	4	3	13	5	2	2	0	1	4	5	0	1	40
1810	2	6	1	1	1	2	0	0	5	4	5	4	36
1812/3	4	6	7	6	1	0	0	0	4	4	5	0	37
1815	4	10	20	17	1	0	0	0	3	9	11	3	78
1817/8	2	11	20	1	0	0	1	2	2	5	8	2	54
1820	6	9	11	1	0	2	0	3	7	3	8	1	51
1822/3	7	7	13	6	1	1	0	2	0	5	9	3	54
1825	8	7	9	0	2	1	0	2	3	1	7	1	41
1827/8	6	19	13	2	2	0	1	0	6	5	1	4	59
1830	4	15	10	9	0	0	0	1	3	7	7	4	60
1832/3	3	19	11	1	1	0	0	4	2	3	4	1	49
1835	8	11	13	16	0	2	0	2	4	2	7	7	72
1837/8	6	11	7	7	2	1	0	7	3	4	10	0	58
1840	9	9	9	4	0	1	1	1	6	3	10	2	55
1842/3	7	9	19	2	4	0	1	3	6	6	14	2	73
1845	12	8	6	5	1	1	0	0	5	10	16	7	71
1847/8	1	7	9	4	3	0	0	2	7	4	7	2	46
1850	4	14	18	0	0	1	0	0	4	10	10	9	66
1852/3	2	9	8	0	0	0	1	1	4	9	23	7	64
1855	5	7	11	10	2	1	1	0	2	3	12	1	55
1857/8	3	13	12	1	6	1	1	0	5	3	9	3	57
1860	3	16	12	0	0	1	0	1	0	8	10	6	57
1862/3.	8	11	8	4	0	1	1	3	4	7	5	5	57
1865	5	8	3	2	0	0	0	0	0	8	13	5	44
1867/8	1	12	8	7	0	0	4	5	8	13	16	2	72
1870	6	12	13	6	2	3	1	3	5	4	15	7	67
TOTAL	139	287	339	122	34	20	17	45	113	155	257	89	1608

Table 2.1 Frequency of Occurrence of Sale Advertisments by Month - Derby Mercury 1792-1870

1 Walton J R (1973) based on nineteenth century data

Horses	1.0 Unit
Cattle	0.9 Unit
Sheep	0.11 Unit
Pigs	0.1 Unit

2 Morgan W B and Munton R J C (1971)

Dairy Cows	1.0 Unit
Beef Cattle	0.8 Unit
Cattle 1-2 yrs	0.6 Unit
Cattle<1yr	0.4 Unit
Ewes	0.2 Unit
Other Sheep	0.2 Unit
Pigs	0.1 Unit

3 Coppock J T (1964)

Cows	1.0 Unit
Bulls	1.0 Unit
Beef Cattle	1.0 Unit
Cattle 1-2 yrs	0.67 Unit
Cattle <1yr	0.33 Unit
Ewes	0.2 Unit

4 Nix J (1986)

Dairy Cows	1.0 Unit
Other Cattle	0.8 Unit
Cattle 1-2 yrs	0.6 Unit
Cattle <1yr	0.4 Unit
Lowland Ewes	0.15 Unit
Rams and Tegs	0.15 Unit
Pigs	0.08 Unit

5 Overton M (1986) adapted for late nineteenth century data

Cows	1.0 Unit
Other Cattle	0.6 Unit
Sheep	0.14 Unit
Pigs	0.15 Unit

Table 2.2 Comparison of Tables of Livestock Units

CHAPTER 3

SOUTHERN DERBYSHIRE: THE NATURAL ENVIRONMENT AND AGRICULTURE IN THE EIGHTEENTH AND NINETEENTH CENTURIES

In the debate about agricultural change reviewed in Chapter 1 some weight has been given to the significance of spatial variation in natural environmental conditions notably the distinction between heavy and light land. Notwithstanding the strengths or weaknesses of this particular argument it does underline the need to give due attention to the influences which the natural environment may have had upon the agriculture of southern Derbyshire in the eighteenth and nineteenth centuries.

The debate which is now entered will be progressed in three stages. The first is concerned with the basic aspects of climate and surface form which are essential factors in the determination of the agricultural capability of land. The sources used are mainly modern so it is necessary to question the extent to which the conclusions may be regarded as applicable to past circumstances. The second stage seeks to review the writings of those who commented upon the agriculture of southern Derbyshire during the time period of this study in association with related modern research findings. The essential issue is therefore the degree to which the nature and variety of environmental conditions were recognised and therefore perceived to be relevant to farming at the time. The third stage of debate is derived from the first two and in it a three fold categorisation of agricultural environments for southern Derbyshire is proposed. These categories will form the basis for comment in later chapters as various aspects of agricultural activity are discussed and as the nature of farm systems is elaborated.

A. Southern Derbyshire - Surface Form and Climate

The location of the study area within the English Midlands, in the central part of the Trent Basin, means that in geological terms the country rocks are dominated by the occurrence of

Triassic and Carboniferous strata. Within the Triassic sequence it is the Mercian Mudstone [Keuper Marl] which is the most spatially significant formation so that the major elements of the drainage system ie, the Trent and its tributaries, such as the Tame, Soar, lower Derwent and lower Dove flow directly across it [see Figure 3.1]. However in a number of localities at the margin of the Mudstone the underlying Keuper Sandstone and also Bromsgrove Sandstone [Bunter Sandstone] come to the surface in irregular but rarely extensive outcrops. The Triassic rocks lie unconformably on a predominantly Carboniferous floor. In south Derbyshire and north Leicestershire the Carboniferous occurs as a series of small inliers of variable conformation. Westphalian strata have the most widespread occurrence but local outcrops of Namurian Sandstones and Dinantian Limestones have also been of economic significance. However the main outcrop of the Carboniferous is located to the north of the Trias. The boundary between the two formations marks a major discontinuity in the landscape along a west to east line lying approximately between Stoke on Trent and Nottingham. The Dinantian Limestone outcrop here marks the southern margin of the Derbyshire dome. On the western and eastern flanks of the dome sequences of Namurian shales and grits and Westphalian coal measures are inclined in westerly and easterly directions respectively.

The broad relationships between the drainage and the surficial geology have been summarised in Figure 3.2. This demonstrates the characteristic entrenchment of the major rivers into the Trias and Carboniferous in the form of wide flood plains flanked by gravel deposits. The latter are variously described as river terrace gravels or fluvio-glacial gravels when they occur at higher levels. The country rocks take the form of low plateaus standing some hundred metres above the flood plains and are in their turn masked by extensive deposits of glacial till and gravels. The plateaux are further dissected by streams tributary to the major river valleys. Their networks display essentially dendritic characteristics but are sensitive to local geological variation particularly where permeable sandstones come to the surface [see Dalton R T and Fox H R, 1986].

It is not surprising that given the complexity of the geomorphic

history of Midland England the relationships between the valley and plateau deposits and associated landforms are far from certain. However the margin of the ice associated with the last [Devensian] glaciation ran approximately north to south across the western margin of the upper Trent Basin with lobes advancing as far east as the Dove Valley in the vicinity of Uttoxeter and the Trent at Yoxall to the west of Burton [British Geological Survey 1977]. Meltwaters from this episode undoubtedly had profound effects on valley form and the content and distribution of surficial materials. Relicts from previous glacial events would also have been subject to modification. It follows that while the area of the Middle Trent has a basic geological simplicity the arrangement of diverse surficial materials has introduced a significant dimension of complexity. This is expressed in spatial variations between the geography of soils within the area and particularly with respect to the drainage characteristics of the land.

In the context of what is essentially a discussion of land capability climate is a fundamental consideration and is likely to show variation both in space and time. Climate therefore merits careful review in the light of the position and internal character of the study area. In terms of its national location the study area approximates to the centre of the land mass being almost equidistant at 70 to 80 miles between the east and west coasts. It is also located at the boundary of the lowland and upland zones with the southernmost fringes of the Pennines lying to the north and north west and the scarplands of Central England to the south and east. Internally the relative relief is low. The specific study area varies in altitude between 35m and 80m OD while the wider mid Middle Trent Region ranges between 30m and 150m. In broad terms there is a decline in altitude from west to east across the area but given its limited overall extent it is evident that a basic uniformity of climate should be expected. It is the case that the mid Trent region is recognised as an agro-climatic region by the Ministry of Agriculture [MAFF 1976 and see Figure 3.3] which is subdivided into western and eastern parts. The statistical basis for this distinction is set out in Table 3.1. In general terms the two sets of data are basically similar but the following elements of

contrast are worth noting:

1. The more elevated and topographically accidented western part has marginally lower temperatures than the eastern in which the greater part of study area is located;

2. The average rainfall amounts are less for every month in the east hence the mean rainfall in the west of 840 mm and in the east of 714 mm;

3. Given the temperature and rainfall regimes potential evapotranspiration is greater in the east, so that while both the growing and grazing seasons are slightly longer there are water deficits in summer of 100mm over most of the study area. Such occurrences are likely to be of great importance in localities with free draining sandy or gravelly soils.

However the map of rainfall for the Trent Basin [Water Resources Board 1972] suggests that these west/east contrasts need some qualification. The line of the Trent Valley is associated with a belt of relative dryness. On average rainfall is circa 600 mm. Northwards towards the margins of the Peak rainfall averages increase to over 750 mm while to the south 700 mm is characteristic of the highest ground at Charnwood. The relationship between climate and agriculture in this region has been neatly summarised from a contemporary viewpoint by Barnes [Barnes F A, 1966 p.101] as follows:

'over this area the climate is relatively dry with a rather variable rainfall. It is characterised by a comparatively large seasonal and diurnal temperature range and moderate amounts of sunshine. Apart from occasional late killing frosts, the growing season is adequate for the satisfactory cultivation of almost any crop grown in Britain. Indeed one of its chief advantages is that it favours agricultural diversity, providing adequate sunshine, warmth and rainfall to sustain a good growth of grass throughout normal summers....subject of course to the suitability of soils'.

In the context of the present study the question to be ultimately answered is the extent to which this statement may be

applicable to past time and the period 1770-1870 in particular. Barnes is writing on the assumption of modern technological and land management inputs which have meant that agricultural activity is no longer as dependent on climate and its variations between years and seasons. Certainly then as now the weather was a major preoccupation of farmers and nowhere is this more clearly brought out than in the weekly county notes printed in the Agricultural Gazette [for Derbyshire see Murray G, Ag G, 1874 et seq]. However, given that climate has varied over time, it is necessary to consider the extent to which farmers in the past may have been faced with more or less favourable circumstances than their contemporary successors. Climatic historians have created a record of past conditions which extends as far back as the late seventeenth century based on the evaluation of variously sequential readings. Of particular note are the work of Manley with respect to the temperature record and Craddock who has studied rainfall. For temperature Manley [Manley G, 1953 and 1974] sought to determine a statement of monthly temperature values for Central England using various records including Swanwick's readings for Derby for the years 1793 to 1798 but relying on extended sequences for south Lancashire and Oxford. These have been represented as graphs [see Figure 3.4] showing annual and seasonal variation which may be taken as broadly applicable to the study area. Overall these would appear to indicate that climatic conditions were marginally less favourable to agriculture than those prevailing at present with mean temperatures some 0.5 degrees lower. The study period includes two years notable for their general coldness. 1816 is credited with an average of only 7.8 degrees while 1784 with its average of 7.7 degrees is regarded by Manley [Manley G, 1953 p.242] as the coldest year on record. Manley [Manley G, 1974 p.384 et seq] developed his data into graphs to represent favourable seasons. Clusterings of such seasons occur in the 1770's and around 1790. By contrast the period 1813-1823 and the later 1840's appear as cool years notably during the summer season.

Data on rainfall has been published by Craddock [Craddock J M, 1976 p.836 et seq]. Figure 3.5 is based upon his estimates of percentage annual deviation from the mean for the Notts/Derby

area beginning in 1760. Unfortunately the work on seasonal distribution by Craddock and Wales Smith [Craddock J M and Wales Smith 1977] is based on south Lincolnshire stations which are too distant to apply to the study area with confidence. However some notably wet years can be identified. In 1778, 1782, 1786, 1828, 1839 and 1848 rainfall appears as 30% above average while there are clusterings of wet years in the 1770's and the 1820's. Dry years of unusual severity occurred in 1771, 1779, 1788, 1826 and 1844. Dry years are grouped around 1780 and 1801 and 1804.

While these various records imply practical difficulties for the farming community much of the essential information remains hidden behind their generalised nature. The problem can be approached from the opposite direction through studies of harvest records but these may be of limited relevance in an area where livestock enterprises based on grass were dominant in the farm economy. Holderness [Holderness B A, 1989 p.97 et seq] argues that sowing conditions which, through a combination of low temperatures and wetness, make the preparation of a proper seed bed difficult are the most significant factors likely to result in a poor harvest. He cites a number of years when harvests were disastrous following difficult spring conditions. These are 1756, 1766, 1768, 1789, 1795, 1800, 1809, 1810, 1811, 1817, 1828 and 1839. In addition the years 1789 and 1800 were notably difficult as a result of wet conditions during the harvesting period. A similar situation is clearly indicated for 1796 by agricultural reports in the Derby Mercury [DM 7.1.1796].

Problematic years for dairy farmers are less easy to identify but a note in the Farmers' Magazine [Anon 3, 1863 p.156] indicates that hot dry summer conditions create problems for successful cheese make as well as feed provision. 1826 emerges as a season of real difficulty when persistent drought curtailed the spring flush of grass growth and diminished hay yields. The problems appear widespread from the material assembled by Jones [Jones E L, 1964 p.164]. The annual report in the Derby Mercury on the Autumn Cheese Fair [DM 4/10/1826] is elaborated as follows:

'at our annual fair supply of cheese was as might be exepected

from the long and severe drought considerably less than average - perhaps by two thirds', and in the same week the market at Newark was well supplied 'considering the great drought experienced in the neighbourhood'. Clearly the year was one of poor grass growth the possibility of which is indicated by Craddock's [Craddock J M, 1976 p.837] estimate of rainfall in Notts and Derby being only 73% of average and Manley's temperature computations for June, July and August of that year of 17.3, 17.9 and 17.6 degrees respectively. However such conditions are exceptional and are only matched by data for the great drought year of 1976. Perhaps more typical was the impact of the early summer droughts of 1874 and 1875. With respect to 1874 Gilbert Murray noted of south Derbyshire that the yield of milk had considerably decreased and that hay crops were light to the extent of being one third below average [Murray G, Ag G, 27.6.1874]. In Cheshire George Willis commented on the enterprising men who had fed cake, bran etc during the dry summer and had still achieved 4 cwt of cheese per cow as opposed to the others who had difficulty in making 2.5 cwt [Willis G, Ag G, 19.12.1874].

Documented situations such as these enable identification and some appreciation of the nature of the more extreme climatic events which had an impact on agricultural activity [see Jones E L, 1964 op cit ch. 3]. Otherwise it is a matter of working with climatic averages and recognising the wide range of opportunity presented to farmers as compared with the potential limitations.

B. Eighteenth and Nineteenth Century Views of the Natural Environment in Southern Derbyshire in Relation to Agriculture.

In this section the writings of contemporary commentators on the agriculture of Derbyshire in the eighteenth and nineteenth centuries will be reviewed alongside the relatively few relevant modern research findings with specific reference to their view of the natural environment. The commentators had varied interests and concerns and it does not follow that it was those who were authors of specifically agricultural reports and essays

who made the most significant contributions. Indeed the earliest statements about agriculture included in William Wolley's History of Derbyshire c.1710 prove to be particularly valuable and are worthy of detailed comment [See Glover C and Riden P, 1981]. William Woolley was a merchant from a farming family who in later life became resident in Marston on Dove. The bias of his history is towards the southern half of the county where he deals mainly with specific parishes and their principal families. In addition Woolley includes assessments of land quality and for a minority of parishes statements as to land use and the extent of enclosure. Maps based upon Woolley's material serve to set the scene for the period 1770-1870 [Fig 3.6]. In his introductory comments Woolley differentiates the north and west of Derbyshire from the south and east. 'The east and south parts....are well cultivated and fruitful yielding a very spacious and pleasant prospect, while in contrast 'the north and west parts which is called the Peak...is not so pleasing to the eye grazing multitudes of sheep on top of its mountains' [ibid, p.8]. He thus demonstrated a broad awareness of the configuration of the county. He further refers to the occurrence of limestone and gritstone as the main elements of the Peak landscape, recognises the distinctive coal county of the eastern and southern parts of Derbyshire and also notes localised occurrence of sandy soils coincident with valley gravels and Triassic sandstone. Woolley does not, however, make specific reference to the marls which occupy a significance part of the south of the county.

In reviewing individual parishes Woolley comments on the general quality of land with occasional reference to variations within the parish. The terms Woolley used are strictly qualitative but range through a spectrum from excellent/very good, to good, to pretty good, good middling, middling/ordinary to barren. For example Egginton is described as having 'a great quantity of very good land on the banks of the Dove, Trent and also of another small brook that runs from Hilton through Egginton so into Dove' [ibid, p.10]. Whether Woolley applied such terminology consistently is debatable, but the fact that similar terms are used in relation to what are likely to have been comparable situations does give credibility to his

comments. For mapping purposes a four fold categorisation has been adopted. Excellent and very good which receive relatively few references are amalgamated with good to identify the better class land. Pretty good and good middling comprise a second category which is termed above average. Middling and ordinary are combined to give an average category. Bleak and indifferent are regarded as poor.

Figure 3.6 shows Woolley's perception of land quality distribution. The good land correlates with the alluvial floodplains of the major river valleys the Trent, the Dove and the Derwent as well as tracts along the Erewash and the Markeaton Brook valley northwest of Derby. In some localities, however, the tendency to flooding is noted. The above average land occurs in discrete blocks, the largest embracing the partially drift covered Triassic marls and sandstones to the north of the Trent/Dove. Average land occurs most extensively in a tract south of the Trent where it correlates with the varied geology of coal measures/gritstone/marl and sandstone outcrops. Woolley specifically notes the sandy character of the soil over a significant part of this area. Average land is also located in a triangle broadly defined by Derby, Ashbourne and Belper which broadly correlates with the mediaeval hunting forest of Duffield Frith. Other areas occur in Hilton and Burnaston parishes where deposits of fluvio-glacial gravels occur. The poorest land is clearly identified with the gritstone in the vicinity of Matlock and Belper.

The period of Woolley's survey coincides with the review of the agricultural progress in the North Midland region by Hey [Hey D, 1984 p.125-158]. The subregional agricultural classification [see Figure. 3.7] which is proposed for the North Midlands places southern Derbyshire into an 'intermediate category' where 'corn and sheep' and 'corn and cattle' with 'substantial' rearing are considered dominant. However the discussion in the text most certainly recognises the importance of dairying in southern Derbyshire such that the significance of various forms of livestock enterprise appears to outweigh that of corn [see Figure 3.8 for summary]. Thirsk in a review of agricultural regions 1500-1750 [Thirsk J, 1987] describes the southern

Derbyshire as a dairying region with subsidiary rearing and corn growing. This image is further supported by Henstock [Henstock A, 1969] and Yates [Yates E M, 1974] whose concerns are with the origin and rise of the dairy industry in the Staffordshire/Derbyshire area.

The broadly pastoral image projected by Woolley and by Hey is further supported by a succession of evidence covering the period of the Napoleonic conflict and its immediate aftermath. Pilkington's survey of Derbyshire is essentially a systematic topography [Pilkington J, 1789]. His chapter on agriculture is preceded by an appreciation of geological variation which he styled as 'subterranean geography'. Consequently Pilkington divided Derbyshire into agricultural regions based on geology. He recognised the significance of the west to east line drawn from Ashbourne through Derby to the Nottinghamshire boundary. To the south of this line there was no stone and 'the soil is a reddish clay or marl and of the quality of this soil I would remark that it is exceedingly various in different situations' [Pilkington J, 1789, p.285]. Pilkington recognises the presence of other lithologies as 'small tracts of gravel and sandy soil are also interspersed throughout the district of which I am speaking but I confess myself incapable of assigning any reason for their appearance in such a situation' [Pilkington J, 1789, p.288]. While Pilkington thus showed his awareness of Triassic sandstones and various gravel deposits he also recognised the distinctiveness of flood plains. 'The soils of the valleys near banks of the large rivers is everywhere of a different nature from that of the neighbouring country'. [ibid p.289]. Pilkington's geological interpretation plus the agricultural emphasis for each 'region' identified has been mapped as Figure 3.9. This represents a situation which had evolved beyond that described by Hey. It is a situation echoed by Brown [Brown T, 1794] in the first board of Agriculture report for Derbyshire. A threefold topographic division into 'high peak', 'low peak' and 'fertile soil' is the basis of Brown's rather generalised view. However 'the fertile soil' is coincident with the Triassic area of southern Derbyshire and its name is indicative of Brown's assessment as to its quality. A similar view is articulated by Curtis [Curtis W, 1806] in his unpublished report addressed to

the Board of Agriculture which gives more case study information than Brown. Curtis uses similar terminology to Pilkington referring to the reddish clay or marl country. Equally the valley lands are particularly noted in that 'the soil in the valleys near the banks of the large rivers is much improved from its original state by the intermixture of various kinds of earth where overflowed by inundations'. [ibid, p.7]. Further comment is provided by the Board of Agriculture reports for Derbyshire prepared by Farey [Farey J T, 1 1815, 2 1815, 3 1817] and also by Pitt for neighbouring Leicestershire and Staffordshire [Pitt W, 1808, 1809].

Farey's three volume report is substantial in scope. By profession Farey was a 'mineralogist and surveyor' who in 1806 had met and been strongly influenced by the early geologist William 'Strata' Smith while in the employment of the Duke of Bedford at Woburn [Ford T D, 1967] Farey was commissioned by the Board of Agriculture to write a Derbyshire report in 1807. He spent three years in the county collecting material. Not only did he indulge his geological interest and meet many mine owners and industrialists he also interviewed significant landowners and farmers [see Figure 3.10]. Farey's observations were recorded in great detail so that in effect his reports contain substantial field notes which lend themselves to further analysis and interpretation which is a recurrent feature of this study. Farey included in his report a geological map of Derbyshire and adjacent counties [Figure 3.11]. This is the first published geological map of the county and is notable for its sophistication of presentation and structural interpretation through cross sections. In the main the outcrops are defined accurately with a major exception in the south of the county. The red marl and the major rivers are identified ie, the Trent and its tributaries. In addition the Carboniferous outcrops of the South Derbyshire coal field and small inliers of carboniferous limestone are mapped faithfully. By contrast the full complexity of the Triassic plus glacial and fluvial deposits are not understood. In effect Farey recognised one all embracing category of 'gravel soils' to include sandstones and gravels and also river alluvium, although Farey clearly acknowledges the particular character of flood plains. Farey

uses his geological survey as the basis for a description of soil and commonly uses geological terms to describe particular areas. His frequent use of 'red marl district' to describe the Mercian Mudstones [Keuper Marl] of the south of the county or 'mountain lime' in referencing the white Peak are typical geological shorthand used in an agricultural context.

It is interesting to note the approach of Farey and his immediate predecessors to the definition of variation in the agricultural landscape with Pitt's map of Staffordshire [Pitt W, 1809]. While the broad elements of county geology are recognised a rather inexact terminology is used. Mixt soil and strong soil describe those parts of Staffordshire dominated by marls and glacial till [Figure 3.12]. The problem of combining the two is revealed in Prince's [Prince H C, 1989] appraisal of the physical background agriculture in the nineteenth century where the juxtaposing of maps from the Board of Agriculture reports [see Figure 3.13] causes inevitable geology/soil discontinuities.

As will be apparent in later chapters Farey saw pastoral activities as dominant in Derbyshire with arable as a particular feature of light land situations. In this Farey was echoed by Glover [Glover S, 1829] whose county topography was published in 1829. Much of Glover's information seems to have been directly derived from Farey hence a strong adherence to a geological basis for the differentiation of soil and agriculture within the county. He referred to the 'productive red marl' with its association with daiy products notably cheese. He also noted a relationship between arable land and light soils in the south of the county. The main divisions recognised by Glover are summarised as Figure 3.14 where the riverside meadows of the Trent and its tributaries receive customary prominance.

A further detailed review of Derbyshire agriculture is the prize essay of Rowley [Rowley J J, 1853]. His geological awareness is based on White Watson's map of Derbyshire which appears less complete than Farey's survey although the outcrops of Triassic sandstones and marls are accurately differentiated. Rowley's geological division of the county forms the basis for

the structuring of his essay. The main features of agricultural activity which he associates with each region are summarised as Figure 3.15. The south of the county is clearly identified as superior to the remainder and is glowingly described as 'a highly favoured region' and 'a land of milk and honey' [Rowley J J, 1853, p.17]. The floodplain areas are given little prominence on White Watson's map but are highlighted in Rowley's text in terms of their productivity.

The accounts of Derbyshire agriculture from Woolley onwards are important in that collectively they tell a consistent story. Indeed it is further recognised in the comments on Derbyshire farming contained in the various parliamentary reports from that of William Smith [Smith W, BPP 1933] through to the report of Druce [Druce S B L, BPP 1880/2]. It is evident that the association between geology and soil on the one hand and agricultural character on the other was something that they all recognised. That such divisions had real meaning and were expressed in the farming landscape is taken as justification for their use in the discussion which will emerge in succeeding chapters. Three particular environmental circumstances merit greater elaboration using the benefits of modern research. These are the riverine alluvial tracts, the areas of light soils and the areas of heavy soils within each of which elements of significant variation can be recognised. The identification of what may be styled distinctive agricultural environments brings together aspects of the discussion which has been developed in this chapter so far. It also reaches back into the review of the concept of sectoral advance in relation to light and heavy lands which featured in Chapter 1.

Riverine Alluvial Tracts

Within southern Derbyshire alluvial lands associated with stream channels are important landscape features and occupy about 20% of the total area. Despite the flood hazard alluvial tracts were regarded highly by commentators on agriculture from Woolley onwards with respect to Derbyshire and are also noted favorably by Plot [Plot R, 1616] in his topographical history of Staffordshire. The relatively high rental values placed upon

such riverine lands, which are discussed in Chapter 4, being clear confirmation of this situation. It is therefore important to appreciate that the agricultural environment which was the most valued was the most dynamic in terms of the operation of earth surface processes. The mapping of alluvial areas by the British Geological Survey shows a hierarchy of scale of development broadly correlative with the hierarchy of the stream network. The extent of alluvial deposits is thus at its greatest in association with the Trent itself. In the vicinity of the Dove and Derwent confluences unusual widths of alluvium extending to 2.5km occur. The major Trent tributaries, the Tame and Soar from the south and the Dove and Derwent from the north, display alluvial floodplains of variable widths up to 1.5km. Many of the lesser tributary brooks also have significant floodplain development. Related features are embayments of alluvial material as at Sinfin Moor, Findern and Ruddington which may mark the sites of palaeolakes. A similar feature marked by organic and lacustrine deposits may exist at Hatton Moor on the northern margin of the Dove floodplain.

The floodplains are normally trenched into the wider landscape and are delimited by degraded river cliffs or low bluffs. Floodplain development seems to have been highly active in late glacial or immediate post glacial times. They are characterised by a basal deposit of extensively resorted sands and gravel upon which finer alluvial material has subsequently accumulated. The modern river channels are of the typical gravel bed type, a circumstance that was clearly identified by Farey [Farey J,1 1815 p.304]. It follows that the calibre of trench infill is variable and the same is true of the nature and origins of its content. Stevenson and Mitchell [Stevenson I P and Mitchell G H, 1973 p.99] have indicated a dominance of material of local derivation essentially quartzitic pebbles from the Bromsgrove Sandstone [Bunter Sandstone]. However they have also indicated the presence of Namurian grits and Borrowdale Volcanics from the much wider afield. The surface cover of fine material which is currently in process of being reworked by lateral stream movement may well be of recent origin. Evans [Evans J G, 1976 p.119] and Bridges [Bridges E M, 1978 p.130] have argued that the effect of early ploughing from the neolithic onwards was to

produce an environment in which soil erosion could take place so that fine material currently lodged in floodplains could have originated from cultivated fields. In effect the alluvial material has been built up progressively by episodic flooding and has been derived in large measure from the Triassic mudstones and glacial tills which dominate the soil parent materials of the area.

The river channels have a meandering form and display much evidence of active lateral mobility so that the floodplain is a dynamic environment in which erosion, storage and remobilisation all occur. Herein lies a major problem for the utilisation and management of the immediate riverine zone. Salisbury et al [Salisbury C R, 1984] have demonstrated that shifting channels have characterised the Trent floodplain since at least 6000 BP while evidence for more recent change has been reviewed by Large et al [Large A R G et al, 1991]. Some reaches of the Trent emerge as particularly unstable such as that from Burton eastwards across south Derbyshire. Studies by Dalton and Fox [Dalton R T & Fox H R, 1989] have identified similar sequences of active and less active reaches for the River Dove. In the vicinity of Scropton and also near the Trent confluence bank recession at rates of over one metre per annum have been measured. Across the floodplains there is widespread evidence of the presence of former meandering courses and it is apparent that farmers with riverside land experience management difficulties over the short and medium term. Downing et al [Downing R A, et al, 1970 p.7] have noted that the lithology of the alluvium is variable laterally as well as horizontally and may include permeable silty and sandy materials alongside impermeable clays. This has important implications for the hydraulic continuity of floodplain and the river channel with respect to the lateral transmissibility of water.

A further dimension of the floodplain environment of relevance to agriculture is of course the prevelance and impact of flooding. The problem of flood occurrence in the Trent Basin has been the subject of a detailed survey by Potter [Potter H R, 1960]. He has been able to produce a record of flood events in the Trent Basin from the late seventeenth century onwards with

much of the emphasis on records taken at the Trent Bridge at Nottingham. Evidence suggests that a flood event at Nottingham means that inundation will occur along the floodplains of the tributary rivers such as the Dove, Derwent, Soar and Tame. For example the great flood of 1795, the highest recorded at Nottingham, was also the second highest for the Derwent at Derby. Additionally at the time of the 1960 flood a special hydrological survey of the Dove valley indicates that at its maximum extent the waters reached the margins of the alluvial tract as mapped by the British Geological Survey. It will be demonstrated in the discussions of grassland and land use in later chapters that the incidence of flooding had important positive and negative impacts on the activities of farmers who had access to land on floodplains. The character of soils which have evolved on flood plains have been described by Ragg et al [Ragg J et al, 1984 p.197 and 215]. Two types are recognised the Wharfe series which occurs on more active floodplains and the Fladbury 2 series developed on alluvial materials towards the floodplain margins. The Wharfe soils are mapped as occupying belts of up to 700 metres from the contemporary river channels thus incorporating the zone of recent meander shift. Such soils are described as deep, well drained and predominantly fine in texture. Agricultural limitations are fewer than might be expected in that the impact of winter flooding is short lived so that the risks from poaching are low and under favourable conditions animals may be grazed at times during the winter. Where more extensively developed these soils can be suited to cultivation. The legacy of ridge and furrow and also documentary evidence will be discussed in later chapters to show that flood plain lands were indeed cropped in the recent past. Fladbury 2 soils occupy remaining areas of the floodplain tracts. These are pelo-alluvial soils featuring a mottled slowly permable clay subsoil. A primary cause of the water logging which is a frequent characteristic of these soils in winter is the rise in the ground water level. However the various brooks and drains which cross the alluvium must also be considered as factors in the induction of such conditions. It is therefore not surprising that Fladbury soils have a larger retained water capacity and low bearing strength when wet. Consequently poaching is a serious risk in winter and grazing is restricted to the summer

months. On the higher margins of the floodplains where flood risk and waterlogging are less prevalent the gley soils give way to gleyic brown alluvial soils. There is greater prospect of these soils being successfully adapted to arable.

The alluvial floodplains are therefore distinctive as agricultural environments. Their particular lithological and drainage conditions create limitations on their effective usage at the present time, a situation which would have been equally operative in the period 1770-1870, although with somewhat different emphases. The detail of such emphases will be further elaborated as the study progresses.

Light Soils

The pattern of light soils across the study area is fragmented but reflects the widespread occurence of both solid and surficial geological lithologies as the sources of origin of appropriate soil parent materials. However the extent of light land patches amounting to about 11% of the area of southern Derbyshire is such that they are likely to have potential influence on the management of farmland to which they relate on the basis of individual farms or parts of farms. Consequently light land is a limited yet important feature of the agricultural landscape of southern Derbyshire. Of the solid geological formations that weather to light soils it is the stratigraphically sequential Triassic strata of the Bromsgrove [Bunter] and Keuper Sandstone which are spatially the most extensive. They outcrop approximately along a line from Ashbourne through Derby to Nottingham to the north of the study area and irregularly on the flanks of the South Derbyshire/North Leicestershire coalfield to the south of the Trent. Of the two formations the Bromsgrove sandstone is the more friable material as compared with the Keuper sandstone, while pebble beds are characteristic of its base. Two soil associations are formed on these Triassic rocks. Cuckney 1 is developed on the Bromsgrove sandstone. It comprises sandy well drained soils which may be podsolised on steeper slopes and strongly acid on the pebble beds. Agricultural advantages include ease of cultivation and the length of the growing season while disadvantages are the

need for inputs of fertiliser and lime, the potential for compaction and panning and the tendency for droughtiness during the summer season. In the past such soil would have benefitted from lime, marl and dung.

The Keuper sandstone tends to correlate with Bromsgrove soils which are not to be confused with the geological formation of that name. Typically these are well drained brown earths which are easily worked but otherwise have general characteristics similar to Cuckney 1 soils. Currently they are regarded as the best soils in the region, a reputation which is also evident in the recent past and will emerge as significant in explaining the greater diversity of agriculture south of the Trent. Other sandstones are of limited occurrence and impact such as the outcrops within the coal measures sequence and the Namurian millstone grit series located to the south west of Melbourne.

Surficial sand and gravel deposits occur widely in association with the major river valley as terrace features and to a much lesser extent as elements of glacial material. The British Geological Survey [See B.G.S. Sheet 140, 1:50,000] identifies two main sequences of sand and gravels in the area. The uppermost is known as the Hilton terrace and is regarded as fluvio-glacial in origin while the lower and more extensive is the fluvial Beeston terrace. The fragments of terrace are rarely continuous on eitherside of the river floodplains.

The Hilton terrace exhibits complex topographc relationships with an altitudinal range of up to 25 metres. In some localities as at Egginton/Etwall Common two levels are identifiable but generally the gravel patches grade downslope towards the alluvium at angles that rarely exceed one degree. At the type site for the deposit near to Hilton village the thickness of the deposit exceeds 4 metres and it has attracted more commercial activity. The content is variable in character but is dominated by quartzitic pebbles originating from the Bromsgrove sandstone. Immediately to the east at Egginton substantial lenses of lacustrine clays have been discovered within the gravels which have influenced drainage conditions and created perched water tables. The Beeston terrace stands some 2 metres above the

levels of the floodplains in the west of the area but up to 10 metres in the east towards Nottingham. Of the various terrace fragments those at the type site at Beeston and also at Burton upon Trent are the most extensive. Like the Hilton terrace the content is dominated by quartzitic pebbles [Stevenson I P and Mitchell G H, 1973 p.94-96]. The mapping of soils at the scale of 1:250,000 [Soil Survey 1984] indicates that the Arrow soil associated correlates with the Hilton and Beeston gravel terraces. These soils are described as brown earths but the influence of the gravelly parent material is clearly emphasised in the account in the Soil Survey memoir [Ragg J et al, 1984 p.83]. The terms used include coarse texture, weak structure, large porosity, low retained water, quick drying top soil, rapid depletion of organic content and reduced ability to retain nutrients. Where the character of the deposits is variable so it is noted that the water regime of the soil is similarly effected. Despite their structural limitations these soils are classed as well suited to cultivation in terms of modern agricultural practice. However in the context of the less sophisticated technologies of the past such soils can be regarded as problematic. The degree of stoniness would create difficulties of workability while the rapidity of the drainage would result in burning out in periods of extended dry weather.

Soils of the Wigton Moor Association [Ragg et al 1984 p.329] are a particular feature of the Beeston terrace in the Trent valley between Burton upon Trent and Lichfield but occur in small pockets elsewhere at the margins of the gravels and floodplains. They are distinguished from Arrow soils by the presence of high and fluctuating water tables. The lower soil horizons are consequently water logged so that cambic gley soils are formed. Modern farming is dependent upon adequate drainage so that similar problems must have existed in the past. A common feature of the light land soils that have been described here is there workability over an extended season of activity. This must have been of particular value in the past despite the need to add lime, marl or dung to these soils to otherwise improve their chemical and physical properties. There is an implication that such soils had arable potential. Even if they are of limited extent this potential must have had an important influence on

the systems of the farms with which they coincided.

Heavy Soils

Parent material derived from clays, shales and marls dominate the solid and surficial geological formations of southern Derbyshire and immediately adjacent areas such that they occupy in excess of two thirds of the total area. There are however significant variations between soils which have developed so that the agricultural environment is by no means uniform. It is the shales of the Namurian and Westphalian formations which occur at the northern margins of the study area which are likely to give rise to the most difficult agricultural conditions. The related soil association is the Bardsey which is described by Ragg et al [op cit 1984 p.9] as a cambic stagnogley, that is to say a soil which is periodically waterlogged because of the slow permeability of the subsoil. These soils remain difficult to manage even with modern underdrainage so that it can be fairly assumed that they posed greater problems in the past. Effective use of such soils for arable is not feasible and when in pasture the effects of poaching ie, the trampling and compaction of ground by livestock are considerable. Coarser materials derived from sandstone bands within the formation serve to provide locally easier conditions but they are not of general significance.

The marls which characterise the Triassic Mercian mudstone formation are the major source of soil parent material which gives rise to heavy land in the study area. The mudstones outcrop extensively south of an approximate line from Ashbourne, through Derby and towards Nottingham and form the geological basis of the block of country southwards to the Dove and Trent and also Needwood Forest. The marls also recur on the western, northern and eastern flanks of the area south of the Trent centred on the South Derbyshire Coalfield. Generally the more elevated parts of these areas support fairly extensive level surfaces. There is however a broad relationship between geology and relief in so far as the mudstones have a regional dip to the south so that the drainage systems which have developed as tributary to the major rivers also have strong southerly

components. The mudstone is described by Mitchell and Stevenson [op cit 1973 p.34] as a dolomitic siltstone incorporating layers of mudstone so that overall its mechanical constituents are predominantly silt/clay in calibre. The mudstones are dominant across much of southern Derbyshire hence the early identification of these rocks as the 'red marl'. Farey's usage of the term 'red marl' to describe the land in south Derbyshire in general and is such as to give it significance as a regional name. It has proved useful to adopt this convention in the present study. The chemical properties of the mudstone are important in that the presence of calcium carbonate led to the widespread digging of mudstone as a soil additive. This practice known as marling will be discussed more fully in Chapter 5.

The more elevated tracts of mudstone especially those located broadly to the south of Ashbourne and in Needwood Forest, are capped with spreads of surficial deposits of glacial origin. Glacial sands and gravels are of limited extent and comprise quartzitic pebbles in the main. They give rise to local occurrences of free draining soil and may have springs breaking out at their margins where they abut against less permeable materials. Glacial tills are more typical of these deposits. Jones and Charsley [Jones P F & Charsley T J, 1985 p.77] indicate that the mapping of the British Geological Survey at 1:50,000 tends to underestimate the thickness and the area covered by these till sheets. Information as to lithological character is sparse but it is clear that it is not uniform. The till sheet on the Forest of Needwood is more clayey than that which occurs elsewhere. Southwards from Ashbourne areas of sandy clay with associated flint, chert and quartz pebbles have been noted [see Mitchell G H and Stevenson I B, 1973 p.82] while occasional erratic blocks of Dinantian Limestone have been identified [see Jones P F and Charsley T J, 1985 p.78]. In the absence of detailed survey it is difficult to say more than to caution against regarding the tills as necessarily the basis for heavy land of the more difficult type. Figure 3.16 which is derived from Ragg et al [op cit 1984 p.324] summarises the interrelationships between soil types developed on Mercian mudstone and the covering till sheets and also extends the analysis into the riverine lands which have been previously

discussed. In terms of the evolution of soil types in relation to topography broad catena like arrangements are evident on slopes. The elevated till areas are mapped as Salop soils. These are stagnoleys ie, surface water gleys which are given to extended water-logging and are also liable to poaching and compaction. Slopes developed at the margins of the till covered areas have Whimple 3 soils [see Ragg et al, op cit 1984 p.319]. These are also stagnogleyic, but the better drainage induced by the slopes gives rise to argillic brown earths in mudstone parent material. Waterlogging is still possible but only in extended wet seasons and under modern conditions cultivation is quite possible. The lower slopes and the floors of minor valleys carry Brockhurst 2 soils [ibid 1984 p.118]. These may be either surface or groundwater gleys and reflect the inherent physical character of the mudstone under wet conditions. Such soils have restricted potential for grazing which is confined to the summer months as a result of limitations imposed by wetness.

In the vicinity of the Forest of Needwood the more uniformly clayey quality of the till produces soils of the Crewe Association [ibid 1984 p.143] which are classed as pelo-stagnogleys. The high water retentive capacity means a tendency to more extended waterlogging than might be experienced on Salop [ibid 1984 p.287] soils for example. At the margins of the Crewe Association soils the types which have been described above in relaltion the mudstone occur. The relationships in terms of geology, slope and soils have been summarised for the Dove Valley/Forest of Needwood area in Figure 3.17.

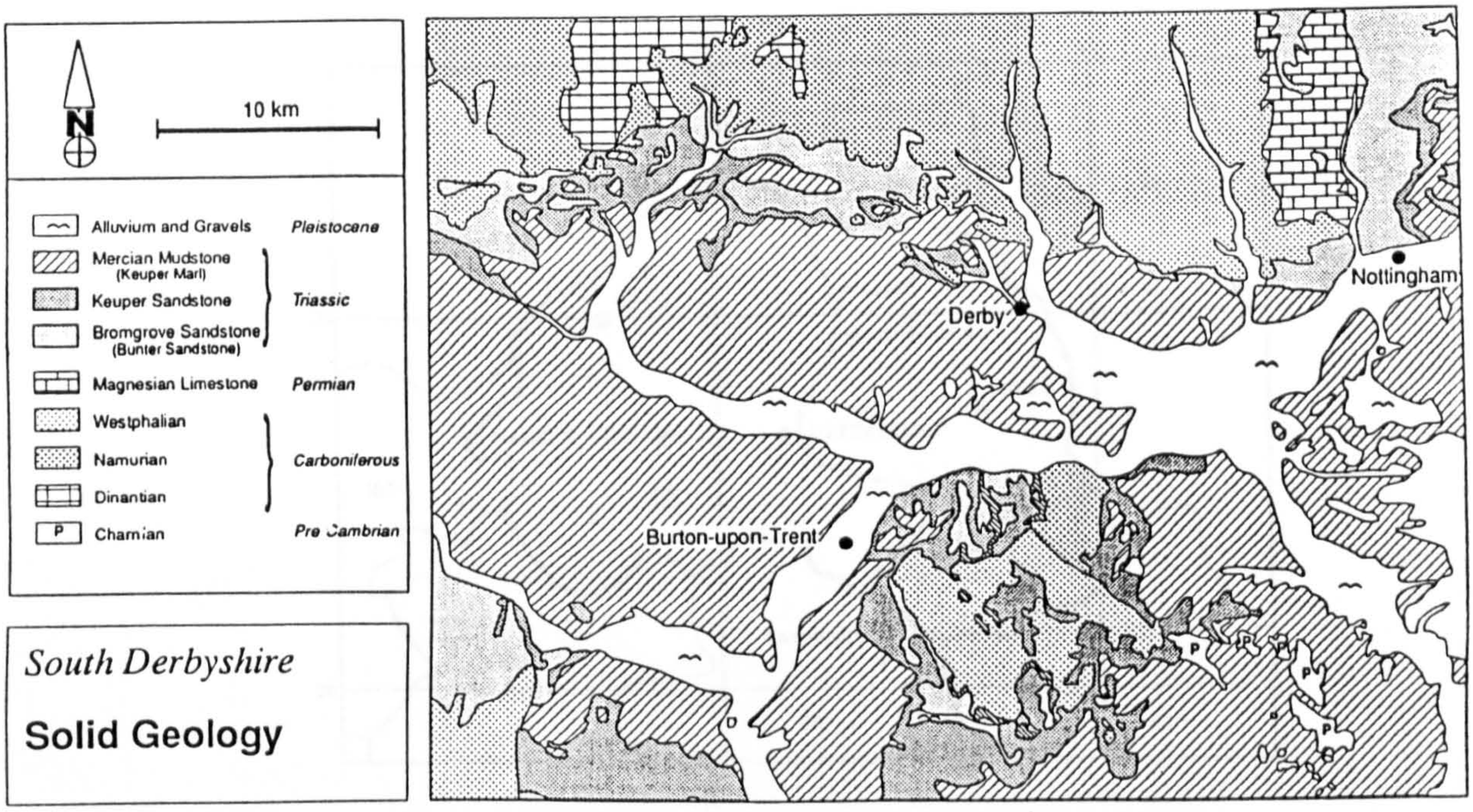
Taken as a broad group of soils the clay lands offer a restricted but nevertheless variable agricultural environment. The key management issue is clearly the removal of excess water and the need to offset the soil structural characteristic imposed by the predominance of clay so as to improve workability. These aspects will be considered in the context of the eighteenth and nineteenth centuries in Chapter 6. With respect to the problem as to how these heavy lands compare with the classic Lias and Oxford Clays of the Midland scarp and vale country it is evident from Ragg et al [ibid 1984 p.156] that the degree of waterlogging is generally less. Consequently the soils

of the Midland clay vales are more difficult to cultivate and have shorter seasons during which they can be safely grazed by stock unless thoroughly drained.

In summary it may be argued that the Mercian Mudstone country was less limiting in its agricultural capability than other lands collectively described as clays. This was a result of its inherent character as a marl rather than a strict clay and also the presence of a fairly diverse range of superficial materials of glacial origin. It seems reasonable therefore to differentiate the mudstone from the shales country associated with the Namurian rocks and the Westphalian coal measures. Similarly the particular character of the till sheet in the Needwood area provides a further basis for valid distinction. The geography of land capability on the heavier lands emerges as more complex than may be initially apparent. A question to be addressed later is the extent to which the agricultural systems which evolved on the heavier lands of southern Derbyshire show variation which may be explained in terms of soil type.

It is evident that southern Derbyshire displayed agricultural environments which offered limitations and opportunities. Its location in the wider context of the climate of Britain meant that both arable and pastoral activities could be pursued without major hindrance. Perhaps temperature conditions were not so favourable as those characteristic of the twentieth century and certainly the problems of climatic extremes could not be so easily counteracted. Few years can therefore be identified as being particularly difficult for the farmer. The principal source of variation within the area lay with the physical landscape. Despite the preponderance of Mercian Mudstone or red marl the occurrence of other lithologies and the presence of a range of surficial deposits give potential significant diversity to the agricultural environment. Three types of environment have been proposed: riverine, light land and heavy land. In their turn these have been shown to be varied rather than uniform. The complexity of the distributional patterns involved means that it is not easy to make a completely tidy subregional division on this basis.

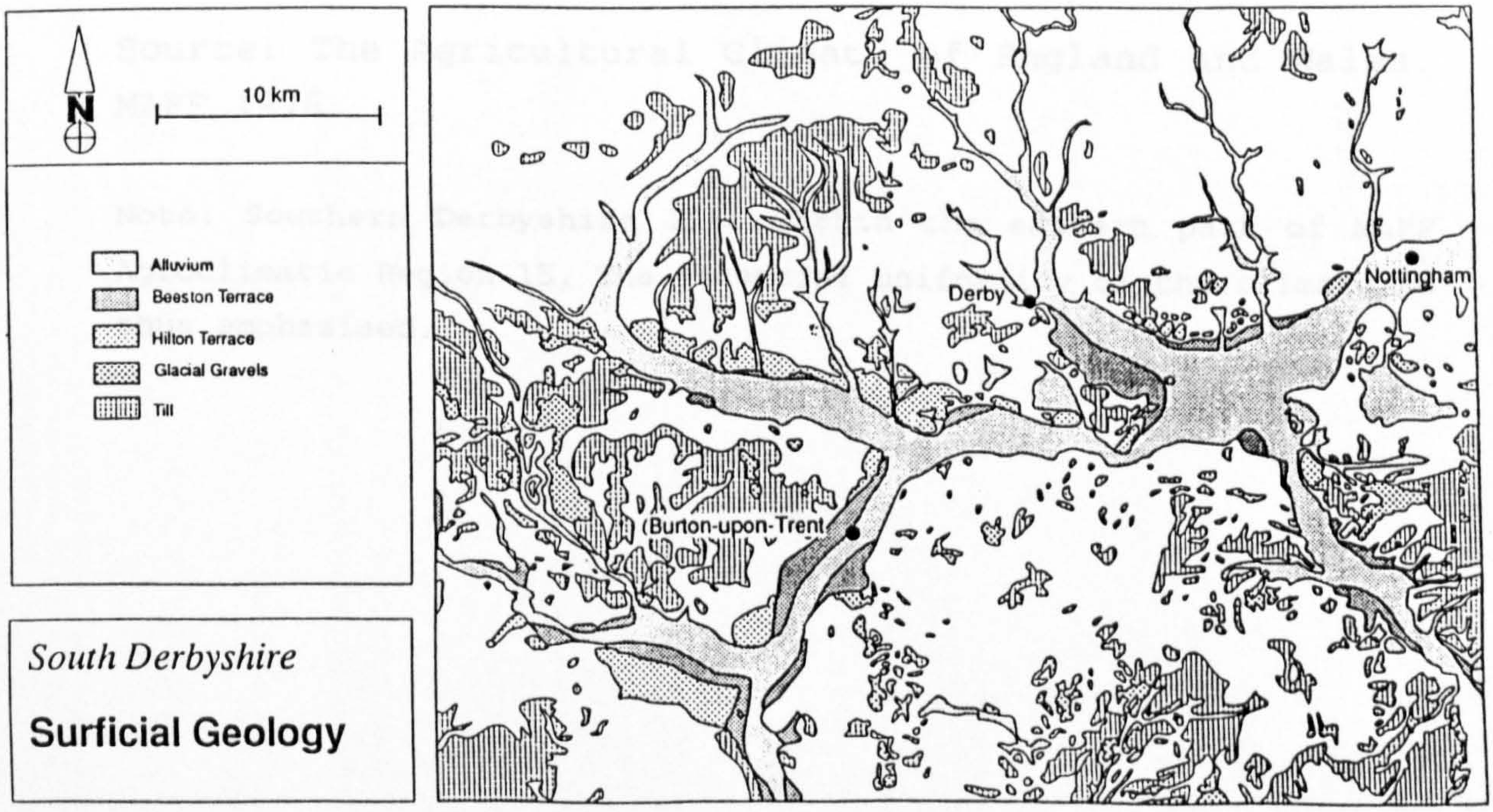
The review of past images of the Derbyshire agricultural environment has demonstrated, however, that the diverse character of the land was well recognised during the eighteenth and nineteenth centuries and, despite the complexities of the spatial distribution of soils, that broad regional distinctions were drawn in a consistent manner. Continuity between such distinctions with patterns evident in the twentieth century are apparent through the work of Barnes on the agrarian landscapes of the East Midlands and help to substantiate a simple subregional framework for this study [Barnes F A, 1968]. During the 1960's dairying was identified by Barnes as the dominant farm enterprise in southern Derbyshire in each of three broad subregional divisions [ibid p.84 et seq]. At the core of southern Derbyshire Barnes proposed the marl area with its chocolate red soils capable of farming flexibility in that good grass and good grain could both be grown. South of the Trent more diversified soil conditions meant that more land was in arable and while dairying was the chief source of farm income the area was not completely preoccupied with dairying in the manner of the marl. Such differences had been in existence for many years and had been noted by Arthur Young in 1770: 'one would almost think that crossing the Trent lead into a different county from the variation of husbandry' [Young A, 1 1771 p.184]. Barnes also distinguished farming on the heavier soils of the clays and shales to the north of the marl as being partly mixed in character but again fundamentally dependent on dairying. A subdivision of southern Derbyshire on these lines has emerged as equally appropriate for the current study, certainly the more varied farming practice to the south of the Trent will emerge as a feature of the eighteenth and nineteenth centuries and that farming to the north of the marl was at a different general scale. However such variation is not entirely a function of the physical environment and it is therefore necessary to consider the social and economic scenes with their implications for the structural aspects of agriculture.



South Derbyshire

Solid Geology

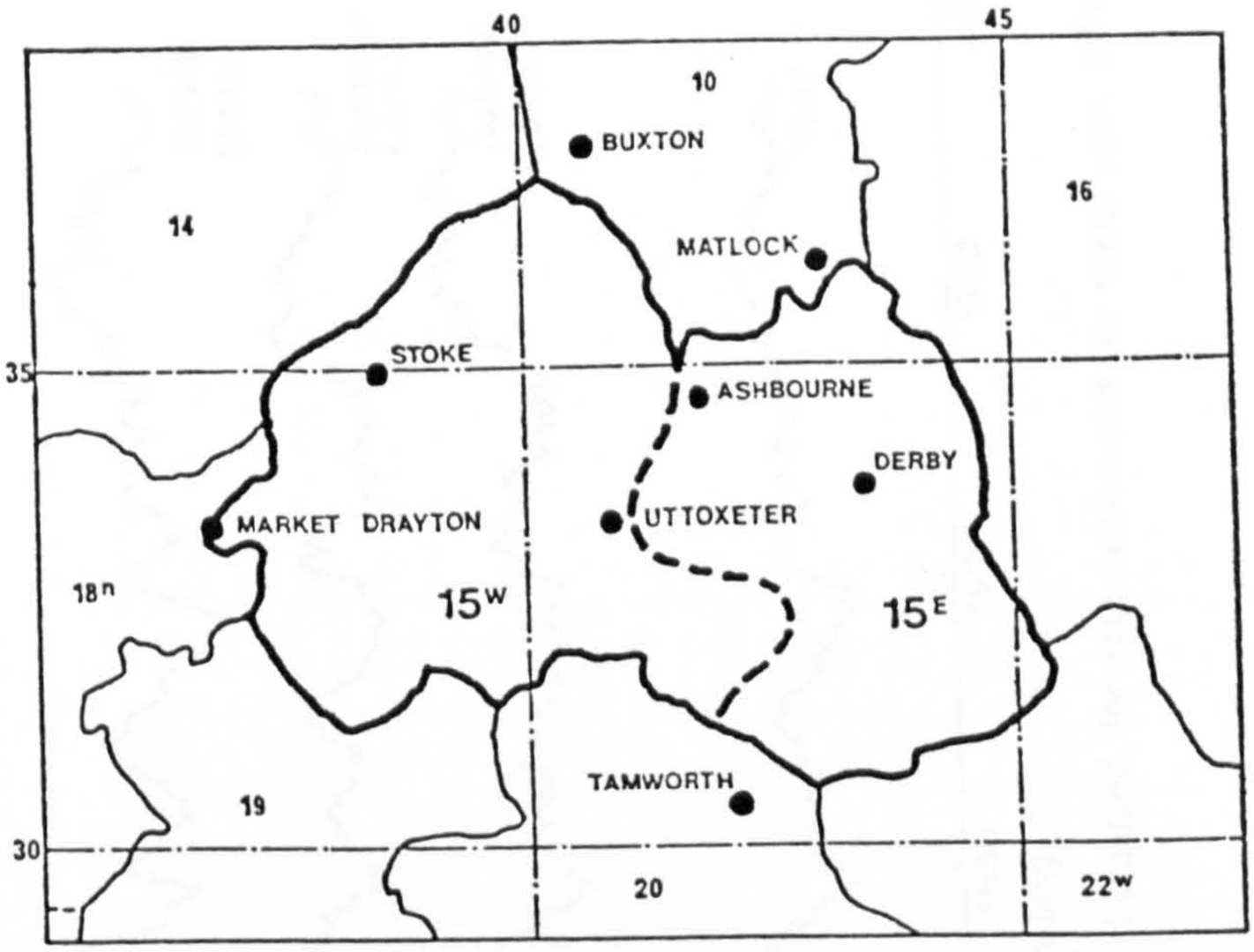
Figure 3.1



South Derbyshire

Surficial Geology

Figure 3.2

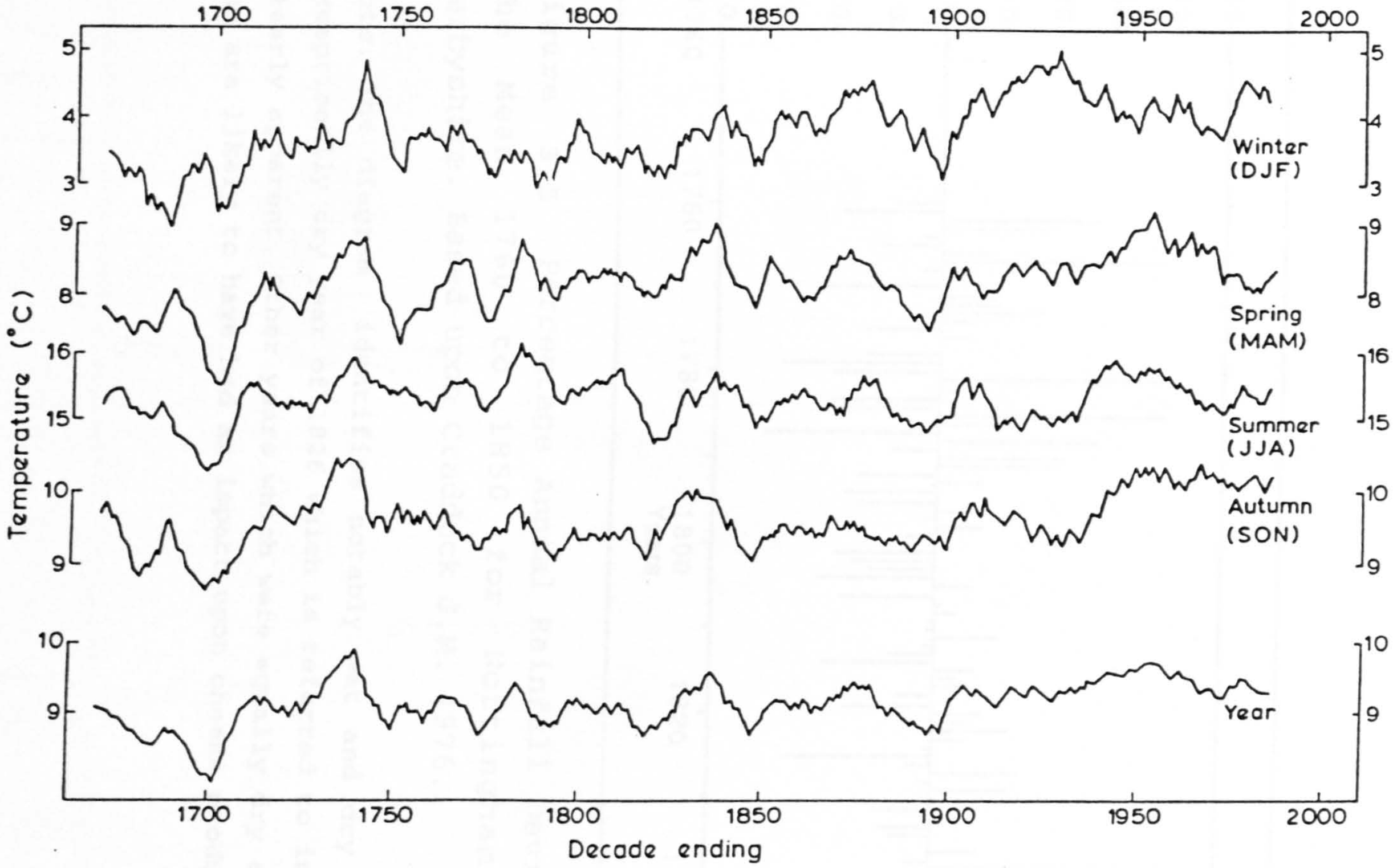


Area 15 lies to the south of the Peak District; 15 WEST is mainly in Staffordshire, a dairy farming area; 15 EAST includes south Derbyshire and parts of north Leicestershire, also a dairying area but with some general cropping in the south.

Figure 3.3 Southern Derbyshire: Agroclimatic Character.

Source: The Agricultural Climate of England and Wales. MAFF 1976.

Note: Southern Derbyshire lies within the eastern part of MAFF Agroclimatic Region 15. The essential uniformity of the climate is thus emphasised.



Ten-year running means of temperatures in Central England, for each season and the whole year, 1659–1982. Originally devised by Manley (1953, 1974)

Figure 3.4

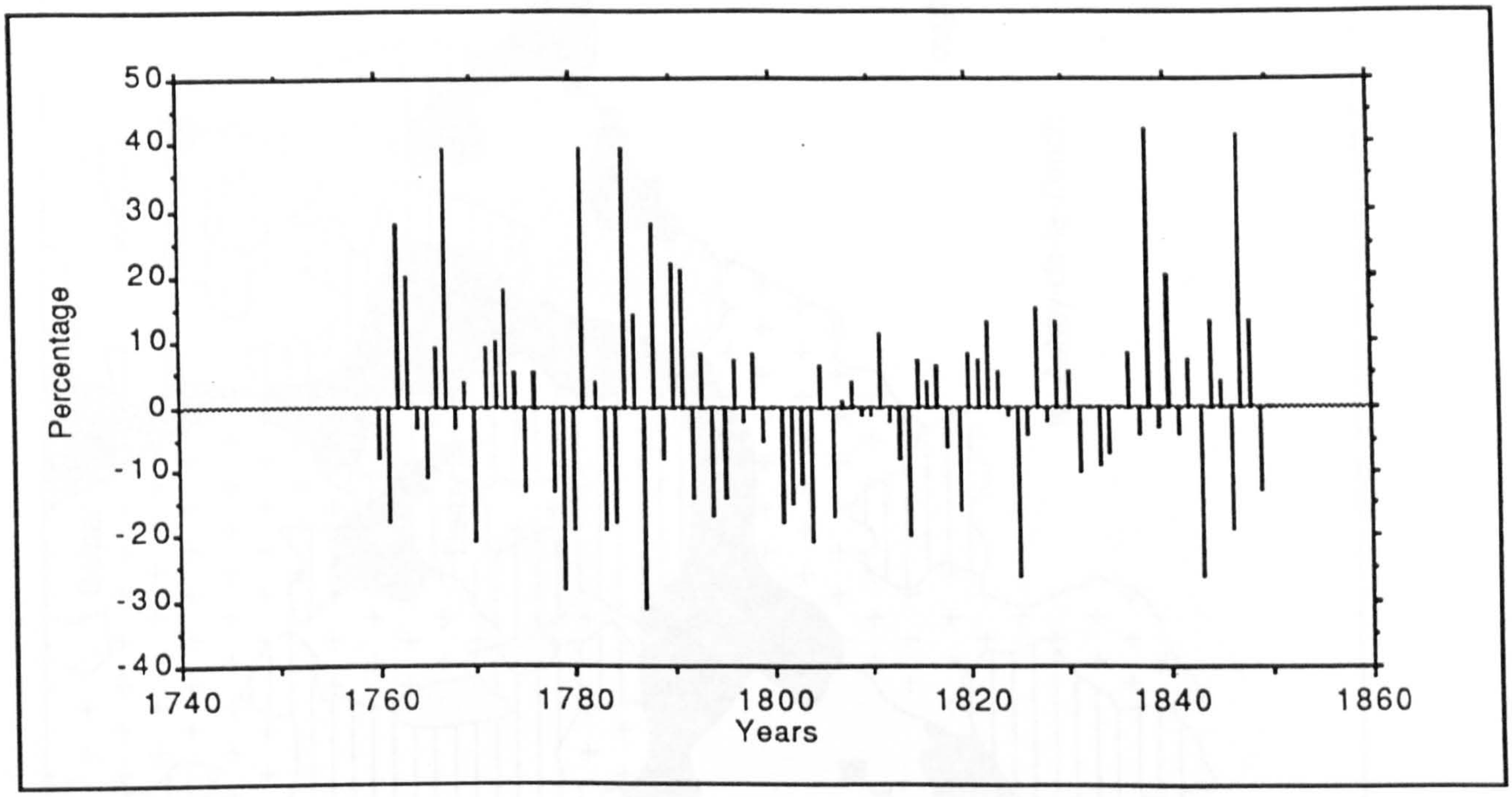


Figure 3.5 Percentage Annual Rainfall Deviation from the Mean 1760 to 1850 for Nottinghamshire and Derbyshire. Based upon Craddock J.M. 1976.

Note: The diagram identifies notably wet and dry years. The exceptionally dry year of 1826 which is referred to in the text is clearly apparent. Other years which were equally dry also occurred and are likely to have had an impact upon cheese production.

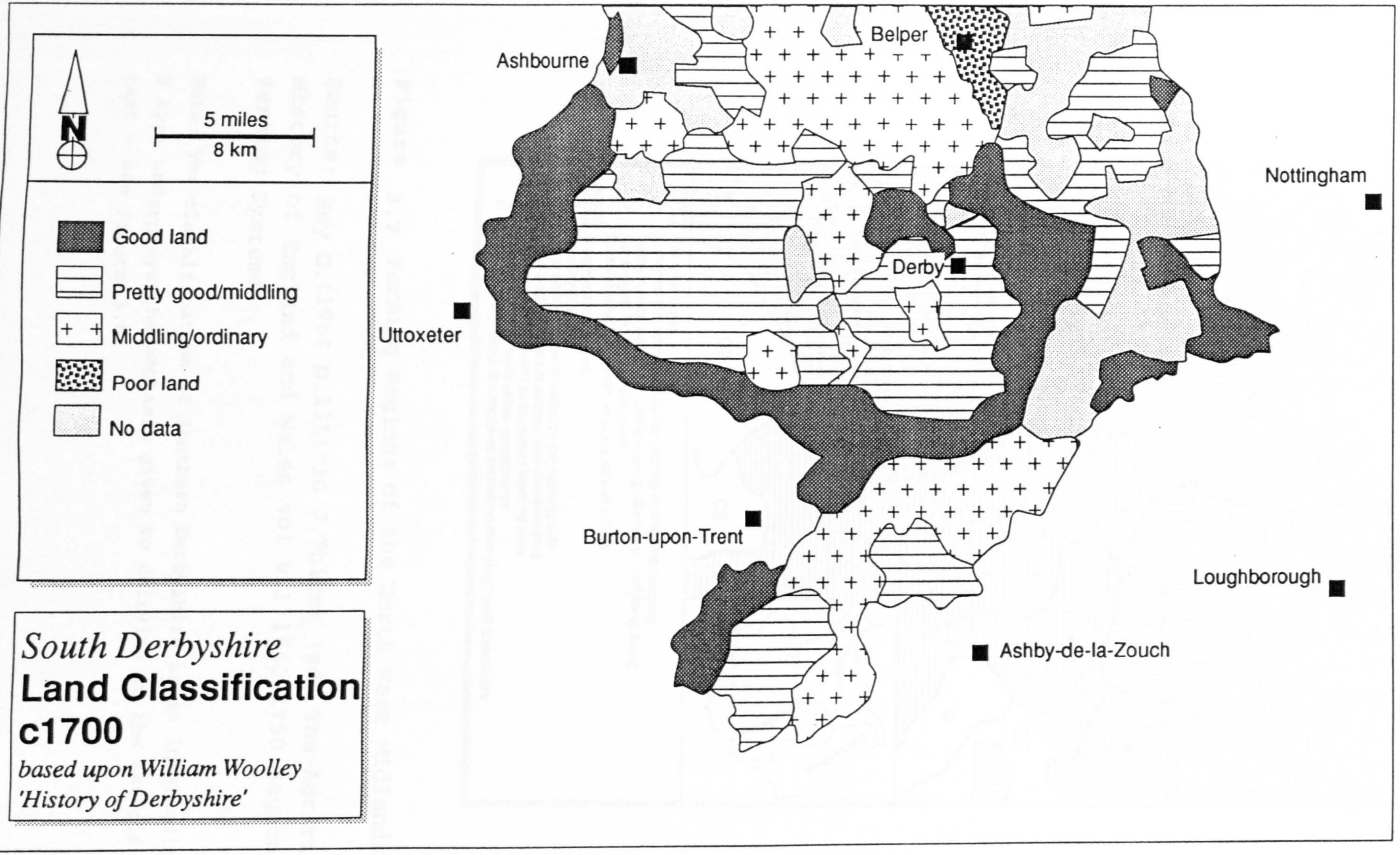

N
5 miles
8 km
Good land
Pretty good/middling
Middling/ordinary
Poor land
No data
Ashbourne
Belper
Nottingham
Derby
Uttoxeter
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
South Derbyshire
Land Classification
c1700
based upon William Woolley
'History of Derbyshire'

Figure 3.6

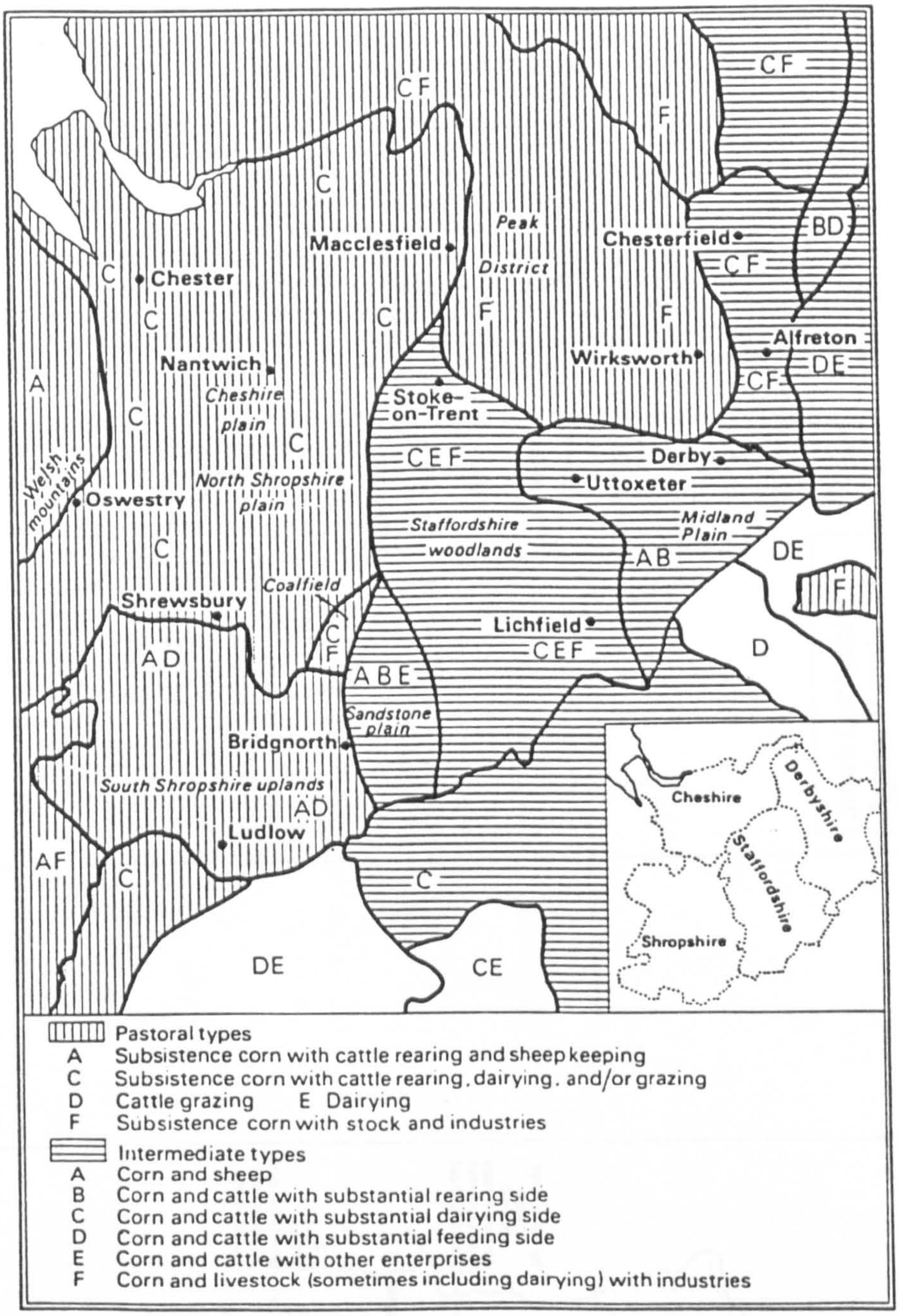


Figure 3.7 Farming Regions of the North West Midlands.

Source: Hey D,(1984 p.131) in J.Thirsk (ed) The Agrarian History of England and Wales vol v.1 1640-1750 Regional Farming Systems.

Note: The classification of Southern Derbyshire as an intermediate B type underplays the emphasis given to dairying in the associated text - see Figure 3.8

Figure 3.8

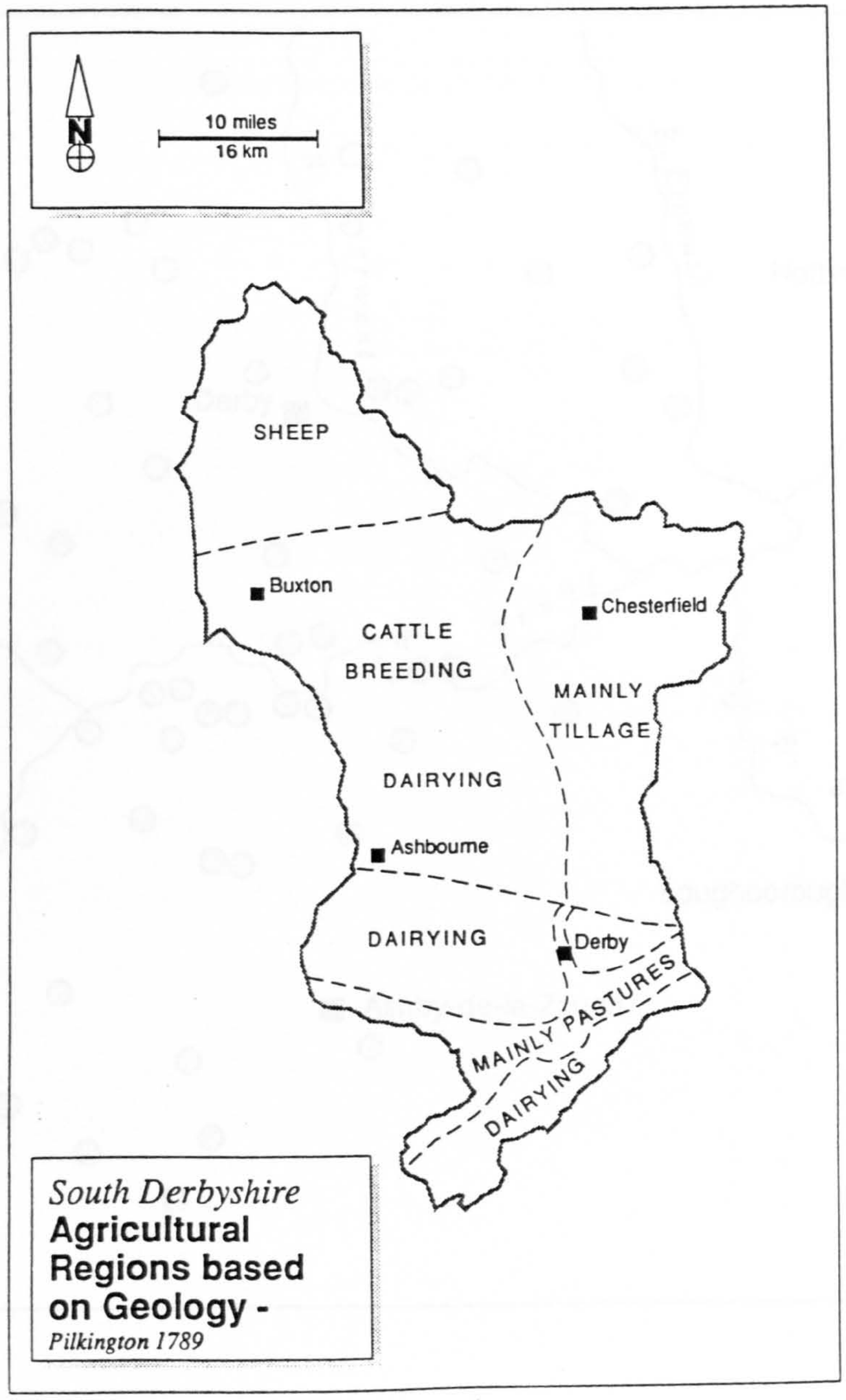


Figure 3.9

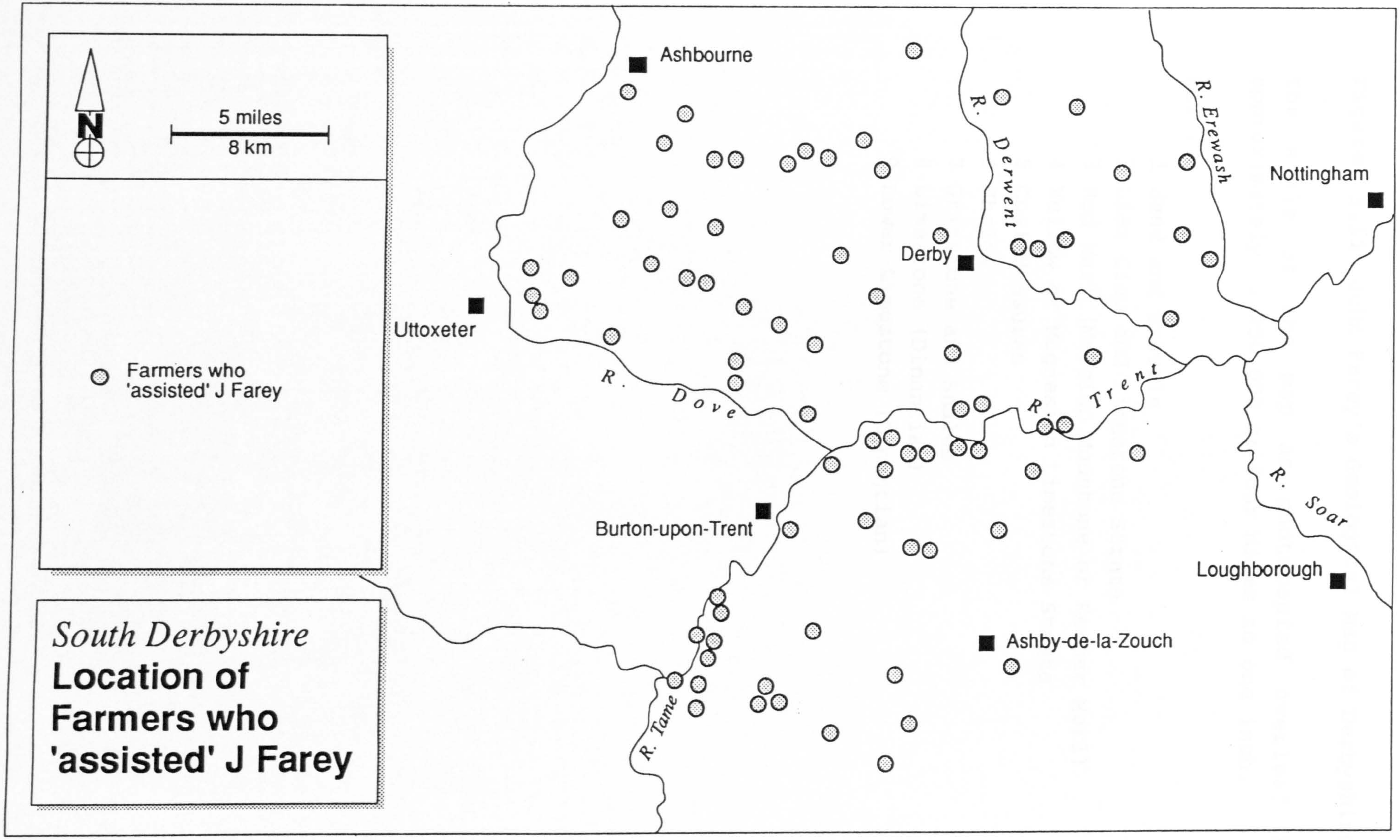

N
5 miles
8 km
Farmers who 'assisted' J Farey
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
South Derbyshire
Location of Farmers who 'assisted' J Farey

Figure 3.10

Figure 3.11 John Farey's Geological Map of Derbyshire.

The scale of the map as photocopied overleaf is approximately 1:250,000 or four miles to one inch.

KEY :

1 Sand and Gravels
2 Lias Clay and Limestone Strata
3 Red Marl (Mercian Mudstone or Keuper Marl)
4 Yellow or Magnesian Limestone Strata
5 Coal Measures
6 Shales
7 Gritstone and Shales
8 Limestone (Dinantian)
9 Lower Limestone (Dinantian)

A Scale of English Miles

Note. The Names & descriptions of the Strata and Soils, represented by the nine different Colours herein, will be found in the Derbyshire Report pages 231 to 299 and an account of the Faults or derangements of the Strata pages 246 262 &c.

A Map of **DERBYSHIRE** and parts of the seven adjacent Counties shewing the principal Strata and Soils and the situation of the Towns by square dots ▪ ▪ ▪ according to their size. Vd. The boundaries of the Counties are distinguished by strong dots ..... the edges of the Strata by small round dots ..... the limits of the distributions or colouring (which are arbitrary) by long and fine dots ..... and the faults or principal breaks of the Strata by lines. ——

By John Farey Senr.
Mineralogical Surveyor.

Figure 3.12 William Pitt's Map of Staffordshire 1808.

Note: The map is based upon soil character rather than geology. However there is a geological basis to the five categories which are identified. Strong soil equates with clays, light soil correlates with Triassic sandstone and limestone matches the outcrops of the Silurian and Carboniferous limestone. The lines of the major river valleys are brought out by the mapping of meadow and pasture. Mixt soil relates to a diversity of geological circumstance.

Map of the SOIL of STAFFORDSHIRE

Explanation..

Strong Soil .....

Light Soil .....

On Limestone .....

Meadow & Pasture .....

Marl Soil .....

Scale of Statute Miles 69½ to a Degree.

0 1 2 3 4 5 6 7 8

CHESHIRE

DERBYSHIRE

SHROPSHIRE

WORCESTERSHIRE

WARWICKSHIRE

Flash

LONGNOR

Congleton

Buxton Spencers

Meerbrook

Blackshaw Moor

Sprink Moor

Sheen

Upper Elkstone

Warslow

Biddulph

Horton

LEEK

Bullington

Weston

Abbotsfield

Onecote

Thursfield

Endon

Grindon

Waterfall

Calton

Heme

Hlore

Talk

Norton

Audley

Tunstall

Bagnall

Ipstones

Caldon

Oakover

Burslem

Stanton Moor

Stanton

Bedley

Wolstanton

Burslem

Basford

Hanley

Buckmal

Ringsley

Weston

Church Mayfield

NEWCASTLE

Keel

Lane End

Dilhorn

CHEADLE

Alkerton

Bradley

Gn Madeley

Caverswall

Craxden

Rocester

Madley Park

Whitmore

Trentham

Barton

Draycot

Barlaston

Fulford

Checkley

Muckleston

Aston

Chop.

Chorlton

Ashley

Leigh

Ashley Heath

Swinnerton

STONE

UTTOXETER

Braunshall

Standon

Chartley

Millwich

Cratwich

Broughton

Sandon

Kraidswell

Marchington

Kingston

Tutbury

Rollaston

Hanbury

ECCLESHALL

Chebsey

Gayton

Stowe

Marston

Weston

Adbaston

Newborough

Needwood

Forest

Ellenhall

High Offley

Seighford

Abby

Knowbury

STAFFORD

Castle Church

Ridgefield

Tatenhill

BURTON

Nadbury

Basford

Colwich

Colton

Yarnell

Copenhall

Haughton

Weeford Park

Hamstall Ridware

Pipe Ridware

Church Eaton

Dunston

Pedmal

Brewley

RUGELEY

Stanshall Ridware

Wichnor

Acton

Marston

Kingcross

Armitage

Alrewas

Canwick

Wheaton Aston

Lapley

Rowsley Park

Farewell

Chase

Hednesford

Stretton

Wimblehill

Kilford

Hopton

Clifton Campville

Thorp Constantine

Wolley Heath

CANNOCK

LITCHFIELD

Stowe

Stanfield

Wigginton

Weston

Hatherton

Norton

Hammerwich

Shareshill

TAMWORTH

Weeford

Shenston

Flints

Codsal

Pelsall

Aldridge

Bushbury

Wednesfield

Rushall

Tettenhall

WOLVERHAMPTON

Willenhall

WALSALL

SUTTON

Penn

Pennington

Bilston

Darlaston

Wednesbury

Gr. Bar

Over Pen

Tipton

W.t Bromwich

Trescot

Wombourn

DUDLEY

Himley

Oldbury

Lowly

Smithwick

BIRMINGHAM

Robbington

Gawes

Kinver

Bagnley

STOURBRIDGE

Halas Owen

Harbourne

Up.r Compton

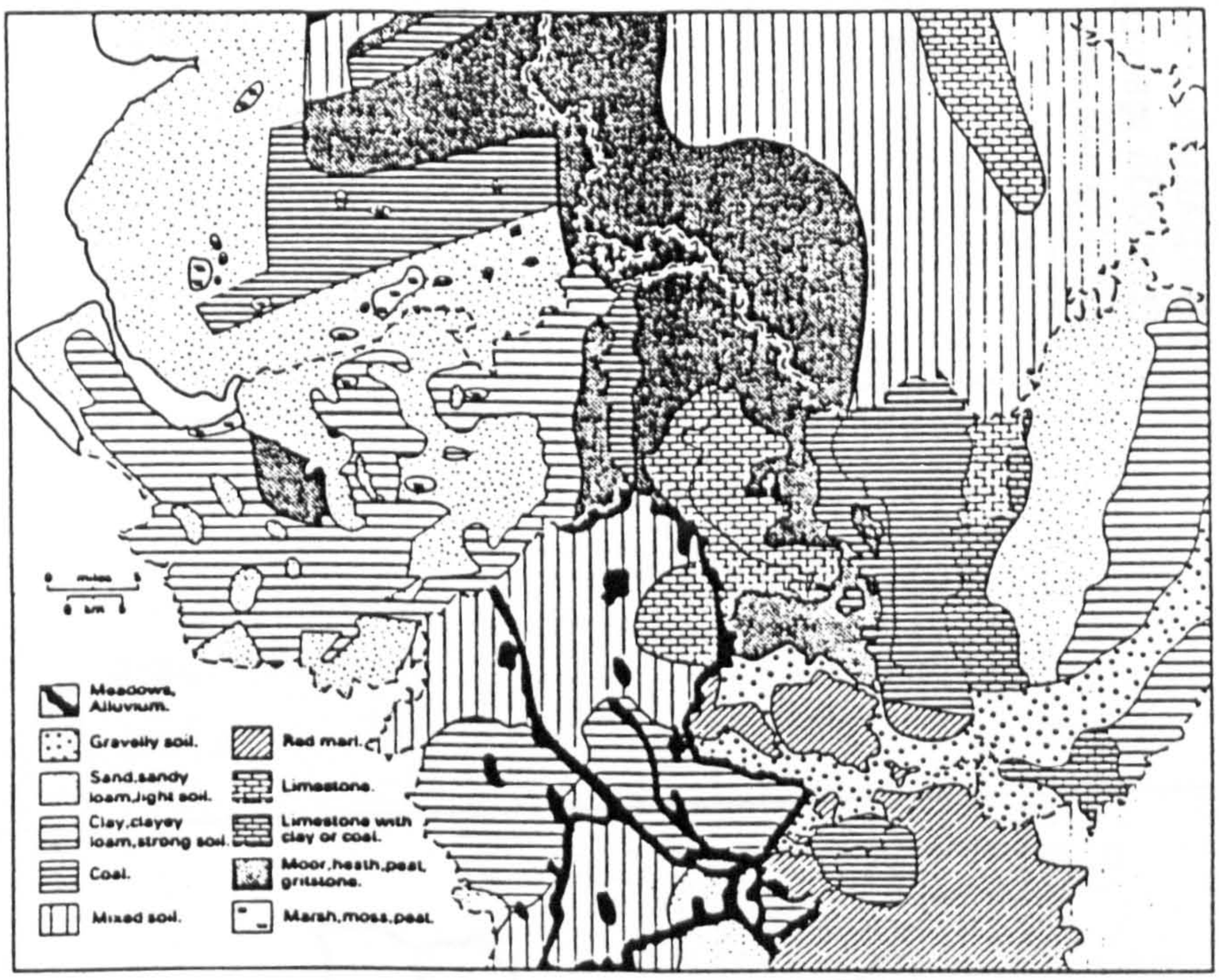
Kinver

Over Arley

Hagley

Part of Staffordsh. Plent

56 Long.d W. from So London.



Soil districts in the north-west Midlands, 1795–1811

Sources: Reports to Board of Agriculture; Marshall, *Review and Abstract: Northern Department*.

Figure 3.13 Soil Districts of the North West Midlands.
Source: Prince H.C.(1989 p.20)
Note: The juxtaposition of county maps based variously upon soil and geological characteristics is clearly evident in the cases of Staffordshire and Derbyshire. Leicestershire is shown on a simple geological basis.

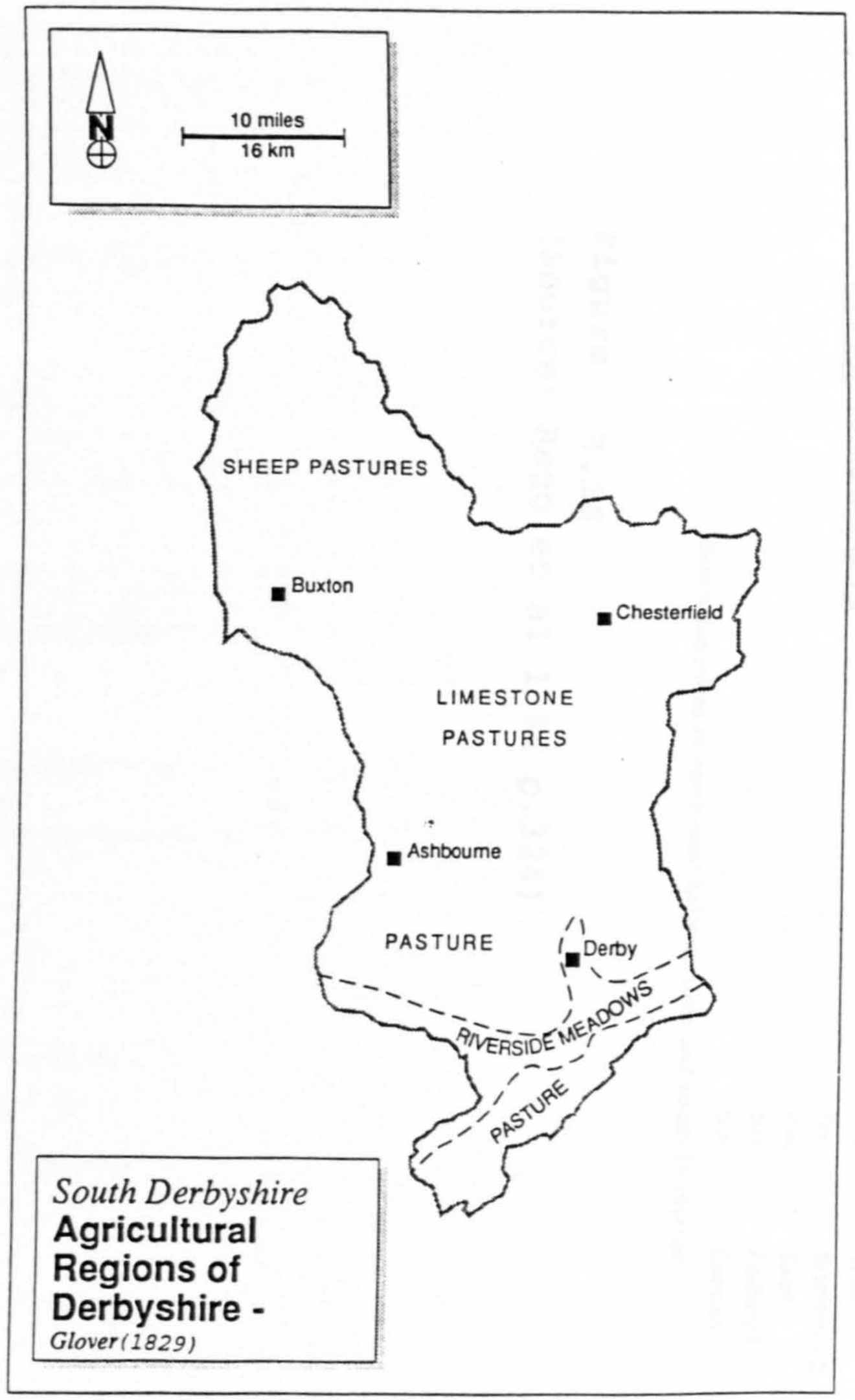


Figure 3.14

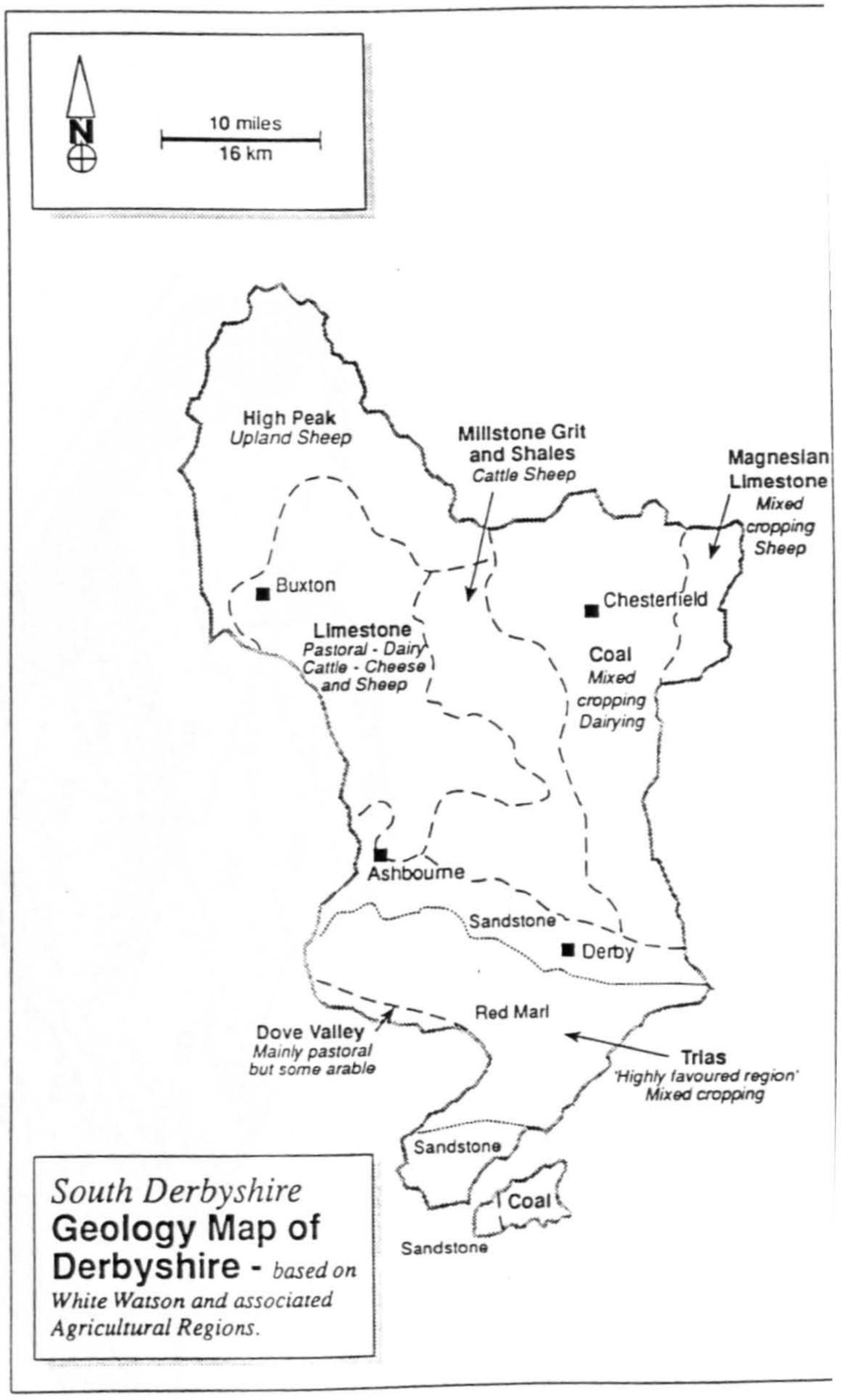
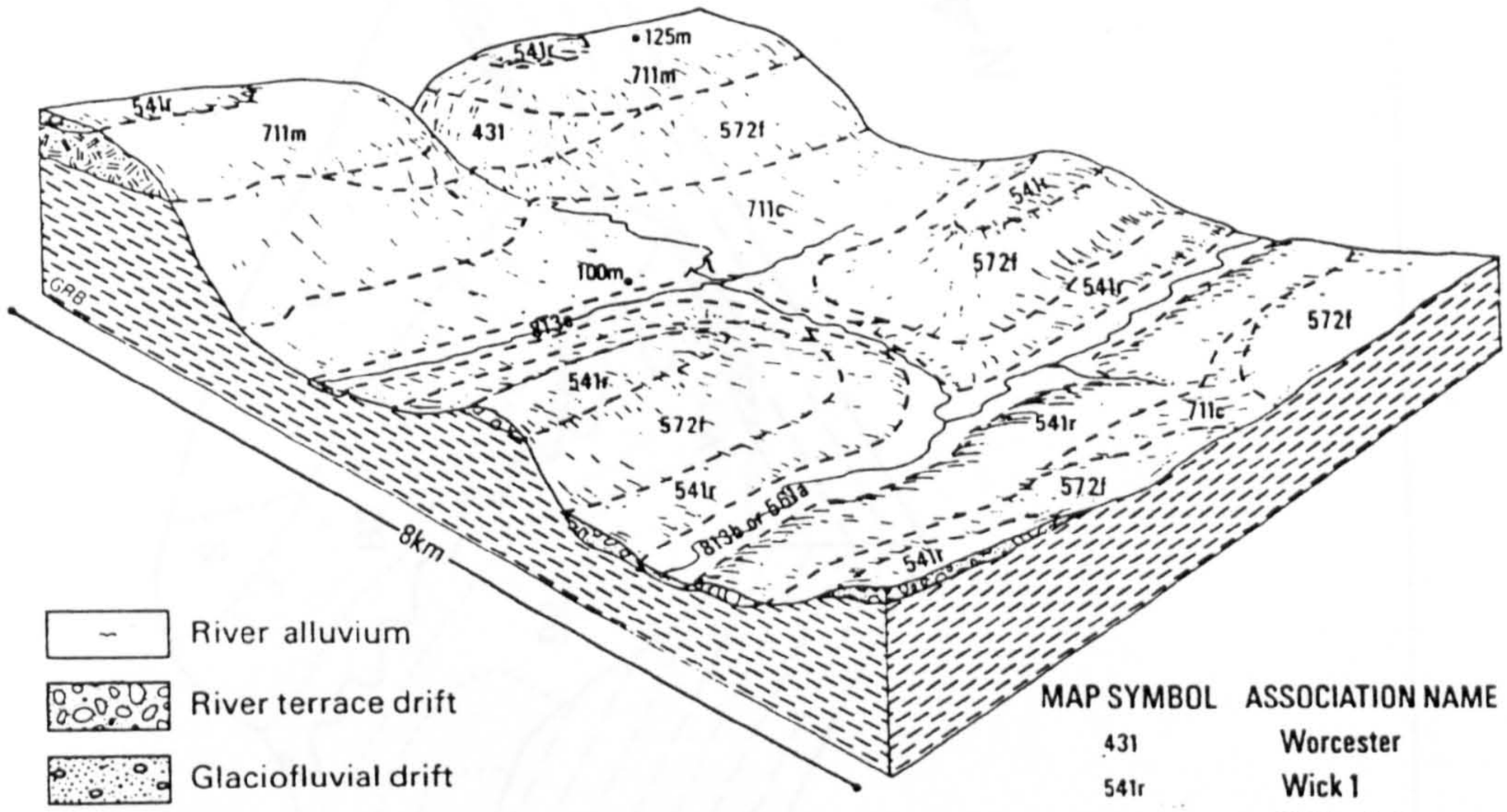


Figure 3.15 Source: Rowley J 1853



MAP SYMBOL	ASSOCIATION NAME
431	Worcester
541r	Wick 1
572f	Whimple 3
561a	Wharfe
711c	Brockhurst 2
711m	Salop
813b	Fladbury 1
813e	Compton

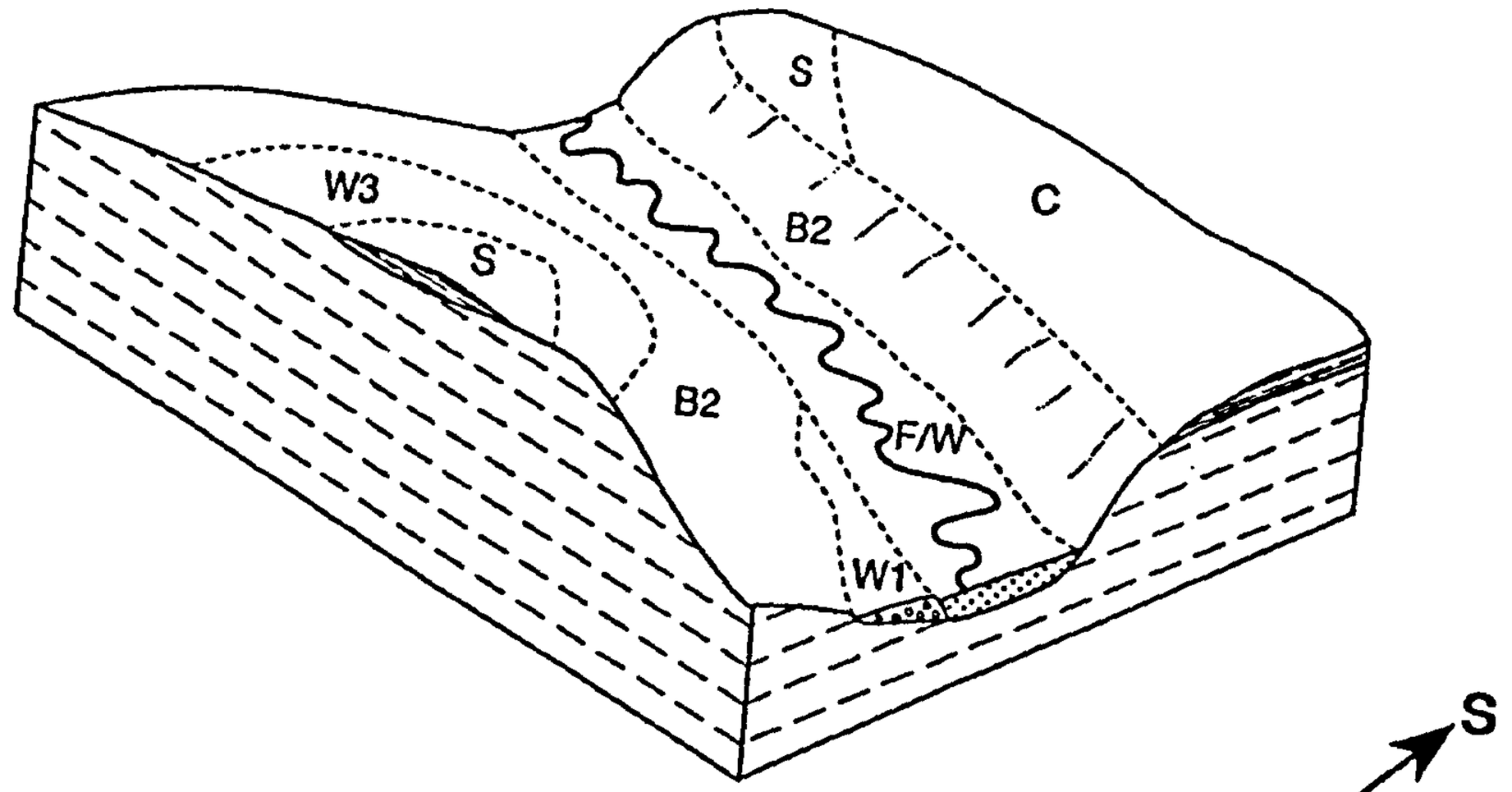
Soil associations in north-west Leicestershire and south Derbyshire.

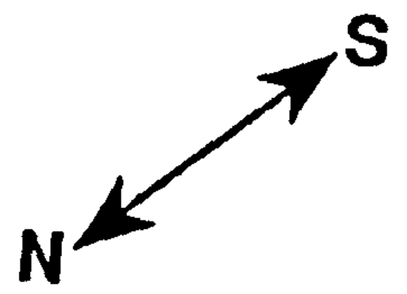
Figure 3.16

(Source: Ragg et al 1984 p.324)

B2	Brockhurst
C	Crewe
F/W	Fladbury or Wharfe
S	Salop
W1	Wick
W3	Whimple

- Alluvium
- Glaciofluvial Drift
- Till
- Mercian Mudstone





Soil Associations in the Vicinity of the Lower Dove Valley

Figure 3.17

Table 3.1 Climatic Statistics for the Middle Trent Region

(Source: MAFF 1976)

AREA 15 WEST
Latitude 52·8°N

Average Height 169 m (555 ft)
Height Range 57–440 m

Month	Temperature Air °C	Temperature 30 cm Earth °C	Rain mm (in)	PT mm (in)	× coeff	Sun hrs/day	Day length hrs	Rad. mw-hr per cm²	Ill. kilolux -hrs
JAN	2·4	3·1	75 (2·95)	0 (0·0)	—	1·2	9·5	55	65
FEB	2·8	3·2	58 (2·3)	8 (0·3)	—	2·1	11·0	110	125
MAR	4·9	4·4	55 (2·15)	29 (1·15)	—	3·2	13·0	205	245
APR	7·5	7·4	56 (2·2)	51 (2·0)	5·1 (0·20)	4·7	15·2	325	385
MAY	10·7	10·8	69 (2·7)	76 (3·0)	7·6 (0·30)	5·6	17·3	415	500
JUN	13·7	14·3	62 (2·45)	89 (3·5)	8·6 (0·34)	6·3	18·6	480	570
JUL	15·4	15·6	73 (2·85)	90 (3·55)	7·1 (0·28)	5·1	17·9	425	515
AUG	15·0	15·3	83 (3·25)	69 (2·7)	9·9 (0·39)	4·8	16·0	350	425
SEP	13·0,	13·7	73 (2·85)	42 (1·65)	5·8 (0·23)	3·7	13·9	250	305
OCT	9·7	10·8	71 (2·8)	18 (0·7)	—	2·7	11·7	150	180
NOV	5·6	6·9	85 (3·35)	3 (0·1)	—	1·5	10·0	75	90
DEC	3·5	4·4	80 (3·15)	−1 (−0·05)	—	1·2	9·0	45	55
Total	—	—	840 (33·0)	474 (18·6)		—	—	—	—

Growing Season: 229 days Apr 5 – Nov 20
Potential Transpiration: 429 mm (16·9 in)
Grazing Season: 170 days Apr 5 – Oct 2
Degree – days above 10°C May to Oct: 665
Winter degree – days below 0°C: 180

Effective Transpiration: 383 mm (15·1 in)
Grass Drought Factor: 11 days

Mean last frost: Early May

AREA 15 EAST
Latitude 52·8°N

Average Height 104 m (342 ft)
Height Range 49–213 m

Month	Temperature Air °C	Temperature 30 cm Earth °C	Rain mm (in)	PT mm (in)	× coeff	Sun hrs/day	Day length hrs	Rad. mw-hr per cm²	Ill. kilolux -hrs
JAN	2·7	3·2	65 (2·55)	1 (0·05)	—	1·3	9·5	60	65
FEB	3·2	3·3	51 (2·0)	8 (0·3)	—	2·2	11·0	115	130
MAR	5·4	4·7	49 (1·95)	30 (1·2)	—	3·3	13·0	210	250
APR	8·1	7·6	48 (1·9)	52 (2·05)	4·3 (0·17)	4·6	15·2	320	380
MAY	11·2	11·2	58 (2·3)	79 (3·1)	8·1 (0·32)	5·7	17·3	420	505
JUN	14·1	14·5	52 (2·05)	91 (3·6)	8·4 (0·33)	6·2	18·6	480	565
JUL	16·1	16·2	60 (2·35)	93 (3·65)	7·6 (0·30)	5·3	17·9	430	520
AUG	15·7	15·9	71 (2·8)	71 (2·8)	9·9 (0·39)	4·8	16·0	350	425
SEP	13·6	14·0	62 (2·45)	43 (1·7)	6·1 (0·24)	3·8	13·9	255	310
OCT	10·2	11·1	61 (2·4)	19 (0·75)	—	2·7	11·7	150	180
NOV	5·9	6·9	73 (2·85)	3 (0·1)	—	1·6	10·0	75	90
DEC	3·8	4·5	64 (2·5)	0 (0·0)	—	1·2	9·0	45	55
Total	—	—	714 (28·1)	490 (19·3)		—	—	—	—

Growing Season: 241 days Mar 29 – Nov 25
Potential Transpiration: 452 mm (17·8 in)
Grazing Season: 213 days Apr 5 – Nov 4
Degree – days above 10°C May to Oct: 745
Winter degree – days below 0°C: 160

Effective Transpiration: 366 mm (14·4 in)
Grass Drought Factor: 29 days

Mean last frost: Early May

CHAPTER 4

THE CHANGING ECONOMIC AND SOCIAL ENVIRONMENT FOR AGRICULTURE IN SOUTHERN DERBYSHIRE DURING THE EIGHTEENTH AND NINETEENTH CENTURIES

In this chapter evidence will be considered as to the economic and social processes which influenced southern Derbyshire during the period 1770 to 1870 in the context of the wider forces operating at the regional and national level. The emergence of a high degree of national economic integration prior to and during the particular study period makes this all the more necessary. Not surprisingly a series of closely interrelated issues have to be elucidated. The first of these concerns the salient features of the evolving regional economy of the East Midlands characterised by a diverse range of industrial development. Secondly there are the related changes in the numbers and distribution of population which comprised the immediate regional market for foodstuffs. Next the relative economic position of the farm population within the region needs to be set in a context of rapidly changing employment opportunity and potential remuneration. A final area of discussion will seek to identify the wider economic context in which Derbyshire farmers operated. This will be concerned with price trends for the key local products of livestock, especially cheese, and grain. It will emerge that national and local markets tended to run in tandem and to follow similar patterns of upward and downward fluctuation.

The Regional Economy of the East Midlands 1770 - 1870

The shear diversity and indeed dynamism of the East Midlands economy is a fundamental feature of the context for a study of agriculture in the study period. While Palmer and Neaverson judge that agriculture was the mainstay of the economy until at least the end of the eighteenth century a wide range of industrial developments occurred [Palmer M and Neaverson P, 1992 p.1]. The principal elements included primary extractive industries, engineering and metal working, textile manufacture,

ceramics and brewing. In addition major facets of the regional and national transport infrastructure evolved including the Trent and Mersey canal in the 1760's and 1770's and later the Midland Railway network and associated engineering based upon Derby from the 1840's. Relatively few activities evolved from the demands of agriculture itself but notable among these were the development of the widely scattered limestone resources which were fundamental to land improvement within southern Derbyshire and beyond. Conversely the Burton brewing industry was founded upon the processing of agricultural raw materials.

Industry was widely distributed across southern Derbyshire and adjacent counties and while much was clearly associated with urban growth many activities were strictly small town or even rural in their location. Areas which were fundamentally agricultural in character were confined to the red marl westward from Derby and adjacent parts of Staffordshire west and south of the River Dove. Areas most obviously associated with industry were the coalfields as is evident from Figure 4.1 drawn from Farey's listing of coalpits [Farey J, 1 1815]. Mining in the south Derbyshire/northwest Leicestershire area dates from the middle ages but as the demand for ceramic ware grew in the early nineteenth century the industrial character of the area became more clear. This was particularly the case following public health legislation in 1848 and the resultant demand for sewage pipes and sanitary ware. The more extensive outcrop of coal measures to the north and east of Derby was the focus of coal production for the regional and eventually the national market. The presence of iron ores within the coal measures led to a diversity of metal working which included substantial industries such as the Butterley Company and the Stanton and Staveley Iron Works.

Textile industries have also had a long pedigree in the region but really began to progress in the eighteenth century. The earliest factory based developments of Cotchet and Lombe at Derby with respect to silk manufacture beginning in 1702 and the later innovations in cotton textiles of Richard Arkwright at Cromford in 1771 and Jedediah Strutt at Belper in 1776 were of major significance. Indeed Palmer and Neaverson go as far as to

say that for a brief period at the end of the eighteenth century the East Midlands possessed the most advanced textile industry in the world [ibid 1992 p.1]. By 1788 56 waterpowered sites had been brought into production and while the majority were located in the Derwent Valley other sites as at Rocester and Tutbury on the Dove were also included. As the nineteenth century progressed various facets of cotton textiles evolved in centres such as Derby and Long Eaton.

The other dimension of textiles of prime importance in the East Midlands was framework knitting. This industry was essentially domestic in character, being based upon the outwork principle, and was concentrated in Nottinghamshire and Leicestershire and the eastern parts of Derbyshire. In essence by the late eighteenth century the bulk of the knitters in Britain were located in this area. The map of sites listed by Farey [see Figure 4.2] shows few knitters operating west of Derby but that some other trades were represented.

Certain towns became associated with particular industries as in the case of brewing at Burton upon Trent. Brewing developed strongly during the eighteenth century on the basis of quality beers for export. Continued growth in the nineteenth century was given a major spur with the arrival of the Midland Railway in the 1840's following which significant expansion took place. Growth was not just a result of the increased marketing opportunity provided by the railways but also the easier availability of malting barley. Similarly Derby became particularly associated with one industry following the decision of the Midland Railway to make the town its headquarters and principal production centre for locomotives and rolling stock. Consequently the town grew rapidly in extent and population from the late 1840's.

The industrial developments which have been outlined here radically altered the regional economy by moving the balance away from agriculture and towards mineral working and manufacturing. It impacted upon agriculture in a variety of ways. The numbers and pattern of population distribution was profoundly changed, the local market for foodstuffs was

significantly expanded, access to regional and national markets was greatly facilitated by transport developments and employment opportunity as an alternative to agriculture grew rapidly.

Population Growth and Demand for Foodstuffs

Growth in population as shown in Table 4.1 for England and Wales provides a simple metaphor of the potential increase in demand for foodstuffs but other factors will be shown to have been involved. Lawton [Lawton R, 1990 p.286-7] indicates the rapid rise in absolute population numbers through the eighteenth and more particularly in the nineteenth centuries. The period 1770 to 1870 saw a trebling of the total population. The first half of the nineteenth century was characterised by the highest rates of natural increase that have ever occurred in England and Wales. The consequence was an age structure [see Table 4.2] whereby in 1821 48% of the population was aged 14 years and under. By 1841 this had declined to 36% of the total, indicating that from the 1830's the proportion of the population which was adolescent/adult increased rapidly with consequent implications for growth potential and food demand.

As has been demonstrated with respect to the East Midlands, population growth in Britain took place against the three complex and interrelated processes of industrialisation, urban growth and technological revolution in transport. The proportion of the population classified as urban increased steadily. The rural population did not immediately decline in absolute terms however, and in many areas this was delayed until the middle years of the nineteenth century. There is much evidence that the rapid growth of urban places was a function of internal natural increase rather than simple in migration from rural areas. In addition it is evident that industrial growth was by no means an urban based phenomenon. At the initial stages many primary and secondary industries began, and some instances continued to operate, in rural or semi rural surroundings.

The interraction between population growth and economic development broadly stated in national terms can be illustrated in the context of southern Derbyshire. R H Osborne's study of

population change in the Middle Trent counties includes maps covering a sequence of time periods beginning with the first census in 1801 [Osborne R H, 1970 p.39-51]. The larger centres shown on the map of population distribution for 1801 [Figure 4.3a] are variously regional/county centres such as Derby or Nottingham with long established market and manufacturing functions, market towns such as Ashbourne, Uttoxeter and Melbourne or towns with a strongly developing industrial sector as in the case of Burton on Trent or Belper. The majority of rural settlements had populations on a parish basis of less than 550 persons. Subsequent change in population is illustrated for 1801-21, 1821-41 and 1841-61 [Figures 4.3b, c, d]. The important feature is the strong growth of towns with an industrial base so that Derby showed an increase from approximately 7,000 in 1801 to around 53,000 in 1861 not including 10,000 for the satellite suburb of Litchurch. Over the same period the population Burton on Trent increased from about 3,500 to 9,500. In the rural areas, however, levels of population change were generally modest. In the periods 1801-21 and 1821-41 trends were predominantly upwards. For 1841-61 there was some scattered evidence of rural decline but generally there was stability within the population range categories which Osborne has selected. Inspection of census data for rural parishes shows a downward drift for latter decades of the century. Analysis of parish population statistics for Derbyshire through the nineteenth century enables a useful categorisation of rural settlement. Figure 4.4 illustrates four types of parish:

1) Parishes dominated by a large country estate such as at Calke or Kedleston where population remained low throughout the nineteenth century. Such parishes would fit the 'close' parish concept as elaborated by Mills [Mills D R, 1970].

2) Parishes like Marston Montgomery which show a slow rise in population towards the mid nineteenth century and then decline as rural out migration gained momentum.

3) Parishes on the fringe of urban settlements like Mickleover near Derby which became caught up in urban growth and show strong population increase through the nineteenth century.

4) Parishes which show population increase as a result of industrial and/or transport developments. In southern Derbyshire Linton illustrates the impact of coal mining, Sawley the growth of textile manufacturing and Shardlow the variable influence of the canal trade at the junction of the Trent and Mersey canal and the navigable middle Trent.

These latter parishes exemplify the impact of the wide range of industrial activity on rural settlements. With respect to the textile trades such activity was frequently transient as the latter nineteenth century saw the evolution of more larger tenemented or factory based units. In a number of instances industrial employment was combined with small scale agricultural activity. The population census of 1851 for example lists miners, knitters and publicans as farming land up to 50 acres in extent.

Wrigley [Wrigley E A, 1986 p.295-336] has drawn attention to a further dimension of employment change, namely the rise of rural trades in the nineteenth century as an alternative to the simple notion of a move from agriculture to industry. He has calculated that at national level the male population aged between 20 and 64 rose from 2,315,000 in 1811 to 4,099,685 in 1851 but over the same period males employed in agriculture rose from 910,000 to just 1,010,000. A ratio of two out of every five men working in agriculture the early years of the century thus declines to one in four at mid century. He claims that this trend of continuous reduction in the share of agriculture in total national employment had become evident around 1600 and that despite agricultural imports it demonstrates clear evidence of increase in output per man in agriculture. Wrigley calculates a rise of 42% per capita between 1811 and 1851. The increased male population in the non agricultural sector did not only find work in the new industries which typify the concept of the Industrial Revolution but also in a range of crafts and trades such as smiths, carpenters, tailors, bookmakers and general retailers. To a significant measure these activities were held within the countryside because the countryside had need of them. Wrigley considers the population trends characteristic of rural

areas owed much to the development of this service sector in the early years of the nineteenth century. The effect of industry and services in the creation of alternative employment opportunity in Derbyshire was argued in 1833 by Porter in evidence to the Select Committee on Agricultural Distress [Porter G R, BPP 1833 12831]. He showed that whereas in 1801 families engaged in agriculture as opposed to trade and manufacturing were in approximate balance at about 14,000 by 1831 agricultural based families numbered 13,324 while trade and manufacturing based families numbered 20,778.

Agricultural and Industrial Wages in Derbyshire

The potential for a change of occupation from agriculture to industry has been shown to have been an important consequence of the regional urban and industrial development for the working population of southern Derbyshire. It has been claimed that such opportunity may explain the differential in agricultural wage rates between the better paid north of England and the poorer paid south of England which developed during the nineteenth century. Caird [Caird J, 1852 p.480] indicated that the weekly wage of Derbyshire agricultural labourers in the mid ninetenth century was 11/- as compared with 6/- in 1770. Such rates were significantly greater than for the non industrial southern counties.

It is interesting to attempt a comparison of agricultural rates with those payable in the growing industries of the county. Clearly there are major difficulties of comparison given the sparsity of data which is further complicated by the use of raw figures signifying money wages as opposed to real wages considered as purchasing power. As Mitchell and Deane have signalled 'in travelling backwards from the twentieth century to the nineteenth the student of wages passes from a highway to a thorny path; but in passing to earlier periods he crosses into a morass with few firm places' [Mitchell B R and Deane P R, 1962 p.338]. There are however opportunities to obtain a feel for the run of events. Schwarz [Schwarz L, 1990 and Table 4.3a] has sought to demonstrate that in North Staffordshire between 1750 and 1790 wages for a number of trades but particularly potters

advanced at a more rapid rate than agricultural labourers. A tabulation of miscellaneous statements concerning money wages in local occupations in the nineteenth century also show agricultural rates to be lower than colliers, metal workers and brewery labourers but to be on a par with framework knitters whose lowly condition is well acknowledged [Table 4.3b]. For the latter nineteenth century Grigg has asserted that from 1850 the average wage in agriculture was half that in manufacturing industry and less for most other jobs in towns [Grigg D B, 1989 p.145]. Such comparisons do not begin to take into account hidden benefits of working on the land including the provision of meals and the availability of cottages at relatively favorable rent. Fortunately evidence to the Royal Commission on the Employment of Children, Young Persons and Women in Agriculture summarised by Culley gives valuable insights into the position of agricultural workers in Derbyshire [Culley G, 1867 BPP J2-24 et seq]. He stated that weekly agricultural wages varied from 14/- to 17/- with the higher rate in the manufacturing districts of the county and was able to compare Derbyshire favorably with Hertfordshire as a southern county with which he was familiar. The impact of industry on the labour market is freely acknowledged which 'constantly tends to raise the wages of those who are content to till the ground'. Culley indicated that the demands of mining and manufacturing were less felt in the south of the county but even here winter employment of surplus agricultural labour in the Burton breweries was noted as providing a wage approximating to 13/- a week plus a daily beer allowance. In the vicinity of Derby the impact of industry was clearly putting strain on the market for agricultural labour. Harrison of Allestree stated that 'girls are not employed in agriculture, they go to the factory' [Harrison E, 1867 BPP Aj2 27a]. Coleman at Kedleston elaborated the problem, 'in consequence of mills, mines and the nearness of the town of Derby with its immense railway works all the likely young men of this district get some other and more remunerative work than agriculture' [Coleman J, 1967 BPP Aj2 29].

Culley made further interesting observations concerning the prevalence of small farms in Derbyshire and the general absence of large [?open] villages from which labourers might have been

drawn. This led to situations where labourers received meat worth 7/- a week in addition to their wages. Unmarried labourers frequently lived in for an annual wage of about £14 and were able to save as much as £10 which eventually enabled them to marry and take a cottage with enough land for two or three cows. Live in dairy maids were similarly remunerated at £14 per annum for an efficient hand and as much as £20 for a maid who could take charge of a dairy [Culley G, 1867 J2-24 and 29].

The rates quoted by Culley appear to have increased significantly in the immediately succeeding years. Murray [Murray G, Ag G, 28.3.1874] stated of south Derbyshire that 'We are surrounded by mines and manufacturies and the wages of the ordinary agricultural labourer have risen from 18/- to 21/- a week increasing to 24/- to 25/- with an additional £1 for beer in the harvest month'. He also noted that in manufacturing the labourers were let off work at 1 o'clock on Saturday afternoons which contrasted adversely with the regime of workers in agriculture where 'milk selling and cheese making necessitate milk is delivered at fixed hours on Saturday half holidays and Sundays'. Murray was also alert to the use of cottage accommodation by non agricultural workers: 'We are fairly supplied with good cottages nearly all of the able bodied labourers who inhabit them are either employed on the railways or public works....the money seems to be frittered away in drink by the man and flimsy finery by the woman and on railway excursions in the summer....their wants appear to increase faster than their incomes'.

The implications for agricultural labour are clear in terms of the impact of the development of industry on wage rates. The move to the selling of liquid milk to the cheese factory or to the town which would have reduced the demand for labour on the farm broadly coincided with this situation and could have gone some way to mitigate its effects. However the local custom of a substantial proportion of labourers and dairymaids living in would have reduced such costs in any case. The issue of living in was also related to the availability of cottages. Druce in evidence to the Royal Commission in 1880 indicated that so many farm workers lived in on Derbyshire farms that there were

relatively few cottages [Druce S B L, BPP 1880-82 p.25]. The custom of a significant proportion of the labour force living on the farm is reflected in the numbers of labourers and dairymaids listed in the nineteenth century census returns. It also lives on in the characteristic large, brick built, three storey farmhouses which are still features of the modern south Derbyshire countryside [see also Hutton B, 1991].

Some light has been shed therefore on the operation of the family based enterprise devoted to dairy farming and cheese making. Additionally the concept of formal wages may not have been applicable to immediate female family members who had a critical role in the business. Orwin and Whetham emphasise the complexity of the situation noting the toughness and stamina required of cheese makers, the central role of wives and daughters in dairy management and the common employment of dairy maids for their keep and a few pounds a year [Orwin C S and Whetham E H, 1964 p.86]. Recognition of the strong family dimension in farming is important as it raises the related matter of the range of size of the units of production given that smaller rather than larger units were predominant, as will be discussed in Chapter 5.

Price Trends for Agricultural Products

The farmers of southern Derbyshire in the period 1770 to 1870 have been shown to have worked in a context in which population growth was consequent upon a combination of industrial and urban development. The resultant impact on agriculture provided an enlarged market for food products but also a diversity of accessible alternatives to working on the land. In common with other industrialising districts agricultural wages were relatively high but this may well have been offset by the predominance of small family operated farms supported by substantial numbers of live in workers. The functioning of the farm system was therefore influenced by the character of the regional economy which in its turn was enmeshed into that which operated at national level. It is apparent that agricultural prices both regionally and nationally in common with prices in general show a sequence of major trends from the

mid eighteenth century onwards superimposed on which were the lesser fluctuations of the cycle of trade. During the eighteenth and nineteenth centuries the operation of a free market system, with the exception of grain until 1846, meant that agricultural activity was particularly susceptible to the consequences of such fluctuations. Demand for foodstuffs increased rapidly however, partly from population growth which has been discussed above and partly from a general rise in purchasing power. This subject has been addressed by Walton [Walton J R, op cit, p.325] who used admitedly crude indicators [see Table 4.4] to suggest a per capita increase of real wages of the order of two and a half times between the mid eighteenth and nineteenth centuries. By allowing for the concurrent increase in population a seven fold growth in potential demand is indicated over the same period.

The response of English farmers, and not least those in Derbyshire, in meeting the demand so generated is generally viewed as positive given trends in production for agricultural commodities. However home production and the all important related issue of price movements is a complex matter which needs consideration in the context of the potential to import food supplies. The evolution of the trading economy enhanced the ability of the nation to pay for the import of foodstuffs which might compete effectively with and to the detriment of domestic agriculture. The prevailing free trade policy which dominated economic thinking at the time was only modified with respect to grains. The Corn Laws, suspended between 1793 and 1801 during the Napoleonic Wars and finally repealed in 1846, offered one sector of agriculture some significant level of protection. In addition major international events such as the Napoleonic War period 1793-1815 and later the Crimean War 1853-56 interrupted the free flow of imports and exports. For much of the period between 1770 and 1870 English agriculture was therefore exposed to external competition. Not all of this competition was international as the Celtic fringe of the British Isles emerged as a major supplier to English markets especially of livestock and livestock products. Estimates have suggested that Ireland had at least 15% of the English market for foods by the 1830's [John A H, 1967 p.284].

In reviewing the major features of the price trends of particular relevance to southern Derbyshire it is necessary to keep in mind the predominance of dairying in the farm economy with grain, principally wheat, as a supplementary enterprise. It seems appropriate to begin the review with the comprehensive statistical statement concerning English agriculture in the eighteenth and nineteenth centuries compiled by Mingay [Mingay G E, ed, 1989 appendices]. Also within this volume Holderness writing on 'Prices, Productivity and Output' is at pains to stress the problematic nature of much of the data in terms of both quantity and reliability. [Holderness B R, 1989 p.84]. Perversely from a Derbyshire perspective information concerning grain prices, notably wheat, is much more readily available than that for either livestock or livestock products. Generally however series of prices are discontinuous, measures are variable between different parts of the country and it becomes necessary to infer national trends from a particular localised source in the absence of a more widespread cover of information. Figures 4.5, 4.6, 4.17 and 4.8 showing price trends for grains [incorporating those for Derby] , wool, meat and cheese are taken from Mingay [1989 op cit] while Figure 4.9, showing cheese prices at Derby, has been derived from annual reportage in the Derby Mercury newspaper. Superimposed on the latter is a curve derived from the Gayer, Rostow, Schwarz index for domestic commodities [see Mitchell B R and Deane P, 1962 p.470]. The index provides a measure of the overall price changes which occurred from year to year between 1790 and 1850 although the range of commodities used in the calculation of the index did not include cheese. Having emphasised the problems surrounding data on prices the striking feature of the graphs is their overall similarity over a hundred year period. The coincidence between trends at local and national scales and between different commodities is very striking.

In discussing the movement of prices from about 1750 Holderness [Holderness B R, op cit p.84-126] identifies two pivotal points. The first is at mid eighteenth century which marked the beginning of a period of fluctuating price increase which continued until the close of the Napoleonic wars. An

initial phase within this period to 1793 saw grain prices rise from £1/10/- to £2/10/- a quarter, cheese from £1/10/- to £2/10/- per cwt and beef and mutton increase from £2 to £3 a stone. A further phase is marked by rapid price increases from 1793 to 1810, albeit with a slight check between 1800 and 1805, to give maxima which represent an approximate three fold increase over 1750 levels. The end of hostilities defines Holderness's second pivot which inaugarated price decline. Initially this was extremely rapid so that commodities had fallen back to their 1790 prices by about 1815. For mutton and wool price decline was less dramatic. Indeed it is customary to distinguish between the livestock and grain sectors on this basis. Through the 1820's and 30's price levels drifted downwards. Livestock prices recovered in the 1840's as did the total market during the Crimean campaign of the 1850's. Significantly from this point onwards there was general advance until English agriculture entered the more troubled times from the 1870's which marked the beginning of the depressed period which lasted into the twentieth century.

Discussion of prices in this manner in relation to events at the time gives a widely accepted four stage sequence which merits elaboration. Firstly Walton [Walton J R, 1990 p.329-331] has interpreted the four decades between 1750 and 1793 as one of negligible growth in agricultural output in contrast to the long accepted view that this period was one of significant it not revolutionary agricultural advance. He argues that output increased up until the mid eighteenth century from which point onwards import dependence becomes an ever more important feature of the national food supply situation. Grigg [Grigg D, 1989 p.18] supports this view and indicates that exports of foodstuffs had effectively ceased after 1760. This first stage is therefore one of rising prices and scarcity with the deficiencies of the market being made good through imports.

The second stage beginning in 1793 with the outbreak of hostilities in Europe has been discussed in detail by John [John A H, 1967] and Thomas [Thomas B, 1982]. They elaborate a complexity of conflict related factors which introduced a sharper level of general scarcity into the food market which

produced rapid price rises and indeed a highly inflationary situation. The main elements of a period of extreme difficulty were the inherent inelasticity of agriculture, government buying to support the armed forces, the withdrawal of able bodied men from the land [estimated at 20%, of the total male population], a number of years of adverse weather with poor harvests and the interuption of trade with Europe, not least with France, which reduced the availability of grain. The response to this situation resulted in massive investment in the extension of the agricultural area and other means whereby productivity could be increased. The third stage of marked decline in prices is discussed in terms of abundant harvests 1813-15 [see Wilkes A R, 1982], the restablishment of former trading links with the continent and the increasing significance of supply from Ireland. This might be regarded as a period of normal adjustment to pre war levels were it not for the ensuing fourth stage of general and extended price decline. Some writers eg, Jones [Jones E L, 1968] and Grigg [Grigg D, 1989] have styled this a period of agricultural depression particularly as it affected the grain sector as it is acknowledged that investment in livestock went ahead. Certainly the evidence submitted to the sequence of House of Commons Select Committees which concerned themselves with various aspects of agriculture during the 1820's and 1830's created the impression of a sector of the economy that was suffering distress.

The apparent contradictions between a rapidly expanding market, falling prices and an agricultural sector that was innovating to improve output have been widely discussed [Mingay G E, 1989, Mingay G E & Chambers J D, 1966, Jones E L, 1968, Wilkes A R, 1982]. In his statements to the House of Commons Select Committee Smith [Smith W, BPP 1833] indicated that Derbyshire was not exempt from such problems. Although it appears that the county did not suffer from rural unrest on the same scale as other parts of the country. Certainly the difficulties of the grain sector were complex. Wilkes [op cit, 1982] seeks to relate the output of grain (particularly wheat), grain prices and the extent to which production kept ahead of demand. In so doing he uses the concept of the reversed slope supply curve to show that producers may increase output against a falling price in

order to sustain income especially if greater production might be secured by more efficient means. He identifies 1835 as the critical turning point when expansion of the wheat area ceased indeed he states that in the autumn of that year 'the wheat acreage showed a marked decline'. However Wilkes does not emphasise the impact changing yields could have had on the economics of grain production. Jones identifies declining yields between 1820 and 1833 which must have put pressure on farm incomes but has demonstrated significant positive trends in wheat yields through the 1830's and 1840's [Jones E L, 1964 p.184-189]. It is further argued by Fairlie that the maximum production of wheat occurred in the mid 1840's [Fairlie S, 1969]. As an alternative to the uncertainties of the grain market farmers may have opted to move towards grass and livestock. Whatever the niceties of this difficult and prolonged post Napoleonic phase the final stage of price movement is that of positive advance which began in the 1850's and broadly coincided with the period of profitable 'High Farming' which is held to characterised agriculture in the 1850's and 1860's.

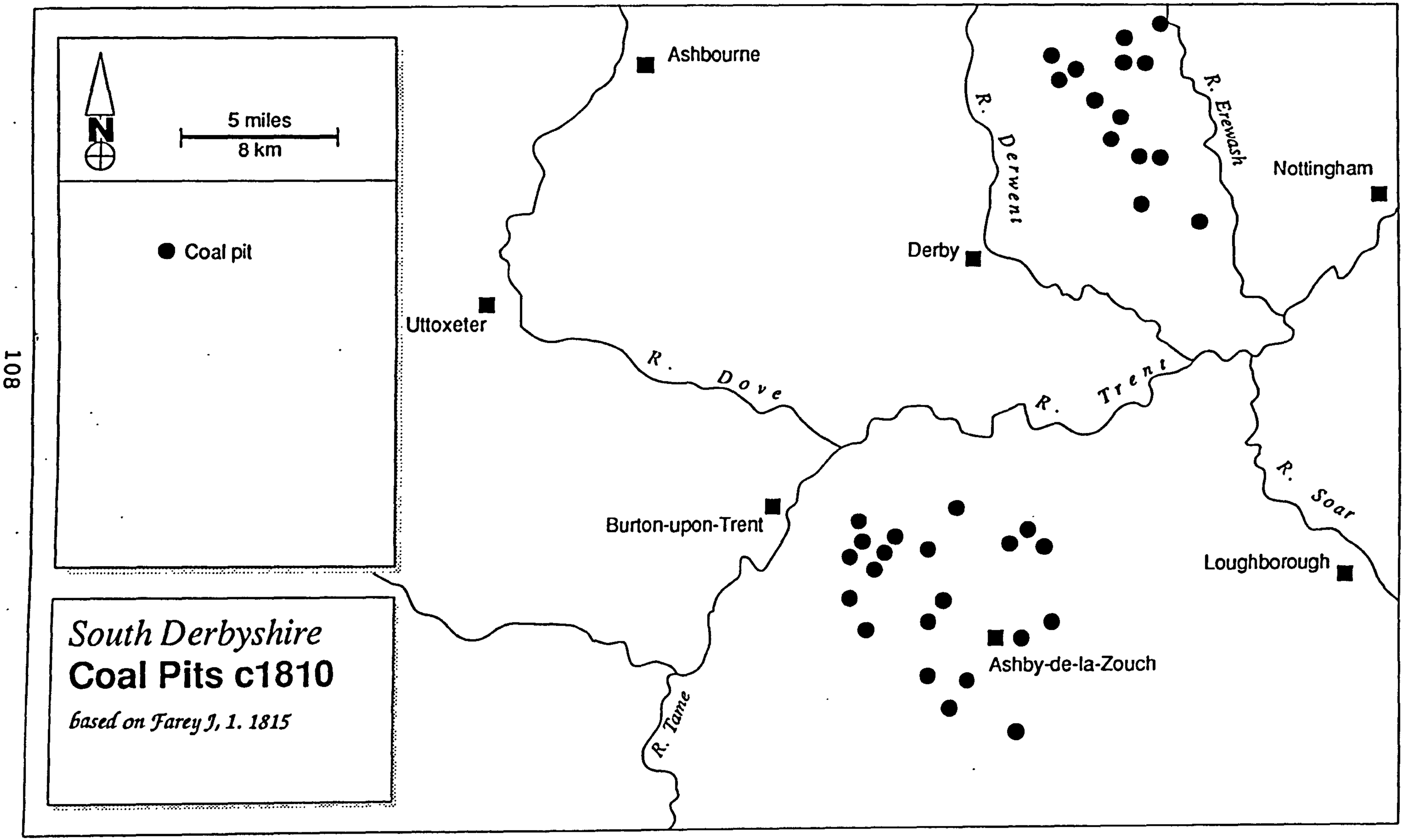
The generally accepted view is that the livestock sector was less adversely affected than grain in the post Napoleonic period as based for example on the calculation of annual percentage rates of change for grain and animal products for the period 1790 to 1870 by Hueckel which suggest a slight advantage for the stock farmer between 1822 and 1845 [Hueckel G, 1981 p.183]. From 1846 both sectors moved upwards but with animal products doing so at the faster rate. However, Figure 4.7 indicates that mutton and beef prices declined until the 1840's and the same appears true of cheese prices in the north west from Figure 4.8. In this context Figure 4.9 which shows price trends for the annual Derby Cheese Fair 1780-1880 illustrates the evolving situation for the most significant product of the southern Derbyshire farmer. It is demonstrated that the movements of cheese prices reflect the sequence of stages evident at national level outlined above but notably in the period after 1820 and they also match the lesser cycles of upward and downward price adjustment reflecting the movement of trading activity. The trend from 1820 which will be discussed in greater detail in Chapter 9 indicates that at best Derbyshire dairy farmers may

have operated in only a marginally favourable price environment relative to grain and that an unequivocal upward movement in cheese price did not begin until the 1850's. This trend carried on into the 1870's but by this time the sale of liquid milk for town use or to cheese factories was rapidly displacing the making of cheese on the farm. Figure 4.9 also demonstrates the general financial uncertainty of farming life. Rarely was the price of cheese steady from one season to the next indeed changes both upward and downward of the order of 10 to 30% are not uncommon. It is not easy to appreciate how the individual farmer coped with the implicit fluctuation of income.

Moreover response to market trends would not be a matter just for farmers as the majority were tenants and therefore landlords had a direct interest in farm success and profitability. Beckett has indicated that a positive relationship between landlord and tenant was not uncommon. 'Overall landlords, sought to help and encourage their tenants without resorting to coercion, and these amicable arrangements enabled progressive agriculture to flourish' [Beckett J V, 1990, p.33]. Chambers and Mingay [Chambers J D and Mingay G E, 1966] have traced trends in rents [Figure 4.10] in a curve which broadly follows that characteristic of prices. There is however an apparent reluctance for a fall in rent to match the decline in prices following the Napoleonic Wars although there is much evidence of rent abatement at this time including estates in southern Derbyshire [see Chapter 5]. The important relationships are therefore between product price, rent and profitability/deficit. In their different ways both rising and falling prices had impact upon the policies of landlord and tenant and could be the arbiters of change and/or intensification of activity.

In summary it has been demonstrated that the farmers of southern Derbyshire of the period 1770 to 1870 functioned in the context of a dynamic industrialising East Midland economy which was firmly tied into the evolving national scene. Consequently the opportunity for expansion of output occurred but the trends of the nationally determined economic environment were neither smooth nor predictable. Industrialisation also impacted positively on agricultural wages but employment in mines and

manufacturing appears as an increasingly attractive alternative to work on the land. To progress this study from such considerations it is next appropriate to consider essential features of the use and management and improvement of land together with the structural characteristics of the associated farm system. This will be a precursor to detailed considerations of the use of land in the provision of feed in a predominantly livestock orientated economy.


N
5 miles
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Coal pit
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Ashby-de-la-Zouch
Loughborough
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
South Derbyshire
Coal Pits c1810
based on Farey J, 1. 1815

Figure 4.1

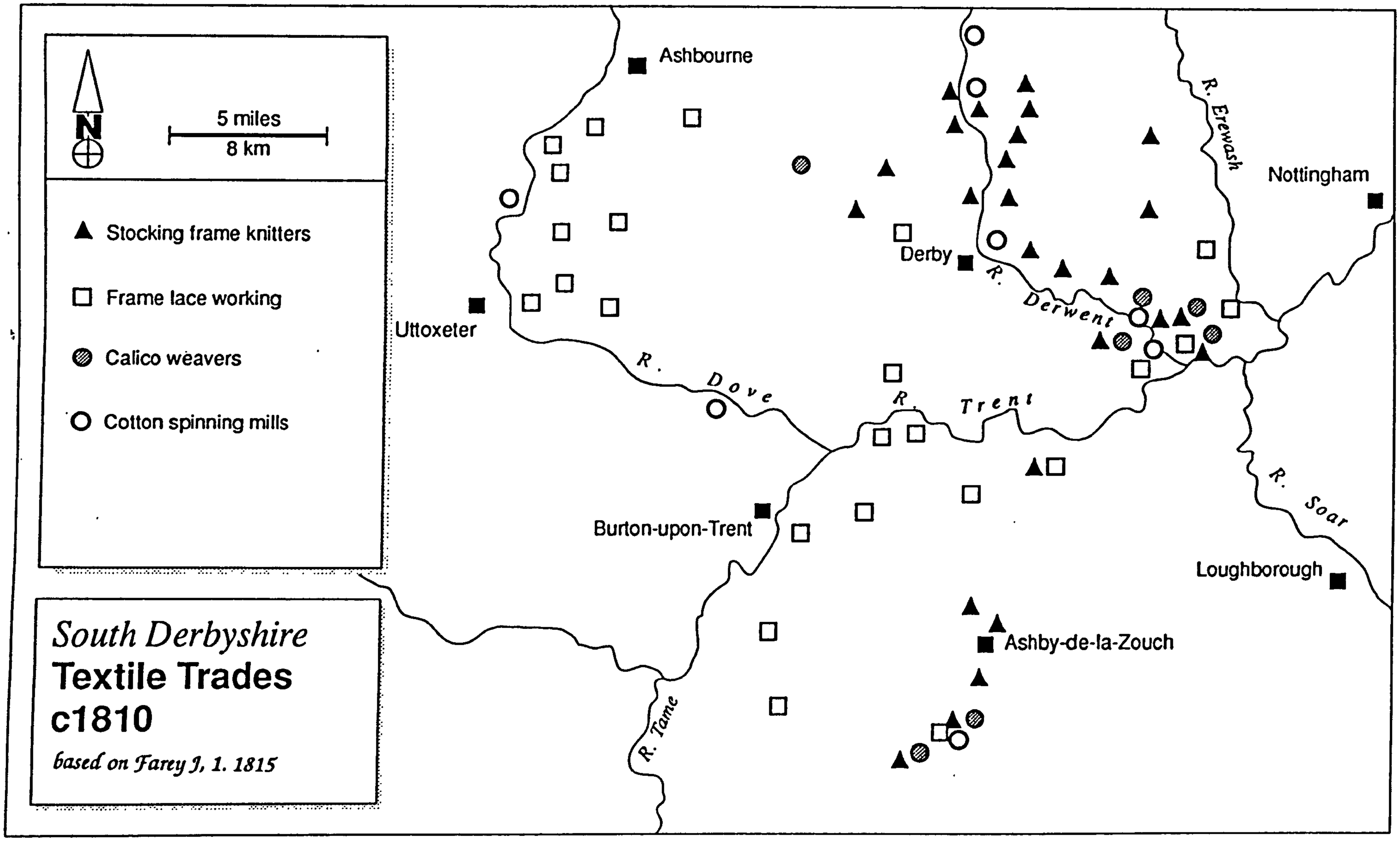

N
5 miles
8 km
Stocking frame knitters
Frame lace working
Calico weavers
Cotton spinning mills
South Derbyshire
Textile Trades
c1810
based on Farey J, 1. 1815
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Trent
R. Derwent
R. Erewash
R. Soar
R. Tame

Figure 4.2

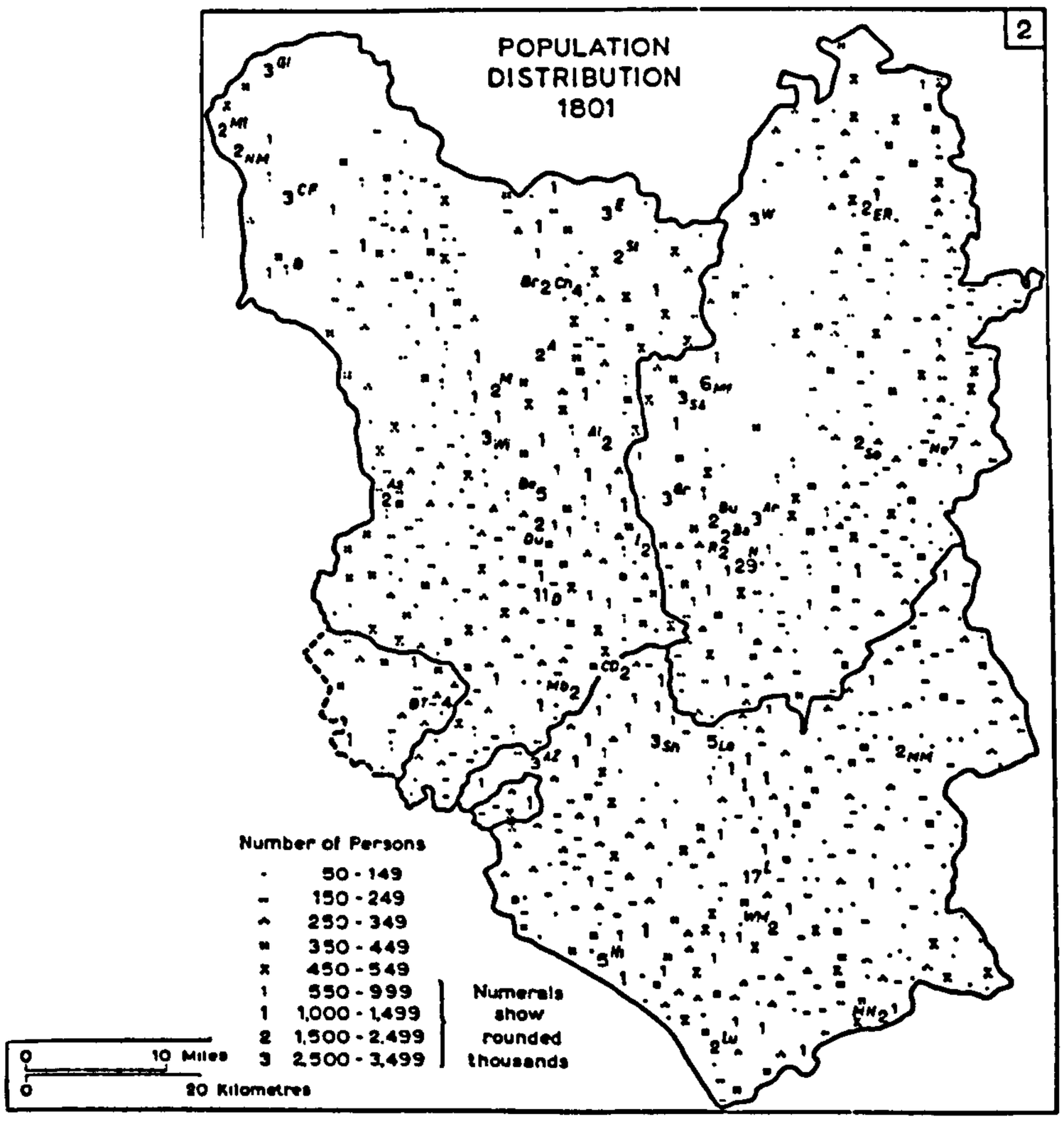


Figure 4.3a and 4.3b,c,d overleaf Population Distribution and Change, Middle Trent Counties. (Source Osborne R.H.1970 p.40, 42, 44 & 46)

Figure 4.3b

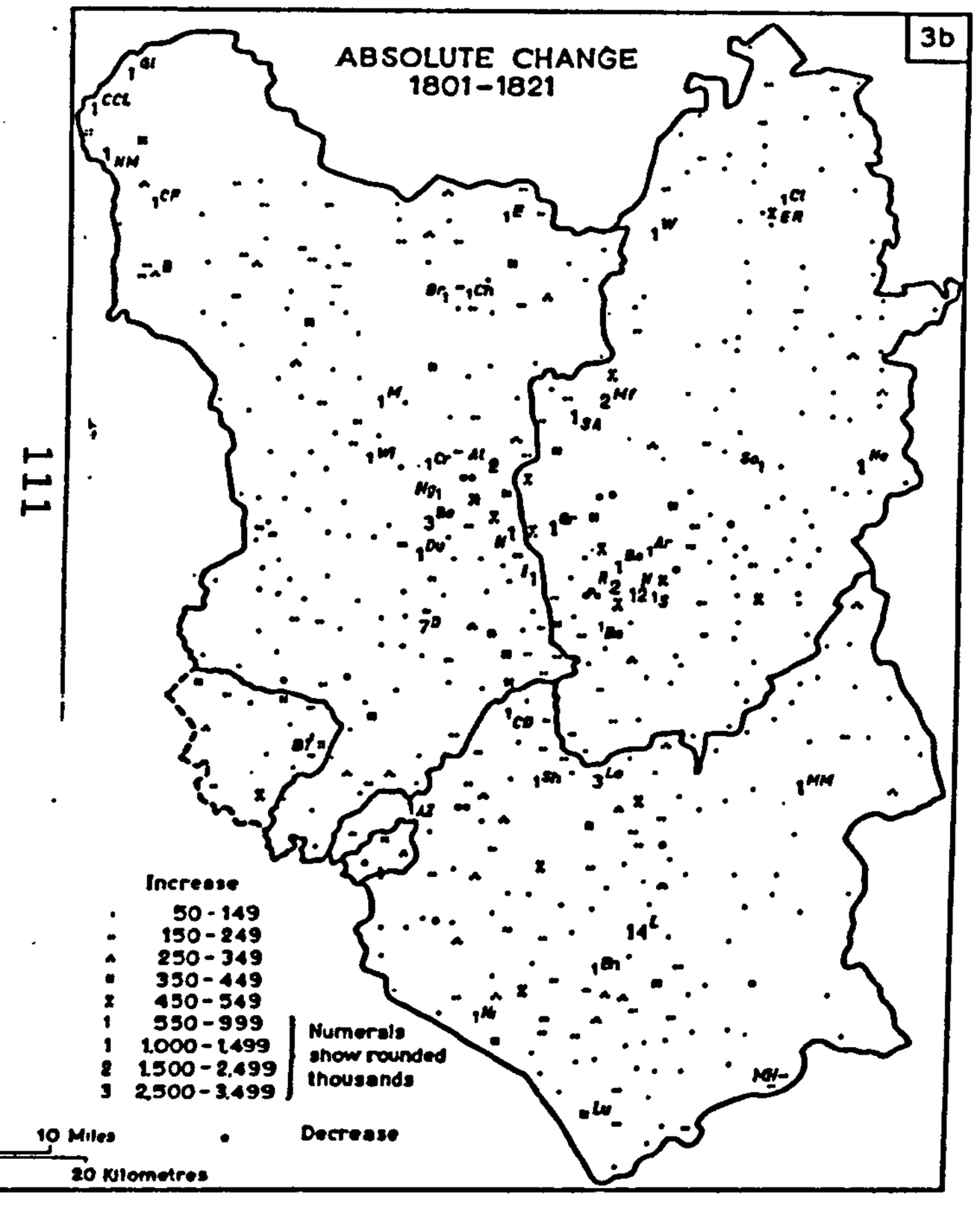


Figure 4.3c

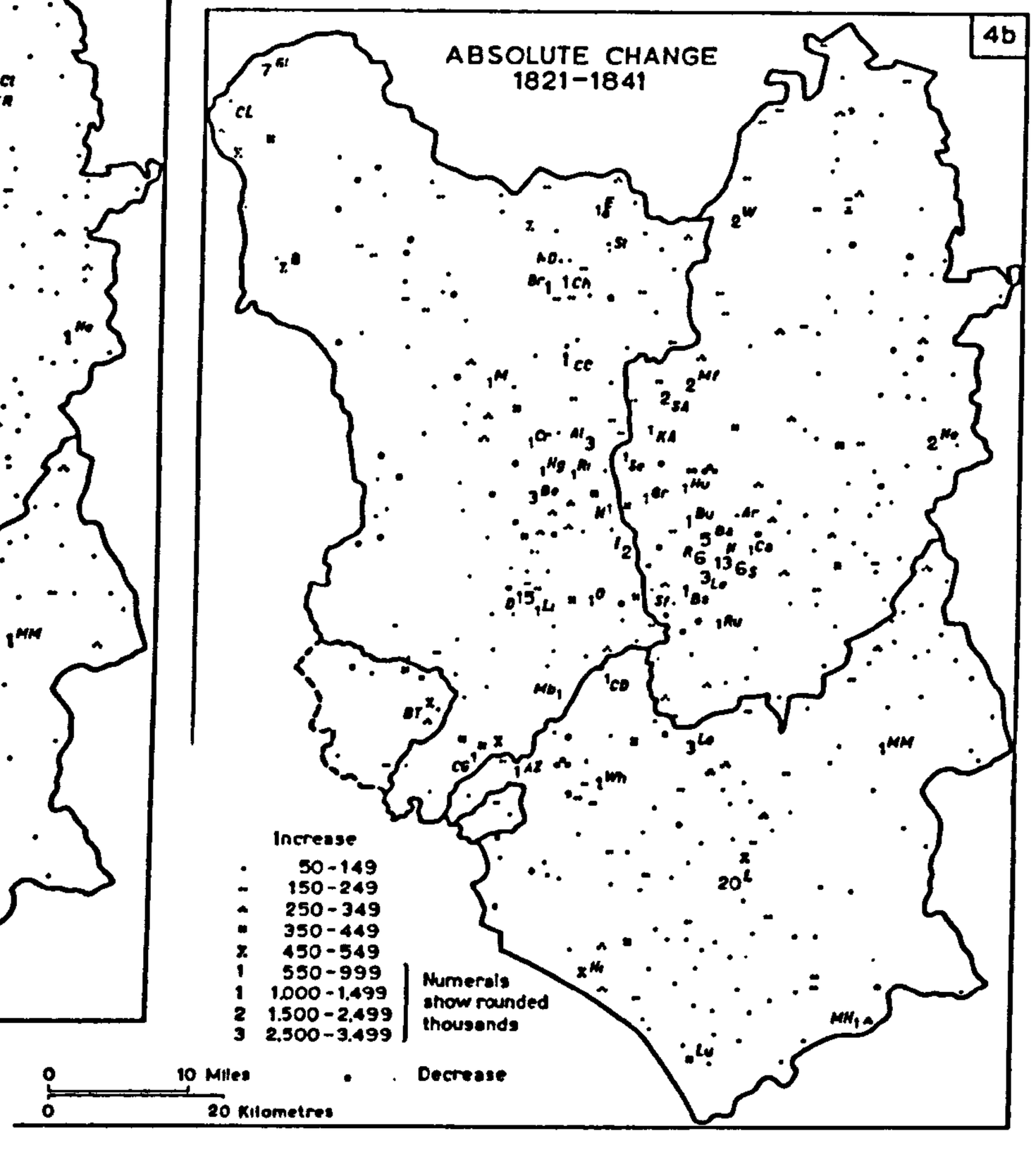
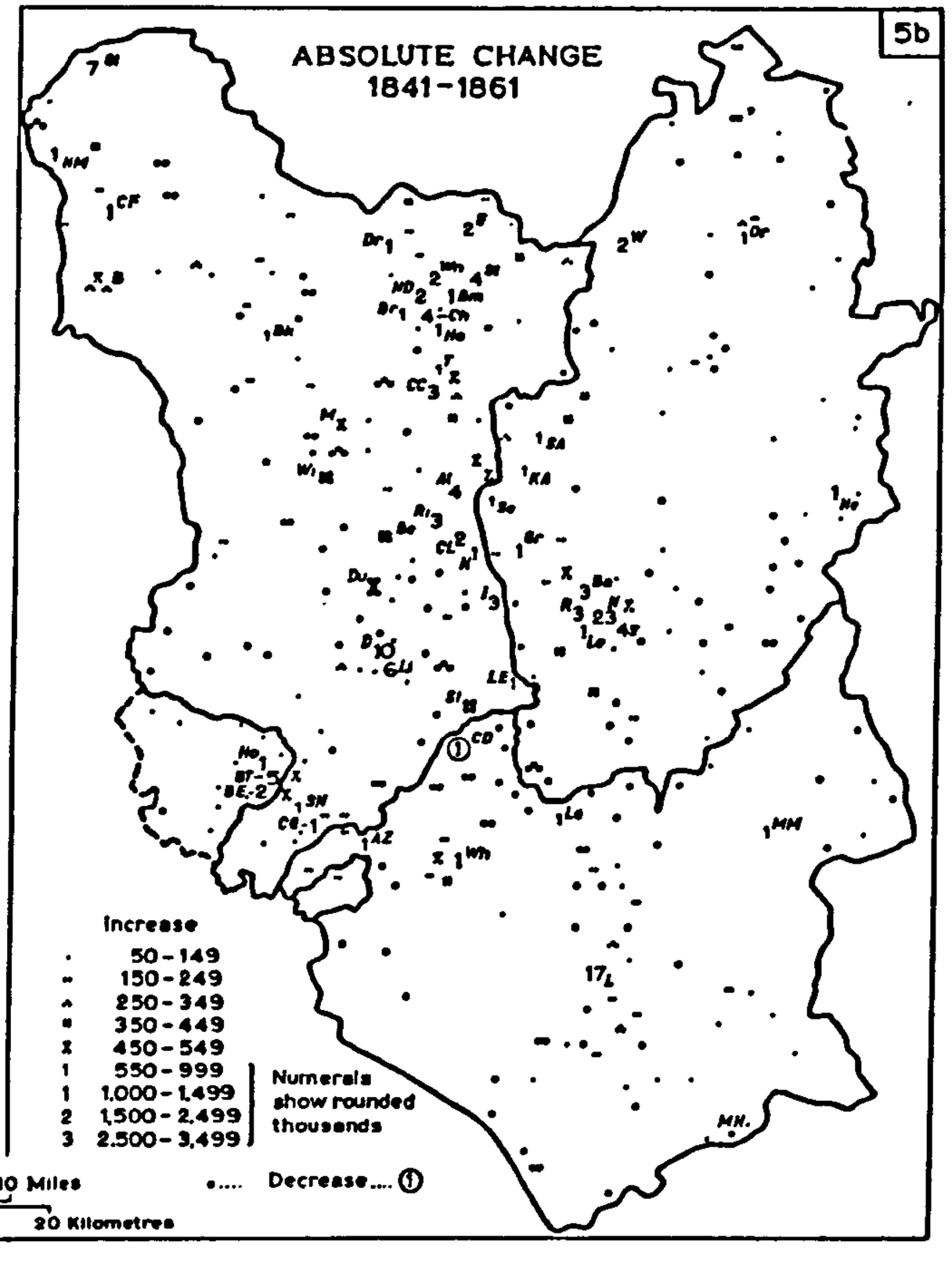


Figure 4.3d



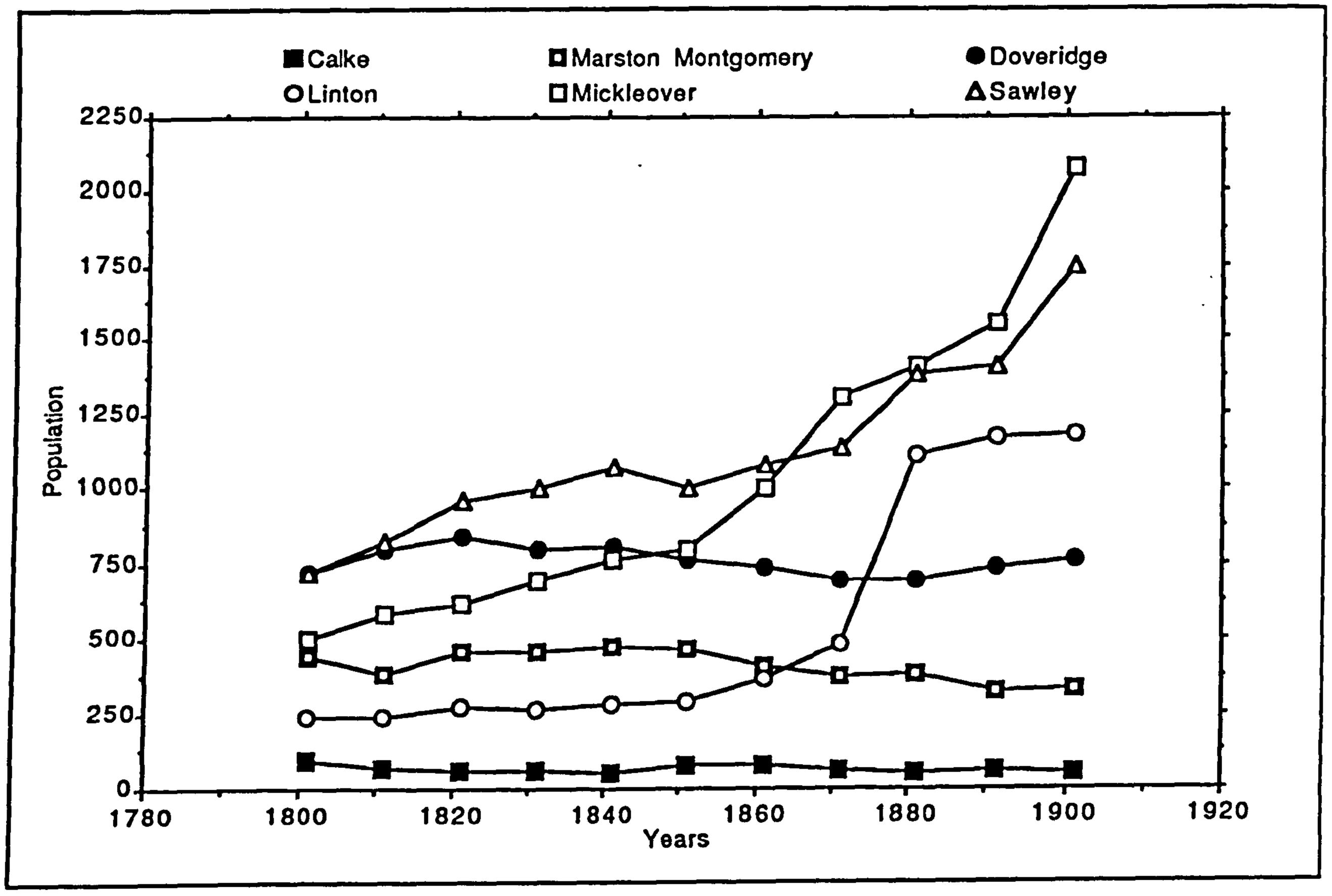
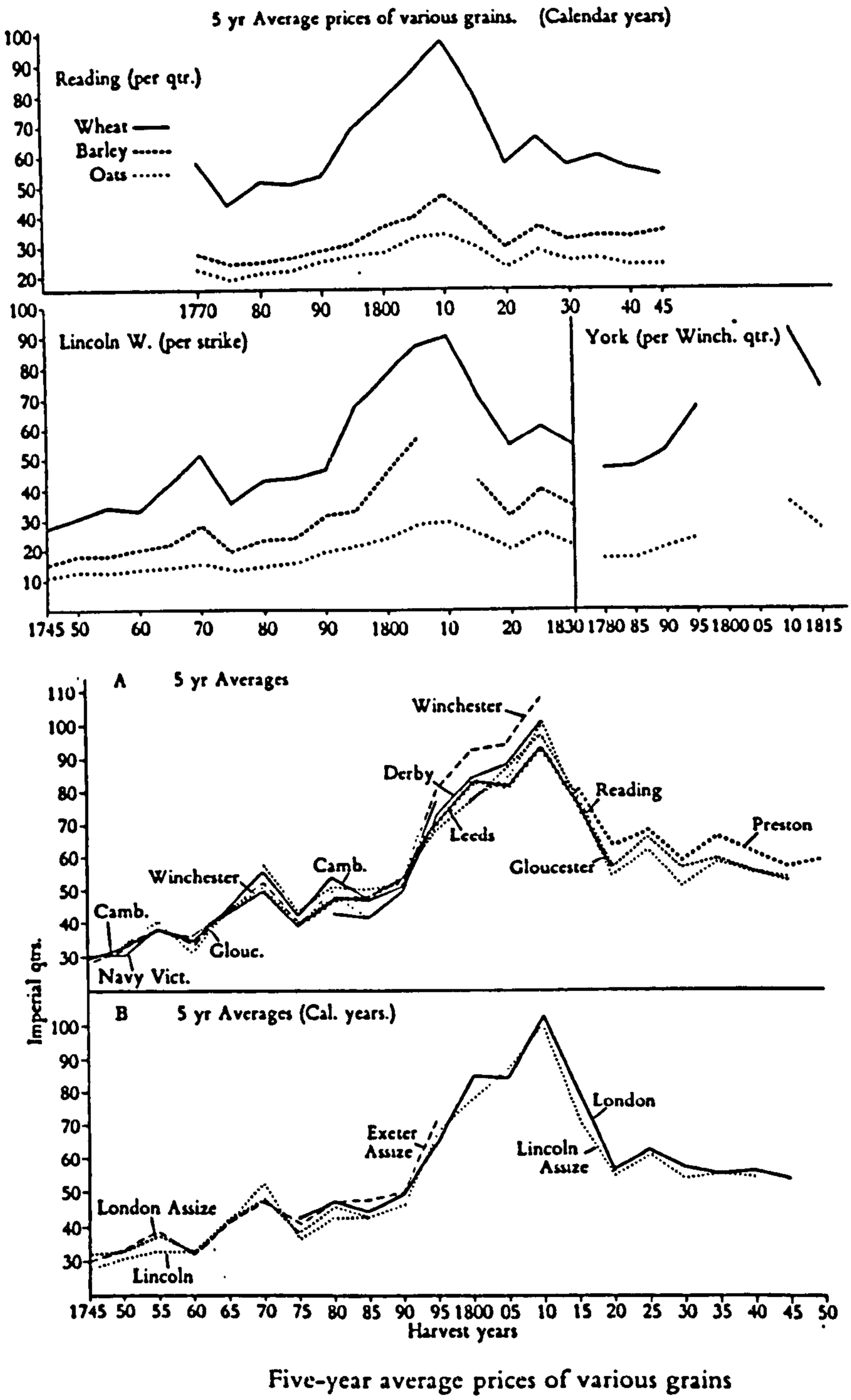
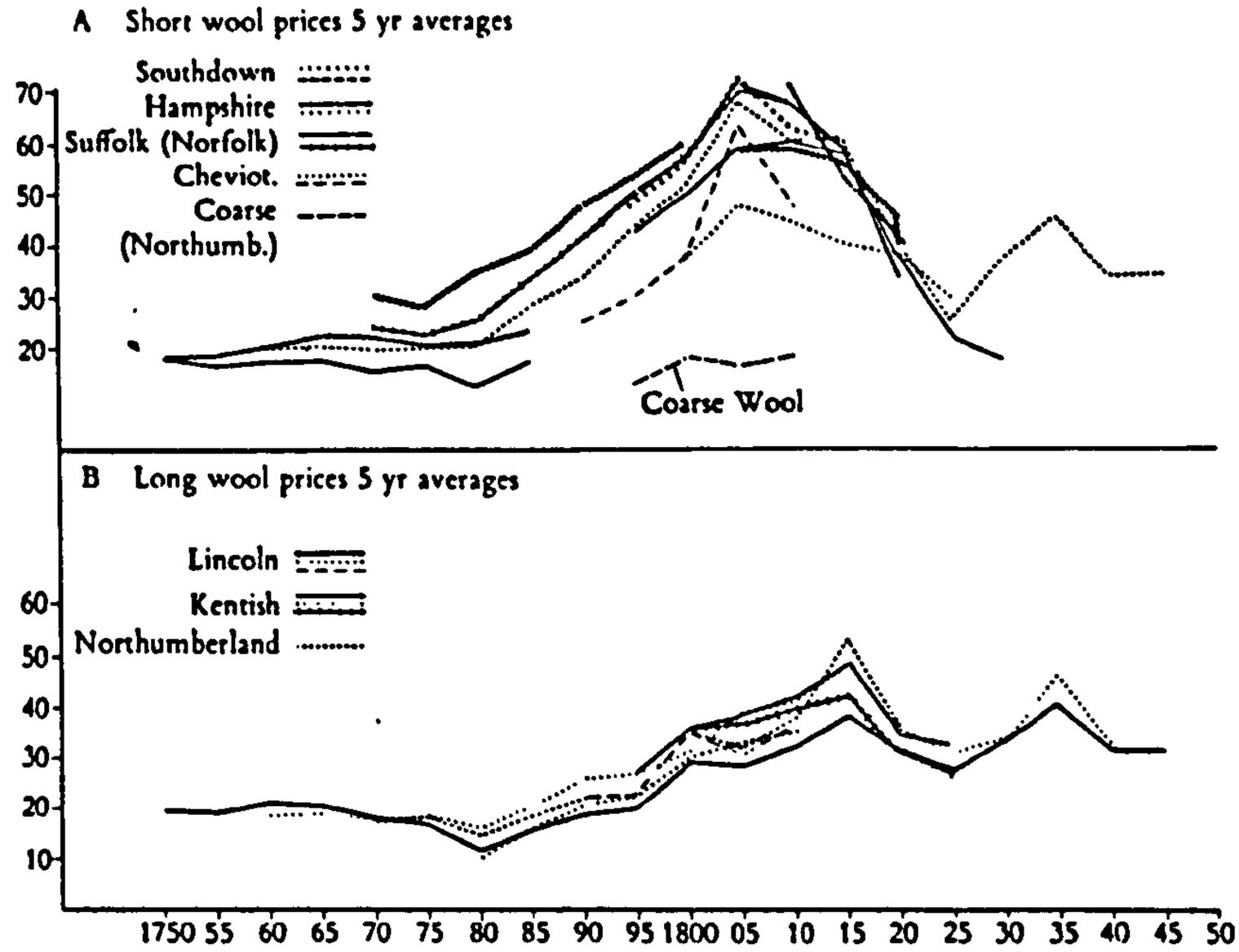


Figure 4.4 Population Characteristics of Selected Southern Derbyshire Parishes in the Nineteenth Century.



Five-year average prices of various grains

Figure 4.5 Average Prices for Various Grains.
(Source: Holderness B.A.1989 p.96)



Five-year average prices of (a) short and (b) long wools

Figure 4.6 Average Wool Prices.
(Source: Holderness B.A. 1989 p.117)

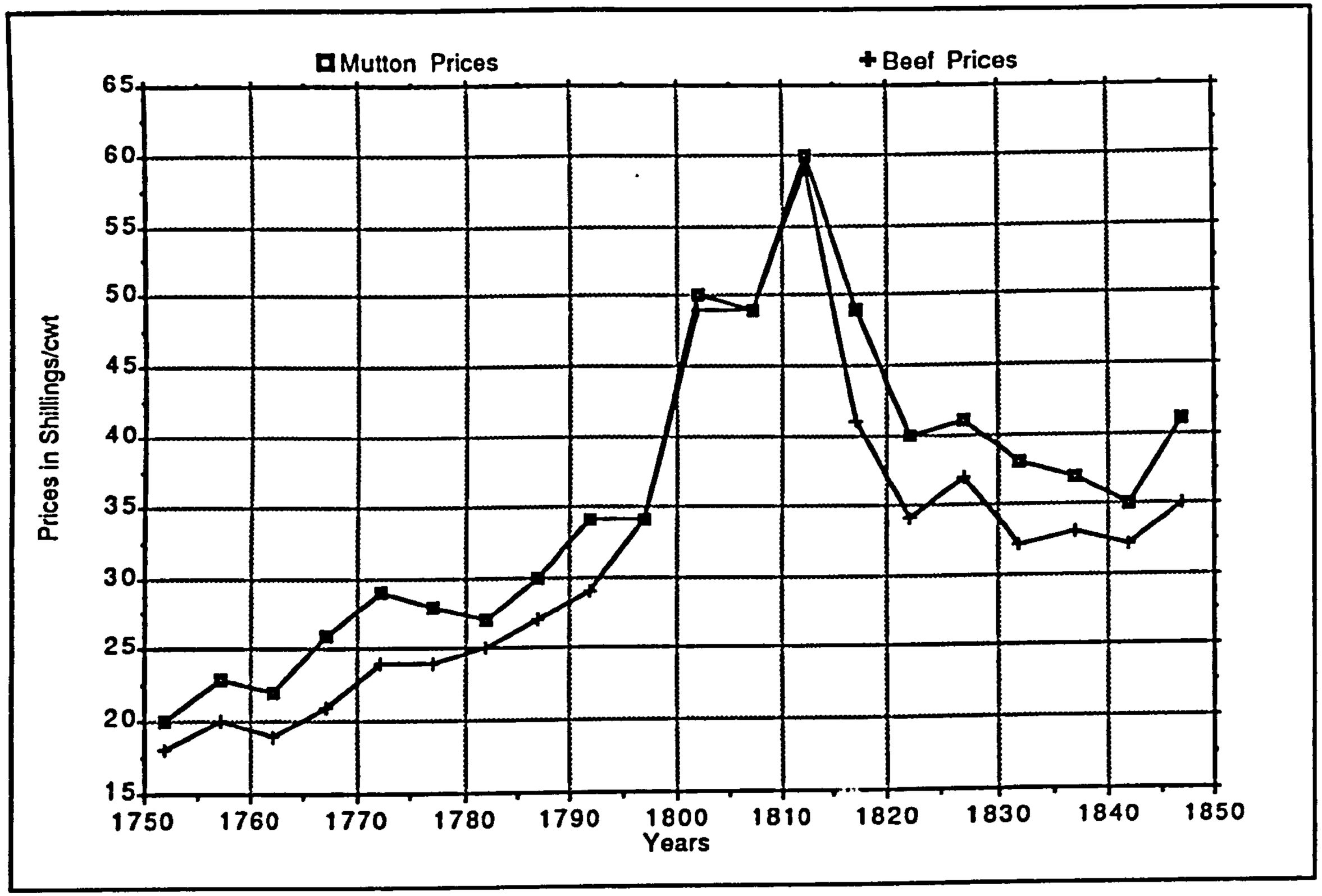


Figure 4.7 Trends in Average Beef and Mutton Prices Paid at St. Thomas's Hospital c.1750 - 1850.
(Source: Mingay G.E.1989 Table 2.2 p.110)

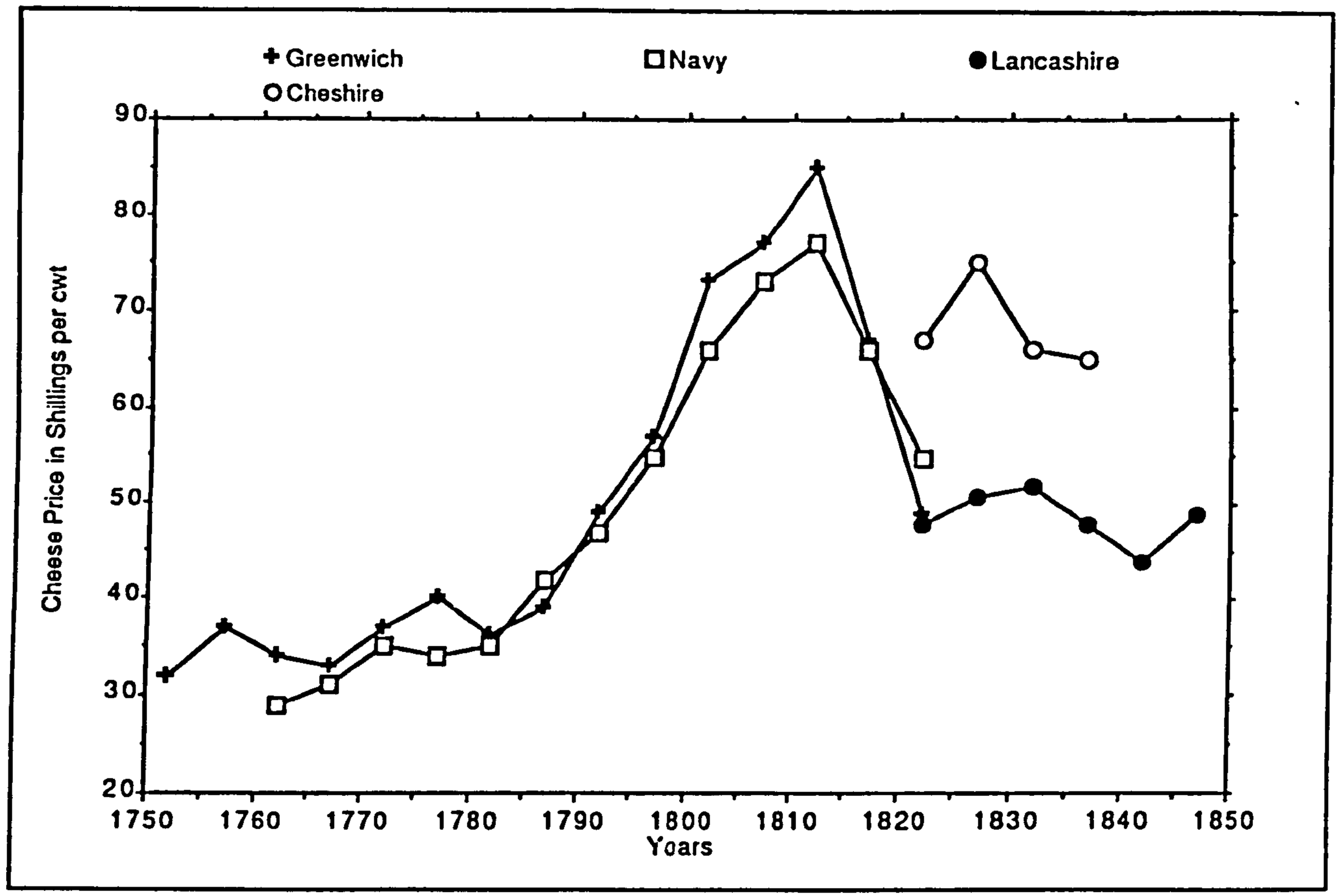


Figure 4.8 Trends in Cheese Prices, Greenwich Hospital, Navy Victualling, Cheshire and Lancashire. (Source: Mingay G.E.1989 Fig 2.3)

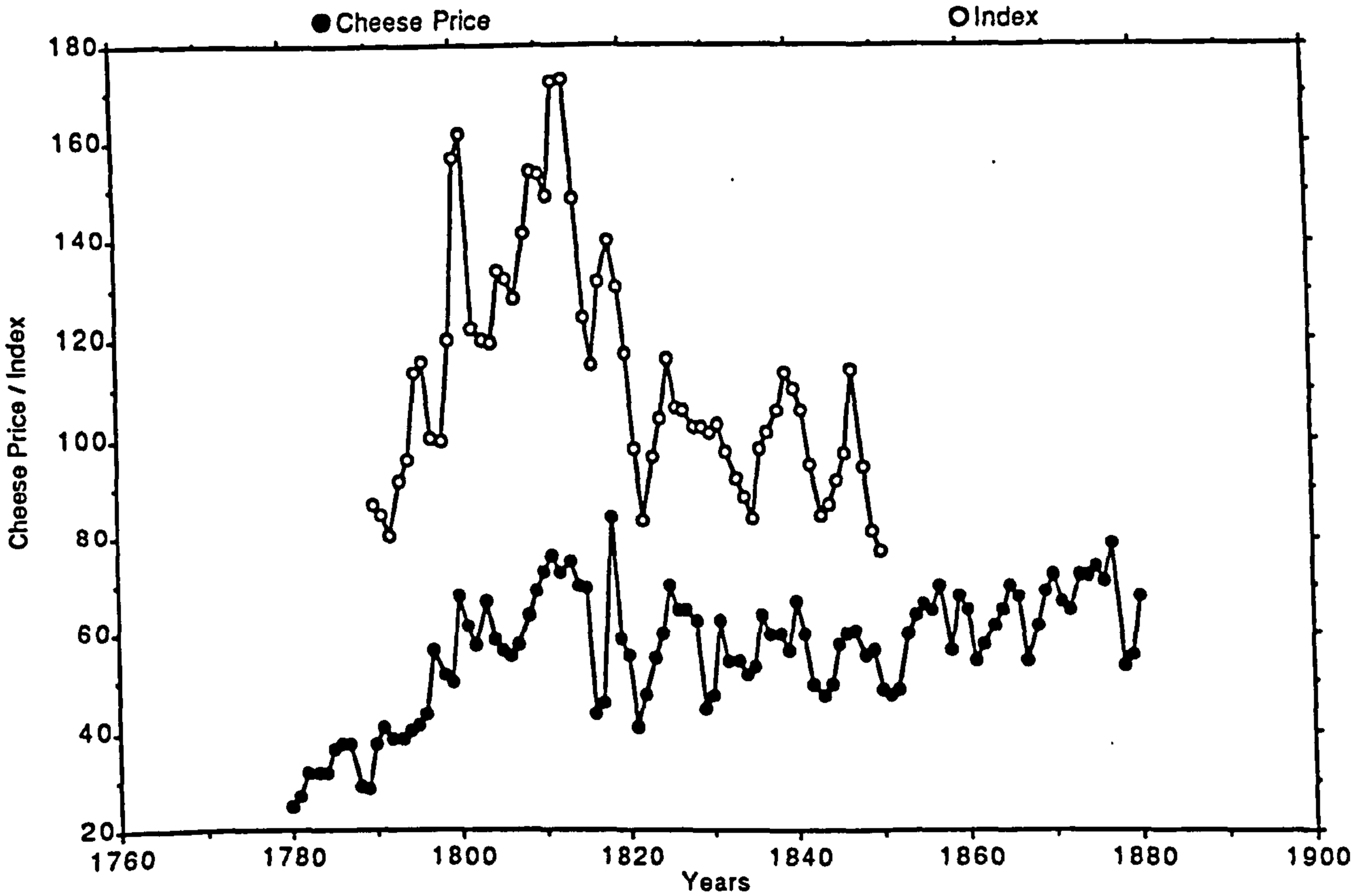
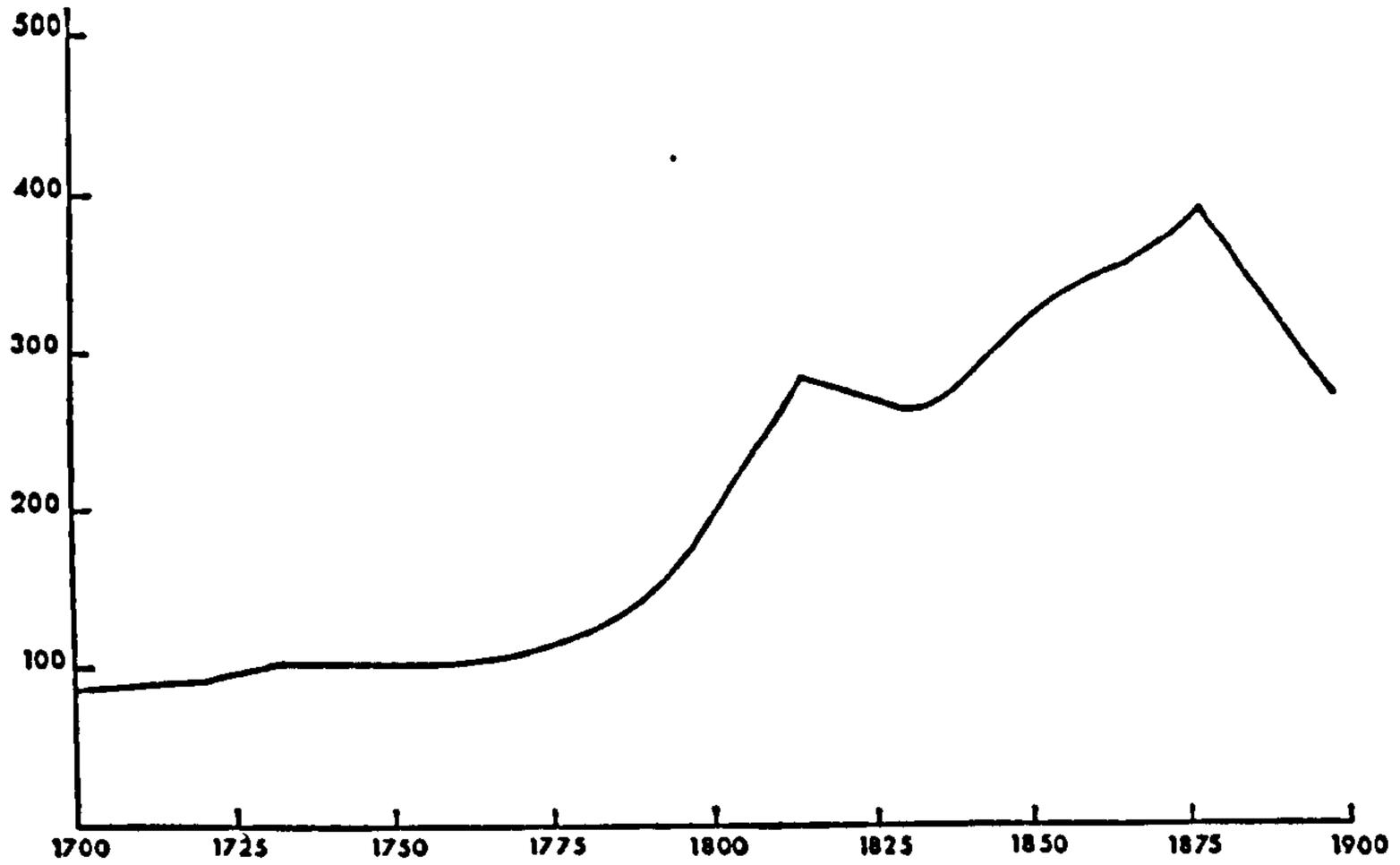


Figure 4.9 Average Cheese Prices Obtained at Derby Cheese Fair 1780-1880 Compared with the Gayer, Rostow, Schwarz Price Index 1790-1850.
(Sources: Derby Mercury and Michell and Deane 1962 p.470)

Note: Cheese prices are in shillings per hundredweight and the Index is based on the average of 1821-5 to represent 100. The Index is for Domestic Commodities. The graph shows a virtual trebling in price between 1780 and 1810. This strong upward movement ran parallel to price trends for other commodities as demonstrated by the Index and must have provided a considerable boost to dairymen. During the period of price readjustment following Waterloo 1818 appears as an exceptional year for cheese prices. The years after 1820 are marked by cyclic price fluctuations for cheese which are broadly matched by the trend of the Index. See Chapter 9 for detailed discussion of cheese and cheese price.



Rent Movements 1700–1900 (1730–50 = 100)

Figure 4.10 Rent Movement 1700 - 1900.
(Source: Chambers J.D. and Mingay G.E. 1966 p.167)

Population trends, England and Wales, 1701–1921.

	Population		Natural increase		Births		Deaths		Net migration	
	000s	Per cent increase p.a.	000s	Per cent p.a.	000s	Per cent p.a.	000s	Per cent p.a.	000s	Per cent p.a.
1701[a]	5058	—	—	—	—	—	—	—	—	—
1731[a]	5772	0.28	958	0.38	8779	3.47	7821	3.09	−244	−0.10
1781[a]	7042	0.73	1438	0.83	6523	3.76	5085	2.94	−168	−0.10
1801[a]	8597*	1.10	1660	1.18	5787	4.11	4127	2.93	−105	−0.07
1831[b]	13,897	1.73	4975	1.81	13,253[(e)]	4.82	8278[(e)]	3.00	−234	−0.09
1881[b]	25,974	1.74	11,332	1.63	32,362	4.66	21,030	3.03	−745	−0.11
1921[b]	37,887	1.15	14,188	1.37	35,440	3.41	21,252	2.05	−2275	−0.22

*England and Wales (adjusted to include military) 9156. [(e)] Estimated

Table 4.1 Population Trends 1701-1921
(Source Lawton R.1990 p.289)

Note : The data in the table illustrates the rapid rise in population during the period 1780 to 1860.

Age structure, England and Wales, 1821–1921.

	Percentage of population aged			
	0–14	15–44	45–64	65+
1821	48	29	16	7
1841	36	46	13	4
1851	35	46	14	5
1861	36	45	15	5
1871	36	45	15	5
1881	37	45	14	5
1891	35	46	14	5
1901	32	48	15	5
1911	31	48	16	5
1921	28	47	19	6

Sources: Censuses of Great Britain (1821–51) and England and Wales (1861–1921).

Table 4.2 Age Structure, England and Wales 1821 - 1921.

(Source Lawton R.1990 p.290)

Note: The data presented show the predominance of young age groups in the population in the middle of the nineteenth century

Table 4.3a Trends in Real Wages in North Staffordshire 1750-1790

(source Schwarz L D, 1990 Index for 1750 = 100)

	1750	1790
Labourers	100	164
Carpenters	100	159
Brick Layers	100	165
Potters	100	238
Agricultural Labour	100	134

Table 4.3b Selected Weekly Wages in Derbyshire 1770 - 1881

	1770	1829	1844	1851	1881
Agricultural Labour	6/-		10/-	12/-	17/-
Colliers		15/-	18/-		
Brewery Labourers		25/-		32/- 17/- to	50/-
Framework Knitters		7/-		11/-	
Iron Foundry Workers		15/-	20/-		

(sources Caird J 1853, Owen CC 1973, Williams JE 1961, Chapman SD 1981)

Real wages and potential demand, 1731–1911.

Year	Real wages	Potential demand	Years	Real wages	Potential demand
1731	100	100	1821	121	265
1741	100	106	1831	169	425
1751	100	110	1841	213	612
1761	92	107	1851	247	799
1771	96	118	1861	209	757
1781	102	136	1871	255	1044
1791	102	150	1881	321	1477
1801	103	169	1891	400	2059
1811	101	189	1901	456	2630
			1911	406	2598

Table 4.4 Real Wages and Potential Demand 1731 - 1911.

(Source: Walton J.R. 1990 p.235)

Note: Walton argues that growth in potential demand exceeded the rate of population growth after the second decade of the nineteenth century.

CHAPTER 5

ASPECTS OF THE AGRICULTURAL LANDSCAPE: TRENDS IN LAND USE, LAND VALUE, FARMSIZE AND SHAPE

The purpose of this chapter is to review trends in a number of related aspects of the evolving agricultural landscape as they occurred in southern Derbyshire between 1770 and 1870. In some instances it will be helpful to compare the Derbyshire scene with national developments. The first aspect to be considered will be broad changes in the major categories of land use in order to clarify the manner in which southern Derbyshire became essentially pastoral in character. This can then be further related to differences in value put upon land expressed mainly in terms of rents. Structural aspects of farm organisation will be appraised in terms of ownership and occupation and also the size of farms characteristic of southern Derbyshire. The concern is to establish a framework against which the key issues of the provision of feed for and the management of livestock can be discussed.

Trends in Land Use 1770 to 1870

The discussion of the agricultural environment developed in Chapter 3 has indicated that southern Derbyshire shared to some degree in major shifts in land use which occurred in England during the eighteenth and nineteenth centuries. The national scene has been reviewed by Grigg who has demonstrated that in England there was an overall increase in the area of land under cultivation during the late eighteenth and first half of the nineteenth centuries [Grigg D B, 1988,1989]. Concurrently there were important changes in patterns of land usage notably a shift away from arable towards pasture on heavier lands and the establishment of new arable on reclaimed areas such as former heath and fen. Both these trends are evident in southern Derbyshire. However in seeking to quantify such trends it must be born in mind that fundamental difficulties exist with respect to the statistical basis for determining agricultural land use in England and Wales prior to the first agricultural census in

1866. The available evidence has also been reviewed in detail by Grigg [Grigg D B, 1986 and 1989]. He dismisses the estimates of Gregory King for 1700 and by Arthur Young for 1770 as unrealiable and prefers the analysis of the 1801 Crop Returns by Turner [Turner M E, 1981] as the benchmark for earlier and subsequent comparison. Grigg suggests that the total agricultural area of England and Wales had reached its greatest extent prior to the nineteenth century and that it stood at approximately 29 million acres until decline started at about the middle of that century [Grigg D B, 1989 p.39 et seq and Table 5.1]. John [John A H, 1967] has argued strongly that the Napoleonic Wars saw an addition of 3 million acres to the cultivated area but this is difficult to substantiate from Grigg's figures. It is clear however that tillage did increase by this amount through the first half of the century, that the area under temporary grass doubled while the bare fallows were more than halved. Permanent grassland showed modest increase in the early century before declining thereafter. Important change occurred within the arable sector with a sharp and a highly significant rise of green winter feed crops which would include roots, turnips, swedes and mangolds [see Table 5.2].

In keeping with the national trend for heavier soils the main land use change which can be identified for southern Derbyshire is the gradual diminution in the area under arable and a complementary growth in the amount of land which was permanent grassland. As this trend will be demonstrated to have begun at least as early as 1600 and was still in progress in the late nineteenth century it will be helpful to take a longer rather than a shorter view of the developments which occurred. It will also be helpful to relate change in land use to the process of enclosure. While enclosure did not of itself bring about land use change it created circumstances in which change could be more easily contemplated and effected. Indeed in the situation of Parliamentary Enclosure it is clear from the preambles to the Acts themselves that improvement in the form of land use change was a major objective. Consideration of land use change is also important in the pursuit of the debate as to the applicability of the heavy soil/light soil model to the agricultural environments of southern Derbyshire.

In addition to the difficulties at the national scale accurate estimates of land use at the regional scale are equally problematic. Using the range of sources which have been discussed in Chapter 2 it is only possible to generate data from the analysis of records which relate to specific parishes for the period up to the turn of the eighteenth century. A number of case studies will be presented which have been derived in this way. With respect to the nineteenth century the Tithe Redemption Surveys provide valuable data for the 1840's, while the earlier 1801 Crop Returns are more problematic in their application but are nevertheless worthy of consideration. In turn statistics derived from these sources can be compared with the more secure data from the early agricultural censuses. The latter have been analysed in some detail for the year 1870. Events from 1870 up to 1895 have been considered by Tomson [Tomson G A, 1986 chapter 6].

Notwithstanding the problems of precise identification of changes in land use in southern Derbyshire it is clear that the contemporary writers on the agricultural scene were agreed that grassland was the increasingly dominant element in the land use pattern. Their images of the agricultural character of the county in general and southern Derbyshire in particular have been reviewed in Chapter 3. Observations as to agricultural trends, especially those made around the turn of the eighteenth century, give an unequivocal impression that arable land was being put down to grass. There is some disagreement, for example between Pilkington and Brown, as to the relative proportion between the two categories. Pilkington [Pilkington J, 1789 p.289] stated that the land [in southern Derbyshire] is 'nearly equally divided between pasture and tillage' whereas Brown [Brown T, 1794 p.19] gave the ratio as 'one third tillage and two thirds grass' in his 'fertile soil district' which essentially coincided with the red marl. They were both in accord as to the prevailing trend which was clearly expressed by Pilkington [Pilkington J, op cit p.301] in the phrase 'the land in tillage is constantly diminishing'. He elaborated by reference to the parish of Appleby, now in Leicestershire, where 'about twenty years ago the fields were enclosed and since that

time the business of the dairy has been much attended to'. This statement reaches to the heart of the problem as to the motive for land use change and the role of enclosure in that change. It is also matched to a degree by Pitt's [Pitt W, 1809 p.29] observations concerning north west Leicestershire in the vicinity of Ashby where the land was divided one part arable to three parts grassland as a consequence of the development of dairying. Most farmers had some land in tillage. Pitt contrasted this area of Leicestershire with the southern districts of the county which were almost entirely in grass. The existence of grassed over ridge and furrow is cited by both Farey and Loudon as further evidence of land use change. Farey [Farey J, 2 1815 p.174] referred to there being 'more grassland than formerly' as witnessed by the universal occurrence of ridges while Loudon commented that 'it appears from the ridges that much land was formerly arable' [Loudon J C, 1825 p.1101].

While the overall trend is clear it is important to appreciate that there were practical difficulties in land use change. Pitt [Pitt W, 1809 p.93] commented critically as to the quality of grassland which had been derived from former open field arable. This was described as 'old turf' and had seemingly been managed at a low level for over a century. It can be anticipated that land that was put down to grass was either seeded fallow or was ley pasture that was extended to the point where it became permanent. The quality of the original hay seed mixture plus the inevitable invasion of weed species combined with indifferent management would have been factors in the condition of grassland. Pitt also regarded reseeding as problematic. He stated that once broken such turf would take forty years before it was again in acceptable condition. Even in the 1860's it appears that the establishment of sound pasture required capital beyond the means of the tenant farmer. John Shaw a land agent of Derby wrote [DM 5.10.1864] - 'it can hardly be expected that a tenant farmer under ordinary circumstances undertake the laying down of clay land as it is a fact known to all practical men that after the first two or three years the greater portion of the young grasses disappear when the land becomes for some time comparatively useless and without good dresssings of manure or depasturing of cattle fed by artificial food a long period of

time elapses before the pastures are established'. In combination with the widespread survival of ridge and furrow as a consequence of grassing down, itself a disincentive to further ploughing and reseeding, it is not surprising that once a change of use had been effected then land became fixed in its new condition.

In order to underpin the views of Pilkington, Brown and others as to the direction of land use change prior to the nineteenth century it is necessary to consider case studies of individual parishes or groups of parishes as signalled above. In the following discussion six parishes are analysed in order to establish some statistical basis for land use change. The Doveside parishes are then considered as a group so that the relationship between land use change and enclosure can be elaborated. In all the parishes to be discussed enclosure by agreement was of particular importance. This process will be demonstrated to have been well in progress by the early seventeenth century. Indeed for two of the parishes, Sudbury and Somersal Herbert the total areas were enclosed by agreement and there was no need to have recourse to an Act of Parliament. Across southern Derbyshire as a whole Parliamentary Enclosure was a procedure for tidying up a fragmented pattern of unenclosed land so that parishes, such as Boulton and Chellaston to the south east of Derby, where open field arrangements survived in tact until the early nineteenth century were unusual.

The first parish to be discussed is Church Broughton [see Figure 2.1 for location of Church Broughton and other parishes] which is essentially a red marl parish traversed by minor threads of brookside alluvium. The occurrence of surveys carried out for the Chatsworth Estate in 1630 [CA] and at the time of Parliamentary Enclosure in 1775 [DRO QR] can be usefully compared in terms of major categories of land organisation. The results can be tabulated:-

	1630	1775
Open field arable	390 acres	320 acres
Closes	590 acres	670 acres
Heath	110 acres	100 acres

Meadow	60 acres	60 acres
Total	1150 acres	1150 acres

It is significant that more than half the land in Church Broughton had been enclosed by 1630. Indeed Wilmot [Wilmot A, 1980 p.269 et seq] has demonstrated in a discussion of the botanical composition of hedgerows that a relatively high level of species diversity is in accord with early piecemeal enclosure. Further enclosure of open field arable and some heath took place between 1630 and 1775 at a rate of about half an acre a year. While there is no proof that the creation of closes necessarily meant that land was put down to grass it is likely on the basis of the regional trend that this did happen to a greater or lesser extent. By 1870 the proportion of land in grassland was 74% and arable 26%.

Marston on Dove was also mapped for the Devonshire estate by Senior in 1616 [CA]. The survey and the accompanying terrier enable the construction of maps of land use and land holdings which have been generalised as Figure 5.1. In turn these can be compared with the Enclosure Award of 1789 [DRO QR], a series of estate surveys covering the period from 1780 to 1852 [CA], and the Tithe Survey of 1839 [DLHL Tithe].

Notable features of the 1616 survey include the extensive tract of common land which formed part of Hatton Moor located to the north west of the parish which was to remain until enclosure. In addition two of four areas of open field arable, Wearhollowe Field and Dove field were located on the Dove floodplain and abutted against the river bank. Clearly such use of the floodplain was considered appropriate despite the risk of flooding and lateral river channel movement [See Dalton R T and Fox H R, 1988]. Wearhollowe Field was divided into meadow and arable parts and inspection of air photographs confirms the survival of ridge and furrow coincident with the latter. Indeed ridge and furrow is an important feature of the landscape of Marston. It occurs in various closes mapped as meadow and pasture in 1616 which then lay against two other areas of open field arable, Kirke Field and Siche Field, in a manner to suggest that these fields were previously more extensive. Field

names such as Smith's New Close and Bagnall's Riche [Rushy ?] Close support a view that the enclosing took place in the context of individual holdings. The principal areas of meadowland occupied the floodplain in the southeast of the parish and comprised large units. Black Diche at 60 acres, Little Meadow at 30 acres in total and Bonholme with 28 acres were all subject to communal arrangements at this time. From the Terrier it is possible to calculate the combined land usage for six holdings. Arable, all open field, comprised 168 acres, enclosed pasture was 215 acres and common open meadow was 219 acres. This gives arable at 28% of the farmed area and grassland at 72%.

The proportions of arable and grassland for the early seventeenth century can be compared with those derived from later surveys. The enclosure of Hatton Moor under the Enclosure Act of 1789 was made in combination with the neighbouring parishes of Hoon and Hatton. In so far as Marston was concerned the effect of the Award was to allow the conversion of the moor into arable. The land use arrangement subsequent to the Award shows as revealed in the Tithe Survey shows 24% of Marston parish to have been in arable and 76% as grassland [see Figure 5.2]. The small change as compared with 1616 is quite striking. At this time virtually all the arable of the early seventeenth century was grass while the former Hatton Moor was now the major block of arable land. Indeed there is clear evidence that farm boundaries had been redrawn after enclosure so that the new arable could be shared. As the nineteenth century progressed the move to arable appears became sharper with the 1870 census showing 17.5% in arable and 82.5% in permanent grassland.

Aspects of the organisation of land can be derived from early surveys in the case of Sudbury parish. 'A complete survey of the inheritance of Lord George Vernon' dated 1659 [Sudbury Estate Office] covers Sudbury itself and the incorporated settlements of Hill Somersal, Aston and Mackley [see Figure 5.3]. The area of the parish coincident with the floodplain of the Dove is described as demesne land and is contiguous with the landscaped park around Sudbury Hall. The tenant farmers of the estate therefore mainly occupied the central and northern parts of the

parish on red marl with some till and thin glacial gravel. The agricultural landscape of these areas was dominated by an intermixture of closes with open field arable. The occupance comprised 58 tenant farms some 75% of which were less than 30 acres in extent. Examples of these holdings were the farms of John Buxton and Edward Madeley which were respectively scattered and compact the details of which are set out in Table 5.3. The predominance of pasture and meadow on all the Sudbury farms in the manner of Buxton and Makeley again underlines the importance of grassland prior even to the eighteenth century. A survey of the Vernon estate dated 1720 [Sudbury Estate Office] shows that by this year all the remaining open field had been enclosed and a new landscaped park had been created on former tenanted farmland to the north of the Uttoxeter - Derby road.

Confirmatory evidence for the early importance of enclosure and putting down to grass is available with respect to Somersal Herbert parish which lies to the north of Sudbury. Soil parent material is again red marl with some glacial gravel and alluvium. The dominance of the Fitzherbert family of Somersal Hall in terms of land ownership was comparable to the Vernons at Sudbury and the Devonshires at Marston. A partial survey of the parish, with small areas of adjacent Marston Montgomery, by Thomas Kirkland in 1725 [Sudbury Hall] enables the mapping of occupance and land use of some 60% of the parish area which has been summarised as Figure 5.4.

At the time of the 1725 survey Somersal parish had been almost entirely enclosed. Fitzherbert owned 90% of the land which was subdivided into 19 tenancies the eight most significant of which comprised between 23 and 95 acres. In each case the holdings were compact in contrast to small freeholders such as Stubbings who occupied scattered closes plus strips in surviving open field arable. Kirkland's map shows clear evidence of a landscape of enclosure. There are characteristic field names such as close, croft and field while fields are elongated in shape with reversed 'S' boundaries. A large 33 acre pasture is called the 'High Field' and group of contiguous fields, Well Ridding, Well Croft, Nathan Well Croft and Well Field suggests the division of an open field of this name.

The aggregation of land use information for eight of the largest farms in Somersal gives 121 acres of arable and 358 acres of grassland or almost an exact ratio of 1:3. This is very close to the proportions identified from the 1842 Tithe Survey of Somersal which are 27% arable and 73% grassland and also the 1870 Agricultural Census of 26% arable and 74% grassland thus suggesting a virtually static situation over at least a one hundred and fifty year period.

Consideration of two further case studies relating to Egginton and Burnaston parishes shows clearly that enclosure by agreement was in progress in the latter eighteenth century only a few years ahead of formal enclosure acts. In Egginton the Everys of Egginton Hall were the dominant landowners but the Poles of Radbourne also had interests. An act for the enclosure of remaining open land in Egginton was obtained in 1791 but was not implemented until 1798 [See Dalton R.T. 1991 p.85]. In 1767 Sir John Every had John Beighton survey his lands in the parish [DLHL Egginton] and Figure 5.5 shows the location of the various fields and closes involved. The detailed mapping of the strip arrangement within the open field arable shows divided ownership between Every and Pole. The pattern of open field arable at this time is fragmented and suggestive of the former existence of more extensive open fields. The widespread occurrence of ridge and furrow is supportive of this view. By the time the Egginton Enclosure Act had been obtained in 1791 all the open field arable identified by Beighton had been eliminated presumably by agreement. The only exception was a large open field known as Heath Flatt which lay within the area of Egginton Heath. At the time of the tithe award in 1839 the proportions of arable and permanent pasture were 25% and 75% and these were unchanged at the 1870 census, a matter to be further elaborated in a subsequent chapter.

In Burnaston parish there were a number of landowners, indeed Woolley in his county history of c1710 described it as a freeholders village. Evidence for enclosure by agreement in the late eighteenth century comes from an estate survey for John Wright [DLHL Burnaston] and surviving Manor Court Rolls [DRO

102-6]. John Wright was a farmer of 59 acres which comprised 43 acres divided into 13 closes and a further 16 acres of open field arable in 19 parcels of strips. Comparison between John Wright's survey and the enclosure map of 1798 shows progress in the elimination of open field arable through the making of closes. For example on the enclosure map three of John Wright's parcels in Top Meadow Field had been combined with adjacent strips to form Stubway Close [See Figure 5.6 and discussion in Amer S and Dalton R T, 1983].

Two entries in the Burnaston Court Rolls from the 1760's also indicate active piecemeal enclosure as a result of problems with the boundaries of recently created closes. An entry for 1765 refers to the hedge and dyke between Manley's Close and Samuel Stone's New close as not being sufficiently hedged. In 1768 the manorial court demanded of Jacob Hardy, William ? and John Salt 'that they make the road from the town down the field against their several enclosures seven yards wide, they having encroached on the road at the time of the making of their enclosures.'

The case studies collectively confirm the observations of Pilkington, Brown etc. It is clear that putting down to grass had its origins deep in the past and had been substantially advanced by the latter eighteenth century. It would appear that for many parishes the balance of land use had been firmly tilted in favour of grassland. The process of enclosure appears as integral to land use change. Parliamentary Enclosure in southern Derbyshire was concerned with residual areas of open field and heath. Table 5.4 lists the progress of such enclosure by decade. The 1760's and 1780's appear as the major decades of activity. The total acreage involved represented 22% of the agricultural area of southern Derbyshire.

The extent to which land enclosed by the parliamentary mechanism represented a fragmented pattern of relict features is illustrated by Figure 5.7 which shows the Doveside parishes. Some 6,130 acres of land was involved which comprised 30% of the agricultural area. Of this acreage 55% was in heath, 30% was open field arable and 14% was meadow / pasture at the time of

enclosure. The heathy areas were made up of large blocks of land such as Egginton Heath [1674 acres], Hilton Common [554 acres], Hatton Moor [360 acres] and Scropton Common [380 acres]. These correlate with gravels or peaty soils. The larger remnants of open field arable lay on the red marl. Small areas survived on the alluvial floodplains where limited tracts of common meadow also occurred.

The motive for enclosure by act of Parliament is revealed in the preambles to the acts themselves. The preamble to the Act for Willington parish [DLHL 4634/ 62] states that in the opinion of the owners and proprietors of open fields, common meadows, common pastures and common wastes and grounds....'are in their present situation incapable of improvement and it would be advantageous to the several persons interested therein if the same were divided and enclosed'. Similarly for Doveridge the Act [DLHL 4634/13] indicates that 'there are within the parish of Doveridge several common fields, common pastures and waste lands which in their present state are incapable of any improvement'. The Act for Marston on Dove which also included Hatton and Hoon parishes [DLHL 4655/9] gives a clear view as to the improvement which might be intended as 'lands in crop at the time of enclosure shall be put down to grass'.

The various enclosure commissioners were concerned with other aspects of rural improvement in that they defined roads, carriageways and footpaths and earmarked patches of gravel bearing land for the use of officers of highways. They also concerned themselves with minor drainage adjustments as illustrated by Figure 5.8 with respect to parishes bordering major rivers such as the Dove and the Trent. In Egginton parish the Brook Drain was cut in order to overcome long standing problems of flooding associated with the course of the Egginton Brook. The enclosure of Hatton Moor was accompanied by the cutting of a drainage system across the Moor and thence to the Hilton Brook, the meandering course of which was also straightened.

The virtual completion of the enclosure process in southern Derbyshire by the end of the eighteenth century coincides with

the compilation of the 1801 Crop Returns. If the need is to establish the proportion of land under arable this is a highly problematic data source as has been discussed by Turner [Turner M E, 1981]. The Returns were a survey of crops, particularly grains, on a parish basis and therefore excluded fallow and rotation grass which are components of arable. Moreover there is no reference to pasture or meadow so that the agricultural area of a parish cannot be calculated. The best that can be achieved is to use the parish areas as first given in the 1831 census of population and to make an estimate as to the non agricultural area of parishes and the amount of land in fallow and rotation grasses. In addition the coverage of the Returns is far from complete and data is only available for 35 southern Derbyshire parishes. Figure 5.9 is based on the Crop Returns and is simply a plot of cropland against non cropland. In all cases the proportion of cropland is substantially in the minority which in itself is significant as pointer to the arable area being generally less than that in grassland. An approximation to the actual parish figures for arable might be based on the subtraction of some 10% for the non agricultural area and the addition of a further 25% of each cropland acreage to allow for fallows and rotation grass. A parish credited with 20% from the Returns would therefore have about 28% of its area in arable. It is not possible to use calculations of this kind as a basis of comparison and the significance of the Returns is simply to indicate the degree to which putting down to grass had progressed.

The principal data source for land uses prior to the agricultural census in the 1860's are the surveys carried out by the Tithe Redemption Commissioners. These enable land use to be identified at a parish level and also on a farm by farm and field by field basis within parishes. Data is available for 43 parishes in southern Derbyshire and has been used to calculate the relative proportions of arable and grassland for the 1840's at 30.5% arable and 69.5% permanent grassland. Figure 5.10 is a plot of parish data and shows that a wide range of situations existed. Some parishes like St Werburgh on the edge of Derby town had no arable at all. Others such as Catton and Croxhall in the far south of the county had over 50% in arable but the most

usual situations were those where arable occupied between 18% and 45% of the farmed area. Parishes dominated by red marl tended to have higher proportions i.e. about 35% while those incorporating extensive tracts of floodplain tended to be at the lower end of the range at 25% permanent grassland. On a farm basis it is apparent that holdings of 30 acres or less were entirely in grass.

If it can be accepted from the Tithe surveys that the basic division of land use in southern Derbyshire approximated to 30% arable and 70% grassland then a useful comparison can be made with agricultural censuses of the latter nineteenth century. A detailed analysis of census data for the whole of the study area has been carried out for the census of 1870. The results confirm that the proportions of arable to permanent grassland had remained unchanged at 30% and 70% respectively. Figure 5.11 shows a mapping of the pattern and proportion of grassland in 1870 by parish. The highest values of 70% and over are concentrated in a broad block of parishes to the west of Derby on the red marl and extending into Staffordshire. Lower proportions i.e. less than 50% and in some cases below 40% permanent grassland occur in the south and east of the area. It is useful to relate the pattern for 1870 shown on Figure 5.11 with the change in total grassland as a percentage of the farmed area which took place between 1870 and 1895 as mapped by Tomson [Tomson G.A. 1986 p.123 et seq and Figure 5.12]. He has calculated an approximate 10% transfer from arable to pasture over this period. It is evident therefore that the stability in the arable/permanent grassland ratio which appears to have occurred between the 1840's and 1870 gave way to a greater emphasis on pasture in the changed economic climate of the 'depression' years.

In summarising the discussion of land use trends it is evident from the dominant position of grassland that southern Derbyshire as a whole conformed with the expected adjustments characteristic of the claylands. Localised exceptions to this pattern existed however where light land occurred. It would seem that grassing down had been achieved prior to the study period to a considerable degree and in some parishes this was the case

as early as the early seventeenth century. The statistical evidence from the nineteenth century suggests that relatively little further change took place until the latter decades. Given that the most important livestock based farm enterprise was dairying the move to grass implies that this form activity was strengthened in terms of the provision of essential grazing and mowing land. A major aim of succeeding chapters will be to elaborate the character of livestock based enterprise and the associated provision of feed. In so doing it will be important to keep in mind the 30% of land which was in arable in the middle decades of the nineteenth century. This is no small proportion and is indicative that for the majority of farmers the products of tillage other than fodder remained important.

Ownership and Occupation of Land and the Value of Farmland

In the further analysis of the evolution of farm systems practiced in southern Derbyshire it is important to consider the structural characteristics of the agrarian scene namely the relationship between owner and occupier (i.e. between landlord and tenant), the size of farms and related aspects of farm shape and degree of fragmentation. All of these matters influenced the decisions made by farmers in their attempts to achieve their objectives.

The pattern of ownership and occupation of land emerges as complex and to a degree dynamic. Land ownership was dominated by estates and analysis of tithe surveys indicates that some 90 % of farmed land was rented from estates. In discussing Derbyshire in the early seventeenth century Craven and Stanley indicate a variation from modest estates of about 400 acres to those of 5000 acres or more with the smaller estates concentrated in the south and east of the county [Craven M and Stanley M, 1991 p.11]. Seemingly the eighteenth and ninetenth centuries saw some enlargement of estates but even so it appears that the character of land ownership in southern Derbyshire did not change radically, small estates remaining predominant. Implicit support for this view comes from Bateman's survey of 1872/3 which shows only a few substantial estates within the study

area centred at Bretby, Calke, Elvaston, Radbourne and Sudbury with land in adjacent parishes. Substantial parts of some parishes formed elements of estates largely located outside the study area. Church Broughton and Marston on Dove for example were part of the Chatsworth Estate of the Duke of Devonshire while Sutton on the Hill was owned by the Chetham's Hospital in Manchester. The prevailing situation was relatively simple with single parishes where one landowner was dominant such as at Ash, Longford and Egginton and whose lands were divided amongst small tenant farmers. It follows that the majority of parishes displayed much of the character of closed parishes [see Holderness B A, 1972]. There were few parishes like Hilton which had relatively large populations and numbers of owners where the owner / occupier relationships were more complex.

Farey indicated that the conventions between landlord and tenant in Derbyshire placed few restrictions on the conduct of farming [Farey J, 3 1817]. Later in the nineteenth century however Druce commented on agreements customary in the south of the county which related to the management of feed and clearly underlined the significance of feed in the farm system [Druce S B L, BPP 1880-2 p.23]. Conditions of tenancy restricted the sale of hay, roots and straw except with the permission of the landlord. It was also required that the quantity of grassland on farms be kept up and that 'should an outgoing tenant leave less land in grass on his farm than there was when he entered the custom requires him to pay compensation to the incoming tenant'. In the south west of Derbyshire close to Burton outgoing tenants received 'one half of last years cake bill and one third of the year before'.

Such arrangements apart the best documented aspect of landlord/tenant relationships are records of rent with their indications of the relative worth or productivity of different types of land and changes in the value of land. From the landlord's viewpoint rent was a major way of realising income from investment in land. For the tenant rent was an important outgoing but the landlord if so moved could provide a cushion against the vagaries of the market in the form of abatement. At a national level the findings of Chambers and Mingay concerning

the movement of rents during the late eighteenth and nineteenth centuries has aleady been referred to in the previous chapter [Chambers J D and Mingay G E, 1966 p.167 and Figure 4.10]. Beckett [Beckett J V, 1989 p.620] confirms the pattern of rent movement proposed by Chambers and Mingay. The particularly steep rise in rents, which followed the rapid advances in prices during the period of the Napoleonic conflict, was apparently not even. Beckett suggests that it was particularly noticeable that rents rose at above the average when enclosure took place. Rents also seemingly rose across the predominantly pastoral counties as well as the arable east. The fall in agricultural prices which occurred in the 1820's and on into the 1830's was accompanied by depressed markets hence there was a concurrent fall in rents but not to the same extent as price movements. Beckett affirms that during this period arable areas suffered more than pastoral. The widespread difficult economic circumstances which affected many farmers at this time, however, led to the agreement of landlords to abatement of rents. Generally the greater value of livestock products per acre led to pastoral districts being more highly rented than arable. In 1852 Caird [Caird J, 1852] suggested an average of 31/5 pence per acre in pastoral areas as against 23/8 pence in arable areas. The relatively high valuations for grassland which will be demonstrated below is in line with Caird's findings and a further indicator of the significance of grassland in the general farm economy of southern Derbyshire.

Contrasts in rental for lands of different character are evident from investigations within the southern Derbyshire area. It is however far less easy to demonstrate trends in rents through time as a result of patchy and inadequate data derived from estate papers which generally list names and amounts due but not the farm acreages involved. Much of the useful material dates from the depressed years of the 1830's. Smith of Swarkestone [Smith W, BPP 1833] confirms that this was a time of difficulty for southern Derbyshire farmers despite the predominance of pastoralism. The extent of grain growing was evidently at a scale to have adversely affected total farm incomes at the time of low prices. Smith reported rent abatements of the order of 5% to 10% in southern Derbyshire 'but that they are very much

oppressed by those rents'. Specific evidence of abatement comes from surveys of Chatsworth Estate farms in southern Derbyshire for 1832 [CA] and Sudbury Estate Rentals for 1830-1835 [DRO Vernon Coll.]. Chatsworth farm rents at Church Broughton, Hatton and Marston on Dove were discounted at 13%, 8% and 14% respectively. At Sudbury the discount was of the order of 7%.

Variation in rent per acre on these farms reflects the environmental character of land and its use. On the peat and gravels of former Hatton Moor and Hilton Common rentals ranged from 24/- to 28/- an acre for arable land while old turf on red marl at Church Broughton, Rodsley and Hollington ranged between 30/ and 36/- an acre. Highest rents were associated with riverside meadows. Doveside lands were rented as 58/- an acre at Sudbury and at 60/- at Scropton. Good quality pasture lands on the flood plain margins were valued somewhat less at 48/- at West Broughton and 50/- at Marston on Dove.

A comparable range of relative values is apparent from farm valuations for the Mosleys of Burnaston Hall [DRO D 2375 86/9]. In 1839 Broomhill Farm at Etwall showed values of 22/- for land on the gravels of the former Egginton Heath which was noted for its poor substratum, average grazing land was 38/- and a water meadow by the Etwall Brook in Etwall known as the Bancroft fetched 63/-. In the same year Conygreave Farm on the gravels of Etwall Common averaged 27/- an acre but by a survey of 1857 the average rent for this land had risen to 33/- an acre. A further survey from the same locality of Samuel Bailey's tenancy at Burnaston in 1864 also points to rising rents with arable being valued at 38/- and meadow land at 60/-. In this instance specific remissions were given for buildings being thatched and in poor condition of 12/- and for 64 acres 'being distant' of £16.

The inference from the data elaborated suggests an upward movement in rents particularly in the latter part of the time period under consideration when prices have been shown to have been moving strongly upwards. However the analysis of Schedule A/B income tax assessments offers another route into the study of possible change in the value of land through time. A key

proviso discussed in Chapter 2 is that the assessments were made on a reasonably comparable basis. The three years for which assessments are available should reflect the prevailing economic circumstances of the time. The year 1814 was a time of downward adjustment at the close of the wars in Europe and elsewhere while 1842 was in the intermediate period between depression and the prosperity of high farming. By 1859 the impact of high farming should have been evident in land values as it appears it might have been in the data for Burnaston parish considered above. Table 5.5a shows relative total assesssments for England and Wales and for selected counties which would reflect industrial/urban considerations as well as agricultural change. Variable percentage changes are apparent between 1814 and 1842 but the overall impression is of strong upward movement. From 1842 to 1859 little clear change is evident and in the cases of Derbyshire and Staffordshire the drift is negative. Table 5.5b based on all rural parishes in southern Derbyshire and follows Grigg's approach of calculating assessment in relation to acreage [Grigg D B, 1962 and 1965]. The calculations match the findings at county level very closely indicating a positive difference in value between 1814 and 1842 followed by modest decline to 1859. In all three calculations the standard deviations are large indicating wide variations between individual parishes. For some parishes the decline to 1859 is quite sharp so that for Marston Montgomery, a red marl parish, the asssessment for 1859 was 25% less than for 1842. The positive movements from 1814 to 1842 are interesting in that they appear point to advance in value during a period noted for difficulty for farmers. The inference is that the comparability of the asssesment may not be so clear as has been previously argued.

Farm Size

Mingay [Mingay G E, 1989, p.948] has argued that the difficulties encountered in the study of farm size are reflected in and are also a result of the general lack of work on this topic. He has indicated that research carried out on farm size to date gives only a very limited indication of the extent of the change which took place and may not be representative. For

the early nineteenth century he suggests that a useful and acceptable classification of farms would be to regard those of less than 100 acres as small, farms of 100 to 299 acres as medium and farms of 300 acres and over as large. This is in accord with the perception of Derbyshire and Leicestershire agriculture projected by Farey and Pitt respectively. It is also in line with the categorisation indicated by Druce for later in the century [Druce S B L, BPP 1880-82 p.22].

In summarising evidence for trends in farm size at a national scale Mingay [Mingay G E, 1989, p.950] states his belief that important changes took place between the mid eighteenth and nineteenth centuries. 'There can be little doubt that the situation reached in 1851 had developed over a very long period, and that almost certainly an important phase towards larger units had occurred over the previous hundred years'. The kind of evidence invoked to support this view can be illustrated by reference to the work of Wordie [Wordie J R, 1974] with respect to the Leveson Gower estates in Staffordshire. He has shown that in the early eighteenth century 19% of tenant farms were larger than 200 acres. By the 1830's however this proportion had risen to 60%. Apparently enlargement worked in favour of better farmers while it was those who were less successful with smaller farms who emerged as the most vulnerable. Beckett [Beckett J V, 1984 p.1 et seq] suggests however that the landlord/tenant relationship tended to preserve stability with respect to farm size on many estates. Landlords may have perceived operational benefit in encouraging a movement to enlarge holdings but the prospect of a possible concurrent reduction in rent may have inhibited such an aim.

The issue of the extent and nature of any increase in farm size has also been considered by Grigg [Grigg D B, 1989 p.111]. He refers to a belief amongst agricultural commentators of the times that, in combination, enclosure and technological development were the forces which lay behind the trend to increase farm size. Grigg attempts to summarise the national situation by indicating that it seems agreed that there was a decline in the number of small farms and a growth of large farms and whilst parliamentary enclosure may have often caused the

demise of small farms, amalgamation also went on in areas which had long been enclosed. Despite the recognition that farm enlargement had long been in progress it is clear from the data to be derived from the 1851 census that the small farmer was still very much in evidence at this time. Tabulations at a national level [see Table 5.6] show that farms between 0 and 99 acres comprised 62.5% of all farms but that collectively these farms accounted for only 21.7% of the total agricultural land. Farms of the medium size range of 100 to 299 acres made up 29.7% of all farms but were associated with 44.7% of the national agricultural area while holdings in excess of 300 acres made up just 7.8% of all farms but accounted for 33.7% of all agricultural land.

The questions for southern Derbyshire which emerge from this discussion are the extent to which the regional situation was comparable to that which prevailed nationally both in terms of the range of farm size and the likelihood of a trend towards larger units. The key problem is lack of comparability between data sources which as will emerge demonstrate that southern Derbyshire was characterised by small farms and that there was variation in the range of farm size across the region but do not facilitate the discovery of clear trends in farm size. The only way forward is to attempt analysis at parish level using a combination of Tithe Surveys, Estate Surveys and the Land Tax Records where such exist and also the 1851 census material. The consequent problem is to determine the extent to which limited if closely worked case studies are characteristic of the whole area.

In common with the available national data the earliest listing of the size of holdings across the study area which is remotely accurate is from the population census of 1851. This census was unique in that farmers were required to declare the acreage of their holding although smallholdings were under recorded. It does provide a basis for comparison with data from the 1870 agricultural census but unfortunately the latter deals in size classes with all farms greater than 100 acres grouped together which limits its usefulness hence the need to refer to the more helpfully categorised 1880 census. Other sources although

diverse in character offer some scope for comparison for earlier years include the views of commentators such as Farey, the Land Tax records covering the period 1780-1832, the parish based tithe surveys for the 1840's and documents from major estates. Collectively there is sufficient coverage to allow some conclusions to be drawn even if they are somewhat tentative.

Farey [Farey J, 2 1815 p.25-6] commented that most Derbyshire farms were between 100 and 300 acres in extent and during his tour of the county discovered few farms greater than 400 acres. It may well be significant given the more diverse agriculture that was practiced that of twelve large farms listed by Farey eight were located in southern Derbyshire to the south of the Trent, the remaining four being in the Peak. The largest of the eight was located at Lullington and exceded 600 acres. The other seven farms were all over 400 acres in extent and were at Walton on Trent, Croxall, Drakelow, Newton Solney and Foremark [three farms]. Pitt [Pitt W, 1809] provided a broad categorisation of Leicestershire farms. In his view farms under 100 acres were often occupied by tradesmen and manufacturers implying that there was benefit to such groups in having access to land. The average or 'more general size of farms' was between 100 and 200 acres while farms from 200 to 300 acres were in the hands of the principal breeders. Broad categorisations of this kind are useful in that they indicate clearly the perceived significance of the farm between 100 and 200 acres in the first decade of the nineteenth century.

Farm size data for southern Derbyshire, extracted from the 1851 census of population, has been incorporated into Table 5.7. The average size of farm in southern Derbyshire has been calculated at 117 acres which is too large probably as a consequence of the undercounting of small holdings by the census enumerators. The table does show however that the greater proportion of farmland, amounting to 26% of the total, was accounted for by farms of between 150 and 199 acres. This indicates a typical farm size for the area but if southern Derbyshire is compared with the medium size category of 100 to 300 acres suggested by Mingay then in 1851 46% of its farms related to 66% of the

farmland with a distinct bias towards the lower end of the size range. The most numerous farms in southern Derbyshire were those of 99 acres or less where half the farms related to just 20% of the agricultural area. This position is confirmed by analysis of the 1870 census but is made more clearly by data from 1880 which offers a retrospective view. Table 5.8 shows that in 1880 47% of land was farmed in units of less than 100 acres, a further 41% of land was farmed in holdings which were 100 to 300 acres in extent thus leaving 12% of land in large farms. The largest category of farm size was for farms of less than 50 acres which comprised 83% of all farms. The overwhelming predominance of small farms is very much in keeping with the pastoral/family farm tradition of southern Derbyshire so that relative to the national scene there were few farms in excess of 300 acres. There is some evidence that the numbers of smallest holdings diminished from the mid nineteenth century onwards. Murray [Murray G, Ag G, 28.3.1874] commented that: 'a few years ago there were in this part of the country many holdings of from 2 to 6 acres, these are rapidly disappearing....owing to the high price of stock few had sufficient capital to purchase a cow or two'. He related this trend to labour availability discussed in the previous chapter: 'in years gone by these small holdings were of great value as a nursery for agricultural labourers, now all is changed and the children of the cottage prefer the factory to the farm or genteel poverty to healthy and happy labour'.

A further aspect of farm size characteristics is their potential relationship with environmental variations in southern Derbyshire. Table 5.7, based on 1851 census data at parish level, shows that the red marl country to the north of the Trent approximates to the situation for southern Derbyshire as a whole. There are few farms greater than 300 acres and these account for just 3% of the area. The major part of the farmland some 78%, was in holdings of between 100 and 299 acres and these comprised 52% of the total. The most numerous category of farms were the small farms with 47% at 99 acres or less. Small farms emerge as particularly characteristic of the shale and coal measure country to the north of the red marl. Here the average size of farm is calculated at 71 acres but with 76% of all farms

being recorded at less than 99 acres in area. These accounted for just under half of all farmland. By contrast to the south of the Trent larger farms are of far greater importance so that 13% of farms were over 300 acres in extent and these comprised 34% of farmland. Table 5.7 indicates that south of the Trent the distribution of farm size in relation to area is biomodal so that the 150 to 199 acre category is also important with 23% of farmland. Farey's identification of a cluster of larger farms in this area thus appears to have persisted through to the 1850's. In all there emerges a reasonably consistent picture of farm size for the latter part of the study period with the 1851 census indicating variation across southern Derbyshire and Farey's earlier observations hinting at little in the way of fundamental change.

Attempts at parish level to reach back earlier than the 1851 census lead initially to the Tithe Surveys of the 1840's. Table 5.9 seeks to compare the analysis of Tithe Surveys with the 1851 census for the same parishes. The Tithe Surveys show a larger proportion of smaller holdings than the 1851 census which confirms suspicions as to underrecording at the lower end of the size range in the census. It is however the sharp differences in numbers of farms in the categories in excess of 150 acres which cast the greatest doubt upon the accuracy of the data. The implication of a substantial increase in the number of larger holdings over a short time period is difficult to accept. It is however interesting to note that in the case of Etwall parish a tithe survey for 1849 gives an exact match with farm sizes recorded in 1851 so there is good cause to have confidence in the data in at least this instance.

Despite such difficulties it is also interesting to relate back to earlier data as revealed in the Land Tax records. Spanning the period 1780 to 1832 it has been suggested that the Land Tax can be helpful when cross referenced with other sources which give precise information so that the sums assessed for tax canbe matched with actual areas of land occupied. Another line of approach based on the Land Tax is to compare the numbers of land owners/occupiers who were significant contributors to the parish tax liability at the beginning as against the end of the

record sequence. This procedure will provide some indication of change in the number of substantial farmers. Data which have been prepared in this manner for selected parishes are presented in Table 5.10. The analysis of land tax records by the author suggests that a tax liability of £1 might be taken as a critical value for the elimination of small occupiers of land, cottagers and tradespeople whose connection with farming may have been marginal at best. With respect to the parishes studied £1 of tax can be broadly equated to 25 acres of land occupied. Table 5.10 shows that three outcomes are possible from this simple analysis. There are parishes such as Etwall, Hilton and Willington where the number of taxpayers with liability greater than £1 declined, thus implying that collectively a smaller group of people occupied the same area of land but in larger holdings. By contrast Findern and Sudbury parishes both show an increase in taxpayers above the critical value. In the case of Findern this is but modest but for Sudbury the increase is considerable. The situation in Sudbury is accounted for by the remodelling of the landscaped parkland of the Vernon estate, which took place around 1800 and which released more farmland to the tenantry. Overall, however, average farm size in Sudbury was reduced over this period thus underlining the complexity of the general problems of size. A third category of parishes, such as Ash, Sutton on the Hill and Somersall Herbert showed stability. These are all small parishes, in which the predominant land owning family could sustain a policy of no change and thus create continuity in land occupance and farm size.

Two of the parishes listed in Table 5.10 Marston on Dove and Egginton, have a number of surviving estate surveys which can be matched with the Land Tax record. Both parishes contained tracts of unenclosed commonland and smaller areas of arable and meadow which were enclosed by Act of Parliament in 1789 for Marston on Dove and 1798 for Egginton [see Dalton R T, 1991]. As case studies consideration of these parishes is instructive.

The ownership of land at Marston on Dove was divided between the Duke of Devonshire who held 91% and the church glebe of 9%. Estate surveys for 1771, 1818 and 1852 (CA) have been combined with the Tithe Survey and award of 1839 and the population

census of 1851 to achieve some analysis of the Land Tax record between 1780 and 1830. The parish population showed little change between 1801 and 1861 at around 100 persons and thus remained very small in the manner of a closed parish [See Holderness B A, 1972]. Figures 5.13 (a) (b) and (c) represent three plots of land tax against known acreages of farms occupied. For 1818 the year and the tax record can be matched exactly but for 1771 and 1832 the nearest year in the sequence is taken. The 1818 x 1818 and 1840 x 1832 plots show a strong relationship between the two sets of records. The 1771 x 1780 plot is less clear. Figure 5.14 is an attempt to summarise the data derived from all the sources and to show the occurrence of a small decline in the number of farm tenancies from 11 in 1780 to 7 in 1852. It is apparent that adjustments to the area of land covered by tenancies took place resulting in enlargement of the holding. The average farm size in the parish is thus increased from c.100 acres in 1780 to c.140 acres in 1852.

The neighbouring parish of Egginton is larger, 2406 acres as compared with Marston's 1003 acres, and was more populous 360 inhabitants as against 100 at the 1801 census. The ownership of land was again dominated by one family. In 1780 the two principal owners were the Every's of Egginton Hall and the Poles of Radbourne plus a few minor owners. Soon after the implementation of the Enclosure Award in 1798 the Pole family sold out to the then Sir Henry Every. Data from an estate survey of 1827 [DR0 2375] shows that there was a strong relationship between tax assessment and acres occupied [see Figure 5.16]. Only Sir Henry Every's home farm plus hall and pleasure grounds do not conform with the general pattern clearly as a consequence of the greater value put upon these particular features. Post 1830 land tax records can be matched against the tithe award data to show a similar direct relationship. Figure 5.16 represents a combined plot of the land tax records for Egginton parish which should be compared with Figure 5.17 which shows farm acreages. The implications of the changes in the pattern of the plot of Land Tax between each decade is that adjustments of liability took place for whatever consideration, including farm size. Overall the number of tenants paying more than £1 remains broadly constant but within narrow limits. This situation is

matched by the number of larger holdings of over 100 acres in subsequent estate surveys. By the 1890's the number of such holdings had become less but by then the area of land was also less as the Everys sold off the former Egginton Heath lands to Burton Corporation for sewage disposal. Farm acreages may therefore have varied through time within Egginton parish but the number of farms remained more or less constant and there is no clear evidence of the emergence of a relatively small number of larger farms.

The discussion of trends in farm size is essentially inconclusive. There appears to have been distinct variation between parishes so that for some it can be demonstrated that fewer larger farms did emerge but for others a state of still stand for part if not all the period 1770 to 1870 was the norm. No overall move to larger units emerges although it does appear that the number of smaller farms may have diminished. The implication is that for many southern Derbyshire farmers the matter of increasing productivity was to be achieved through a degree of intensification of activity rather than the progressive management of larger areas of land.

An additional structural feature of the farmscape which would be likely to influence farm efficiency and therefore the profitability of farms was the extent to which they were arranged as contiguous units or comprised a number of fragmented patches of land. Data derived from the mapping of Tithe surveys shows that while a majority of farms were organised as single units a considerable number were fragmented. In some parishes comparison between patterns of fragmentation and patterns of agricultural environment appear to reflect rational estate policies. In Marston, Egginton and Burnaston parishes there is clear evidence of individual farms being arranged to incorporate land of different character. This resulted in elongated holdings in the case of Marston and fragmentation in Egginton and Burnaston.

A case study of the more extreme form of fragmentation is provided by Burnaston parish. Figure 5.18b shows the land holding pattern of the two largest farms in the parish. Both

farms comprise eight separate areas of land. Comparison with land use [Figure 5.18a] shows that the fragmented arrangement enabled the inclusion of a range of agricultural possibilities Within the boundaries of these farms. Comparable fragmented arrangements are revealed in the survey of Egginton parish. Of the fourteen farmers whose holdings were larger than 50 acres only one occupied an unfragmented land area. Eleven farmers had three or more discrete parcels of land but the greatest level fragmentation involved eight parcels. The agricultural environments of Egginton comprise extensive riverine tracts and light land on fluvio-glacial gravels.Prior to the implementation of Parliamentary, enclosure in 1798 the latter formed part of Egginton Heath . The analysis of the Tithe Survey shows a strong correlation between soil conditions and land use with the riverine lands being in meadow and pasture while the gravels were in arable. The larger farms show a common pattern of organisation in relation to land use and soil so that the various parcels held by each farm enable access to both meadow and pasture and also arable. Such an arrangement would be driven by the policy of the Every Estate and a comparable situation prevailed in the neighbouring parish of Marston on Dove through the Devonshire Estate. The enclosure by act in 1789 of the common known as Hatton Moor, which extended into the north west of this parish enabled the Devonshire estate to review the organisation of the tenant farms in Marston as described above [see Figure 5.2]. The area of the former moor is mapped by the British Geological Survey as alluvium but was described by Farey [Farey J, 1 1815] as peaty in character. After enclosure it was converted into the main block of arable land in the parish. The new farm shapes were devised so that the boundaries took in part of Hatton Moor and then extended across the Dove flood plain, which is a major element of the Marston parish landscape.

The potential to incorporate land types of different character within farm boundaries as occurred at Egginton and Marston was not always realised however. The parish of Etwall, which lies immediately to the north of Egginton, included a share of the gravel based Egginton Heath in combination with 'red marl' and glacial drift based soils. While under the Etwall enclosure award of 1798 the common lands of the heath were substantially

made over to the Cottons of Etwall Hall a number of other land owners with common rights also received allocations. This fragmentation of ownership of the former common was taken a stage further when in 1827 [DRO D2375 86/18] the Cotton's sold the estate in order to resolve financial difficulties. The situation now existed whereby A N E Mosley, who was building a small estate of his own based upon a newly erected Hall in adjacent Burnaston parish, could aquire more land and enlarge his tenant farms. These were single units whose land was entirely gravelly in character.

Other parishes also show a predominance of farms organised as one unit of land. Three adjacent parishes of Doveridge, West Broughton and Somersal Herbert have two thirds of farms of this character. The smaller parishes of Ash and Sutton on the Hill also show a majority of non fragmented farm units. A common factor with respect to these five parishes as compared with Etwall, Egginton and Marston is their enclosure prior to the mid eighteenth century combined with greater uniformity of agricultural environment.

In cross referencing the key aspects of the themes discussed above the predominance of permanent grassland in the pattern of land use is a significant overriding feature. Indeed it will be shown that the grassy image of southern Derbyshire was even sharper when the extent of temporary grassland within the arable system is identified. The importance of grassland is further underlined by the greater value given to it in the assessment of rent and although rentals increased as the nineteenth century progressed the differential between arable and permanent grassland was sustained.

The essential features of the use of land so identified needs also to be considered in the context of the discussion of farm size. In terms of numbers small farms of less than 50 acres have been shown to have been dominant but only accounted for a quarter of the farmed area. However it is clear from analysis of some 120 farms identified in the tithe surveys that farms of less than 30 acres had no arable and those less than 50 acres and greater than 30 acres had but a minimal area of arable. It

follows therefore that the 30% of the agricultural area of southern Derbyshire in arable was distributed amongst the larger farms which occupied approximately 75% of the area farmed. Consequently the proportion of arable on farms larger than 50 acres averaged 40%. The significance of arable in the farm system as operated on these larger units was therefore greater than the regional average of 30% suggests. Moreover consideration of fragmentation of holdings indicates that in appropriate circumstances larger farms were deliberately arranged to gain access to land with differing potential. It follows that the system operative on the small all grass holdings must have been relatively less complex than that which could be developed on farms greater than 50 acres in extent.

It has been shown that trends in farm size are difficult to determine and while there may have been some elimination of small farms it appears that no clear regional move to larger farms developed during the period 1770 to 1870. The continuing predominance of the small family farm is evident from Druce's comments in 1880 [see Druce J B L, BPP 1880-2] and also from Bond's analysis of half a century later in the 1930's [see Bond J, 1932]. Even though small farms dominated the southern Derbyshire scene it is also clear that the natural environment was influential particularly at the margins of differing geological/soil situations. Farm shape and degree of fragmentation were so influenced while at wider scale the clays and shales supported smaller farms than the red marls which in turn were characterised by farms smaller than on the varied geology south of the Trent. Agriculture in this as in other senses emerges as environmentally sensitive, a theme to be further considered in the discussion of land improvement in the next chapter.

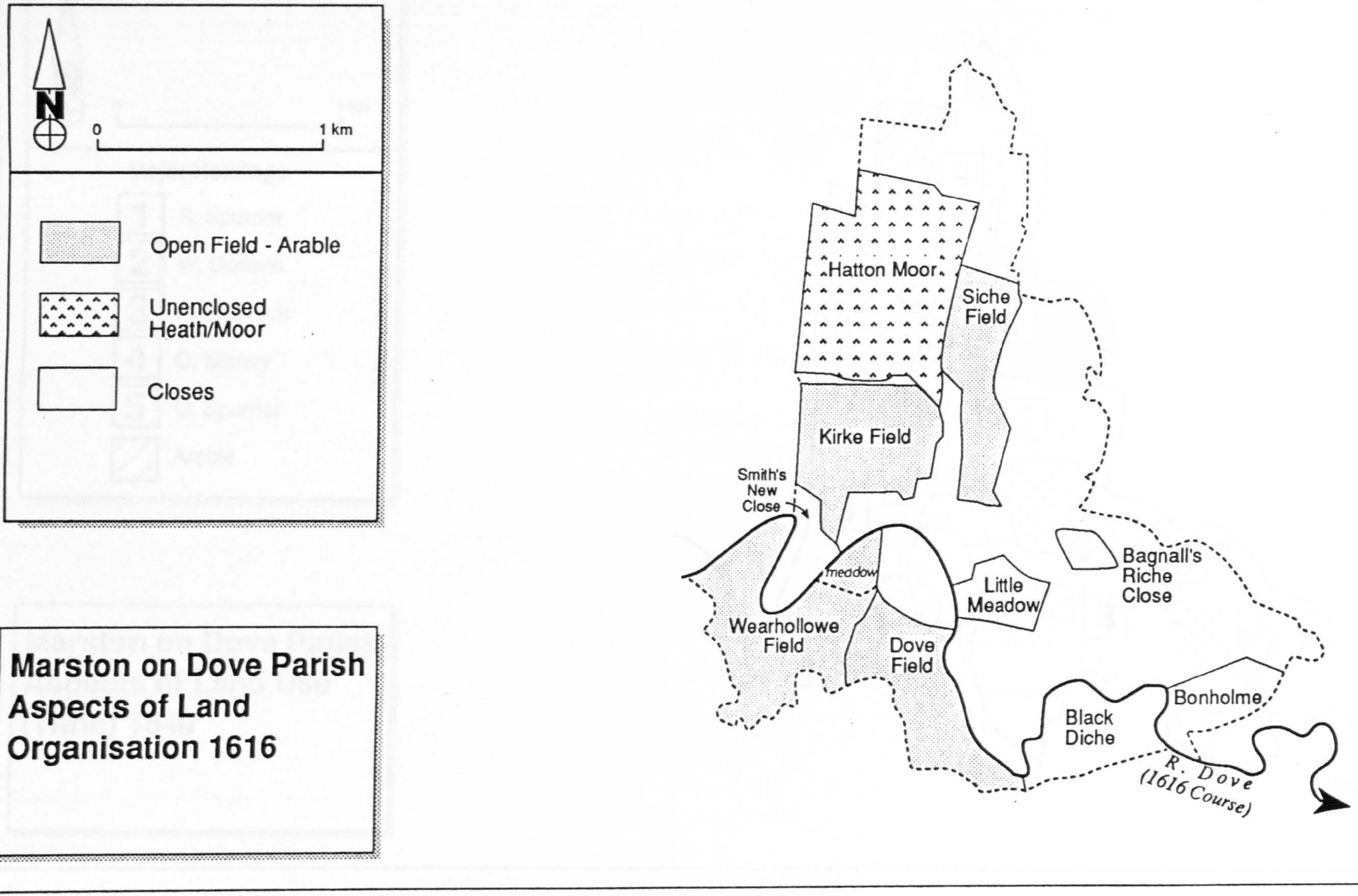


Figure 5.1 *(based upon William Senior's Survey for the Chatsworth Estate)*

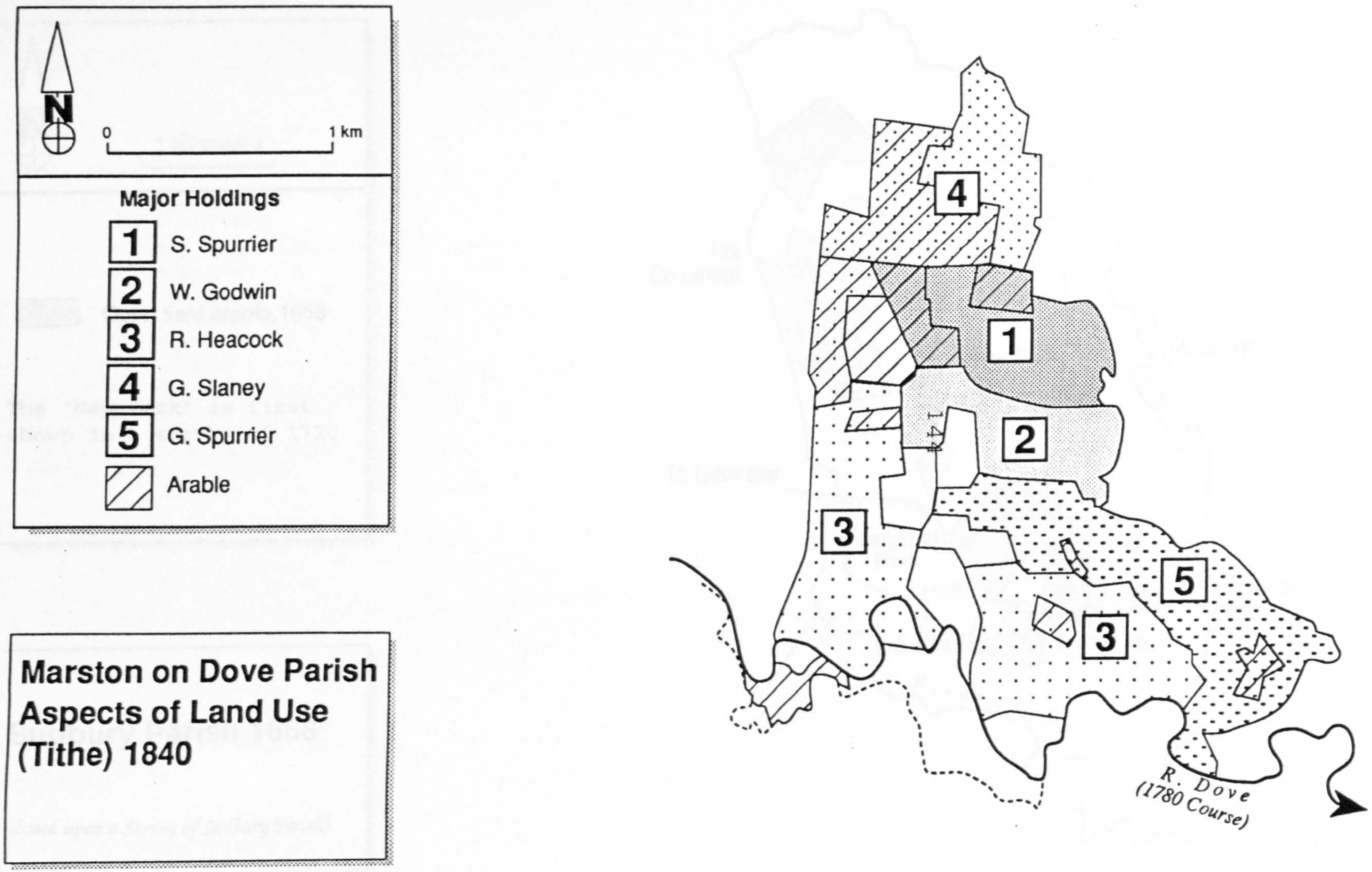


Figure 5.2 *(based upon Tithe Award Schedule)*

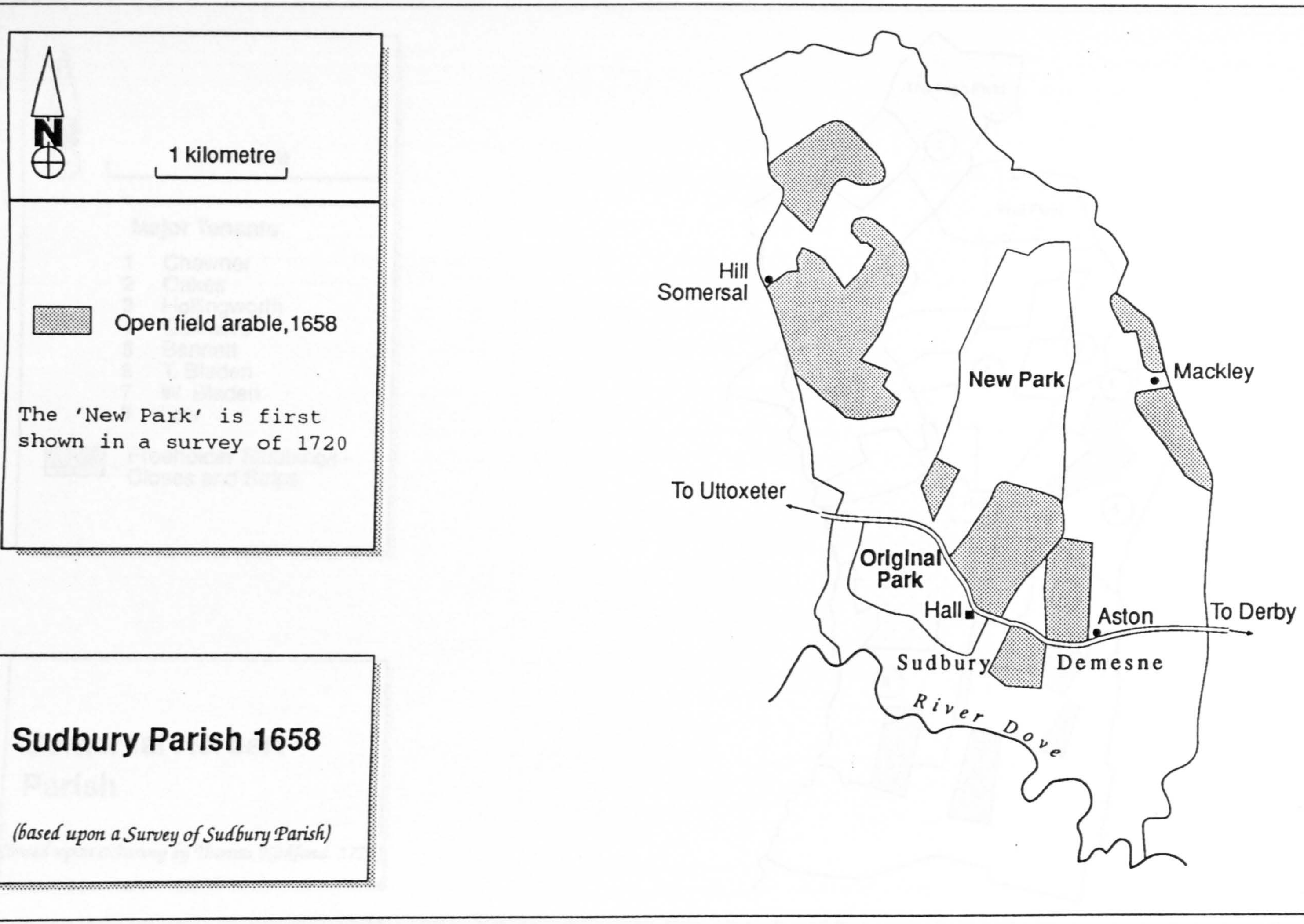
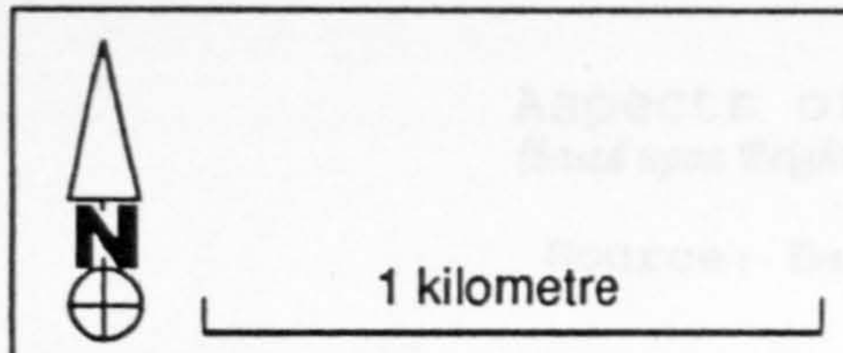

N
1 kilometre
Open field arable,1658
The 'New Park' is first shown in a survey of 1720
Hill Somersal
New Park
Mackley
To Uttoxeter
Original Park
Hall
Aston
To Derby
Sudbury
Demesne
River Dove
Sudbury Parish 1658
(based upon a Survey of Sudbury Parish)

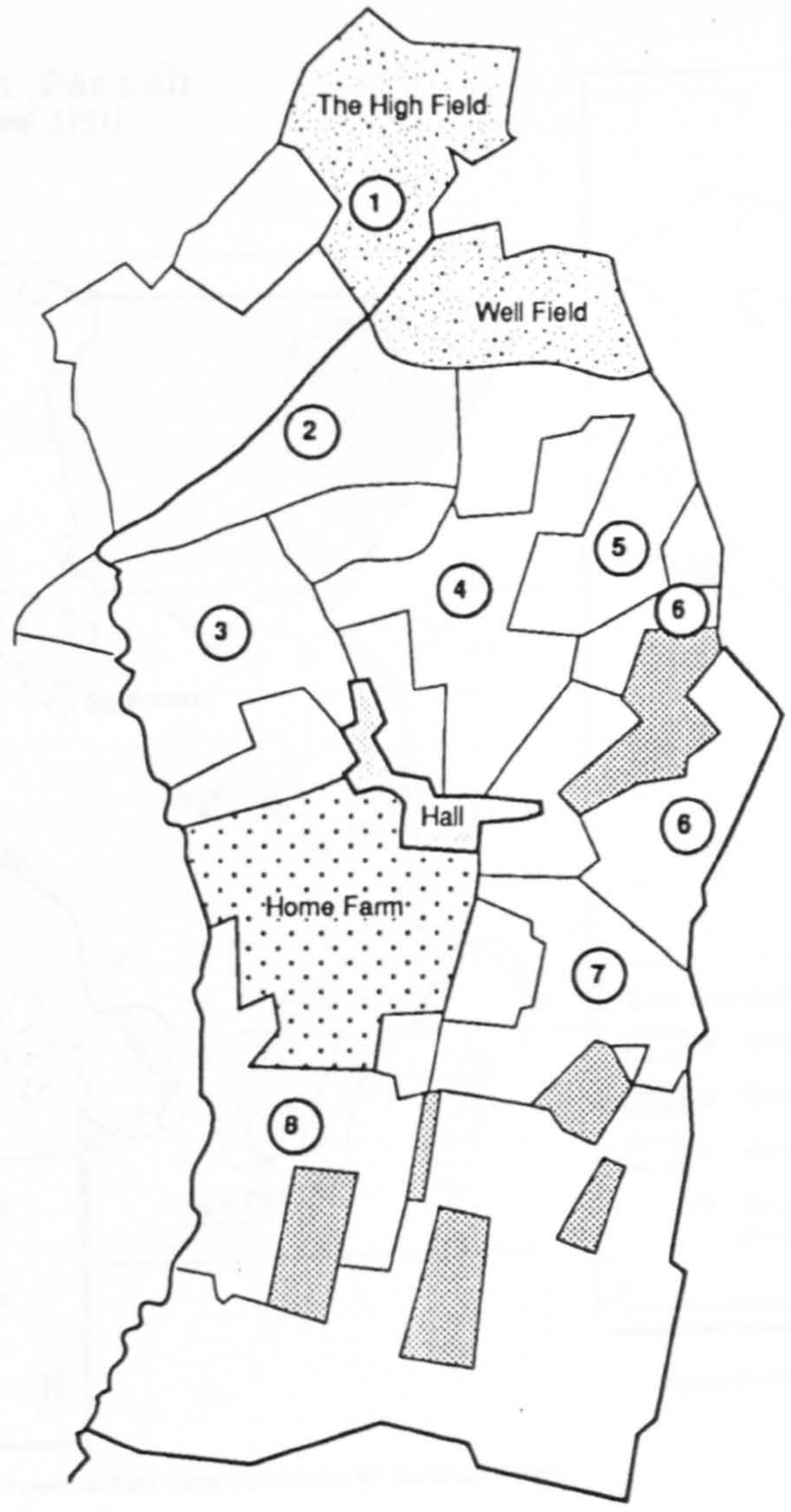
Figure 5.3



Major Tenants

1 Chawner
2 Oakes
3 Hollingworth
4 Galimore
5 Bennett
6 T. Bladen
7 W. Bladen
8 Low

Freeholder Stubbings - Closes and Strips



Somersal Herbert Parish

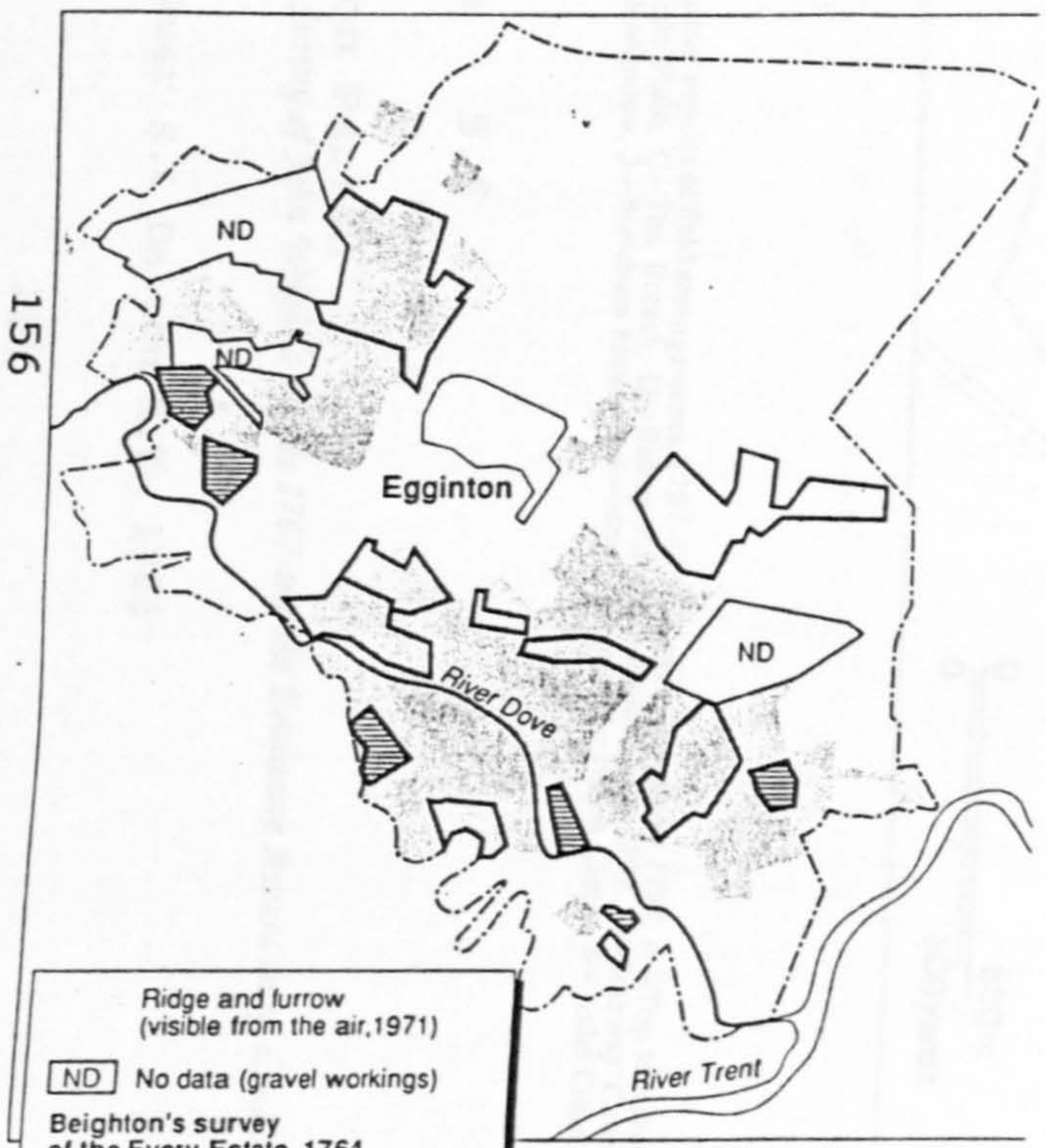
(based upon a Survey by Thomas Kirkland 1725)

Figure 5.4

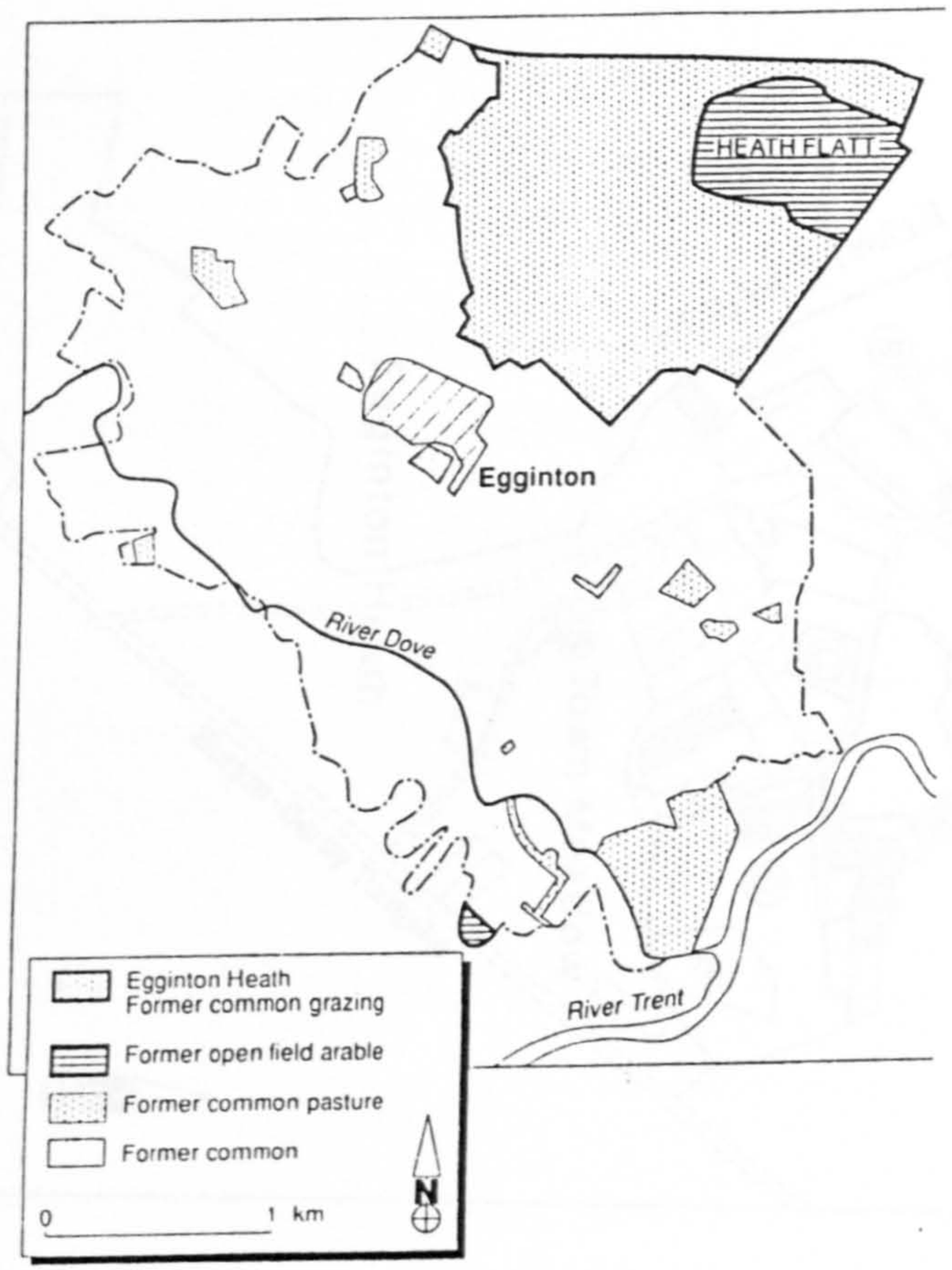
Aspects of Enclosure in Egginton Parish

(based upon Beighton's Survey of 1764 and the Enclosure Award 1791)

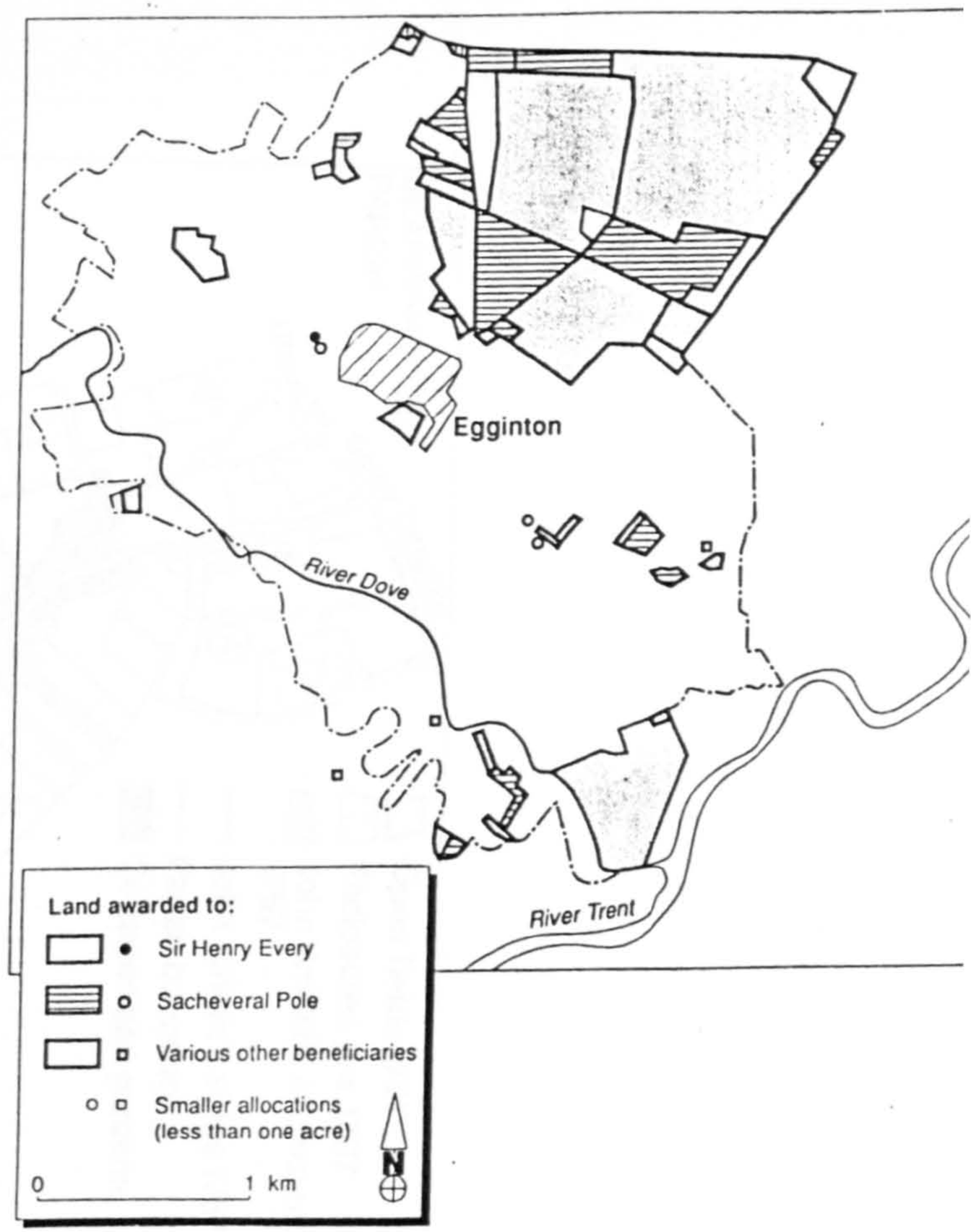
Source: Dalton R.T. 1991



Egginton Parish — Evidence of open field arable and common pasture enclosed by agreement prior to the Enclosure Award.

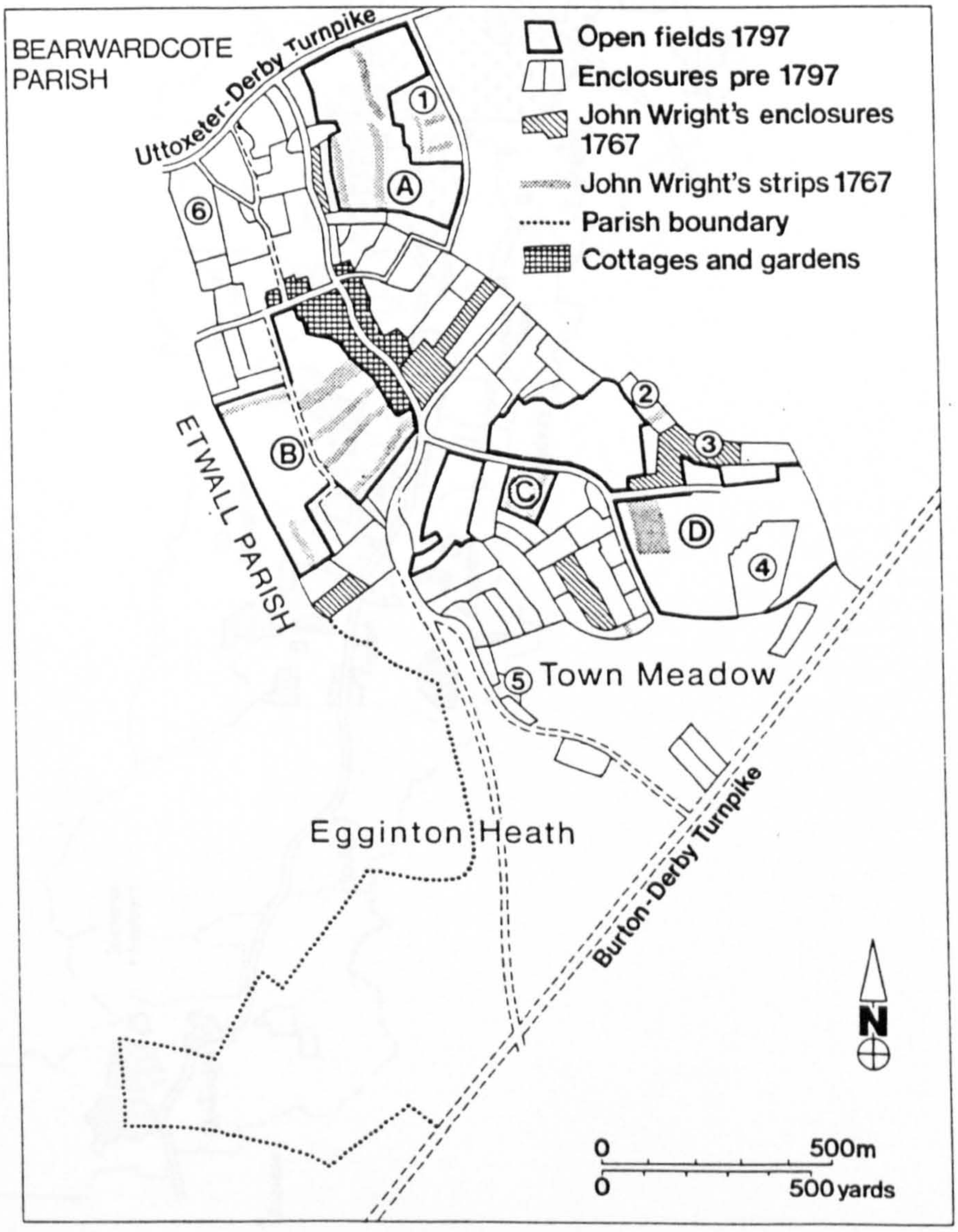


Egginton Parish — Open and common field redistributed under the Enclosure Award.



Egginton Parish — Land allowed to the beneficiaries under the Enclosure Award.

Figure 5.5



Burnaston parish: aspects of field arrangements, 1767–1797. Key:—*Openfields 1797*. A—Top Meadow Field, B—Little Field, C—The Breach, D—Riding Field. *Enclosures pre 1797*. 1—Stubway Close, 2—Top Ditch Meadow, 3—Bondham Meadow, 4—Moor Furlongs, 5—Heath Closes, 6—Aults Closes.

Figure 5.6

Burnaston Parish
(based upon a Survey of John Wright's Estate 1767 and the Enclosure Award Map dated 1797)

Source: Amer S.& Dalton R.T. 1983

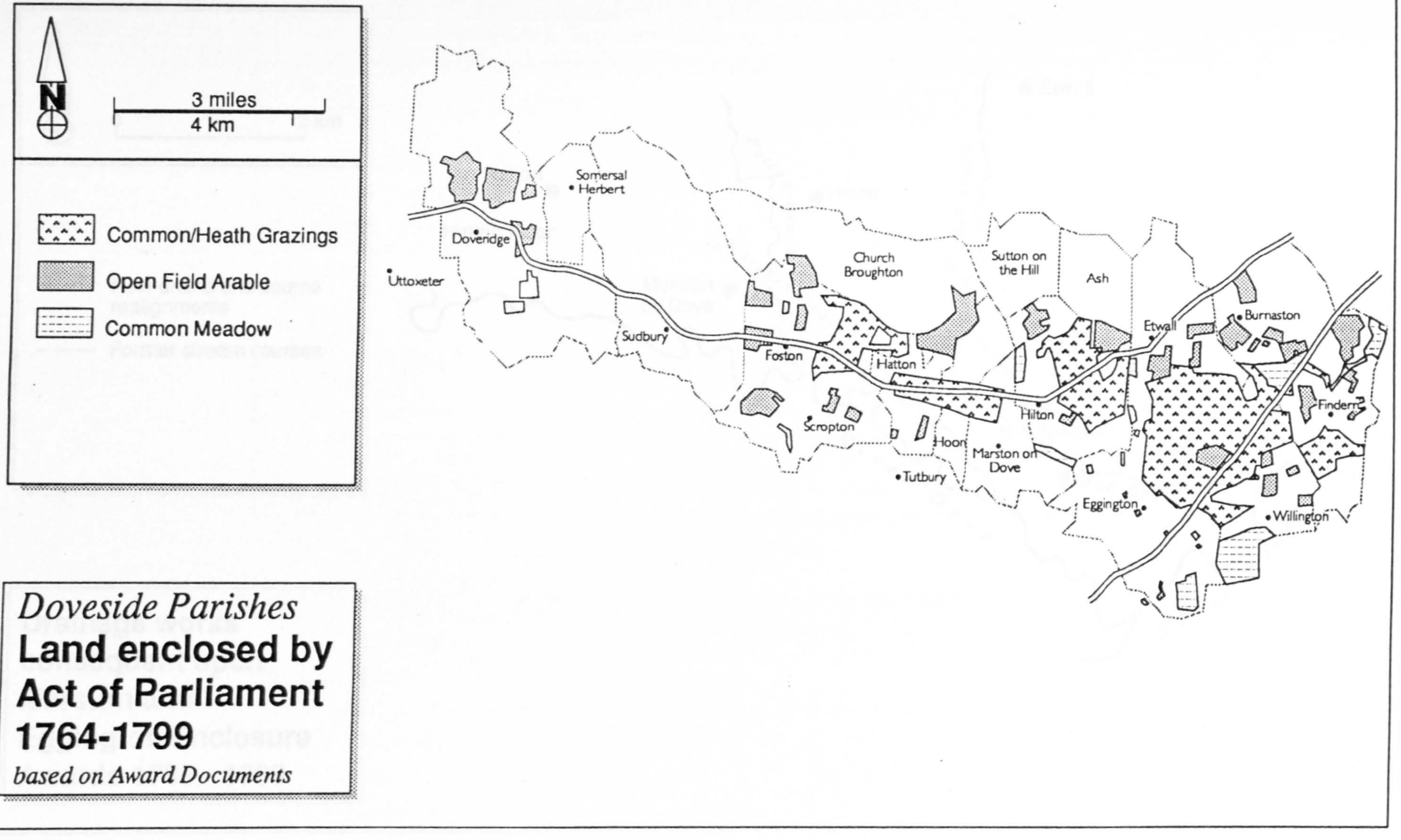

N
3 miles
4 km
Common/Heath Grazings
Open Field Arable
Common Meadow
Somersal Herbert
Doveridge
Uttoxeter
Sudbury
Church Broughton
Sutton on the Hill
Ash
Etwall
Burnaston
Foston
Hatton
Hilton
Findern
Scropton
Hoon
Marston on Dove
Tutbury
Eggington
Willington
Doveside Parishes
Land enclosed by Act of Parliament 1764-1799
based on Award Documents

Figure 5.7

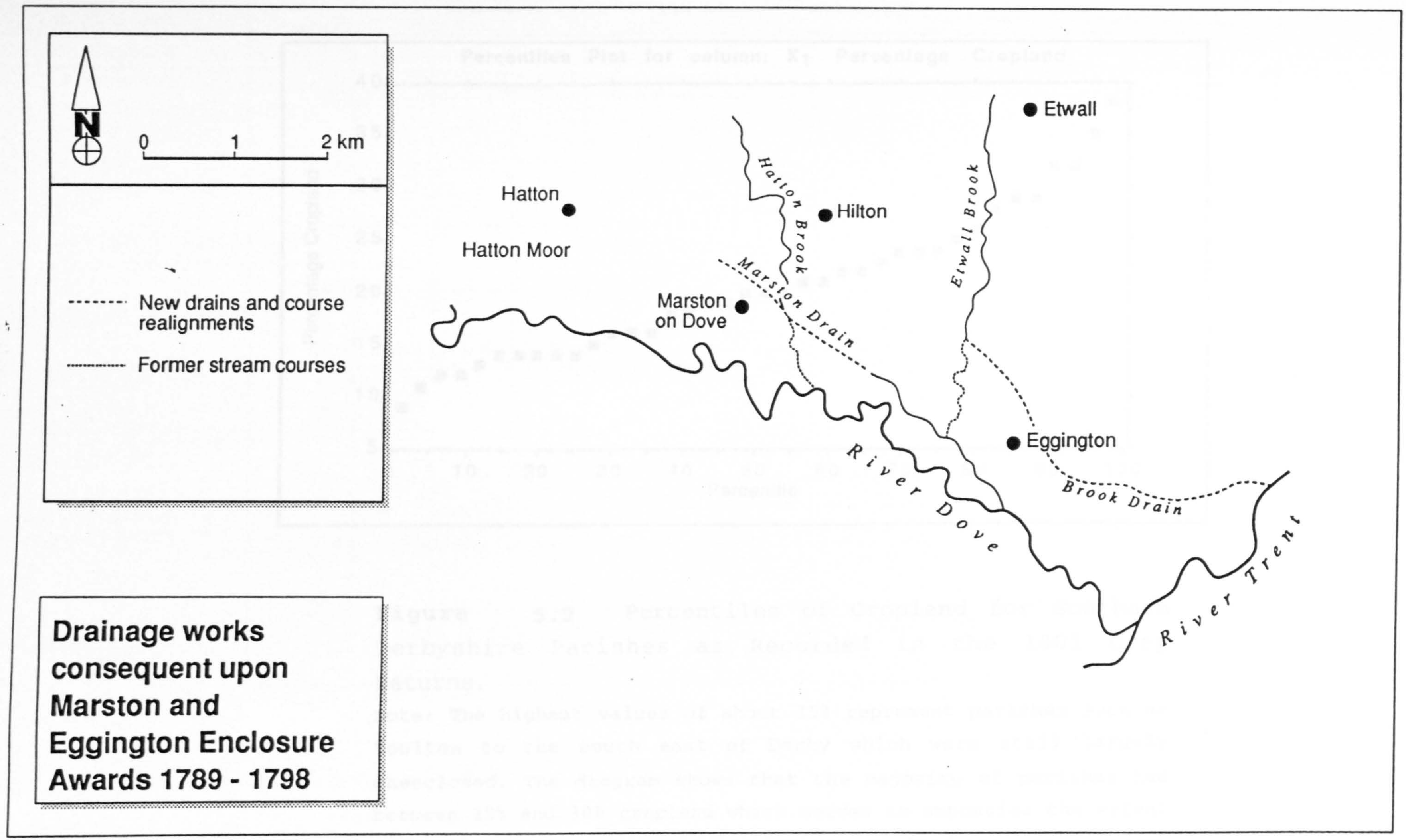

N
0
1
2 km
New drains and course realignments
Former stream courses
Drainage works consequent upon Marston and Eggington Enclosure Awards 1789 - 1798
Hatton
Hatton Moor
Hilton
Etwall
Marston on Dove
Eggington
Hatton Brook
Etwall Brook
Marston Drain
Brook Drain
River Dove
River Trent

Figure 5.8

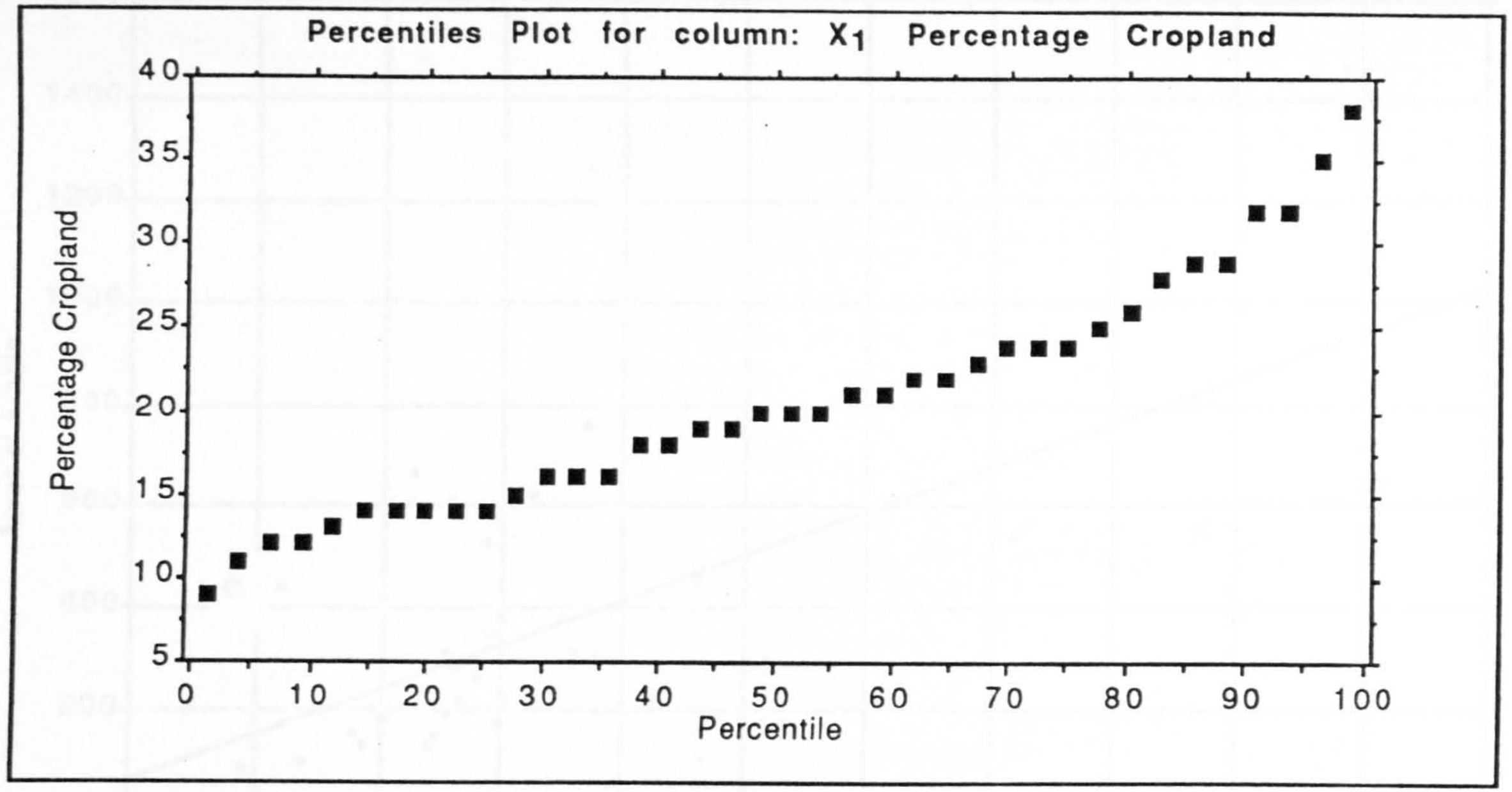


Figure 5.9 Percentiles of Cropland for Southern Derbyshire Parishes as Recorded in the 1801 Crop Returns.

Note: The highest values of about 35% represent parishes such as Boulton to the south east of Derby which were still largely unenclosed. The diagram shows that the majority of parishes had between 15% and 30% cropland which serves to emphasise the extent to which grassland was the main feature of land use in Southern Derbyshire.

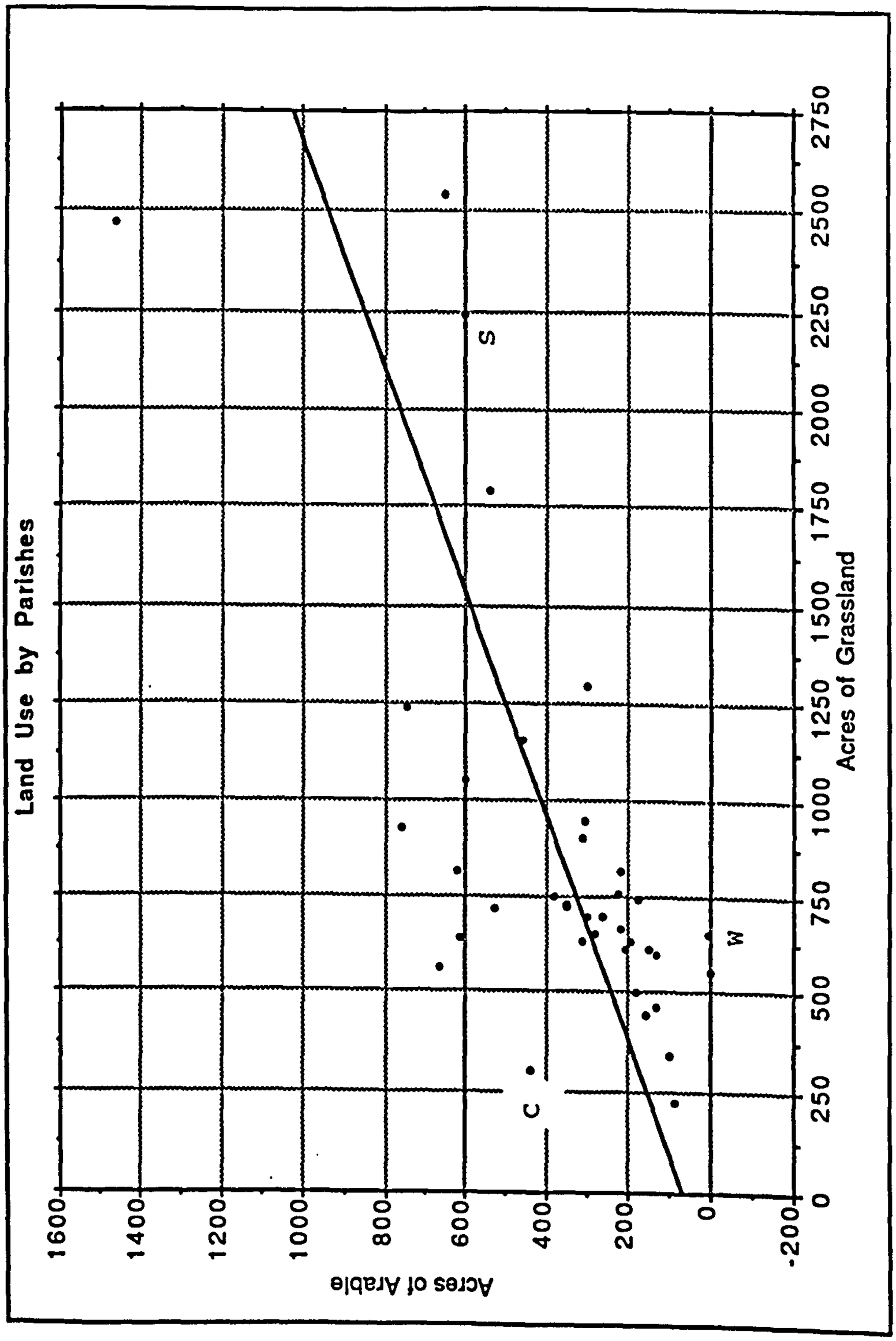


Figure 5.10 Relationship between Acreages of Arable and Grassland in Southern Derbyshire in the 1840's - based upon data derived from Tithe Surveys and Files.

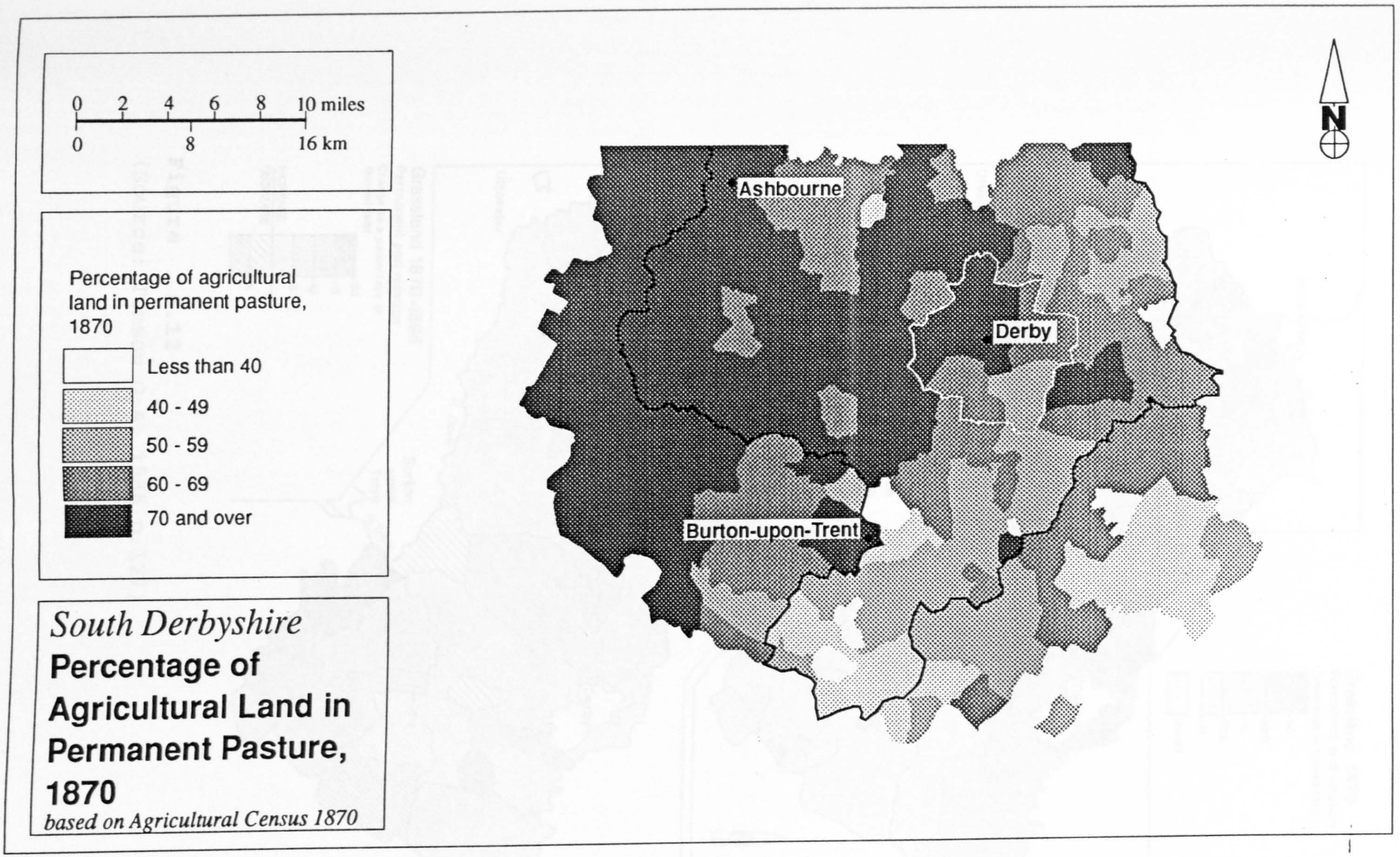

0 2 4 6 8 10 miles
0 8 16 km
Percentage of agricultural land in permanent pasture, 1870
Less than 40
40 - 49
50 - 59
60 - 69
70 and over
South Derbyshire
Percentage of Agricultural Land in Permanent Pasture, 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 5.11

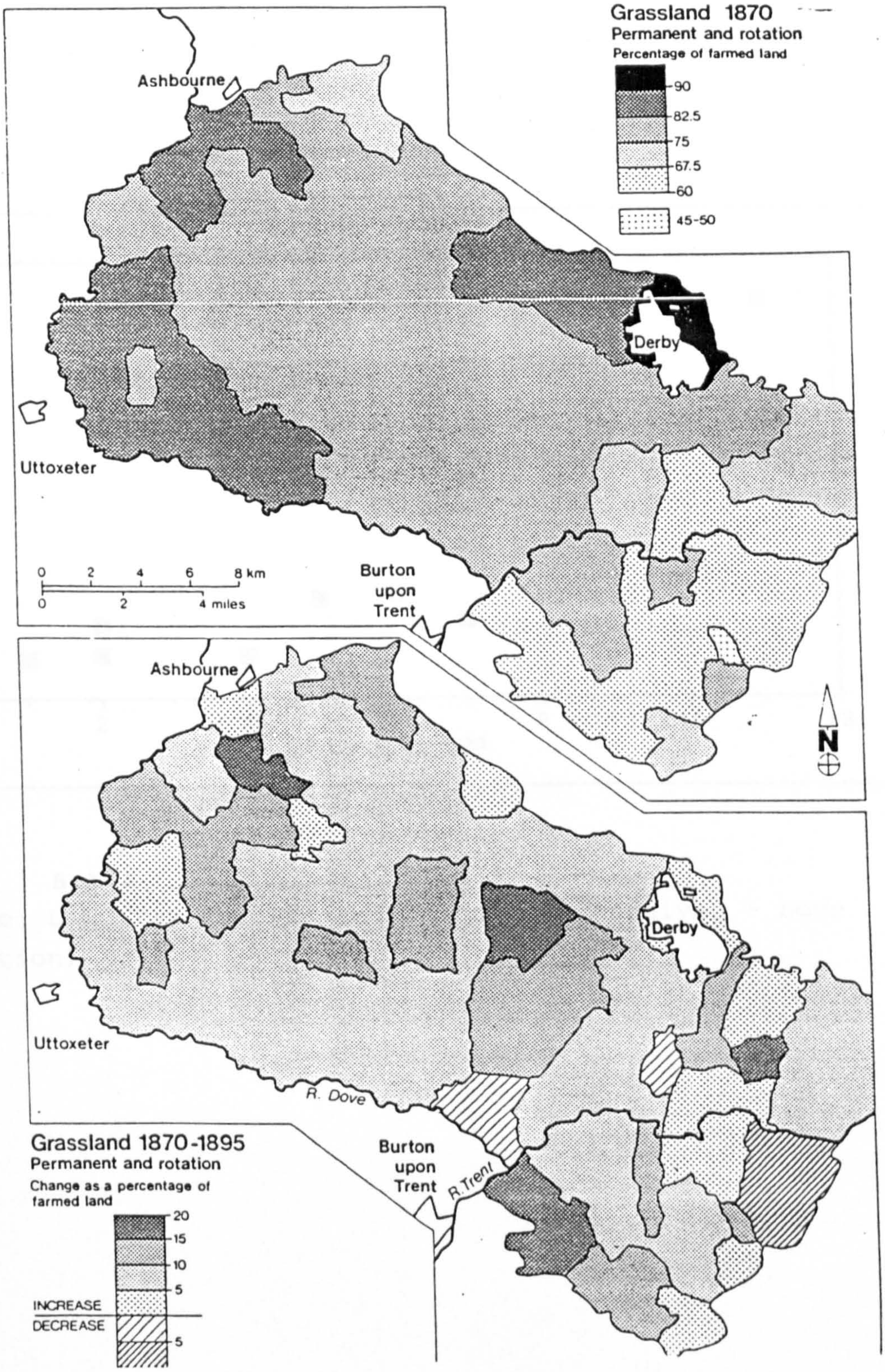


Figure 5.12

(Source: Tomson G.A. 1986 p.127)

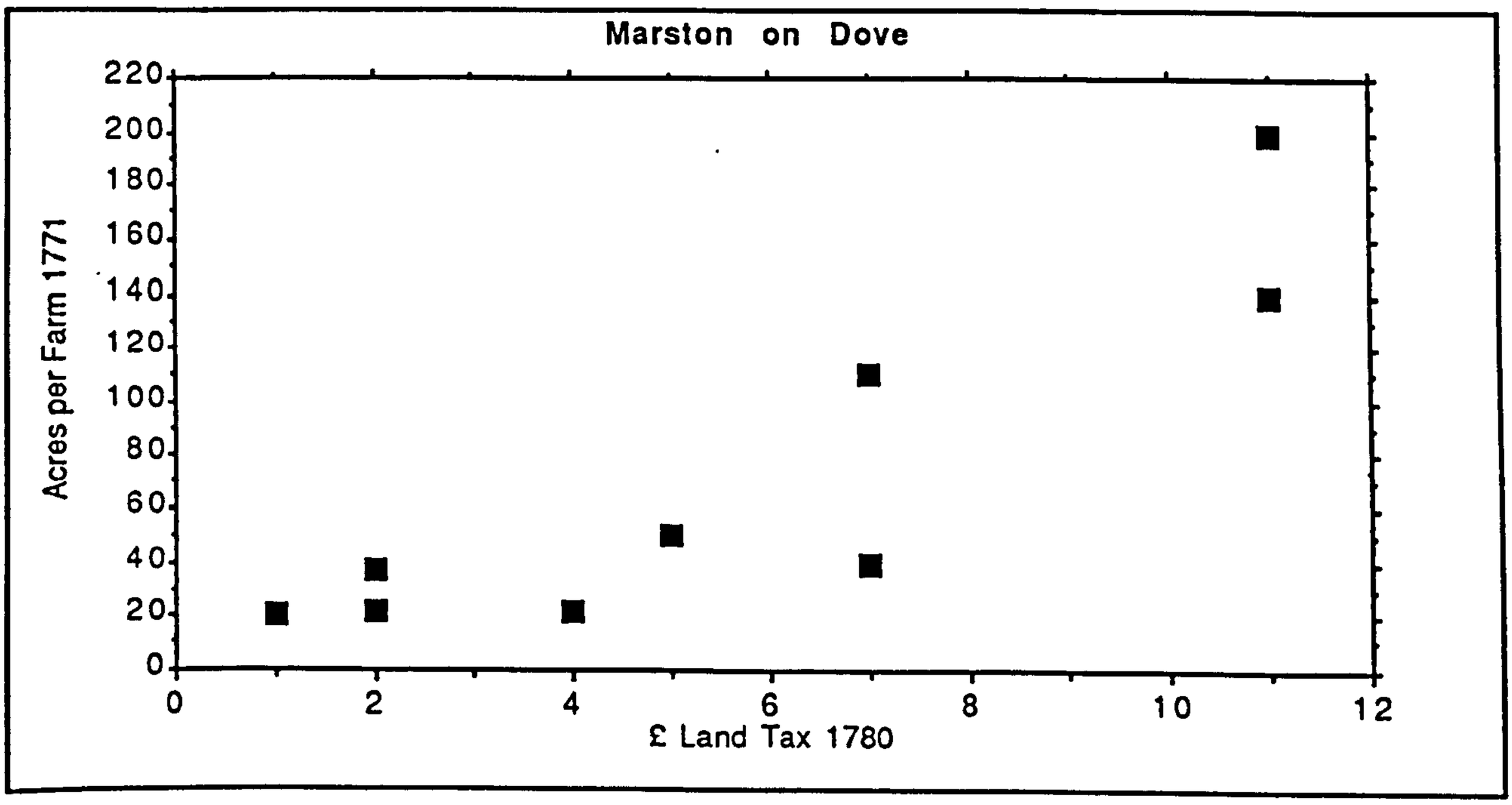


Figure 5.13a
(Source: Land Tax Records and Chatsworth Archives - Dove Collection)

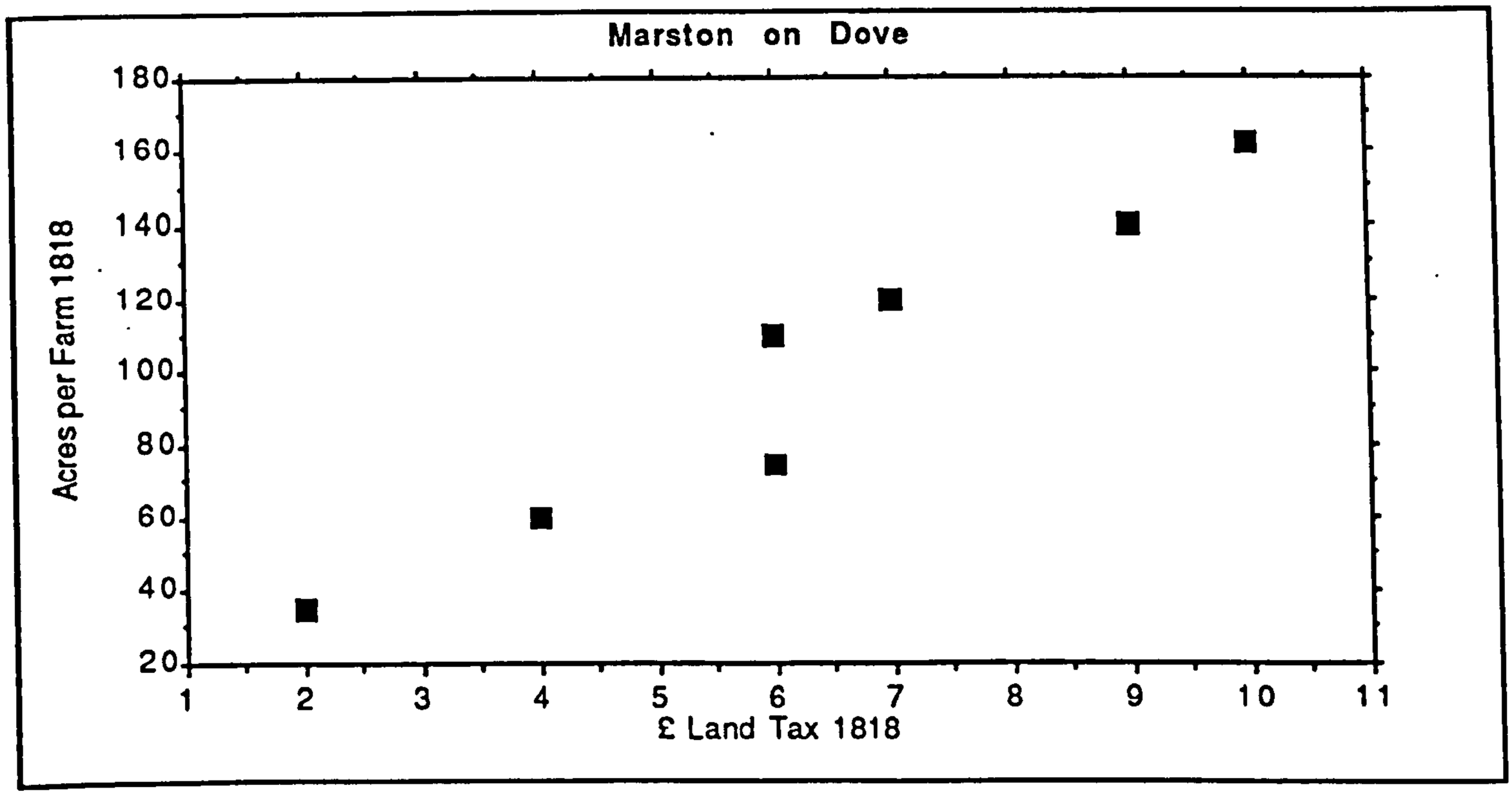


Figure 5.13b

(Source: Land Tax Records and Chatsworth Archives - Dove Collection)

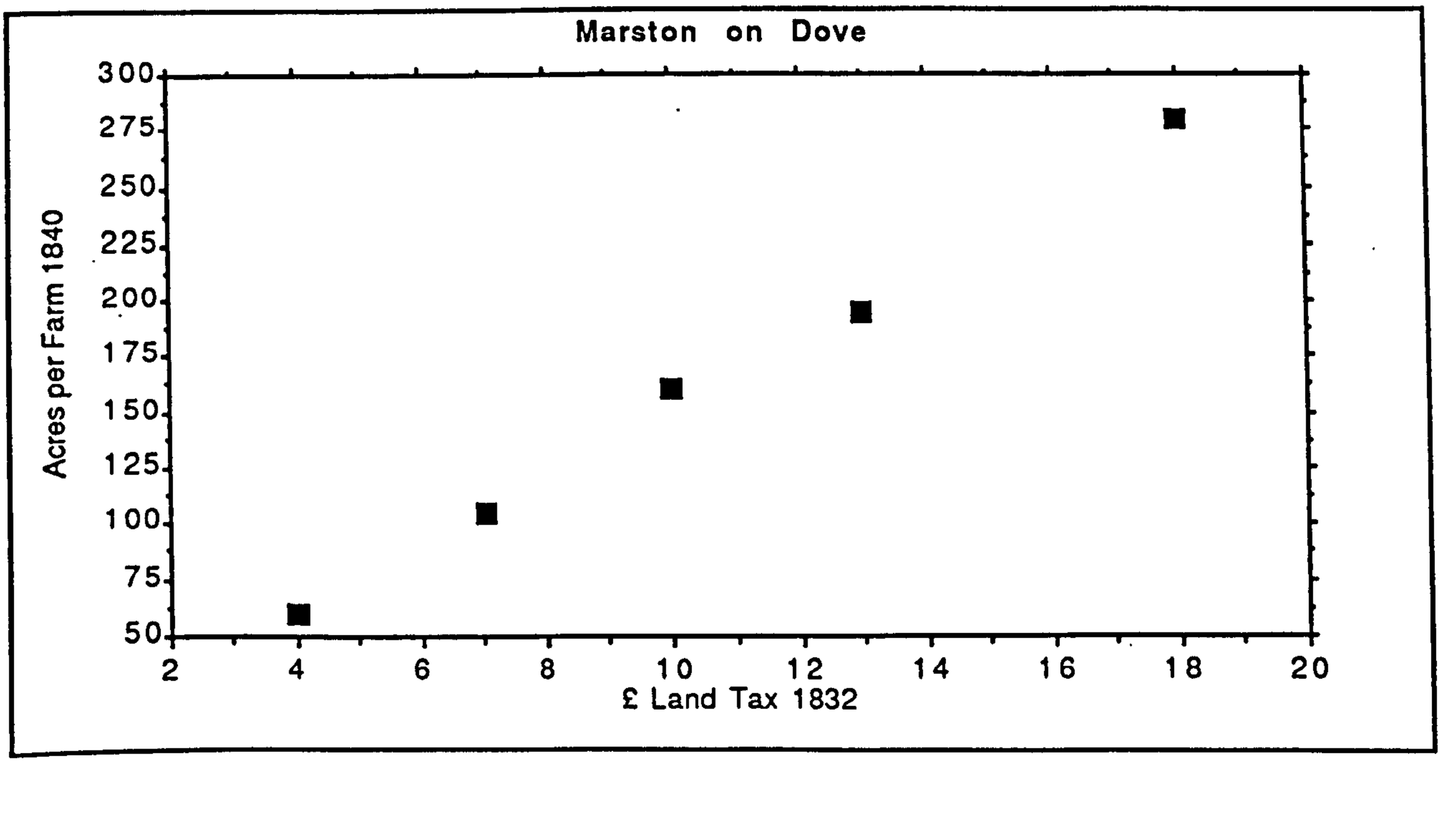


Figure 5.13c

(Source: Land Tax Records and Chatsworth Archives - Dove

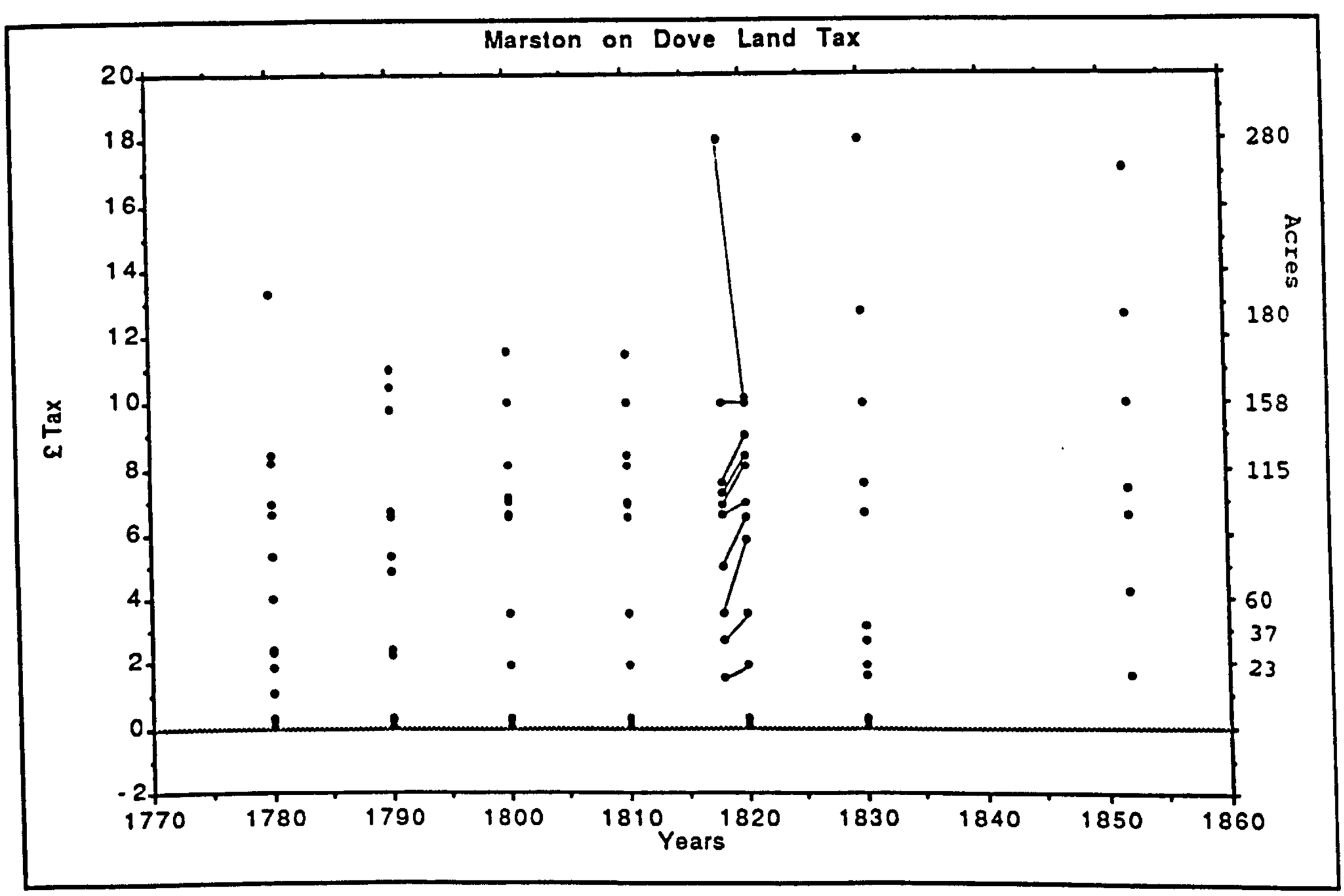


Figure 5.14 Marston on Dove Parish - Land Tax Liability and Acreages Farmed 1780 - 1830 plus Farm Acreages for 1818 and 1852.
(Based upon Land Tax records,Chatsworth Archives - Dove Collection and Tithe Surveys).

Note: The farm acreages for 1818 are linked to the matching tax liability for 1820 which was unchanged from 1818. The number of farmers with a tax liability of £1 or more falls from 11 in 1780 to 7 in 1852.

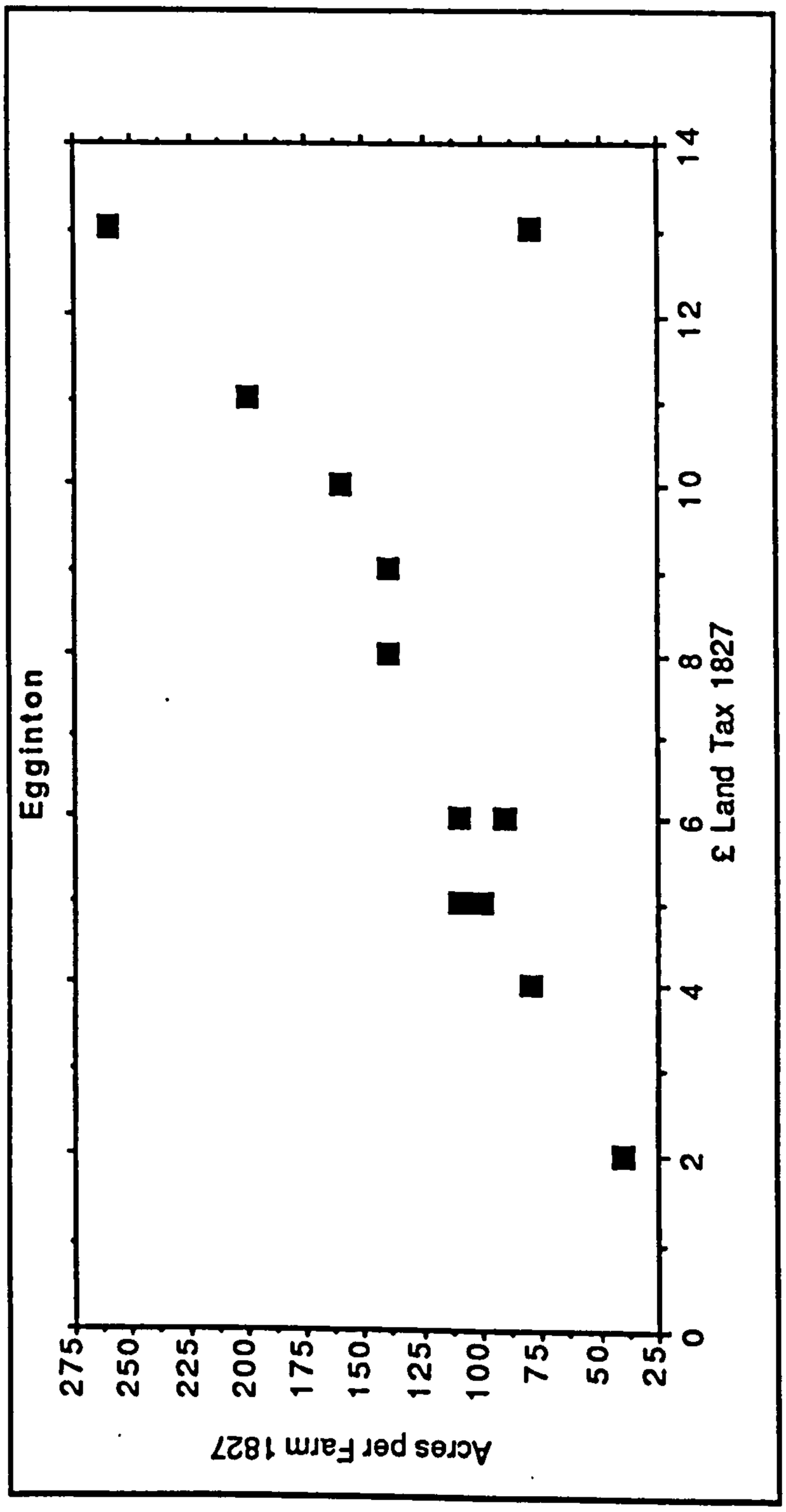
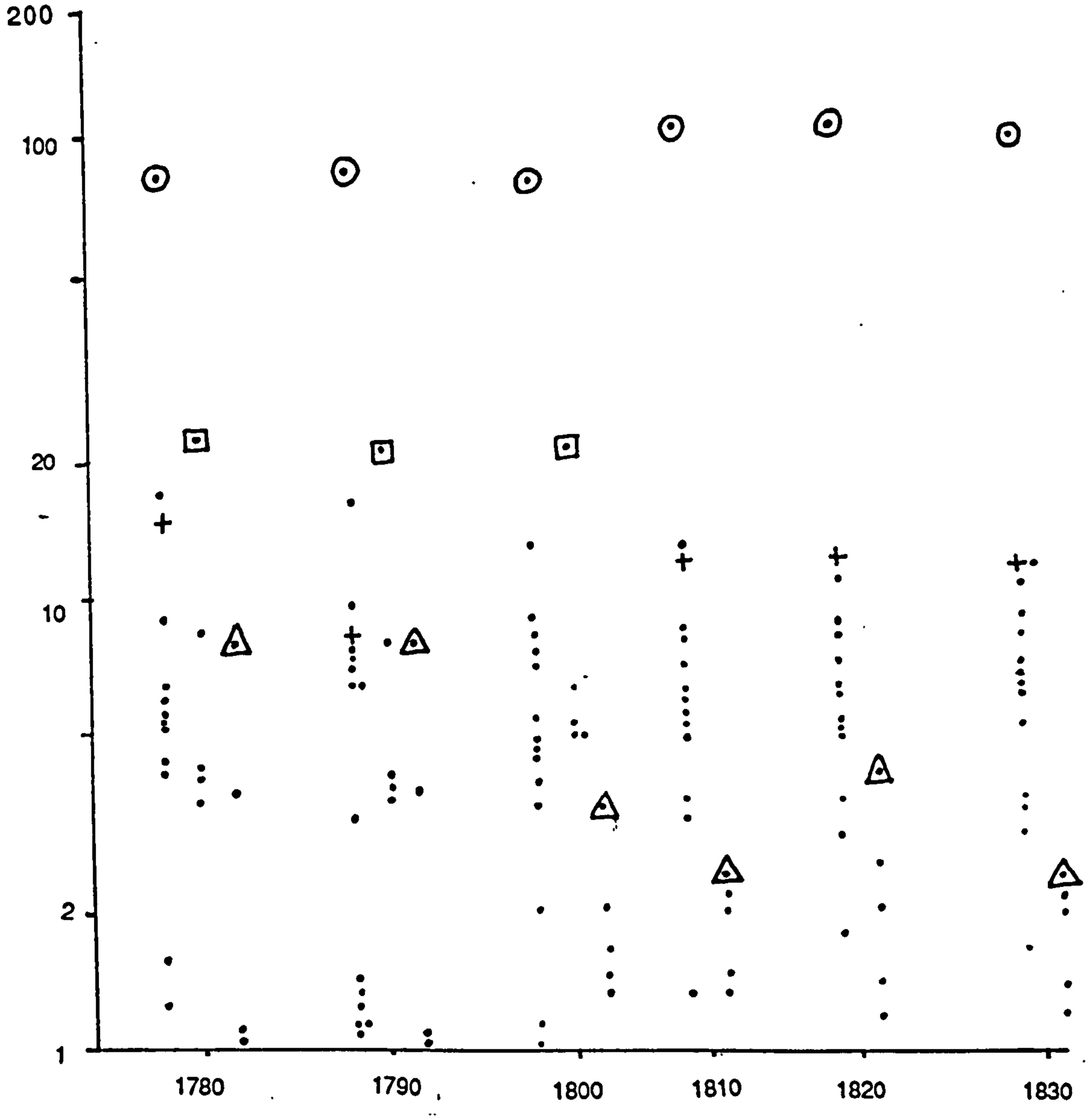


Figure 5.15 Egginton Parish - Relationship between Land Tax Liability and Area Farmed 1827. (Based upon Land Tax Records and Every Estate Survey of 1827).

Figure 5.16 Egginton Parish - Land Tax Liability 1780 - 1830.
(Based upon Land Tax Records)



Columns headed ⊙ refer to the Tax liability of the Every family. The symbol indicates the total liability of the family. The + represents the particular liability for Egginton Hall, grounds and home farm. The . represent the liabilities of individual tenants.

Columns headed ⊡ refer to the Tax liability of the Pole family of Radbourne. The . represent the liabilities of individual tenants.

Columns headed △ refer to the liability of the rector of Egginton. The . show the liability of small landowners.

Small tenants with a Tax liability of less than £1 have been excluded.

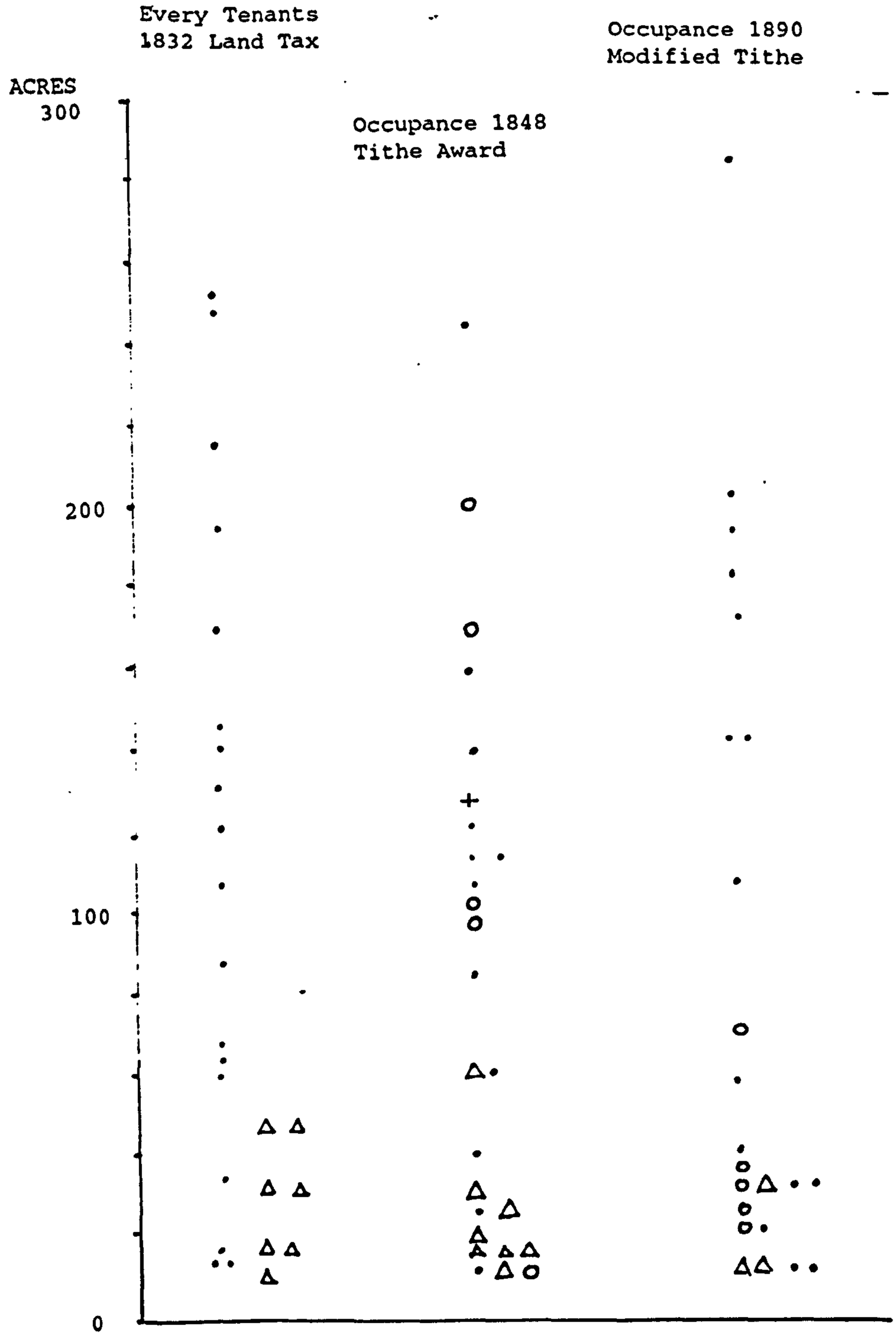


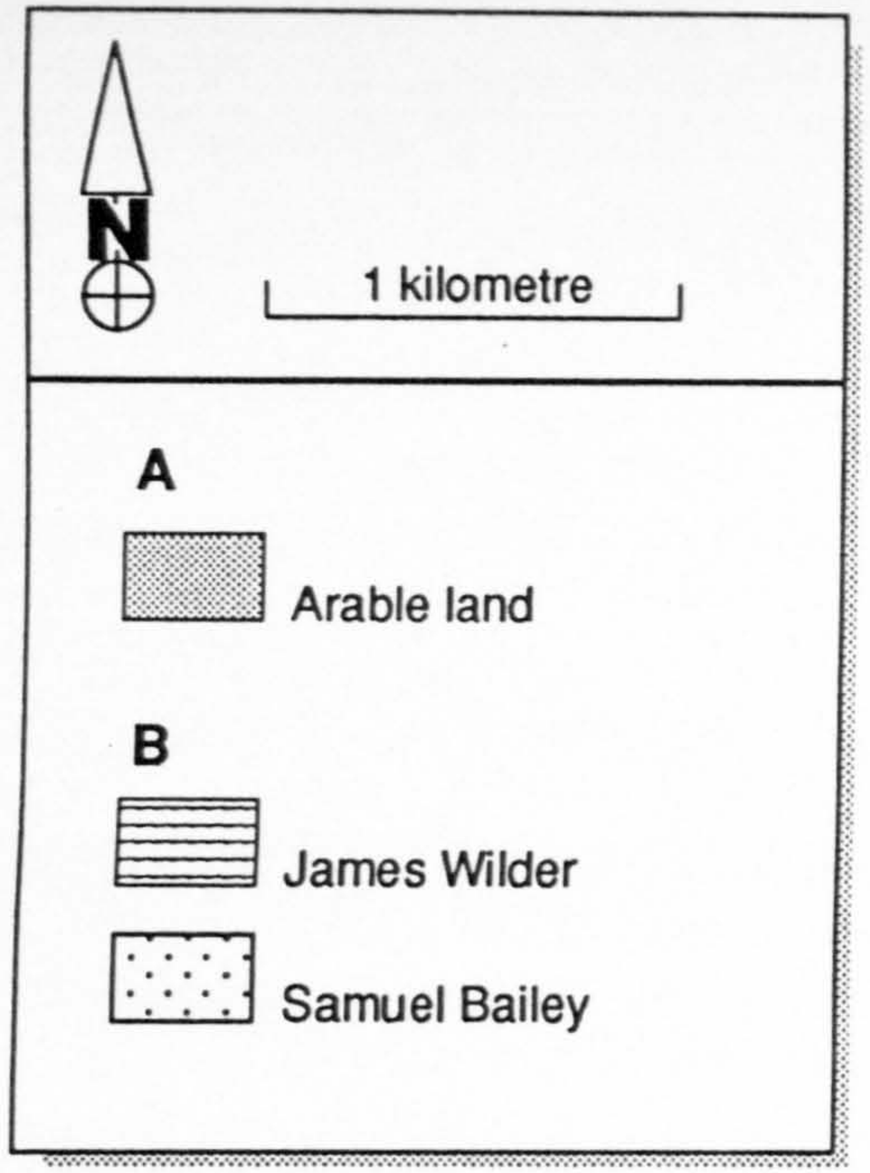
Figure 5.17 Egginton Parish - Comparison of Land Occupance 1832,1848 & 1890.
(Source : Land Tax Records and Tithe Surveys)

Every tenants resident in Egginton are shown .

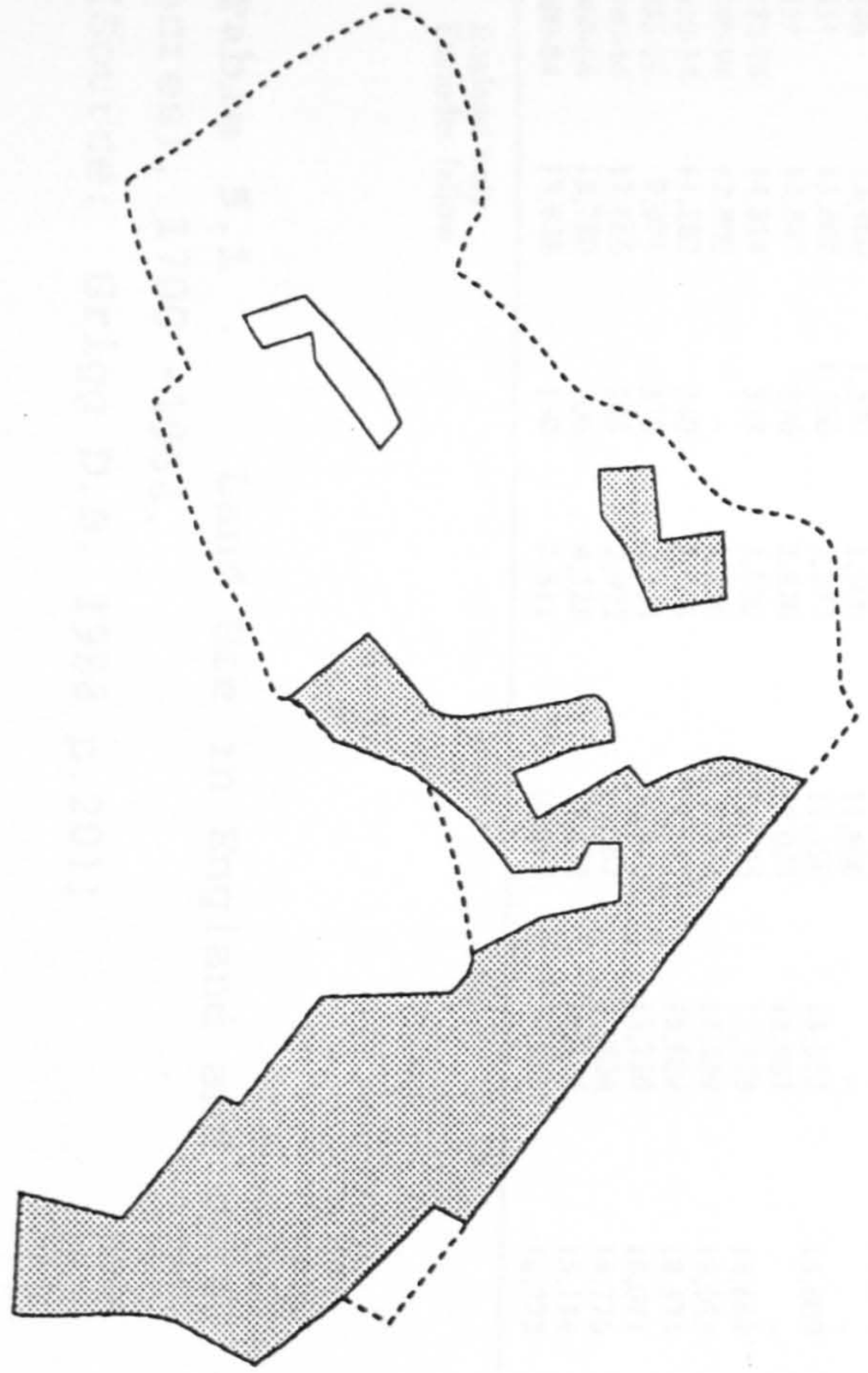
Tenants renting land from Every and a second owner are shown O

Every Estate home farm is shown +

Non Every tenants and owner occupiers are shown Δ

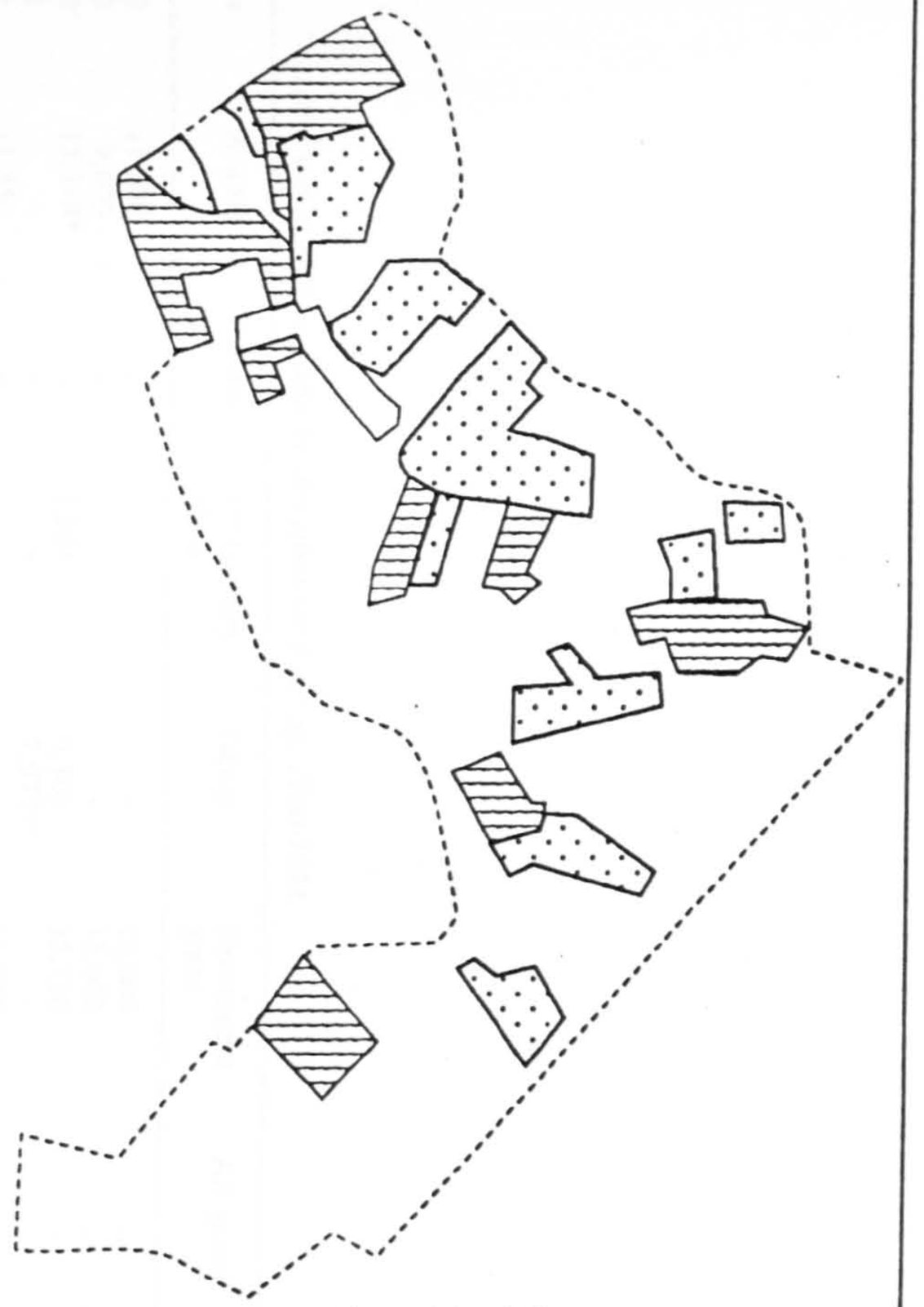


Burnaston Parish 1848
(Source: Tithe survey)



Distribution of arable land

Figure 5.18a



Fragmented land holdings

Figure 5.18b

Land use in England and Wales (thousand acres), 1700-1984.

Date	Arable	Fallow	Temporary grass	Tillage	Permanent grass	All grass	Crops and grass
1700	11,000	-	-	-	10,000	-	21,000
1700	9,000	-	-	-	12,000	-	21,000
1770	13,518*	-	3,201	9,505	15,736	-	29,254
1801	-	-	-	7,977**	-	-	-
1801	11,350	-	-	-	16,796	-	28,146
1808	11,575	2,297	1,149	10,442	17,495	18,644	29,070
1812	12,000	2,400	1,200	10,800	-	-	-
1827	11,143	-	-	-	17,605	-	28,749
1836	15,100	1,200	2,600	10,100	16,363	18,963	29,563
1846	13,100	1,500	1,300	11,800	-	-	-
1851	13,667	1,300	2,277	11,390	13,332	15,609	26,999
1854	14,847	896	2,820	12,027	12,987	-	27,834
1870-74	14,814	558	3,090	11,725	11,579	14,669	26,394
1890-94	12,800	-	3,056	9,744	15,029	18,085	27,829
1910-14	11,202	340	2,586	8,615	15,989	18,575	27,192
1935-39	9,071	370	2,351	6,910	15,720	18,071	24,790
1940-44	12,665	248	2,972	10,387	11,804	14,776	24,470
1960-64	13,780	206	4,528	9,252	10,626	15,154	24,406
1980-84	13,678	150	2,811	10,865	9,961	12,772	23,628

• England only.
•• Excludes fallow.

Table 5.1 Land Use in England and Wales (thousand acres), 1700 -1984.
(Source: Grigg D.B. 1988 p.201)

Crops as a percentage of arable

	1801	*1836*	*1875*	*1938*	*1945*	*1961*	*1985*
Wheat	22.7	26.8	22.4	21.2	15.0	12.7	32.5
Barley	13.6	15.7	15.5	10.3	13.7	24.9	26.8
Oats	18.8	12.6	11.5	15.1	15.9	6.7	1.8
Cereals[a]	55.1	55.1	49.4	47.9	48.0	45.5	61.3
Cereals as a % of sown area	79.3	78.7	66.1	55.9	64.6	70.2	76.5
Potatoes	1.6	–	2.5	5.5	6.8	3.6	2.6
Sugar-beet	–	–	–	3.8	2.8	3.0	3.8
Oilseed rape	–	–	–	–	–	–	4.9
Horticulture	–	–	1.1	3.7	5.6	4.9	3.7
Fodder roots[b]	5.9	10.2	13.8	7.4	5.3	2.1	0.7
Peas and Beans	6.9	4.7	6.2	2.0	1.7	0.6	0.8
All fodder[c]	12.8	14.9	20.0	12.0	9.8	6.3	3.6
Fallow[d]	20.3	9.4	3.6	4.1	2.3	2.1	0.6
Other crops	n.d.	n.d.	2.8	0.6	0.8	0.2	0.0
Tillage	89.8	79.5	79.4	77.5	76.1	65.5	80.5
Temp. grasses[e]	10.2	20.5	20.6	22.5	23.9	34.5	19.5
Arable	100.0	100.0	100.0	100.0	100.0	100.0	100.0

n.d. no data.
[a] Includes rye and mixed corn.
[b] Turnips, swedes, mangolds and fodder beet.
[c] Includes rape, kohl rabi, kale, cabbages, maize, etc.
[d] No data on fallow in 1801 returns. Assumed to be 2.3 million acres.
[e] No data on temporary grasses in 1801 returns. Assumed to be 1.15 million acres.

Table 5.2 Crops as a Percentage of Arable.
(Source: Grigg D.B. 1989 p.52)

Table 5.3 Holdings in Sudbury Parish 1659

1. John Buxton

	a	r	p
Close and pasture	7	0	12
Meadow		2	27
Open field arable	3	2	34
House			34
Total	12	0	13

2. Edward Madeley

	a	r	p
Close and pasture	27	2	35
Meadow	4	1	6
Open field arable	7	2	23
House		7	21
Total	40	1	5

a = acres
r = rood
p = perches

Table 5.4 **Enclosure in Southern Derbyshire by Act of Parliament**
based upon Turner M.E ed 1978

Decade	Number of Acts: Including Open Field Arable	Number of Acts: Not Including Open Field Arable	Estimated acreage: Including Open Field Arable	Estimated acreage: Not Including Open Field Arable
1730's	-	1	-	190
1740's	-	-	-	300
1750's	-	1	-	-
1760's	11	-	12,437	-
1770's	2	2	1,088	1,700
1780's	12	1	10,370	87
1790's	5	3	2,794	650
1800's	2	2	1,900	1,000
1810's	2	-	838	-
1820's	3	-	940	-
1830's	-	1	-	200
Totals	37	11	30,367	4,127
	48		34,494	

Tables 5a and 5b Income Tax Valuations - Schedules A/B

[a] County Figures (thousands of pounds)

	1814	1842	% change 1814-184	1859	% change 1842-1859
Derbyshire	700	862	23	842	-2.4
Leicestershire	789	919	16.5	933	1.5
Staffordshire	868	1137	30.9	1087	-4.4
Cheshire	935	988	5.6	1043	5.5
England and Wales	35400	42127	19	42995	2

Source Stamp JC 1916 p.54/5

[b] Parish Data for Southern Derbys (shillings per Acre)

1814	30/2 per acre +or- 9/-
1842	37/10 per acre +or- 11/8
1859	37/6 per acre +or- 9/9

The figures represent an average for all parishes plus the value of one Standard Deviation

Table 5.6 Farm Size in England and Wales - 1851
(Source Grigg D M, 1989)

Farm Size Category in	% Total Farm Holdings	% Area Farmed
0 to 49 acres	41.8	8.6
50 to 99 acres	20.7	13
100 to 299 acres	29.7	44.7
over 300 acres	7.8	33.7

Table 5.7 Farm Size in Southern Derbyshire - 1851
(Source Census of Population)

Farm Size	Red Marl		South of Trent		Clays / Shales of Coalfield		Total-Southern Derbyshire	
in Acres	% Farms	% Area Farmed	% Farms	% Area Farmed	% Farms	% Area Farmed	% Farms	% Area Farmed
0-49	27	6	27	4	44	15	29	6
50-99	20	14	15	8	32	34	21	14
100-149	21	24	15	13	16	28	19	20
150-199	20	31	18	23	4	10	17	26
200-249	7	14	4	7	4	13	6	11
250-299	4	9	7	12			4	9
over 300	1	3	13	34			4	14

Table 5.8 Farm Size in Derbyshire - 1880

(Source Agricultural Census)

Farm Size Categories	No. of farms	Total Area Farmed	% Total Area
0 to 49 acres	10058	139944	26
50 to 99 acres	1503	108731	21.5
100 to 299 acres	1319	213436	41.5
300 to 499 acres	122	44857	8.7
500 to 999 acres	17	10459	2
1000 acres and over	1	1406	0.3

Table 5.9

Doveside Parishes - Comparison of farm size calculated from the Tithe Surveys with data from the 1851 census of population

	Tithe Surveys 1839 - 50	Census of Population 1851
	Number of farms	**Number of farms**
Farm Size (acres)		
0 - 49	68	43
50 - 99	36	27
100 - 149	27	30
150 - 199	12	32
200 - 249	6	11
250+	3	5
Total	152	148

Table 5.10

Land Tax Assessments for Selected Parishes - numbers of parishioners with a tax liability greater than £1 (approximately equivalent to 25 acres)

	1780	1830
Etwall	19	12
Hilton	16	10
Willington	15	11
Marston on Dove	10	7
Egginton	23	23
Somersal Herbert	9	10
Ash	4	4
Sutton on the Hill	5	5
Findern	13	15
Sudbury	27	48

CHAPTER 6

ASPECTS OF LAND IMPROVEMENT

Through the eighteenth and nineteenth centuries the issue of the enhancement of the capability of land was sharply addressed by progressive agriculturalists. Improvements focused on draining surplus water from the land and also adding a range of substances to the land notably marl and lime but also residues from industrial processes. As the nineteenth century progressed and agricultural chemistry became better understood then manufactured fertilisers such as phosphates began to become available while the value of bones and guano were also recognised. These additives variously served to make the land more workable, to facilitate the release of nutrients into the soil and to contribute directly to its fertility. Moreover the benefits to the soil of improved feed regimes involving the use of oil cake and grains were increasingly appreciated. The approach in the search for permanent and sustainable improvement of land was often empirical but none the less highly important in the enhancement of agricultural productivity.

In southern Derbyshire, no less than in the remainder of Britain, such improvement was widely attempted and achieved. It is however extremely difficult to arrive at other than rather generalised conclusions as to the success of this process in terms of the levels of improvement which were achieved or the areas of land which were affected. Despite such limitations analysis of land improvement can proceed in two directions. The first of these is concerned with land drainage by surface or subsurface means while the second deals with improvement through the modification of soil properties by the addition of substances such as lime and marl. Other aspects of the use of additives and the development of feed regimes involving cake and grains will be considered in the next chapter.

Land Drainage

The development of techniques for facilitating the removal of

excess water from land has been fundamental in the enhancement of the productive potential of farming. Equally such techniques have had a profound influence on the range of crop choice. Referring to the period 1750-1900 Holderness [Holderness B A, 1971 p.174] has described drainage improvement as 'a touchstone by which good farming was distinguished from bad' and as 'the most important form of investment in the fixed capital of agriculture'. Chambers and Mingay [Chambers J D and Mingay G E, 1966 p.175] state that drainage was the great improvement of the age which facilitated speeding operations, the elaboration of rotations, the introduction of machinery and above all the increase of profit. The particular beneficial effects of drainage in relation to heavier soils have been identified in the context of the debate concerning sectoral advance summarised in Chapter 1 and this a matter of some significance in the identification of potential progress in productivity in the southern Derbyshire area.

In Britain as a whole and not least in southern Derbyshire two major phases of land drainage can be identified. The first was the use of ridge and furrow, the corrugation of the land surface, which is likely to have had its roots in the mediaeval period. This was clearly in place and functioning long before the study period which is under discussion. The second is the use of techniques involving subsurface drainage which emerged in the eighteenth century but became of key importance in the nineteenth century with the mass manufacture of pipes. The common factor between the two systems was the labour costs incurred in the construction and maintenance of drainage systems.

Arguably a most widespread relict feature in the contemporary agricultural landscape in England is ridge and furrow. Its preservation has much to do with the conversion of open field arable to enclosed pasture. This has been particularly noted with respect to heavier soils. [See Harrison M J et al, 1966 p.366]. The precise origins of ridge and furrow or broad rig are complex and lie in mediaeval technological and tenurial arrangements relating to common and/or open arable and meadow fields. The creation of furrows to collect surplus water and

carry it to organised and managed systems of marginal ditches was the most effective drainage arrangement available. It most certainly seems to have stood the test of many centuries. Writers such as Adams [Adams I H, 1976], Harvey [Harvey N, 1980] and Chambers and Mingay [Chambers J D & Mingay G E, 1966] describe ridge and furrow as a simple system of drainage created by ploughing. However Upex [Upex S, 1984] through the detailed analysis of field systems in Northamptonshire and Cambridgeshire has demonstrated the potential complexity of ridge and furrow and its relationship to the wider drainage network. The implication is one of widespread collaboration within and between parish/manorial units. The survival of ridge and furrow to the present day argues strongly for the systems having been effective during the eighteenth and nineteenth centuries. In southern Derbyshire and adjacent counties the prevalence and significance of ridge and furrow is referenced by Farey [Farey, 2.1815 p.96] for Derbyshire and Pitt [Pitt W, 1809 p.89] for Leicestershire. Farey notes that 'ridges pretty generally prevail on the Derbyshire ploughlands whatever the nature of the soil or the declivity of the surface'. Pitt recognised the necessity and hence utility of ridge and furrow in stating that 'most of the lands of Leicestershire require ridging - very little being dry enough or sandy enough to lay quite flat'. Within southern Derbyshire a detailed analysis and mapping of the occurrence of ridge and furrow has been made for the parishes on the north side of the Dove, using the vertical air photography survey of Derbyshire to a scale of 1:12,000 carried out in October 1971 [see Figure 6.1].

The extent of survival of ridge and furrow in the late twentieth century is undoubtedly an under representation of original maximum in view of ploughing out in the course of recent cultivations, settlement extensions or the working of aggregates. Some 20% of the area investigated shows evidence of ridge and furrow which is sufficient to allow certain correlations with basic physiographic elements of the area. Firstly substantial tracts of alluvial land supports surviving ridge and furrow on both the Fladbury 2 and Wharfe soil series [See Ragg et al, 1984 p.197,319]. The ridge systems tend to lie parallel to the run of the flood plain and therefore at right

angles to brooks tributary to the Dove into which the furrows lead. There is scope for confusion with water meadows in this flood plain situation but the discussion of water meadows in Chapter 7 suggests that such features were not common. While generally ridge and furrow supported both arable and meadow there is evidence that in some parts of the flood plain is most certainly related to open field arable. In many instances the characteristic curved reversed S form is evident but arable open field is shown lying against the Dove itself at Marston on Senior's 1610 estate survey for the Duke of Devonshire (CA).

Secondly on the various terrace gravels eastwards from Hilton ridge and furrow is absent. This is to be expected given the mapping of these areas as heathy common by Burdett [Burdett P, Map of Derbyshire] in 1767 and by various enclosure commissioners for individual parishes over the latter decades of the eighteenth century. On the less well developed gravels to the west of Hilton there is evidence of early enclosure and also the presence of ridge and furrow. This is particularly the case in parishes such as Doveridge and Sudbury where Lord Waterpark and the Vernons created deer parks which in themselves were important elements in landscape evolution. Thirdly on the various Triassic and Carboniferous strata including the areas capped with glacial till a diversity of soil types all carry ridge and furrow. Indeed it is in these circumstances that the greatest survival of ridge and furrow remains. In some parishes such as Burnaston and Findern analysis of the patterns of ridge and furrow shows a strong positive correlation with slope orientation. It is also clear that blocks of ridge and furrow as furlongs in the open fields strongly guided the post enclosure landscape with respect to the downslope elongation of field shape.

Those who created and maintained ridge and furrow and related drainage features undoubtledly had a sound yet subtle appreciation of natural water movement across the ground surface. The change of land usage from arable to permament grass, which has allowed the preservation of ridge and furrow is significant, in that it indicates under changing economic conditions the optimal use of land was re-evaluated. It does not

follow that the efficiency of the drainage system itself was in question. The key input in maintaining the system was labour as efficient water flow was dependent upon the spade for the clearance of marginal brooks and channels.

Underdraining became established as a beneficial procedure during the eighteenth century. Like the maintenance of surface drainage it was labour intensive involving the hand digging of trenches. These were variously filled with permeable materials such as brushwood and gravel or, in country where stone was available, were lined at the bottom with vertical slabs which were then capped to create channels through which water could flow freely. Darby [Darby H C, 1964 p.190] has described how from about 1800 onwards manufactured tile drains were introduced. Initially these were of the horseshoe and sole variety but cylindrical pipes were first used in Kent from 1808. However these were not widely marketed until the mid 1830's when cheap machine made versions began to be mass manufactured. This led to the effective drainage of heavier lands over wide areas [see Phillips A D M, 1989]. The benefits were not simply to the cultivator but to the stockman in the reduction of disease carried on wet pastures such as foot rot and liver fluke.

According to Marshall [Marshall W, 1796 1,p.140] writing from his farm at Statfold near Tamworth underdrainage was practiced in the Midlands generally including southern Derbyshire from the mid eighteenth century. Its importance was enthusiastically recognised by Curtis [Curtis W, 1806 p.35] and Farey [Farey J, 2.11 p.363 et seq]. Both writers emphasise the benefits of the improvement while Farey holds up the activities of early nineteenth century Derbyshire farmers as examplars of the practice stating that they are not as backward as commonly believed. Curtis visited prominant South Derbyshire farmers such as Greaves of Ingleby, Mundy at Markeaton, Princep of Croxall, Pearsall of Foremark and Coke of Longford. The techniques used were varied. Greaves used 9" - 12" stones as uprights with a coping stone or alternately two stones made into an inverted 'V' when attempting soughing at depth of 6' to 8'. Drains at 2' to 4' were lined with stones or grooved tiles. Pearsall and Coke also practiced deep draining, Coke having his own brick kiln for

the manufacturing of draining tiles.

Farey [ibid p.384] lists drainers, farmers who have had land drained and manufacturers of draining tiles. This data has been mapped as Figure 6.2 to provide a statement of the geography of aspects of land drainage in southern Derbyshire at about 1810. The distribution of identified farmers shows that underdrainage was practiced across the area but with an apparent concentration in the locality to the east of Derby. These farmers were served by professional drainers of whom Farey [ibid p.386] lists twelve - 'such a noble list of improvers by draining'. Two of the twelve, John Potter of Mackworth and John Samples of Belton near Loughborough, had been operating since 1786 and 1788 respectively employing up to 40 men. From the data it is possible to construct fields of operation of drainers and a range of up to 20 km is indicated. The cost of operations varied with the depth of the drains. John Samples charged 4d per yard at a depth of 3' with an increase of 3d for every additional foot of depth with the employing farmer bearing the cost of the materials. Farey identified 12 brick and tile kilns at locations within south Derbyshire or close by in neighbouring counties. The Derby Mercury carried advertisements from manufacturers of soughing [drainage] tiles eg, 'at Stapleford Old Brick and Tile Manufacturing a kiln of tiles of different sizes will be ready to be drawn this week, any persons being in want may have what quantity they please' [DM 25.3.1813].

The common form of drainage tiles is described as either short curved tiles like ridge tiles or 'hollow or pipe bricks having a half cylindrical notch in them so that two of these form a hollow cylinder or pipe'. These tiles were understood by Farey [Farey J 1 p.454] 'to be now made duty free at the kilns, without any holes being made through them, to disfigure or spoil them for other uses to which it was pretended they might be applied, and which weakened the tiles and occasioned many of them to break in carriage and in laying in drains'. It is thus apparent that tiles had been manufactured and modified in order to avoid payment of duty on drainage tiles. However it is not clear that Farey's assumption was correct as according to Harvey [Harvey N, 1980 p.81] tax was levied on all bricks and tiles

between 1784 and 1850. From 1826 tiles 'for the sole purpose of draining marshy land' were exempt 'provided they were so marked'. Harvey also emphasises that pipes and tiles were not standardised as a consequence of the numerous brick and estate yards which were involved in their manufacture. This is apparent both from Farey [Farey J 1 p.454] and estate records of A N E Mosley of Burnaston Hall [DRO 84/36].

Prices for tiles are quoted as follows by Farey at Clifton [near Ashbourne]: tiles 12" long, 8" wide and high @ 12d. Newton Solney: pipe bricks 9" long, 7" bored @ 4d pipe bricks 9" long, 23" bored @ 35/- per 1000 ie, 2d each Uttoxeter: tiles 12" long @ 2d pipe bricks 9" long @ 8d and 10" long @ 14d. The relative cheapness of the smaller tiles must have encouraged their use even though they may well have proved less effective. This was certainly the case with respect to the pencil pipes of 1" diameter which according to Harvey [Harvey N, 1980 p.81] were marketed between 1840 and 1870.

A N E Mosley purchased small diameter tiles on behalf of his tenant John Archer on recently enclosed Etwall Common between 1813 and 1820. Rent accounts [DRO 84/36] indicate the following quantities:

1813	700	@ £1.15.0
1814	1600	@ £1.15.0
1815	1300	@ £2.12.0
1818	3880	@ £9. 9.6
1819	300	@ 12.6
1820	1200	@ £2. 8.0

The cost of these tiles at approximately 2d each is comparable with Newton Solney pipe bricks of 24" diameter. On the assumption that tiles were 9" in length it is possible to calculate an approximate cost for draining at 2d per yard for tiles plus 4d for trench digging to 3'. This gives £ 1.10.Od as the cost of laying a hundred yard run of pipes . If the depth is increased to 6' then the cost rises to £6 while the use of 7" diameter pipes would double this sum. Given figures of this

order it is not surprising that field drainage in the early nineteenth century was a costly process and that temptation to lay small diameter pipes at shallow depth perhaps to inadequate grids was considerable.

The development of the rail network had a dramatic impact upon the availability of tiles coinciding as it did with the introduction of the cylindrical pipe making machine in the 1840's and the drainage plough of the 1850's which had considerable impact on costs. The Derby Mercury in 1840 [DM 2.8.1840] carried an advertisement for Tweeddale drain tiles for sale at points between Alnwick [Northumberland] and Stratfieldsaye [Berkshire]. Pusey [Pusey P, 1850] indicates the availability of pipes at one-sixth of their former cost ie, 15/- for 1000' as opposed to 90/- for 1000'. It was against this evolving background that Rowley [Rowley J, 1853 p.62] in his Derbyshire prize essay was able to write that 'draining on the red marls is going forward'. On the old grasslands, as he described them, drainage up to the 1830's was of the sod and turf or wedge type. The discovery of the tile machine is regarded as fortunate for 'by its means many thousands of sheep are grazed in security and the natural fertility of the land is increased'. Given the problems of disease in sheep which occurred in the nineteenth century this is an optimistic view of the impact of drainage.

Such comment is in marked contrast to Rowley's evidence presented to the Royal Commission in 1848 [BPP 1848 QQ 6834 et seq]. Rowley then reported a lack of capital for drainage and that the tenant farmer by custom was responsible for the labour involved and the haulage of tiles. Many tenants were inhibited from undertaking schemes by such arrangements and the rate of progress was likely to have been slow. It is not surprising that Rowley gave the opinion that there was great room for improvement by drainage on both arable and pasture land. At the time when Rowley was voicing his opinions the Government was taking action to facilitate land drainage through the Public Money Draining Acts of 1846 and 1850. The outcome was the making of loans to land owners who wished to improve land through properly devised drainage schemes over a period which extended

to the close of the nineteenth century. The analysis of the records of loan schemes is an important feature of Phillips analysis of the progress of land drainage [Phillips A D M, 1989]. The statistical data and the maps presented by Phillips show considerable spatial variation in the level of take up between different parts of England. Derbyshire readily emerges as a county where there were relatively few loan schemes. Only 28 land owners in Derbyshire availed themselves of loans which totalled £57,517. On the basis of a cost of £6 to drain one acre then the area affected was approximately 9,500 acres or just 7% of the area of land in Derbyshire identified by Phillips as being in need of drainage. Figure 6.3 derived from Phillips shows the location of schemes approved in the 1850's and 1860's. In total some 30 drainage schemes had been implemented by 1869 representing all but two of those eventually approved for the county. The majority of schemes were located in the southern part of the county in two major clusters, one on the coal measures to the northeast of Derby and the second in the vicinity of Ashbourne extending west into Staffordshire. For southern Derbyshire the approximate area of land in need of drainage dealt with under the loan schemes amounted to 8.5%.

Important characteristics of the drainage process have been identified and tabulated through the examination of company records [PRO IR3/5] and more particularly the detailed correspondence of Andrew Thompson between 1858 and 1864 [Sneyd MSS]. Thompson was a land surveyor involved in the assessment of half the schemes carried out in southern Derbyshire in adddition to others in neighbouring Leicestershire and Staffordshire. It is evident that loans were sought by the more substantial land owners, even so areas of land to be drained were strictly limited in a number of instances for example 106 acres at Wingfield, 117 acres at Lullington and 160 acres at Marchington. The largest schemes in southern Derbyshire were on the Vernon Estate in Sudbury and West Broughton and involving some 1,450 acres of land and 1,300 acres at Edward Coke's estate at Longford which was estimated to take five years to completion. Nearby in Staffordshire a scheme involved some 3000 acres on Lord Bagot's estate at Blithfield in Staffordshire where it is stated that 'earlier shallow drains gave little benefit' and the

schemes normally involved an improved specification of 2" pipes at a depth of 4' and 11 yards apart [Sneyd MSS]. The range of cost quoted gives an average of about £6 per acre with an estimated resultant increase in land value of 8/- to 10/- an acre. It is evident that the scale and cost of operations was such as to deter small estate owners with limited capital and income and who would experience difficulty in loan repayment. It is also the case that the marl subsoil gave rise to difficulties which tended to increase costs so that at Longford for example the marl was described as hard and very strong in places while at Holly Bank Hall at Needwood the stiff soil made the cutting of drains expensive.

Phillips concludes that from a national perspective drainage of grassland was secondary to that of arable such that in the period 1840 to 1870 'draining must be seen primarily although not exclusively as an improvement for arable'[Phillips A D M, 1989]. He argues that the return on capital following drainage was more rapid on arable than grassland and that consequently farmers may have been reluctant to put newly drained arable down to grass. Even in the Derbyshire area with its well established pastoral economy it appears that drainage was aimed as much at arable as it was at pasture. The main focus of the schemes were upon arable at Stainsby House on the coal measures and at Bradley Hall near Ashbourne and at Catton Hall both on the Trias.

It is evident that while the schemes which received loan support must have had potential benefit in limited localities their number and scale was not sufficient to effect a general improvement across the heavier lands of Derbyshire. There is the possibility of course that drainage was also being progressed through schemes which did not feature in the loan process but it may have been that the major effort came later. Certainly the judges of the Derbyshire prize farm competition in 1881 reported that 'a great extent of land in the district we visited is being underdrained and much is being redrained' [DPFC p.474] but even at this time there was still discussion as to the optimum distance and depth to lay pipes and also the most effective diameter to adopt.

Land Improvement - Marling and Liming

The control of soil acidity emerged as an aspect of land improvement which grew in significance as technical advance in agriculture progressed. In many parts of the country not least in southern Derbyshire this was achieved by the addition of marl. However by the early nineteenth century Harvey [Harvey N, 1980 p.68] reports that the direct addition of burnt lime had largely replaced marling. The relative merits of the two additives are discussed in the context of southern Derbyshire, marling being dealt with first.

Marl has been defined by Adams [Adams I H, 1972 p.157] as a calcareous clay ie, a clay containing a high proportion of calcium carbonate. The digging of marl for the purpose of soil improvement probably had its origins in the middle ages and was a well established practice by the eighteenth century. On heavy soils it was used to improve texture as the lime fraction in the marl reduced acidity and through the process of floculation structure was modified to improve workability. The benefits have been summarised in a verse which casts doubt on the wisdom of marling heavy land. 'He that marls sand may buy the land. He that marls moss shall have no loss. He that marls clay throws all away' [See Harvey N, 1980 p.68].

In southern Derbyshire and throughout the occurrence of its outcrop the dominant Mercian Mudstone formation has been widely used for marling. This was the case on soils developed on the mudstone as well those outside its outcrop. The relationship between the character of marl bedrock and soils developed upon it has been outlined by Ragg et al [Ragg J et al, 1984 p.314 et seq]. While marl is rich in potassium, calcium and magnesium in contemporary farming terms marl soils need added lime and nitrogen to maintain soil fertility. This implies that the amount of free lime available in Mercian Mudstone is rather limited and casts doubt on the effectivness of marling. Harvey [Harvey N, 1980 p.67-9] underlines this point arguing that adding clay to clay brings no benefit and marling clay land is an expensive way of adding any lime that may be required.

Farey [Farey J, 1.1815 p.456] noted the location of a number of marl pits in southern Derbyshire as mapped on Figure 6.2. These may have been the larger pits or simply those he observed in his travels as inspection of the Ordnance Survey First Edition at 1:10,560 [c1880] reveals a widespread distribution of pits including clusters of pits in parishes such as Etwall and Findern. The economics of marling must have been favourable as the material was immediately to hand and required no processing. An application of 20 waggon loads per acre is quoted by Marshall [Marshall W, 2. 1796 p.189] at a cost of 40/- per acre. Chambers and Mingay [Chambers J D and Mingay G E, 1966 p.63] indicate that marling was traditional in the north west Midlands but note that marling was held to be excessive in Staffordshire by the end of the eighteenth century. This is confirmed by Pitt [Pitt W, 1808 p.69] who wrote that marling was practice much used on the red soils. He noted that as marl exists as an understratum it should be used sparingly 'otherwise it gives a harshness to soils too strong before'. By the early nineteenth century the peak of popularity had been reached in Derbyshire. Farey [Farey J, 1 p.148] stated that in several parts of the red marl marling was much practised but with no hollow draining the land was overcrowded and became too tenacious and cold.

As a soil additive the purpose of liming was to reduce soil acidity which facilitated the release of soil nutrients, the increase of the water holding capacity of soils on light land and the break down of heavier clays. Clearly as a more chemically concentrated and freely soluble source of calcium carbonate lime was vastly more effective than marl. Indeed as lime burning technology improved and transport systems evolved so the availability of lime became such as to replace marling by the early part of the nineteenth century. The beneficial properties of lime were well recognised by commentators on the agricultural scene in the North Midland area and it is evident that burnt lime was available to farmers from the latter seventeenth century. Woolley [Glover C and Riden P, 1981 p.76] writes of Crich that 'this town is famous for very good lime which is carried about the county and sold at Derby, about eight miles off from thence about 16d or 18d per horse load'. While

Hey [Hey D, 1984 p.141] states that dung, lime and marl were often mixed together as a manure. He quotes Tobias Ireland of Marston Montgomery who purchased 8 loads of lime for £2 in 1651 and Lord Vernon of Sudbury who in 1677 paid Wright the lime man £1 for 360 loads of lime. Marshall [Marshall W, 2. 1796 p.2] in his account of the agriculture of the Midland counties was enthusiastic about the use of lime and referred to the lime obtained from Ticknall and Breedon in South Derbyshire as being of singular quality. He recommended application at the rate of 5 to 6 quarters to the acre and noted that the cost of fetching this lime over a distance of 20 miles was 40/- to the acre. From experiments on his farm at Statfold near Tamworth he had shown that barley benefited from an application of 10 quarters per acre and quoted the experience of a relative farming on the banks of the Trent who had successfully set lime on wheat.

The authors of reports to the Board of Agriculture, Pitt [Pitt W, 1809] in Leicestershire and Curtis [1806] and Farey [Farey J, 2. 1815] on Derbyshire are supportive of Marshall's views. Pitt [Pitt W, 1794] in his early survey of Staffordshire wrote of the positive effects of lime on acid soils stating that 'lime is an excellent corrective of such harshness: it has the power of amelorating such soil and in some measure of breaking and dissolving its particles. It is much used and with good effect especially after marling'. The latter remark is further evidence of the limitations of marl.

Farey's account [Farey J, 2. 1815 p.418-445] is typically more detailed than that of his contemporaries. His geological awareness enabled him to identify clearly the major sources of limestone available to southern Derbyshire and adjacent counties. The foremost was the Dinantian limestone outcrop of the 'White Peak' where the resource appears as widely exploited by the early nineteenth century. Harris [Harris H, 1971 p.60 et seq] notes the use of crushed lime from this area as early as the sixteenth century and the proximity of the limestone peak to coals in the Westphalian Coal Measures and the Namurian [Millstone Grit series] which facilitated the development of lime burning.

A second series of outcrops of the Dinantian limestone are located in southern Derbyshire and north Leicestershire as inliers in an area otherwise dominated by Upper Carboniferous [including coal measures] and Triassic strata. Despite their limited extent they are thus situated almost providentially to serve the needs of agricultural improvement at some distance from the main limestone outcrop. The data provided by Farey on the lime industry has been mapped as Figure 6.4. This shows a strong relationship between limestone outcrops and an evolving transport network. Indeed some elements of the network were deliberately created in order to facilitate the trade in lime and some locations for burning were thus created away from the limestone outcrops. The most important transport system influencing this process emerges as the Trent and Mersey Canal with its various tributary systems, the Cromford/Erewash, the Derby and the Caldon/Uttoxeter canals. Farey lists a number of canal bank lime burners who derived their limestone from the anticlinal Crich inlier, referred to by Woolley [see above], which lies adjacent to the south eastern extremity of the main limestone outcrop. Many of these sites were operated by Messrs Edward Banks who burnt lime at locations as far apart as Bull Bridge south of Crich and Horninglow at Burton upon Trent. It is interesting but hardly surprising to note that the price charged for burnt lime increased with distance from Crich rising from 3/4 a stone at Sandiacre on the Derbyshire/Nottinghamshire boundary to 4/- at Burton upon Trent.

Other lime burners can be identified. The Derby Mercury [DM 18.2.1812] advertised 'the lime kilns at Brinsley in the County of Nottingham, adjoining the Cromford canal'. 'They are remarkably well situated for getting both limestone and coal and for the conveyance of lime into all parts of Nottinghamshire, Derbyshire, Leicestershire, Rutland and Lincolnshire'. While in 1813 [DM 8.4.1813] 'Gabriel Brittain respectfully acquaints his friends and the public that he carries by his boats Crich lime from the lime works of the Butterley Company at Codnor Park and he delivers it to the places for ready money. Orders were taken by Samuel Slater of Derby, N Lyons of Barton Turn [SW of Burton upon Trent] and Mr Sutton of Kegworth '.

The exploitation of the resources of the south eastern margin of the limestone outcrop was matched by comparable development to the south west in the vicinity of Caldon in Staffordshire. Here the Caldon canal had been engineered along the line of the Churnet valley. At Froghall wharves received limestone from Caldon quarries via tramways first opened in 1778 and later substantially extended by John Rennie. In 1786 the canal company opened its first batch of kilns at Froghall [see Lindsay J, 1979 p.54 et seq]. Initially limestone and lime were transported westwards towards Leek and the Potteries and thence into the Trent and Mersey system. The prospect of wider distribution southwards came with the proposal in 1797 to extend the canal to Uttoxeter with a link along the line of the Dove Valley to the Trent and Mersey north east of Burton upon Trent a scheme that was warmly supported by Farey. The Uttoxeter link was ultimately achieved in 1811 from which time lime burning was recorded at Uttoxeter. While it was claimed in 1818 [Lindsey J, 1979 p.63] that the canal was contributing to the prosperity of market activity in Uttoxeter lack of trade soon became a problem and the canal was closed in 1847.

Of the various limestone inliers of South Derbyshire and North Leicestershire those located at Ticknall and Breedon achieved the greatest fame. The location at Breedon which provides a site for the parish church forms a particularly prominant landscape feature. Ford [Ford T D, 1969 p.62] describes the inliers 'as comparatively little known' but variable in character. He notes that at Breedon some 75m of dolomitised beds dip steeply to the west a feature that was also evident to Farey [Farey J, 2, 1815 p.419]. In addition local mineralisation with galena and associated gangue minerals was also likely to have attracted attention. That Breedon lime was different from other lime was well recognised. Monk [Monk J, 1794 p.17] reported it to be 'too strong'. Pitt [Pitt W, 1809 p.7] thought Breedon lime to be magnesian in character and recognised that there might be limits to its application - 'the farmers find it an excellent stimulating manure, especially on strong soils, but do not care to use it above 4 tons per acre'. Farey as a geologist actually equated Breedon with the Magnesian Limestone of north east Derbyshire. The outcrops at Ticknall together with inliers at

Calke Park [Crewe Estate] and Staunton Harold [Earl Ferrers] were not dolomitic. The lime produced was applied by Mr Greaves of Ingleby to gravelly lightish land at the rate of 160 bushels per acre or half of that Breedon lime which is 'so powerful of quality that a very small increase would kill the crop'. The limestone at Ticknall was exploited at the initiative of the Crewe family. Sinar [Sinar J, 1985, p.169] reports that the Ticknall lime kilns flourished in the period 1820 to 1840. The stimulus for this apparent steady increase in output was the completion in 1805 of a network of tramways from the Ticknall lime yards and also those at Breedon on the Hill to the newly constructed Ashby canal at Moira.

The market thus opened up lay southwards into Leicestershire and Warwickshire but the well established local market served by waggons and the Trent and Mersey continued to expand. The Derby Mercury advertised in 1820 that Hutchinson and Ordish of Ticknall, 'are in attendance at Burton, Derby and Ashby on market days'. Curtis [Curtis W, 1806 p.51] notes that William Smith of Foremark [and later Swarkestone] was both a burner and seller of Ticknall lime - 'the demand is such that he makes £500 per annum'.

Of the inliers north of the Trent comparatively little is known. Chisholm et al [Chisholm J I, 1988 p.26] describe the limestone at Birchwood Park quarries near Snelston as massive thick bedded limestone. Active quarrying is recorded by Farey and lime burnt [Farey J, 2.1815 p.418] using coal from Cheadle at 8/8 per 20 bushels. Glover listed the quarries in 1829 [Glover S, 1829 p.85-6] while in 1857 White [White F, 1857 p.233] reports the works as being in the ownership of Hanson and Fitzherbert of Somersal. The limestones at Wild Park near Brailsford were owned by the Poles of Radbourne. Here hot lime, presumably magnesian was reputedly sold at 9/6 per score bushels. The Turnditch quarries were being offered for sale in 1820 [DM 13.12.1820] but featured in Glover's list of 1829.

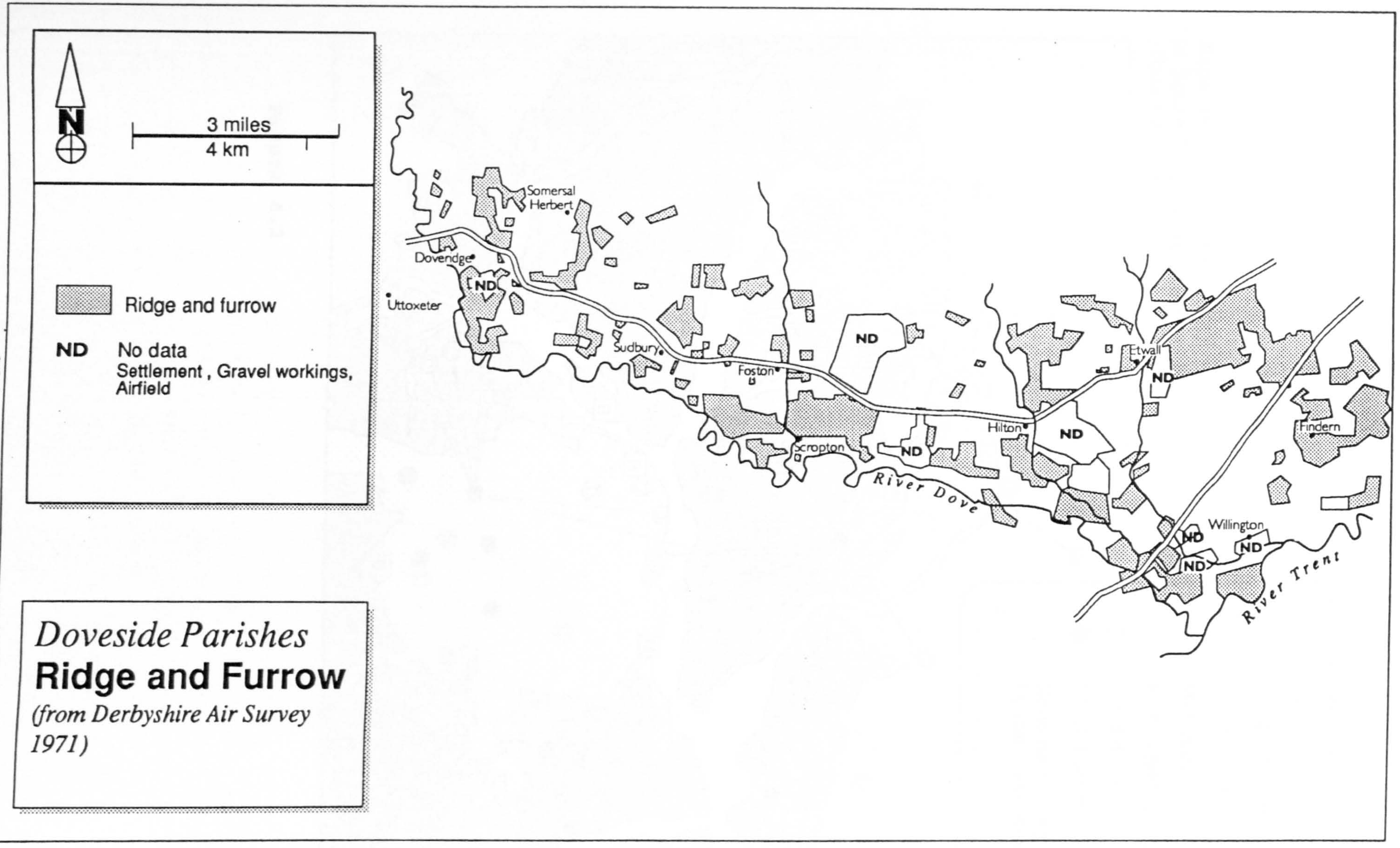
The range of distribution from five of the various sources of lime south of the main outcrop has been plotted on Figure 6.4. Ticknall and Breedon lime, despite the latter's strength, were

certainly distributed over distances of 20km while the lesser quarries at Birchwood Park, Wild Park and Turnditch were distributed at a radius of about 10 km.

Further analysis of data gathered by Farey [Farey J, 2 1815 p.433 et seq] on the amount of lime applied per acre shows some variation between the geological situation of farms and the amount of lime used by farmers. On the Triassic marls rates of application varied between 80 bushels and 200 bushels per acre. Lesser amounts were used on arable where cultivation including ploughing and harrowing integrated lime into the soil more effectively than when simply spread on pasture. On heathland greater amounts were used when initial reclamation was in progress. Information on rates of application and price per bushel underlines the high cost of liming in the early nineteenth century. Lime purchased at say Willington on the Trent Mersey and applied at 160 bushels per acre would cost £4 per acre or £400 for 100 acres. This would clearly represent a considerable outlay and it is not difficult to understand how the Earl of Chesterfield at Bretby is reported to have spent £500 on liming.

While it can be recognised that the small farmer may well have found the capital outlay for effective liming difficult to achieve or sustain there is no doubt that southern Derbyshire was well situated to benefit from the trade in lime which grew rapidly through the study period. Certainly liming was a standard procedure for more substantial farmers in the management of arable land but reference to its use on grassland is relatively infrequent. There are comparisons to be made with the cost implications of land drainage previously discussed. Although the cost of drainage was borne by landlords the advantage was again with the larger and better capitalised concerns. The extent of effective drainage is difficult to assess but the feel of the data is that it was limited in an area like southern Derbyshire which was dominated by small estates and small farms. However land improvement was significantly achievable by other means i.e. through the direct application of fertilisers and through the better feeding of livestock. These aspects are considered in the following

discussion which is directed towards the identification of feed regimes.



Doveside Parishes

Ridge and Furrow

(from Derbyshire Air Survey 1971)

Figure 6.1

Aspects of land improvement in South Derbyshire c1810
(Data from J Farey)

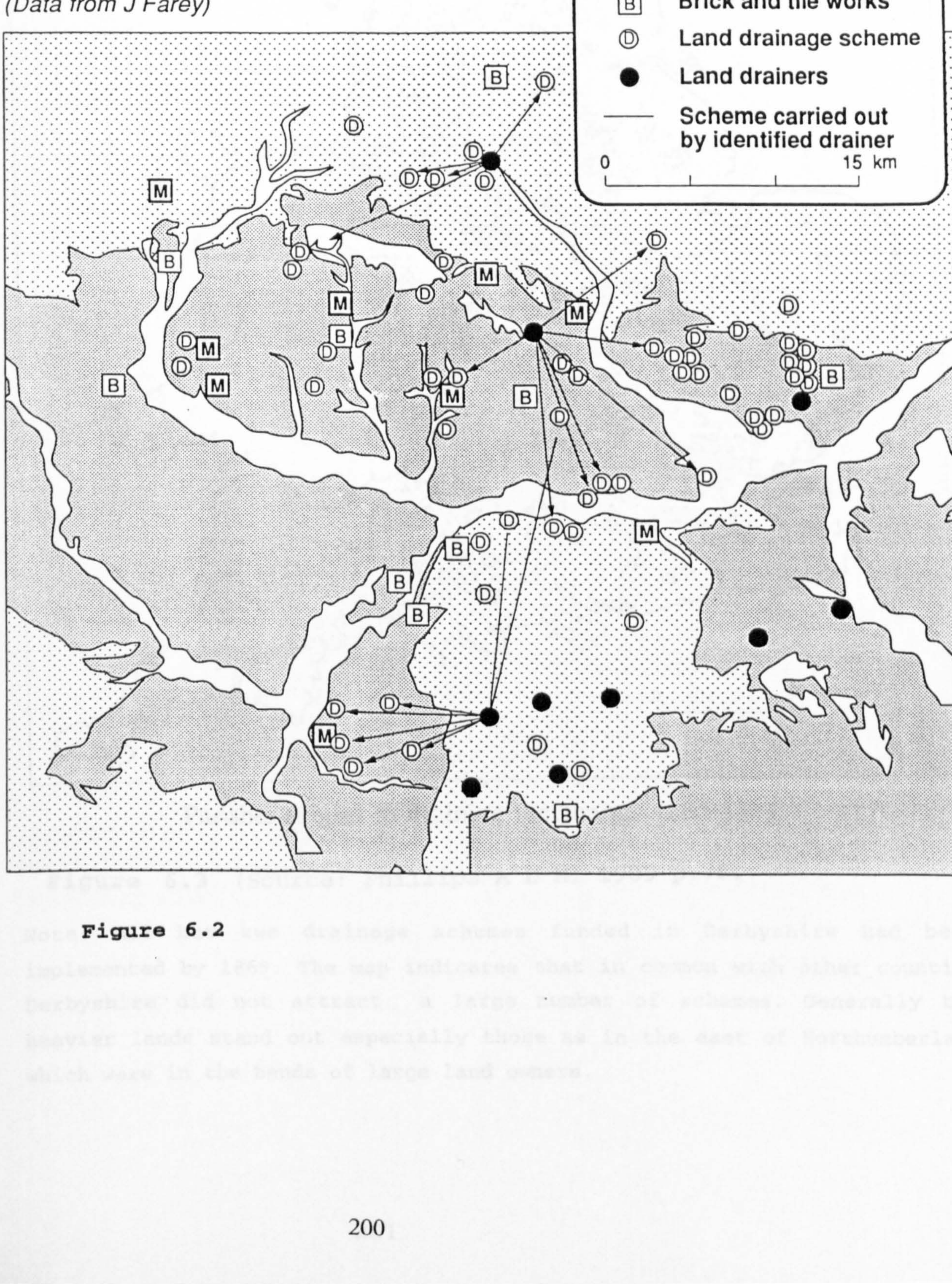
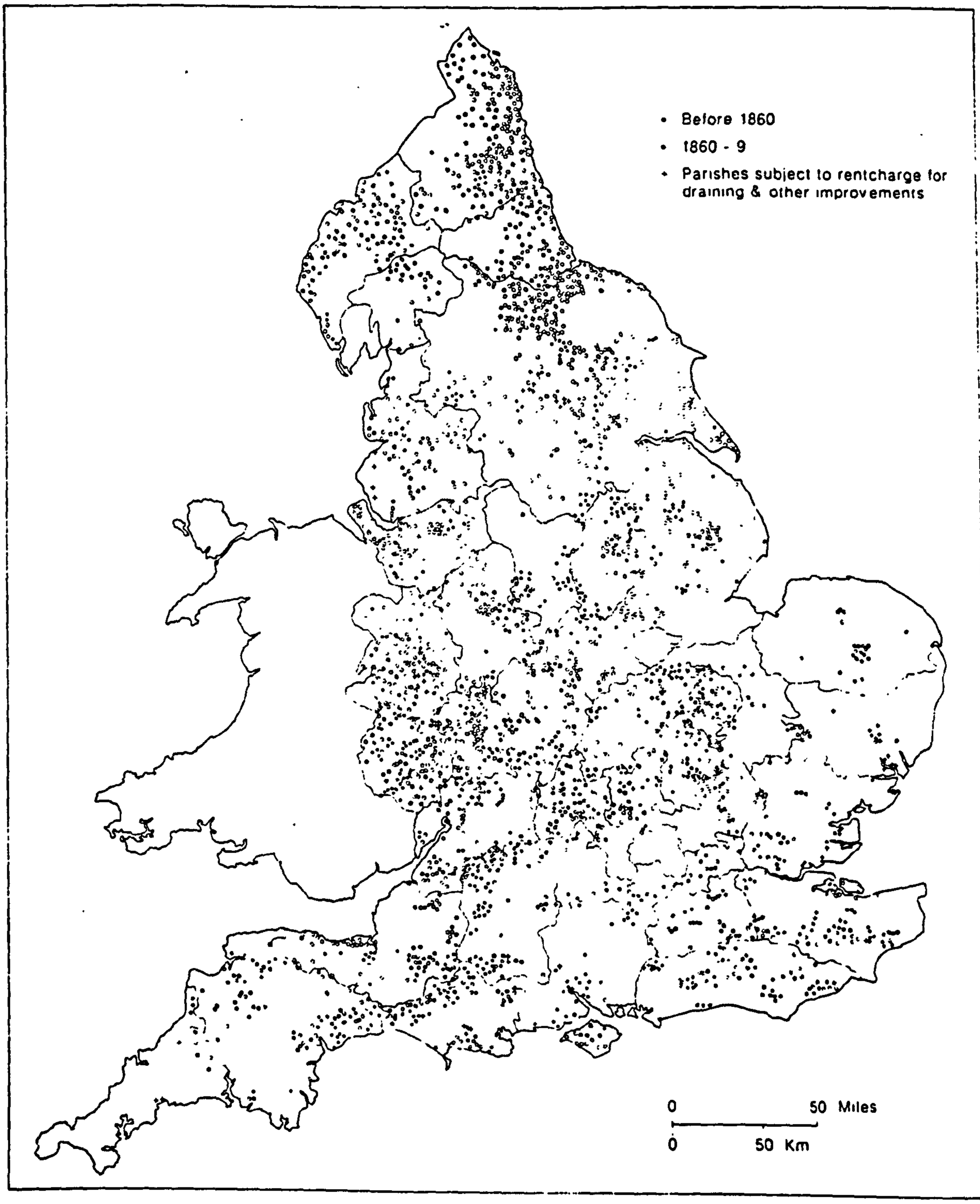


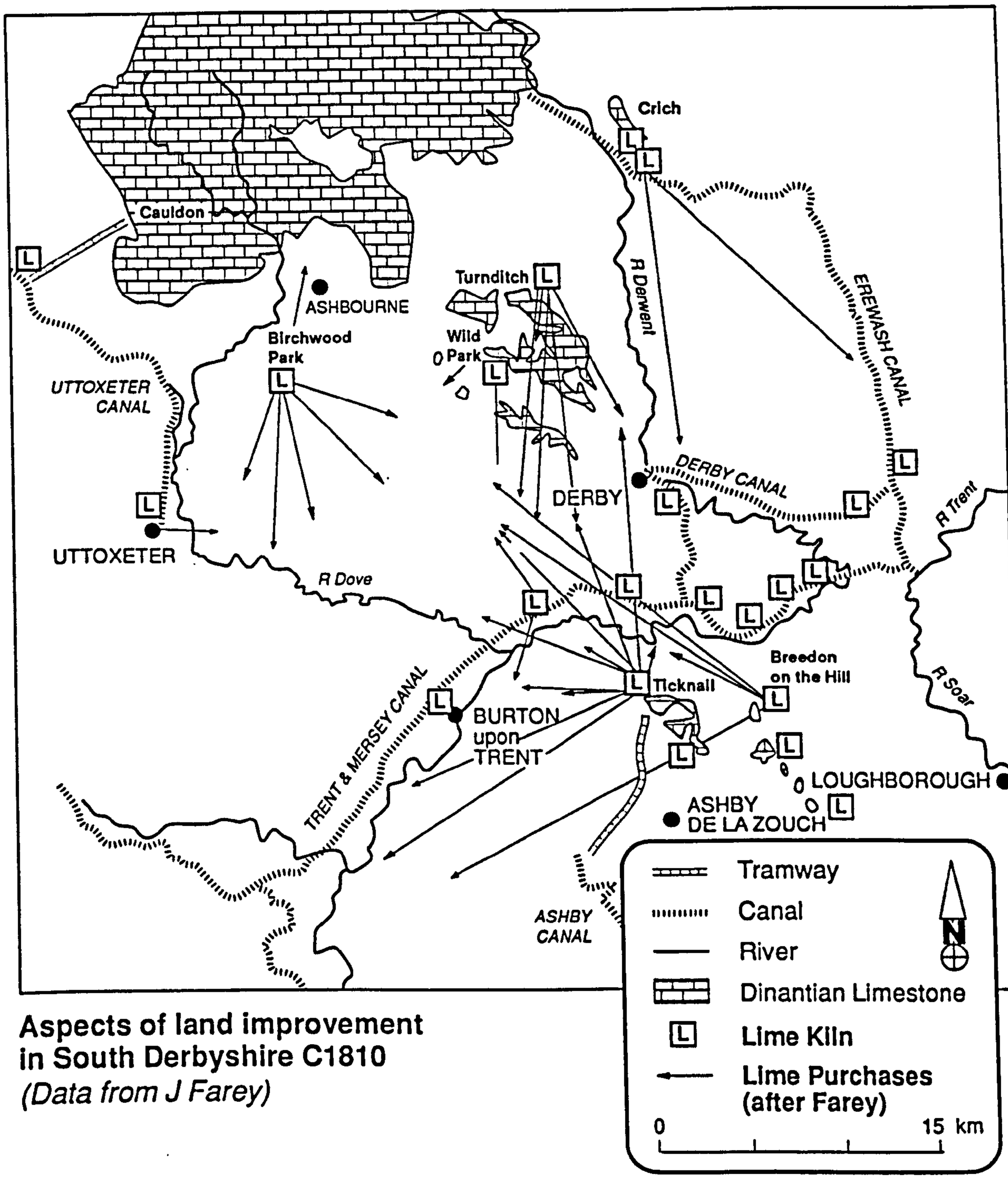
Figure 6.2



Parishes subject to draining rentcharge, 1860–1869

Figure 6.3 (Source: Phillips A D M, 1989 p.75)

Note: All but two drainage schemes funded in Derbyshire had been implemented by 1869. The map indicates that in common with other counties Derbyshire did not attract a large number of schemes. Generally the heavier lands stand out especially those as in the east of Northumberland which were in the hands of large land owners.



Aspects of land improvement in South Derbyshire C1810
(Data from J Farey)

Figure 6.4

CHAPTER 7

CROPLAND AND GRASSLAND AND THE PROVISION OF STOCK FEED

The availabilty and quality of feed is a matter of fundamental significance to this study with its focus on a livestock based farm economy. Preceding chapters have discussed related features of the agrarian scene including the natural environment, land use trends, farm size and occupation and ownership of land and the nature and extent of aspects of land improvement. It is the purpose of this chapter to relate these factors to a more detailed appraisal of land management with a particular focus on the production and provision of feed for livestock. In this context it will be necessary to balance the few detailed insights into the operation of particular farms against more generalised inferences drawn from a review of the way in which grassland and cropland were managed in southern Derbyshire. The discussion is developed in two parts, the first concerns grassland and the second cropland and purchased feed.

Part One: Grassland

It has been shown that grassland was the dominant use of land in southern Derbyshire in the period from the mid eighteenth century and for some parishes had certainly been so established at much earlier dates. Grassland was thus the essential characteristic of the farming landscape of the time which was in tune with an evolving livestock based economy. It is important to elaborate the varying nature of grassland and in particular to consider its productivity and the extent to which it may have been improved. The issue of land drainage has already been considered in the previous chapter and while it is evident that some improvement was achieved especially during the latter decades of the study period there is uncertainty as to its extent and its effectiveness may also need to be questioned.

Discussion of the character of grassland in southern Derbyshire may usefully begin with data derived from the agricultural

census of 1870 which provides a secure platform from which to consider earlier trends. A broad outline of change has already been established in Chapter 5 where it was shown that permanent grassland occupied approximately 70% of agricultural land in southern Derbyshire throughout the nineteenth century. Figure 5.11 has demonstrated that there were important distributional variations across the area as shown by the 1870 census and it is likely that these had been in existance for some time. South of the Trent and into Leicestershire permanent grassland accounted for some 55% of the agricultural area while on the red marl in Derbyshire and adjacent parts of Staffordshire the proportion is 73%. For a group of individual parishes south of Ashbourne around Cubley and Yeaveley over 80% of land was permanent pasture.

Tables 7.1a, b and c have also been derived from the 1870 agricultural census to show important relationships between grassland, dairying and the provision of feed. From Table 7.1a milk cows were the majority type of stock as expressed in livestock units for the red marl area. On average each livestock unit was supported by over 3 acres of agricultural land approximately two and a quarter acres of which was grass. Of the grass between two thirds and three quarters of an acre was mown for hay. Also within the arable element green crops were grown such as to provide each unit with just under one tenth of an acre of feed. On the coal measure country the situation was similar to that prevailing on the red marl although over 4 acres of land was available to each livestock unit and the average area of hay exceded one acre. South of the Trent and into Leicestershire the principal difference was a much greater emphasis on green crops and a marginally smaller area of hay. These observations in combination with the clearly more varied agricultural practice south of the Trent indicated in Tables 7.1 b and c underpin the subregional distinction on either side of the river which has already been signalled. They also highlight key characteristics of the dairy dominated red marl notably a relatively low level of hay and green crop provision in terms of area with a consequent enhancement of the role of grazing land and also purchased feed.

Classification and Quality

An important aspect of general grassland management which merits immediate comment is the distinction traditionally made between meadowland which was mown for hay, essentially a winter feed, and pasture land which provided accommodation and grazing for livestock principally in summer but often in winter as well. The greater area of the meadow or pasture was 'permanent' and although identical in function was distinct in this sense from the temporary mowed or pastured grasslands which comprised elements of the arable system and which will be considered separately. It has been evident from the parish based case studies discussed in Chapter 5 that it was customary to distinguish grassland as pasture or meadowland and that such distinction had implications for the level of rent that was realised. Levels of rent and also comment in farm sale notices in the Derby Mercury indicate that meadowland was generally valued more highly than pastureland and when located in particularly favourable circumstances such as on riverside alluvium was markedly so eg, £5 to £6 an acre as against £2 to £3 for medium quality and 30/- or less for modest pastures. It is important to note that these higher rents were payable on lands substantially given over to dairying rather than stock feeding. Sheldon described the Doveside, Trent and Derwent grazings as 'having long been famous for dairy productions' [Sheldon J P, 1883 p.142].

The normal pattern of meadowland management for the early nineteenth century is described in some detail by Farey [Farey J 2, 1815 p.175-9]. He underlined the lack of functional compatability between grazing and mowing lands. Meadows were shut for hay in the spring and livestock were excluded from them. The subsequent harvesting of hay would be controlled by the weather conditions of a particular season but would usually be completed by July. In Derbyshire the hay harvest was regarded as being of greater importance than the corn harvest and in the south of the county the use of the term 'the harvest' meant the hay harvest rather than the products of tillage. The methods of hay making were also traditional involving much labour and skill in mowing, bedding and storage. The latter was in the form of

ricks. Farey [ibid p.182] described the purpose built hay barn at Locko Park near Spondon as unique to the county. Following the carting of hay from the meadows the further growth of grass known as the eddish or aftermath was variously used. In some instances it was grazed, in others it was allowed to grow on through to the following spring without treatment while in others it was managed in various ways in order to improve the yield of hay.

In the reality of farming practice meadows and grazed pastures were not fixed in their use. In the Tithe Surveys for example interesting variations were recorded between parishes in the way that grassland was categorized. In a number of instances such as Ash, Sutton on the Hill and Egginton parishes [DLHL Tithe] meadow and pasture were distinguished on a field by field basis. Whereas in the case of Doveridge the term 'meadow or pasture' is used with no attempt at differentiation. The Tithe File for Etwall parish [PRO IR 29/8] provides evidence as to the problem of the classification of grassland. In discussion as to the appropriateness of the suggested tithe rent charge two farmers confirmed that land was both mowed and grazed. Mr Eaton commented that 'I can go to a greater portion of the pasture land [in the parish] and show that it has been mowed very frequently'. Mr Spencer remarked of his 82 acre field Far Slade that 'I eat this perhaps two years and mow it a third - it has been charged [for tithe rent] at pasture'.

Bearing in mind that differentiation of pasture and meadow was not clear cut a fivefold categorisation of grassland in southern Derbyshire is proposed.

1. Low lying grazings and meadows occupying the alluvial flood plains of major rivers such as the Trent and the Dove and also the narrow alluvial tracts associated with the lesser brooks and streams. As has been shown in Chapter 3 floodplains occupied the unusually high percentage of 20% of the agricultural land of southern Derbyshire. Given that they were predominantly in grazings which had a national reputation for quality it is likely that floodplains made a substantial contribution to regional productivity.
2. Water meadows which were highly localised in circumstances

where capital and effort had been invested in attempts to bring about the early spring growth of high quality grass. In a number of instances these were located on flood plains.
3. Temporary grassland created for variable but limited periods within arable rotation systems.
4. Pasture for grazing which was widely distributed throughout the area and which occupied the larger part of the grassland category.
5. 'Upland' meadows i.e. any meadowland located away from the major river valleys and spatially coincident with the previous category.

As a consequence of their extent the quality of the ordinary pastures together with the 'upland meadows' was a key factor in determining the potential productivity of farming in the southern Derbyshire area. At this juncture however there needs to be considered the paradoxical problem of the general quality of grassland. Despite its fundamental importance in areas dominated by livestock such as Derbyshire the evidence of nineteenth century agricultural commentators indicates that in the country as a whole much grassland was managed at a level sufficiently low as to merit strong criticsm. Recognising the validity of this view in the wider farming context Broad goes so far as to suggest [Broad J, 1980 p.79] that grassland farming in the Midlands was cheap farming involving a low level of capital which indicates that the ability of many farmers to put much effort into the improvement of grassland had been strictly limited.

The Board of Agriculture reports provide evidence to support poor management of grassland but also indicate that some farmers were practicing progressive techniques. Pitt [Pitt W, 1809 p.58] said of Leicestershire farming that much of the grassland had been managed at a low level for many years. At the lowest end of the scale were pastures characterised by neglect in the form of weed invasion to the exclusion of better quality grasses. These could be contrasted with well managed weed free pastures sustained by the input of labour on the part of the farmer. Similar variation is reported by Farey [Farey J, 2 1815 p.190] with respect to Derbyshire. Although the focus is on the

improving farmer and better practice Farey emphasised the problems of weed growth and weed control but gave equal prominence to the importance of well established pasture to the dairy economy. Seemingly the prevailing opinion among farmers was that old turf was comparable with 'artificial grasses' or lands new laid down, 'though clear and luxuriant in their growth'. Additionally Farey [ibid p.188-9] specifically identified localities with very rich pastures on the red marl at Ash and Barton Blount. By contrast he also identified what in his view were 'too many instances of the neglect and weeding of new pastures'. Specific occurrences of such neglect are cited for the lands on the Trias at Trusley, Longford and Weston Underwood and near the Trent at Findern and Twyford. Surprisingly he referred to Sudbury Park in this context in a rare criticism of the farming practices of the gentry.

Farey [ibid p.189] regarded the key to good management of pasture as the combining of the grazing of land by sheep and cattle - so that 'the whole surface is eat down fair and smooth'. A similar effect could be achieved by the successional grazing of cattle and sheep as was the method of Thomas Harvey of Hoon Hay which resulted in his pastures being 'rendered fine, uniform and neat' [ibid p.190]. The important feature of such grazing regimes was the ability of sheep to graze closely and effect control of weeds including yellow ragwort, wild thyme and hen goose. Certain weeds were not palatable to sheep so that Farey [ibid p.191] noted that thistles, dandelion and other broad leaved plants were far too common. Thistles were evidently a major problem and Farey observed plentiful crops of these invaders which were 'too repeatedly left to ripen and disperse before they were cut' in the pastures and also in meadowlands before mowing. The cutting of thistles before seeding was regarded as the most effective treatment for thistle infestation but this was thought to induce tillering and thus worsen the problem in the long run. An alternative was spudding or digging out with a special weeding spade but this was labour intensive. The ability of the Earl of Chesterfield at Bretby to send his men into the lanes to dig thistles out of the verges to prevent seeding must have been a rare luxury.

Farey [Farey op cit p.46-7] also reported the techniques used by improving farmers who sought to increase the productivity of pastures. For some, such as Lord Vernon of Sudbury, there was a choice to be made between using dung from the midden and stable to fertilise his meadows, or applying it to arable land. In the event 20-30 two horse cart loads were spread on each acre of meadow while with the exception of turnips lime rather than dung was used on arable. Lord Vernon's approach indicates that with limited dung available the provision of winter feed for stock had high priority in his system. Dung was also used on the meadows of the Kedleston Estate but in this case it was mixed in with 'red marl'. Farmers made up composts from various materials as top dressings for meadows. William Smith at his Foremark farm and Thomas Harvey at Hoon Hay used a combination of earth and lime. On the Mundy's Markeaton Estate lime was mixed with the street sweepings from the town of Derby. The scavengers of the town were paid £6 for a three horse cart load occasionally mixed with privy soil. At Measham on the South Derbyshire coal field it was the practice to mix coal ashes with lime although ash would have had no nutrient value. On William Greaves farm at Ingleby the accumulated mud and vegetable debris were dug from the bottom of fish ponds every six years and mixed with lime and dung. The most elaborate system was used on the Chesterfield Estate at Bretby. Various materials such as coal dust, ashes, earth from banks, dung and lime were mixed together with considerable care. The labour intensive aspect of this operation is described by Farey [op cit p.187] 'during every spare hour the labourers are employed to sift, turn and mix the materials in the compost yard - a practice highly worthy of imitation in other large establishments'. A more general practice was to roll meadows in spring as this was held to facilitate growth and increase yield.

It would seem that Pitt's observations of neglect noted above were of wider potential application throughout the nineteenth century. In the 1860's Morton [Morton J C, 1865 p.62] wrote that 'the condition of so large an extent of our pastures is unsatisfactory' and that farmers work on the basis that 'pastures not only maintain their own fertility but contribute

to that of the arable fields' in a reference to pastures as the ultimate source of dung. Morton's assessment was matched by Johnson [Johnson C W, 1863 and 1864] and Sutton [Sutton M, 1861 p.420] who judged that 'thousands of meadows and pastures are producing less than half the quantity of hay and feed which the land is capable of from a deficiency of plants of those kinds which are most productive and most suitable for the soil.' Later in the century both Thompson [Thompson H S, 1872] and particularly Sheldon were equally critical [Sheldon JP, 1883 p.141-2] stating that 'grassland is too generally left to take care of itself - and this widespread neglect being the rule rather than the exception is a matter which causes but little surprise'. In the process of general condemnation widely scattered areas are identified for specific comment. Morton [Morton J C, 1865 p.63] for example refers to Gloucestershire where 'grasslands keep hardly any larger dairy stock than they did twenty years ago' as a result of 'lack of drainage and inadequate manuring'. Correspondents of the Farmer's Magazine in 1863 and 1865 commented on the gross neglect of pastures in Dorset and Surrey respectively while Smith [Smith R, 1848] was urging the eradication of common weeds from pastures in Rutland. The only county which received praise was Cheshire where draining and boning were frequently acknowledged as the key factors in pasture improvement and farm productivity. Cheshire was a yardstick for comparison as Little [Little E, 1860 p.291] wrote of north Wiltshire, 'there is not as much improvement as Cheshire, there is little done in manuring with bones, guano or other grass manure'.

With respect to the East Midlands in the 1860's Moscrop [Moscrop W J, 1866 p.326] was to write of Leicestershire 'there remains much land which loudly calls for drainage' and there are 'hundreds of acres so covered with anthills as to be almost worthless; on some farms hassocks and thistles are allowed to run riot'. The clear implication is that little had changed since Pitt, and to some degree Farey, had made their assessments half a century earlier. This view of the general run of Midland pastures is supported by Carrington in an account of his farms on the red marl at Hollington and Croxden Abbey just to the west of the Dove in Staffordshire [Carrington W T, 1865 p.345] when

he observed that 'it is much to be regretted that from ignorance and supiness, want of capital or security of tenure our pastures are so much neglected'. A further comment [ibid p.344] that 'farms which are all in grass are generally small and in the hands of needy unenterprising tenants' also supports the central concern about grassland given the large number of very small all grass farms which has already been identified.

A fundamental issue with respect to grassland quality was the long term impact of a dairy regime. Unlike the business of feeding cattle and/or sheep dairying progressively depleted the soil and herbage of essential minerals. Carrington [Carrington W T, 1865 p.345] recognised the problem in stating that 'there is an immense drain upon the mineral resources of the land entailed by any system which turns upon the sale of milk - unless dairy pastures are liberally dressed with manures they will soon become perceptably poorer'. Evershed [Evershed J, 1869 p.274] also articulated the problem and its solution in the form of boning which had given the quality of Cheshire dairying particular fame. 'The application of bones [at 3 or 4 cwts per acre] to pastures exhausted by years of depasturing with dairy cattle has been generally resorted to and in the case of worn out cow pastures the effects on herbage have been marvellous - they are not found to answer on dry light land but they seldom fail to answer on the moister heavier soils which have been underdrained'. Cadle [Cadle C, 1869 p.321] noted 'the continual exhaustion of their [pastures] phosphates and other constituents by selling of the butter and cheese and rearing of young stock without any return being made to the land either by dressing or manuring,' - 'a state of things which cannot be too strongly condemned'. Heywood [Heywood W H, 1865 p.338] saw the evidence in the fields: 'one of the best indicators of progressive improvement attendant upon this system of grazing is obtained by one simply observing the very great difference in the quality of dung heaps ....the cold aqueous appearance of that produced by milking stock contrasted with the fermenting oily nature of that collected from fattening beasts'.

The combination of boning and draining as practised in Cheshire was widely reported and commented upon enthusiastically in the

agricultural literature of the nineteenth century [see for example White H, 1848, Dixon J, 1858, Johnson C W, 1864, Risby T, 1864]. Morton [Morton J C, 1865 p.62-64] indicated that Cheshire may well have acquired an almost unique position amongst the English dairying counties in the nineteenth century in terms of the effectiveness of land management through drainage, bone dust and the adoption of the Shorthorn cross. He speculated that since 1800 the number of stock kept could well have trebled and 'the weight of cheese made is in even greater proportion'. The success of the Cheshire system has been reviewed and summarised by Davies [Davies C S, 1961]. The practice of boning began in the 1820's using imported bones, waste from the Sheffield cutlery trade and the button trade associated with Lancashire textiles. The impact on the productivity of Cheshire dairying was reported as immediate but the amounts applied at 2 tons to the acre and the cost at £3/10/- a ton were considerable [Palin J, 1845]. The extent to which boning was practiced in Derbyshire is not easy to determine. Rowley [Rowley J J, BPP 1848 QQ6877] refers to the use of bones but in the context of arable cropping while Carrington and Evershed [Carrington W T, 1865 and Evershed J 1869] both note the use of bones on pastures on the particularly well managed farms at Tutbury and Croxden Abbey already referred to and also at Hollington. Such comment must be set alongside Carrington's wider view reported above that dairy pastures were generally in need of drainage and manures and that small farms showed lack of enterprise.

A similar level of qualification needs be applied to the use of other dressings including manufactured superphosphate and phosphatic guano. The latter is reported to have been first imported in the 1830's [Collins E J T, 1975 p.x] and was landed at rates in excess of 100,000 tons from the 1850's to the 1870's. Thompson [Thompson F M L, 1968 p.75] has demonstrated that superphosphate was manufactured from 1842 but was not available at national level in quantities over 100,000 tons until the 1860's. Both fertilisers were advertised in the Derby Mercury on a regular basis and were certainly used by the rather elite farmers referred to above but there is no way of determining the extent of their popularity amongst the run of

the mill farmers.

Although there were instances of exceptional practice on permanent grasslands in southern Derbyshire located away from the alluvial valleys an interim verdict would be that they suffered the national character of neglect. It is tempting to link this assessment with Farey's statement [Farey J, 3 p.190-1] that 'the best and fattest cheese is made from inferior land'. Caird [Caird J, 1852 p.217] commented similarly about Leicestershire: 'a great portion of the inferior grass land of the county is devoted to cheese making'. Even in Cheshire there is evidence of a belief in a relationship between poor land and good cheese. In 1874 to shouts of 'hear hear' from a meeting addressed by G Murray of Elvaston Nield of Worsley near Manchester observed that 'it was by no means the richest pastures that were best adapted for the production of cheese. On the contrary some of the very finest cheese in Cheshire comes from land which would no doubt be condemned by many because it abounded in rushes' [Nield H, 1874 p.285]. Such views contain an element of justification for a policy of neglect but it should be kept in mind that in Farey's time, for example, the local dairy herds were dominated by the Longhorn breed of cattle. Some of these would have been of the improved type developed by Bakewell at Dishley near Loughborough but much traditional stock would have been kept. These beasts were described as thrifty. Indeed their ability to flourish on lesser quality ground was regarded as one of their great virtues. As the nineteenth century progressed and the Shorthorn became the preferred stock amongst dairymen then by implication such attitudes to pastures ought to have undergone some change as the Shorthorn is recognised as needing better quality pastures. However, as will be demonstrated in Chapter 8, many Derbyshire dairy cows were probably not pure Shorthorns and the cross bred stock may well have combined better milk yields with a continuing degree of thriftiness. Additionally as late as 1869 Evershed reported an apparently commonly held opinion that the flavour of cheese was adversely affected by luxuriant pastures and artificial feeding [Evershed H, 1869 p.271], a view also expressed by Neild with respect to Cheshire. There is an implication here that traditional farmhouse cheese making methods were not completely

suited to the processing of richer milk.

Pastures and Meadows of the River Alluvium - with particular reference to the River Dove

It has been emphasised already that high praise was given to the quality of pastures and meadows located on riverine alluvial deposits but comment from the mid nineteenth century became less favorable. Alluvial deposits as mapped by the British Geological Survey occupy 37,500 acres of southern Derbyshire although as has been demonstrated in Chapter 3 the outer margins would have experienced a much more limited inundation regime than those adjacent to river channels. Even so the area involved was considerable and the potential contribution to agricultural productivity significant. The predominance of dairying on the floodplains indicated by Sheldon is confirmed by analysis of the 1870 agricultural census as riverside parishes reflected a predominance of dairying [see discussion in Chapter 8].

In the context of grassland management the river had been seen as a benefactor to the farmer for many centuries. Modern research relating to the eleventh century underpins the positive assessment of the floodplain lands. Holly [Holly D, 1962 p.67] writing in the Domesday Geography notes that the valleys of the Dove, Trent and Derwent were the most populated and least wooded areas of the county and also those with the greatest extent of meadow; the 200 acres at Egginton was noted as exceptional. For neighbouring Staffordshire Wheatley [Wheatley P, 1971 p.201] comments on the plentiful meadows on the floodplains of the Tame, Trent and Dove with 60% of vills having some meadow. The largest acreages were 40 acres at Marchington and 50 acres at Fauld and Rolleston. The work of Yates [Yates E M, 1974 p.55], Hey [Hey D, 1984 p.129] and Henstock [Henstock J, 1969 p.36] also underlines the long recognised merits of such lands. Early specific references to the Dove quoted by these writers go back to Leland [1540] Drayton and Camden [1607] and Plot [1686]. Yates [op cit p.55-6] has argued that the high values put on hay tithes for Uttoxeter, Hanbury and Rolleston during the fourteenth century is indicative that the riverside meadows had particular

significance at that time. Similarly rent charges for meadow lands for the sixteenth and early sevententh centuries were important indicators not only of the quality of these lands but also of the emergence of the dairy industry.

Henstock [Henstock A, 1969 p.35] has developed a similar argument for Derbyshire which is supported by Hey's [Hey D, 1984 p.142] analysis of probate inventories for the seventeenth and eighteenth centuries. Marshall [Marshall W, 2. 1796 p.42] in his commentary on the 'Midland Department' gives general praise to the qualities of the meadowlands on the banks of the rivers noting the benefits consequent upon flooding in the form of sediment deposition and the raising of the temperatures of the grass. Pilkington [Pilkington J, 1789 p.189] too notes that the soil of the valleys near the banks of the large rivers is everywhere of a different nature from that of the neighbouring country.

It is in Pitt's survey of Staffordshire agriculture [Pitt W, 1808 p.88] that the most detailed explanation of the unusual fertility of the Dove Valley is developed. He gave particular emphasis to the reach of the Dove below Mayfield to the confluence with the River Churnet to the south of Rocester. Apparently as far as the confluence 'the water has a greyish cast apparent to the eye from its being impregnated with calcareous earth to which may be attributed the extraordinary fertility of its banks. After receiving the Churnet, a considerable stream from part of the moorlands, not abounding with limestone its water is diluted, and although its banks still continue to be excellent, yet they visibly decline in richness and their extraordinary fertility ceases' [Pitt W, 1808 p.89-90]. Pitt thus identified a specific section of the Dove Valley as being exceptional but still emphasised the merits of the lower valley in the vicinity of Uttoxeter and Doveridge which fetched rents of up to 40/- an acre. 'Here the plain on either side of the river is composed of deep mellow loam impregnated with if not wholly formed of a rich sediment of mud and calcareous earth. The herbage is very fine and rush free and....thousands of acres and entirely pastured with sheep and cows, some horses very little of it mown for hay'. Pitt noted

that the uncertainties of flooding make 'the risk of hay too great' and that in the spring 'the Dove sometimes rises so high in twelve hours as to carry off sheep and cattle to the great alarm of the inhabitants and in a few hours abates and returns again within its own channel' [Pitt W, 1808 p.89]. The problem of flooding on the Dove was also commented upon by Farey. He described the low meadows of the Dove as 'very rich land' but subject to sudden floods. Some farmers such as Thomas Harvey of Hoon Hay and others near to Tutbury had created mounds on the floodplain as cattle refuges. Farey's [Farey J, 1 1815 p.132] observations of the river channel show that he recognised its gravel bed character the waters binging gritstone, sand and limestone pebbles. The importance of limestone in explaining the Dove meadows is noted by Glover [Glover S, 1829 p.203], Rowley [Rowley J J, 1853 p.58-59] and Evershed [Evershed H, 1869]. Rowley described the soils as being subject to natural irrigations 'fertility being brought down from the mountain lime'. While Rowley stated that the land was chiefly in grass he also comments on the occurrence of arable. Indeed he writes in glowing terms as to the arable potential of the flood plain alluvium: 'should the arable land show any symptom of exhaustion plough deep and deeper still is the way of restoring its fertility. Like an exhausting fire it only requires stirring to make it again active'.

It is also evident that during the nineteenth century attempts began to be made to regulate or at least contain the effects of floods. R B Philipson in discussing the Sudbury Tithe Award in 1842 noted that 'the meadowlands on the River Dove are of fine quality....they produce light crops in cold dry summers and in wet seasons are liable to floods by which much injury is done' [PRO IR 18]. Clearly the attempts at river regime regulation through the delay of entry of tributary brooks, such as the mill leats at Marchington and Tutbury and the Foston, Hilton and Egginton Brooks, were not adequate.

Problems were exacerbated in the mid nineteenth century through transport developments and these led to the eventual construction of a series of floodbanks parallel to the meandering Dove channel but more immediately to the

straightening of specific reaches of the river. This occurred with the bridge improvement at Aston near Sudbury and more generally with the construction of the North Staffordshire Railway in 1850 along the line of the Dove Valley between Uttoxeter and Marston on Dove. The railway runs close to the river and crosses it at Scropton. It is built on a low embankment to be above flood level and thus effectively divides the flood plain down the middle. Despite the provision of cattle passes and culverts the embankment provided an obstruction to the retreat of floods.

The general flood problem still exists and has been subject to a DSIR investigation into flooding in the Trent catchment [DSIR 1964] and has been discussed at length by Potter [Potter H R, c1960]. It was also a matter of concern to the agriculturalists of the mid nineteenth century. A note by the Duke of Devonshire's agent in his survey of Marston on Dove in 1852 indicates that one tenant Rowland Heacock reported that 'acres of meadow had been ruined since the construction of the railway' [CA]. It is difficult to see this as an isolated occurrence and it could well have been the stimulus for flood bank construction. The initiative appears to have come from local land owners. A letter from the agent of Sir Truman Moseley of Rolleston Hall in Staffordshire to his Chatsworth Estate counterpart seeks 'to remind you of the very necessary flood bank by the River Dove at Marston. Sir Truman wishes to make one on his own land further down but it would be useless until that referred to is done' [CA 12/4]. Inspection of the first edition Six Inch Series of the Ordnance Survey shows the flood banks to have been complete and in their present form by the 1880's. They were commented upon favourably by the judges of the Derby Prize Farm competition in 1881 [DPFC 1881, p.472-3]. The thrust of their observations however related to the floodplain and the channel of the Trent itself. Evidently effective management was difficult as revealed by the problems of establishing a navigable channel between Burton upon Trent and the Trent/Derwent confluence during the eighteenth century [see Chapter 9]. The Trent meadows were of high quality like those of the Dove, as witnessed by an advertisement in the Derby Mercury [20.1.1814]: 'for sale 64 acres of more or less extraordinary

good land situated on the banks of the Trent in the parish of Aston'. By 1881, however, the general picture was one of neglect 'the state of every river and almost every stream on the farms we visited shows how fearfully arterial drainage has been neglected' [DPFC 1881, p.473]. The farm competition judges also refer to shoals in the river bed, shifting of the channel and persistent flooding of the riversided meadows and conclude that 'thousands of acres of the broad and fertile valley of the Trent have been well nigh ruined by the continual overflow of the river' so that 'the whole valley is one vast quagmire'. It is the words 'arterial drainage' that give a hint that the floodplains were managed perhaps in the manner of water meadows discussed in the following section. The Dove is excepted from full criticism as 'only in the valley of the Dove did we see any effort to prevent a recurrence of these floods and there the river was being embanked for miles'.

A broad assessment as to the situation and character of the riverside lands is that by the mid nineteenth century flooding had ceased to be seen as a major benefit to the farmers but as a hazard which needed control. Pitt's [Pitt W, 1808 p.88-90] comments about the wide alluvial tract of the Dove near Uttoxeter may be particularly significant in indicating the recognition of the flood problem at an earlier time. In that particular locality the inability to use the land for hay clearly puts at least one substantial area of floodplain into the grazing/pasture category.

Water Meadows

An important feature of riverine lands, widely distributed in southern England, were water meadows. Adams [Adams I H, 1976 p.93] indicates that water meadows were evolved in the latter years of the sixteenth century and were of two types catchwork systems for hill sides and ridge and furrow systems on flood plains. Three contemporary agricultural commentators Marshall [Marshall W, 2. 1796 p.27], Brown [Brown T, 1794 p.33] and notably Farey [Farey J, 2. 1815 p.458 et seq] report on the distribution and significance of water meadows in the North Midlands and Derbyshire. Marshall indicates that water meadows

were not common but singled out Robert Bakewell at Dishley as 'being in truth the master of the art' [Marshall W, 2. 1796 p.236] on the basis of his 100 acre meadow on his Soarside estate near Loughborough. Brown [Brown T, 1794 p.33] in a brief comment thought that the practice was much less than previously but notes 'that the still brooks that empty themselves into the Dove have been converted to this purpose in several places'. Farey in effect excuses Brown for his lack of information: 'he seems to have been rather unfortunate in the enquries for his report' [Farey J, 2. 1815 p.458] and then provides an extended commentary on irrigation in Derbyshire. He is most favourably disposed to the technique and argues strongly for its application to a wider range of suitable riverside situations. Farey appears to have been influenced by his experiences on the Woburn Estate of the Duke of Bedford. William Dowdeswell, who was also at Woburn, had created a water meadow system for Edward Coke at Longford Hall in 1785. Dowdeswell's sons Edward and John also worked in Derbyshire creating meadows for Mr Stone of Boylestone and Mr Woolley of Shirley. Farey included the Dowdeswells in a list eight drainers/irrigators who undertook work in south Derbyshire though the majority were based in north west Leicestershire. He also listed 54 localities where land was irrigated and 76 farmers who benefited from water meadow systems. In total 854 acres of land is identified as being irrigated in amounts varying from 4 acres at Lullington to 120 acres at Measham. The latter figure is exceptional, the majority of meadows being between 10 and 30 acres.

Figure 7.1 shows the pattern of distribution of water meadows in southern Derbyshire and northwest Leicestershire. Although they occurred widely water meadows are not generally associated with the floodplains of the major rivers. The Trent does not feature at all while three localities are identified on the Dove east of Uttoxeter. Five categories of water meadow can be identified.

1) Watered meadows in the sense of natural outflowings which are identified to the east of Uttoxeter.

2) Reservoir fed meadows. A small number of meadows were fed from reservoirs or storage tanks as in Sudbury Park.

3) Wash from farm yards and towns. It must be presumed that such wash would be dilute liquid manure. A number of farmers

practiced this system including Robert Lea of Barrow Fields, Walton upon Trent who watered some 8 acres of land.
4) Catchwork systems. The most extensive catchwork system was that of William Cox near Brailsford where 50 acres was so treated - 'a great part of this land was boggy and foul in the extreme, it has now but very few rushes and no sedge grass tussocks'.
5) True Water Meadows. The largest of these was at Melbourne where the stream was jointly managed by ten occupiers to water a total of 181 acres of meadow.

The common character of all five systems was the desire to improve the productivity of grassland. The general pattern of management is that practised by Thomas Robotham of Ley Hall at Doveridge in respect of 12 acres of meadow:
1) October/November to end of March: meadows watered
2) End March to mid May: ewes and lambs fed plus perhaps some dairy cows
3) 20th May to 15th July: hay crop is grown and taken with a yield of 2 to 22 tons per acre
4) End July: meadows wetted if possible
5) Autumn: land used for feed for dairy cows

A similar system is described for the meadow of Robert Stone of Boylestone, originally engineered by John Dowdswell. Information on cost gives a total of £6/8/- per acre for engineering a water meadow in the period around 1800. This was broken down as 3 guineas per acre for groundwork exclusive of carting, £2 per acre for floodgates, hatches and ale and £45 for a large sluice. Farey expressed his approval of the benefits for stock farmers to be derived from irrigating meadows and was pleased to prove that the situation in Derbyshire in the first decade of the nineteenth century was far from negative. Indeed the system was regarded as being capable of much wider application:
'When the very great advantages reaped from irrigation in most of the above cases are considered it is much to be lamented that many valleys having good opportunities for this improvement remain in shamefully neglected state - Barton Fields, Ednaston, Milton, Repton etc and that a vast many others might be further and highly improved by making use of the streams that flow

uselessly through them' [Farey J, 2. 1815 p.471].

Farey's hopes were not to be realised. Only minor evidence of additional water meadows emerges through the nineteenth century such as on the Hilton Brook at Hilton and the Etwall Brook in the meadow called Bancroft at Etwall. Evershed refers to a water meadow system at Tutbury and also on Carrington's farm at Croxden [Evershed H, 1869]. It is thus the case that water meadows were restricted in extent and comprised localised patches of highly productive grassland comparable to the alluvial floodplains.

Seeds or Sown Grasses

Seeds or sown grass to establish temporary ley pastures were important in the arable system in the maintenance of soil fertility. Additionally these grasses were, of course, a crop in their own right to supplement the mowing or grazing of permanent grassland. Clear statistical evidence as to the area under sown grasses in the southern Derbyshire region is not available until the agricultural census although discussion of crop rotations does give an albeit skeletal view as to their significance at earlier times. In the 1870 agricultural census all parishes are shown as having some land in temporary grassland and the significance of grass in the farm economy is underlined. The distribution of temporary grassland was by no means even. At the wider scale the red marl area with the lowest proportion of land in arable was also the area with the lowest temporary grassland with an average per parish of 5.3% of agricultural land. For some parishes notably to the south of Ashbourne the proportion was less than 2% but relatively high values occurred in light soil localities such as Brailsford, Mercaston and Mugginton where the acreage of arable was also greater.

A marginally greater emphasis on temporary grassland occurs in the Staffordshire parishes to the west and south of the Dove with 6.75% of land so classified. Dove floodplain parishes of Mayfield and Rocester have negligible temporary grassland while others further downstream with relatively more arable, such as Tutbury and Tatenhill, had as much as 12%. The trend to higher

proportions of ley pasture occurred both northwards and southwards. To the north parishes on the various shale and coal measure formations averaged 8% temporary grassland while south of the Trent in Derbyshire the figure is 9% and in northwest Leicestershire with more emphasis on mixed farming it rises to 11.1%.

The antecedents of the 1870 situation with respect to temporary grassland are difficult to determine. While it may be speculated that the overall trend would have reflected that for arable land the flexibility open to farmers to extend and shorten leys could have complicated the situation considerably. Some insights can be gleaned from the consideration of crop rotation data. The late eighteenth century crop rotations on the red marl reported by Arthur Young on his visit to the Radbourne estate indicate the predominance of a cereal, fallow and beans sequence rather than a more sophisticated approach involving rotation grass and roots. Approximately one hundred years later the 1870 census showed 5% of Radbourne parish to be in temporary grass, an indication that for at least one parish important change had taken place.

The most detailed account of the character of nineteenth century temporary grassland was provided by Farey [Farey J, 2, 1815, p.161]. He observed that it was customary to sow grasses as mixtures, often including clover, although the latter was sown on its own. Clover was recognised as a sound crop in preparation for wheat, not only because of its leguminous properties, but also because of its rooting character which helped in the development of a good tilth on heavier soils such as the red marl. Farmers such as Rowland of Mickleover, Harrison of Ash and Webb of Barton Lodge who farmed the red marl all used one year clover leys in the first decade of the nineteenth century while similar leys were practised by the tenants of the Devonshire Estate in the 1840's [CA]. Farey [Farey J, 2 1815, p.161] noted the use of eight mixtures of grasses in his travels through Derbyshire. Clover featured in all of them and it is evident that particular mixtures were preferred for particular purposes. Seed crops were commonly planted with a nurse crop of grain such as barley and were allowed to grow on after the harvest. Pitt

[Pitt W, 179 p.87] and Farey [Farey, J, 1815, p.157] both stress the desirability of mowing the at least the first season's growth of ley pasture in order to avoid the effects of trampling the ground by livestock. Wheat was usually sown when leys were broken as it did better on newly fertilised land.

Grassland as Feed

The detailed discussion of the various categories and conditions of grassland enables an assessment of the significance of grass in the feed regime(s) as practiced in southern Derbyshire. It is important to keep in mind the degree of grassiness in the landscape as expressed by combining permanent and temporary grassland. The red marl parishes averaged 77.5 % grass in 1870 while the adjacent Staffordshire parishes averaged 79%. Parishes to the north of the red marl were 71% in grass but southward of the Trent in Derbyshire and Leicestershire the proportion fell to 63%. Some parishes were as much as 95% in grass, notably those immediately adjacent to the towns of Derby and Burton and also incorporating large tracts of riverine land as in the cases of Mayfield and Rocester in relation to the Dove. The division of temporary grass between pasture for grazing and meadow for mowing was 60% to 40% across southern Derbyshire allowing for variation between parishes. About one third of permanent pasture was in hay and a greater proportion of the temporary grassland was so categorised. Figure 7.2 shows the distribution of agricultural land in hay by parish at the time of the 1870 agricultural census. The pattern appears complex but the block of parishes on the red marl west of Derby has 15 - 20% of land in hay which is somewhat less than other parts of the study area. It is in this locality that the proportion of land in grass is at its greatest thus indicating a prevalence of grazing as opposed to mowing land.

The importance of grass for winter feed as well as summer grazing and accommodation is thus well established. The related issue of quality of grazing and hay remains incompletely answered other than in terms of the potential superiority of the land on the river alluvium and the ablity of an unknowable

number of better farmers to manage grassland to achieve higher outputs especially if they could establish water meadows. A similar problem arises with respect to yields of hay. Fussell [Fussell G E, 1966 ch. 11] suggests on the basis of a range of authorities such as Johnson [Johnson C W, 1863 p.2-5] that one ton per acre would have been a reasonable expectation. This is somewhat less than the 23/24 cwt quoted for the early Rothamstead experiments on unmanured land which is much in line with the average national yields for the end of the nineteenth century listed by Mitchell and Deane [Mitchell B R and Deane P, 1962 p.90-91]. Yields of hay from temporary meadows are shown to be 25% higher than those from permanent meadows. Low [Low D, 1843 p.558] considered that 2 tons of hay to the acre should be considered a good crop. Farey [1815 2 p.179] quoted yields of hay in southern Derbyshire of 30 to 40 cwt per acre at Waldley north of Doveridge on the red marl and 30 cwt per acre at Foremark. Pitt [Pitt W, 1809 p.157] referring to Leicestershire, put the expected yield at between 20 and 40 cwt per acre, which is more in keeping with Fussell's assessment of the variation between unmanured and manured meadows. The vagaries of the weather within and between seasons would have been significant for hay yields but taking one ton per acre as an expectable yield then on the basis of the averages indicated on Table 7.1a the seasonal provision per livestock unit would be around three quarters of a ton. This includes an allowance for the feeding of horses as they have not been included in the calculations of livestock units.

The quantity of product from pastures must be related to the quality of grass and argument about the manuring and dressing of grassland. Tabulation by Halley and Soffe with respect to modern pastures indicates the relative feed value of grass and hay as compared with roots and grains [Halley R J and Soffe R J, 1988 p.374-5 and see Table 7.2]. The best that can be achieved with respect to the study period is to speculate that the values for protein etc would have been less especially in circumstances where depasturing had taken place. Despite such uncertainties it remains that grassland for the accommodation and grazing of stock was the key element of the farming system. Depending on its management carrying capacity might vary and increase through

time. The evidence for increased carrying capacity is problematic in that it combines the estimates of agricultural commentators with statistics derived from the 1870 census. Marshall's [Marshall W, 2 1796 p.231] estimate of one cow and two sheep per two acres perhaps offers a norm for very best practice as Young [Young A, 1771 p.165] considered a stock rate of 2.5 to 3 acres of grass per cow to be normal for the latter eighteenth century. The figure of three acres per cow is in accord with Pitt's view of Leicestershire dairying [Pitt W, 1809]. It is also quoted by Carrington in 1865 in indicating a need for 3 acres to each dairy cow with 4 acres on lesser land [Carrington W T, 1865]. Analysis of the 1870 agricultural census as presented in Table 7.1a gives a somewhat different picture with an average of approximately two and a quarter acres of grass to each livestock unit across southern Derbyshire and adjacent counties. This is interestingly less than the estimates quoted and may provide some basis for arguing that stock rates moved positively in line with improvements in feeding arrangements considered below. A move from one dairy cow to 3 acres of grassland to one cow to 2.25 acres would represent an advance of 25%.

In summary the productivity of grassland in southern Derbyshire must have been highly varied. The water meadows and floodplain grazings were exceptional, the latter commanding rents normally associated with the fattening of beef stock. In localised favoured or well managed situations good grazing and/or crops of hay were obtainable from the more extensive marls and clays. The remainder of the grassland in the form of permanent pastures which may have doubled as meadows appear to have been of lesser quality. Upgrading of such pastures required improved drainage, the elimination of weeds and the enhancement of the range of nutritious grasses and herbs through dressing with artificial manures and the feeding of stock with cake and the like to improve dung. Change of this kind would have been dependent as always on the impact of labour and capital which may not have been available to the ordinary tenant farmer. The uncertain extent of effective drainage improvements in Derbyshire has been discussed in the previous chapter although it is evident that some if perhaps localised advance was made. The importance of

the addition of dressings such as bones has received emphasis but only Cheshire is acknowledged to have adopted them widely. However comment by Evershed on progressive practice in neighbouring Staffordshire indicates that they were not unknown in the area. Colyer [Colyer R J, 1975 p.53] has indicated that the grazing pastures of significant stock raising counties such as Leicestershire and Northamptonshire did not show appreciable improvement until the feeding of oil cake to cattle became widespread in the 1830s and 1840s. The argument is that a better diet for cattle led to higher quality dung which gave more nutrients to the soil and a better growth of grass. In this way the cycle of indifferent stock grazing indifferent pastures was broken. A similar view is put forward by Holderness [Holderness B A, 1989 p.164] but with respect to top dressings in stating that 'there was no revolution in pasture management until guano or basic slag were adopted'. While the Derby Mercury carried advertisements for oil cake, thus indicating that it was obtainable, the most important supplementary stock feeds available for purchase in the area were brewers' grains and malt dust. It is quite conceivable that grains had implications for pastures. Indeed Holderness [ibid p.157] comments that 'brewers' grains contained elements valuable in fertilising the soil'. If this were the case then the long history of the purchase of grains by farmers, combined with their increasing availability as the Burton brewing industry expanded rapidly as the nineteenth century progressed may have had an important positive effect on south Derbyshire pastures. As indicated in Chapter 1 such a view was taken by Sturgess in his argument about agricultural advance on the claylands [Sturgess R W, 1966 and 1967] and will be further considered below.

Part Two: Tillage and Purchased Feedstuffs

While the greater proportion of the land in southern Derbyshire was in grass a significant part was cultivated as arable to produce crops for sale and feed for winter use. Table 7.1b summarises essential statistics for 1870. On the red marl an average of 27% of land in arable is indicated which rises to 47% south of the Trent. Generally cereals occupied over 55% of the arable land with wheat as the first ranking crop however as has

been argued temporary grassland and green crops were of prime concern to the dairyman. For the milk producers of the red marl Evershed [Evershed H, 1869 p.270] put the role of cultivation into wider perspective that 'the dairy farmer regards his ploughed land as merely subordinate to the requirements of the dairy - yielding food and litter for the winter months'.

It is possible to gain some idea as to change through time in the total land tilled and the crops involved by comparing the 1801 crop return data for the 34 southern Derbyshire parishes for which it is available with the 1870 agricultural census results for the same parishes. This is set out in Table 7.3. An important qualification to be borne in mind is the potential lack of coincidence between the parish as surveyed by the incumbent priest in 1801 as opposed to the agricultural parish defined by the boundaries of the farms within it in 1870. There is no way of knowing the degree of error but it is possible that the number of parishes is sufficient to cancel some of the discrepancies. It is also the case that it must not be assumed that any changes were linear through time. Taking the results of analysis at their face value there is an overall 8% decline in the area under tillage. Given the slow transfer of land from arable to pasture discussed in Chapter 5 this percentage is reasonably credible. Important changes in emphasis on particular crops is also evident. While wheat was the first ranking crop for both years barley had overtaken oats as the second ranking crop in 1870 and peas and beans show sharp decline. Conversely potatoes and notably root crops show substantial increase in area of the order of 80% which must be combined with a growth in yields of about 20% over the same period. The greater capacity to produce winter feed within an arable system where rotations became more sophisticated represents the most important finding of the comparison which has been attempted.

As the sequence of cropping was a key factor in enabling an increased acreage of green crops it is important to consider the development of favoured rotational arrangements and any spatial variation in their occurrence. Many of the early agricultural commentators place emphasis on rotations and the ways they were

integrated with land improvement in the use of lime and dung [e.g.Farey J, 2 1815, p.102-112]. While variations in soil, farm size and the awareness and energy of individual farmers meant that there was not necessarily one answer to the matter of rotation as farmers made adjustments as it suited by introducing additional grain crops for example. There is also evidence of environmental impact on rotational preference in terms of the management of heavier and lighter soils.

As has been indicated from Arthur Young's [Young A, 1771] visits to the Radbourn and Longford Estates which were both on red marl the rotations practiced were characteristic of heavier land. At Radbourn in the absence of roots three course rotations were practised which involved fallow, cereals and peas or beans. At Longford Wenman Coke, a relative of the famous Coke of Holkham had tried the classic Norfolk four course rotation of turnips, barley, fallow, wheat which lacked the sophistication of the six course cropping thought characteristic of Norfolk at that time [Chambers G E and Mingay J D, 1966, p.61]. By contrast Pilkington [Pilkington J, 1789, p.284-9] identified four rotational variants in Derbyshire all of which involved the planting of successive grain crops, the use of fallow and up to three years of temporary grassland following barley as a nurse crop. Significantly only one of the rotations so identified included turnips thus indicating the difficulty of their cultivation on heavier land. Pilkington [ibid p.289] said of the lighter sandstone based soils around Brailsford he thought the best management was 'not suffer land to remain long in either tillage or pasture without change'. By contrast Marshall, although generalising about the Midlands, noted the practice of using longer leys particularly on heavy lands, perhaps for periods up to six or seven years [Marshall W, 1796, 1.p.214].

Pitt [Pitt W, 1794] writing of Staffordshire and Brown [Brown T, 1794] and Curtis [Curtis W, 1806] quote a range of rotational sequences which have been tabulated as Table 7.4. The absence of turnips from farms on the marl provides further evidence of the unsuitability of this crop. Farey [Farey J, 2, 1815, p.108-112] provides information on the rotation used by 29 farmers in southern Derbyshire and recognised two main classes of rotation:

1. Rotations on heavier land where fallow was manured as preparation for wheat which in its turn was followed by barley with seeds, a period of ley and then further grain crops. Farms on the red marl west of Derby are noted as having no green crop in the rotation and common use of fallowing.
2. Rotations on light land where fallow preceded the planting of turnips or swedes. The fallow year saw the application of lime or dung. The eating of the root crop off the land by sheep would add further dung. Roots were followed by barley with seeds as a preparation for a ley of variable duration. When the ley was broken grain crops were planted usually beginning with wheat.

Such arrangements have much in common with those quoted by other commentators but have a clearer rationale for their adoption. It would appear that similar rotations continued to be practised through the first half of the nineteenth century. Rowley [Rowley J, 1853, p.59-61] indicated three comparable sequences of cropping as representative of southern Derbyshire. The rotation cited for the red marl is the less complex of the three and involves a more extended period of ley very much in the manner indicated by Marshall some sixty years earlier.

Direct evidence of the practical arrangement of rotations on specific farms is available from Agents record books of the Devonshire Estate in the parishes of Marston on Dove, Hilton and Scropton (CA). The land in this area embraces the flood plain of the Dove and the slightly more elevated tract of the former Hatton Moor and Hilton Common with their gravel based soils. The available data for four farms covers the period from 1843 to 1850 an eight year sequence but unfortunately 1847 is missing entirely for this record and the 1850 material is discontinuous (See Tables 7.5 a-d). This data which shows the chosen course of cropping year by year and field by field enables a view to be formed not only of the rotations followed but more importantly of the way in which the farmer manged his arable land to secure the desired range of arable crops given the size of fields. Two factors clearly influenced the pattern of cropping in a given year: - the rotational sequence for each field and variations in size between fields. The outcome is that in any one year the areas under all aspects of cultivation varied from previous and succeeding years.

Of particular interest are the cropping arrangements cited by Evershed [Evershed H, 1869] and summarised as Tables 7.6 a and b with respect to red marl farms at Croxden Abbey and Tutbury in the hands of W T Carrington and John Archer respectively. The rotation practised integrated cash and feed crops but used significant and varied inputs of fertiliser. The use of cake for stock feed indicates that high quality manure was available and the implication is of close integration between land and stock. Interestingly both farmers practised fallowing which is in accord with the data from the 1870 census which shows 7% of the arable on the red marl to have been in fallow [see Table 7.1b]. A further contrast with the area south of the Trent is evident where fallows amounted to approximately half this proportion. The significant point is that while the period from 1770 to 1870 saw increased areas of temporary grassland and green crops fallows were not eliminated and remained a necessary part of land management.

In summary the consideration of rotations enables certain basic principles/characteristics of the management of cropland to be identified.

1. The use of leys was normal. This provided a break in the sequence of grain and green crops but of variable length from a single year to several years with two or three years being the most common arrangement. Most frequently the ley was mowed in its first year and grazed in succeeding years. The fundamental merit of ley farming is thus clearly recognised in that once the temporary grassland is broken up then the combination of green manure and dung was incorporated into the soil. Clover if planted on its own was a one off break crop.
2. The establishment of leys required a cover or nurse crop and this very commonly was barley although occasionally wheat was used in this context.
3. Turnips and more especially swedes were an established element of cropping. The late sowing of turnips and swedes created the opportunity for land to be dressed with lime and dung and for the necessary cultivations to take place. Turnips were not a regular feature of the red marl farms. Mangolds which gave heavier yields came into favour from the mid nineteenth century.

4. Wheat, as the more demanding grain crop, either followed the breaking of the ley period or was preceded by a bare fallow especially on the red marl. The crop was thus sown under the most advantageous conditions that a farmer could achieve.
5. Crops such as oats and beans were planted towards the end of the cycle of crops where the fertility/condition of the soil was becoming reduced.
6. Rotations were not rigidly adhered to but were varied in order to take account of local circumstances which may include soil conditions ie, wheat was a more significant element of rotations on heavy land while barley figured more prominently on light land.
7. Generally the rotation systems were more elaborate on farms with light or varied soil patterns than on the more uniform red marl country.

The approach to the management of arable land in southern Derbyshire was therefore effected within a framework of established principles which were operated in a flexible manner. However it can be also be demonstrated that each crop tended to have a particular geography which in part reflected environmental conditions and in part the objectives of farmers. It is appropriate therefore that the range of crops grown be considered systematically. This will necessarily include cash crops such as wheat and barley which were integral elements of the rotations which enabled green crops to be grown. Wheat in particular provided farmers with important income.

Characteristics of Specific Crops

1. Wheat

As has been demonstrated for 1801 and 1870 wheat was the major cash crop within arable systems as practiced alongside the grassland/livestock enterprises of southern Derbyshire. Wheat growing occurred across the study area [See Figure 7.3] including those localities where grassland was predominant so that the soils of the red marl emerge as being well suited to wheat. Pilkington [Pilkington J, 1789 p.301] recognised that the red marl soils, generally regarded as strong, were better

adapted to wheat and also oats and beans rather than barley. The potential of the marls was noted by Evershed [Evershed H, 1869 p.272] who saw 'good red marls into which the plough may go to any depth without change in the character of the soil turned up may with good treatment be cropped successively with corn'. Farey [Farey J, 2. 1815 p.113] had also been equally clear on this point and indicated that the red marl lands produced excellent quantities of wheat. He also pointed to the widespread use of lime as the basis for preparing land for wheat and sought to relate the rate of application of lime to the eventual yield so that for example William Smith at Foremark used 3 bushels lime to the acre and obtained 32 bushels. Bushels were reckoned at 65 lb and 70 lb so yields of 1 ton per acre are indicated. This appears to exemplify good practice as Kain [Kain R, 1986 p.357] estimated a county average yield of 22.3 bushels per acre at the time of the tithe surveys. The agricultural census gave Derbyshire an average wheat yield of 29.6 bushels for the last decade of the nineteenth century which was perhaps in line with the national average given Overton's [Overton M, 1986] statement of 32 bushels for 1911. There is some evidence therefore for an increase in yields in Derbyshire as the nineteenth century progressed.

In Farey's time the range of difficulties facing the wheat farmer was considerable. In this context there was disagreement as to whether spring or autumn sowing of wheat was to be preferred mainly on the basis of the perceived resistance of the crop to the endemic disease of smut and mildew. Wire worm infestation was another major problem faced by the cereal grower. Law of Locko preferred spring wheat to autumn sown on the basis that in his experience it was less prone to mildew but Lea of Burrow Fields expressed the opposite view. Webb of Barton Lodge regarded late spring sowing was a way of reducing the problem but still achieved yields of 33 bushels per acre. Many farmers seemingly sought ways of reducing the predation of disease by dressing or steeping seed before planting. Brine, stale urine, soap boilers waste and even arsenic were used for this purpose [Farey J, 2 1815, p.117]. By mid century manufactured chemical aids were coming onto the market so the Derby Mercury carried advertisements [DM 18.10.1860] for Down's

Farmers' Friend, Patterson's Smut Eradicator and Evans' Derbyshire Dressing in this connection.

The distribution of wheat growing in southern Derbyshire can be determined from the 1801 Crop Returns and the Tithe Redemption Surveys of the 1840's and the agricultural census of 1870. Table 7.7 shows aggregate figures for the Crop Returns for counties in the Middle Trent Region. Wheat was the first ranking tillage crop in Derbyshire and Staffordshire and second ranking behind oats in Leicestershire. The mapping of the 1801 acreage figures on the basis of rank order [Figure 7.4 and see also Henderson H C K, 1957, p.18] indicates the dominance of wheat over barley on the red marl both west and east of Derby and on the varied soils in Leicestershire north west of Loughborough. The margins of the heavy land tract of Needwood Forest also show wheat as out ranking barley. Only in relatively few parishes was wheat the third ranking crop and most often by the smallest of margins.

The evidence from the Tithe Redemption Surveys over the period 1839-1850 indicates that the pattern described for 1801 still persisted. Kain [Kain R, 1986 p.357] estimated that for Derbyshire as a whole wheat was marginally first ranking above oats and occupied 38% of all tillage excluding fallows. In individual parishes wheat occupied in excess of 20% of the acreage of tillage on the red marl and is clearly the dominant crop. Comparable data for Staffordshire is indicative of a parallel situation and is confirmed by Phillips [Phillips A D M, 1973, p.38] in his detailed analysis of that county - 'this uniform distribution would confirm wheat as the main cash crop of both the heavy and light arable land of that county'. He also argues that the lighter lands were more productive on the basis of the more flexible agricultural systems that could be practised in such areas.

Evidence from the Tithe Files for the area around Longford [PRO IR 29/8] which is at the heart of red marl country shows that a cluster of individual farms each had about a quarter of their land in arable irrespective of size. The rotational system used lacked root crops and included fallows. At the Spath 77 acres of

arable included 31 acres of wheat with 17 acres of fallow. Similarly at Suffield House Farm 37 acres of arable was divided between 21 acres of wheat and 12 acres of fallow with 4 acres given to other crops. It is clear that wheat still played an important part in the farm economy of farms on the red marls in the 1840's using a rotational system characteristic of heavier soils. Given average yields and a price of 60/- a quarter an expected gross return would have been £9 per acre. Spath farm near Longford with its 31 acres of wheat could have grossed £279, a potentially important contribution to farm income.

The more detailed information of the 1870 agricultural census shows the pattern of distributional variation of wheat across the area studied [see Figure 7.3]. Parishes with the highest proportions, i.e. in excess of 12%, were located broadly at the southern and eastern margins. In some parishes in north west Leicestershire over 16% of the land was in wheat. More usually the proportions of parish areas in wheat were in the order of 4% to 8%, this being noticeably the case for red marl parishes. The lowest values were associated with urban parishes and those incorporating extensive areas of floodplain land.

The implication of the available data from the 1801 Crop Returns to the 1870 census is that wheat growing was a general enterprise for farms large enough to have arable. Output would have increased consequent upon enhanced yields as discussed above perhaps by the order of 50%. This would have paralleled national trends as indicated by Fairlie [Fairlie S, 1969 p.114-5] but at lesser levels. The movement of output for England and Wales between 1829 and 1876 as determined by Fairlie suggests that the period of maximum production of home grown wheat was from the early 1830's to the late 1850's with 1845 as the year of greatest output. Despite a near doubling of the output per acre by the late 1850's national production began to fall away as the area under wheat declined but it is difficult to determine whether this happened in Derbyshire. These issues have been discussed further by Vamplew particularly in relation to the repeal of the Corn Laws in 1846 plus the ensuing price-cost squeeze whereby the import of grain prevented price rises at a time of increasing wages and rents [Vamplew W, 1980a and

1980b].

Whatever the doubts about trends in earlier decades the position of wheat as a tillage crop in Derbyshire was not long sustained after 1870. The Judges of the Derbyshire Prize Farm Competition of 1881 observed that 'of all the corn crops wheat appears to be least in general favour' and that 'less is grown than formerly' [DPFC 1881, p.458]. Depression in grain production had taken hold by this time and the progress of decline has been summarised by Tomson in analysing the annual agricultural census figures for Derbyshire for the period 1870 to 1895 [Tomson G A, 1986 p.129]. Decline in wheat growing was most marked in parishes on the marls north of the Trent as compared with those to the south and even here the area was cut by half [ibid p.132].

2. Barley

Barley was widely grown throughout Derbyshire but on a lesser scale and a more variable basis than wheat. By the latter years of the eighteenth century barley had ceased to be significant for human consumption and was used for animal feed and in the brewing industry. Brewing was widely established at the time [Mathias P, 1959] so that numerous towns featured this industry as part of their economic structure. In the middle Trent counties Nottingham, Derby, Uttoxeter, Shardlow and not least Burton upon Trent all had breweries. In addition to urban breweries a number of lesser settlements had malt offices or small maltings. Farey [Farey J, 2, 1815, p.127] listed malt offices at Borrowash, Duffield, Repton, Shardlow and Stretton while the County Rate Assessment of 1836 included malt offices at Doveridge, Etwall and Willington.

The importance of barley growing, malting and brewing in Derbyshire towards the close of the eighteenth century was emphasised by Pilkington [Pilkington J, 1789, p.291, p.302]. He stressed the trading aspect stating that the production of 5000 quarters was such that half of it was sold to more westerly markets in Stafford, Chester and Lancaster. At the same time

barley was brought in from Nottinghamshire and Leicestershire. In all 'a considerable quantity' was sold in the markets of Burton and Uttoxeter. Seemingly about two thirds of all barley was converted into malt.

The position of barley in southern Derbyshire farming in the first half of the nineteenth century can be gleaned from the 1801 Crop Returns, the writings of John Farey and the Tithe Files and Surveys. The Crop Returns show barley as the third ranking cereal crop overall in the parishes of southern Derbyshire and eastern Staffordshire but second ranking in north west Leicestershire. At individual parish level the proportion of tillage under barley varies from 3% at Radbourne and 4% at Snelston to 20% or more in parishes in the Trent Valley and also in south Derbyshire and north west Leicestershire. In very few parishes such as Repton does barley rank first among the cereals [see Figure 7.4]. These correlate substantially with the light soils of gravel spreads and outcrops of Triassic sandstone which also give light soil conditions well suited to the growth of barley. Barley growing was relatively insignificant in those parishes where soil conditions are dominated by the red marl and glacial tills.

Farey [Farey J, 2, 1815, p.126] discussed yields of barley at some length many of the examples quoted being comparable to those achieved for wheat. William Smith at Foremark obtained 30 bushels per acre, Bowyer of Waldley and Cocker of Ilkeston 32 bushels per acre and Lord Vernon at Sudbury as much as 40 bushels per acre. Such yields are undoubtedly exceptional in that they exceed the county average of 33.1 bushels per acre for the close of the nineteenth century by a substantial margin. Kain [Kain R, 1986, (1) p.357] in his analysis of tithe files has calculated an average of 28.8 bushels per acre for Staffordshire and 29.4 bushels per acre for Derbyshire in 1816 [Kain R, 1986, (2) p.285].

Farmers in southern Derbyshire were therefore limited in their ability to respond to the demand for barley by the character of soils. At the same time the Burton breweries were an important and evolving element of the local barley market. Analysis of the

day books of Benjamin Wilson's brewery in the 1780's and 90's shows that some locally grown grain was purchased as well as supplies from the south and east of England. Figures 7.5 and 7.6 have been drawn for the brewing seasons 1785-6 and 1792-3 and show that at this time the lighter soiled parishes of southern Derbyshire were indeed part of the supply area. A similar pattern has been demonstrated by Owen for the 1820's [Owen C C, 1992]. The decline in the area under barley of over one third between 1801 and 1870 still allowed the crop to be first ranking in some parishes to the south of the Trent. Indeed the mapping of the 1870 agricultural census shows a clear division between parishes in the north and west, including the core of the red marl, where little barley was grown and those to the south and east [see Figure 7.7]. In these parishes where lighter soils occurred over 7.5% of the agricultural area was in barley. There was therefore a clear continuity with earlier times with respect to the main areas of production.

3. Oats

In contrast to extended discussion of wheat and barley by Pilkington [Pilkington J, 1789] and Farey [Farey J, 2, 1815] oats received relatively little comment. Apart from a reference by Farey [op cit p.129] to the grinding of oats for oatmeal in north Derbyshire it was mainly grown for farm consumption as horsefeed. The cultivation of oats was consequently widespread across Derbyshire and in neighbouring counties. The 1801 Crop Returns show oats coming a close second to wheat in terms of acreage for the collected parishes of southern Derbyshire and north east Staffordshire but was third ranking in north west Leicestershire. In a number of individual parishes on the northern margin of the red marl where it gives way to sandstones, as at Mugginton, Brailsford, Osmaston and Snelston, oats was the first ranking crop. In many other parishes oats ranked second.

The general significance of oats suggested by the Crop Returns is confirmed for the 1840's by data from the Tithe Surveys [Kain R, 1986]. For some Derbyshire parishes averages in excess of 20% of the arable area are recorded as for Sudbury and 25% for

Yeaveley and Alkmonton [PRO IR 29/8]. In neighbouring Staffordshire parish totals were generally less than 15%. By 1870 the percentage of land in oats was 16%. South of the Trent it was of the order of 11% but northwards onto the coal measures it was 24%, perhaps a reflection of a market for feed for pit ponies. In the latter years of the nineteenth century, as the area under wheat and barley declined then oats emerged as the leading arable crop [DPFC 1881, p.458].

4. Root Crops and other Fodder Crops [Green Crops]

It has already been indicated that crops grown for stockfeed were of special significance in an area such as southern Derbyshire given the prominence of livestock enterprises. In discussion of the various crops grown at national level the field turnip is given considerable if undeserved emphasis [Chambers J D and Mingay G E, 1966, p.55] and inevitably features in the southern Derbyshire region. By the time of Curtis [Curtis W, 1806] and Farey [Farey J, 2. 1815] field turnips had apparently been substantially superceded by the more reliable swedish turnips otherwise known as swedes although it would appear that the term turnip was commonly used to describe both plants.

Problems in the cultivation of the field turnip for southern Derbyshire farmers on heavier soils have been identified in discussing rotational arrangements. Marshall [Marshall W, 1 1796, p.176] referred to turnip soils as 'light and dry'. Even on light land, however, turnip cultivation had to be undertaken with care. Pitt [1794 p.69] writing about Staffordshire recommended four ploughings and harrowings in order to obtain a good tilth for sowing turnip seed at mid summer. The addition of fertiliser in the form of lime and dung or street sweepings from large towns was necessary in order to bring soil to appropriate condition. Pilkington [Pilkington J, p.303] noted however that turnip hoeing was much neglected in Derbyshire as once established turnips were labour intensive and field work in the form of hoeing and weeding was essential so that they grew to a good size. Although not unique in this respect the turnip was also weather sensitive and disease prone. Farey [Farey J, 2,

1815 p.135] noted the prevalence of the turnip fly which was also cited as a problem in 1881 [DPFC 1881, p.467]. The possibility of dealing with the turnip fly through the application of fertiliser is advocated in the 1850's. Dunn and Hanson of Nottingham offered Laws patent turnip manure or superphosphate of lime [DM 17.3.1858]. This had been 'in use for 16 years and when drilled with turnip seed it produces such rapid growth in the young plant that loss of crop by the fly is effectively prevented'. Pitt [Pitt W, 1794 p.69] emphasised the benefit of open weather in autumn and winter in order to allow the crop to develop fully in contrast to cold and dry conditions which could restrict yields considerably. In order to overcome these problems a wide range of varieties of turnip emerged [Farey J, 2, 1815, p.136]. In this vein the Derby Mercury [DM 10.8.1797] carried advertisements for the Holstein field turnip. Its merits were described in characteristically glowing terms. 'The crops were twice as great, its stood the severity of winter, it was so very sweet that cattle of all sorts ate it with avidity and it may also be grown in a dry season'.

The classic and preferred use of field turnips was by sheep or calves feeding them directly from the land which saved the labour of lifting the crop and also distributed dung. It was necessary for land to be in good condition in order that it not be poached for stock to be systematically folded across turnip ground using hurdles. Not surprisingly Farey [Farey J, 2, 1815 p.189] noted that Derbyshire farmers such as Rowland of Mickleover and Mundy of Markeaton on the red marl drew and cut their turnips for yard feeding of sheep and cattle while others lifted turnips and allowed them to lie on the ground for up to one month before folding. Turnip cutting was aided by machinery so for example John Greaves of Burton offered a turnip engine as part of his sale [DM 12.1.1815] and such references feature commonly in sales through to the 1860's.

Farey [Farey J, 2, 1815, p.144] emphasised the importance of the swedish turnip in Derbyshire describing it as 'spreading and widely grown'. The swedish turnip had been introduced into Britain in the late eighteenth century as a hardier and more reliable substitute for the field turnip. All but one of the

farmers visited by Curtis [Curtis W, 1806] grew swedes. Farey [Farey J, 2, 1815, p.145] who also visited Hoon Hay, Markeaton and Bretby remarked upon the high level of approval of farmers particularly Mundy of Markeaton who 'has had good crops on rather stiff land of the red marl'. In addition to its ability to grow on heavier land swedes stood the winter better and were therefore potentially available in late winter and early spring. Some farmers visited by Farey claimed that swedes could survive into early summer. The greater average size of the swede meant that overall yields per acre were greater than that for the field turnip.

It follows that the growing of the swede was more advantageous to the farmer. Its manner of cultivation was similar and equally demanding upon labour but in its preference with respect to soil and weather conditions it was more versatile. Like turnips swedes could be left in the ground and fed off by sheep. The larger size, however, meant that swedes were often lifted and sliced in the yard to be fed to dairy cows and to beasts being fattened. Both the method of usage and also yields of root crops were highly variable according to seasonal weather conditions. Average yields for turnips and swedes in Derbyshire as indicated in Agricultural Returns for Great Britain [1890-1901] show an average of about 15 tons per acre but with a range from 11 tons in poor years to over 18 tons in good years. Kain suggests yields of 12/13 tons from Tithe File data which indicates a useful advance in productivity [Kain R J P, 1986a]. The mangold reported as coming into favour by Rowley generally gave heavier yields of the order of 25% to 33% [see Mitchell B R and Deane P, 1962 p.90-91].

Cabbages were another member of the brassica family which were better adapted to Midland conditions than field turnips [Marshall W, 1796, 1.p.205]. Farey [Farey J, 2, 1815, p.140] was impressed by the usefulness and versatility of cabbages as compared with turnips. He noted the availability of a range of varieties which enabled them to be sown in either spring or autumn and the possibility of growing cabbages on a variety of soils. The particular merit of cabbages was their availability in winter when dairy cattle, fattening stock and sheep could be

fed off them when turnips were not accessible at times of hard frost. It was even feasible to pull up and then chop cabbages in the yard when frozen solid.

On a farm by farm basis the area under green crops was limited. They were labour intensive, had to be cultivated in the context of a crop rotation but, all being well, gave good yields. Various advertisements in the Derby Mercury include standing green crops as part of the farm sales. Characteristic acreages are demonstrated by Mrs Taylor of Ridgway Farm, Repton who had 4 acres of turnips [DM 30.11.1815] and John Woolley of Lullington who had 3 acres [DM 3.18.1827]. At the sale of Royle Farm at Drakelow [DM 30.1.1828] there were 5 acres of turnips. In 1820 the Rev. Holden of Aston Hall, Aston upon Trent had 8 acres of turnips, 2 acres of swedes and 1 acre of cabbage[DM 30.8.1820]. In the 1801 Crop Returns Green Crops were recorded for the great majority of parishes but were not always clearly distinguished. The acreages of all such crops have been mapped as Figure 7.8 Interesting distributional variations emerge with certain parishes seemingly having greater acreages in proportion to their size. Generally these correlate with light land as in the cases of Brailsford [90 acres], Mugginton [120 acres], Cauldwell [59 acres] and Foremark [79 acres]. Green crops were also prominent in the north west of Leicestershire where they occupy 10% of tillage. This compares with 5.8% for southern Derbyshire and 7% for adjacent parishes of Staffordshire.

Further distributional aspects of green crop cultivation can be derived from the data collected by Farey [Farey J, 2, 1815, p.135 & 148] which has been mapped as Figure 7.9. This shows swedes and cabbages to have been widely grown but turnips less clearly so. There is an indication that they were more favoured south of the Trent. By the middle years of the century mangolds had replaced swedes particularly on heavy land and are described by Rowley [Rowley J J, 1853, p.61] as typical of Derbyshire rotations. This may have been but the 1870 agricultural census indicates more than twice the acreage of turnips and swedes than mangolds on the red marl i.e. 1471 acres as opposed to 608 acres. The 1870 agricultural census also shows root crops to have been grown in all parishes but with significant variation

across the area in much the same manner as for 1801. Figure 7.10 shows the highest percentages of the total agricultural area in roots to have been south of the Trent. Here the overall percentage for Derbyshire parishes was 5.8% and for adjacent Leicestershire parishes 4.75%. On the red marl and coal measures as well as neighbouring Staffordshire the percentage of land in roots was of the order of 2.5% on average. A substantial block of parishes from the Dove eastwards through the Derby area which coincides with the greatest intensity of dairying is apparent on Figure 7.10 with values of less than 2.5%. An irregular pattern of marginally higher values occurs on the northern margin where the sandstones outcrop. Comparison of Figure 7.10 with Figure 8.7, showing intensity of dairying, and 8.13 showing level of significance of sheep, indicates the stronger relationship between roots and sheep. Further confirmation of the existence of a broad northwest/southeast division within the study area in 1870 is thus evident. It incorporated all aspects of agriculture as well as green crops so that wheat and barley appear as of greatest significance in crop systems in the southeast.

Three other crops merit some mention in a discussion of stock feed. Peas and/or beans are recorded for virtually all parishes at the time of the 1801 Crop Returns and in Derbyshire the total acreage exceeded that of green crops. Later in the century they are listed on farms of the Devonshire Estates [CA 1843-50], occupied over 20% of arable as recorded for some parishes in the Tithe Surveys eg, Sutton on the Hill. The 1870 agricultural census indicates a total acreage for red marl parishes of 1300 acres only marginally less than for turnips and swedes. Peas and beans were also mentioned favourably by the Prize Farm Judges in 1881 [DPFC 1881, p.460]. Paradoxically Farey plays down their significance in the farm system indicating that 'peas are not extensively cultivated' and of beans the variability of the crop received more emphasis than its utility [Farey J, 2, 1815, p.132]. By contrast Farey [ibid p.150] is enthusiastic about the use of potatoes as stockfeed. The potential high yield of 400-600 bushels per acre is commended and their value as feed for pigs and cattle, either cooked or raw, is recognised.

Purchased Feedstuffs

A vital element of the evolution of animal feed systems through the eighteenth and nineteenth centuries was the introduction of purchased feedstuffs. Almost invariably these had higher feed values than grassland or fodder crops. Although the extent to which this was the case can only be inferred from the analysis of current products as stated by Halley and Soffe [See Table 7.2]. It is evident from the work of the nineteenth century agricultural scientist Augustus Voelcker that essential qualities and limitations were well appreciated [Voelcker A, 1874 p.283-4]. Two types of purchased feed emerge as of particular relevance to this study in the form of oilseed cake and brewers' grains. With respect to the former Thompson has presented a clear tabulation of the availability of oilseeds at a national scale from the first decade of the nineteenth century [Thompson F M L, 1968]. As summarised by Collins the supply of oilseeds grew rapidly from 35,000 tons in the 1820's, to 160,000 tons by the 1840's and over 600,000 tons by the late 1870's [Collins E J T, 1975 p.x]. The prime value of using oilseeds is frequently stated as having been in the quality of the animal dung in relation to pasture improvement as much as a feed in its own right. While there are few references to cake or more usually cake mills and crushers in the sale advertisments in the Derby Mercury, the eight references which do occur are confined to the 1860's. Interestingly these relate to a wide scatter of farms, all of which carried dairy cattle, from Sudbury to Shardlow and Mugginton to Repton. They show that the frequent advertisments placed by suppliers in preceeding decades did not go unheaded [DM 20.9.1865] and it was probably not until the 1860's that the use of oilseeds began to show up in the advertised possessions of retiring or deceased farmers. Comment by Voelcker [op cit, 1874 p.283] suggests that while the feed value of oilseeds was high some care was necessary in their use. Linseed cake led to the production of much rich milk but the quality would be impared unless the linseed was pure. Similarly decorticated cotton cake was one of the best and most economical being rich in fat, nitrogen and phosphates but at least needed to be put through a cake cutter to make it more

digestible. There is therefore no way of knowing the extent of the general usage of oilseeds in southern Derbyshire.

The potential significance of brewers' grains in the southern Derbyshire dairy system has already been signalled. Fortunately the situation with respect to grains is much clearer than that for oil cake. The potential feed value of grains is well documented, for example by Halley and Soffe, who indicate that the malting process leads to a concentration of the fibre fraction in the residual grains as well as the crude protein and oil fractions [Halley R J and Soffe R J, 1988 p.374-5]. A comparison with the food values of pasture, hay and roots demonstrates that grains are a superior source of protein and more importantly, in the light of previous discussion of phosphate deficiencies in grassland, are approaching three times the phosphorous content of pastures and hay [see Table 7.2]. This latter point has considerable potential significance for the quality of grassland in the southern Derbyshire. It can be demonstrated that grains were widely available and it may therefore be inappropriate to regard grasslands as totally degraded as a result of decades of dairying in the manner discussed above. The high proportion of phosphates in grains had been recognised by Morton among others [Morton J C, 1855 p.307]. The grains purchased from breweries were wet grains and comprised 75-77% water [Voelcker A, 1874 p.283]. They were more nutritious than their appearance warranted and Voelcker asserted that 'there is no food which equals brewers' grains for producing good milk in the most economical manner'.

Mathias [Mathias P, 1959 p.41] has indicated the widespread use of grains in urban dairies over many centuries but it is evident that farmers in southern Derbyshire and adjacent areas were able to make use of surplus spent grains from the breweries towns such as Burton upon Trent as a supplementary feed for livestock. Evidence points to their use from at least the latter eighteenth century and as the nineteenth century progressed the quantity of grains available from Burton increased dramatically. Owen has indicated a sixty fold growth in the output of Burton beer from 50,000 barrels in 1831 to over 3 million barrels in 1888 [Owen C C, 1978 p.229]. In consequence it is to be expected

that increasing numbers of farmers introduced grains in larger amounts into their feed systems. The assertion by Sturgess, which has already been noted, that on dairy farms in the fifties and sixties the increased use of purchased grains for winter feeding returned more and better dung to the land is thus given considerable credibility [Sturgess R W, 1967].

An important factor in the quality of Burton grains as stock feed appears to be their use in the brewing of strong beer. Such grains could not be used a second time for brewing small beer hence grains from Burton were above normal in quality. The earliest note of the use of spent brewer's grains was by Arthur Young at a farm in Alfreton [Young A, 1771 p.164]. This was followed by a more substantial reference to grains by William Marshall [Marshall W, 2, 1796, p.300-301] with respect to the area around Burton where 'several hundred head of cattle, mostly cows, are annually fatted with hay and grains'. This would seem to relate to animals which were being fattened up after the end of their useful lives as dairy cows. Commonly grains for feed were taken fresh from the vats and mixed with malt dust. Marshall [Marshall W, 2, 1796, p.300] states that the usual quantity of grains fed to stock was about a bushel a day mixed with hay at the rate of a half hundred weight per week. Apparently a diet of this kind would fat a cow within a period of 5 to 6 months. Marshall [Marshall W, 2, 1796, p.301] indicates further that in seasons such as 1785-86 when hay was excessively dear at 5/- a hundredweight then a principal part of the product of Burton breweries was bought up by the cow keepers of the town.

Analysis of the day books of Wilson and Co, Brewers of Burton for 1792/3 and of Samuel Allsopp's brewing for 1823/4 give an idea as to the distribution pattern of spent grains. The pattern has been plotted as Figure 7.11 to which has been added a circle at eleven miles from the centre of Burton following Rowley's statement [Rowley J J, 1853, p.60] that grains from Burton breweries are bought largely by all farmers within reach of 10 to 12 miles. Wilson's two principal customers were Joseph Summerland of Uttoxeter and Edward Martin 'beast feeder from Derby'. They both received deliveries of grains and dust on

every week day during the brewing season from October through to the following spring. Summerland purchased £85 worth of grains per month @ 4d a bushel ie, some 5,100 bushels while Martin took 2,700 bushels monthly. If Marshall's diet of a bushel a day is reasonable then Summerland and Martin were buying sufficient to feed 170 and 80 cattle respectively. Sale advertisements in the Derby Mercury show that Summerland was a stock dealer but it could also have been that he and Martin were acting as distributors of grains in their areas. Mathias [Mathias P, 1959, p.41] points to the importance of intermediaries in the trade in brewers' grains. More typical of Wilson's customers were farmers such as Massey of Hilton who purchased 32 bushels weekly and Dethick of Willington who took 30 bushels each week through the winter season. These and other smaller customers, such as Shilton of Swadlincote and Spencer of Rollestone Park must have developed feed systems of which grains were a regular part. Allsopp's customers were all located south of the Trent/Dove at distances up to ten miles. The quantities taken and the regularity of delivery on a daily or alternate day basis again indicate grains to be an integral element of the feed system. J. Evans of Callingwood was taking 240 bushels a week, Brown of Castle Hayes near Tutbury 130 bushels and Stretton of Wichnor 40 strikes.

Rowley [Rowley J J, 1853, p.60] indicates that by mid century farmers were entering into contracts with the Burton brewers to supply 2000 to 4000 bushels annually. At this time the brewing industry at Burton was undergoing rapid expansion in response to an enlarged market created by the rail network and the development of year round rather than seasonal brewing [Owen C C, 1973 Chapter V]. The grains were sold at 3d to 4d a bushel ie, at prices comparable to Wilson's in the 1790's and were equally divided between the farmers of Derbyshire and Staffordshire. The use of pits to store grains on farms was well established by this time. It was thus possible for farmers to keep stocks in hand and to take advantage of lower prices at times of year when grains were in good supply. Rowley states [Rowley J J, 1853, p.60] that better quality grains were fed to dairy cows and that mouldy grains were fed to pigs. However Murray [Murray G, 1895 p.19] thought that stale brewers' grains

were the most objectionable of feeds. Much of Rowley's comment is confirmed by the report of the judges of the Derby Prize Farm Competition for 1881 [DPFC 1881 p.488]. Farms at Twyford and Markeaton had large grain cisterns and are cited as typical of the locality. Grains of the best quality could be had in any quantity at any time of year from Burton. Contracts for 5000 to 6000 bushels annually were typical at this time. While there is an implication in this discussion that grains were of importance to larger dairy farmers it is significant to note Culley's comment on the activities of south Derbyshire cottagers in the 1860's that 'formerly many cows were kept in the lanes in summer and fed in winter on grains purchased from Burton breweries' [Culley G, 1867 J2-77]. It is perhaps important to note the use of the word 'formerly' by Culley as Murray [Murray G, 1874 Ag G, 28.3.74] had remarked on the recent decline in small holdings as the price of stock had become too high. It is possible to envisage on the basis of Culley's observation that grains had been within the reach of all dairymen including those who were hired labourers with perhaps two or three cows of their own.

To the farmer grains were in effect a substitute for land which would otherwise be given over to winter feed production as meadows for hay or arable for roots and cabbages. More land was available for accommodating and grazing more stock which in turn produced more manure which could be used for sustaining or enhancing the productivity of the land. The trade in spent brewers' grains from Burton upon Trent thus emerges as a highly significant aspect of the farm economy of southern Derbyshire. The growth of brewing at Burton meant that the supply of grains was reliable and increasing. Burton was not the only brewing centre of the region however. Breweries existed in the smaller market towns such as Uttoxeter and on a larger scale in Derby and Nottingham. There is no indication of any sales of grains from these brewers although it is difficult to imagine that such a valuable stock feed would not have been marketed. Mathias [Mathias P, 1959 p.399] indicates that the brewing industry was well established in these towns in geological circumstances not totally disimilar to those which produce the acclaimed water supply of Burton. It may have been that the emphasis on high

quality beers at Burton and the manner of use of grains which left them high in food value marked the difference. Burton beers were brewed to travel rather than to be drunk by the local work people as in the vicinity of Derby and Nottingham.

On the basis of the argument presented a positive view of the role of the feeding of grains in the advance of dairying in Derbyshire can be presented. Such a verdict needs to be qualified in the light of observations from the latter decades of the nineteenth century including for example Livesey's analysis of Derbyshire dairying in the earlier days of the development of the liquid milk trade and cheese factories in the mid 1870's [Livesey W, Ag G, 23.1.1875 and 30.1.1875]. His most detailed comment applied to farms which served the factory located in Derby. These were of 100 to 250 acres in extent and were close to the town and/or had extensive areas of flood plain land alongside the Derwent. Consequently it is not surprising to find them described as being mostly under permanent grass with only a few cases where a quarter of the land was in arable. Livesey indicated that 'the food of the cows in the winter months principally consists of hay and a few grains, they are turned onto the pastures in all weathers with questionable benefit to the cows and to the great injury of the pastures'. While acknowledging that the demand for winter milk was inducing farmers to spend more on feed than formerly Livesey went on to assert that 'as a rule the great bulk of the dairy cows in the county are pinched for food in the winter, hence they come to the pail in too low condition, and part of the season is gone before they get in good condition'. The regime for a 230 acre dairy farm in Leicestershire described by Moscrop [Moscrop W, 1866 p.316] with the emphasis on a few roots for winter feed appears remarkably similar. Livesey was able to give a much more positive view of the areas on the red marl which served the cheese factories at Mickleover and Longford. In these localities the 'industrious tenants' of W Leaper and E W S Coke farmed land of adhesive character principally in permanent pasture producing the finest varieties of grass in great profusion. But most importantly for the discussion of the role of grains 'that brewers' grains and meals are used liberally in the winter and spring months considerably increasing the produce'. There is

therefore an indication in Livesey's comment that there was a significant degree of variation within dairy practice in southern Derbyshire. It also emerges that the changed market of the 1870's was moving farmers towards greater inputs of artificial foodstuffs thus reinforcing a trend which was long established. The point was underlined by Murray [Murray G E, 1875 Ag G, 3.7.75] who stated 'that the development of the milk trade in this county [Derbyshire] is inducing dairy farmers to use large quantities of artificial food even throughout the summer'.

Despite this positive view Murray himself was to comment sceptically some twenty years later as to the extent of improved feed systems before the latter decades of the nineteenth century beyond the feeding of a few roots and grains in winter [Murray G E, 1895]. His view was in tune with the reflections of J P Sheldon another Derbyshire farmer looking back over the years from the 1890's [Sheldon J P, 1893 p.234]. He expressed his belief in a prevailing continuity of traditional practice in dairy feeding which signified a dependence upon grass with modest supplementary feed. Notwithstanding this view Sheldon noted some useful improvement involving the use of cabbages, roots, cake and grains. This incorporated essential features of Archer's and Carrington's practices and also the prize winners in the Derbyshire Prize Farm Competition of 1881 including Hellaby of Twyford and Mundy of Markeaton [see DPFC 1881 p.525 et seq] but as a general view of southern Derbyshire practice was probably without the degree of sophistication achieved by these elite farmers. Perhaps it may be reasonably speculated that a number of farmers aspired to such practice but it remains difficult to generalise about the remainder. The smallest farmers were clearly limited in what they might have achieved. Contradictions characterise a view of the progress which might have occurred in the evolution of feed practice, at one level evidence points to the increasing availability of grains with implications for better fed stock, higher milk yields and pastures less degraded than the national norm but on another contemporary opinion is cautious as to the extent of improvement of feed regimes.

Summary

A summary of this extended discussion of the provision of feed for livestock enables a number of key points to be made. The first is that the grasslands of southern Derbyshire were variable in character and quality. The alluvial floodplains were unusually extensive and of national repute but may have declined in the latter decades of the study period. In their prime they may have approximated to managed water meadows. For the greater area of pastures and meadows on the marls and clays it is necessary to balance comment as to the extent of widely recognised deficiencies in quality at both national and local levels against the effects of improved feed regimes involving cake and grains. Individual farmers such as W T Carrington and John Archer of east Staffordshire had made notable advance in developing grassland management systems through the combination of drainage and bones in the manner of the farmers in Cheshire and also by substantial purchase of feed. Their farm systems seem to provide some idea as to best practice in the area towards the close of the farmhouse cheese era. It is by no means clear however as to the extent to which such systems were general in Derbyshire. There is similar uncertainty with respect to the extent of the use of oil cake as a supplementary feed. It is the case, however, that brewers' grains were widely available and were used as winter feed by the larger dairymen and also cottagers with a few cows. The nature of grains is such that their use would have made good the draining of phosphorous from pastures and there was a belief that the dung produced from cattle was beneficial to the land. It is possible therefore to take a more positive view of the condition of grass and its merit as feed in southern Derbyshire though the scope for variation in practice was considerable. It has been shown that Carrington for one was sceptical of the quality of pastures especially on smaller farms. Even if the farmers on small acreages had some abilty to buy in grains the question remains as to the quantity that they might afford while at the same time the absence of arable must have restricted the range of their feed practices.

Another potentially significant development which has been identified in southern Derbyshire was the increased acreage of green crops. While chopped roots and cabbages were fed to dairy cows and no doubt added to the range of their diet it is the case that green crops were grown to the greatest extent south of the Trent as an element of a more diverse farming and enterprise regime which prevailed there. The percentage of land in green crops was notably less on the red marl and clay country at the time of the 1870 census. It is interesting to note the emergence at this time of the cluster of marl parishes west of Derby and to the south of Ashbourne where the proportion of land in green crops and also hay was relatively low at 2.5% and about 15% respectively. On the other hand the amount of land under permanent grass was unusually high at over 80%. In Chapter 8 this area will be shown to have had a notable predominance of dairy cows in milk. There is an inference that given a level of winter feed provision which was relatively low even for the red marl area a reliance on purchased feed, most likely in the form of grains, is indicated.

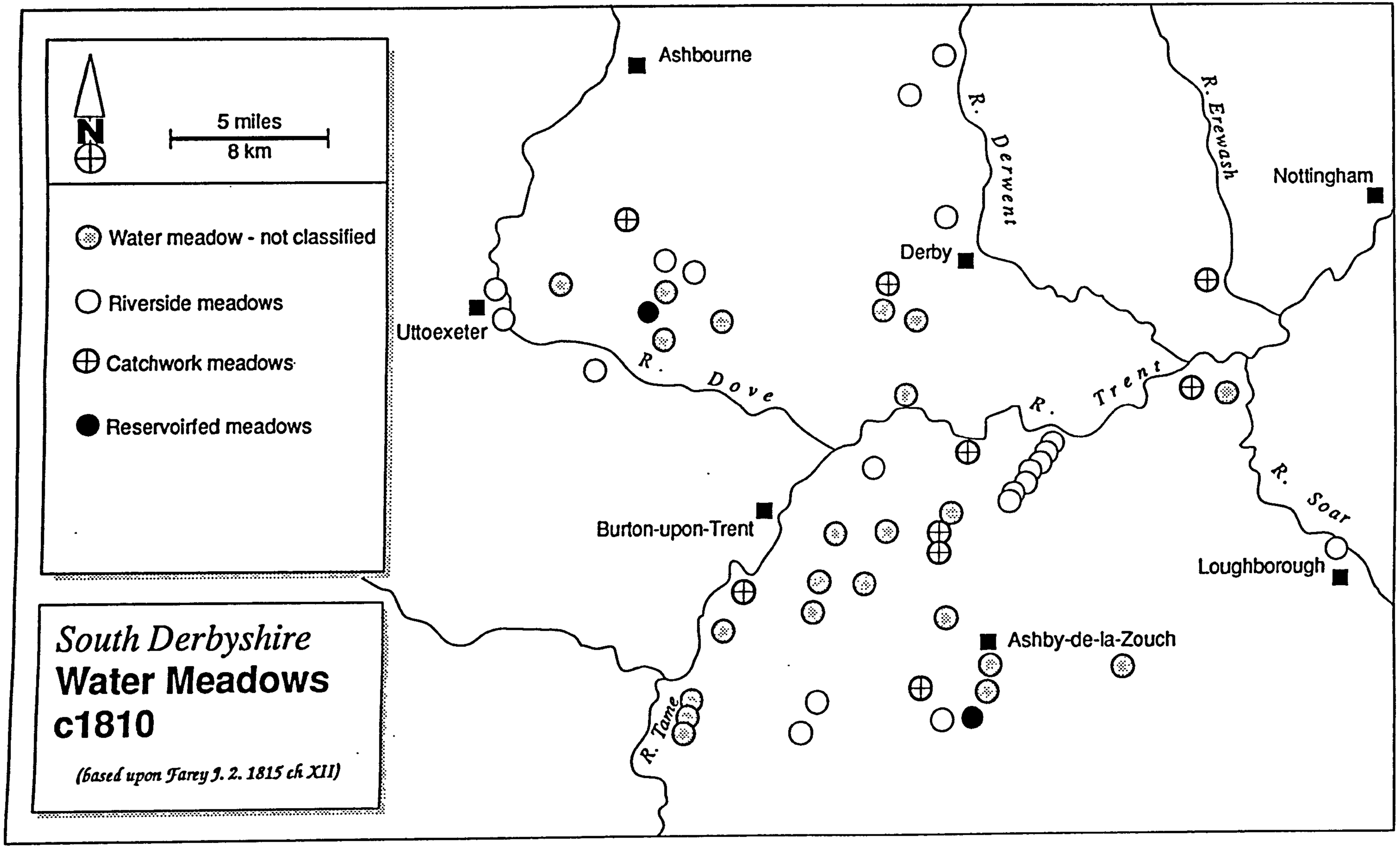

N
5 miles
8 km
Water meadow - not classified
Riverside meadows
Catchwork meadows
Reservoirfed meadows
South Derbyshire
Water Meadows
c1810
(based upon Farey J. 2. 1815 ch XII)
Ashbourne
Uttoexeter
Derby
Nottingham
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Tame

Figure 7.1

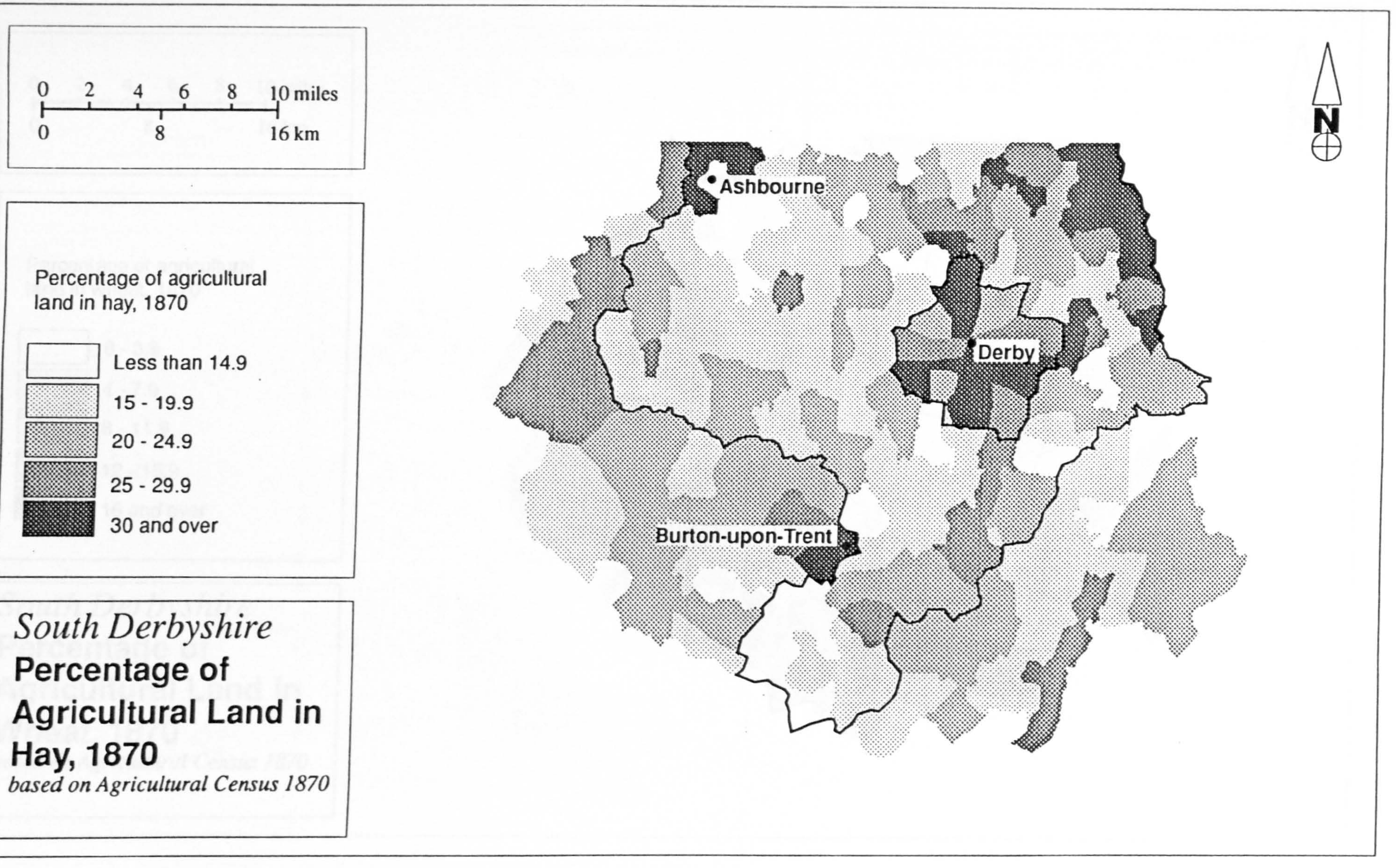

0 2 4 6 8 10 miles
0 8 16 km
Percentage of agricultural land in hay, 1870
Less than 14.9
15 - 19.9
20 - 24.9
25 - 29.9
30 and over
South Derbyshire
Percentage of Agricultural Land in Hay, 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 7.2

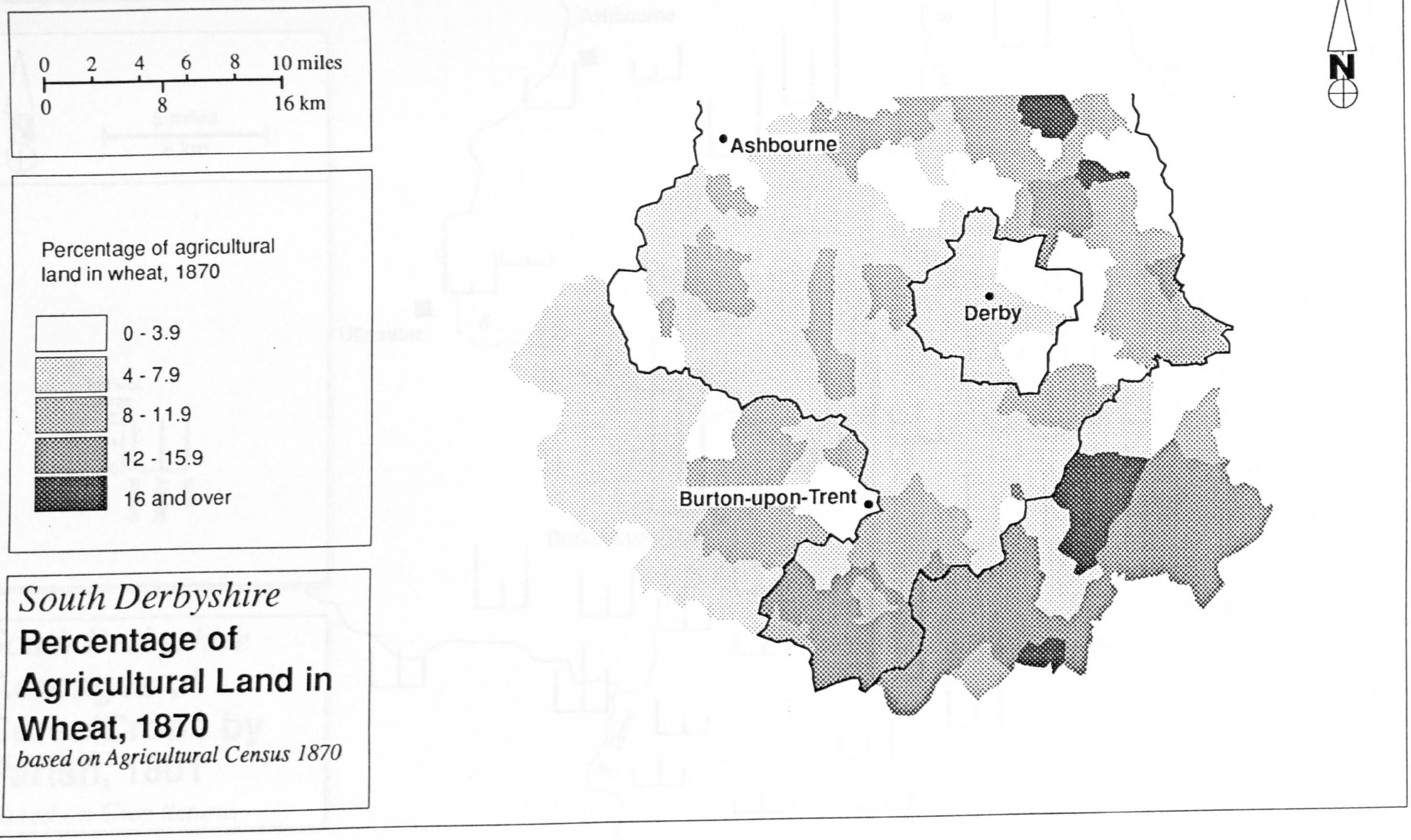

0 2 4 6 8 10 miles
0 8 16 km
Percentage of agricultural land in wheat, 1870
0 - 3.9
4 - 7.9
8 - 11.9
12 - 15.9
16 and over
N
Ashbourne
Derby
Burton-upon-Trent
South Derbyshire
Percentage of Agricultural Land in Wheat, 1870
based on Agricultural Census 1870

Figure 7.3

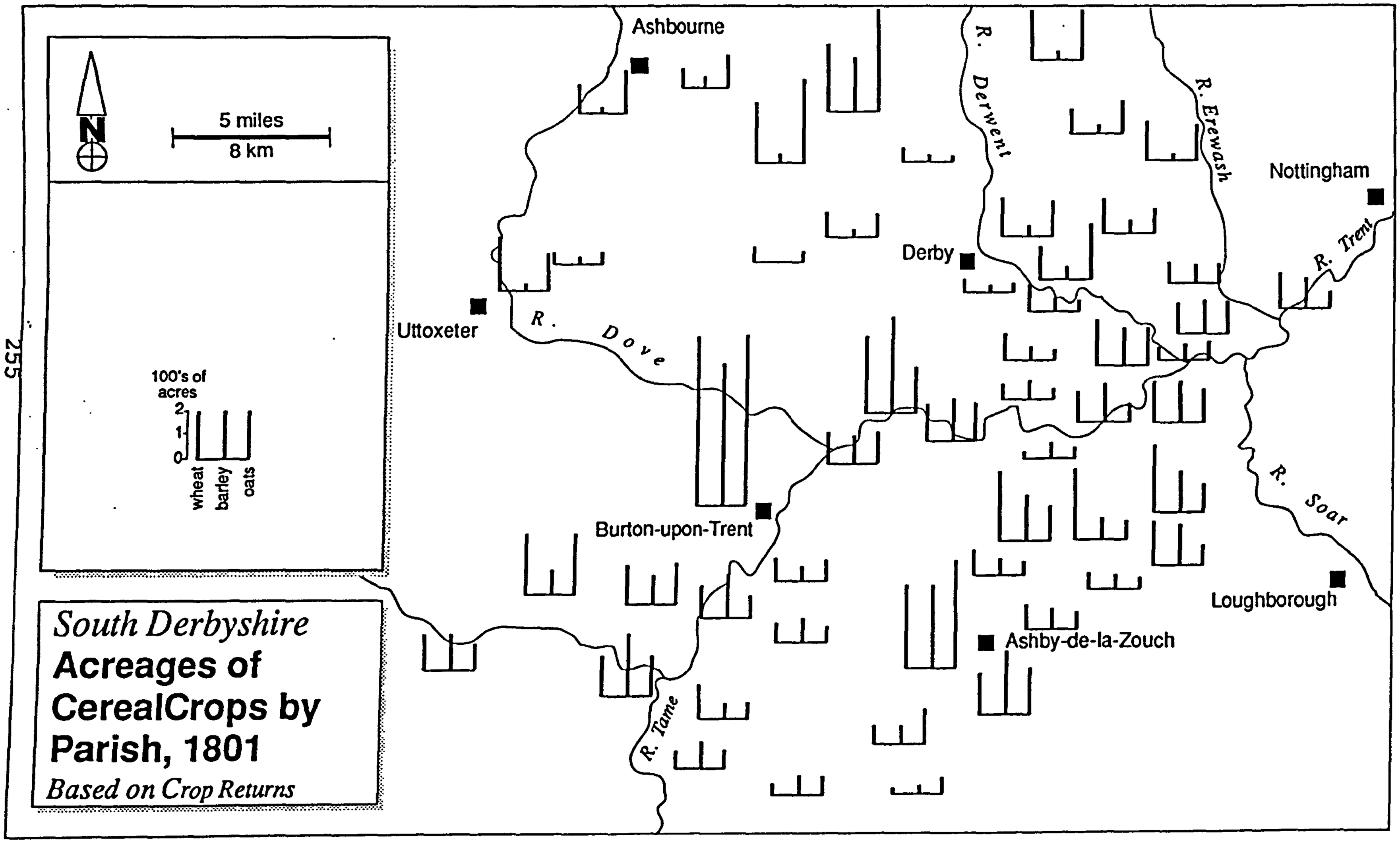

N
5 miles
8 km
100's of acres
2
1
0
wheat
barley
oats
Ashbourne
R. Derwent
R. Erewash
Nottingham
Derby
R. Trent
Uttoxeter
R. Dove
Burton-upon-Trent
R. Soar
Loughborough
Ashby-de-la-Zouch
R. Tame
South Derbyshire
Acreages of CerealCrops by Parish, 1801
Based on Crop Returns

Figure 7.4

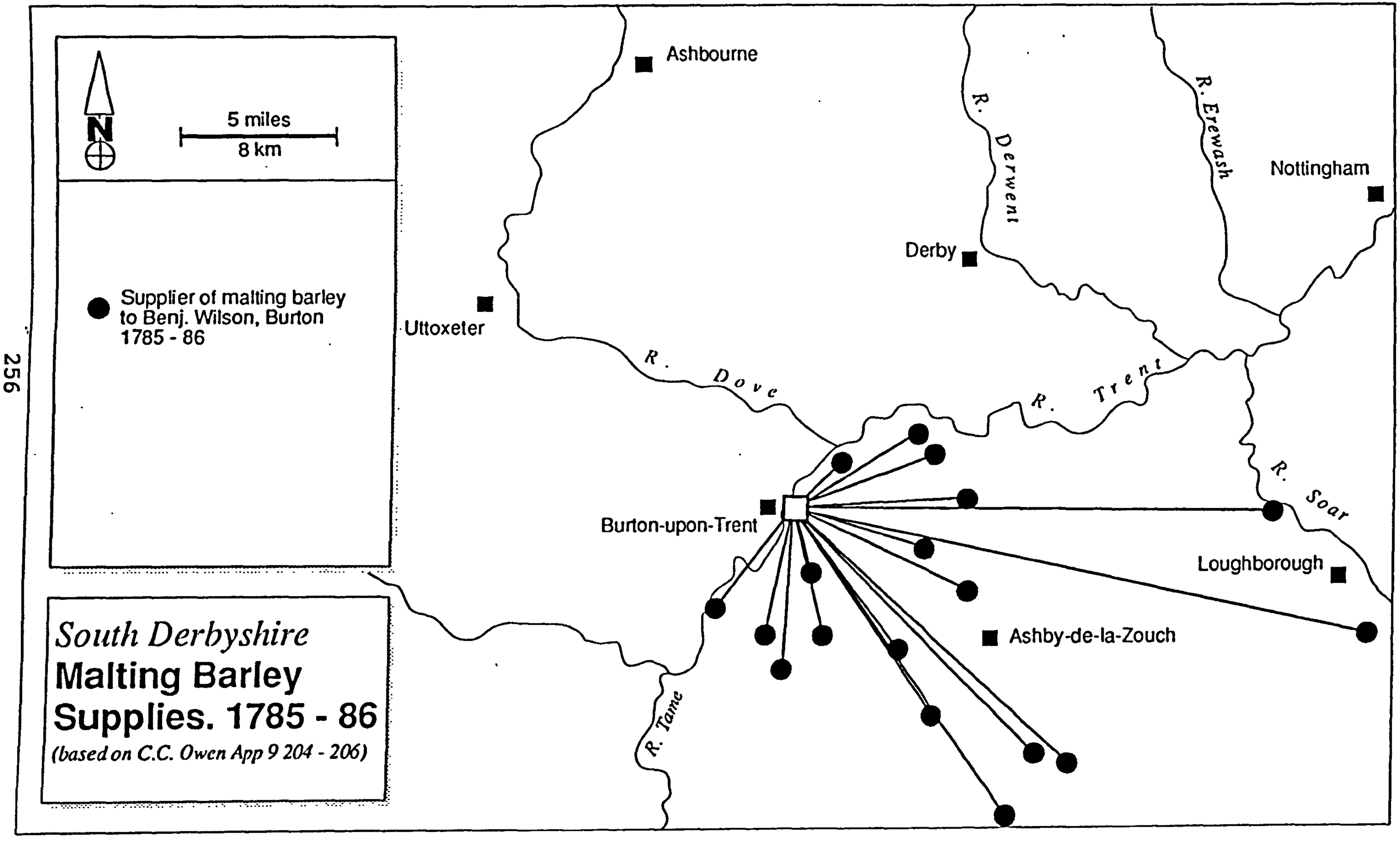

N
5 miles
8 km
Supplier of malting barley to Benj. Wilson, Burton 1785 - 86
South Derbyshire
Malting Barley Supplies. 1785 - 86
(based on C.C. Owen App 9 204 - 206)
Ashbourne
Uttoxeter
Derby
Nottingham
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Tame

Figure 7.5

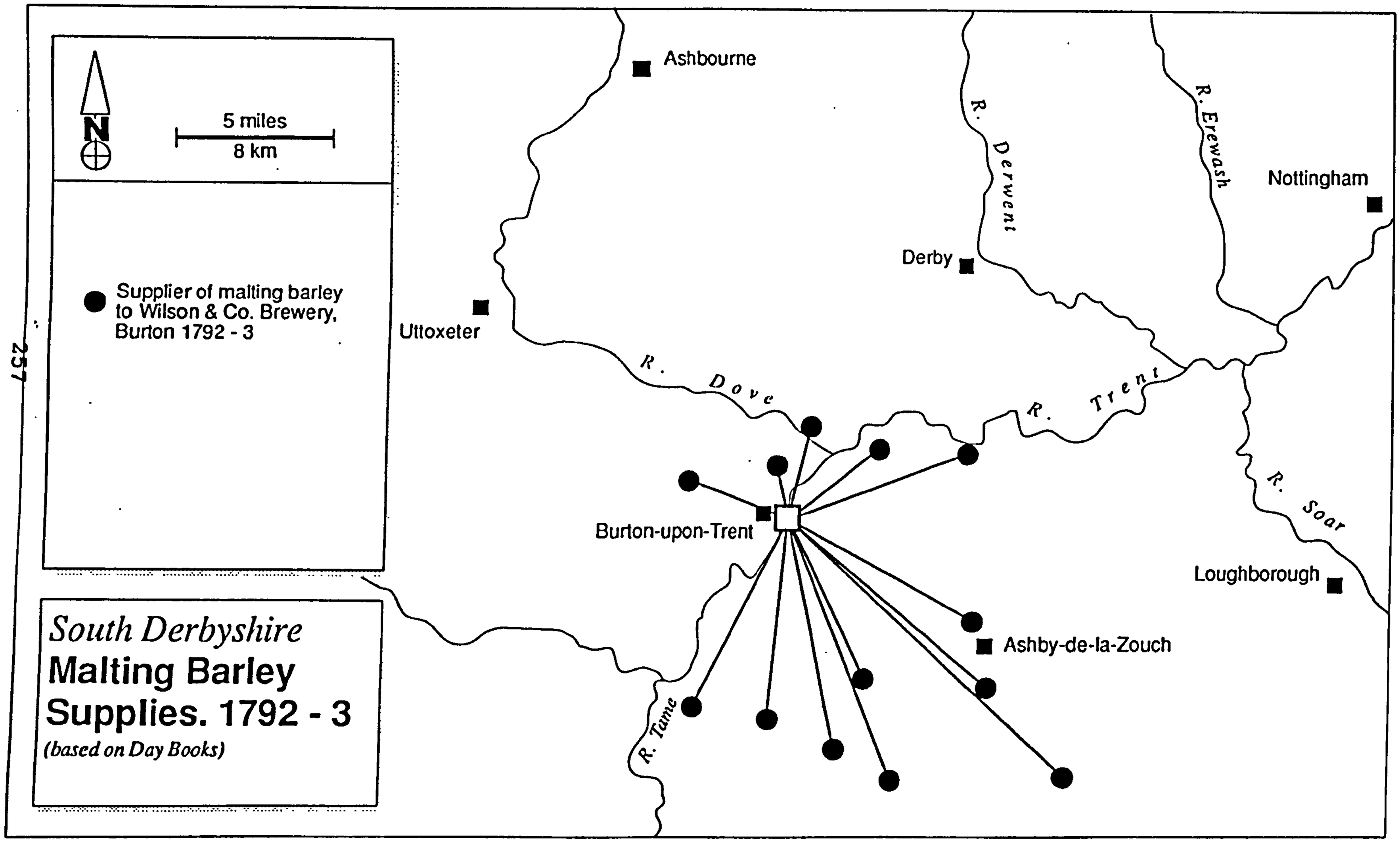

N
5 miles
8 km
Supplier of malting barley to Wilson & Co. Brewery, Burton 1792 - 3
South Derbyshire
Malting Barley Supplies. 1792 - 3
(based on Day Books)
Ashbourne
Uttoxeter
Derby
Nottingham
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch

Figure 7.6

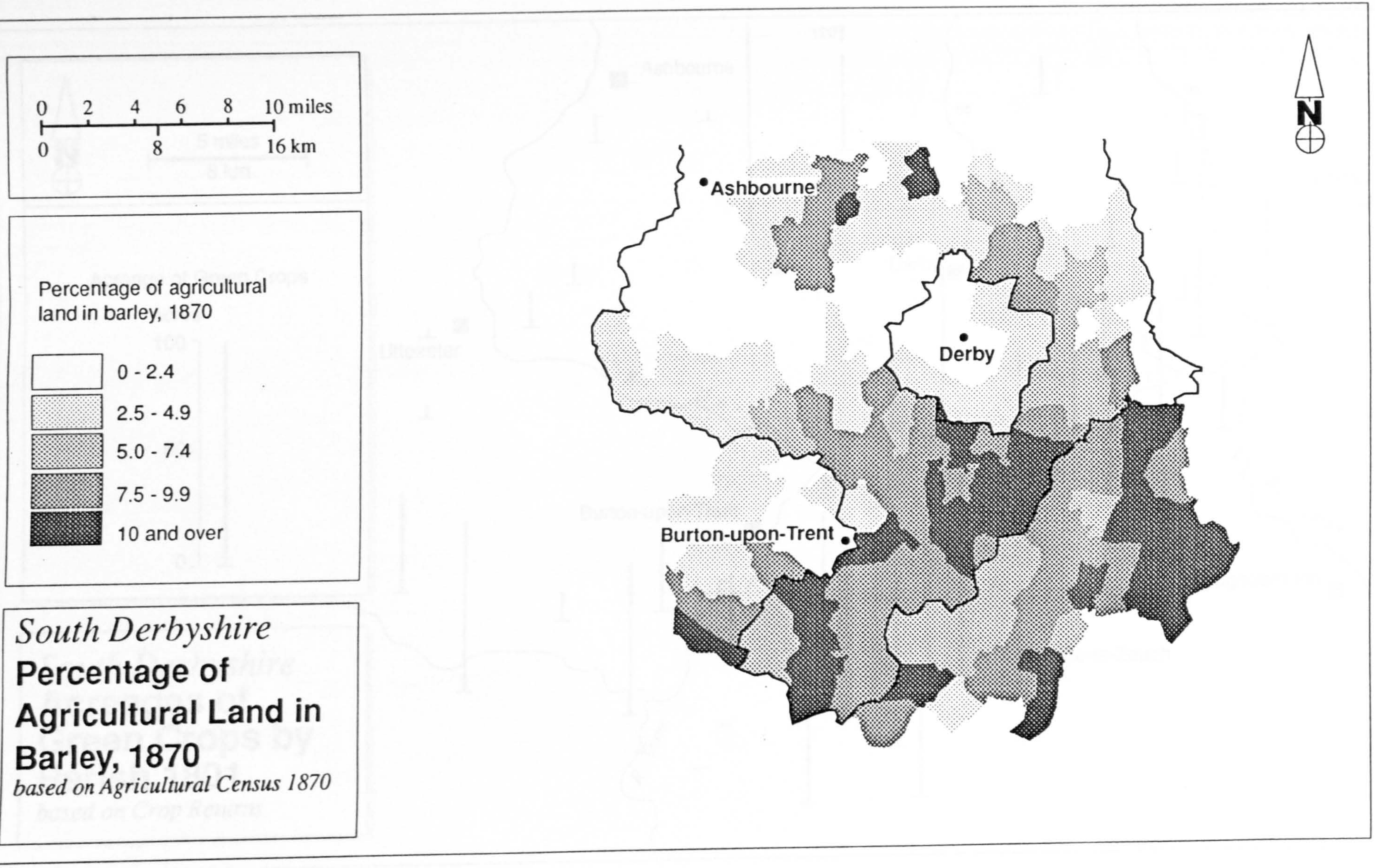

0 2 4 6 8 10 miles
0 8 16 km
Percentage of agricultural land in barley, 1870
0 - 2.4
2.5 - 4.9
5.0 - 7.4
7.5 - 9.9
10 and over
South Derbyshire
Percentage of Agricultural Land in Barley, 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 7.7

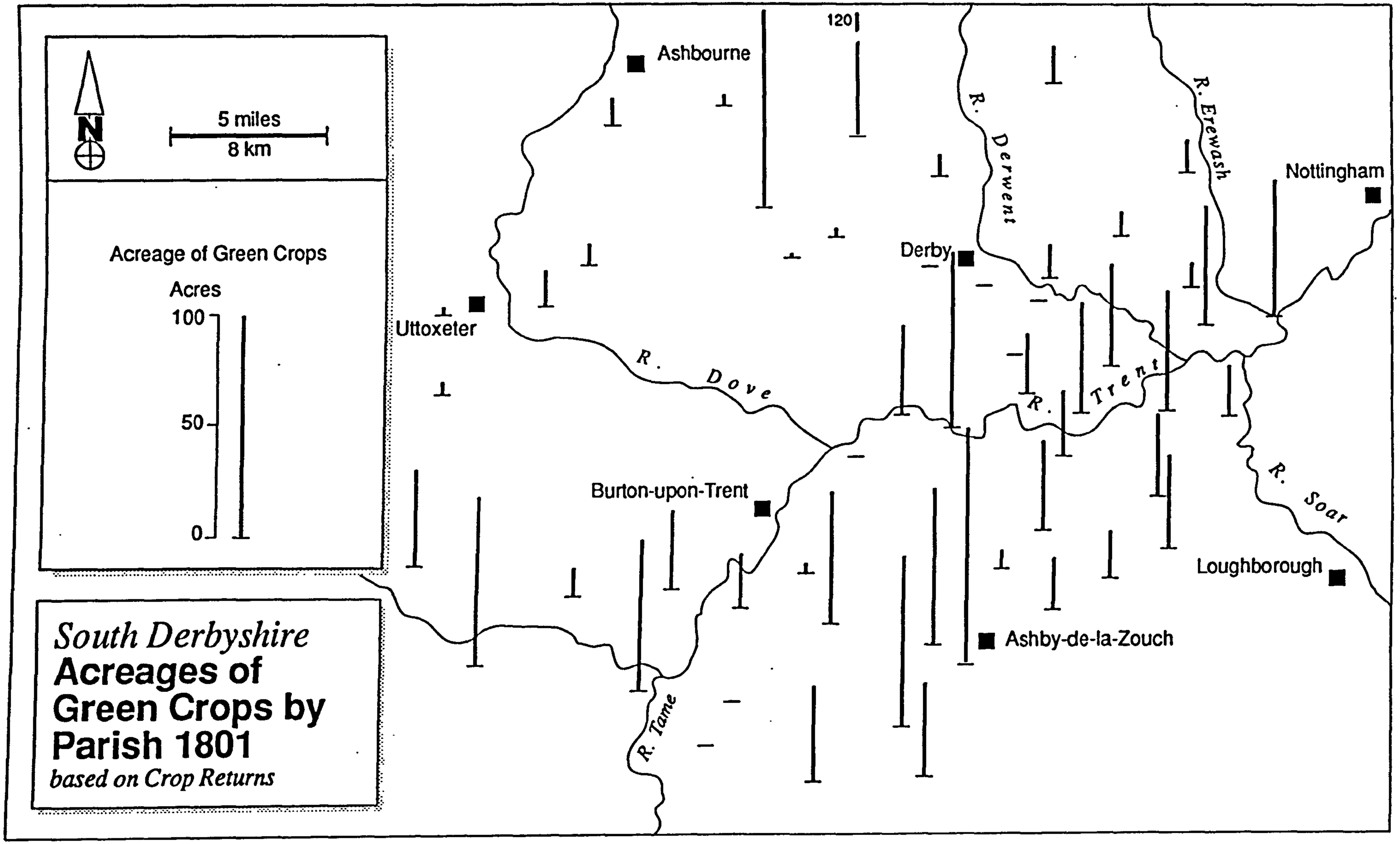

N
5 miles
8 km
Acreage of Green Crops
Acres
100
50
0
120
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Ashby-de-la-Zouch
Loughborough
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
South Derbyshire
Acreages of Green Crops by Parish 1801
based on Crop Returns

Figure 7.8

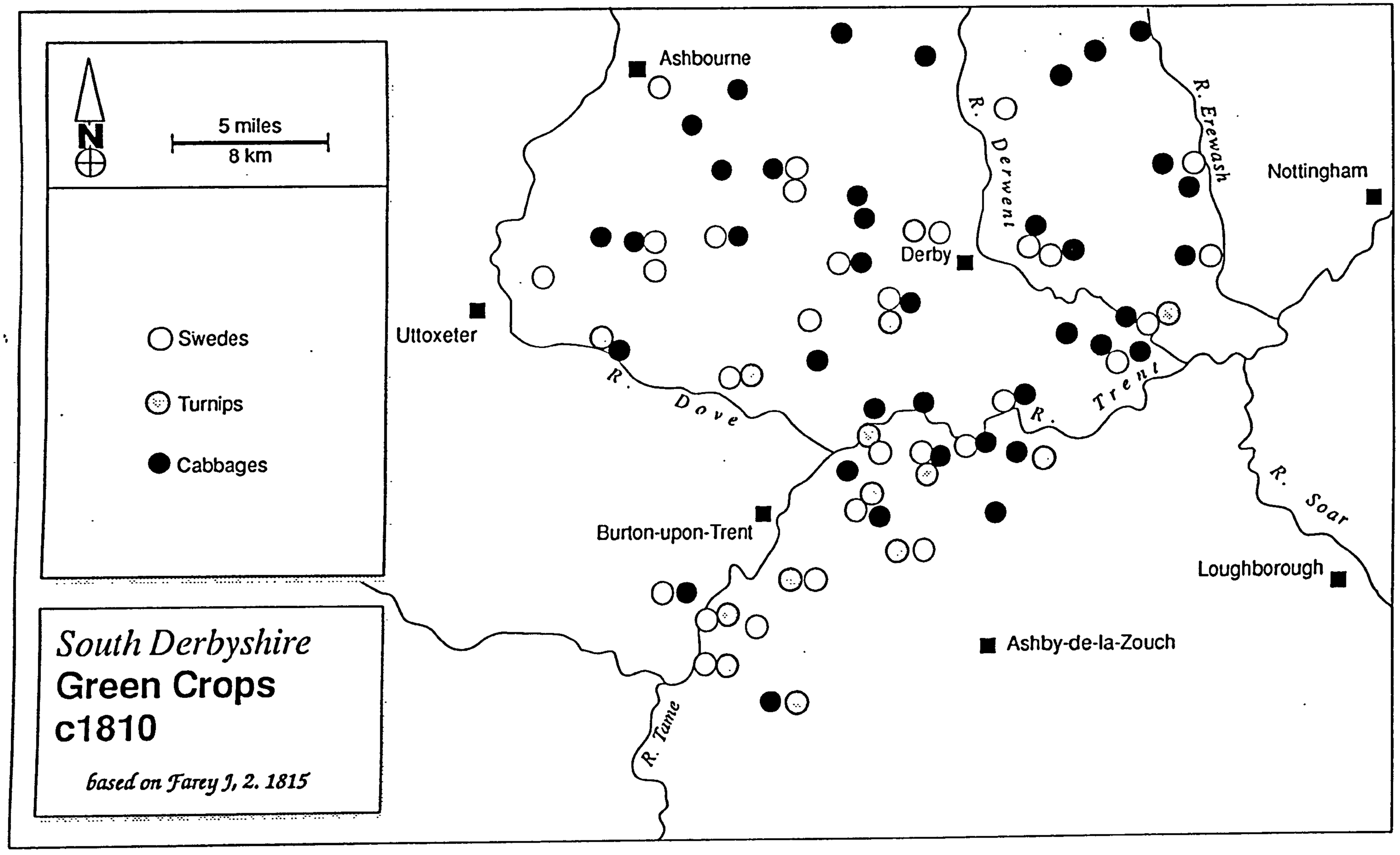

N
5 miles
8 km
Swedes
Turnips
Cabbages
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
South Derbyshire
Green Crops
c1810
based on Farey J, 2. 1815

Figure 7.9


0 2 4 6 8 10 miles
0 8 16 km
Percentage of agricultural land in roots, (turnips, swedes and mangolds) 1870
0 - 2.4
2.5 - 4.9
5.0 - 7.4
7.5 - 9.9
10 and over
South Derbyshire
Percentage of Agricultural Land in Roots (turnips, swedes, mangolds) 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 7.10

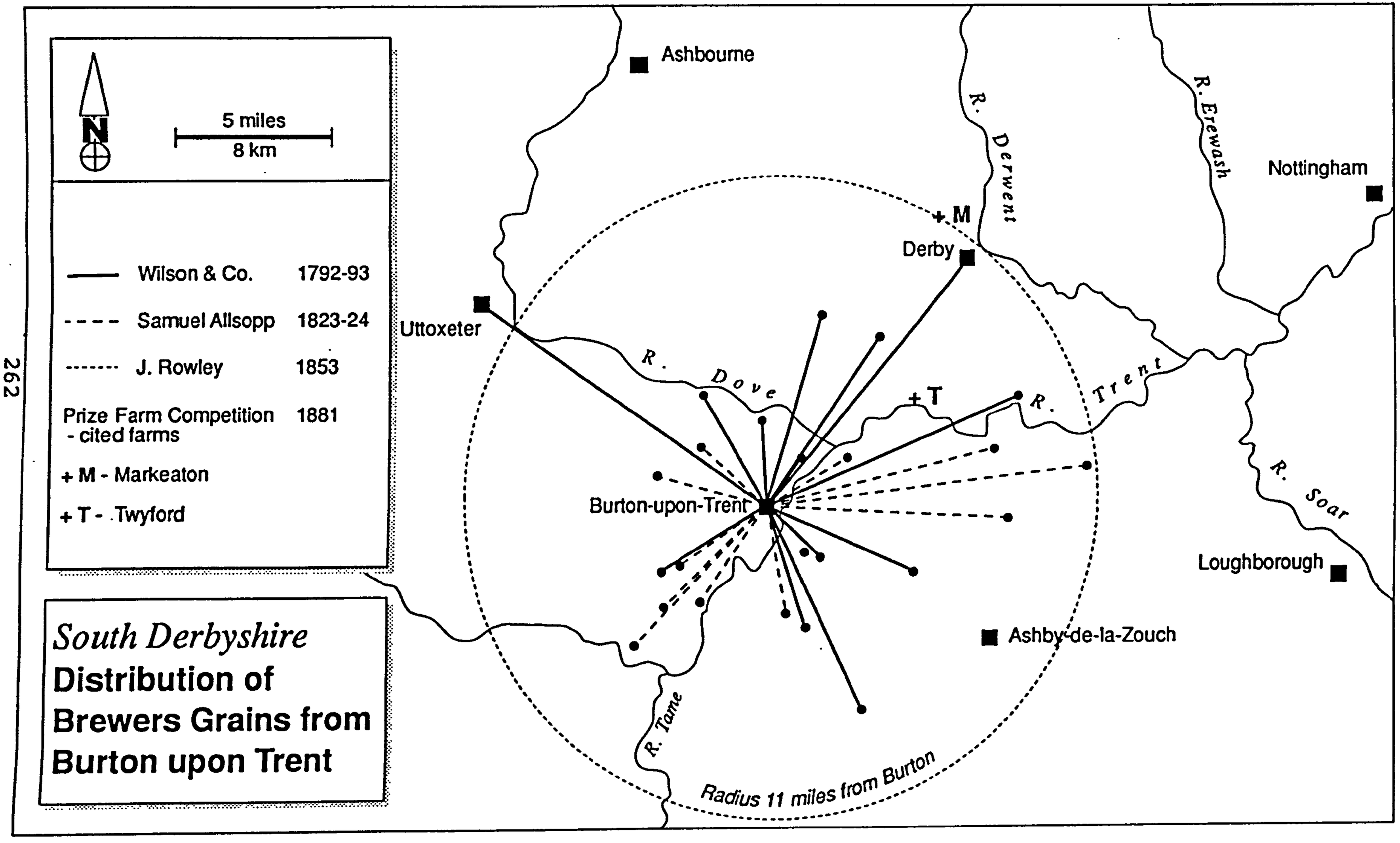

N
5 miles
8 km
Wilson & Co. 1792-93
Samuel Allsopp 1823-24
J. Rowley 1853
Prize Farm Competition 1881
- cited farms
+ M - Markeaton
+ T - Twyford
South Derbyshire
Distribution of
Brewers Grains from
Burton upon Trent
Ashbourne
R. Derwent
R. Erewash
Nottingham
+ M
Derby
Uttoxeter
R. Dove
+ T
R. Trent
R. Soar
Loughborough
Burton-upon-Trent
Ashby-de-la-Zouch
R. Tame
Radius 11 miles from Burton

Figure 7.11

Table a AREA PER LIVESTOCK UNIT IN ACRES
1870 Agricultural Census

	Red Marl Derbys	Red Marl Staffs	Coal Measures	South Trent Derbys	South Trent Leices
Total Agricultural Area	3.2	3.68	4.08	3.5	3.8
Grassland	2.22	2.24	2.21	2.15	2.4
Hay	0.66	0.75	1.09	0.64	0.7
Green Crops	0.085	0.093	0.09	0.22	0.183

Table b PERCENTAGE DIVISION of ARABLE LAND - MAJOR CROPS
1870 Agricultural Census

Wheat	23	26	21	22	23
Barley	15	10	11	20	19
Oats	22	16	20	14	12
Fallow	7	8	9	3	3.5
Green Crops	5	9	8	12.5	12
Peas and Beans	3.2	5	3	4	4
Ley Pasture	7	9	7	8	8
Ley Hay	12	14	17	13	14
Others	5.6	3	4	3.5	4.5
% Agric Area in Arable	27	27	33	47	42

Table c PERCENTAGE DIVISION of LIVESTOCK UNITS
1870 Agricultural Census

Milk Cows	55.3	56.9	55.6	36.4	38
Cattle over Two Years	13.3	11.8	11.9	17.9	20
Cattle under Two Years	18.9	18.4	18.6	19	17.7
Sheep	12.5	13.7	13.9	26.6	24.5

Table 7.1

	DRY MATTER %	DIGESTIBLE CRUDE PROTEIN g/kg DM	METABOLISED ENERGY MJ/kg DM	MINERALS % TOTAL DM Ca	Ph
PASTURE GRASS [Average]	20.6	93	11.2	0.5	0.29
HAY [Average]	85.8	73	9.2	0.55	0.28
ROOTS	10	70-80	14	0.42	0.33
BREWERS' GRAINS [Dried]	90	149	10.4	0.32	0.78

Derived from Halley R J and Soffe R J, 1988 p.374-5

Table 7.2 Aspects of Nutritional Characteristics of Selected Livestock Feeds

LAND USE [in acres] South Derbyshire Parishes

	Tithe Award c 1840	Census 1870
Arable	15247	14895
Pasture	32533	36855
Agric. Area	47780	51780
Pasture as % of Agric. area	68	71

CROPPING [in acres] for 34 South Derbyshire Parishes

	Crop Return at 1801	Census 1870	Acreage Change 1801 -1870
Wheat	4347	4209	-138
Barley	2772	3034	262
Oats	3945	2484	-1461
Potatoes	246	342	96
Peas and Beans	1210	728	-482
Turnips	833	1487	654
TOTAL	13353	12284	-1069

Table 7.3 Aspects of Land Use Change in Southern Derbyshire in the Nineteenth Century

Table 7.4 Crop Rotations

(a) Pitt (Pitt W Staffordshire 1794)

I	1. Fallow	2. Wheat	3. Beans or Peas (on marl)	4. Barley	5. Oats
II	1. Oats	2. Wheat	3. Turnips	4. Barley with seeds (on light land)	

(b) Brown (Brown T Derbyshire 1794)

I	1. Clover	2. Wheat or Oats	3. Fallow manured for turnips (on fertile soil)

(c) Curtis (Curtis W Derbyshire 1806)

Hoon Hay	1. Wheat	2. Oats	3. Turnips	4. Barley with Seeds	
Bretby	1. Wheat	2. Oats	3. Barley	4. Turnips	5. Barley in the Seeds
Foremark	1. Oats	2. Wheat	3. Barley	4. Turnips	5. Barley with Seeds
Repton	1. Oats	2. Barley	3. Turnips	4. Turnips	5. Barley with Seeds
Croxall	1. Beans or Oats	2. Wheat	3. Turnips	4. Barley with Seeds	
Walton on Trent	1. Beans or Oats	2. Wheats	3. Turnips	4. Barley with Seeds	
Ingleby	1. Wheat	2. Turnips	3. Barley with Seeds		
Markeaton	1. Turnips	2. Barley with Seeds			

Table 7.5a

Pattern of Cropping of Samuel Spurrier of Marston on Dove 1843- 1850. Source CA

Field Area							
A R P	1843	1844	1845	1846	1847	1848	1849
9 0 5	W	SE	W	O	no data	W	SE
8 1 8	F+T	W	W+T	W+B		PE	B
5 3 15	W	B	C+R	W		T	W
4 3 15	SE	W	B	T		O	T
4 2 30	SE	W	B	F		SE	W
120 1 26	(= total farm area, 32.2.33 arable + 87.2.33 grassland)						
	A R P	A R P	A R P	A R P			
Tillage	27 3 18	23 2 28	32 2 33	32 2 33			
Meadow	31 3 28	11 2 30	33 0 3	27 0 13			
Pasture	60 2 20	85 0 8	54 2 30	60 2 20			
	W-Wheat	SE-Seeds		A-Acres			
	B-Barley	C-Clover		R-Roods			
	O-Oats	R-Roots		P-Perches			
	T-Turnips	PE - Peas					
	F-Fallow						

Table 7.5b

Pattern of Cropping of William Godwin of Marston on Dove 1843 - 1849. Source CA

Field Area							
A R P	1843	1844	1845	1846	1847	1848	1849
5 0 7	SE	W	B	T	no data	SE	W
5 0 36	B	SE	W	B		B	SE
4 0 38	B	T	SE	SE		B	T
3 2 32	T	B	SE	W		T	B
3 1 26	W	B	T	W+B		W	B
3 1 6	W	B	T	B		W	B
117 0 2	(=total farm area, 25.2.25 arable + 91.1.17 grassland)						
	A R P	A R P	A R P	A R P		A R P	A R P
Tillage	20 2 28	20 2 39	17 1 5	20 2 37		20 2 28	20 2 39
Meadow	32 2 29	25 1 8	36 1 9	30 0 38		32 2 29	25 1 18
Pasture	65 3 25	70 3 25	63 1 28	66 0 7		65 3 25	70 3 25
Wheat	6 2 32	5 0 7	5 0 36	4 3 19		6 2 32	5 0 7
Barley	10 0 34	10 1 24	5 0 7	9 2 35		10 0 34	10 1 34
Turnips	3 2 32	4 3 38	6 2 32	5 0 7		3 2 32	4 3 38
Seeds	5 0 7	5 0 36	8 1 30	4 3 38		5 0 7	5 0 36
	W-Wheat	T-Turnips		A-Acres			
	B-Barley	SE-Seeds		R-Roods			
				P-Perches			

Table 7.5c

Pattern of Cropping of Thomas Docksey of Hilton

Source: CA

Field Area							
A R P	1843	1844	1845	1846	1847	1848	1849
12 3 27	SE	W	O+dills	F	no data	?	?
13 1 35	W	B	SEp	SEp		T	B
9 2 7	T	B	SEp	P		F	W
8 1 4	SEp	W	B+SE	SEp		F	W
5 0 16	T	W	F	W		SE	W
7 1 20	B	SEm	SEp	SEp		O	T
8 2 23	O	F/T	B	SEp		W	O
10 0 11	B	SEp	SEp	SEp		?	W
7 1 35	SEp	SEp	W	F		P	P
10 2 24	SEp	SEp	W	O		B	?
11 2 4	SEp	O	T	B		SE	SE
10 1 23	W	BE+O	F	W		W	F
6 0 21	BE	F	W	Cm		O	BE
9 0 39	SEm	SEp	O	W		F	B/O
130 3 09							
	(Note the total farm area = 245.3.34, 130.3.09 arable +115.0.25 grassland)						
Tillage	70 2 36	86 0 0	90 0 36	67 0 28		data incomplete	
Meadow	42 2 26	33 1 27	33 1 27	33 1 27			
Pasture	133 2 12	127 2 7	123 1 1	146 1 19			
Wheat	23 3 18	26 1 7	24 0 30	24 2 38		A-Acres	
Barley	17 1 31	23 0 2	16 3 27	11 2 24		R-Roods	
Oats	8 2 23	11 2 24	9 0 39	10 2 24		P-Perches	
Turnips	14 2 23	8 2 23	11 2 24				
Beans	6 0 21	?					
Fallow		8 2 23	10 1 23	7 1 35			
Clover				6 0 21			
	W-Wheat	SE-Seeds	m-mowed				
	B-Barley	BE-Beans	p-pasture				
	O-Oats	C-Clover					
	T-Turnips						

Table 7.5d

Pattern of Cropping of John Slaney of Marston on Dove. Source: CA

Field Area							
A R P	1843	1844	1845	1846	1847	1848	1849
8 3 35	B	C	W	O/B	no data	no data	O
7 0 38	P	P	P	P			P
11 1 8	P	P	P	P			P
9 2 18	SE	W	O&P	T			W
14 0 17	M	M	M	M			M
1 3 26	P	P	P	P			P
3 2 31	P	P	P	P			P
9 2 38	P	P	P	P			P
9 2 35	W	O	T	B			T
11 0 5	O	T	B	SE			B
10 0 2	T	B	SE	W			?
3 3 3	B	BE	W	O			O
11 1 4	P	P	P	P			P
2 0 22	P	P	P	P			P
115 1 35							
	A R P	A R P	A R P	A R P			
Tillage	43 2 28	53 1 6	53 1 6	42 1 1			
Meadow	23 2 35	14 0 17	14 0 17	14 0 17			
Pasture	48 0 12	48 0 12	48 0 12	49 0 17			
Wheat	9 2 35	9 2 18	12 3 36	10 0 2			
Barley	12 1 26	10 0 2	11 0 5	13 2 25			
Oats	11 0 5	9 2 35	9 2 18	7 2 26			
Turnips	10 0 2	11 0 5	9 2 35	9 2 18			
Beans		3 3 1					
Peas			?				
Clover		8 3 35					
		W-Wheat	M-Meadow		A-Acres		
		B-Barley	P-Pasture		R-Roods		
		O-Oats	C-Clover		P-Perches		
		T-Turnips	BE-Beans				
		SE-Seeds					

JOHN CARRINGTON Croxden Abbey Farm

Area 310 acres Permanent Grassland 200 acres
of which meadow 60 acres
Arable 110 acres

[a] Arable System
1. Fallow Crops - cabbages and swedes, 15 tons dung & 3 tons guano /acre.
2. Wheat and oats
3. Seeds - mown plus artificial manure
4. Seeds mown then 2/3 tons of lime /acre and ploughed for wheat.
5. Wheat
6. Oats - dressed with 2.5 cwt of guano or 4cwt bone manure/acre.

[b] Meadowland
Mown every year, dunged every second year and dressed with bone manure.
Cake, cabbage and hay is consumed by stock wintered on meadows.

[c]Livestock

50 Dairy Cows	1 Bull
14 Heifers	70 Ewes
14 Stirks	105 Lambs
14 Calves	

Feed Regime for Dairy Stock
Spring - Calving - daily supplement 5lb oats/oilcake/hay
Summer - out to grass
Autumn - supplement cabbages
Winter - supplement roots, cabbage, cake, hay, straw.

Livestock Units - overall 1 unit to 3.4 acres of land.
- 1 unit to 0.11 acre of Green Crops
-1 unit to 0.65 acre of Hay

Income:-			Expenditure:-		
50 Dairy Cows	@ £18.15.0	=£925	Rent	@ 33/- /acre	= £511.10.0
14 Fatted Cows	@ £11	=£154	Labour		= £350
70 Ewes etc	@ £3.5.0	=£227.10.0	Feed	@£2/LU	= £182
20 Pigs	@ £5	=£100	Seed and	@ 5/- /acre	= £ 77.10.0
20 acres Wheat	@ £10	=£100	Fertiliser		
	Total	=£1506.10.0		Total	=£1121

Table 7.6a

JOHN ARCHER Castle Hays Farm, Tutbury.

Area 440 acres Permanent Grassland - 294 acres
of which meadow 25 acres.
Arable 146 acres.

[a] Arable System
lime , guano and bones used
1. Fallow Crops - swedes, mangolds, cabbage - dunged heavily.
2. Barley.
3. Seeds - mown.
4. Seeds - pastured.
5. Seeds - pastured.
6. Oats - land then limed and dunged for :-
7. Wheat.
8. Beans.
9. Wheat.

[b] Grassland.
Hay is cut from 26 acres of seeds and 25 acres of meadow.
Permanent pasture receives 5 cwt of bone dust per acre.

[c] Livestock.

61 Dairy Cows	120 Ewes
9 Barren Cows	185 Lambs
20 Heifers	92 Hoggets
17 Stirks	19 Feeding Sheep
16 Calves	
1 Bull	

Livestock Units - overall 1 unit to 3.15 acres of land
- 1 unit to 0.11 acre of Green Crops
- 1 unit to 0.3 acre of Hay

Income :-			Expenditure:-		
61 Dairy Cows	@ £18.10.0	= £1128.10.0	Rent	@33/- / acre	= £734
9 Fatted Cows	@ £24	= £ 216	Labour	7 Full Time	= £490
All Sheep		= £ 390	Feed	@ £2.10.0 LU	= £350
All Pigs		= £ 150	Seed and	@ 7/- /acre	= £143.10.0
Wheat 32 acres	@ £10	= £ 320	Fertiliser		
Barley 16acres	@ £7	= £ 112			
	Total	= £2316.10.0		Total	=£1717.10.0

Table 7.6b

Table 7.7 1801 Crop Returns - Middle Trent Counties

	Derbyshire	Staffordshire	Leicestershire
Wheat	4,414 (32%)	2,713 (36.4%)	2,305 (30%)
Barley	2,840 (16%)	1,152 (15.6%)	2,138 (27%)
Oats	4,058 (29%)	1,795 (23%)	2,555 (34%)
Potatoes	252 (1.8%)	134 (1.8%)	135 (2%)
Peas	337 (2.5%)	316 (4.4%)	537 (7%)
Beans	574 (4%)		
Turnips	797 (7%)	524 (7%)	769 (10%)
Rye	63 (0.4%)		

Source: Turner M (1983)

CHAPTER 8

LIVESTOCK IN THE FARM ECONOMY OF SOUTHERN DERBYSHIRE

The significance of dairying in the farm economy of southern Derbyshire has been signalled in previous chapters. The writings of successive early commentators on the Derbyshire scene from Pilkington [Pilkington J, 1789] onwards suggest a growing emphasis on a well established dairy industry. The statement of Loudon [Loudon J G, 1825 p.1101] that 'cowstock for the dairy is the prevalent stock of Derbyshire' can be taken as representative. Their views are supported by the research findings of Hey [Hey D, 1984] and Henstock [Henstock J, 1969] with respect to the origins of specialised dairying in the seventeenth century and possibly earlier and are underpinned by the thrust of the argument presented in previous chapters concerning for example the growing significance of grassland and other sources of feed during the late eighteenth and nineteenth centuries. It follows that dairy production was at the heart of southern Derbyshire farm enterprise throughout the study period. Ancillary livestock enterprises namely sheep and beef cattle need also to be considered, however, as to a degree they must have been complementary to dairying within the farm system. Indeed sheep have a general if low level significance such as to merit separate consideration from cattle. The purpose of this chapter is therefore to determine the essential temporal and spatial characteristics of livestock farming in the southern Derbyshire area.

The principal data sources which have been used in the study of livestock are the farm sale advertisments which appeared in the Derby Mercury newspaper. The nature and problems associated with the use of advertisments have been considered in Chapter 2. It should be kept in mind that nowhere else can such a wealth of information be discovered concerning numbers, breed and quality of livestock as it existed on an individual farm basis. To a degree the sales lists comprise outline farm surveys in this respect. Important difficulties with sale advertisments are the extent to which an individual advertisment was a true reflection of the stock normally carried on the farm in question and the

matter of the compilation of statistics based on sales data. It is not easy to argue that the batch of sales which appeared in the newspaper in any one year can be regarded as a statistically valid sample. Yet, despite its deficiencies, it is the case that tabulation and comparison of such data is the only way in which trends over time and regional characteristics might be highlighted.

In the search for such trends and patterns the subdivision of sales data into two distinct categories has proved helpful. The first of these categories comprises sales where the farmer was variously relinquishing a tenancy on the basis of retirement, giving up farming, moving to another part of the country or had deceased. These events led to the auctioning off of the stock remaining on the farm as well as unsold produce, farm equipment and personal effects. The all important supposition is that the stock offered for sale was that which was normally kept on the farm and as indicated in Chapter 2 this may be problematic. It is impossible to know whether stock had been disposed of as a farmer's health failed or finacial difficulties might have hastened the termination of a tenancy. While 322 sales where there are indications that only a proportion of the normal stock was on offer have been eliminated it is likely that the data derived from the advertisments carries a degree of understatement. In all there are 769 acceptable sales in this category and given the predominace of tenancy in southern Derbyshire they must reflect the range of scale of activities of the general run of farmers. It is found that all farmers in this category kept dairy cattle thus underlining the fundamental importance of dairying in southern Derbyshire. Not all farmers combined their dairy enterprise with sheep however so a subdivision of the category into sales which were dairy only and sales which involved both dairy cattle and sheep has been adopted.

The second category includes sales where surplus and or fat stock were being disposed of by a large estate, a significant owner occupier or substantial tenant. In the 1860's regular markets such as at Ashby railway yard also feature which took place on an annual or biennial or even monthly basis. Stock

sales reflect a larger scale of activity than that of the majority tenant farmers and may provide pointers to innovation in respect of the introduction of new livestock breeds for example. A total of 406 sale advertisments of this category have been analysed.

It is important to see the stock offered in sale advertisments in the perspective of the total market for livestock. Correspondence in the Derby Mercury [DM.1.8.60] discusses the move of the markets from the streets where they had been traditionally held to a new Derby Cattle market on the edge of the built up area of the town. In 1859/60 a turnover of 34,230 beasts and 18,902 calves is quoted. The trade in stock was substantially beyond that indicated in sale notices which amounted to just 1,061 cattle and 124 calves in 1860.

Part One: Temporal and Spatial Aspects of Livestock

Sales of Stock from Tenanted Farms

The data derived from the farm sales advertisments in the tenant farm category have been listed in Table 8.1. The table contains four classes of information adjusted to livestock units to enable direct comparison. In their turn these have been graphed as Figure 8.1 which serves to illustrate important trends with respect to the absolute and relative numbers of livestock in southern Derbyshire. Of prime importance is the best fit curve for average livestock units per sale per year which shows a rise from about 23 units per sale in 1800 to 36 units per sale in 1870. On the basis that livestock offered in sales equated to farm size in some way there is evidence of either an increase in stock rate or an increase in farm size or more likely a combination of both during the period from 1770 to 1870.

The relationship between livestock units and farm size can be tested by comparing known acreages of farms from the 1851 census of population with calculated unit numbers of farm stock offered for sale in the twelve month period following the census. Twenty two sales from tenant holdings have been identified in this way and the comparison between the two variables is represented as

Figure 8.1a. A strong correlation between the two sets of data is demonstrated which include a wide range of farm size but with the greater number of farms falling between 125 and 175 acres i.e. sizes characteristic of southern Derbyshire. On this basis it could be argued that livestock units are a simple alternative expression for farm size. The mean ratio for the data is approximately 1 livestock unit to 3.9 acres of land with a range of variation from 1 unit to 2.5 acres to 1 unit to 7 acres. Calculations of livestock units per acre from the 1870 census for southern Derbyshire, and indeed for the county as a whole, give an average of 3.6 acres per unit which suggests that 3.9 acres derived from a small number of sale occurrences can be regarded as representative. The issue of possible increase in stock rates has already been considered in Chapter 7 where, on the basis of a combination of comment from various authorities and analysis of the 1870 census, it has been tentatively suggested that an increase of 25% might have occurred.

Significantly perhaps the curve shown on Figure 8.1 indicates a modest decline in the rate of increase of livestock units as time progresses, a possible pointer that farmers were beginning to reach the limits of the system. Indeed inspection of both Figure 8.1 and Table 8.1 suggests that a change in the rate of upward trend took place around the 1830's. This may be a reflection of problems with the data set and the extent to which the entries for the various years may be strictly comparable. A possible influence on the trends shown on Figure 8.1 is that cattle numbers recorded after 1865 may have been depressed as a result of the incidence of cattle plague. The occurrence of the disease was a major item of report in the Derby Mercury from August 1865 until April 1866 when the number of cases nationally and locally diminished significantly, although in May 1866 new cases were still being reorted in south Derbyshire at Hoon and Hungry Bentley [DM 16.5.1866]. If accepted at face value, however, the overall trend shown on Figure 8.1 points to a situation where the period of greatest change in terms of numbers of stock on farms occurred ahead of the stage when, as argued in Chapter 7, feed systems incorporating brewers' grains and the like may have been more widely adopted. It may be implicit that up to the 1830's progress with respect to

productivity was founded mainly on increased numbers, possibly related to changes in farm size, whereas after the 1830's feed and also better quality of stock were important factors. These significant issues will be further discussed in Chapter 10.

Figure 8.1 and Table 8.1 also clearly demonstrate the contribution of cattle, notably cows in milk, to the overall increase in livestock numbers. The trend line for average sheep livestock units in sales involving sheep is constant at 7/8 units throughout the period and serves in effect to underline the growing significance of dairy cattle. As dairy cows in milk have been counted as one livestock unit then the average numbers for each year tabulated provides a measure of the size of the productive herd as indicated by a particular batch of sale advertisments. Decadal averages, which smooth the data set, show an increase from an average of 11.3 milk cows per herd in the 1800's to 18.5 per herd in the 1860's. Interestingly the order of growth in herd size in so indicated at 65% matches the rate of increase in the national dairy herd suggested by Holderness which has been discussed in Chapter 1 and further considered in Chapter 9 [Holderness B A, 1989]. In addition to giving some credibility to the worth of the data derived from sale advertisments when analysed in this way Holderness's data, in conjunction with the 1870 census, provides a means for determining numbers and changes in the productive dairy herd in Derbyshire and southern Derbyshire between 1770 and 1870. Table 9.4 suggests a doubling in the number of cows in Derbyshire from about 30,000 in 1770 to the 59,350 recorded at the 1870 agricultural census. Comparable figures for southern Derbyshire would have been 14,500 and 28,880.

Further analysis by mapping and tabulation enables sub regional characteristics of the livestock system in southern Derbyshire to be identified, outline features of which have already been indicated in Table 7.1c. In so doing the subdivision of tenant farm sales data on the basis of dairy only and dairy with sheep is helpful. For both types of sale data has been treated on a decadal basis for the purposes of mapping and is presented as Figures 8.2 a-g and Figures 8.3 a-g respectively. The interpretation of the sequence of maps, Figures 8.2 a-g,

indicates the occurrence of significant spatial change through time within southern Derbyshire. In the earlier decades of the nineteenth century there is a predominance of dairy with sheep tenant sales without any clearly emergent spatial variation across the area. In the latter decades, and notably from the 1850's, a division broadly along the line of the River Trent is apparent. To the north of the Trent a greater proportion of dairy only farms has emerged as characteristic while to the south of the river dairy with sheep farms still predominate. Additionally fat and surplus stock sales are concentrated in this southern area. Consideration of the distributional patterns shown on Figures 8.3 a-g where sales are plotted on the basis of number of livestock units offered per sale enables the spatial change derived from farm classification to be further elaborated. In parallel with the trend shown on Figure 8.1 there is a clear indication that generally more livestock were offered at sales. There is also a further dimension differentiation between the northern and southern parts of southern Derbyshire with respect to size of sales. Small numbers of units characterise sales on farms on the northern margins which are located on the heavier soils of the shales and coal measures. Larger sales with 40 or more livestock units are particularly well represented southwards from the River Trent. In the intervening area coincident with the red marl a wide range of farm sale size as measured by livestock units is apparent and a general increase in the number of units offered is clear over the period 1800 to 1870.

On the basis of the mapping of sales data a threefold division of the southern Derbyshire region has been further justified - the coal measure/shales to the north, the central area dominated by the red marl, and the more varied area south of the Trent. In the first two instances the likelihood of environmental influence based upon parent material/soils is acknowledged. To the south of the Trent, however, it is possible that other influences are important such as the proximity of the stock raising and rearing tradition of Leicestershire and the wider occurence of large estates.

The trends, identified in the analysis of maps set out above,

are further elaborated through the tabulation of data and the construction of dispersion diagrams on sub-regional basis. In the dispersion diagrams, Figure 8.4a, b & c, livestock unit data has been plotted on a decadal basis for the three identified areas. The wide range in the numbers of units offered in farm sales from lower values of 2 to upper values of over 100 is readily apparent. The median values as well as the upper and lower quartiles have been identified for each array of data. The upward trend in the number of units offered in sales within each area is generally clear the main anomaly being the high values for the 1820's south of the Trent.

The information presented in Table 8.2 is based upon the three sub regions and seeks to identify change on a decadal basis. Livestock has been categorised in substantially the same manner as for Table 8.1 and converted to livestock units. Also included in the tables are the proportions of sales which included dairy cattle, sheep and beef cattle. The data which relates to the red marl area should be considered alongside the graph of change in average livestock units, Figure 8.5. The broad pattern of change through time is comparable to that for southern Derbyshire as a whole with a clear upward trend in the number of livestock units offered at sales and a significant position for cattle in those sales. The average number of dairy cows offered also rose from 11.5 per sale in the 1800's to 17.5 in the 1860's. The data relating to sheep shows fluctuation but with no certain upward trend thus indicating a diminishing relative position for sheep in the farm economy. It is not surprising that the percentage of sales including sheep tends to drift downwards from 70% of the total in the 1810's to around 40/50 % in the 1840's, 50's and 60's.

Similarly Table 8.2 can be related to Figure 8.6 for sales which took place on farms located to the south of the Trent. Compared to the red marl, the total numbers of livestock units offered per sale are shown to have been consistently larger in this area. A strong upward trend in mean units per sale occurred as time progressed which is more than matched by the increase in numbers for all cattle. Concurrently the proportion of dairy units in relation to total units declines

from just over 50% in the 1800's to 40% in the 1850's and 60's. Mean sheep units are greater than on the red marl but show no clear upward trend except in the 1850's and 1860's. However the percentage of sales including sheep increased steadily from 71% to 95% to give a situation of increasing contrast with the red marl. In parallel with this development the percentage of sales which included beef cattle also grew to 60% by the 1860's. The overall impression is therefore of a farm economy evolving towards a more mixed livestock basis as opposed to the greater concentration on dairying on the red marl.

The situation on the shales and coal measures is also summarised on Table 8.2. The size of the data base does not permit the construction of graphs in the manner of Figures 8.5 and 8.6 for this area. There are however parallels with the situation on the red marl though the numbers involved suggest a lesser scale of farming activity with the mean units per sale ranging from 19.4 to 22.5 showing no upward trend from the 1820's onwards. Similarly the average dairy derived units per sale is relatively small in the 1800's and 1810's but then rises to over 10 in the 1820's and remains roughly at this level. Sheep were an important element of sales but even so the dominant position of dairying is confirmed by dairy units taking up some 50% of all units. Identifiable beef cattle in sales are virtually non existant in this area.

In summary important general characteristics of the livestock system as practiced on tenant farms in southern Derbyshire have been identified. The predominance of the dairy herd is clearly apparent. There are however significant variations in the average scale of operations across southern Derbyshire and towards north west Leicestershire there is evidence of a more diverse range of enterprise.

Fatstock and Surplus Stock Sales

As has been indicated above these sales relate mainly to the home farms of landed estates, owner occupiers and larger tenant farmers. Data for such sales have been tabulated as Table 8.3 and a classification of types of sale attempted. Generally the

number of animals offered is greater than that for tenant farm sales and in many instances the range of stock is more varied. It follows that these sales emanated from more significant production units in terms of size and complexity of operation. The locations of such sales which have been included in Figures 8.2 a-g show a changing distribution pattern from a random scattering in earlier decades to a concentration to the south of the Trent by the 1850's. In all 406 sales were discovered in the Derby Mercury in the years sampled between 1790 and 1870. The greater proportion of the sales took place in the period after 1820. The farms associates with landed estates are represented by the Vernons at Sudbury, Lord Chesterfield at Bretby and the Harpur Crewes at Calke. Some more distant estate sales, beyond the limits of southern Derbyshire, were also advertised such as for the Devonshire Estate at Chatsworth, the Ingestre Estate near Stafford and the Portland Estate at Clumber in Notinghamshire. Certain nineteenth century industrialists who created landed estates for example the Burton brewers of Bass at Rangemore and Allsopp at Newton Park also feature. Additionally more significant farmers such as John Sutton of Shardlow, Thomas Hassall of Smisby, William Smith of Swarkestone and Thomas Agard of Borrowash also conducted sales in the style of the landed estates.

Some estates and farms advertised stock on a regular basis. Christmas was a particular focal point for such events so that the annual December Fatstock Sale at Chatsworth was aimed at butchers rather than graziers and farmers who might be seeking to improve their herds and flocks. Other estates held spring and autumn sales. Prominent amongst these were the sales at the estate at Dunstall in Staffordshire. Occasional sales were advertised early on the period, during 1808 and 1822 for example, but from the 1830's sales took place twice a year. In every instance a mixture of cattle and sheep were offered e.g. at the autumn sale of 1832 [DM 19.9.1832], 51 Shorthorn fat cattle, 28 bullocks and 180 fat Grey face/Leicester cross breed sheep. The scale and composition of this sale is typical in that total livestock units exceeded 80 and cattle were predominant. The Crewe estate at Calke and Twyford also offered stock on a regular basis between 1810 and 1840. Numbers were variable

between sales but the range of stock was diverse as in 1837 for example [DM 27.9.1837]. In that year 4 Longhorn and 2 Shorthorn dairy cows, 1 fat Alderney with 3 fat Longhorns, 4 Longhorn bullocks, 20 fat Portland sheep and 65 Portland ewes in lamb went under the hammer. A list of sales characteristic of the classification is presented in Table 8.4. The numbers indicated are representative of the range of size but occasionally particularly large numbers feature such as 500 Northumberland ewes in lamb at the Vernon Arms, Sudbury, [DM 24.9.1807], 116 neat cattle at Lord Chesterfield's estate at Bretby in 1815 [DM 7.9.1815] and 430 Shropshire/ Blackface cross sheep by Lynn of Lichfield in 1830 [DM 12.9.1830]. An interesting farmer and estate manager was William Smith of Swarkestone. Apart from managing the Crewe and Foremark estates he took over the Dishley farm of the late Robert Bakewell in 1825. He was there responsible for the final disposal of the great man's stock in 1830 [DM 21.8.1830] which comprised 20 dairy cattle, 20 bullocks, 120 fat sheep, 200 ewes in lamb, 120 hogs and 180 rams.

The examples quoted here indicate that sales were directed at butchers for fatstock but also graziers and farmers for breeding stock. In the classification proposed in Table 8.3 sales which combined fat sheep and fat cattle account for 41% of advertisments, 28% of sales comprised mixed cattle and sheep i.e. including some animals for breeding, for the dairy or for the butcher while a further 8% of sales were concerned with fat cattle only. A further 16% of sales were confined to sheep and these tended to occur during the first two decades of the nineteenth century. Some notable sheep sales took place outside the study area including the Shugborough Estate near Stafford which offered 300 ewes in lamb [DM 20.9.1810]. Sales of rams occurred regularly throughout the study period. Obviously good rams were an essential asset to the farmer who was concerned to improve his stock. A typical sale was that of Bancroft of Sinfin who offered 8 new Leicester rams in 1832 [DM 26.9.1832].

An important characteristic of sales in the fatstock category is the greater diversity of breeds which are represented both

amongst cattle and sheep. This may well have reflected a range of purposes amongst elite farmers for whom experimental and hobby approaches could be as important as the production as commercial stock. The contrasts with the objective of the small/middle size family based tenant operation were therefore of some significance. It was likely that surplus stock from estate home farms found their way to tenants as a way of improving stock.

In summary it has been demonstrated that the two categories of sale proposed as a result of inspection of farm sales advertisments had distinct characteristics and represented differing scales of approach to farming and also differing objectives. The larger group of sales, concerned with tenant farms, were more representative of the general farming landscape of the times. The analysis of farm sales data suggests that during the first part of the nineteenth century and perhaps ealier there was a trend towards a larger scale of activity generally across southern Derbyshire. At the same time in certain areas, the red marl and the shale/coal measure country, there was an increasing degree of specialisation which involved cattle, notably dairy cattle. It follows that the next stage of the discussion will be to present a more detailed appraisal of cattle and the dairy based industry as it evolved in southern Derbyshire followed by a brief consideration of sheep.

Part Two: Cattle in the Southern Derbyshire Farm Economy

In discussing the particular significance of cattle, notably dairy cattle, in the farm economy of southern Derbyshire a number of issues need to be explored. These relate to the composition of dairy herds to include their size and the significant matter of breed preference which evolved during the study period. Although beef production has been identified as a distinct adjunct to dairying then the extent to which this enterprise may have existed in its own right deserves some consideration. Similar comment needs to be developed in relation to pig rearing which has been traditionally associated with dairy production especially when cheese making was involved.

Dairy Herd Size and Composition

In the analysis of farm sales data presented above dairy cows in milk were separated from total cattle. It was the case however that a substantial proportion of the latter category were essential elements of the total dairy herd either as followers eventually to be integrated into the herd or as discards which were barren or being fatted.

The composition of actual dairy herds as revealed through farm sale notices is illustrated through Table 8.5. Twelve sales have been listed from across the study period as representative of the style of data to be derived concerning dairy herds. The actual dairy cows which may be variously described as in milk or in calf are clearly identifiable as the potentially productive members of the range of stock on offer. Other herd members are then listed in age sequence to include heifers which may or may not be in calf, stirks [i.e. young heifers or bullocks] between one and two years old and finally calves which again may be male or female. Fat and barren cows are indicated separately as animals probably destined to be sold off for slaughter for meat. Many sale notices list bulls but equally many do not and the practice of bull letting is discussed below. The common absence of fat cattle from sales lists indicates that young male animals were frequently sold on at an early age rather than being fattened on the farm of their origin. In terms of livestock units it is apparent that the total dairy herd consistently accounts for over 90% of all cattle units on farms.

A further perspective on the dominance of dairying can be gained through the approach to the analysis of agricultural statistics adopted by Whetham [Whetham E H and Orwin C S, 1964 p.137 and Whetham E H, 1968 p.47]. The ratio of cattle of two years and over [i.e. those which can be reasonably presumed to have been non dairy cattle but which may have included fatting cows] in relation to cows in milk gives a measure of the relative importance of the two categories of cattle. It is on the basis of a ratio of non dairy cattle to dairy cows in milk of less than 30:100 calculated from the 1870 census that Whetham classed

Derbyshire as a dairying county. Comparable calculations have been made on a parish basis for southern Derbyshire and adjacent counties using the 1870 agricultural census data and have been mapped as Figure 8.7. The map shows important variation across the area but with individual parishes standing out against the overall trends. In general terms the northern and western parts show a stronger association with dairying with notable blocks of parishes with particularly low i.e. less than 20:100 ratios on the red marl west of Derby and in Needwood Forest west of Burton. To the south and east the balance is still in favour of dairying. However some parishes are mapped with a near balance between the two enterprises such that ratios of at least 90:100 occur in riverside locations and notably on the substantial alluvial tract at the confluences of the Derwent and Soar with the Trent. The map provides a clear statement as to the prime importance of dairying at the close of the study period and strongly supports the inferences which have been drawn from the sales advertisment data to that effect.

The representation and tabulation of sales data [see Figure 8.1 and Table 8.1] has pointed to an increase in the size of the productive dairy herd from 10 to 11 animals per farm sale around 1800 to over 18 cows in milk by the 1860's. Closer examination of the advertisment data shows that from the 1830's onward more than half the sales involved 15 or more dairy cows there being a noticeable reduction in the number of sales with fewer than 5 cows. Comparison between these figures and statements concerning dairy herd size made by various commentators from the 1790's onwards does suggest that the advertisments provide a clearer perspective on the significance of smaller farms which have already been demonstrated as more typical of southern Derbyshire. Pitt [Pitt W, 1794 p.176] writing of Staffordshire indicated that 'dairies extend from ten, fifteen and twenty cows to fifty or even seventy cows'. Marshall, perhaps more reasonably, quoted 14 to 15 cows as being typical of his 'Midland District' [Marshall W, 1796 p.293]. Farey [Farey J, 3 1817 p.3-9] listed a number of herds by size against the names of their owners who were more substantial and progressive farmers. These were rarely less than 20 in size and some such as Harrison of Ash who kept Longhorns and Smith of Swarkestone who

favoured Shorthorns were greater than 50. Large sized herds also feature in the comments of Evershed and Moscrop in the 1860's and in the 1881 Derbyshire Prize Farm Competition report.

Cattle Breed

Some 30% of farm sale notices give an indication of the breed of cattle involved. Sometimes this information relates to the dairy cows and in others it is the bull which is so identified. In the latter instances it could mean that a bull of identifiable breed or even pedigree was being used to improve a herd of the ordinary sort. In 70% of sales no indication of breed is given. This is a large proportion which should be kept in mind as the argument is inevitably developed around the minority of instances for which information is available. There is some evidence from the latter nineteenth century which supports a cautious approach. Moscrop [Moscrop W J, 1866 p.328] wrote that the normal dairy stock of Leicestershire was Shorthorn: 'the variety being rather coarse but in later years improved through crossing'. In 1872 the Farmer's Magazine [Anon 8, 1872 p.454] reported a Shorthorn Sale at Tansley near Matlock as 'taking place in a county so well adapted for shorthorns and where so to speak they are comparitively little known the sale will doubtless cause much talk in the neighbourhood and lead to a little more beef being grafted on the capital dairy cows which abound hereabouts.... still the dairy cows of Derbyshire are too good to be altogether 'improved' out of their true and honest character as milkers'. At about the same time Livesey argued for the improvement of dairy stock in the vicinity of Derby on the basis that 'the want of better breed sires is evident in many places but amongst many farmers there is a strong prejudice against any mixture of pedigree blood - by a judicious selection of male animals the produce would be improved both for the grazier and the dairyman' [Livesey W, Ag G 30.1.1874]. Collectively there is here a body of opinion indicating that the introduction of Shorthorn blood was variable and recognising that for dairy purposes and also for subsequent fattening local stock crossed with Shorthorn might be preferred. The following discussion of evolving breed preference is progressed with this view in mind.

Data derived from sale notices relating to tenant farmers is set out in Table 8.6 and for estates and farms engaged in stock sales in Table 8.3. For both categories of farm operation two breeds, the New Longhorn and the Shorthorn, receive the greater proportion of citings. Of 275 breed references for tenant farms 198 or 70% are for Shorthorn animals and 50 or 21% are for the New Longhorn. Other breeds which feature such as Channel Island, Hereford, Highland Scotch and Ayrshire are therefore of relatively minor significance. Viewed through time 1830 emerges as an important stage in the evolution of breed preference as from then onwards the New Longhorn declined rapidly and the Shorthorn grew in popularity. From 1850 seemingly there was only vestigial commercial interest in the Longhorn.

Distributional characteristics of breeds have been derived from both Farey's lists and the farm sale notices. Figure 8.8 is based upon Farey's report and provides a view of the preferences of larger farmers in 1810. Farey [Farey J, 3 1817 p.1-20] identified nine prime breeds of cattle and nine crossbreeds. The map shows some residual Old Longhorn but a predominance of New Longhorn and Shorthorn across the southern parts of Derbyshire. A number of crossbreeds involving both New Longhorn and Shorthorn are indicated. The square boxes show estates where owners kept a range of cattle breeds. Farm sale notices have been mapped to show New Longhorn and Shorthorn before and after 1830 as the year of major change in preference. Figure 8.9 covering the period up to 1829 shows that both breeds were clearly widely distributed but after 1830 Figure 8.10 shows that only a few Longhorn sales occurred south of the Trent. Possibly this reflects proximity to the places of origin of the breed in North West Leicestershire.

Significant changes in herd size and its breed character have been identified during the period 1790-1870 it is now appropriate to review the origins of these breeds and also their particular merits which may have proved attractive to farmers who collectively were firmly orientated towards dairying. Given that dairying for cheese making was firmly established in southern Derbyshire by the mid eighteen century [Hey D, 1984,

Henstock J, 1969] it follows that the traditional ordinary cattle must have been suited to this purpose. Trow Smith [Trow Smith R, 1959 p.1] refers to livestock types rather than specific breeds being characteristic of this time while Moore Colyer [Moore Colyer R J, 1989 p.335 et seq] notes 'a bewildering mixture of multipurpose cattle across the country' with Longhorns being prevalent in the Midlands. Marshall [Marshall W 2. p.289-290] identified the Derbyshire Longhorn as a county type which was distinguishable from its county neighbour the Staffordshire Longhorn which was 'adapted to grazing rather than the dairy'. However he noted a superior dual purpose Longhorn strain along the banks of the Trent at the boundary between the two counties. Farey [Farey J, 3 1817 p.32] emphasised the milking properties of the original Derbyshire Longhorn by describing them 'as a useful sort of cows for the dairy with large bags'. He noted that such cows prevailed generally in Derbyshire until the beginning of the nineteenth century. Trow Smith [Trow Smith R, 1959 p.48] supports Farey's view. He states that the Old Longhorn was 'rather more easily fattened than other breeds and were yielders of high quality milk in moderate quantities'. Moreover this useful dual purpose animal was described as thrifty that is capable of performing satisfactorily on pastures of modest quality as indicated in the discussion of grasslands in Chapter 7. It seems likely that it was this type of cattle which formed the base stock for later crossing with the Shorthorn.

The emergence from this local Longhorn stock of an allegedly superior strain was a complex process. According to Marshall [Marshall W 2, 1796 p.268], it involved the import of already improved stock from north west England. It also required the efforts of enthusiastic breeders in the Midlands: Gresley of Drakelow Hall near Burton upon Trent in the 1730's, Webster of Canley and Fowler of Rollright in Warwickshire during the mid century and thereafter Robert Bakewell of Dishley Grange near Loughborough. Bakewell seemingly took much of the credit for the process whereby through in breeding a New Longhorn was evolved in which the properties of smaller bones, faster maturation and higher quality meat were fixed. Bakewell's methods and aims with respect to the New Longhorn ran parallel with his experiments on

sheep which led to the New Leicester and which are discussed in a later chapter.

Marshall [ibid p.268-7] identifies Princep of Croxall then the southermost parish in Derbyshire but now in Staffordshire, as the first owner of a dairy of New Longhorn cows in the county. Princep is described as hiring Bakewell's Shakespeare, 'the most robust individual of the longhorned breed owned by Fowler', for 80 guineas a season. Not only does this show that there was contact between the main developers of the breed but it indicates that bull letting was one means whereby the New Longhorn was diffused through the area. Farey [Farey J, 3 1817 p.6] lists a number of bull letters and farmers who hired bulls. This data has been mapped as Figure 8.11 and shows linkages between Derbyshire and the adjacent parts of Staffordshire and Leicestershire. A northward movement into Derbyshire from the early places of origin of the breed is indicated. Additionally Farey [Farey J, 3 1817 p.7-11] identifies from Derbyshire farmers who as early as the 1760's had been instrumental in introducing important Longhorns into Derbyshire and then distributing them to their tenants. These were Coke of Longford, Pole of Radbourne, Meynell of Kirk Langley and Mundy of Markeaton. The latter family also features in what was an infamously snowy sale day of 21st April 1808 when the Longhorn herd was dispersed within the immediate locality and to more distant parts of England.

So by a combination of bull letting, sales of stock and gifts to tenantry the diffusion of the New Longhorn was effected. Hall and Clutton Brock [Hall S J G and Clutton Brock J, 1989 p.63] state that by 1810 the overwhelming majority of cattle in the Midland counties [particularly Leicestershire, Derbyshire and Staffordshire] were improved Longhorn type. However the quality of the improved Longhorn relative to the original local Derbyshire/Staffordshire types was open to doubt even before the close of the eighteenth century. Pitt [Pitt W, 1794 p.176] was enthusiastic following a visit to Princep at Croxall in 1794 but perhaps this herd was exceptional in that 'by long attention has been brought to a very high degree of superiority.....with a pretty good show for milking and such a disposition to fatten

the young stock and obliged to be almost starved by short pasturage, otherwise they run fat and never stand the bull'. Marshall [Marshall W, 1796 p.281] supported this last point but doubts the usefulness of the Longhorn in the dairy. He wrote 'the fattening quality of this improved breed in a state of maturity is undoubtedly good. As gregarious stock they undoubtedly rank high. As dairy stock however their merit is less evident; dairywomen here and elsewhere bear witness against them: nevertheless the advocates of this breed assert their eligibility in this character some indeed go as far as to say, that a cow which is profitable to the graziers is likewise so to the dairyman'. Certainly the milk yield appears to have been less when measured in the potential weight of cheese to be made per cow in a year. Curtis [Curtis W, 1806 p.85] quoted the New Longhorn as producing 3 cwt per cow as opposed to the 4 or 5 cwt of the old variety. Pitt [Pitt W, 1794 p.177] was sceptical of such figures however regarding the normal cheese output as more likely to have been half these amounts. The farmers interviewed by Farey [Farey J, 1817 p.33-4] also reflected doubt and division of opinion. William Cox of Culland is quoted as saying that 'careful breeding was the basis for his confidence in them as milkers'. However Mundy of Markeaton and Jowett of Draycott thought 'that flesh is had at the expense of milk in great measure'. Greaves of Ingleby indicated that New Longhorns tended to dry off early in August.

Trow Smith [Trow Smith, 1959 p.46-7] summarises the work of Robert Bakewell with respect to the Longhorn as follows: 'He took the best Longhorn stock he could find from Webster of Canley, mated like to like, and brought in some intercrosses which possessed the characteristics lacking in his main lines of breeding stock. In the end he produced from the useful dual purpose animal a new single purpose beef beast in which the propensity to produce milk had been lost, which was of little importance where other dairy breeds were available. Bakewell's line of Longhorn cattle virtually died out within a few decades'. Bakewell's biographer Pawson also notes the rapid decline of the Longhorn and quotes Youatt as stating that 'there is no improved Longhorn on the Dishley Farm and there are not a dozen pure Leicesters [Longhorns] within a circuit of a dozen

miles of Dishley' [Pawson H C, 1957 p.4]. This was about the time in the 1820's when William Smith was in the process of winding up the operation at Dishley. Table 8.7 lists comments about Longhorns as they appeared in sale notices. It is interesting that there are no references to links in terms of origin with Bakewell or Dishley which stands in stark contrast to advertisements for New Leicester sheep which frequently acknowledged their derivation. On the other hand there is no lack of awareness of the significance of various local breeders or the original work at Rollright. A late reference to New Longhorn discovered in sale advertisements [DM 23.10.1850] represents perhaps an auctioneer's attempt to drum up some interest from buyers but the emphasis is on flesh not milk. The last reference is in 1868 at Chaddesden Moor Farm near Derby which offered a bull, 16 milkers plus followers [DM 11.3.1868].

The vacuum for Derbyshire farmers seeking improved dairy stock as alternative to both Old and New Longhorns was filled by the Shorthorn which emerged as the dominant breed type after the 1830's. The Shorthorn was developed in northeast England and east Yorkshire using the methods established by Bakewell by the Colling brothers. Curtis [Curtis W, 1806 p.85] regarded the Shorthorn as superior to the Longhorn while Farey [Farey J, 3 1817 p.3] described the Holderness, Yorkshire or Durham Shorthorns 'as a most useful kind of dairy cows'. He quoted controlled experiments indicating Shorthorn milk yield to be twice that of the Longhorn but with a much lower butterfat content. The Shorthorn breed appears to have embraced a range of strains. Moore Colyer [Moore Colyer R J, 1989 p.338] indicates that the Collings actually bred 'a thrifty beef animal' and it was left to others such as Bates of Kirklevington [1775-1849] in the 1830's to recover the breed's milking properties and thus set in train the evolution of the Dairy Shorthorn. Hall and Clutton Brock [Hall S J G and Clutton Brock J, 1989 p.49] indicate that the Shorthorn's reputation for milk yield was not finally established until the latter part of the nineteenth century. A note in the Farmer's Magazine for 1863 [Anon 3 1863 p.294-7] indicates that in the Midlands 'their milk is not rich in cream yet on rich pastures or high feeding this is more than counterbalanced in quantity and making of beef at the same

time'. This statement needs to be balanced against the indications of the development of more dairy orientated cattle in Derbyshire which have been discussed above. Notwithstanding such reservations it was from the 1830's that the Shorthorn gained popularity in southern Derbyshire as indicated by Derby Mercury sales notices. Perry [Perry P J, 1982 p.560] in a study of herd books identifies the period 1836-4 as one of particular change leading to the breed acquiring national status. Champion of Bawtry is identified as a Nottinghamshire breeder of note. Walton [Walton J R, 1984 p.226] also emphasises the importance of the 1830's for the diffusion of the Shorthorn. He notes signs of resistance in Leicestershire 'presumably because Bakewell's Longhorn was still important in that county'. The mid nineteenth century position is summarised by Moore Colyer [Moore Colyer R J, 1989 p.342]. 'Careful selection had evolved an animal of moderate feed intake and early maturity, which produced a useful milk yield and beef of high quality'. Fussell [Fussell G E, 1966 p.56] confirms the status of the dairy Shorthorn by indicating that it became the most numerous of any breed of dairy cows during the second half of the last (nineteenth) century, a view supported by Hall and Clutton Brock [Hall S J G and Clutton Brock, 1989 p.50]

In Derby Mercury sales notices the first reference to the Shorthorn is to the sale of one bull by Brentnall of Risley [DM, 21.3.1805]. Sales which occurred in the earlier part of the century were dominated by socially significant farmers such as Henry Harpur of Swarkestone [DM 24.3.1808], Princep of Croxall [DM 16.2.1815] and Earl Moira of Donington Park who offered 36 dairy cows [DM 9.3.1815]. Important out county sales gave opportunity to acquire Champion's stock at Bawtry. The various comments listed in Table 8.8 indicate the potential of such names to the auctioneer and it is clear that the work of the Colling brothers was knowledge that farmers could have been expected to have had. In the comments in sale notices concerning Shorthorns there is one piece of evidence for bull letting by Champion of Bawtry. This practice may well have been more widespread. Wilkinson of Linton advertised Shorthorn bulls for service in 1830 [DM 3.2.1830]. In 1835 Derbyshire farmers had made known to them the existence of Harold. 'Harold the purest

high bred Shorthorn bull in England available to serve cows at the depot, Normanton Road, Derby @ 6/-. Testimonials are invited from cheese factors with respect to confidence in the usefulness of progeny to dairy farms' [DM 25.3.1835].

The dairy and also the fattening properties of the Shorthorn are emphasised in these advertisements. It is tempting to regard the latter as of no small interest to dairy farmers who could potentially sell surplus male progeny and discarded cows as credible beef animals. The popularity of the breed may need little further justification. Apart from one reference to Ayshires being superior milkers to the Shorthorn [DM 28.3.1838] the only other dairy animals of note were Channel Island cattle. Specific sales of such cattle are regular features of the sale notices particularly from the 1830's onwards. Mostly these sales took place at inns in Derby and Nottingham. In 1830 [DM 14.7.1830] 'a dairy of Alderney cows offered a Derby market imported from the island'. Similarly in 1835 [DM 6.6.1855] at the Nag's Head Derby '25 Alderneys in calf were offered imported via Southampton'. Again in 1848 [DM 25.8.1848] 13 Alderneys and Guernseys 'imported from E Parsons Fowler the largest exporter in Jersey'. The quality of these animals is strongly promoted by Mr Brearey [a leading Derby auctioneer] in a sale in 1855 [DM 11.4.1855] at the King's Head, Derby where 8 Alderneys and 5 Guernseys were offered. The stock are described as 'having been carefully selected [mainly discounted from prize cattle] with unequalled milking capacity, richness of colour, fine symmetry and docility'. Farm sales notices which included Channel Island cattle characteristically involved just one or two animals and these emanated from estates such as at Bretby and Calke. Trow Smith [Trow Smith J, 1959] regards Channel Island cattle as features of gentleman's estates but the steady import of dairy stock, often two or three times a year, suggests a strong interest which may have been wider. Such cattle sales benefited from the policies of the Jersey Agricultural Society which from 1835 set out to establish a standard for Channel Island breeds [Fussell G E, 1966 p.29].

Stock Fattening

The fattening of stock occurred on both estates and tenant farms. For tenant farmers whose prime concern was milk then the raising of calves, the fattening up of dry and barren cows and the occasional raising of bullocks were all possibilities. These activities are commented upon by Farey [Farey J, 3 1817 p.23-29]. He described a number of farmers such as Samuel Rowland of Mickleover who suckled calves until 4 to 6 weeks old when they would be worth £3 a head. Others fed on cheese whey until 7 to 12 weeks old when their value would be 4 guineas. This practice is described as common in the county. Calves particularly male calves but also surplus female calves could be sold for raising or for slaughter.

The fatting of cows was also a widespread activity. Mr Richard Harrison of Ash is described by Farey as fatting cows at different ages as they decline in milk. As cows dry at the end of the summer they were fed on hay, turnips or aftermaths of the grain harvest while other farmers also used brewers' grains and potatoes. Such animals were sold at Christmas time or kept on to be finished on grass the following spring. Farmers in the tenant category clearly produced beef animals as a supplementary enterprise. For estate farms and other larger concerns sales notices give no indication that beef production was in any sense a local specialism but rather part of a range of activities. Table 8.3 which lists fatstock and surplus stock sales shows that fat cattle were frequently offered either as specific lots or in combination with sheep. Most often the numbers involved were large i.e. from 30 upwards and the breeds, Scotch or Highland, Hereford or Shorthorn are identifiable as beef animals.

Finally some brief reference must be made to pigs as an element of the dairy system. These received little comment in the contemporary literature other than to note their almost universal presence on farms. About 30% of farm sale notices refer to pigs but the numbers, which are usually less than a dozen and typically two or three, are such as to suggest that the needs of the individual farm community were met with only modest scope for sales. In a region so strongly committed to dairying the keeping of pigs was a natural extension given the

availability of whey from cheese making.

Summary

Having reviewed the cattle element in south Derbyshire farming in the period up to 1870 certain trends have been demonstrated, the most significant of which concerns the progressive increase in the size of dairy herds as offered in farm sales. Such a development had important potential to increase the output of the farm. Conceivably this could have been achieved through better management which increased the carrying capacity of the land, the wider use of supplementary feed such as brewers' grains or a trend towards larger farm units or the adoption of stock types which matured more quickly and were more efficient in their use of feed. As with other aspects of the agricultural scene there also appears to be a relationship between herd size and the broad environmental context of the farms. The shale and coal measure country supported smaller farms than the red marls north of the Trent or the more diverse country to the south of the river. This area is not clearly distinguishable in terms of soils and the larger scale of operations may reflect a sub regional difference with respect to estates and estate policy on farm size.

A specific sequence of breed preference appears to have occurred. The traditional Longhorn was replaced in part by the New so called Improved Longhorn from about the 1760's onwards. The limitations of this breed for the dairyman soon emerged and were seemingly widely recognised by the early nineteenth century. The main preferred alternative was the Shorthorn which gave superior quantities of milk even if the quality was inferior. By the mid nineteenth century the Shorthorn was widely established as the most numerous breed in Britain. It may be worth speculating as to whether the emergence of the more economical Shorthorn was itself sufficient to allow farmers to increase the size of herds on a given area of land. On the other hand there is no evidence at all as to the rate of decline of the traditional cattle of the area except by implication. Brown [Brown T, 1794 p.22] described the traditional Longhorns as

'rather inferior' and Loudon [Loudon J C, 1825 p.1110] as 'of no particular breed'. Clearly such animals could have persisted as an element of the cattle stock of southern Derbyshire until well into the nineteenth century especially in the hands of the less adventurous farmer. It could be that the high proportion of sales which make no reference to breed is supportive of such a view to some degree. Equally there are important indicators that Derbyshire farmers may well have evolved sound dairy animals to which some Shorthorn characteristics may have been added by cross breeding thus creating stock which could thrive on pastures of limited quality but also produce milk in reasonable quantity. The implication is that the landscape of dairying comprised a complex pattern of advanced and less advanced farmers working units of variable size. The common feature was of course their concern to produce milk and in most instances to process that milk into cheese.

Part Three: Sheep as an Element of the Southern Derbyshire Farm System

It has been demonstrated that the role of sheep in the farm economy and enterprise pattern of southern Derbyshire was distinctly secondary to that of cattle. Nevertheless sheep were of sufficient significance on both estate and tenant farms to merit discussion and analysis. Moscrop summarised the situation with respect to sheep in pointing out that in Leicestershire 'sheep are not a leading feature of dairy districts but every farm has a small number chiefly as adjuncts to the cows' [Moscrop G E, 1866 p. 317]. From inspection of sale advertisments it is apparent that breeding ewes were most frequently kept but in a minority of instances the absence of a breeding flock indicates an interest in fattening. This conclusion is supported by a reference to wintering of sheep in Burnaston in the 1840's [PRO IR18] and a further note by Moscrop that in addition to breeding flocks sheep were also bought in for the winter to have the run of the dairy pastures. One practical reason for combining sheep with cattle has emerged in the discussion of grassland management in Chapter 7 in Farey's account of the careful pasturing of land by both cattle and sheep in order to effect weed control.

A general picture of the significance of sheep in the farm economy of southern Derbyshire relative to dairy cattle has already been derived from analysis of farm sale notices [Figure 8.1 and Table 8.1]. The distributional pattern of the sheep enterprise at the close of the study period is apparent from Figure 8.12 which shows sheep livestock units as a proportion of all livestock units at the time of the 1870 agricultural census. Across the area adjacent to and to the south of the Trent values are generally greater than 24% and in some parishes exceed 30%. On the red marl with its strong association with dairying parishes commonly show less than 12% of livestock units as sheep. It is possible to work backwards from this situation by combining data from the 1870 census and farm sale advertisments in order to gain some perspective on the changing position of sheep in the farm system. Table 8.2 shows that the proportion of sales on the red marl area which included sheep declined from approximately 70% in the 1800's to 50% in the 1860's. South of the Trent an opposite trend prevailed so that by the 1860's the proportion of sales including sheep had risen from 70% to 95%. Figure 8.5 demonstrates that despite variations from year to year the average number of sheep livestock units offered at sales on the red marl remained almost constant between 1800 and 1870. On the assumption that the characteristics of sales may be directly equated with those of farms Table 8.9 shows that if the 23,276 sheep recorded in red marl parishes in the 1870 census relate to 50% of the farms which then existed the sheep population in 1800 would have been 32,856 when 70% of farms carried sheep. In round terms a decline of 9,500 sheep is indicated which can be expressed as 1,425 livestock units or the equivalent of the same number of productive dairy cows. If it is further assumed that the land formerly occupied by sheep was used to accommodate more dairy cattle then an indication of the scale of possible substitution is obtained. As there were 18,707 dairy cows in the red marl parishes in 1870 it follows that an increase of 7.5% in dairy cow numbers between 1800 and 1870 may be attributable to decline in sheep. However Table 8.2 indicates that the change to fewer farms carrying sheep had taken place by the 1840's. It can be calculated that a substitution of 9% more dairy cows took place between 1800 and

1840.

Using the same assumptions with respect to the area to the south of the Trent, but taking into account the increase in average sheep numbers per sale shown on Figure 8.6, Table 8.9 shows that total sheep numbers increased by over 4,000 between 1800 and 1870. The degree of divergence in trend from the red marl is thus apparent. It is interesting to note that the numbers of acres of agricultural land to each sheep was identical on the red marl and to the south of the Trent in 1800 at one sheep to 3.2 acres but by 1870 had changed to one sheep to 4.5 acres on the marl as compared to one to 2.35 acres south of the Trent.

It emerges that from the above analysis that there was an important relationship between trends in numbers of sheep and dairy cattle. However sale advertisments can be used to demonstrate other points of contrast with respect to sheep to the north and south of the Trent. Table 8.10 seeks to compare the number of breeding ewes offered in these areas in the earlier and later parts of the study period. While the modal value for the number of ewes offered per sale is consistantly in the 21-40 category contrasts do emerge which demonstrate that breeding flocks at sale were generally larger to the south of the Trent. On the red marl 32% of sales involved numbers of 20 or less and only 26% offered more than 40 ewes. South of the Trent the range of numbers offered was wide but more than half the sales involved numbers greater than 40 with 18% of sales exceeding 100 ewes. Calculation of mean numbers offered show 29 per sale on the red marl but 48 per sale south of the Trent.

Influences on the sheep element of the farm economy include changes in breed preference and increased occurrence of foot rot distribution. At the national scale important changes with respect to sheep breeds that had been in train since about 1600 came to fruition in the study period. Slicher van Bath [Slicher van Bath B H, 1967 p.296] has written that 'in regard to breed improvements we must remember that in the seventeenth and eighteenth centuries a great change took place in the qualities that were considered desirable in animals'. In the case of sheep in Britain this involved the evolution of distinct breeds which

were both lighter and meatier than their predecessors but with less wool. In the Midlands such change focused strongly on the New Leicester breed which was perfected by Robert Bakewell at Dishley near Loughborough in the 1760's [see Pawson H C, 1957]. Despite the immediate proximity of Dishley to southern Derbyshire some caution is necessary in assessing the scale and speed at which the New Leicester may have become influential. Curtis [Curtis W, 1806 p.82] observed in his tour of Derbyshire that 'upon the common highways and on the moors I met with sheep extremely course both in shape and in wool but not knowing how to class them under any particular distinction I shall only observe that they are a disgrace to their owners'. Farey [Farey J, 3 1817 p.89] who listed ten prime breeds and seven cross breeds of sheep in Derbyshire also noted the existence in the county of 'a great variety of mixed and uncertainly crossed animals'. As with cattle it is impossible to know what proportion of the total sheep population were of this unimproved kind and for how long into the nineteenth century such sheep may have persisted.

Figure 8.13 is based upon Farey's listing of sheep flocks and shows a preponderance of the New Leicester in the southern part of Derbyshire. Some light can be shed on the origins of this pattern through the identification of tupping linkages also referenced by Farey. These have been mapped as Figure 8.14 and show strong connections with flocks in north west Leicestershire particularly in the vicinities of Ashby and Loughborough. Further evidence of the popularity of the New Leicester and the interrelationships between flocks is shown on the series of maps Figures 8.15a-d which are based on analysis of sale notices in the Derby Mercury. The patterns of linkage are here shown to have been quite complex.

The evidence indicates that despite being a lesser element of the total farm system at least some southern Derbyshire farmers were readily adopting improved New Leicester stock and as time passed to take advantage of further developments. Ryder [Ryder M L, 1983 p.497] has demonstrated the continued improvement of breeds into the mid nineteenth century [see Table 8.11]. The principal change was earlier maturity so that the butcher was

dealing with younger and potentially better quality meat even if the carcass of a whether was somewhat lighter overall. The coming to a condition fit for slaughter in fifteen months which had been achieved by 1850 should be compared not just with the two years of 1800 but with the four years typical of the time prior to the breeding experiments of the mid eighteenth century. Changes of this magnitude would have had a significant impact on productivity in that output was effectively more than doubled. Further changes resulting from improved feed also have to be accommodated. The substitution of roots for hay as winter feed effectively reduced the useful breeding life of ewes as a result of increased wear on teeth. Ewes came to be discarded after five breeding seasons because they could no longer forage effectively. On the other hand the impact of improved root based winter diet was such that ewes were now in condition to rear twin lambs which previously had been unusual. For all farmers the period from 1750 to 1850 saw a potential for up to a three fold increase in output of sheep for slaughter on the basis of a fixed land area and fixed flock size. If applicable to southern Derbyshire the implication of static flock size from sales advertisments does not equate to static productivity.

It is also arguable that the ground conditions on the marls, till sheets and alluvium of southern Derbyshire and adjacent areas plus the enclosed landscape dominated by small hedged fields provided a particularly appropriate environment for the New Leicester. This arises from the particular physical characteristics of the New Leicester. Curtis [Curtis W, 1806] and Farey [Farey J, 3 1817] noted criticism of the breed on the basis of its lack of wool and excess fat. Copus [Copus A K, 1990 p.38-39] in an investigation of the Southdown argues that there was virtue in some of the apparent negative features of the New Leicester in that the fattiness of the flesh especially immediately below the skin meant that the carcass was a valuable source of tallow. This was a major attraction to butchers who would gain another source of income. However the price of tallow fell sharply when the close of the Napoleonic episode opened up Great Britain to continental imports. In his writing Copus [ibid p.39] argues further that the New Leicester, in contrast to the Southdown, was well adapted to areas where there were well

sheltered fields and a plentiful supply of grass. Rowlandson [Rowlandson R, 1849 p.432] had drawn similar conclusions although he took the view that in the 1790's the Leicester was equal to the Southdown in contrast with Curtis and Farey. Rowlandson wrote that 'from observations carefully made I feel convinced that ordinary Leicesters will succeed better, return a greater amount of money to the farmer in less time and on a smaller amount of food both of flesh and wool than an ordinary Southdown if they are fed on a pasture fairly succulent up to a rich one or on an artificial food such as rape, swedes etc and this will be still more distinguishable if the experiment is made in a moist country'.

The particular significance of the New Leicester for southern Derbyshire farmers which has been suggested above is supported by the 38% of farm sale advertisements of the Derby Mercury which carried a reference to breed [see Table 8.11]. Overall the predominance of references is greater than 2:1 in favour of the New Leicester over all other breeds. Fatstock and surplus stock sales representing the estates and the larger tenants refer to New Leicester in just 45% of cases, a reflection of the wider concerns of these members of the farm community and their more affluent market which had finer tastes in meat. Curtis wrote [Curtis W, 1806 p.82] that the New Leicester 'is propogated by all the principal breeders of the county'. At that time the breed had been existence for forty years.

Apart from the preponderance of the New Leicester a range of minority and crossbreeds are noted in sales advertisments. A few farmers kept Southdowns but a minority breed which grew in significance in southern Derbyshire was the Shropshire. Trow Smith [Trow Smith, 1959 p.67] describes the Shropshire as an ancient breed adapted to heaths and therefore thrifty in its habit. Farey [Farey J, 3 1817 p.123] identifies few locations and indeed sale notices show a predominance from the late 1830's onwards. The numbers involved are generally small such as 29 sold by Smedley of Egginton 1829, 15 at Newton Park Farm, Newton Solney in 1840 [DM 25.11.1840] and 14 by Holmes of Littleover [7.2.1840] and 6 at Blakely Farm, Etwall [DM 24.5.1850] both in 1850. Substantial numbers of Shropshires were offered in sales

during the 1860's when breed references to Shropshires exceded those to Leicesters. Breeders from adjacent counties advertised over 500 ewes in the Derby Mercury [DM 12.7.1865] while Mr Kettle near Burton disposed of his 'splendid flock, established twenty years ago' of 200 ewes and 10 rams.

While farmers moved in favour of the New Leicester, perhaps on environmental grounds but certainly on the basis of its area of origin, another environmentally related factor that of foot rot needs to be taken into account. Lord Ernle [Ernle, 1961 p.235] stated that the difficulties of clayland farmers were exacerbated by the rot of 1830 and 1831. Nationally it was seemingly the most disasterous on record and 'swept away two million sheep'. Wet weather conditions favoured this disease on the clays and it may be significant that, according to Craddock [Craddock J M, 1976 p.837], rainfall in Notts and Derby was 128% of average in 1830. Rot was certainly a problem for Derbyshire farmers in 1881 [DPFC 1881, p.472] and is described as a factor in the decline of sheep on wet land by Druce [Druce S B L, BPP 1880-2 p.24]. It is conceivable, therefore, that sheep rot played its part in reducing sheep numbers on the marls and clays to the point where farmers moved increasingly to dairy only systems with their focus on cheese production. Table 8.2 shows that the decline in the proportion of sales involving sheep on the marls and coal measure series is apparent from the 1840's and it may be that this is a pointer to the impact of disease occurrence.

In summary it has been demonstrated that while sheep were a lesser element in the farm economy they had general significance - albeit a significance which declined somewhat on the red marl and also the shale/coal measure country. This trend was seemingly a reflection of the increasing emphasis on dairying in the farm economy of these districts. South of the Trent by contrast sheep flocks were greater in size and frequency and the combination of sheep with cattle appears to have become a general feature of the farm system. The attempt to quantify the nature of these changes has given an indication of the possibility for the substitution of dairy cattle for sheep, albeit over an extended time period and provides an additional

argument in the explanation for the growing numbers and importance of dairy cows in southern Derbyshire.

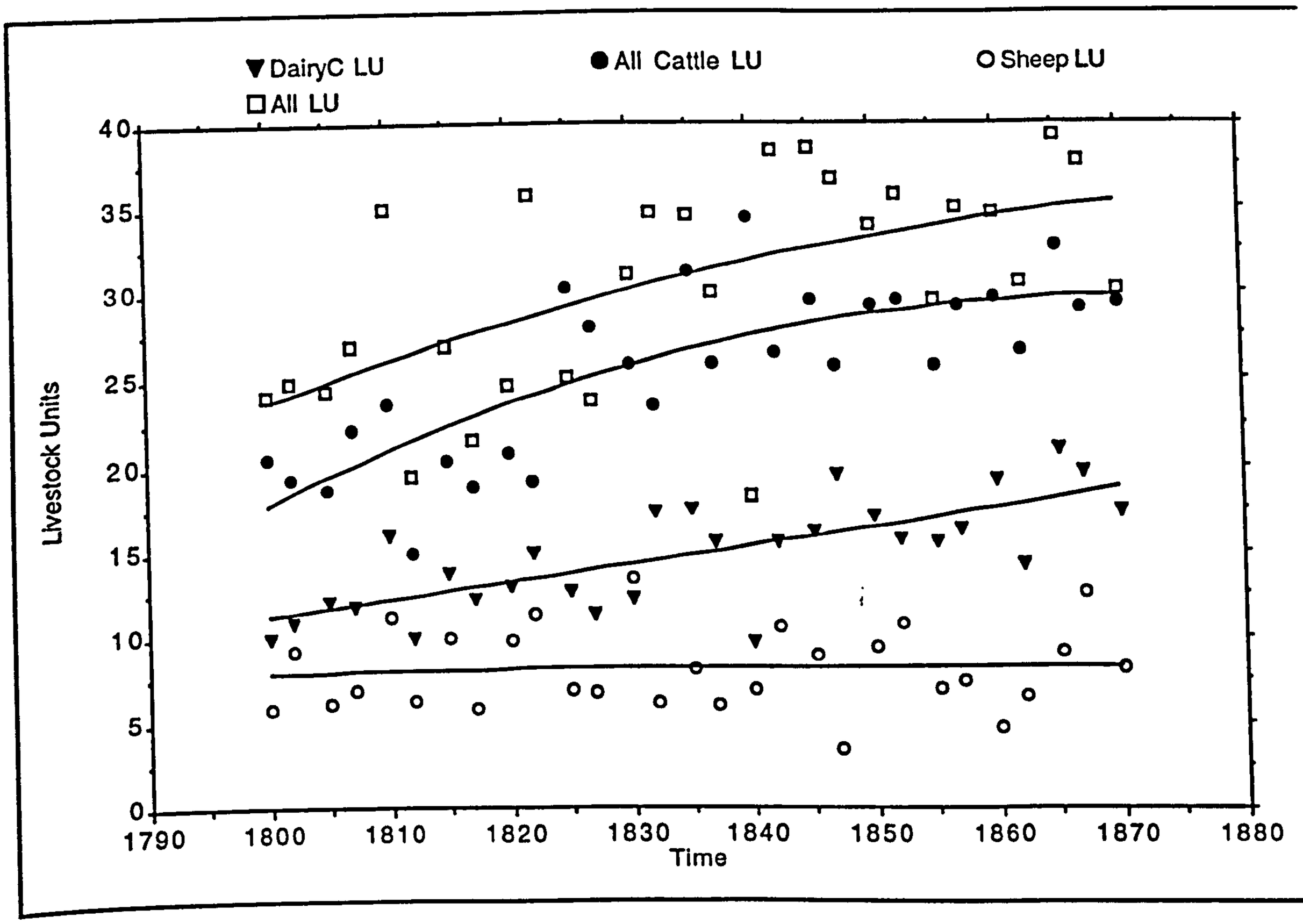


Figure 8.1 Southern Derbyshire: Trends in Average Livestock Units [LU] for Sale Advertisments 1800 - 1870

Note: The regression analysis has been effected using a polynomial formula in order to bring out the nature of trends through time more clearly than simple regression.

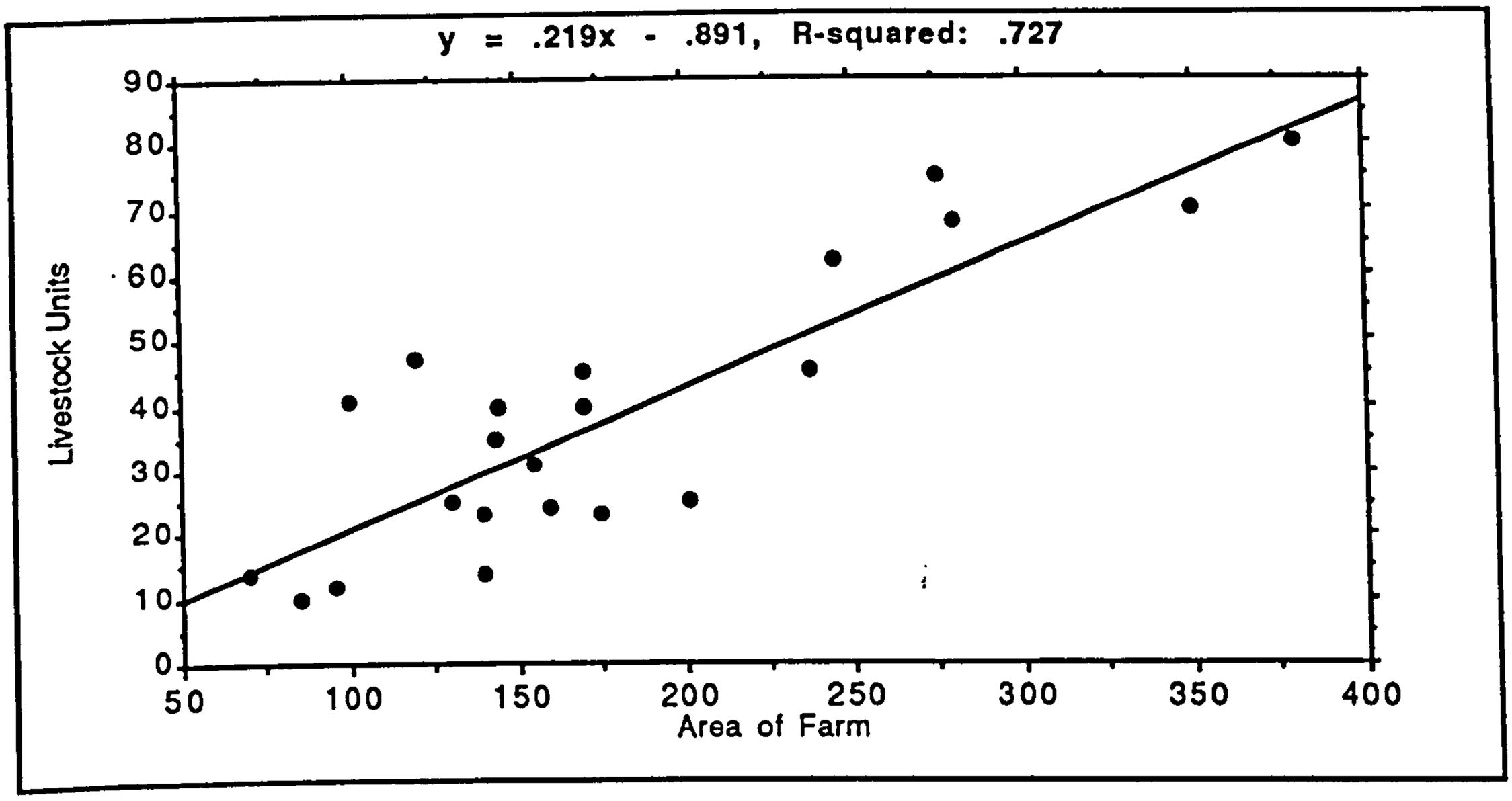


Figure 8.1a Relationship between Total Livestock Units and Farm Area 1851/2
(Sources: Census of Population 1851 for farm size and sales notices in the Derby Mercury for livestock.)

Note that the statistical relationship is strong.

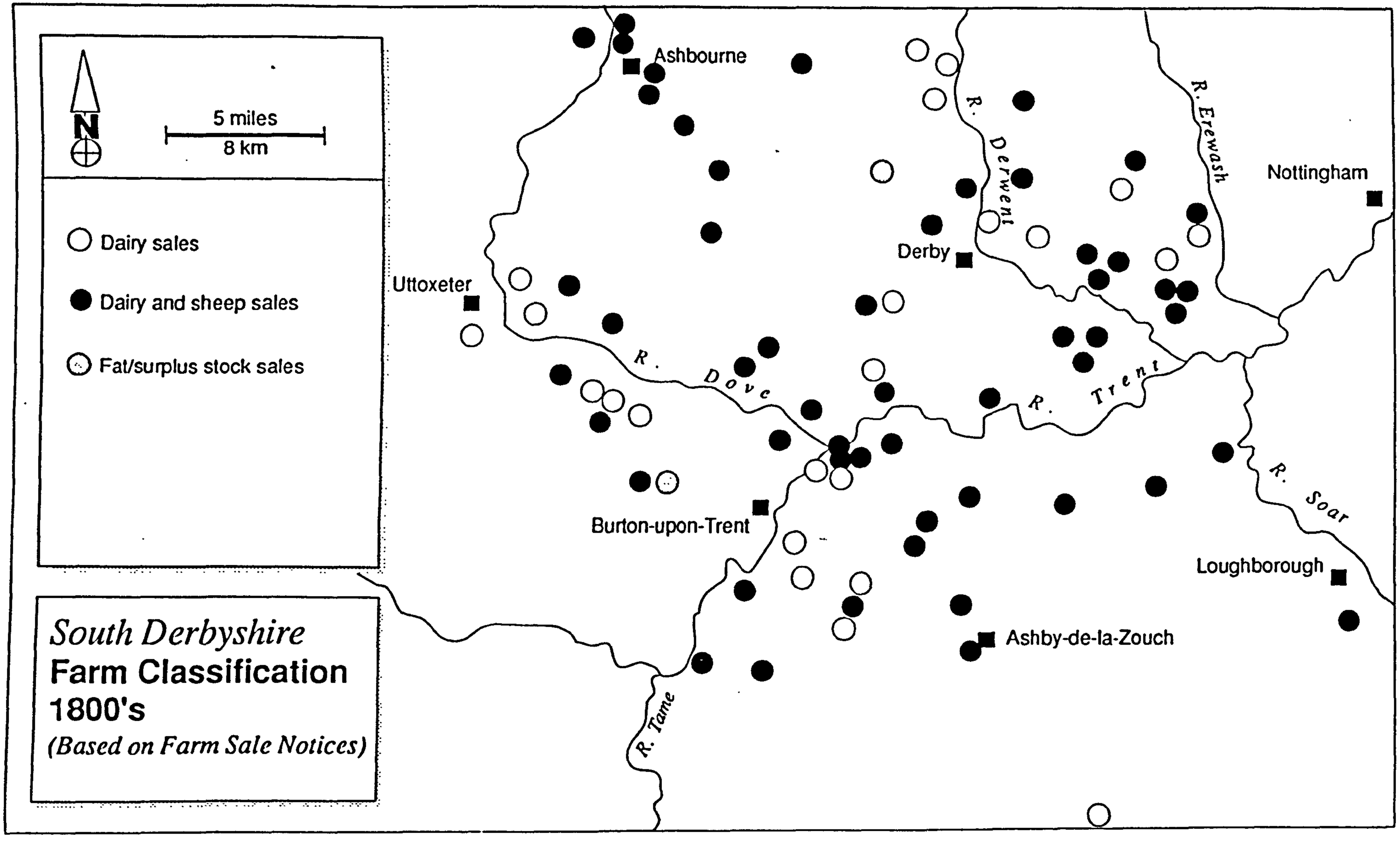

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1800's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.2a

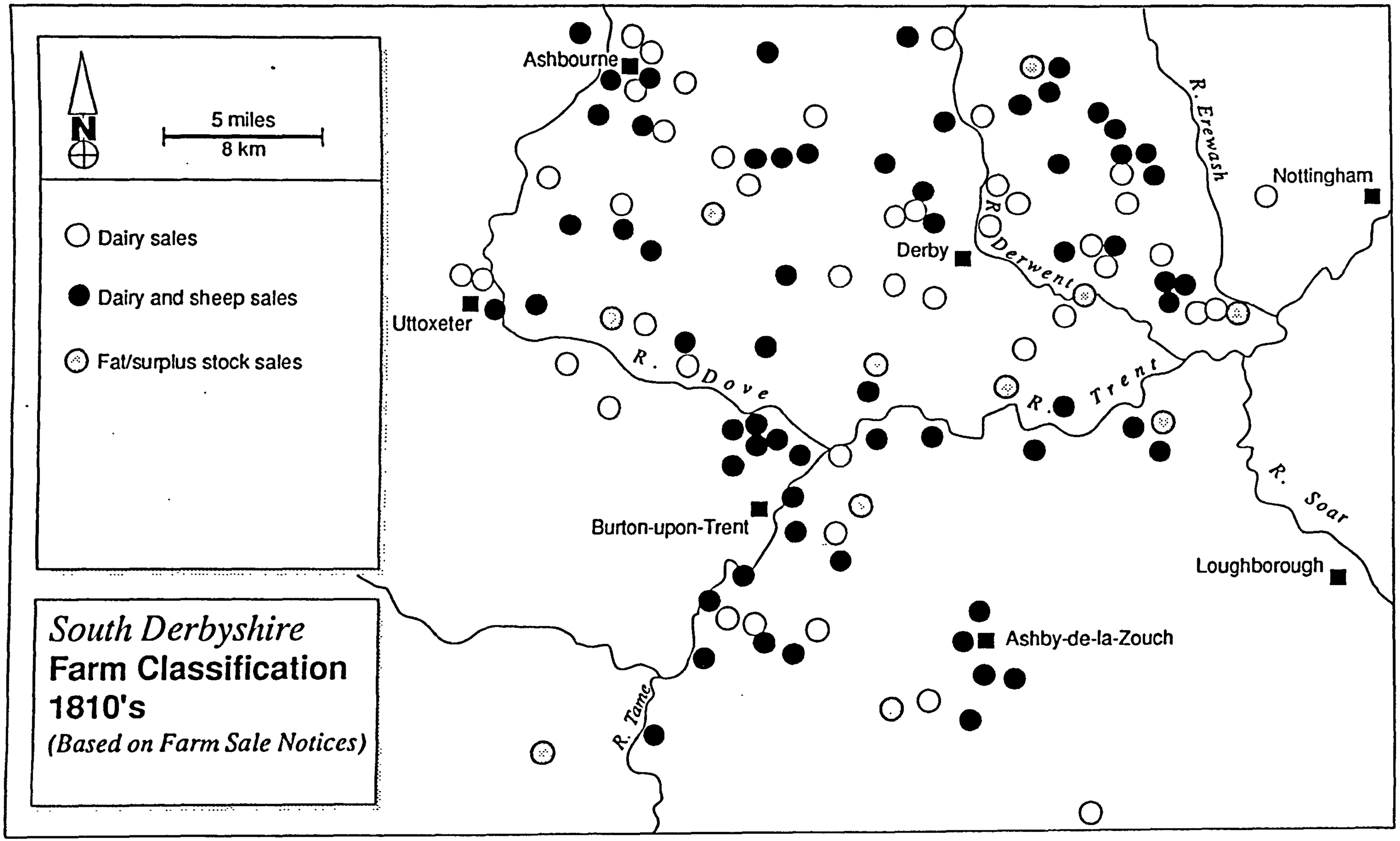

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1810's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame

Figure 8.2b

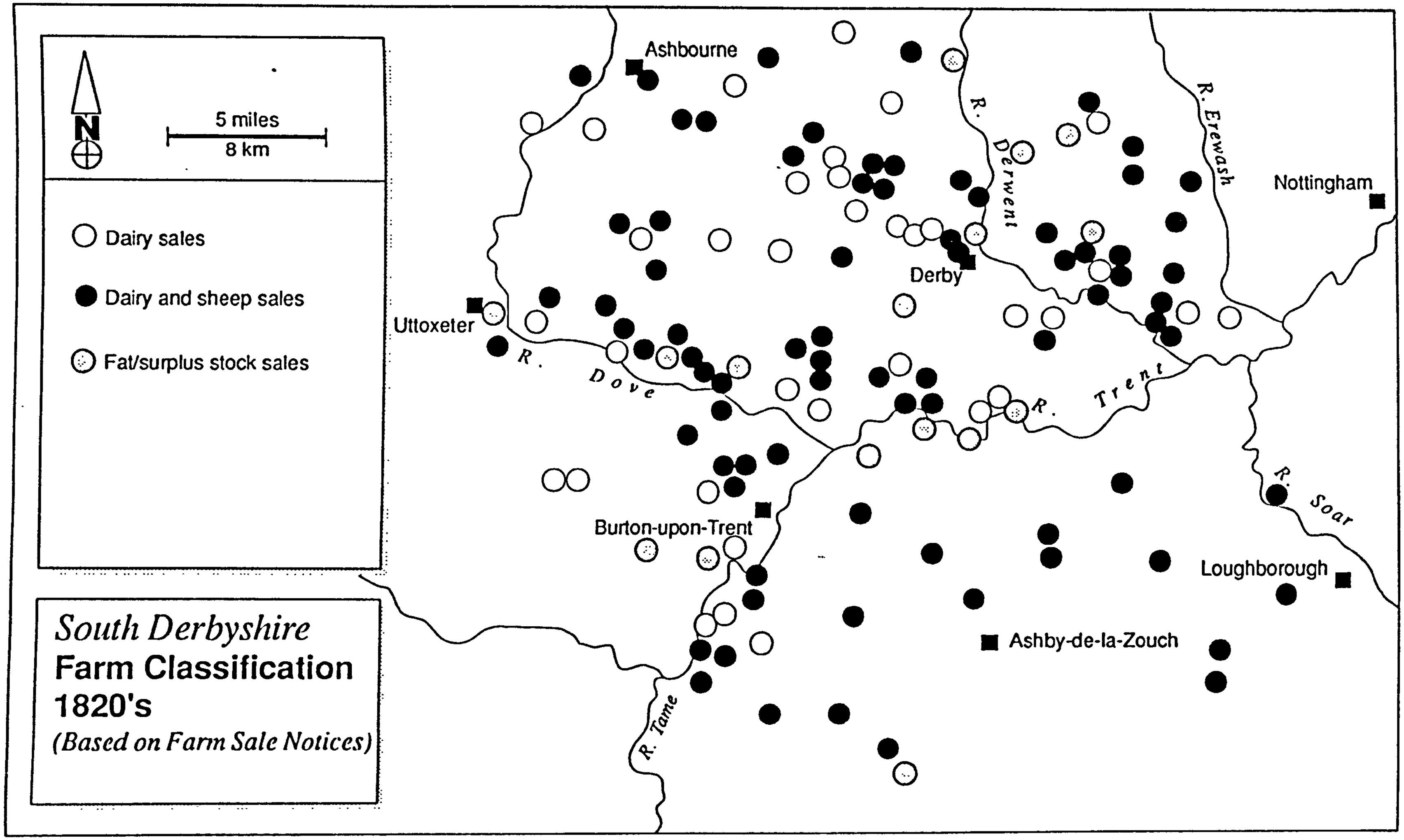

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1820's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame

Figure 8.2c

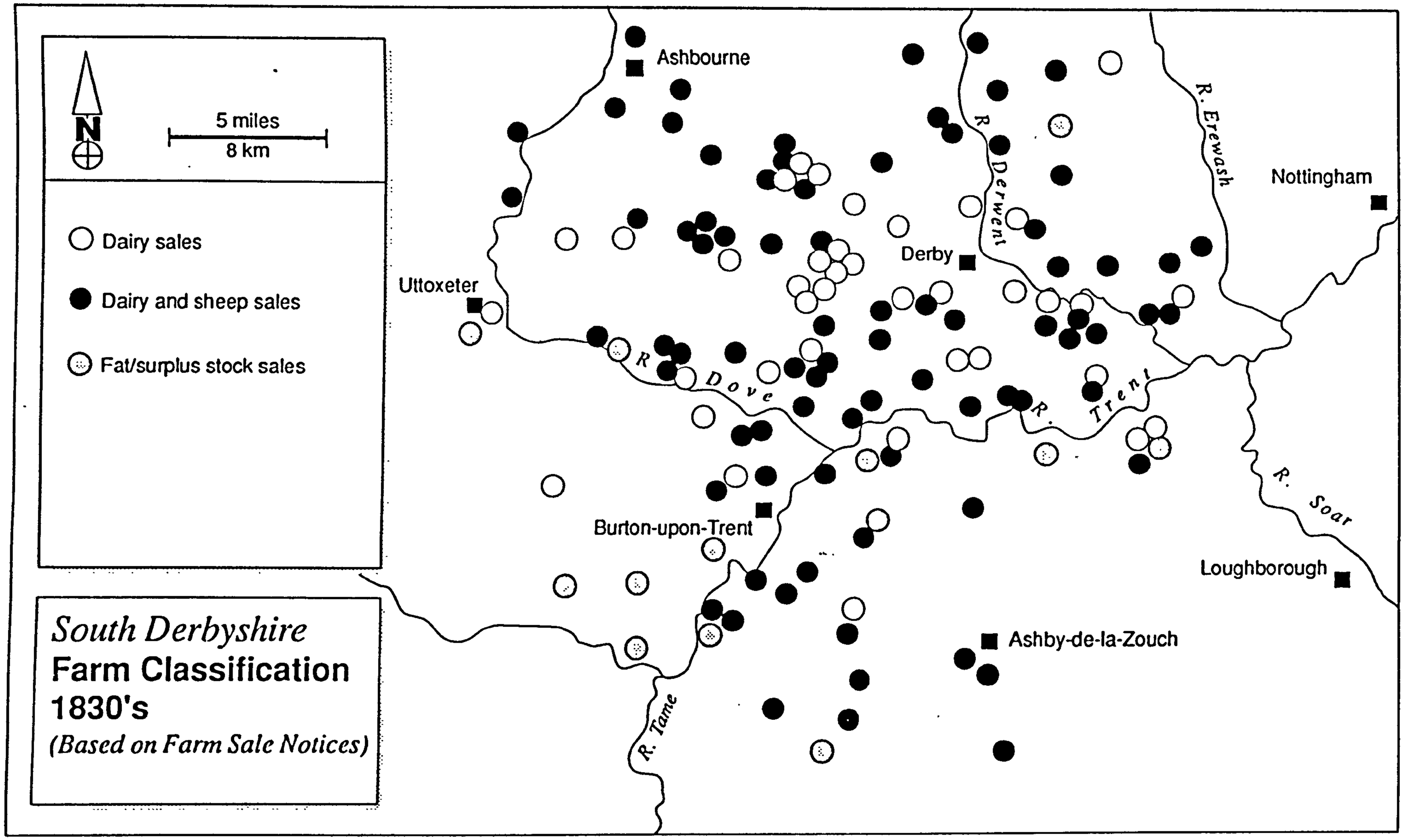

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1830's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.2d

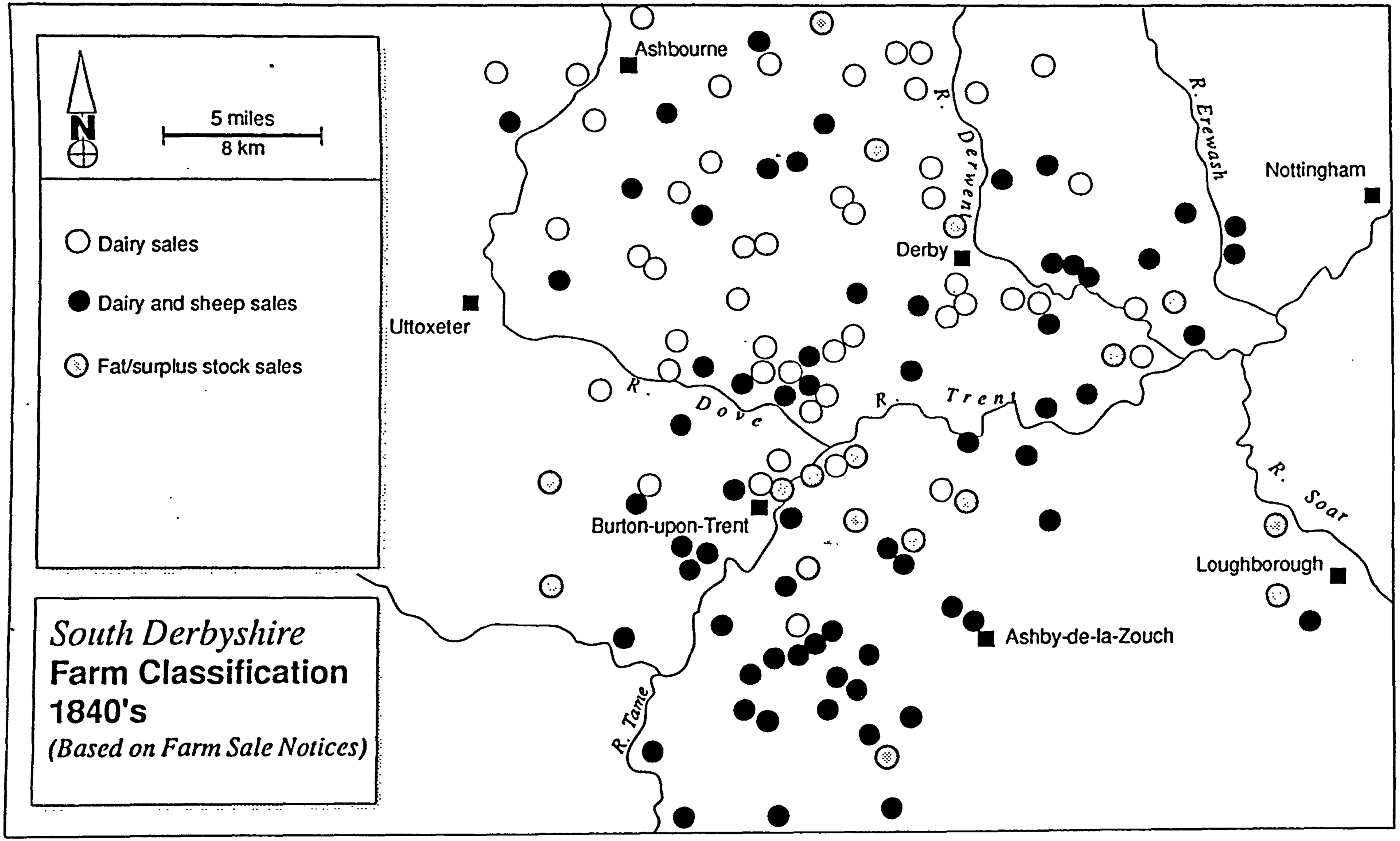

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1840's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.2e

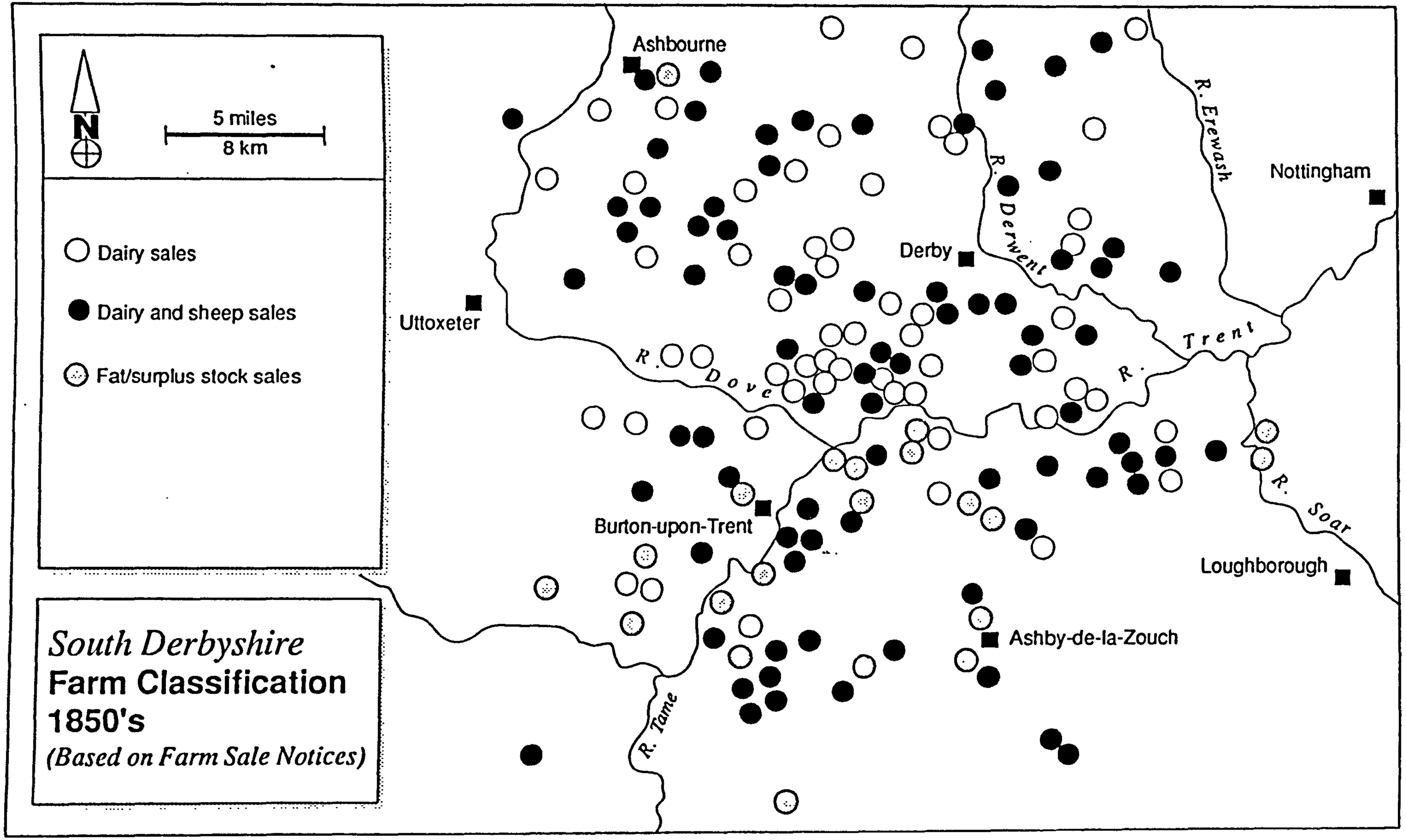

N
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1850's
(Based on Farm Sale Notices)
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
Trent
R.
R. Soar
R. Tame

Figure 8.2f

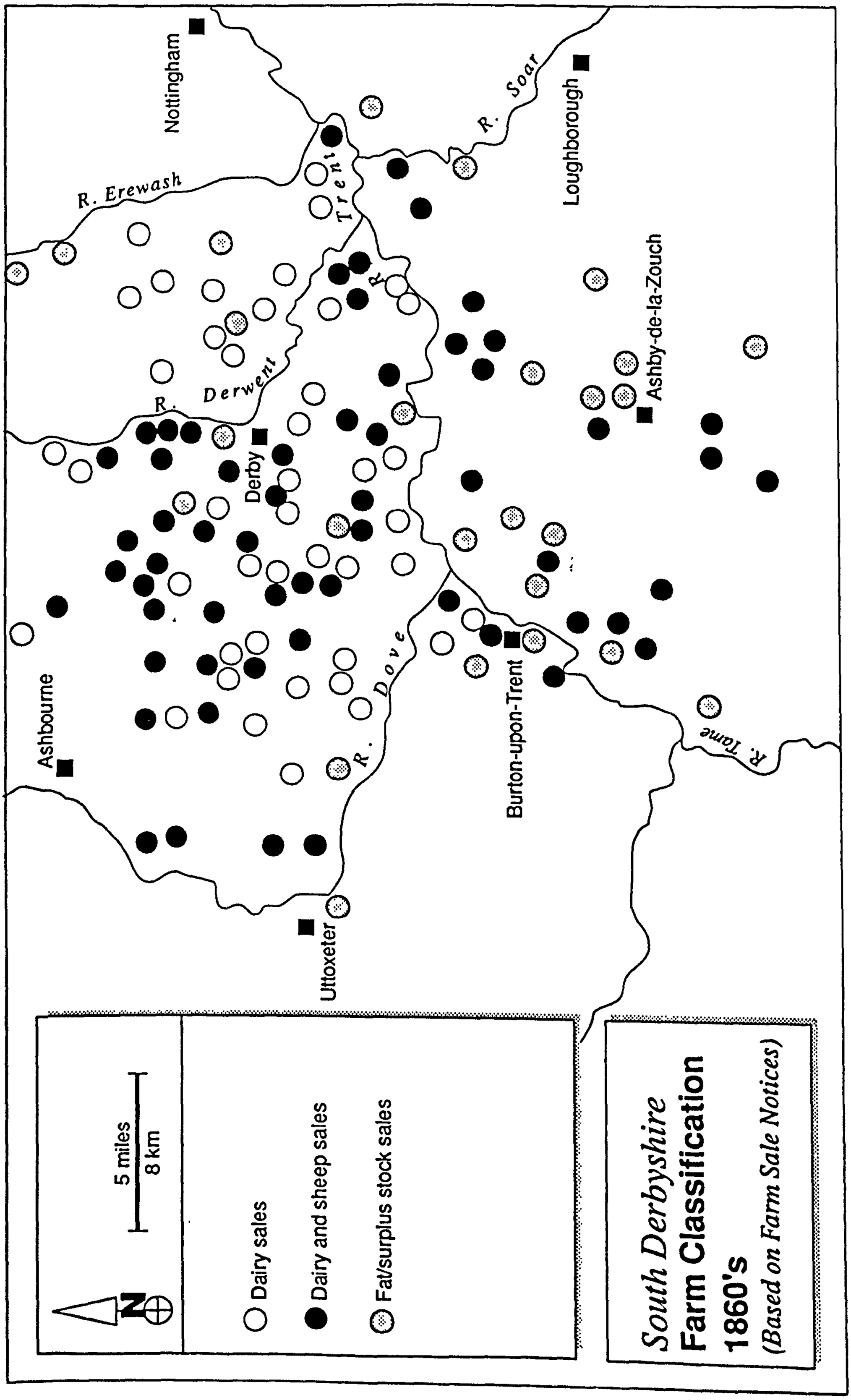

Nottingham
R. Erewash
R. Trent
R. Soar
Loughborough
Ashby-de-la-Zouch
R. Derwent
Derby
R. Dove
Burton-upon-Trent
R. Tame
Ashbourne
Uttoxeter
5 miles
8 km
Dairy sales
Dairy and sheep sales
Fat/surplus stock sales
South Derbyshire
Farm Classification
1860's
(Based on Farm Sale Notices)

Figure 8.2g

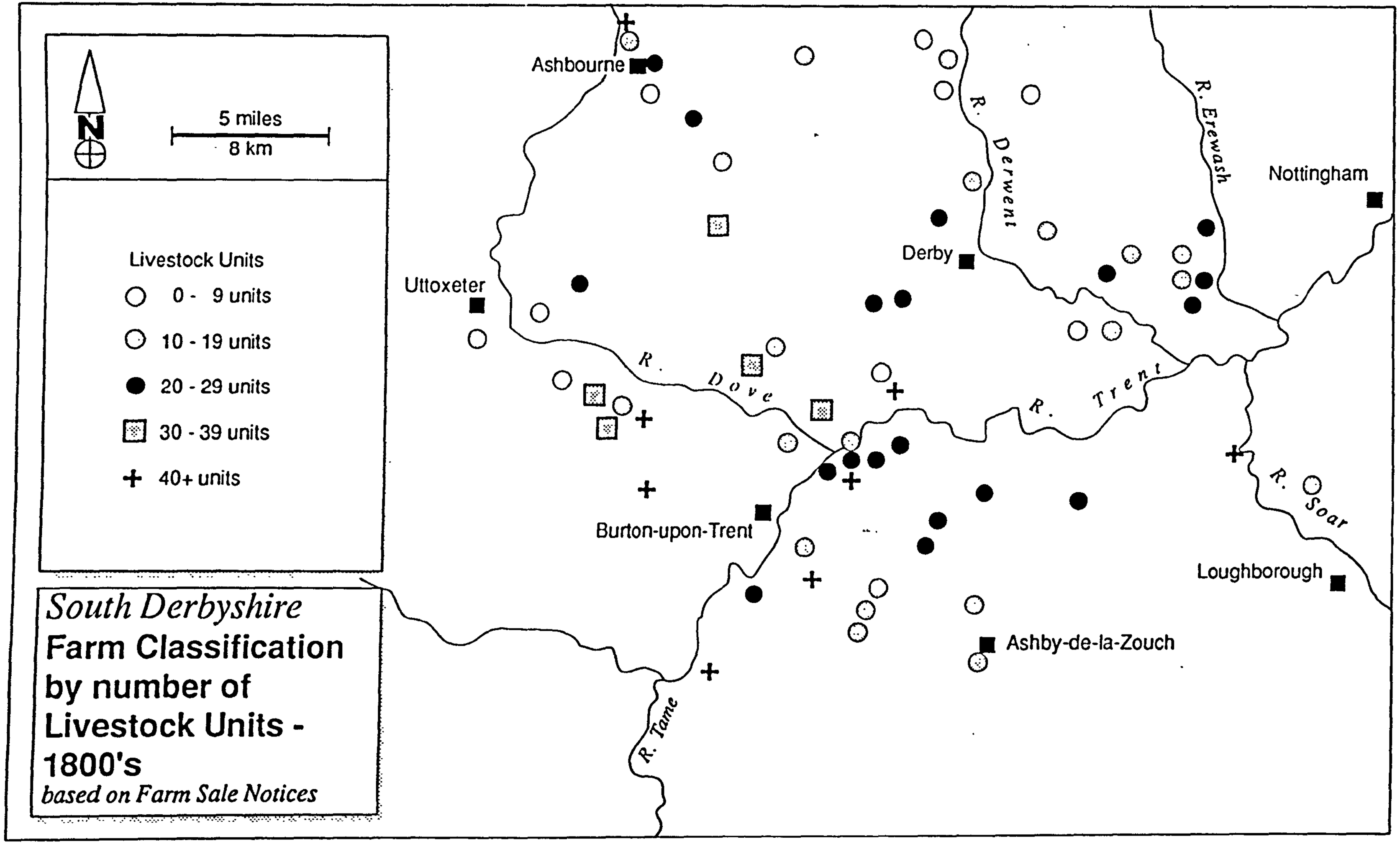

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1800's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame

Figure 8.3a

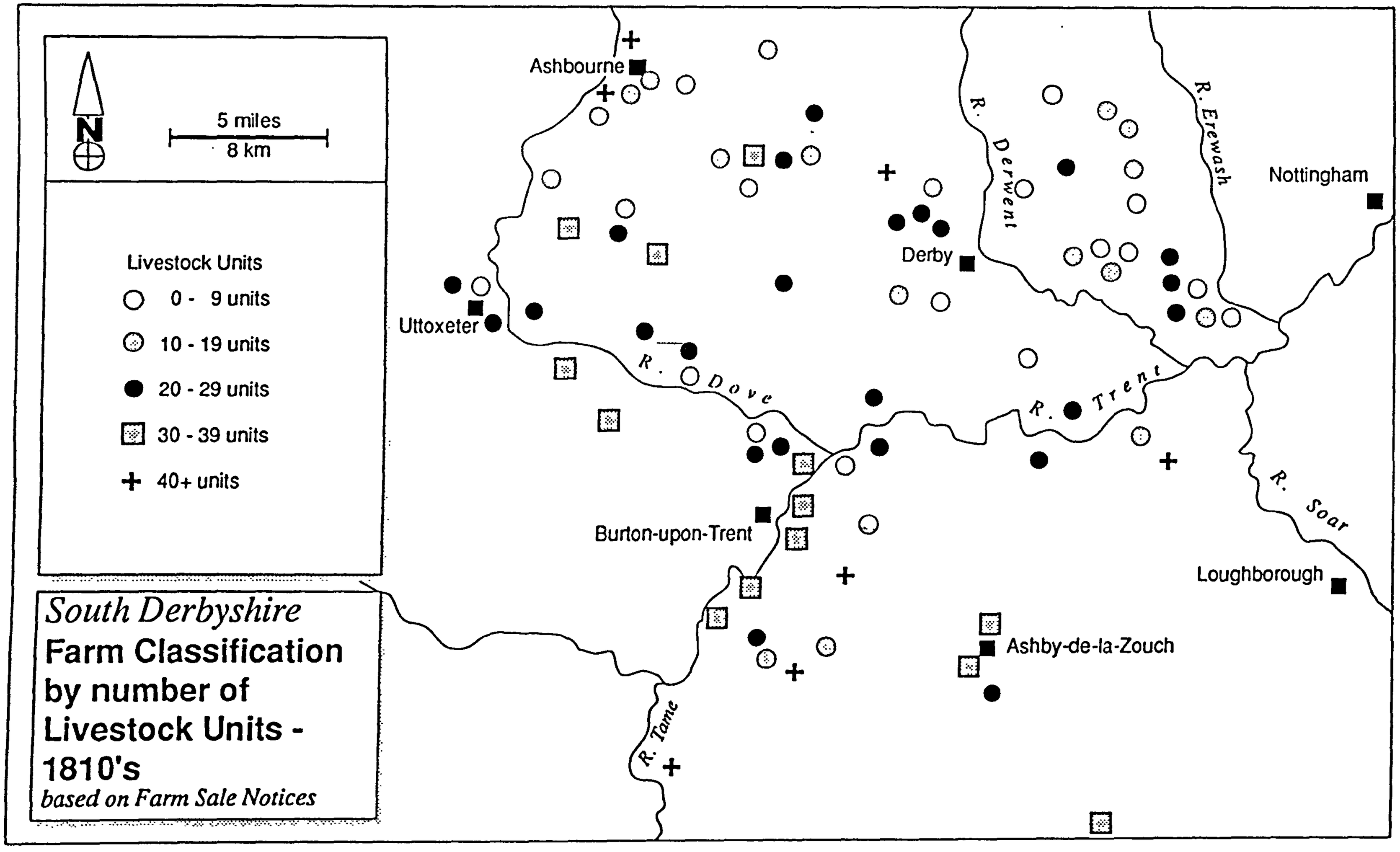

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1810's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame

Figure 8.3b

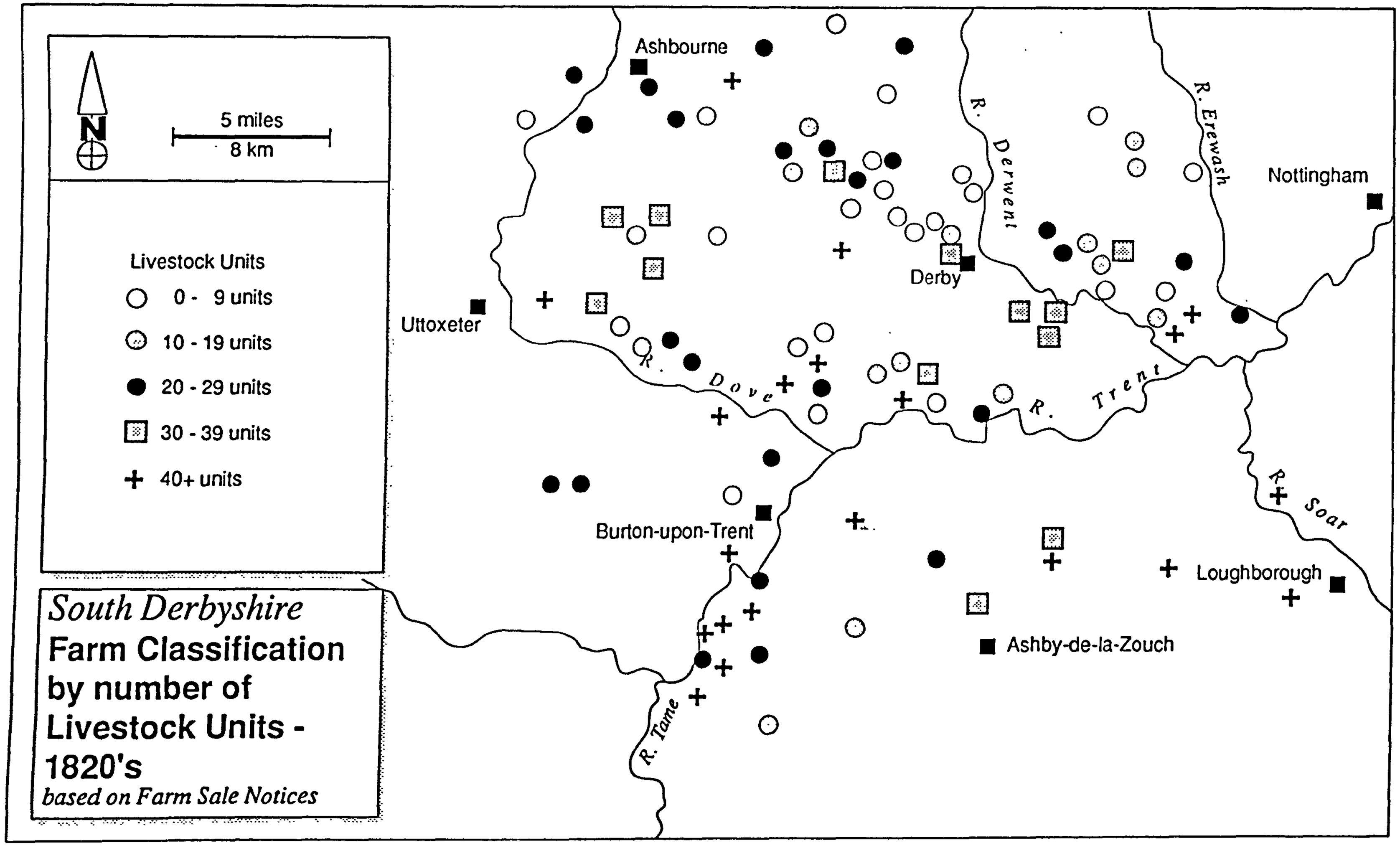

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1820's
based on Farm Sale Notices
Ashbourne
Derby
Nottingham
Uttoxeter
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.3c

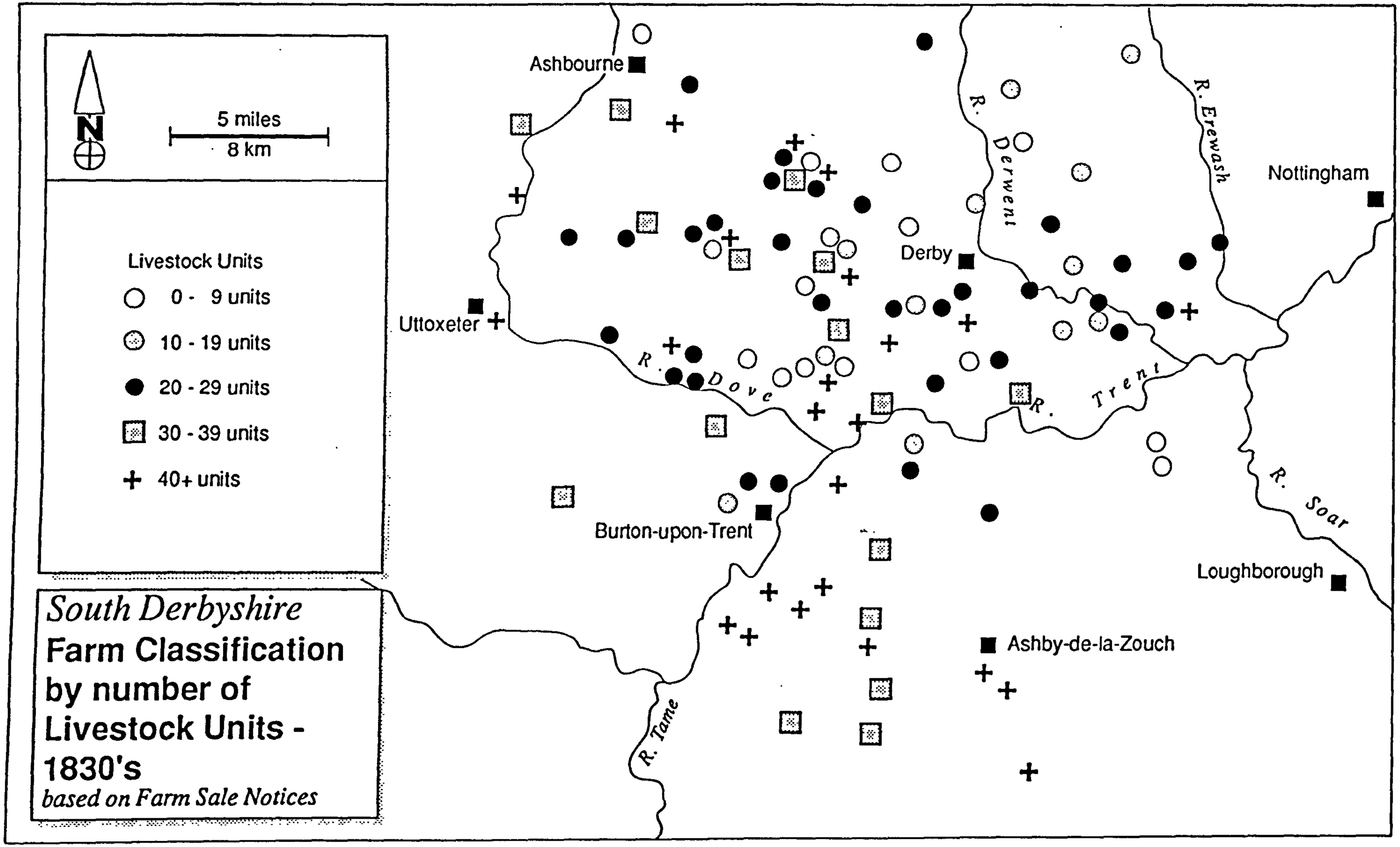

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1830's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.3d

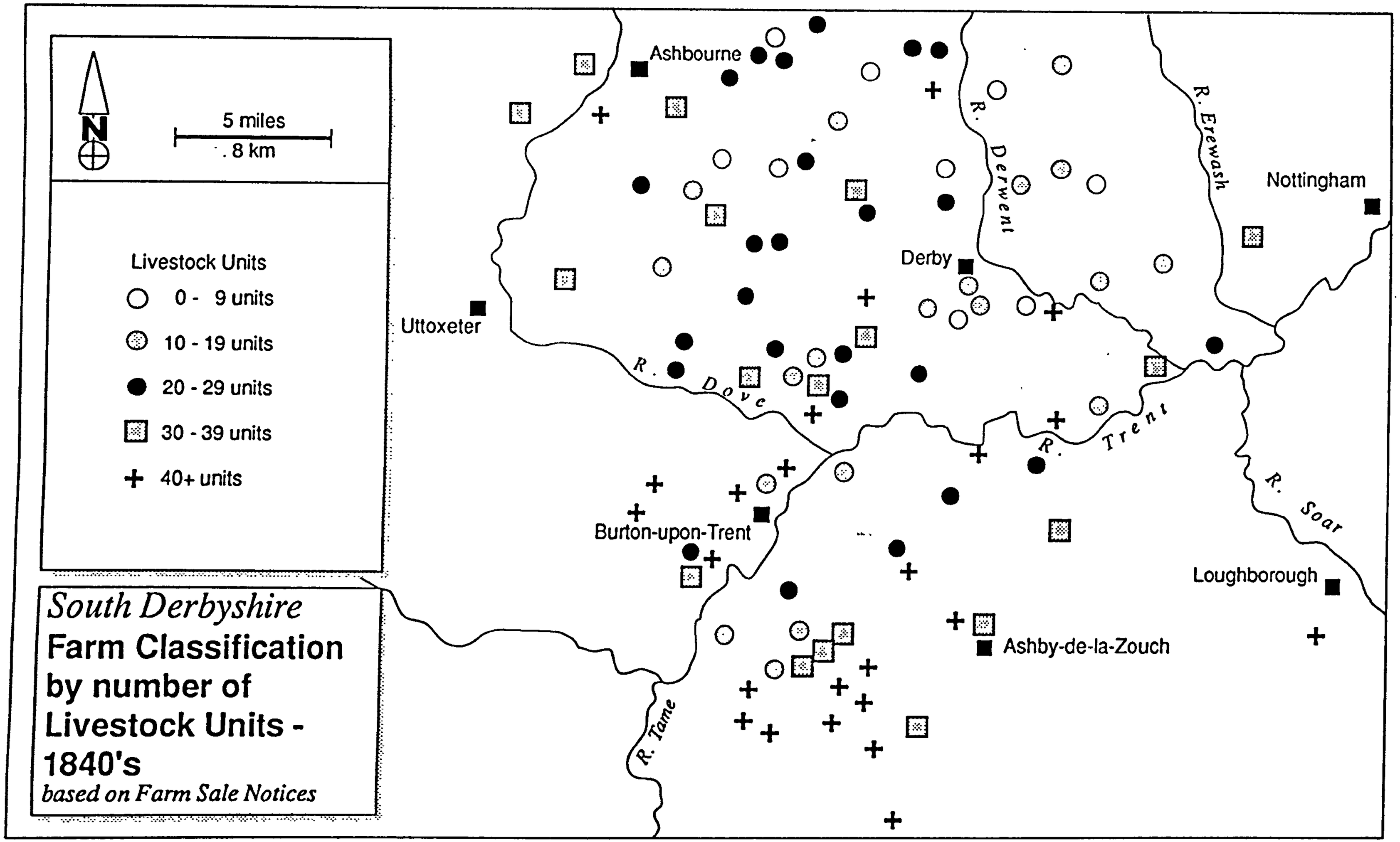

N
5 miles
. 8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1840's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame

Figure 8.3e

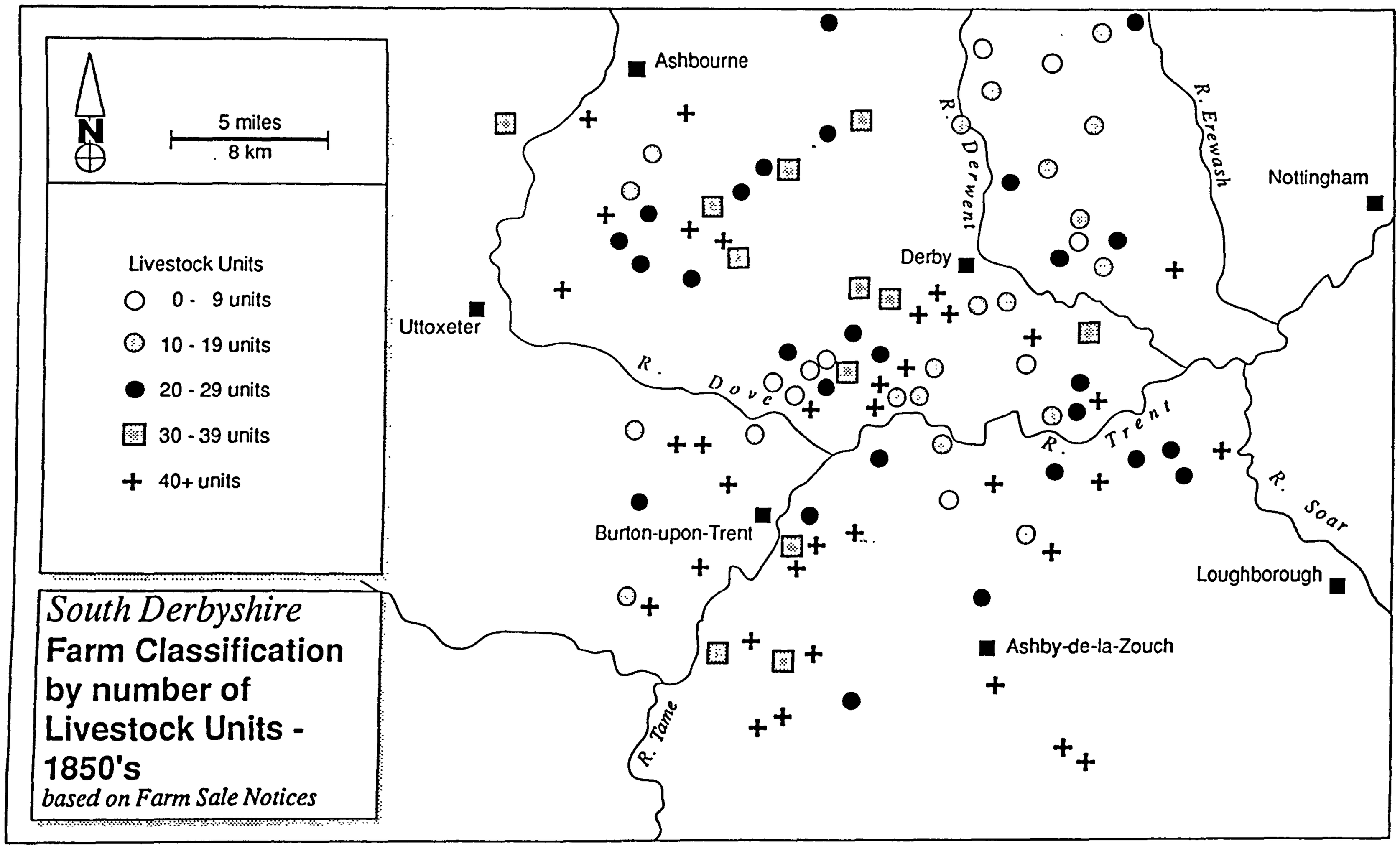

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification
by number of
Livestock Units -
1850's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.3f

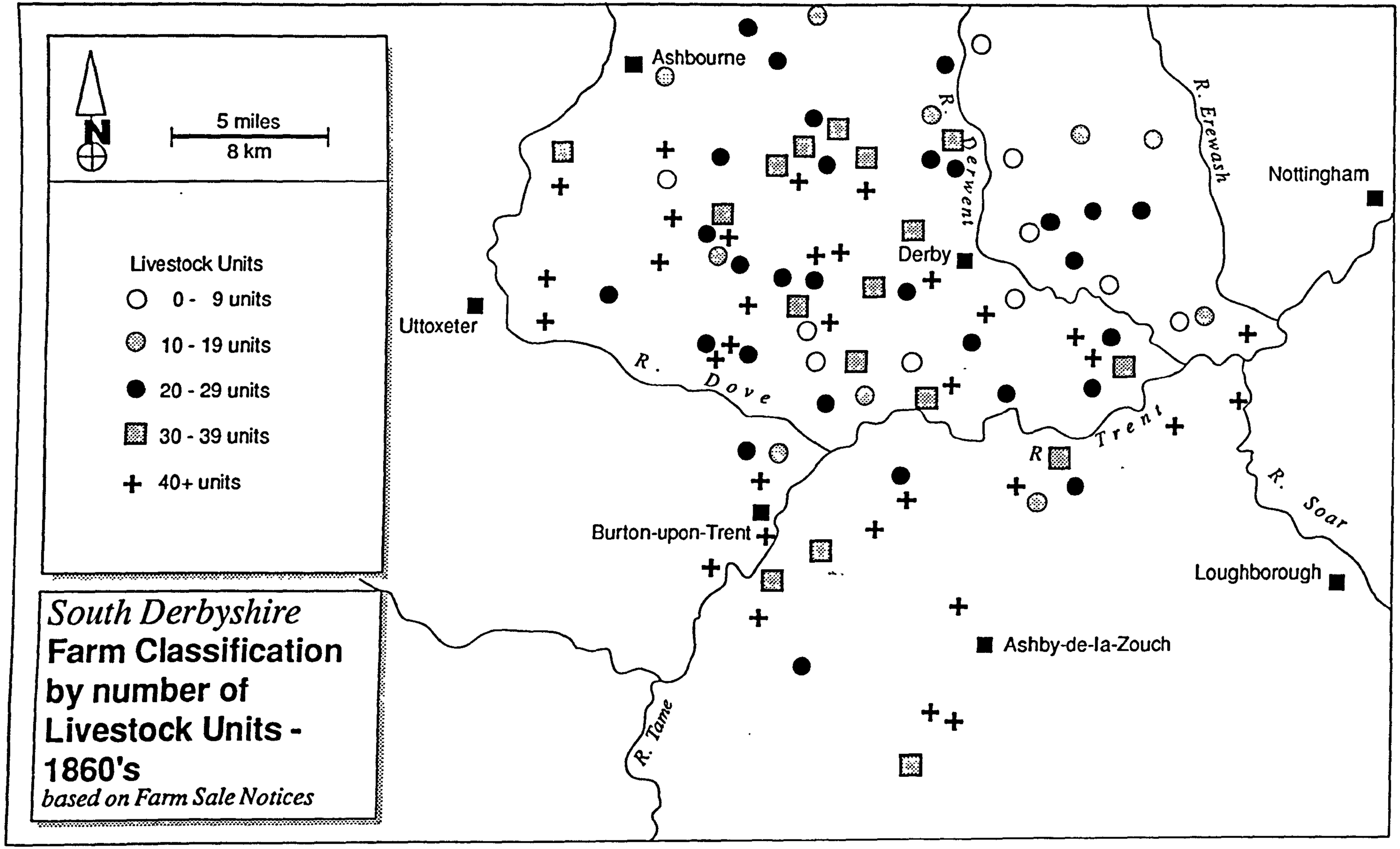

N
5 miles
8 km
Livestock Units
0 - 9 units
10 - 19 units
20 - 29 units
30 - 39 units
40+ units
South Derbyshire
Farm Classification by number of Livestock Units - 1860's
based on Farm Sale Notices
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
Trent
R. Soar
R. Tame

Figure 8.3g

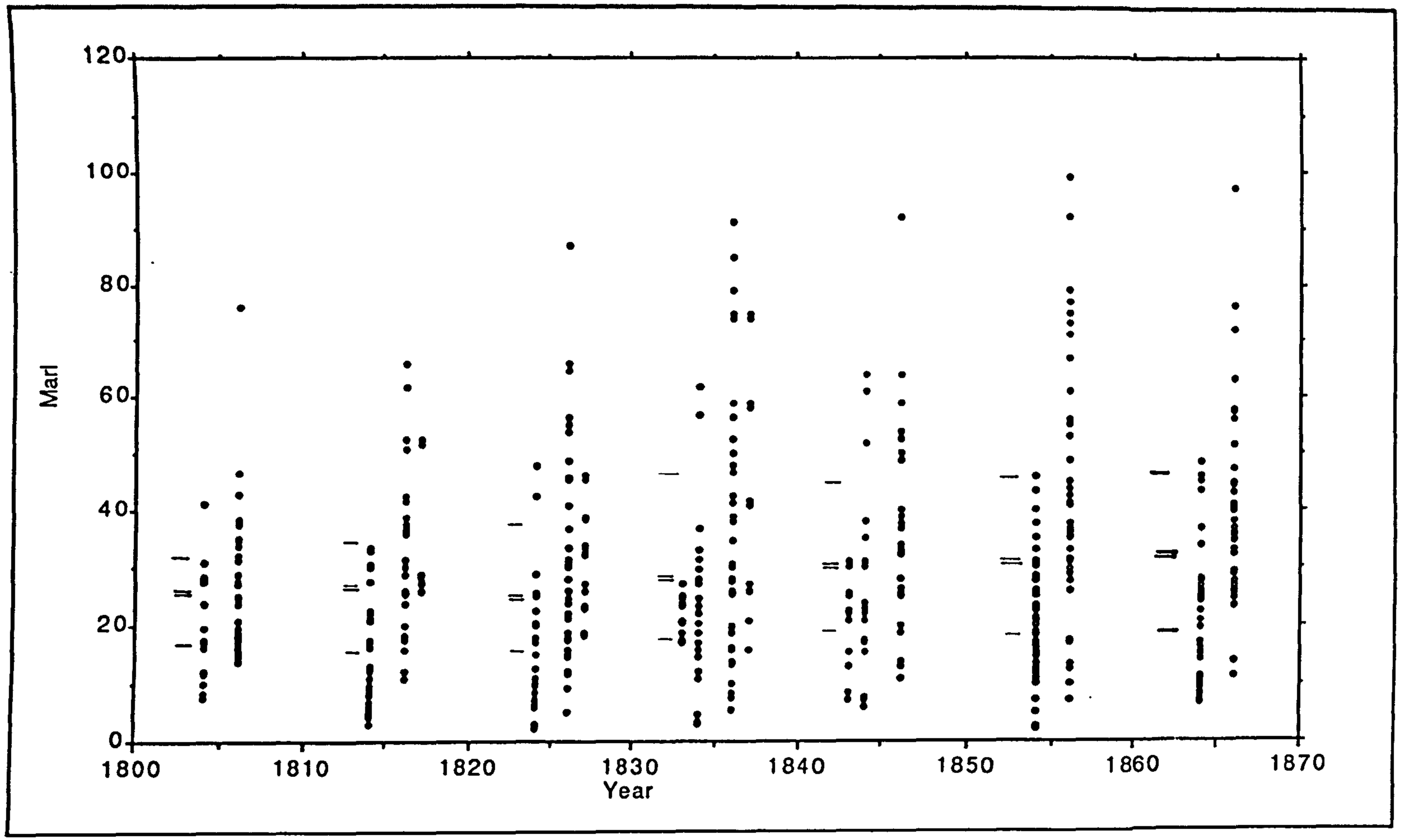


Figure 8.4a Red Marl. Dispersion Diagram to Show the Range of Size of Sale by Livestock Units.

Note : The paired columns of symbols relate to a decadal period. The column to the left of each pair shows dairy cattle only sales while the column to the right shows sales including both sheep and cattle. The median values indicated = and the upper and lower quartiles indicated - relate to all the values plotted in a pair of columns.

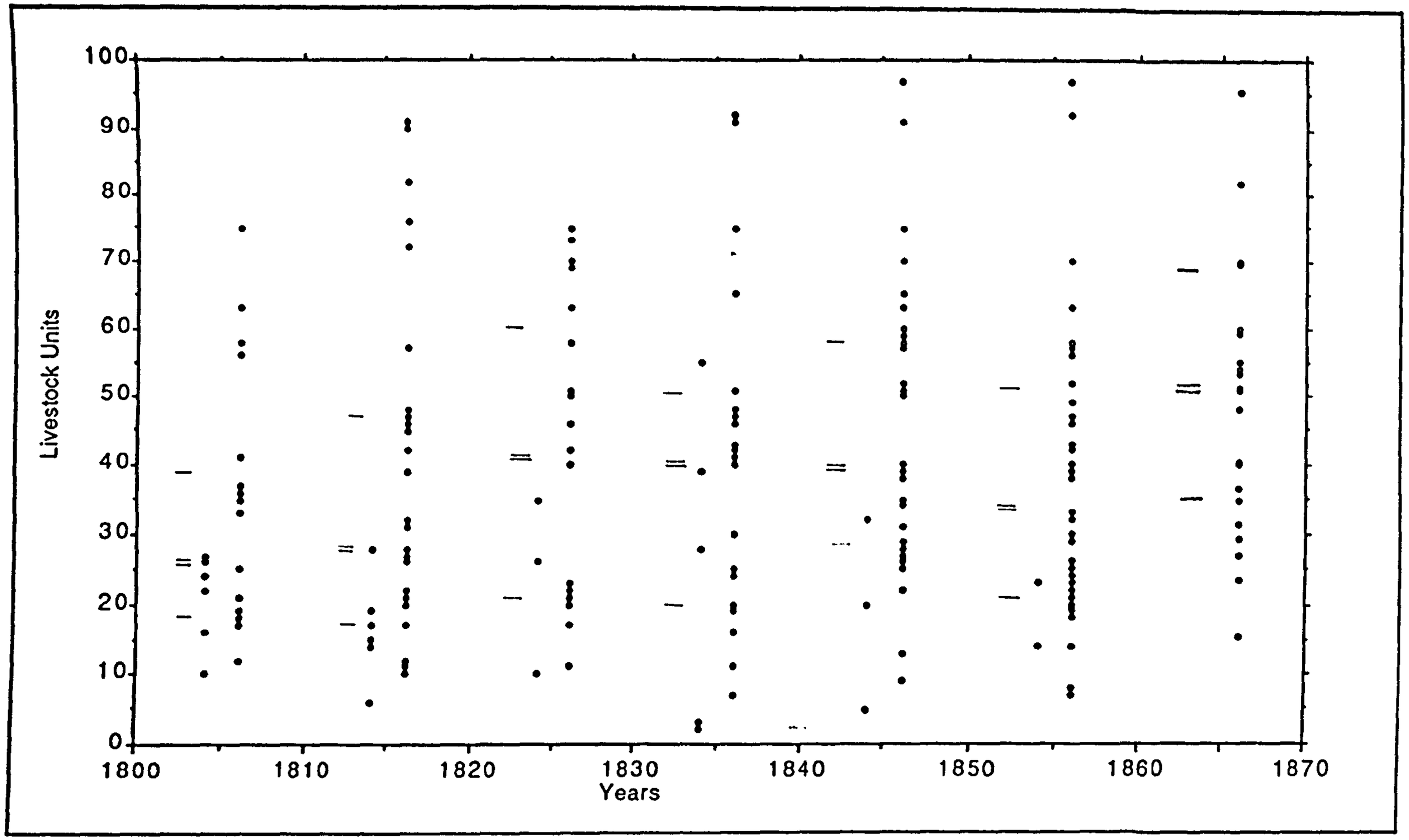


Figure 8.4b South of the Trent. Dispersion Diagram to Show the Range of Size of Sale by Livestock Units.

Note : The paired columns of symbols relate to a decadal period. The column to the left of each pair shows dairy cattle only sales while the column to the right shows sales including both sheep and cattle. The median values indicated = and the upper and lower quartiles indicated - relate to all the values plotted in a pair of columns.

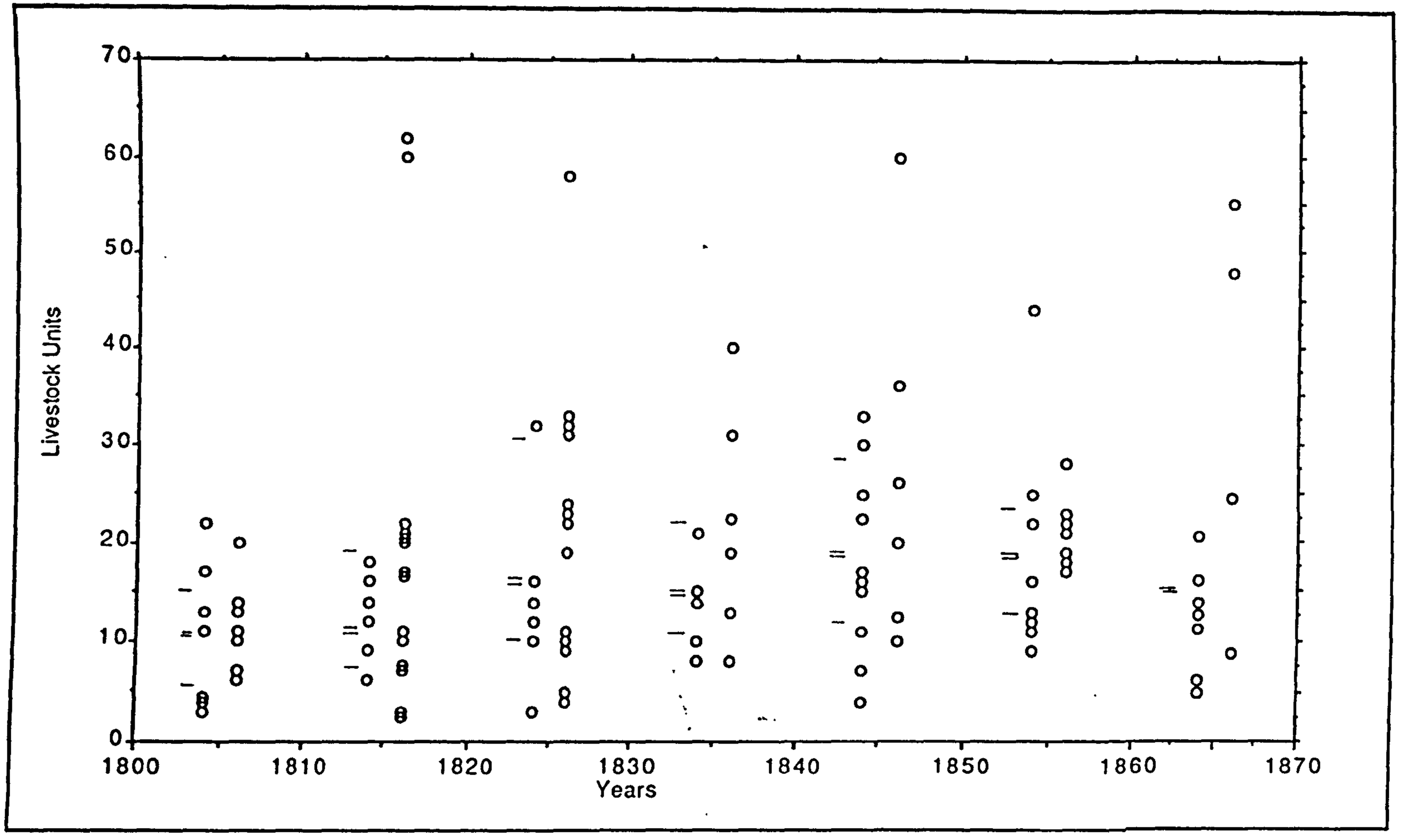


Figure 8.4c Coal Measures and Shales. Dispersion Diagram to Show the Range of Sale Size by Livestock Units.

Note : The paired columns of symbols relate to a decadal period. The column to the left of each pair shows dairy cattle only sales while the column to the right shows sales including both sheep and cattle. The median values indicated = and the upper and lower quartiles indicated - relate to all the values plotted in a pair of columns.

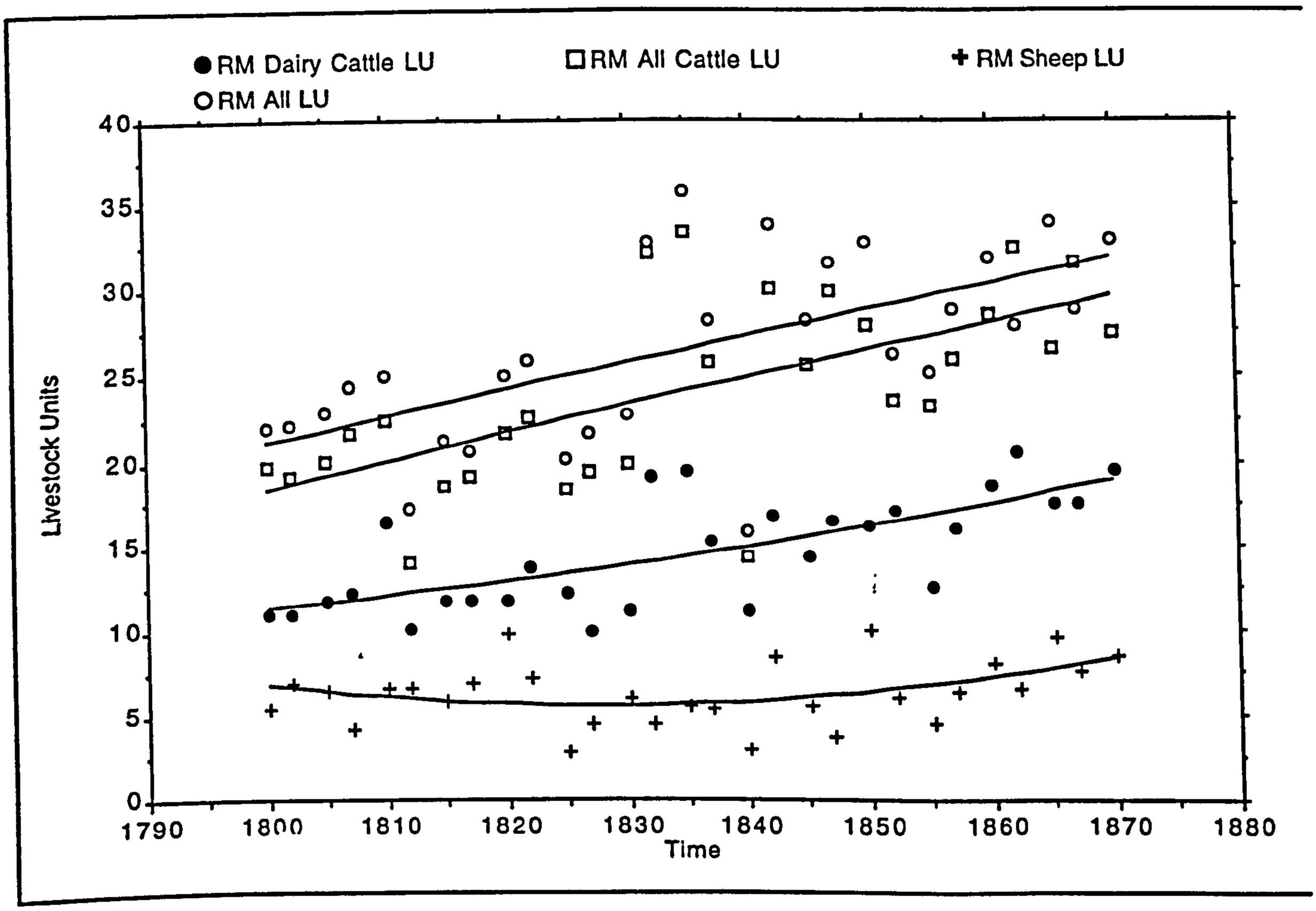


Figure 8.5 Red Marl Area: Trends in Average Livestock Units [LU] for Sale Advertisments 1800 - 1870

Note: The regression analysis has been effected using a polynomial formula in order to bring out the nature of trends through time more clearly than simple regression.

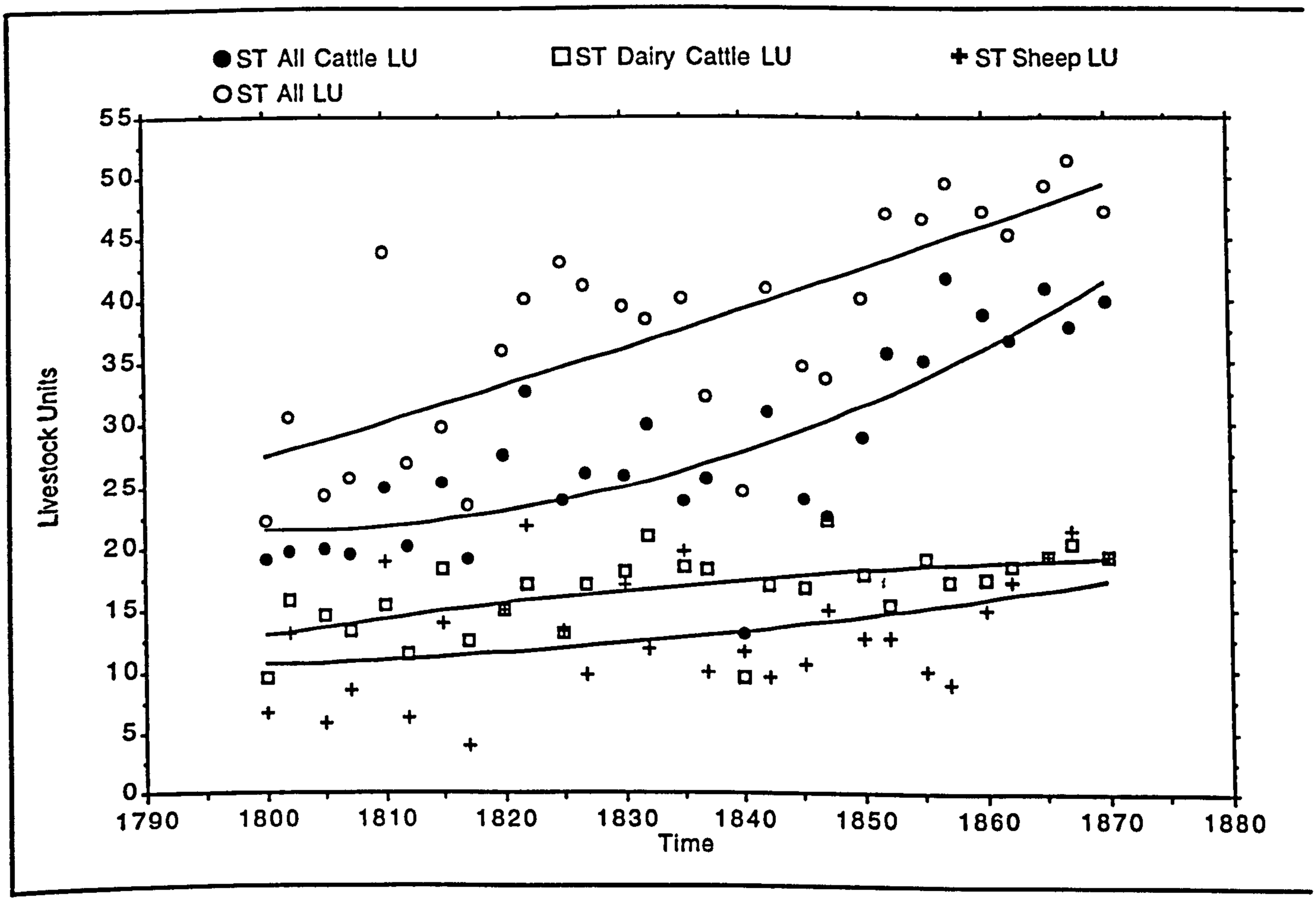
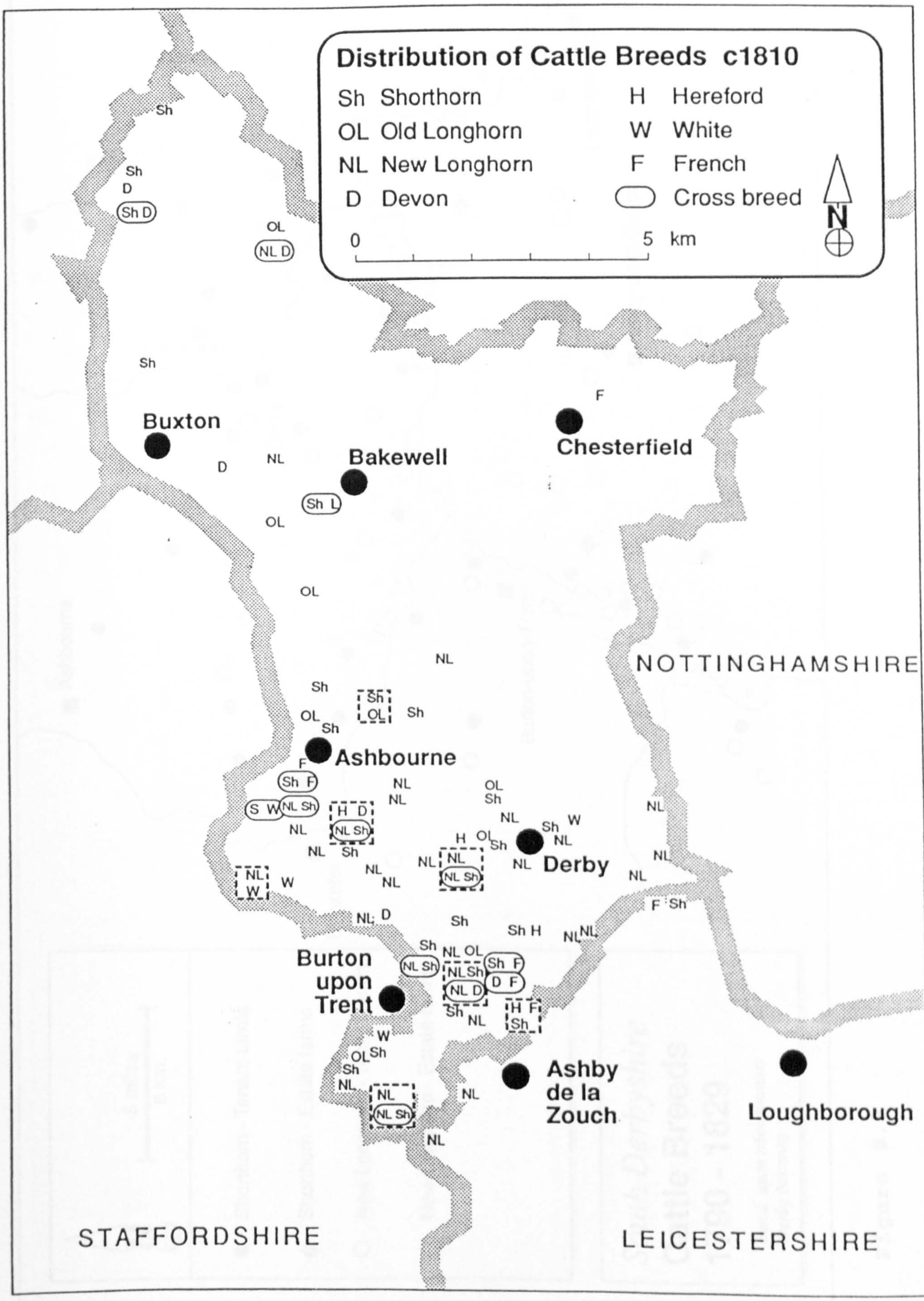


Figure 8.6 Area South of the Trent: Trends in Average Livestock Units [LU] for Sale Advertisments 1800 - 1870

Note: The regression analysis has been effected using a polynomial formula in order to bring out the nature of trends through time more clearly than simple regression.


0 2 4 6 8 10 miles
0 8 16 km
Ratio of Cattle - Two Years Old and over to 100 Cows and Heifers in Milk. By Parish
Less than 20
20 - 29
30 - 59
60 - 89
90 and over
South Derbyshire
Ratio of Cattle Two Years Old and over to 100 Cows and Heifers in Milk 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 8.7



based on Farey J, 3. 1817

Figure 8.8

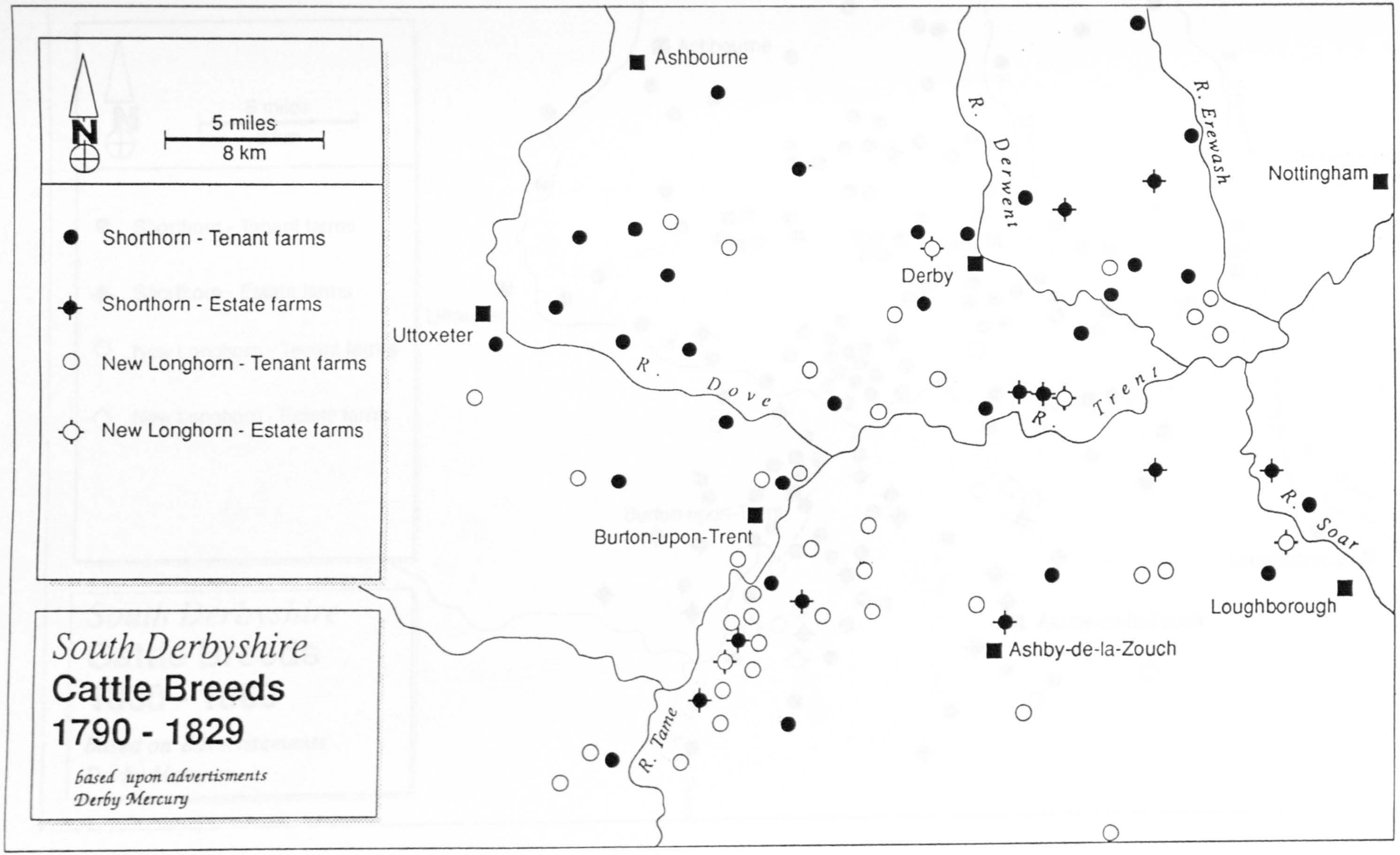

N
5 miles
8 km
Shorthorn - Tenant farms
Shorthorn - Estate farms
New Longhorn - Tenant farms
New Longhorn - Estate farms
South Derbyshire
Cattle Breeds
1790 - 1829
based upon advertisments
Derby Mercury
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.9

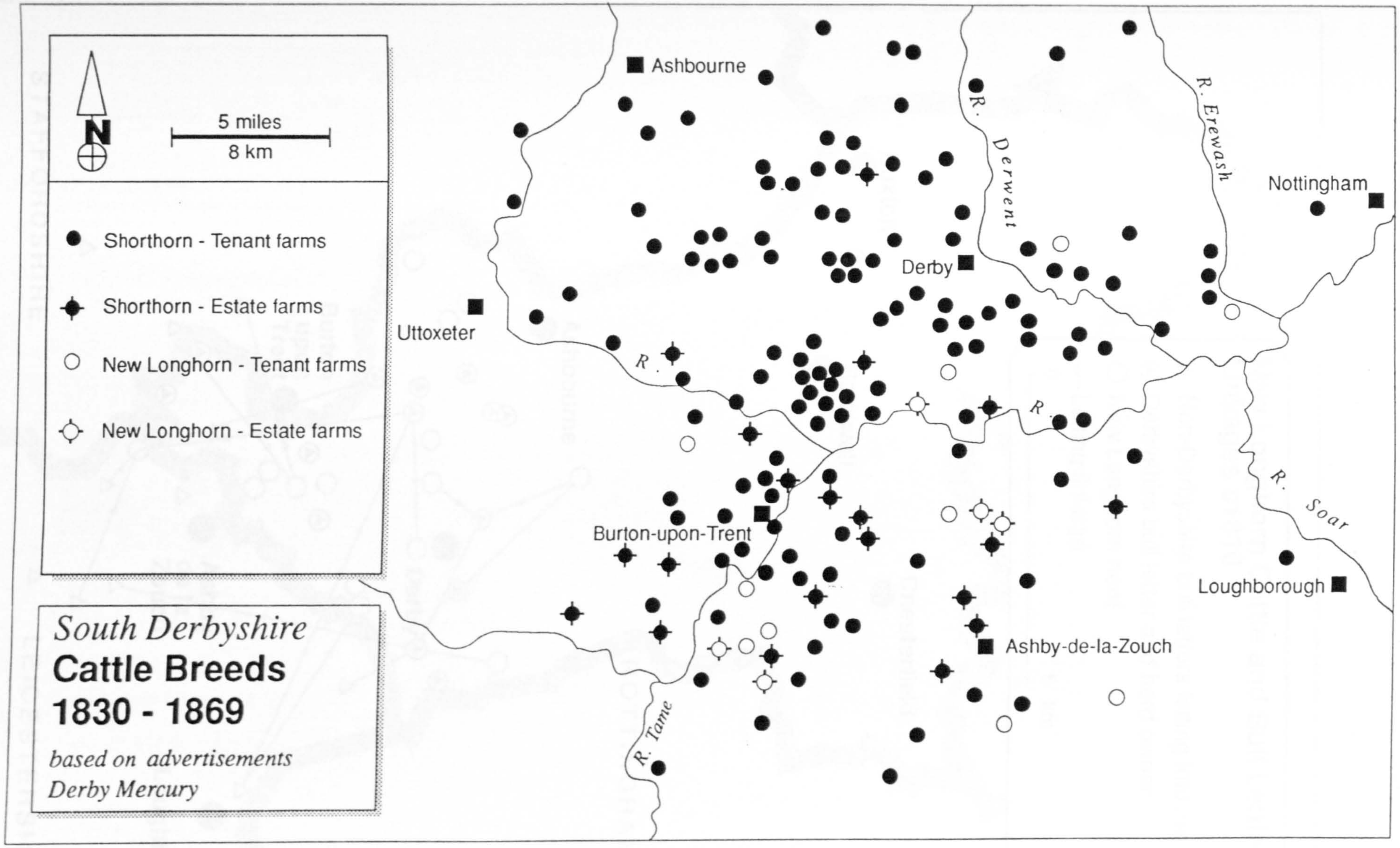
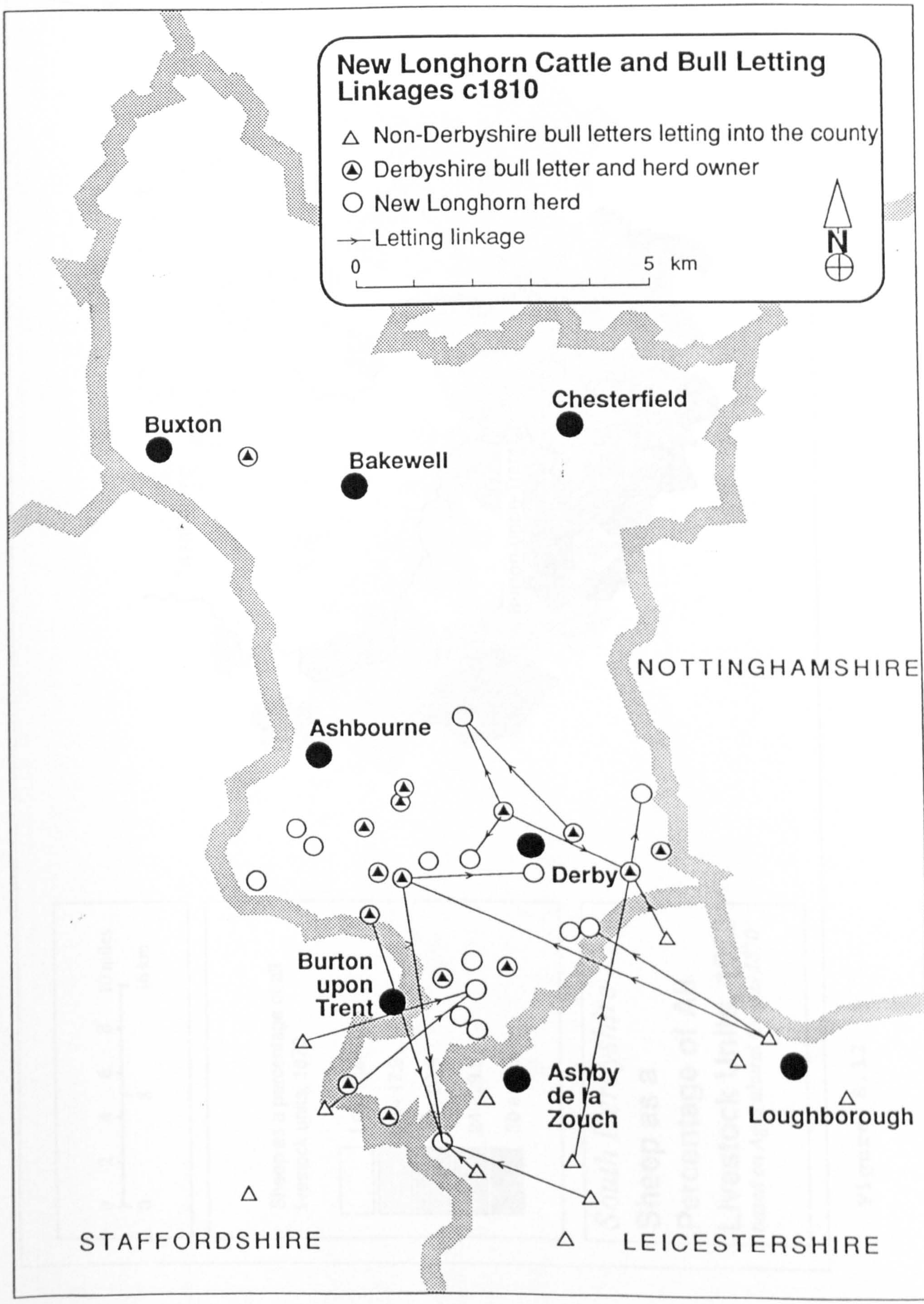

N
5 miles
8 km
Shorthorn - Tenant farms
Shorthorn - Estate farms
New Longhorn - Tenant farms
New Longhorn - Estate farms
South Derbyshire
Cattle Breeds
1830 - 1869
based on advertisements
Derby Mercury
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Soar
R. Tame
R.
R.
R.

Figure 8.10



based on Farey J, 3. 1817

Figure 8.11

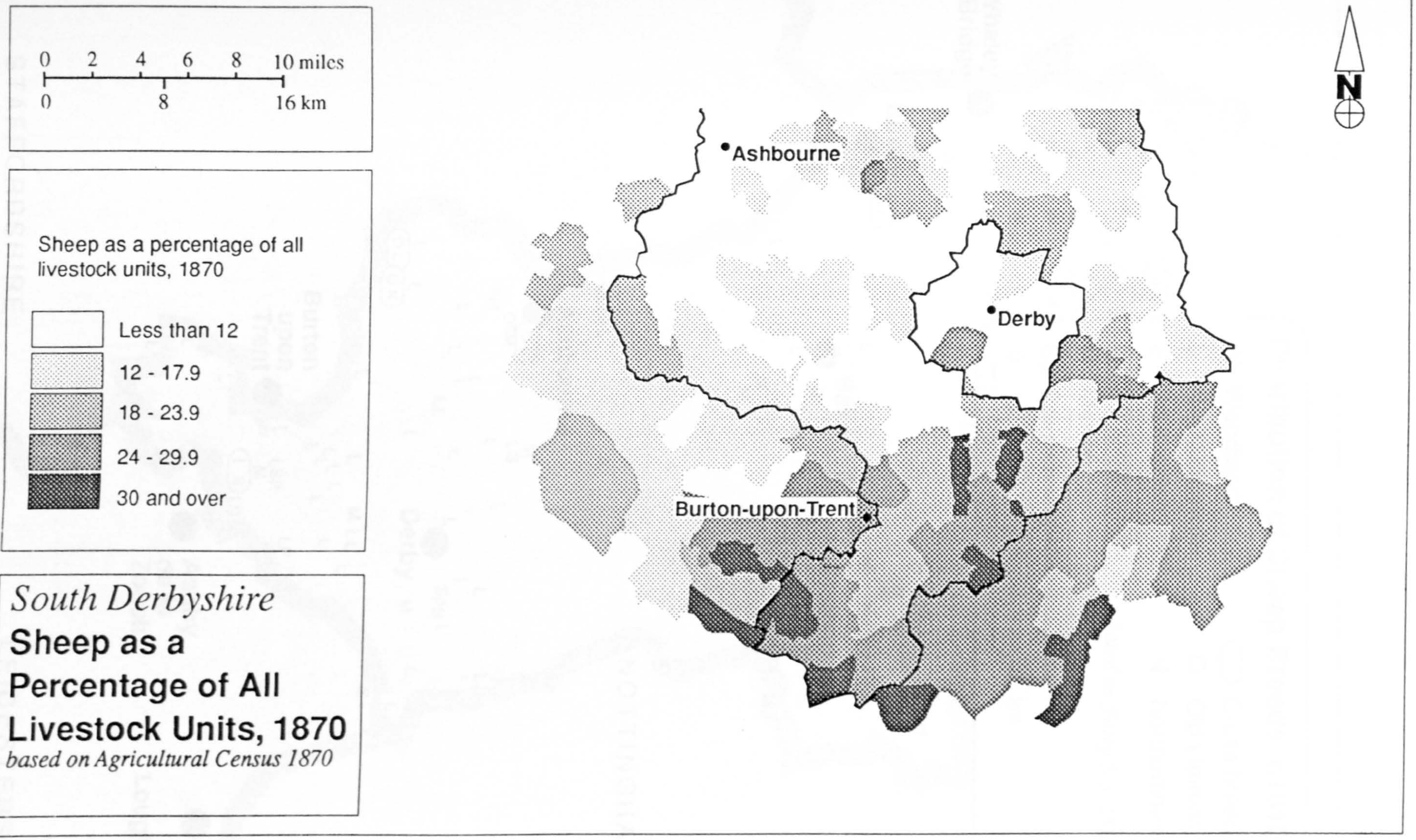

0 2 4 6 8 10 miles
0 8 16 km
Sheep as a percentage of all livestock units, 1870
Less than 12
12 - 17.9
18 - 23.9
24 - 29.9
30 and over
South Derbyshire
Sheep as a Percentage of All Livestock Units, 1870
based on Agricultural Census 1870
N
Ashbourne
Derby
Burton-upon-Trent

Figure 8.12

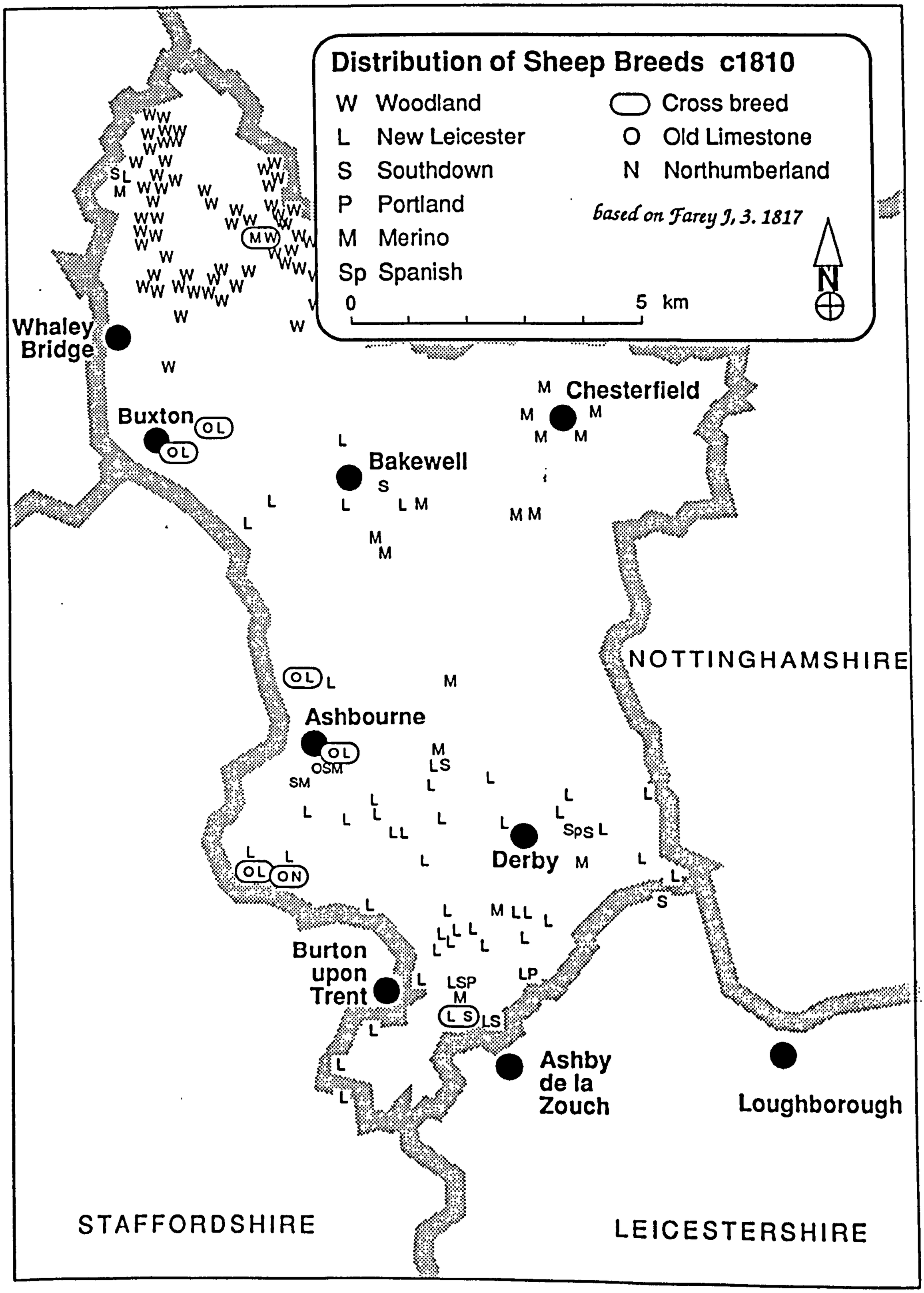

Distribution of Sheep Breeds c1810
W Woodland
L New Leicester
S Southdown
P Portland
M Merino
Sp Spanish
Cross breed
O Old Limestone
N Northumberland
based on Farey I, 3. 1817
0
5 km
N
Whaley Bridge
Buxton
Bakewell
Chesterfield
Ashbourne
Derby
Burton upon Trent
Ashby de la Zouch
Loughborough
NOTTINGHAMSHIRE
STAFFORDSHIRE
LEICESTERSHIRE

Figure 8.13

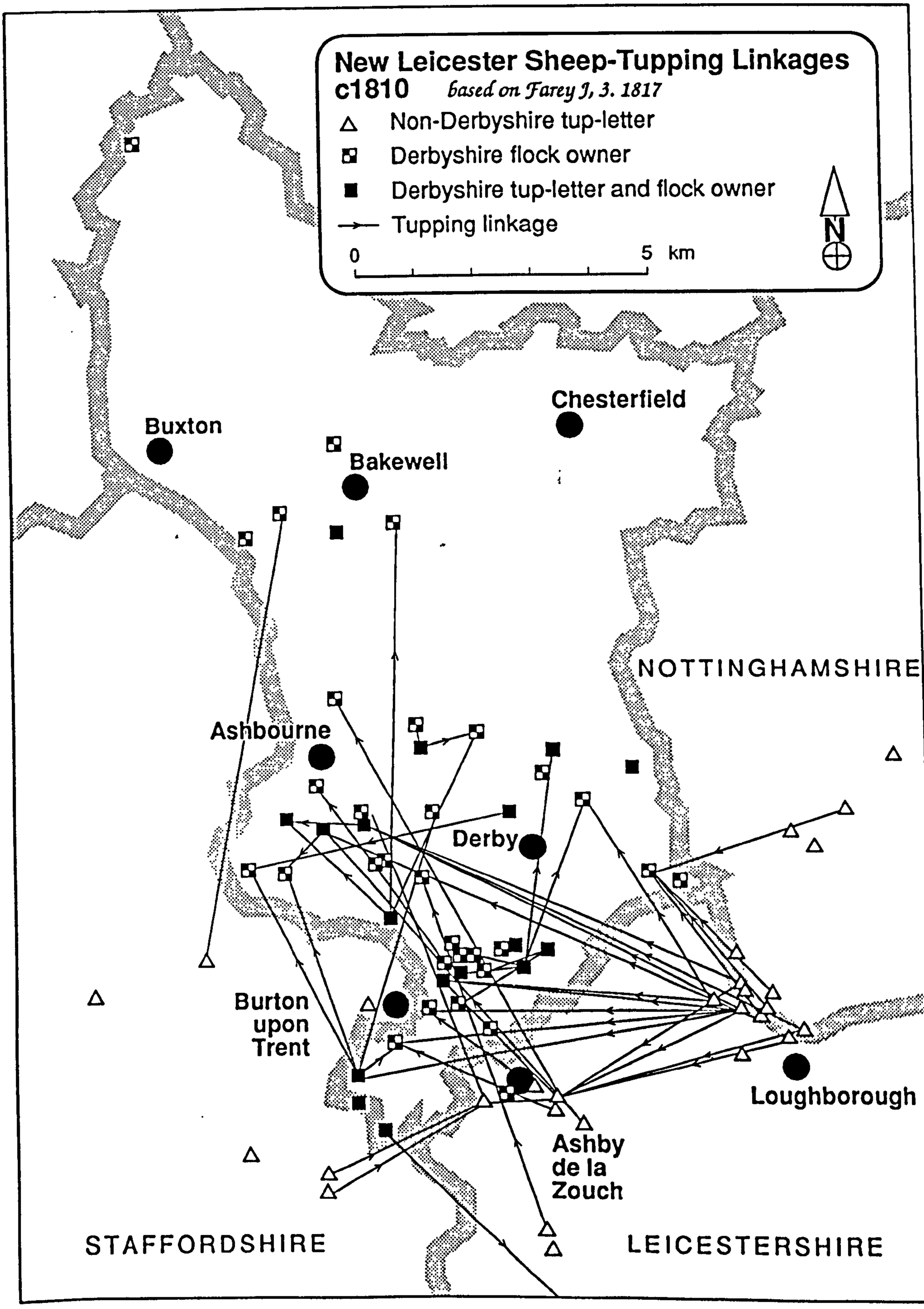

New Leicester Sheep-Tupping Linkages
c1810 based on Farey I, 3. 1817
Non-Derbyshire tup-letter
Derbyshire flock owner
Derbyshire tup-letter and flock owner
Tupping linkage
0
5 km
N
Chesterfield
Buxton
Bakewell
NOTTINGHAMSHIRE
Ashbourne
Derby
Burton upon Trent
Loughborough
Ashby de la Zouch
STAFFORDSHIRE
LEICESTERSHIRE

Figure 8.14

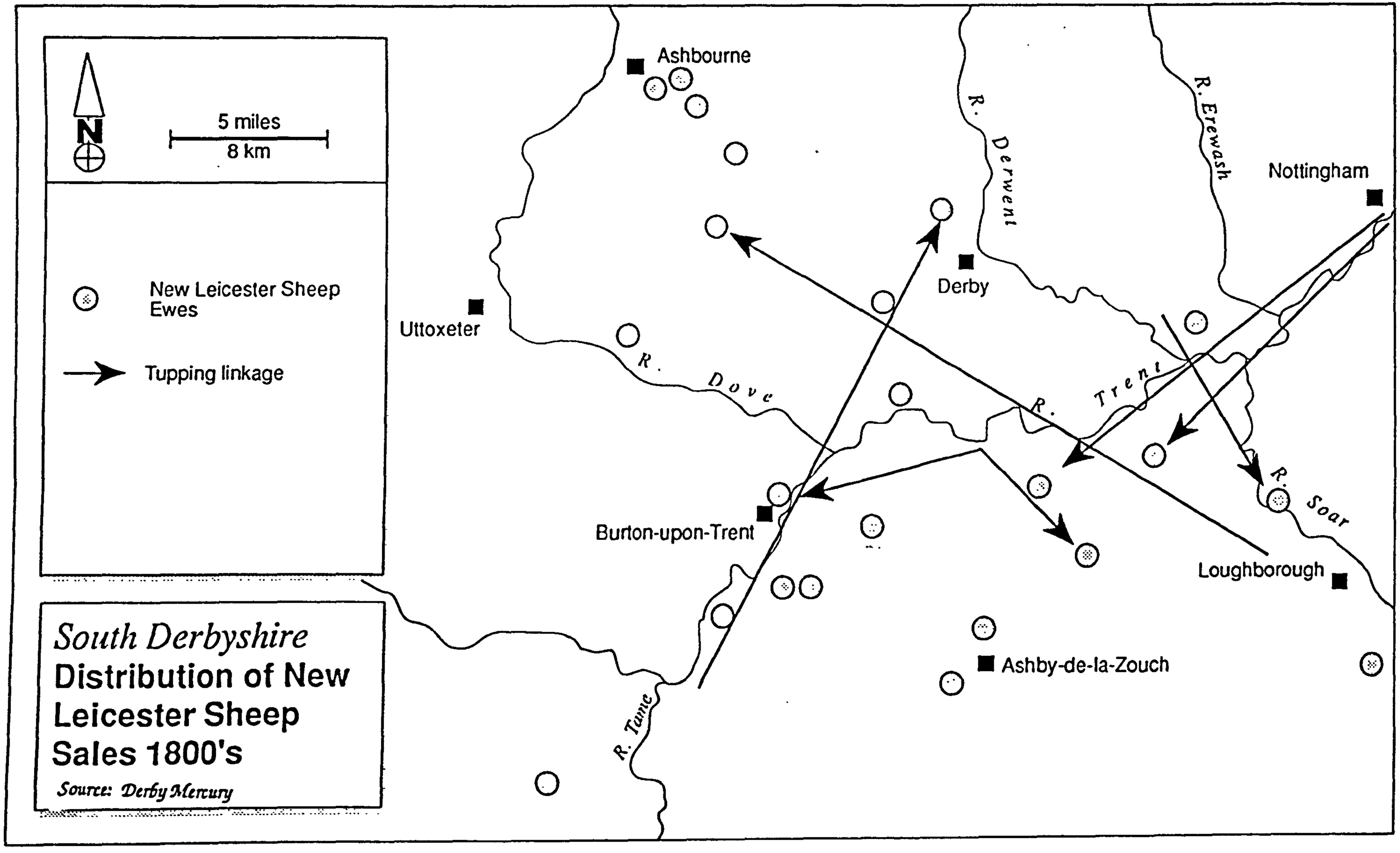

N
5 miles
8 km
New Leicester Sheep Ewes
Tupping linkage
Ashbourne
Uttoxeter
Derby
Nottingham
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Tame
South Derbyshire
Distribution of New Leicester Sheep Sales 1800's
Source: Derby Mercury

Figure 8.15a

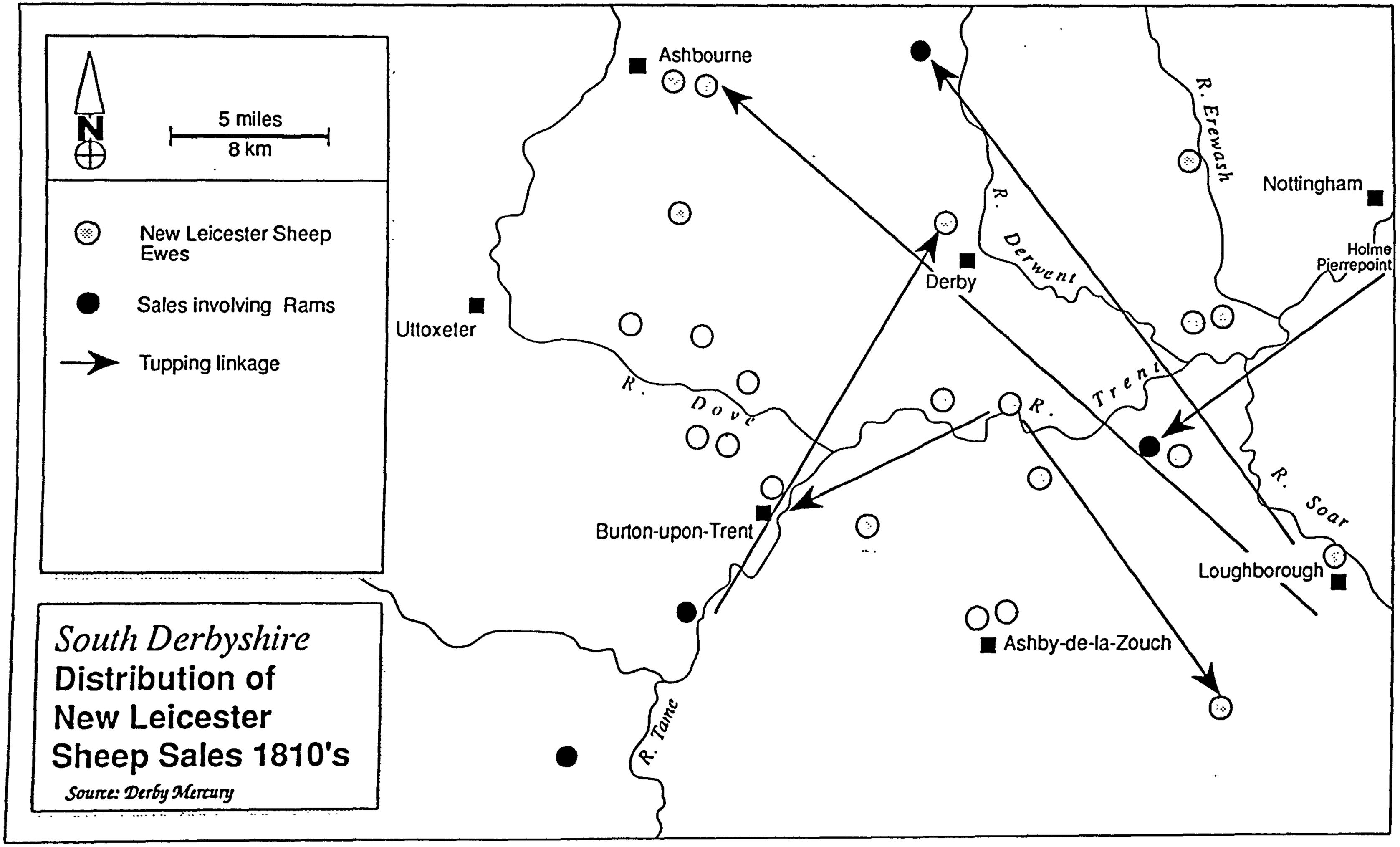

N
5 miles
8 km
New Leicester Sheep Ewes
Sales involving Rams
Tupping linkage
Ashbourne
Uttoxeter
Derby
Nottingham
Holme Pierrepoint
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Tame
South Derbyshire
Distribution of New Leicester Sheep Sales 1810's
Source: Derby Mercury

Figure 8.15b

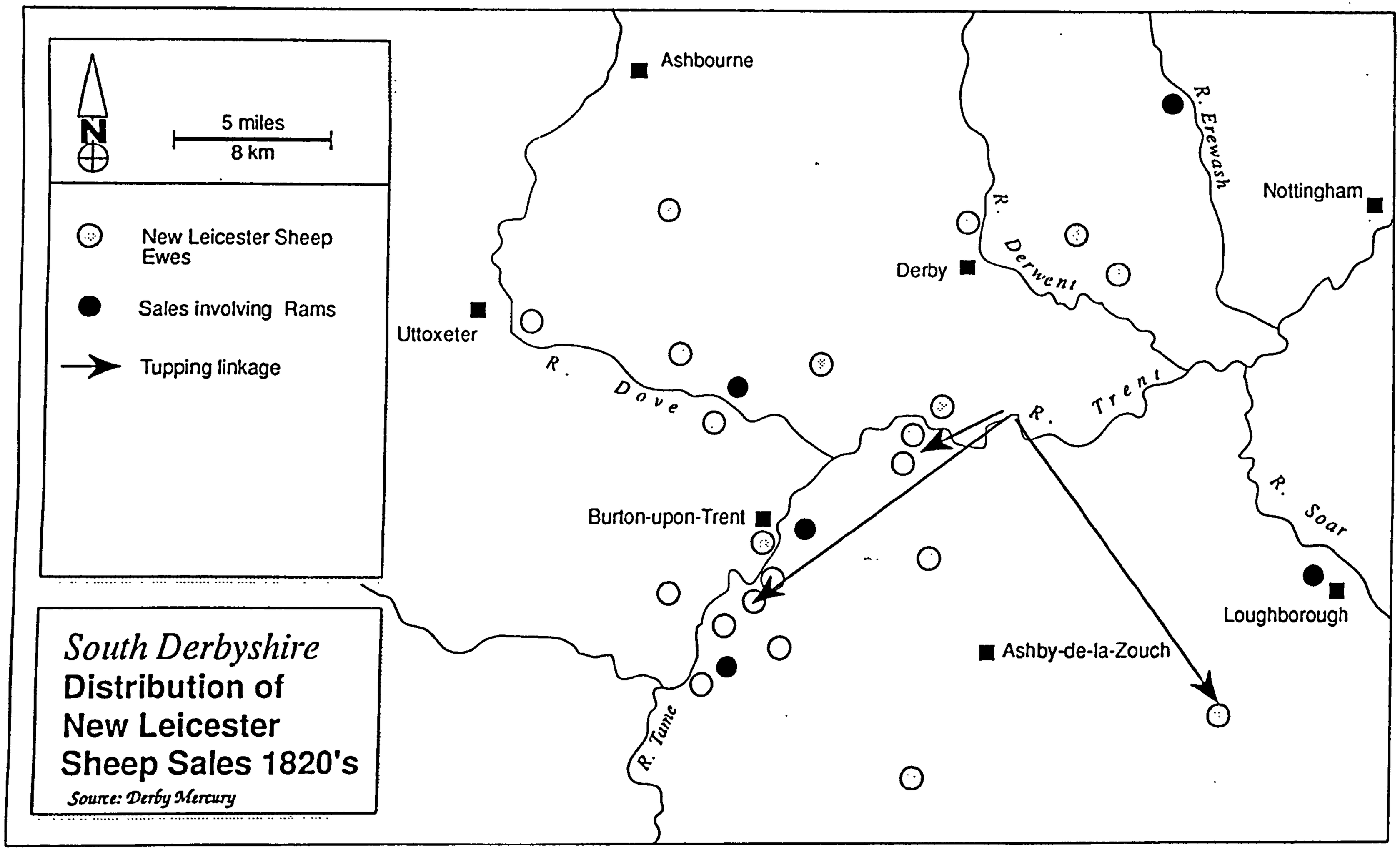

N
5 miles
8 km
New Leicester Sheep Ewes
Sales involving Rams
Tupping linkage
Ashbourne
Uttoxeter
Derby
Nottingham
R. Erewash
R. Derwent
R. Dove
R. Trent
R. Soar
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Tame
South Derbyshire
Distribution of New Leicester Sheep Sales 1820's
Source: Derby Mercury

Figure 8.15c

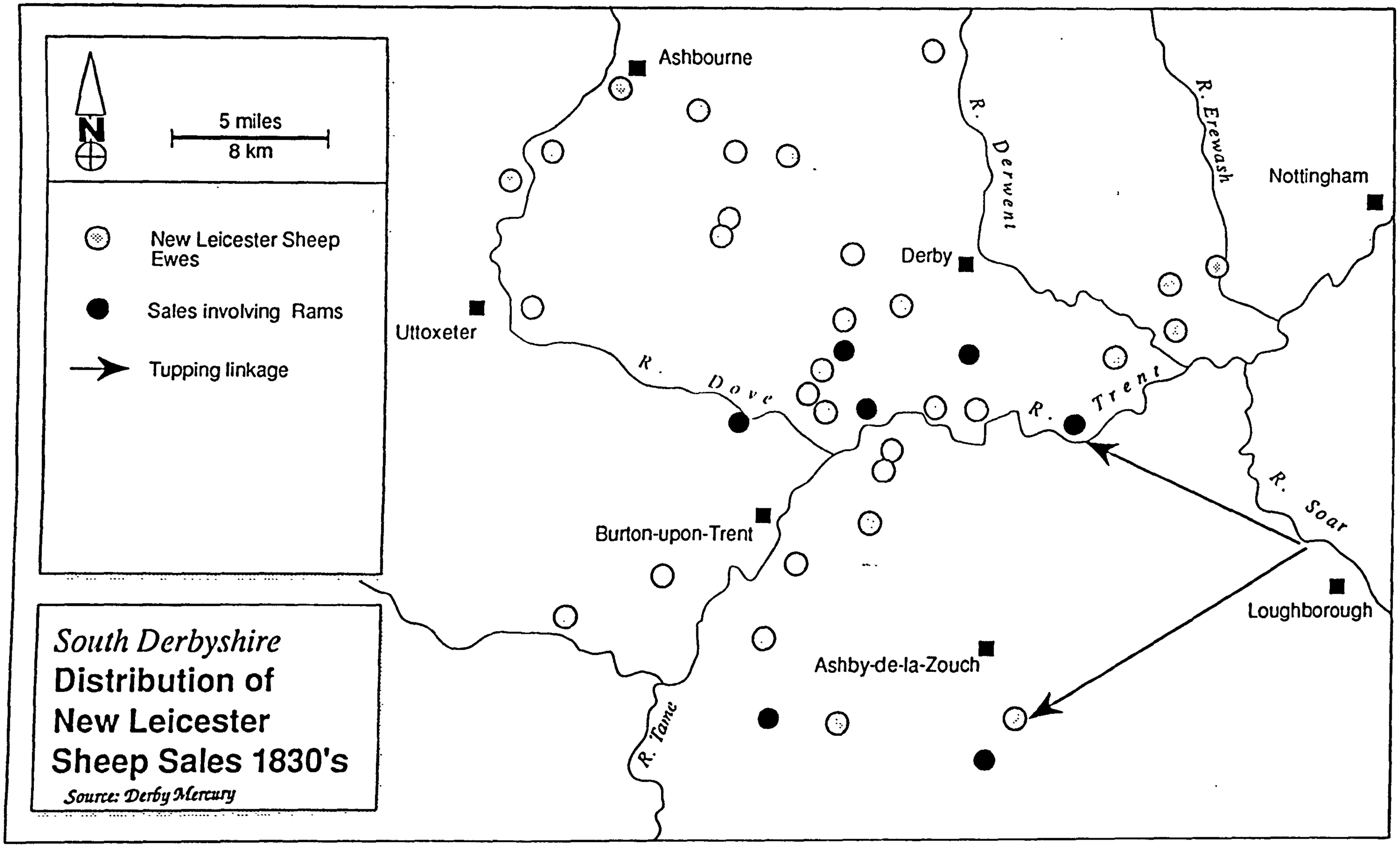

N
5 miles
8 km
New Leicester Sheep Ewes
Sales involving Rams
Tupping linkage
South Derbyshire
Distribution of New Leicester Sheep Sales 1830's
Source: Derby Mercury
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Ashby-de-la-Zouch
Loughborough
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame

Figure 8.15d

Year	Average No Dairy Cows	Average No Cattle LU's	Average No Ewes in Lamb	Average No Sheep LU's	Average No - all LU's	Total Sales per Year
1800	10.5	20.5	34	5.9	24.1	16
1802/3	10.9	19.3	31.9	9.2	24.9	22
1805	12	18.7	30	6.2	24.4	22
1807/8	11.8	22.2	28.6	6.9	27	15
1810	16	23.7	48	11.1	35	24
1812/3	9.9	15	27.3	6.4	19.4	18
1815	13.7	20.4	46	9.9	27	34
1817/8	12.2	18.9	36.5	5.9	21.6	23
1820	13	20.9	35	9.8	24.8	29
1822/3	15	19.2	60.5	11.3	35.8	34
1825	12.7	30.4	32.2	6.9	25.2	26
1827/8	11.3	28.1	28.5	6.75	23.9	34
1830	12.2	25.9	31.5	13.4	31.1	24
1832/3	17.3	13.5	40.8	6.2	34.7	26
1835	17.5	31.2	55	8.2	34.6	37
1837/8	15.5	26	36	6	30	30
1840	9.7	34.4	46.5	6.9	18.3	16
1842/3	15.6	26.5	54	10.5	38.4	36
1845	16.2	29.6	41.7	8.9	38.5	32
1847/8	19.5	25.8	40	3.5	36.7	17
1850	17.1	29.3	51.8	9.4	34	33
1852/3	15.7	29.6	37.6	10.7	35.8	34
1855	15.6	25.8	24.3	6.9	29.6	24
1857/8	16.3	29.3	34.9	7.4	35	24
1860	19.1	29.8	32.5	4.7	34.7	27
1862/3	16.2	26.7	39.3	6.5	30.7	29
1865	21	32.7	48.7	9	39.2	24
1867/8	19.6	29.1	65.5	12.5	37.7	32
1870	17.3	30.2	45.6	8.2	30.2	37

Table 8.1 Southern Derbyshire: Average Numbers of Livestock Units for Farm Sale Advertisments 1800 - 1870

		1800's	1810's	1820's	1830's	1840's	1850's	1860's
	Total No of Sales	43	57	69	83	62	76	88
	Mean LUs/Sale	22.6	20.9	23.2	29.9	26.6	27.6	31.9
	Mean Cattle LUs/Sale	20.2	18.6	20.6	27.8	25	25.2	28.5
RED MARL	Mean Cows in Milk/Sale	11.5	12.5	11.9	16.3	14.7	15.5	18.5
	Mean Sheep LUs/Sale	5.8	6.6	6.2	5.4	5.3	7	8
	% Sales inc. Cows in Milk	100	100	100	100	100	100	100
	% Sales inc. Beef Stock	9	11	14.5	17	10	12	16
	% Sales inc. Sheep	70	56	67	64	45	51	51
	Total No of Sales	21	29	20	26	30	35	20
	Mean LUs /Sale	25.7	30.9	40.2	37.7	35.9	45.9	47.4
	Mean Cattle LUs/Sale	19.6	22.4	27.6	26.4	25.7	35.5	39
SOUTH OF	Mean Cows in Milk/Sale	13.3	14.5	15	18.9	16.5	17.4	19.4
TRENT	Mean Sheep LUs/Sale	8.6	10.8	14.9	14.7	11.3	11.1	19.3
	% Sales inc. Cows in Milk	100	100	100	100	100	100	95
	% Sales inc. Beef Stock	19	20.7	15	27	33	43	60
	% Sales inc. Sheep	71	79	85	77	90	94	95
	Total No of Sales	15	21	19	10	17	16	12
	Mean LUs/Sale	13.3	11.2	22.5	21	19.4	21.9	19.2
	Mean Cattle LUs/Sale	11.4	9.7	17.2	18	17.9	14.8	16.4
SHALE &	Mean Cows in Milk/Sale	6.5	4.8	10.4	10.3	12.1	10.6	11.6
COAL	Mean Sheep LUs/Sale	5.6	4.4	7.7	4.4	2.9	5.3	5.1
MEASURES	% Sales inc. Cows in Milk	100	100	100	100	100	100	100
	% Sales inc. Beef Stock	12	10	7	11	8	7	0
	% Sales inc. Sheep	47	71	68	60	39	44	33

Table 8.2 Average Numbers of Livestock Units for Farm Sale Advertisments by Decade for Sub Areas of Southern Derbyshire 1800's - 1860's

Table 8.3

Fat and Surplus Stock Sales 1795 - 1870
(Source: Derby Mercury)

Year	Total Sales	Range of Stock Offered per Sale										Cattle Breeds								Sheep Breeds						
		Rams	Mixed Sheep	Breeding Ewes	Sheep and Rams	Mixed Cattle and Sheep	Fat Cattle and Sheep	Dairy Cows	Fat Cattle	Bulls	Mixed Cattle	Channel Island	Longhorn	Shorthorn	Hereford	Scotch	Galloway	Ayrshire	Devon	Leicester	Southdown	Greyface	Blackface	Portland	Woodland	Cheviot
1795	5	0	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
1797/8	6	0	1	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1802/3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1805	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1807/8	6	0	1	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1810	11	3	0	1	2	5	0	0	0	0	0	2	2	1	0	0	0	0	0	1	0	0	0	0	0	0
1812/3	7	0	0	1	1	0	1	0	1	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0
1815	10	0	0	0	0	5	1	0	2	0	0	2	3	2	1	3	0	0	2	1	1	0	0	1	0	0
1817/8	2	0	0	0	0	0	1	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
1820	5	1	0	0	0	1	1	1	0	0	1	0	1	3	1	1	0	0	0	1	0	0	0	0	1	0
1822/3	13	1	3	0	1	0	4	0	3	1	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0
1825	4	0	1	0	0	0	1	0	2	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0
1827/8	12	1	1	0	0	2	4	0	0	0	3	1	1	3	0	2	0	0	0	3	0	0	0	0	0	0
1830	13	0	0	0	0	5	5	0	3	0	0	0	0	3	1	4	0	0	0	3	1	0	1	0	1	0
1832/3	13	2	0	0	2	1	5	0	1	0	1	1	0	2	0	2	0	0	0	3	0	1	0	0	3	0
1835	18	3	0	0	1	4	6	1	0	0	0	3	0	1	0	0	0	2	0	7	0	1	1	0	1	2
1837/8	20	1	0	0	2	4	8	0	2	0	0	3	1	3	0	1	0	0	0	4	0	0	0	1	1	1
1840	21	2	1	0	0	9	7	0	0	0	0	2	1	5	1	1	0	0	0	4	1	0	2	0	1	0
1842/3	20	2	0	1	0	7	3	0	3	0	0	4	0	7	0	5	0	0	0	4	1	1	0	0	1	0
1845	12	1	1	0	0	3	5	0	1	0	0	1	0	5	1	3	0	0	1	3	2	2	0	0	0	2
1847/8	16	0	0	0	0	2	8	0	3	0	0	3	0	4	0	1	0	0	0	0	0	0	1	0	0	2
1850	17	0	0	0	0	4	9	0	3	0	0	1	0	7	4	4	0	1	0	2	2	1	0	1	1	0
1852/3	14	0	1	0	0	2	10	0	0	0	0	1	0	4	2	1	0	0	0	0	1	1	0	0	1	0
1855	18	0	1	0	0	3	8	1	2	1	0	2	0	3	2	2	0	0	0	0	1	0	2	0	0	0
1857/8	19	1	1	0	0	0	13	1	1	0	0	2	0	3	0	2	1	0	0	0	1	2	1	1	0	0
1860	13	0	0	0	0	2	5	3	2	0	0	1	0	4	0	0	0	0	0	0	0	1	0	0	0	0
1862/3	24	0	0	2	0	6	14	2	0	0	0	2	0	3	0	1	0	0	0	2	0	0	1	0	0	0
1865	18	0	0	3	0	4	10	1	0	0	0	1	1	1	0	0	0	0	0	1	1	0	0	1	0	0
1867/8	39	0	0	1	0	3	31	0	0	0	0	1	0	3	0	0	0	0	0	2	1	1	0	0	0	0
1870	27	0	0	3	0	3	18	3	0	0	0	2	0	4	1	0	0	0	0	0	0	0	0	1	0	0
Total	406	18	16	21	9	77	168	13	0	3	8	35	13	74	15	38	1	3	3	53	17	11	10	5	11	8

Table 8.4

Southern Derbyshire

Representative Fat and Surplus Stock Sales

(Source: Derby Mercury)

Date	FARM
17Jan 1805	Scarsdale, Kedleston: 1 dairy cow, 5 bulls, 79 Fat shorthorns, 114 ewes in lamb,
	93 hogs.
13Sep 1810	Farrow, Loughborough: 90 ewes in lamb, 30 New Leicester rams.
11Mar 1813	Crewe, Swarkeston: 85 Fat cattle, 70 Fat sheep.
26Feb 1818	Jowett, Draycott: 6 Longhorn bulls.
9Feb 1820	Broadhurst, Foston: 20 Shorthorn dairy heifers.
20Feb 1828	Radford, Smalley: 4 dairy cows, 8 stirks, 48 Fat Scotch bullocks.
6Mar 1828	Worthington, Branston: 20 Fat cattle, 79 Fat sheep.
27Mar 1833	Smith, Swarkston: 75 dairy cows, 280 Fat sheep, 80 woodland sheep.
19Oct 1842	Sutton, Shardlow: 34 Fat cattle, 16 Fat sheep, 42 hogs, 38 lambs.
1Sep 1847	at Derby Cornmarket: 8 Alderneys - direct from the Island.
7Feb1855	Devereux, Drakelow Hall: 29 Fat Scotch catte, 50 Blackface hogs.
24Feb 1858	Coton Park: 18 heifers, 40 West Highland Scotch cattle, 60 Fat sheep.

Table 8.5

Illustrative Dairy Herd Sales (Source: Derby Mercury)

	Dairy Cows	Heifers	Barren Cows	Stirks	Calves	Bulls	Others
15/3/1798							
Blake of Shirley	13	6	-	7	7	1	0
10/3/1803							
Avery of Breaston	11	4	2	2	5	1	0
17/3/1808							
Allen of Draycott in the Clay	18	8	4	6	0	1	0
19/11/1812							
Plimley of Cubley	12	4	0	2	3	0	0
4/10/1820							
Johnson of Callow	10	3	0	3	3	0	0
23/1/1828							
Warren of Stapenhill	9	3	6	3	4	0	0
6/2/1833							
Stones of Rosliston Park	34	12			4	1	0
7/2/1838							
Weeldon of Etwall	24	2	3	8	0	1	0
21/1/1848							
Daniel of Coton Park	28	6	4	10	10	3	0
25/11/1851							
Branby of Findern	25	4	7	3	9	1	0
16/5/1855							
Johnson of Mugginton	13	11	3	13	4	1	0
21/11/1860							
Smith of Bradley nr Ashbourne	18	4	0	7	4	0	0

		1790's	1800's	1810's	1820's	1830's	1840's	1850's	1860's
	Longhorn	2	6	4	24	7	4	1	2
	Shorthorn	0	3	8	26	49	46	38	18
TOTAL	Channel Island	0	0	1	0	4	1	2	5
REFERENCES	Scotch	0	0	0	3	1	0	0	0
	Hereford	0	1	2	1	0	0	1	0
	Ayrshire	0	0	0	0	1	0	3	0
	Longhorn	1	4	2	14	3	1	1	1
	Shorthorn	0	3	6	9	37	29	23	11
	Channel Island	0	0	1	0	3	1	2	5
RED MARL	Scotch	0	0	0	1	1	0	0	0
	Hereford	0	1	1	1	0	0	0	0
	Ayrshire	0	0	0	0	1	0	3	0
	Longhorn	1	2	2	10	4	3	0	1
	Shorthorn	0	0	2	11	9	11	13	5
SOUTH OF TRENT	Channel Island	0	0	0	0	1	0	0	0
	Scotch	0	0	0	1	0	0	0	0
	Hereford	0	0	1	0	0	0	0	0
	Ayrshire	0	0	0	0	0	0	0	0
	Longhorn	0	0	0	0	0	0	0	0
	Shorthorn	0	0	0	6	3	6	2	2
SHALES AND	Channel Island	0	0	0	0	0	0	0	0
COAL MEASURES	Scotch	0	0	0	1	0	0	0	0
	Hereford	0	0	0	0	0	0	0	0
	Ayrshire	0	0	0	0	0	0	0	0

Table 8.6 References to Cattle Breed in Sale Advertisments by Decade for Southern Derbyshire and Sub Areas

Table 8.7

Selected comment on sales of New Longhorn cattle in the Derby Mercury

24.10.1792	Mr Brown of Stretton le Fields near Burton - 12 Longhorn dairy cows - 'one of the cows is the most completest animal that has been offered to the public since the sale at Rollright'.
4.1.1802	Mr Rowland of Mickleover - 'Longhorn bull bred by F.N.C. Munday of Markeaton'.
1.11.1810	Mr Towle of Breaston - 'capital Longhorn bull bred by the late R Jowett of Draycott'.
20.2.1818	Mr Jowett of Draycott - 'several Longhorn bulls derived from Princep's sale of Rollright stock'.
23.11.1825	Mr Birch of Tatenhill - 'Longhorn bull from Princep's sale'.
23.10.1850	Mr Hopkins of Long Eaton '16 Longhorn cows - descended from the best Longhorn blood in the kingdom and have attained extraordinary weights'.

Table 8.8

Selected comments concerning sales involving Shorthorn cattle derived from the Derby Mercury

4.3.1818	Mr Champion's sale of improved Shorthorn cattle - 4 young bulls by 'Young Comet'. 1 bull Blucher.
27.11.1817	Alpheus Thacker of Ambaston - 1 Shorthorn bull by Mr Champion's Cornet.
12.2.1823	Marston Farm, Tutbury - 24 dairy cows - 'these cows are pure Durham and principally young descended from the famous stock of Mr Wimall of Worcestershire'.
14.9.1825	White of Coates near Loughborough - 24 dairy cows - 'Colling stock from the north east - superior stock as is seldom brought to the hammer'.
13.3.1828	Hartshorne, dairy farmer, of Bradley Pastures near Asbourne - 'cows are all young extraordinary deep milkers - the stock has been inproving for a number of years by the introduction of the best shorthorn bulls hired from Mr Champion and then eminent breeders'.
22.1.1835	Robinson of Tatenhill - 'a Shorthorn bull from Smith of Dishley and celebrated stock extraordinary milkers possessing fine symmetry and frame with an aplitude to fatten to a great and admired weight'.
25.3.1835	Brown of Linton, 35 Shorthorns - 'particularly deserving the notice of dairymen grazing and butchers'.
31.3.1858	Lord Scarsdale, Ireton Farm, Kedleston - sale of 13 Shorthorns - 'the dairy is one of the best in the county, of pure Durham blood in good condition and deep milkers and will be sold without reserve in consequence of the noble owner discontinuing in dairying'.

		1770	1800	1870
Red Marl	Numbers of Sheep	35306	32586	23276
	Percentage Farms with Sheep	?80	70	50
	Ratio One Sheep/ Agric Area	2.9 acres	3.2 acres	4.5 acres
South of Trent	Numbers of Sheep	11292	13387	18169
	Percentage Farms with Sheep	?60	70	95
	Ratio One Sheep/ Agric Area	3.78 acres	3.2 acres	2.35 acres

ESTIMATED CHANGES IN SHEEP NUMBERS IN THE SOUTHERN DERBYSHIRE REGION

Table 8.9

Number of Ewes Offered	Red Marl		South of Trent	
	1790-1829	1830-1869	1790-1829	1830-18
1-20	29	35	9	7
21-40	44	57	15	17
41-60	14	15	9	16
61-80	9	4	4	10
81-100	0	2	6	6
101-120	2	3	3	4
>121	1	2	8	7
TOTAL	99	118	54	67

COMPARISON OF SALES INVOLVING BREEDING EWES - RED MARL AND OF THE TRENT

Table 8.10

Table 8.11 Comparison of Development of New Leicester and Southdown Sheep Breeds 1801-1856

(Source: M L Ryder 1983 p.497)

		Fleece Weight (lb)	Age Killed	Whether Weight per quarter (lb)
1801	Dishley	8	2 yr	25
1856	Leicester	7	15 mo	90 (liveweight)
1801	Southdown	2½	2 yr	18
1856	Southdown	6	15 mo	80 (liveweight)

		1790's	1800's	1810's	1820's	1830's	1840's	1850's	1860's	Total
	Leicester	2	4	12	22	31	21	9	18	119
	Southdown	0	0	1	0	3	1	3	2	10
TOTAL	Shropshire	0	0	0	1	0	0	8	27	36
REFERENCES	Woodland	0	0	0	0	1	0	0	0	1
	Cheviot	0	0	0	0	1	1	3	0	5
	Blackface	0	0	0	0	1	0	2	2	5
	Leicester Cross	0	0	0	0	1	0	4	0	5
	Leicester	2	4	5	11	22	12	6	13	75
	Southdown	0	0	1	0	3	0	3	1	8
	Shropshire	0	0	0	0	0	0	4	14	18
RED MARL	Woodland	0	0	0	0	1	0	0	0	1
	Cheviot	0	0	0	0	1	0	3	0	4
	Blackface	0	0	0	0	1	0	2	1	4
	Leicester Cross	0	0	0	0	1	0	2	0	3
	Leicester	0	0	7	8	9	8	3	5	40
	Southdown	0	0	0	0	0	1	0	1	2
	Shropshire	0	0	0	1	0	0	4	13	18
SOUTH OF TRENT	Woodland	0	0	0	0	0	0	0	0	0
	Cheviot	0	0	0	0	0	1	0	0	1
	Blackface	0	0	0	0	0	0	0	1	1
	Leicester Cross	0	0	0	0	0	0	2	2	2
	Leicester	0	0	0	3	0	1	0	0	4
	Southdown	0	0	0	0	0	0	0	0	0
SHALES AND	Shropshire	0	0	0	0	0	0	0	0	0
COAL MEASURES	Woodland	0	0	0	0	0	0	0	0	0
	Cheviot	0	0	0	0	0	0	0	0	0
	Blackface	0	0	0	0	0	0	0	0	0
	Leicester Cross	0	0	0	0	0	0	0	0	0

Table 8.12 References to Sheep Breeds in Sale Advertisments by Decade for Southern Derbyshire and Sub Areas

CHAPTER 9

THE FARMHOUSE CHEESE INDUSTRY

The discussion in this chapter focuses on what emerged as the dominant farm enterprise of southern Derbyshire and also adjacent areas during the period 1770-1870: the manufacture of farmhouse cheese. It should be noted that there is relatively little reference to other dairy enterprises such as butter making in any of the available sources. Farey [Farey J, 3 1817 p.64] commented that 'butter making is second to cheese' but implied that it was for own consumption and immediate local market rather than for wider commercial sale. Liquid milk could only be produced and sold near to or within towns. Farey [ibid p.30] made particular reference to larger centres such as Derby, Chesterfield and Sheffield which were so supplied. Caird [Caird J, 1852 p.211] noted Nottingham's receipt of milk from Ruddington Grange. Glossop and Belper are also given special reference where the mill owners Oldknow and Strutt made provision for their workforces.

This leaves cheese as the major product of the dairy industry which would have had an important advantage relative to butter or milk in terms of potential shelf life and its transportability. In addition cheese comprised a protein rich element of diet for the growing workforce in urban industrialized areas. It is difficult to quantify the significance of cheese relative to butter or milk in the absence of sound statistical data. A national view by Taylor [Taylor D, 1971 p.591] suggests that at least 40% of all milk produced was made into cheese in the 1860's as opposed to 30% for butter with 25% disposed of in liquid form. Taylor indicates that the proportion made into cheese would have been greater in specialist producing areas, perhaps 70%. Another view as to the likely relative proportions of milk usage in specialist areas is given by Hallas in her study of nineteenth century Wensleydale and Swaledale [Hallas C, 1991 p.7-8]. She suggests that 65% of milk was made into cheese, 25% was made into butter and the remaining 10% was retained for liquid sales.

Distribution and Growth of Farmhouse Cheese Making

It is evident that by the eighteenth century cheese making was already widely distributed throughout the study area [Henstock A, 1969] and had been integrated into a nationwide system of marketing of which the River Trent and associated canals were vital elements [Fussell G E, 1926-9, Fussell G E and Goodman C, 1934-7]. Within the producing areas cheese merchants known as factors and also local cheese fairs were vital elements in the marketing process and the fixing of prices to the farmer [Farey J 3., 1817 p.62]. Evidence presented in the previous chapter, that dairy herds may well have become larger as the nineteenth century progressed, in combination with the replacement of the Longhorn breed by Shorthorn cattle or a local dairy orientated variant, had potential implications for productivity and the significance of cheese in the regional farm economy. Although Shorthorn milk is said to have given 15% less cheese per gallon [Holderness B A, 1989 p.164] this could well have been outweighed by the greater milk yield of the Shorthorn. By the 1860's cheese imports from the Netherlands and North America were making significant inroads into the English market. The local response was the establishment of rural cheese factories in Derbyshire from 1870 onwards [see for example Davis J G, 1965 p.7 and Tomson G A, 1986] but while these served to take up surplus milk production they were immediately in competition from the fast growing rail born liquid milk trade. During the late 1860's and particularly the 1870's farmhouse cheese declined rapidly as the growing national market for liquid milk became established as the major outlet for the dairy farmers of Derbyshire.

The argument that farmhouse cheese was pre-eminent among agricultural enterprises in southern Derbyshire in the period 1770-1870 is derived from the emphasis given to it by all the contemporary agricultural commentators, and by the extent to which it is noted in farm sale advertisements. Pilkington [Pilkington J, 1789 p.301] reported the rise of dairy farming and that some 2000 tons of cheese was sent out of Derbyshire chiefly to London. Brown [Brown T, 1794 p.48] described cheese as 'the chief, if not the only article of provision which the

natives of Derbyshire can spare out of their own county'. A wider view was taken by Marshall [Marshall W, 176 2. p.288] claimed that 'cheese is the grand object of the Midland dairy'. Farey [Farey J, 3 1817 p.43] provided detailed information concerning cheese making and is echoed by Glover [Glover S, 1829 p.209] who described cheese as 'the most important article in the economy of a Derbyshire farm'. Rowley [Rowley J J, 1853 p.51 and 59] in his prize essay on Derbyshire agriculture stated that 'cheese is the great staple of the district'. Increased output as speculated by White [White J, 1857], and discussed below, served to confirm Derbyshire's continuing role as a significant cheese producing area as the nineteenth century progressed. It was certainly so considered in major reviews of dairying in Britain made later in the nineteenth century by Morton [Morton J C, 1875 & 1878] and by Sheldon [Sheldon J P, 1883]

As indicated in Chapter 1 contemporary commentators are among the sources used by Henstock [Henstock J, 1969] in his review of cheese manufacture and marketing in Derbyshire and North Staffordshire in the two hundred years between 1670 and 1870. The analysis achieved by Henstock is effective in establishing the broad outline of development. Figure 9.1 represents an attempt to map the cheese making region which Henstock describes although it is apparent that it was an important activity beyond the boundaries so defined notably northwards into the Peak District and westwards into Staffordshire. He argues that the early core of the region was the Dove grazings and that from this base cheese making became more widely practised during the seventeenth and eighteenth centuries. Henstock [Henstock J, 1969 p.35-36] used probate inventories as the basis for his findings which were paralleled by Hey [Hey D, 1984 p.1412] and further supported by R H Osborne's detailed study of Brailsford parish [personal communication]. Of the 169 Derbyshire inventories discovered by Hey 96 i.e. approximately 60% refer to cheese directly. Before 1690 few inventories referred to cheese rooms but post 1740 26 out of 33 recorded this evidence of cheese making. Henstock [op. cit] cites 42 inventories which showed the presence of cheese or cheese making equipment in a variety of Staffordshire and Derbyshire localities in the vicinity of

Uttoxeter and Ashbourne. He also notes the move from arable to pasture within the pattern of agricultural land use as evidence of growing emphasis on dairy production. 'The expansion of dairying can perhaps best be viewed as a movement towards that branch of farming for which the land in the region was most suited, and as a reflection of the growing demand for cheese and butter from the rapidly rising population of the eighteenth century' [Henstock J, 1969 p.36-7].

The development of the cheese industry in the study area was clearly tied to the evolution of a national system of marketing and trade in cheese of which southern Derbyshire was but one element. Henstock [op cit, 1969 p.32] and McInnes [McInnes A, 1990 p.128-131] quote Plot's 'Natural History of Staffordshire' to demonstrate the presence of cheese merchants in the late seventeenth and early eighteenth centuries. Fussell [Fussell G E, 1926-9 p.395] and Fussell and Goodman [Fussell G E and Goodman C, 1934-7 p.382] argue that London was at the centre of the trade network in cheese and also butter. The markets at Derby, Ashbourne and Uttoxeter are referred to as examples of local foci for producers. Henstock [Henstock J, 1969 p.40-2] discusses the of the River Trent as an important element of the trading network. Prior to the canal age attempts were made to improve the navigation on the Middle Trent and Lower Derwent with a view to securing Burton and Derby as the upper limits to river navigation respectively. Although of somewhat marginal success, as a result of the problems associated with managing dynamic meandering streams, wharves and warehouses were constructed at Burton, Willington, Wilden Ferry and Derby. Transport arrangements were much improved with the bringing into operation of the Trent and Mersey canal system, completed in 1777, and the Derby canal completed in 1780. New warehousing was then available at Willington, Horninglow [Burton upon Trent], Derby at Siddals Road and Shardlow at the junction between the Trent and Mersey and the Trent itself. Below Shardlow the Trent was effectively navigable and ports like Gainsborough continued to function as transhipment points. The pattern established in the Trent valley seems to have been matched in the northwest of England with respect to the Mersey and Dee whereby Cheshire cheese was marketed in London via Liverpool.

The farm sale advertisements which have been used to demonstrate the wider aspects of the livestock economy also make reference to cheese and/or dairy equipment. A typical sale notice making such reference is shown as Figure 9.2. While nearly all farm sales indicated the presence of dairy cattle only one in three make direct reference to dairy utensils, cheese or cheese making equipment. These have been listed on the basis of the threefold division of southern Derbyshire into sub regions in Table 9.1 and the same data has been mapped over four time periods as Figure 9.3. A seemingly random scatter of plots across the Derby Mercury advertising area emerges thus emphasising the universal character of cheese making, although the concentration of sales is somewhat less to the south of the Trent.

Technical Aspects of Cheese Making

A detailed statement as to the process of cheese making is not central to the current work but a brief analysis is important. In addition two closely related matters emerge which have already been noted in the contexts of wages and farm size. The first is cheese making as a family occupation and the second is the consequence of numerous small units of production for the quality of the product, it being evident that a growing market requirement for good uniform quality cheese was an important factor in the demise of farmhouse production from 1860 onwards. Both Brown [Brown T, 1794 p.48-52] and Farey [Farey J, 3 1817 p.46] described techniques which they had observed in farm dairies. Farey commented that 'the processes of cheese making seem very differently conducted'. It is apparent that at this time and throughout the first half of the nineteenth century that the biochemistry of cheese making was hardly understood. There was a heavy reliance on empirical skills and the development of personal preferences and techniques. In addition different types of cheese were made. Farey [Farey J 3., 1817 p.58] refers to Double Gloucester, Cheshire and Stilton as well as Derbyshire type cheese being made in the county. It may not have been so easy to distinguish cheeses as it is today, the similarity between Cheshire and Derbyshire was said to have been such that differentiation was difficult. As the nineteenth

century progressed descriptions of regional cheese making systems by Morton [Morton J C, 1875 & 1878] suggest that distinctions were becoming clearer although he described the Derby process as similar to that for Double Gloucester. In a judgement of quality Sheldon remarked [Sheldon J P, 1883 p.233] that the essential character of Derby cheese is 'that of a middle class cheese' and that it did not have the reputation of Cheddar, Cheshire or Stilton. Consequently Derby cheese was not likely to command the same level of price as these makes so it is interesting to note the practice of cheese making on the cheddar system at Home Farm, Foston in 1865 [DM 8.2.65]. Brigden [Brigden R, 1986 p.84-5] expresses an even less enthusistic view that 'Derby cheese was a locally popular nourishing but unpretentious product that remained largely outside the ranks of polite society'. Clearly Derby cheese did not compare with the product of neighbouring Leicester, 'the finest cheese in England' which would generally fetch £1 per cwt more than other makes. Variation in overall weight of individual cheeses also seems to have been usual and is evidence of a lack of uniformity in the approach to cheese making. Farey [Farey J, 3 1817 p.5] referred to cheeses of between 12 lb and 25 lb but with 20 lb being the norm appropriate to being marketed via cheese factors. Pilkington [Pilkington J, 1789 p.301] notes Derbyshire cheese of up to 30 lb in weight being made.

The cheese making season coincided with that of grass growth from mid April to mid November. As the season drew to an end the quality declined such that the product 'resembled cheese in shape only' [Ag G 15.5.1876]. Reference has been made Chapters 1 and 4 to the arduous nature of work in the cheese dairy which was necessarily long and hard in order to process two milkings of cows daily. In some dairies Sunday observance prevented the processing of that day's milking and in 1865 the Rev. Wheeler of Holbrook was disqualified from the cheese competition at the Derbyshire Agricultural Show when it was discovered that he had used Sunday's milk [DM 20.9.1865]. According to Davis [Davis J A, 1969 p.7] cheese making and other associated operations were crafts handed down from mother to daughter. He states 'what does a man know about cheese' and remarks that the only operation men were allowed to do was to lift and turn cheese. The inference

that cheese making techniques evolved slowly, if at all, is underlined by Cheke [Cheke V, 1959 p.128]: 'before 1850 the work of the dairy with cheese making in particular did not change to any extent....the actual cheese making remained in the hands of traditional cheese makers who continued to produce cheese both good and bad with no knowledge of the causes of such variation'. Caird [Caird J, 1852 p.252] also emphasised the skills of the maker and the farm family in the Cheshire cheese district. 'The farmer's wife in Cheshire is the most important person in the establishment, the cheese which is either made by her or under her direction forming the produce of two thirds or three fourths of the farm'. By the 1860's there was some evidence of difficulty with respect to the availability of dairymaids in the Midlands. TJS [TJS 1865] argued that 'the breed of dairymaids is yearly diminishing' as a consequence of 'the advanced and altered mode of living of agricultural society'. In 1873 two Derbyshire men E W Coke and J G Crompton [Coke E W & Crompton J G, 1873 p.501-2] regarded one of the benefits to the farmer of the emergent milk trade to be the removal of the 'unavoidable drudgery of cheese making being carried on in his own dwelling house'. Similarly Morton [Morton J C, 1875 p.270] emphasised the negative impact of being tied to cheese making and the freedom that the liquid milk system was bringing to farm families.

The availability of skilled female labour was therefore critical for the quality of product. As it seems that the product of 9 cows was the average that one dairy maid could handle at a milking the number of milk cows was also related to the number of skilled women on a farm. The equipment used certainly up to the 1850's appears to have lacked sophistication as Sheldon noted [Sheldon J P, 1883 p.234] 'thirty years ago the cheese making appliances in Derbyshire were as a rule very primitive in character'. Many sale advertisments both before and after this year indicate the use of improved equipment such as the copper kettles or vats which were used following the addition of rennet [made from the stomach acids of calves] for the separation of curds and whey. The separation process was the most important factor in achieving quality. At this stage anatta would be added if a coloured cheese was required. Cheese presses were used to remove moisture from the curd and to shape the cheese into

moulds. As the nineteenth century progressed these were more commonly of the screw type, the largest being made of gritstone. Made cheese was transferred to a storage chamber where further drying took place. Turning and wiping of made cheese was essential in order that maturing could proceed without cracking or deterioration through bacteriological decay. Farey [Farey J, 3 1817 p.47] noted one dairy as producing 'a dry sound cheese and is in perfection at a year and a half or two years old'. Cheese of this kind would have been firm if not hard. Certainly it was sufficiently consolidated to withstand the most commonly used test employed by factors when buying from farmers which was to walk across the cheeses layed out on the floor. The time taken in maturing raises an important opportunity in marketing flexibility which was potentially available to the farmer, the factor, the shipper or the retailer of cheese. All had the potential to store cheese and to release it onto the market at a time perceived to be favourable. Generally they would have been aware that cheese lost about 15% in weight as it dried during the first year and would therefore lose value [Holderness B A, 1989 p.254].

The need for care in the making and storage of cheese also raises the matter of the physical character of dairies. The general condition of dairies was treated scathingly by Harding [Harding J, 1860 p.82 et seq] of Marksbury near Bath who had done much to perfect and promote the cheddar process. He asserted that 'throughout our dairy districts old fashioned dairies are ill ventilated, often damp and filled with impure air and not infrequently in close proximity to stables, piggeries etc'. He consequently advocated cleanliness, temperature control and insulation as poor conditions lead to loss of product and inferior product. The existance of inadequate facilities on Midland dairy farms was apparent on Lord Bagot's Blithfield estate in east Staffordshire [Sneyd 7 1864 p.63 & 97]. At the relatively large 267 acre Oaklands Farm 'there is not a proper dairy the present one being only 6 feet wide and leading directly from the kitchen'. At nearby Dunstall Farm the cheese was actually 'made in the kitchen where the food was cooked',

Towards the close of the 1850's the first evidence emerges of a move towards mechanisation of cheese making in southern Derbyshire with the marketing of curd separating machines by local dairymen Travis and Thompson and also by Keevil of Lacock in Wiltshire described by Carrington [Carrington W T, 1860 p.450] as the principal machine. Notices relating to these machines in the Derby Mercury suggest that a move had been made towards the achievement of a better quality product attracting a higher price but significant doubt emerges as to the level of take up. In 1857 the report of the Derby Michaelmas Cheese Fair [DM 3.10.1857] notes that one dairy achieved 77/- per hundred weight some 10% above the average for the year. 'This was Mr Travis of Mercaston who also exhibited the new cheese making machine invented by him and with which his cheeses has been made. We understand this apparatus is now being used by several of the best dairymen in the county among whom is Mr Smith of Birdsgrove who obtained Mr Meynell Ingram's prize of £5 and a silver medal and Mrs Smith £2 at the Stafford Agricultural Show for exhibiting the best cheese. The machine caused considerable interest even more so than at the last fair and Mr Travis received several orders. They are manufactured by Mr Dunn of King Street, Derby and from what we hear are the cheapest cheese making apparatus and before the public'. In 1858 [DM 5.5.1858] Mr G Travis took great pleasure in stating that his apparatus, now available in five sizes between 36 and 120 gallons, was being used by several large dairy farmers in southern Derbyshire and could be seen at Mercaston, Hopton, Wirksworth, Derby and Tutbury. It was later claimed in 1860 [DM 3.10.1860] that using the Travis apparatus 'the milk that would make 27 lbs of cheese by the old method of manufacture will make 30 lbs by this process thus enabling an increase in income of between 5/- and 7/- a hundred weight'.

It was also in 1858 [DM 14.4.1858] that Thomas Thompson of Radbourne announced 'that he has now completed his patent cheese making apparatus which exceeds all others for simplicity of construction real utility and expedition. To complete the whole process from time of putting in the rennet is two hours and 40 minutes for 70 1bs weight curd'. Keevil's apparatus, a Patent Cheese Making Apparatus for cutting, filtering and pressing, was

also advertised in 1858 [DM 20.6.1858]. 'It is the most perfect invention hitherto applied to the manufacture of cheese and effects a great saving in time, labour and material producing large quantity and better quality'. The merits were more simply put by Little [Little E, 1860 p. 296] as the making 'of a larger amount of cheese from the same quantity of milk'. Other basic cheese making problems were also being tackled as J G Haywood of Market Place, Derby was advertising in 1860 'stoves for cheese and rooms' in order to maintain a constant heat [DM 7.11.1860].

These developments mark a shift by more significant dairy farmers, aided by workshop operators, towards a better and more uniform quality of product. At the 1859 Derby Cheese Fair [DM 5.10.1859] five or six dairies including that of H Chandos Pole of the Radbourne Estate Home Farm produced cheese 'the greater part of which was made by machines such as Keevil's and Travis's'. The price obtained was 76/- to 80/- a hundredweight as compared with 65/- for middle quality in that year. Potential reward for investment is thus clear yet despite the benefit of a modest degree of mechanisation Sheldon wrote in 1883 that machines had only been adopted in a few advanced dairies [Sheldon J P, 1883 p.236].

By the 1860's farm cheese making was beginning to face the challenges which were effectively to bring this considerable and long established enterprise to an end [see Tomson G A, 1986]. Factory based cheese manufacture was to be promoted in Derbyshire through the 1860's leading to the founding of a number of units in the county from 1870 onwards. It is clear that the factory movement was a response to cheaper better quality imports from the United States. According to Sheldon [Sheldon J P, 1883 p.xx] American cheese first entered Britain in 1830 but only arrived in large and increasing quantities in the 1860's [Rigby T, 1864] with imports reaching one million cwt by the early 1870's [Morton J C, 1875 p.300]. The impact of imports on the Derby market was evident by 1860. The report of the Derby Cheese Fair for that year [DM 3.10.1860] indicated the amount of transatlantic and Dutch cheese of superior quality created a situation where the factors were less dependent on home production.

The wider problem posed for Derbyshire dairymen was set out by a long established Derby cheese dealer, Mr Etches, in letter to the Derby Mercury [DM 2.10.1867]. He pointed out that farmers in Missouri averaged 4.5 cwt per cow of factory made cheese which was then sold in Liverpool for 30/- a hundredweight. Given the favorable price differential as compared with Derbyshire cheese Etches stongly urged the adoption of a factory based system. 1868 saw the initiative of the Derbyshire Agricultural Society under the guidance of Lord Vernon of Sudbury which led to the first cheese factory being set up at Longford in 1870 and which was quickly followed by others. The benefits of an American system had been urged upon the editor of the Derby Mercury by 'Senex' [DM 6.10.1869] who wrote also of the prospect of ending the slavery imposed by dairying on farm families. He castigated the conditions of the dairy being 'small and ill ventilated with no means of regulating temperatures which may vary over 20 degrees in 24 hours'. The advantages of the factories were soon to be acknowledged in a succession of reports in the Farmers Magazine and the Agricultural Gazette. For example in 1874 Murray [Murray G, AgG 19.9.1874] reported that 'cheese factories are reaching extreme prices for their produce greatly in excess of the farmhouse cheese'. In the same year the Agricultural Gazette [Ag G 18.4.1874] carried a note from the Sheffield Telegraph on the successful economies of cheese factories to the effect that 'labour costs had been reduced, the quality of cheese improved, the price advanced and the quantity for a given amount of milk increased'. Morton [Morton J C, 1875 p.263] in a review of national developments was to write in similar terms of the economies and efficiencies of scale in factory cheese making. The general view on price was summarised by Long [Long J, 1885 p.136] who noted that the price obtained for factory cheese was 10/- a hundredweight higher than for traditional cheese but at half the cost.

More important than the emergence of cheese factories for the decline of the farmhouse industy was the rapid expansion of the trade in liquid milk. According to Murray [Murray G 1895 p.18] 'the conveyance of milk from Derby to London dates from 1869'. This is in accord with the completion of the Midland Railway's

terminus at St Pancras in October 1868 [Williams R, 1948 p.7] which in turn explains that company's bottom ranking against all others in the transport of milk to London in that year noted by Morton [Morton J C, 1868]. It is also in accord with comment from Druce [Druce S B L, BPP 1880-2 p.26] that he was unable to obtain milk carriage statistics from the Midland Railway but that the traffic manager estimated that the 940,000 gallons carried out of Derbyshire in 1872 had risen to 5.5 million gallons by 1880.

As Derby was linked by rail to Birmingham and Manchester in the 1850's it is likely that milk was sent to destinations other than London before 1869. Coke and Crompton in a comment on Derbyshire dairies in 1873 noted that 'the traffic in milk from the Derby Station to the metropolis exclusive of all milk sent to Manchester may be quoted at twelve tons per day' [Coke E, & Crompton J G, 1873 p.501-2]. Druce [op cit 1880-2] noted that the Midland was sending milk to Birmingham, Newcastle and Hull as well as London and that the North Staffordshire Railway was criticised for not sending milk to the Potteries on Sundays. On the Midland Wirksworth was identified as the most distant collecting point from London at 140 miles and the charge was a penny farthing a gallon.

It is hardly surprising that access to the railways was to become all important for the farmer. In 1865 Heywood [Heywood W H, 1865] compared the profitibility of milk favorably against cheese given the tenant to be one mile from the railway station. Murray [Murray G, 1875 Ag G 6.11.1875] reported that 'the milk trade from Derby is steadily increasing' and that 'except in outlying districts far from railways cheese making will soon be an obsolete industry'. He commented further on price to the effect that 'many are netting 8d to 9d a gallon; the very best managers find it difficult to realise an equal price by converting their milk to cheese. A clearer view as to critical distances for milk carriage emerged in 1881 when it was said of the Derbyshire dairyman that 'where he has to send his milk 4 miles to a station and to pay the carriage the price he realises is not more than can be made from butter or cheese' [DPFC, 1881 p.461].

It seems to be the case, therefore, that the liquid milk trade did not greatly influence the cheese makers of southern Derbyshire before the 1870's. Certainly the concerns of the local agricultural community were initially directed at meeting the American challenge of imported cheese. It was not to know that the Midland Railway was soon to be transporting Derbyshire milk to London at preferential rates [Atkins P J, 1978]. The major shift in British agriculture investigated by Taylor [Taylor D, 1971] thus began to influence Derbyshire and was guided if not manipulated by the railway companies in the manner discussed by Hawke [Hawke G R, 1970] with respect to the transport of grain and livestock. JPS [? J P Sheldon] wrote in the Agricultural Gazette in 1877 that 'there is now no trade whatsoever in home made cheese' [Ag G 28.5.1877]. His view was disputed in correspondence the following week but it can be taken as an indication of the severe and rapid decline of farmhouse cheese making in the 1870's.

Cheese Price Variation and the Market

As has been indicated farm based cheese making was such that farmers had a range of potential outlets for their product. Cheese was consumed within the farm community and its immediate vicinity. Cheese could also be sent into the local markets, which operated weekly in towns towns, eg Derby, Ashbourne, Ashby, Burton and Uttoxeter. Henstock [Henstock A, 1969 p.45] emphasises the role of local cheese managers and provision dealers and the importance of sales into urban and industrial communities such as those based on lead and coal mining. Of prime significance in fixing the seasonal price of cheese were sales made at major cheese fairs held at Michaelmas i.e. towards the end of the cheese making season. The price realised at the Fair would determine that given by itinerant merchants or factors with respect to deals already struck with farmers.

Cheese factors were therefore an essential link between producer and the national market and had a particular role in the marketing process. Factor's cheese was best quality cheese for

which some farmers won a particular reputation such as Mrs Smith of Clifton near Ashbourne 'the factor never omitted speaking of good cheese' [DM 6.2.1833]. While many factors were generally itinerant as revealed 'Cheese factor wants a situation - a person of 31 years of age without incumberance as a traveller' [DM 2.3.1817]. Others were members of the local farm community who combined cheese production with marketing. The factor system was open to various abuses characteristic of the nineteenth century. Smith [Smith W, BPP 1833 p.12268] reported in 1833 that the farmer generally sold his cheese to one cheese factor and that 'where a man is steady in letting him have his cheese he will advance money for his rent [and so is the wool stapler] cheese is advanced at 10/- a hundred/weight'. This suggests that the factor could assume a controlling position in the local market. Indeed various reports issued at the time of the establishment of cheese factories in the 1860's - 1870's were critical of the factors who allegedly had regularly taken advantage of their position [See Tomson G A, 1986 Ch.2]. Druce [Druce S B L BPP 1880-2 p.25] for example saw one of the benefits of the cheese factory system to be the break up of the monopoly of the old cheese factors, 'who often advanced the farmer money on the cheese before he actually bought it and who therefore had the farmer in his power when settling day arrived and the cheese was fit for market and could dictate almost what he pleased'.

Changes in the price of cheese, and the circumstances which may have influenced that price are recorded in a variety of sources but particularly in the Derby Mercury. The Derby Michaelmas Fair, unlike other fairs held in the town, was reported annually in the Derby Mercury newspaper between 1780 and 1880. The information contained in the reports is variable but merits careful analysis. The range of price obtained is always stated with some differentiation noted on the basis of quality and colour. However there is virtually no information as to the quantity that was sold. Only in 1826 [DM 4.10.1826] is there reference to 300 tons being two thirds of normal i.e. an implied 450 tons. Not infrequently comment is made upon trading conditions in a particular year and also comparison between conditions and prices at Derby and other centres mostly located

in the north Midlands.

Figure 9.4 shows a simple plot of the average price for non coloured cheese on an annual basis from 1780 to 1880. Overall the price paid for cheese per hundredweight rose from 25/- to over 70/- through the study period. There is also considerable variation between one year and the next, the sharpest contrast being between 1818, the year which shows the highest recorded price of 82/- per hundredweight and the preceding year 1817, 48/- per hundredweight and 1819 at 58/- per hundredweight. It is unusual to find the same price being achieved in successive years. Apart from occasional wide fluctuations the cheese producer normally operated in a situation of some uncertainty from year to year and the level of profitability would have been difficult to predict.

Given the overall price rise between 1780 and 1880 and also fluctuations between successive years important periodic patterns and trends in price change are also evident. The years from 1780 to 1815 saw a rise in price from 25/- a hundredweight to one in excess of 70/-. After the end of hostilities 1815 a sharp fall occurred so that, discounting the exceptional year of 1818, a price low of 42/- was recorded in 1821. From 1821 to 1870 an almost cyclic pattern is evident with prices again exceeding 70/- in 1825 and 1857. This is brought out more clearly in the plot of five year running means, Figure 9.5, peaks in 1826, 1838, 1847 and 1855 separate troughs in 1821, 1831, 1843 and 1850 suggesting an approximate ten year price cycle. In broad outline the graphs show many of the classic features of the price curves for food stuffs and indeed for other commodities during the late eighteenth and nineteenth centuries. There is a strong correlation with the cyclic pattern of trade revealed in the Gayer, Rostow, Schwartz index [Mitchell P and Deane P, 1962 p.470-1] which indicates that national economic considerations were an important influence [see Figure 4.9 and also Figure 9.6]. Despite such fluctuations general trends in cheese price in the post Napoleonic period through to the 1870's have been identified as Figure 9.7. The thirty years from 1820 to 1850 have been illustrated separately as Figure 9.8 where the best fit curve shows a static situation

with respect to prices. The period 1850 to 1880 is also highlighted in Figure 9.9 which shows a strong upward trend although prices for 1878 and 1879 were ominously low. In the earlier period the Derby market area for cheese seems to have faired little better than the grain market where a price decline through to 1840 was the norm. However the cyclic pattern of wheat prices had a greater amplitude than that for cheese hinting at a potential greater level of uncertainty for the producer [see Figure 9.10].

Comparison with data relating to cheese made in other regions of England is only possible to a limited extent. Cheese prices quoted by Mingay [Mingay G E ed, 1989 p.114] suggest a similar pattern for Greenwich Hospital and Naval victualling cheese purchase prices [Figure 9.11] rather than for prices paid by factors for farm cheese. Sequences of prices for Lancashire cheese 1771-1859 and Cheshire cheese from 1829 [Mingay op cit, p.1001-2] merit some consideration in relation to those recorded for Derby [see Figures 9.12 and 9.13]. The Lancashire trend has many of the features of that for Derby but at levels some 5/- to 10/- a hundredweight lower. This may reflect the strong local regional preference for Lancashire which according to Cheke [Cheke V, 1959] was much appreciated for its toasting qualities. The graph of Cheshire prices on the other hand indicates an upward trend except for a sharp decline in 1843/4. Cheshire was clearly a cheese of national repute conceivably more so than middle class Derby cheese. The discussion of grassland management has demonstrated the particular advance in productivity made in Cheshire from 1820 onwards through drainage and boning. It seems reasonable to suppose that this was accompanied by an enhanced and more standard quality. Hallas [Hallas C, 1991 p.6] includes a graph of cheese prices in her study of the Yorkshire Dales but the data is fragmented and there is only a hint of a sequence similar to that at Derby.

Of perhaps greater significance than comparisons of this kind is the data relating to other cheese fairs also included in the Derby Mercury. This material has been tabulated as Table 9.2 for the years and places for which it is available alongside the

price obtained at Derby. The single references to Northampton, Shrewsbury and Worcester all match directly to the Derby price. The 1826 price for Newark is at variance with Derby but is explicable on the basis of the unusual drought conditions which occurred in that year. However the cheese prices at fairs nearby to Derby at Chesterfield, Loughborough, Nottingham and Ashbourne quoted for a number of years are similar to if not exactly the same as the Derby price. The clear implication is that for the North Midlands if not for a wider region there were common influences operative in determining the prices of cheese rather than local factors particular to an individual market centre.

The interaction between supply and demand must be central to an understanding of this relationship between numerous small farm based producers and a much wider subregional if not regional, market. There are however important gaps in the data which prevent a clear quantitative assessment. On the demand side population increase and dietary change imply an expanding market for the producer. Fussell's [Fussell G E, 1926-9] discussion of the cheese trade indicates a multistage system of marketing which must have applied until rail transport was available from the 1850's viz:

1. Derbyshire Cheese Producer

2. Cheese Factor [cheese transferred to warehouse in canal side].

3. Cheese stored at transhipment point [eg Gainsborough Cheese].

4. Cheese shipped to London Cheese merchants to be stored and sold.

The uniformity of price between the cheese fairs suggests that demand factors worked back through this sequence to create common trading conditions across the North Midlands. On the supply side, as has already been indicated, it is difficult to see uniformity of circumstance. The amount of cheese produced in any one season on any one farm in part reflects the quality of the dairy herd to the extent that some cows may have produced

twice as much milk as others. The skills of the women of the dairy had fundamental implications for quality. Further significant controlling variables, which have been identified above, would have included the conditions of the dairy and cheese room and the quality of grass growth in a given season combined with the ability to provide winter feed.

Comment in the Derby Mercury does reveal that lack of uniformity of product and poor quality of cheese was reflected in prices and marketability. The range of price obtained for good and poor quality cheese at the Derby Fair is quoted in the Derby Mercury for all years until the 1860's. In 1819 for example the sale of cheese was said to be 'exceeding brisk for 58/- to 60/- per hundredweight; a prime dairy or two of coloured fetched 65/- inferior cheese was scarcely saleable at 55/-' [DM 2.10.1819]. Figure 9.15 shows range of price during the period 1780 to 1860. It is apparent that in the earlier years of the late eighteenth and early nineteenth centuries a range of 2/- to 3/- a hundredweight was normal but in later years it widened to exceed 10/- in some years during the 1850's. This may reflect an increase in concern for quality and the introduction of cheese making apparatus by more progressive farmers referred to above.

An attempt to summarise variations in reported market conditions at Derby Cheese Fair is made in Table 9.3. Of the 21 years included deficiency of supply is clearly indicated on only four occasions in 1826, 1831, 1854 and 1859. In the acknowledged dry year of 1826, the price was also lower than anticipated i.e. '5/- less than looked for by dairymen'. In 1831 the supply was not large owing to deficiency of make' but the price of 65/- was high relative to adjacent years. In 1854, another year with a dry spring and annual total of 17.78" for Derby, 'there was rather a small supply which was sold rapidly in the morning at from 60/to 68/-. A few superior dairies were priced at 70/- upwards but they had great difficulty in meeting with purchasers and some went home unsold'. The fourth year 1859 not only had a supply of cheese below average but a lack of buyers who may have been elsewhere which probably may be accounted for 'by Rugby fair being on the same day' so that 'high prices were asked for at the commencement but later in the morning sales consequently

slackened'. In 1818 the year of the highest price the quantity was 'larger than expected'. This implies some potential difficulty perhaps the consequence of the prolonged drought through June, July and August of that year. On occasion it is apparent from comment on demand that the market was over supplied. The report on the 1816 fair reads 'our fair was crowded with cheese and although the buyers were full as numerous as usual we were sorry to note a great flatness.... general prices were 44/- to 48/- with best at 50/-.... small lots only 40/-, cheese not sold and was taken home again'. 1828 was another year with unusual supply: 'very early on Monday morning great numbers of wagons and carts laden with cheese were brought into town, and prior to business being commenced the market place and streets leading there to were jammed.... the quantity offered for sale was very considerable and the sales were rapidly affected.... William Woodward of Egginton, an elderly person, had his pocket picked of one shilling and sixpence'. In 1851 when the price was lowest since 1829 'we are informed that there were upwards of 600 wagons and carts laden with cheese forming an enormous train of vehicles which extended through several streets'.

On other occasions the activities of the buyers were such that the large supply was bought up as in 1819. 'At our fair on Monday there was the largest supply of cheese we have seen for many years which sold exceeding brisk for 58/- to 60/- per hundredweight'. In 1823 'our fair on Monday was unusually crowded with cheese the supply being greater than in any former year within our recollection - a less depreciation of prices took place than might be expected. Buyers were numerous'. However on occasions the market did not fit the expectations of the Derby Mercury reporter as in 1842 when the fair was 'numerously attended by buyers and with a plentiful show wagons remained unsold; at 48/- to 52/- the price was surprisingly low'. The significance of quality is apparent in 1848, which was an unusually wet year, when a large quantity of inferior cheese was produced so that the market was depressed and large stocks continued to be held by the factors.

Productivity

Aspects of the productivity of farmhouse cheese making have featured in the preceding discussion of prices. It is evident that factors such as weather conditions were reflected in variations in output from season to season. It is important however that productivity be further considered at the levels of the individual farmer and of southern Derbyshire as a whole. If change through time can be determined then a significant index of potential agricultural progress will have been established. Unfortunately the data base relevant to productivity is tenuous so that it is necessary to interpret a limited range of measurements and estimates. A number of these focus upon exceptional situations rather than the general but it is possible to arrive at a reasonable feel for the average output per cow in milk for the earlier and later stages of the study period and to come to some view as to levels and changes in overall output.

A number of estimates and in some instances actual measurements of the amount of cheese produced per cow are available for the study period. Some reference has already been made to these in Chapter 8 in connection with change in cattle breed preference but a more detailed review indicates important variation of opinion and a need to arrive at a judgement as to likely average output. An early estimate relating to Derbyshire was made by Arthur Young when visiting Radbourne around 1770. He reported a product of 3 cwt per cow from Longhorns [Young A, 1771]. Pitt [Pitt W, 1794 p.43] writing of Staffordshire also thought 3 cwt to be an average but considered 5 cwt to be achievable in exceptional circumstances. Marshall [Marshall W, 1796 2 p.326] quoted a herd of 21 cows which produced 3-4 tons of factors cheese which approximates to between 3 and 4 cwt per cow in a season. For Derbyshire Farey [Farey J, 3 1817 p.44-5) typically provided the more detailed and useful information. He listed a number of farms which achieved yields per cow within a range of from 2 to 5 cwt which might thus represent the extreme limits of output. No particular pattern of production emerges which might suggest that some localities were more favoured than others.

Skill in the selection and feeding of stock in combination with efficiency in the dairy are thus emphasised rather than environmental advantage. For the middle years of the nineteenth century Caird [Caird J, 1852 p.218] cited 3 to 3.5 cwt of cheese per cow on average land in Leicestershire and 4.5 to 5 cwt on better land but in his prize essay on Derbyshire Rowley [Rowley J J, 1853 p.51] proposed an average productivity of 3 cwt per cow. In 1860 Carrington wrote that the average yield of cheese in this district i.e. southwest Derbyshire/northeast Staffordshire is probably not 3.5 cwt [Carrington W T, 1860 p.449] which was identical to that identified for Cheshire by Heywood [Heywood W H, 1865 p.339] but slightly more than the 3.25 cwt average identified for this county in 1876 by Murray [Murray G, Ag G 17.4.1876]. In 1865 Carrington quoted a yield of 4.5 cwt in a discussion of his farms at Croxden Abbey between Ashbourne and Uttoxeter [Carrington W T, 1865 p.353] but later in the century Long was to comment that this figure related to 'an especially good lot of cows' [Long J,1885 p.27]. This more cautious view of dairy productivity had been supported by Morton [Morton J C, 1878 p.678] who referred to an 'annual make rarely amounting to 4 cwt while 3.5 cwt would be considered a fair yield'.

The available figures suggest therefore that there was no dramatic increase in average cheese production per cow between the late eighteenth and mid nineteenth centuries. Perhaps a cautious view of the earlier figures would be not more than 3 cwt per cow with 2.5 as a better assessment of the overall position. This conclusion is in accord with the outcome of Hallas's research into dairying in Wensleydale and Swaledale at the turn of eighteenth century [Hallas C, 1991 p.7-8]. Hallas has estimated an average milk yield of 300 gallons per cow per season which could be made into 2.5 cwt of cheese. For the latter years an average of 3.5 cwt is reasonable in the light of the opinions considered above. It conforms with the general conclusions of Taylor [Taylor D, 1971] as to the national position with respect to milk yields and cheese output. It also matches the somewhat earlier conclusion of Orwin and Whetham that during the 1850's 'a herd of good dairy cows might give 3 to 3.5 cwt of cheese in each season, a milk yield for this

purpose being of some 400 gallons' [Orwin C S and Whetham E H, 1966 p.36-7]. In addition these writers added the caveat that 'there must have been many farms where underfed cows reared a calf and provided no more than a couple of hundred gallons of milk in the summer grazing season'. On the other hand the suggested annual output of 3.5 cwt per dairy cow is more conservative than the conclusions of Waud that the range of output in Derbyshire was 3.5 to 4 cwt and exceptionally 4.5 cwt [Waud L M, 1978 p.4] and also of Holderness who suggested milk yields which would have allowed a national average of 4cwt [Holderness B A, 1989 p.163].

Turning to the issue of cheese output at county level the earliest statements as to production in Derbyshire refer to what must have been superior traded cheese rather the totality of make. Pilkington [Pilkington J, 1789] noted that 2,000 tons of cheese were being sent out of the county annually which broadly matches the later observation of Pitt [Pitt W, 1809 p.288] that combined total of 5,000 tons of cheese was traded down the Trent from Leicestershire, Derbyshire and Staffordshire. Of this total Leicestershire contributed 1,500 tons, the rest being divided between the other two counties. The figure of 2,000 tons also features in Farey's [Farey J, 3 1817 p.62] writings with respect to the quantity of cheese obtained by factors for London dealers or for Government contracts. All that can be concluded at this stage is that during the period 1790 to 1810 Derbyshire output comprised about 2,000 tons of traded cheese plus that which was sold locally and consumed within the farm community.

By the mid nineteenth century much larger figures were being quoted and provide evidence of a substantial growth in cheese output. Rowley [Rowley J J, 1853 p.51] indicated an annual county production of 10,000 tons of cheese. This figure is echoed by White [White F, 1857 p.13] who wrote of Derbyshire, 'dairy farms are numerous in the southern and northern parts, and the annual production is said to be about 10,000 tons of cheese which is sent to all parts of the Kingdom'. White went on to state that in 1846 'the quantity of cheese made was about 8,000 tons, and forty years ago it did not exceed 2,000 tons'.

The latter figure would seem to have been an underestimate if matched against the statements of Pilkington, Pitt, and Farey. It is also the case that the 8,000 tons suggested by White for 1846 and the 10,000 tons for 1857 might well have been overestimates. The agricultural census gives a total of about 59,350 cows and heifers in milk for Derbyshire in 1870. Acceptance of an average annual output of cheese of 3.5 cwt per cow, as proposed above, would mean that more than the entire milk output of the county would have been needed to achieve 10,000 tons.

Further calculations of this kind can be made, however, which provide an opportunity for gaining some perspective on the levels and changes in cheese output which occurred in Derbyshire in the nineteenth century. These have been set out in Table 9.4. For 1870 the numbers of cows in milk are those as recorded in the agricultural census. A range of possible cheese ouputs for Derbyshire is indicated taking into account differing average yields per cow and proportions of milk output converted into cheese. In selecting the latter account has been taken of Hallas's findings in the Yorkshire Dales where in 'primarily cheese producing areas' 10% of output was retained as liquid milk, 25% was made into butter and the remaining 65% made into cheese [ibid p.7-8]. On the basis of an output of 3.5 cwt of cheese per dairy cow and a conversion rate of 70% cheese output in Derbyshire in 1870 was somewhat in excess of 7,000 tons. To have exceded 10,000 tons at this date, let alone in the 1850's when it may be presumed output was lower, yields in excess of 4 cwt and conversion rates of the order of 80% must be assumed.

The data relating to 1870 in Table 9.4 has been used as the basis for estimating production around 1800. The conversion factor of 65% has been derived from Holderness's estimates of the growth in the national dairy herd from 740,000 in 1770 to 1.2 million in the 1840's to the 1.5 million recorded in 1870. The assumptions have been made that the growth rate through time was linear and that Derbyshire conformed to the national pattern. On the basis of a yield of 2.5 cwt of cheese per cow and a conversion of 65% of milk into cheese then a county output of just over 3,000 tons is indicated in 1800. This seems very

reasonable, in comparison with the estimates of 2,000 tons being traded out of Derbyshire as discussed above, as there is a fair margin for local disposal. It is possible to extrapolate the argument back to 1770 when, following Holderness, there would have been approximately half the number of dairy cows compared with 1870, say 30,000 with perhaps an average cheese yield of 2cwt giving a Derbyshire total of 1,950 tons, assuming a 65% conversion rate. Comparable production figures can be calculated for southern Derbyshire using the dairy cow population for 1870 of 28,800 derived by the aggregation of the parish statistics. 14,400 cows in 1770, 18,800 in 1800 and 28,800 in 1870 would have produced respectively 936, 1527 and 3528 tons of cheese.

The figures which have been thus generated for Derbyshire as a whole, and also the southern part of the county, indicate a more modest and perhaps more realistic rate of growth of output than that implied by White. The more than doubling of output between 1800 and 1870 compares most favourably with an increase of 40% for the Yorkshire Dales over the same period [see Hallas C, 1991 p.8]. It is more modest than the trebling reported by Morton for Cheshire already noted in Chapter 7 [Morton J C, 1865 p.62-4]. At the level of individual farms variations in output are likely to have been considerable. On the basis that dairy herds southern Derbyshire farms averaged about 11 animals in 1800 and 18 in 1870 then, given a range of cheese production of between 2 and 5 cwt per cow, the product per herd increased from 22 - 55 cwt in 1800 to 36 - 90 cwt in 1870. Given a cheese price of 60/- per cwt the range of income would have been £66 to £165 in 1800 and £108 to £270 in 1870. The bias would have been towards the lower end of the range in the earlier year and higher in the later in terms of the 2.5 cwt and 3.5 cwt figures discussed above. These would indicate average herd outputs of 27.5 cwt for the 1810's and 63 cwt for the 1860's making £82/10/- and £189 per annum respectively.

The levels of production indicated by these figures are supported by the quantities of cheese held by farmers and cited in advertisements in the Derby Mercury. Ward of Oatlands at Walton on Trent had 3 tons [60cwt] of cheese in store at the time of sale in 1830 [DM 13.1.1830] which would have been worth

£144 at the season's average price of 48/-. In the same year Morley of Brailsford had 400 factors cheeses which represents 8000 lb of cheese or just over 32 tons or nearly £200 worth at the higher price of 55/- per cwt. More usually the quantities quoted are somewhat less. Royce Farm, Drakelow had 58 cheeses for sale [DM 30.1.28] which was well passed the time of the Michaelmas Fair while Shorthouse of Willington had 170 factors cheeses [DM 23.8.1837] which would have been well before the end of the cheese making season. Large sums of money were involved in the trading of cheese and particularly at the time of annual fairs. This is underlined by occasional crime reportage in the Derby Mercury. The 1813 Fair report noted 'that the light fingered gentry were not idle, a countryman had his pocket picked of £360 and another of £23' [DM 30.9.1813]. In 1855 'Mr Camp, farmer at Etwall, had £120 stolen from his bureau having returned from Derby Cheese Fair' [DM 3.10.1855].

Summary

This chapter has reviewed the character of the farmhouse cheese industry during the study period. Its central position in farming until the 1870's has been emphasised. It emerges that virtually all farmers were involved in cheese making hence it seems appropriate to consider the circumstances of production and of the market at some length. It has been argued that in the period up to 1870 the average annual cheese output per cow increased while at the same time the average size of herds and stock rates plus the quality of feed also increased enabling farmers to increase production at farm level. In parallel the rather sparse data on overall regional/county output has been analysed and suggests a significant rise by a factor of about 2.5 between 1800 and 1870. A county output of about 7,000 tons in 1870 would approximate to 9% of the national make of cheese if Murray's estimate of 80,000 tons for the 1860's is accepted [Murray G, 1877 Ag G 2.4.1877].

Little change in production technology took place at least until

the 1850's and in most years supply to the market was good. Demand for cheese was also increased progressively and in many years was such that sale was brisk. This suggests an approximate balance between supply and demand which may explain the overall steadiness of the price sequence between 1820 and 1850. While acknowledging that particular circumstances such as weather conditions may explain variations from year to year the fact that prices were sometimes lower than expected does support the view that the factor as middleman had an important controlling effect. In addition the combination of imported and home product may have meant that total supply was running ahead of increasing demand. For a range of reasons therefore the individual farmer had difficulty in predicting his income from year to year. From the 1850's while prices advanced and productivity continued to rise, especially where innovation took place at farm level, overseas competition increasingly influenced the market. The Derbyshire response of setting up factories to produce a better quality cheese undoubtedly succeeded in the early stages. It also moved farmers towards liquid milk production, a trend that was quickly sharpened by the policy of the Midland Railway from 1870 onwards of promoting the sale of milk in London.

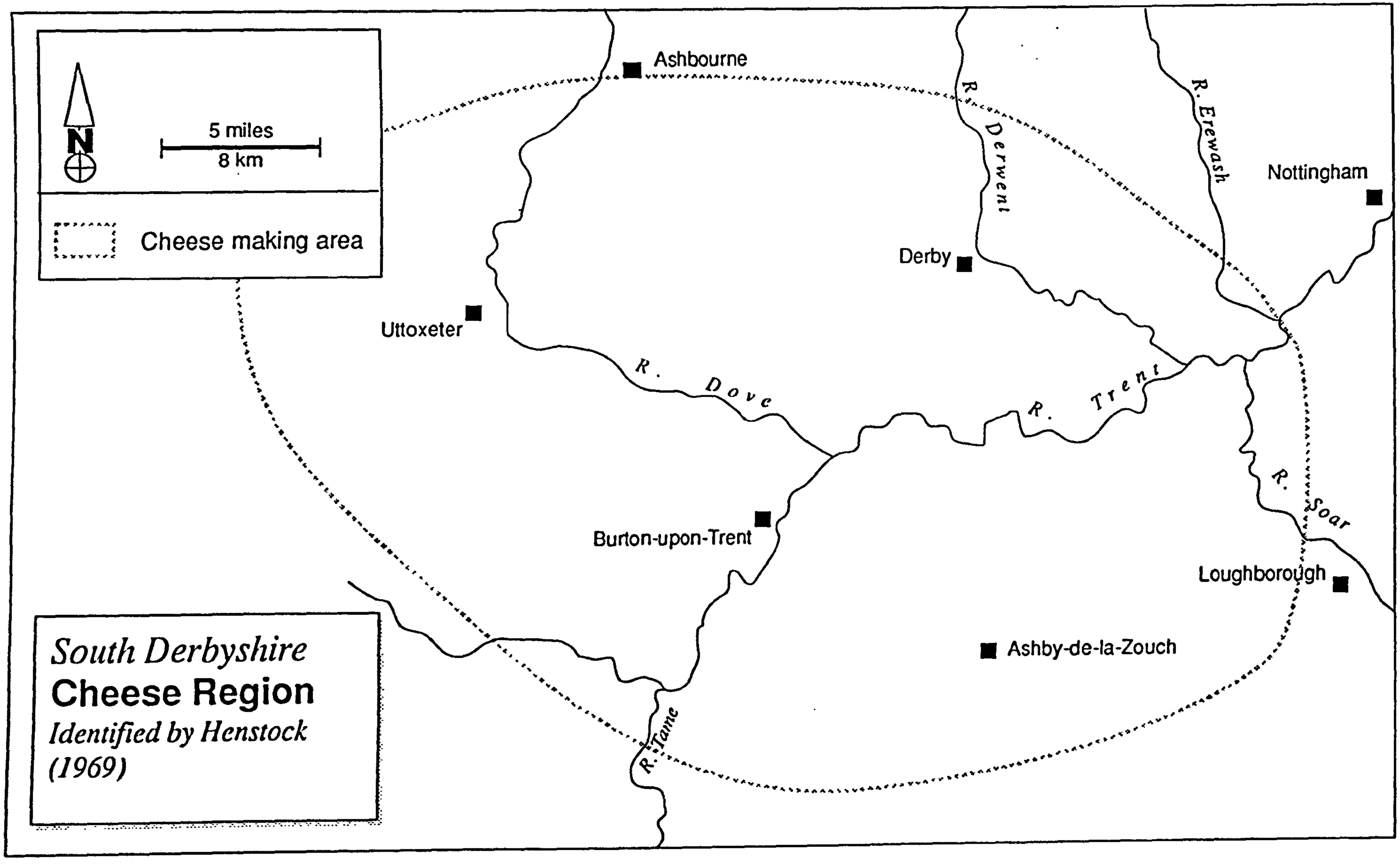

N
5 miles
8 km
Cheese making area
Ashbourne
Derby
Nottingham
Uttoxeter
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Derwent
R. Erewash
R. Dove
R. Trent
R. Soar
R. Tame
South Derbyshire
Cheese Region
Identified by Henstock
(1969)

Figure 9.1

EGGINTON.

AN Excellent Dairy of Short-horned Incalved Cows, Fat and Fresh Barren Cows, Stirks (barren and incalf), eight rearing cow Calves, very superior Short-horned Bull, Fat and Store Pigs, Waggon and Hackney Mares, capital Farming Implements, broad and narrow wheel Waggons and Carts, Gearing, Ploughs, Harrows, Fleaks, with a great variety of Farming Implements, a general assortment of Dairy Utensils, Brewing Vessels, Household Furniture, &c.;

TO BE SOLD BY AUCTION,

By BREAREY & SON,

By direction of the Executors, and without reserve,

On the premises of the late Mr. LOWE, at Eggington, in the county of Derby, on WEDNESDAY and THURSDAY, the 9th and 10th of October, 1839, the sale to commence each morning at half-past ten o'clock.

This Sale consists in part of the undermentioned effects, namely, fourteen superior short-horned incalved cows, high-bred yearling short-horned bull, two barren and one incalved stirk, two fresh barren and four fat cows, thirteen fat sheep, four fat and two store pigs, two waggon mares, one hackney, two yearling waggon fillies, quantity poultry, one capital four and half inch waggon complete, two narrow wheel ditto, three broad wheel carts, one narrow wheel light ditto, an excellent straw cutting machine nearly new, gearing for four horses, single wheel plough, two pair harrows, ox harrow, malt mill, land roller, fifty-five fleaks in good condition, three bonny rakes, three waggon ropes, forks, rakes, sieves and riddles, with a great variety of farming implements; two brass cheese pans and four brass milk ditto, an excellent barrel churn, three large whey tubs, eighteen factors' cheese vats, pair large milk churns, mash tub, three coolers, ten various sized barrels, copper milk kettles, harvest bottles, small quantity wheat and barley, eleven cheeses, two large water tubs, twenty-seven sack bags, together with an assortment of Furniture, &c.

N.B. The Cows are known to be very deep milkers, strong constitutions, and of early note.

Catalogues may be had on the Premises; at the Every Arms, Eggington; and of Brearey and Son, Victoria-street, Derby.

Figure 9.2 Derby Mercury Sale Advertisment.

The advertisment appeared in the newspaper on October 3rd 1839. It is typical of advertisments from farms where dairying and cheese were the main elements of the system.

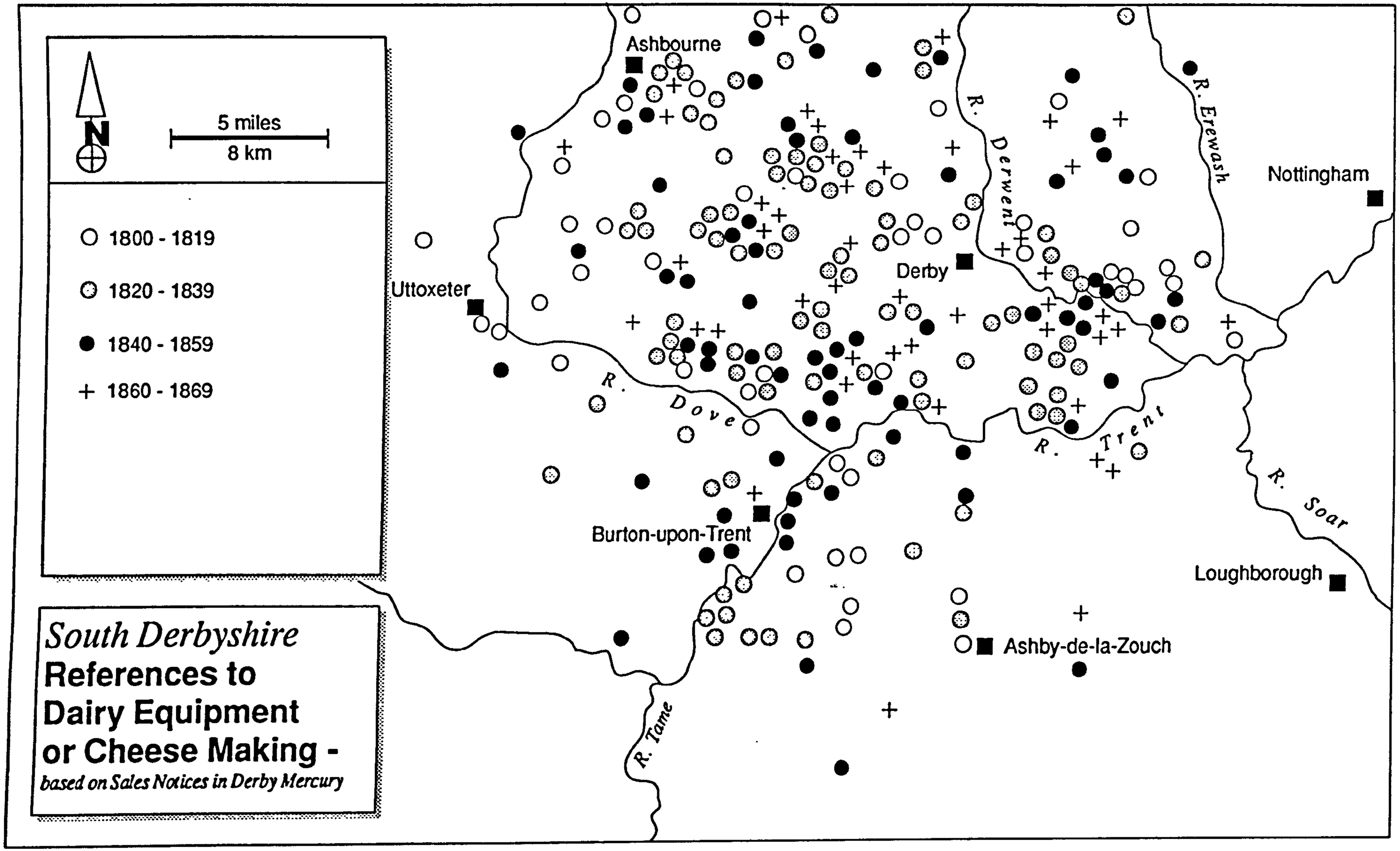

N
5 miles
8 km
1800 - 1819
1820 - 1839
1840 - 1859
1860 - 1869
Ashbourne
Uttoxeter
Derby
Nottingham
Burton-upon-Trent
Loughborough
Ashby-de-la-Zouch
R. Dove
R. Derwent
R. Erewash
R. Trent
R. Soar
R. Tame
South Derbyshire
References to
Dairy Equipment
or Cheese Making -
based on Sales Notices in Derby Mercury

Figure 9.3

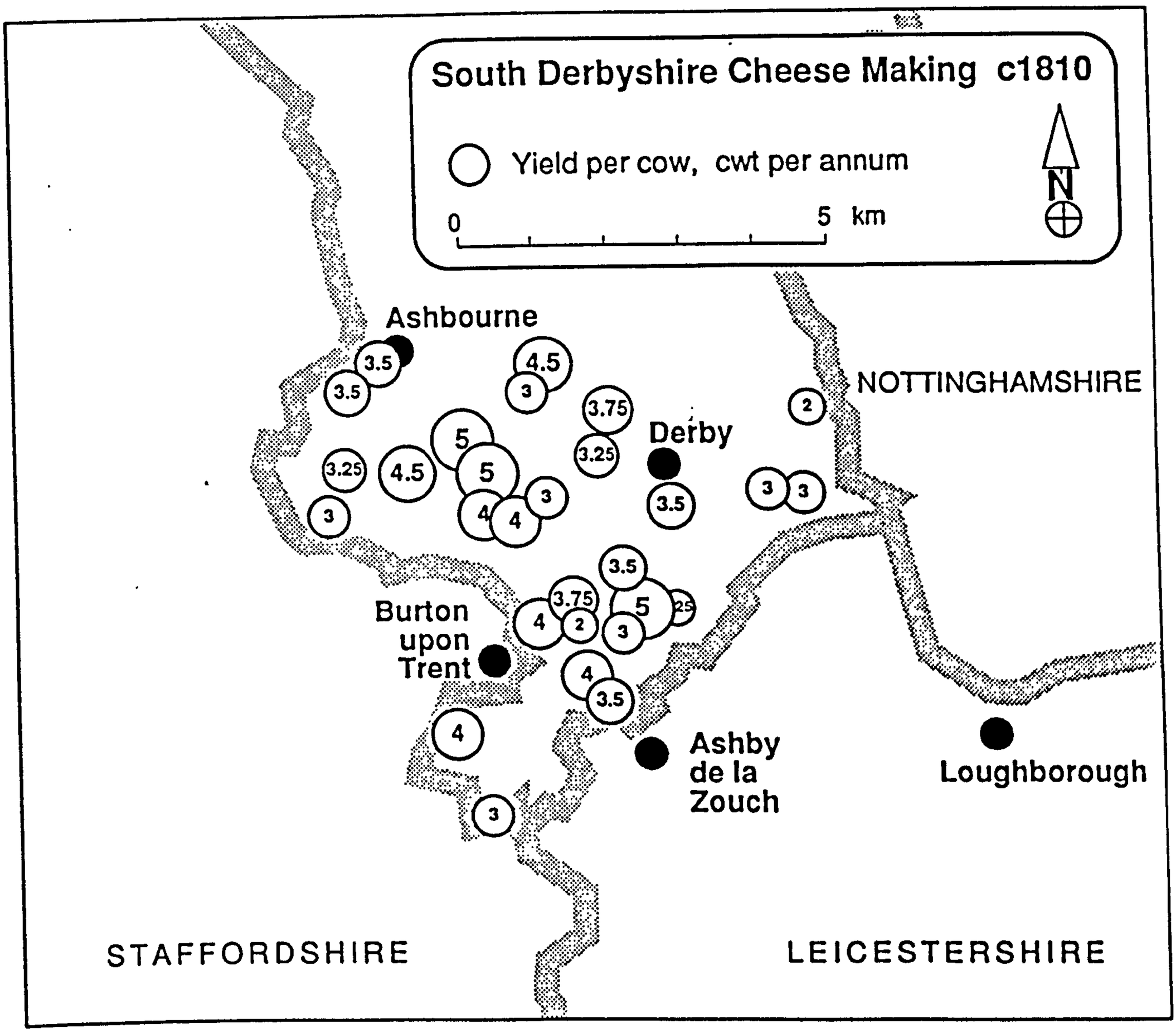


Figure 9.4
(based upon data in Farey J 3.1817)

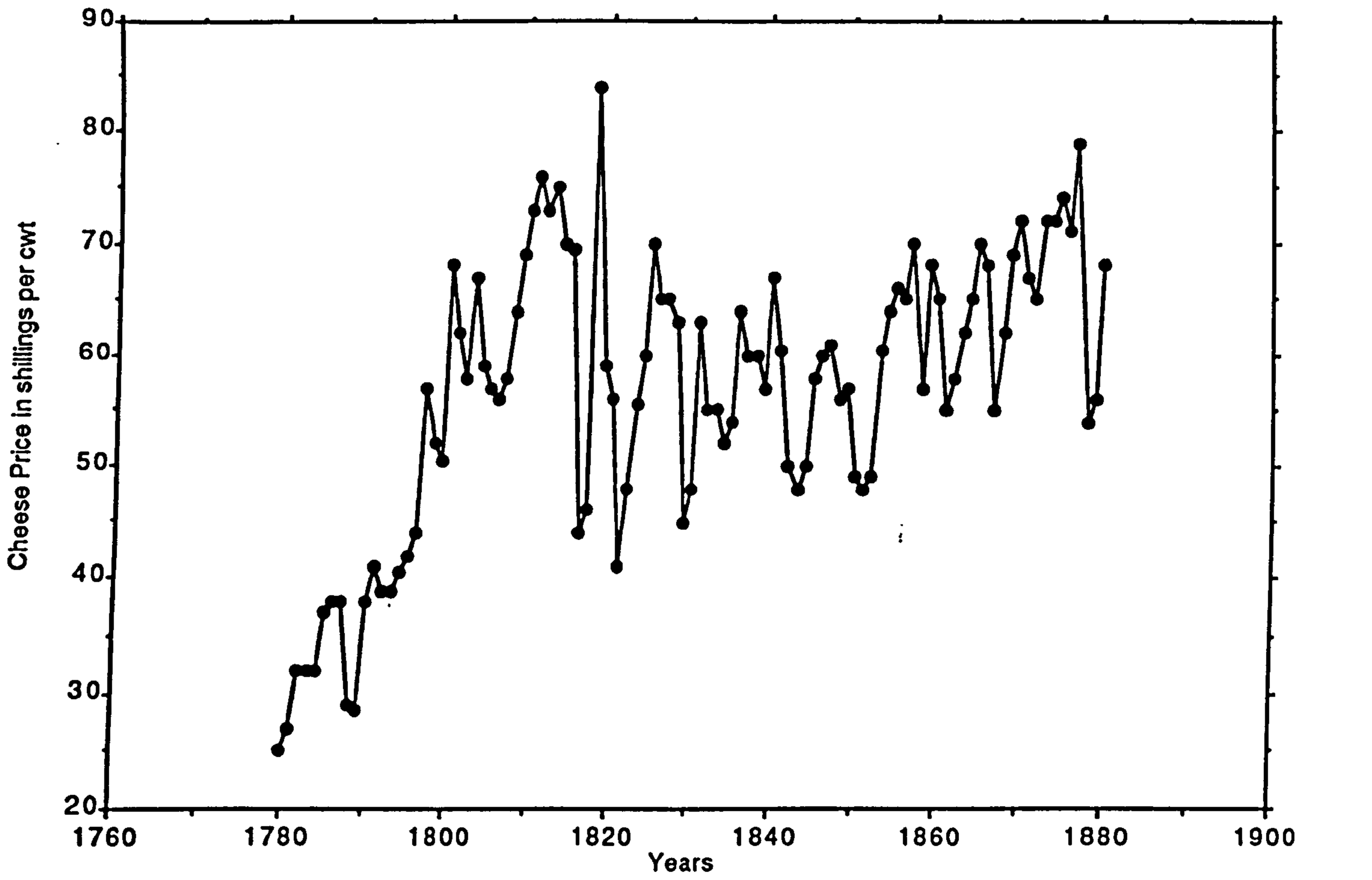


Figure 9.5 Average Prices a Derby Cheese Fair 1780 - 1880 (Source: Derby Mercury)

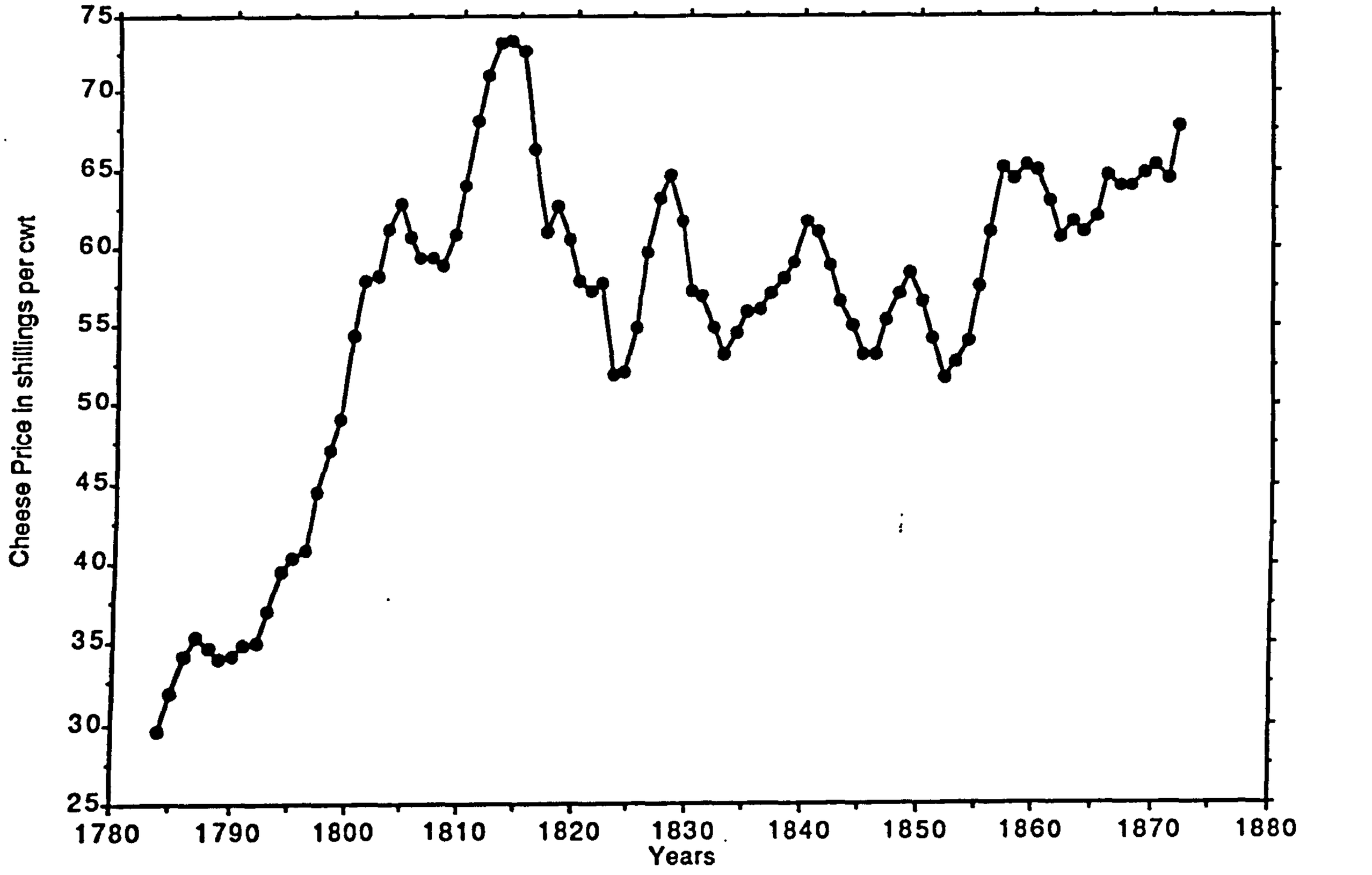


Figure 9.6 Five Year Moving Average of Prices at Derby Cheese Fair 1780 - 1880 (Source: Derby Mercury)

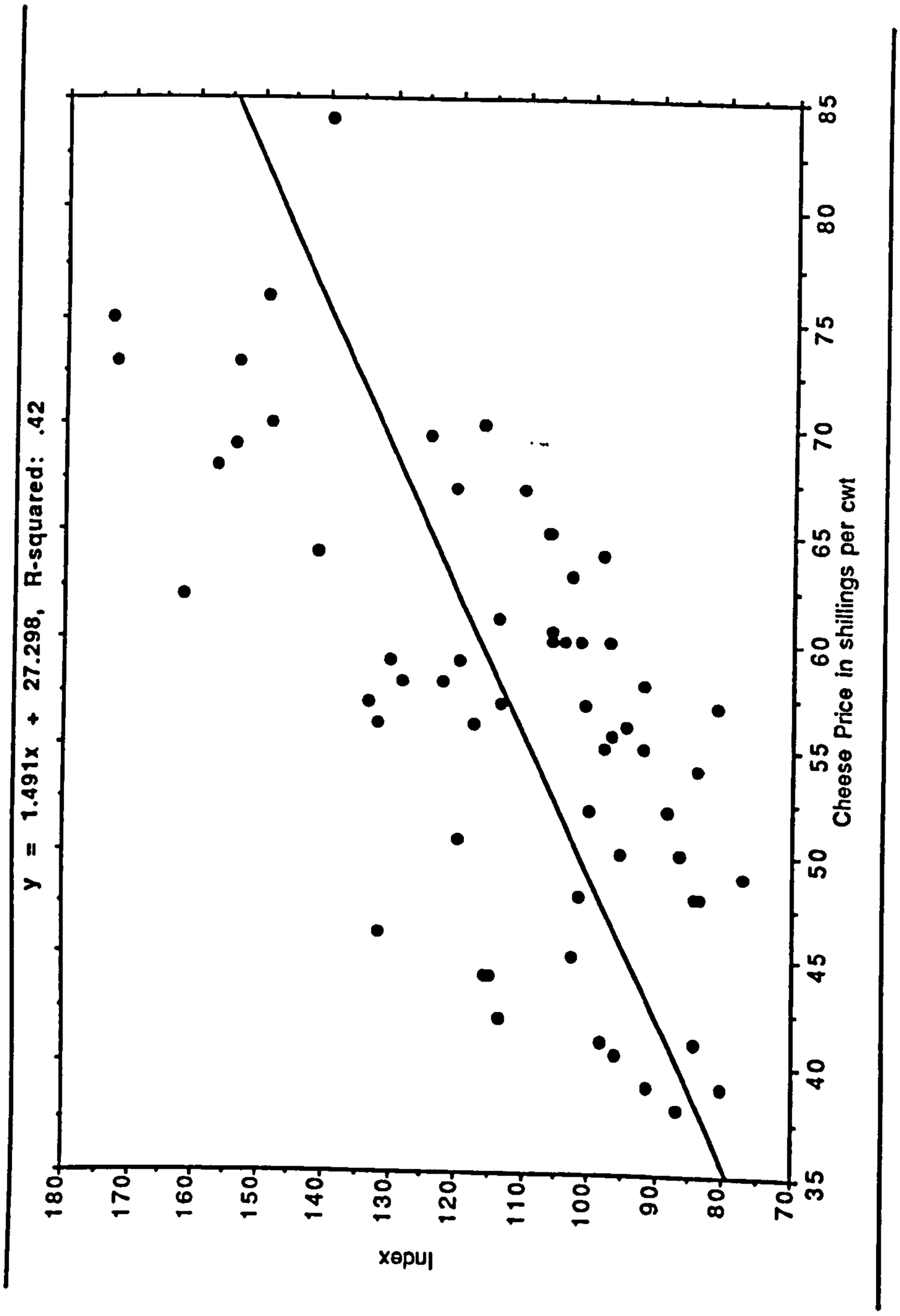


Figure 9.7 Prices at Derby Cheese Fair Correlated with the Gayer, Rostow, Schwarz Index for Domestic Commodities

Note: There is a strong statistical relationship, well within the 99% confidence limit, between cheese price and the index.

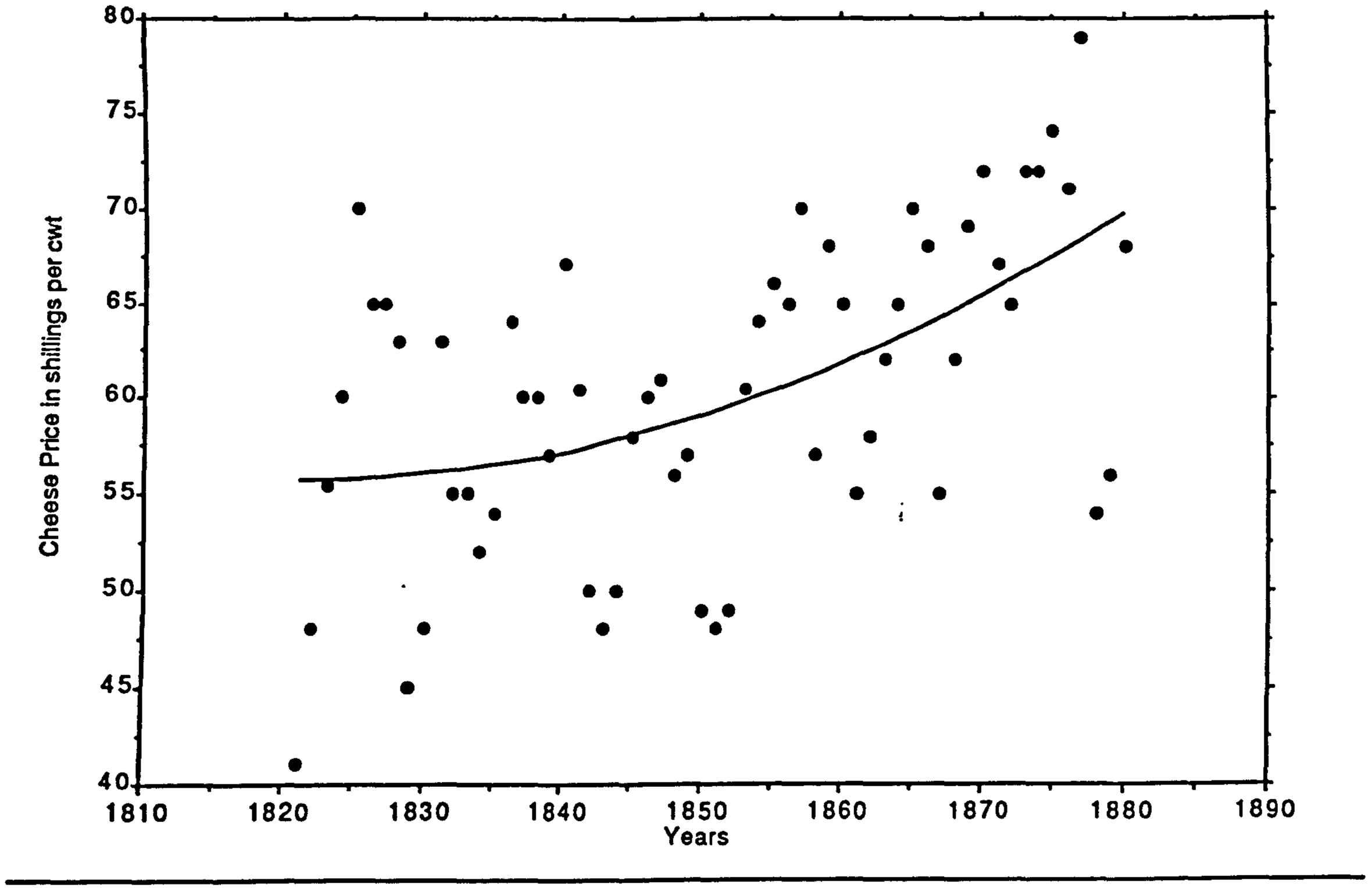


Figure 9.8 Price Trends at Derby Cheese Fair 1820 to 1880 (Source: Derby Mercury)

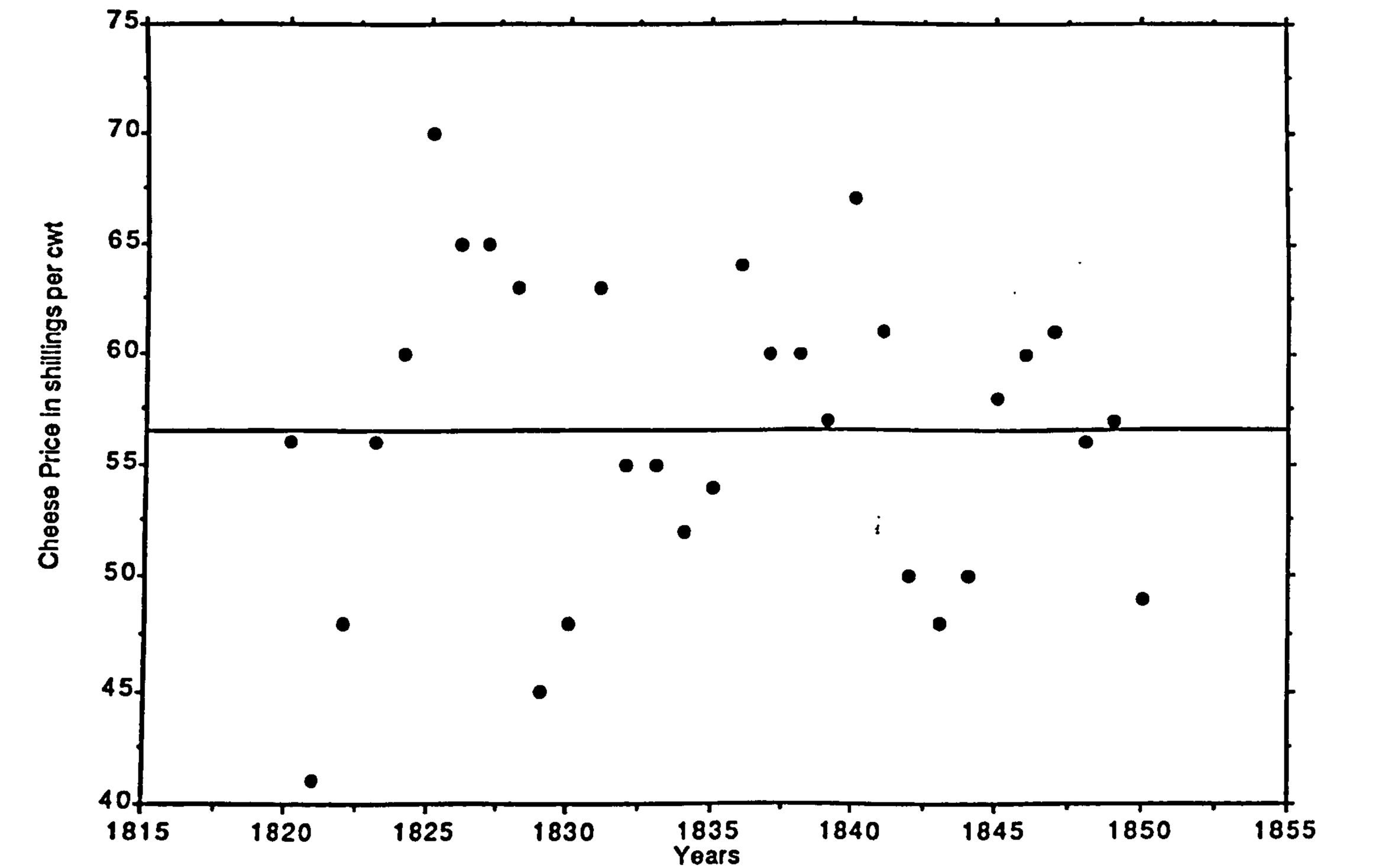


Figure 9.9 Price Trends at Derby Cheese Fair 1820 to 1850 (Source: Derby Mercury)

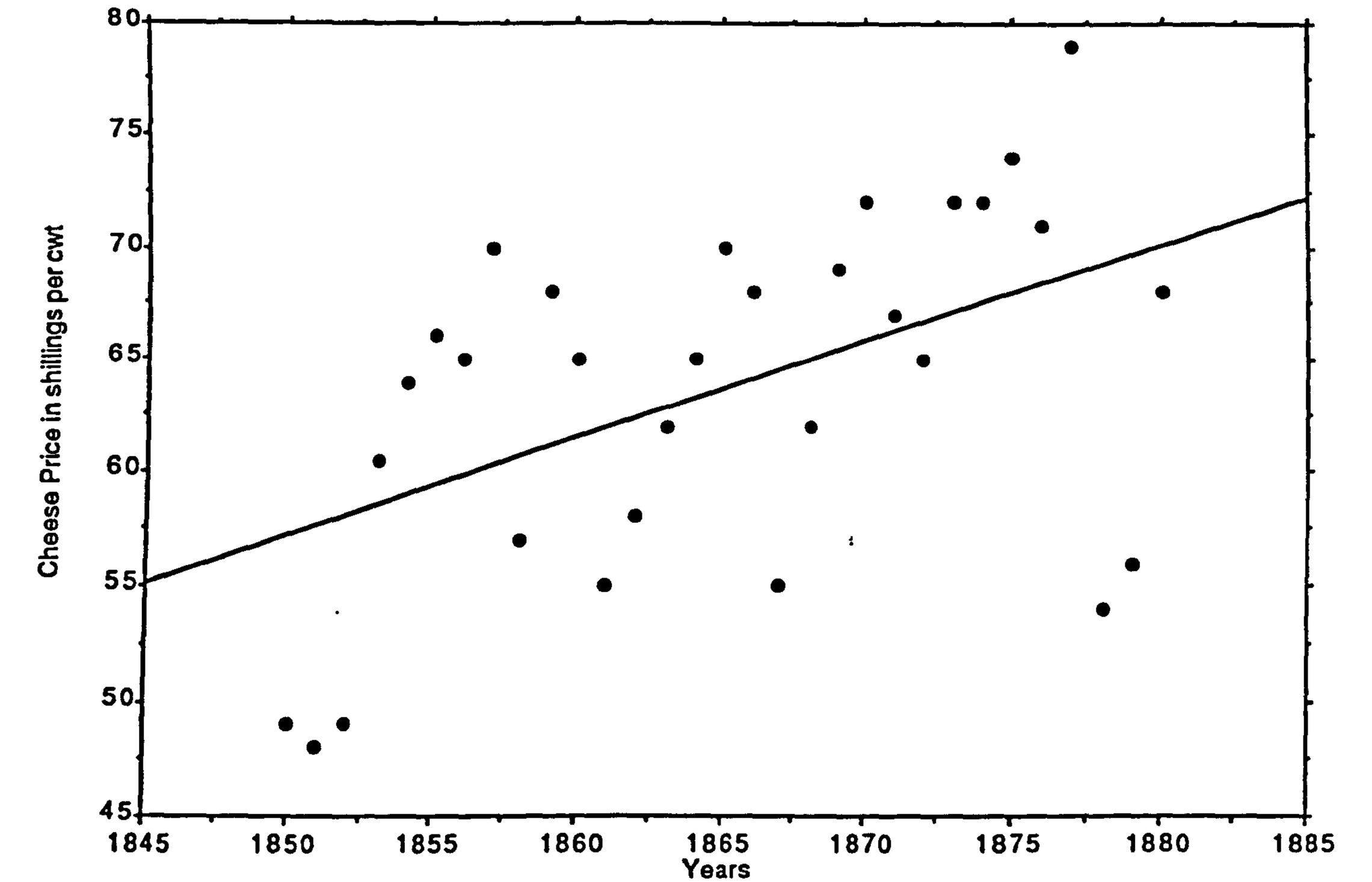


Figure 9.10 Price Trends at Derby Cheese Fair 1850 to 1880 (Source: Derby Mercury)

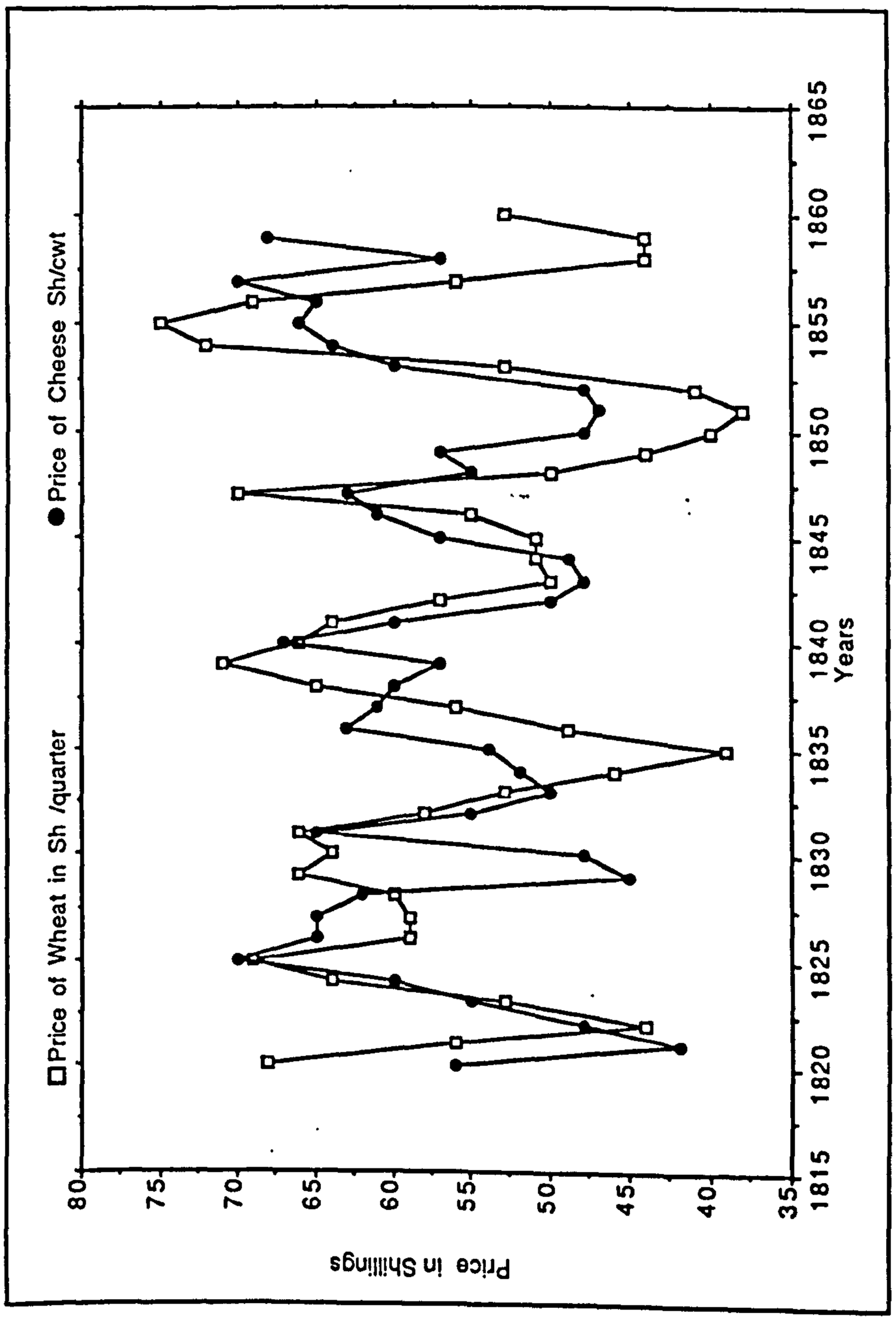


Figure 9.11 Comparison of Cheese and Wheat Prices for Derby 1820 - 1860.
(Source: Derby Mercury)

Note that the swing in wheat prices is greater than that for cheese.

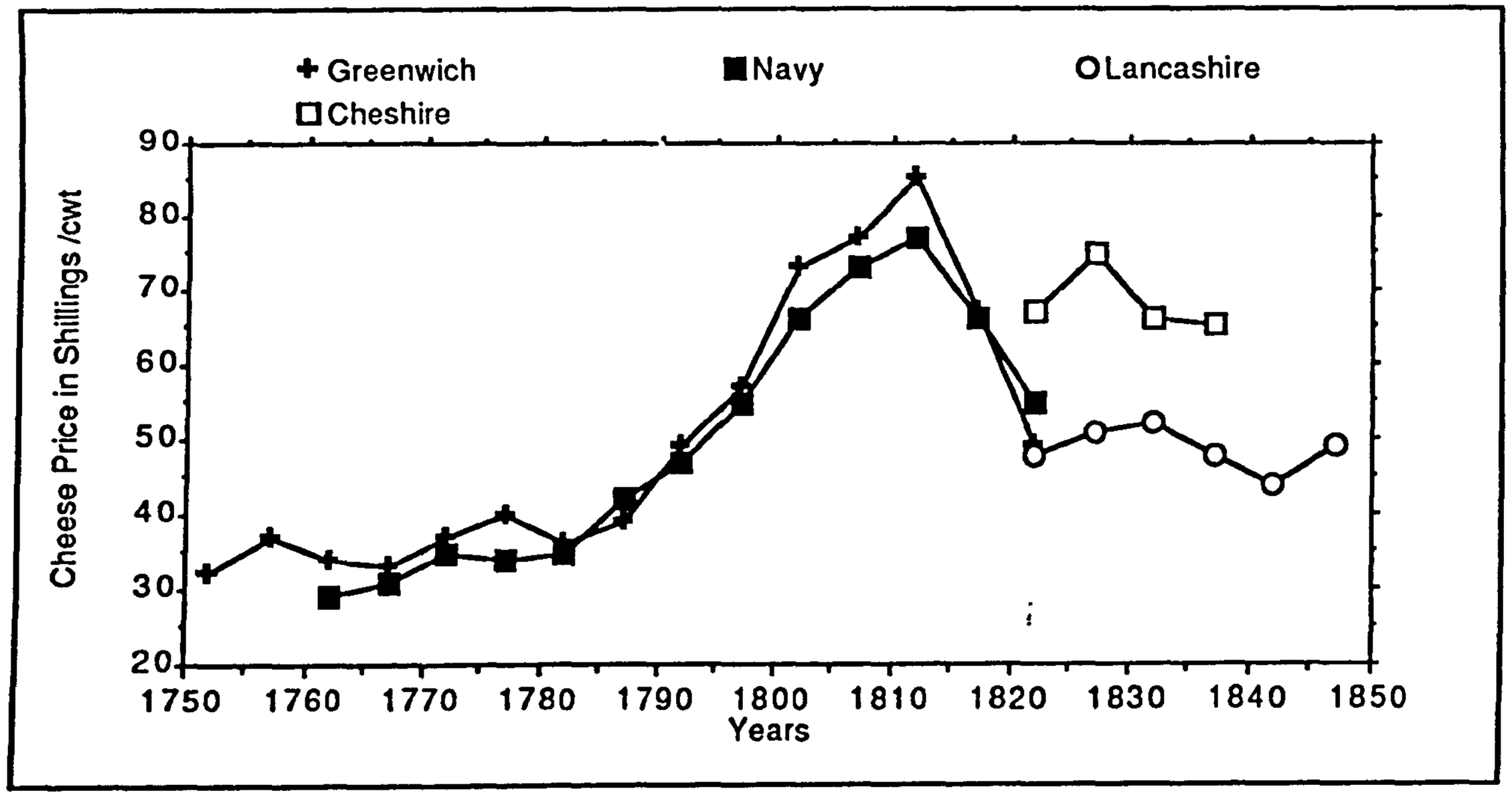


Figure 9.12 Comparison of Cheese Prices 1750 to 1850

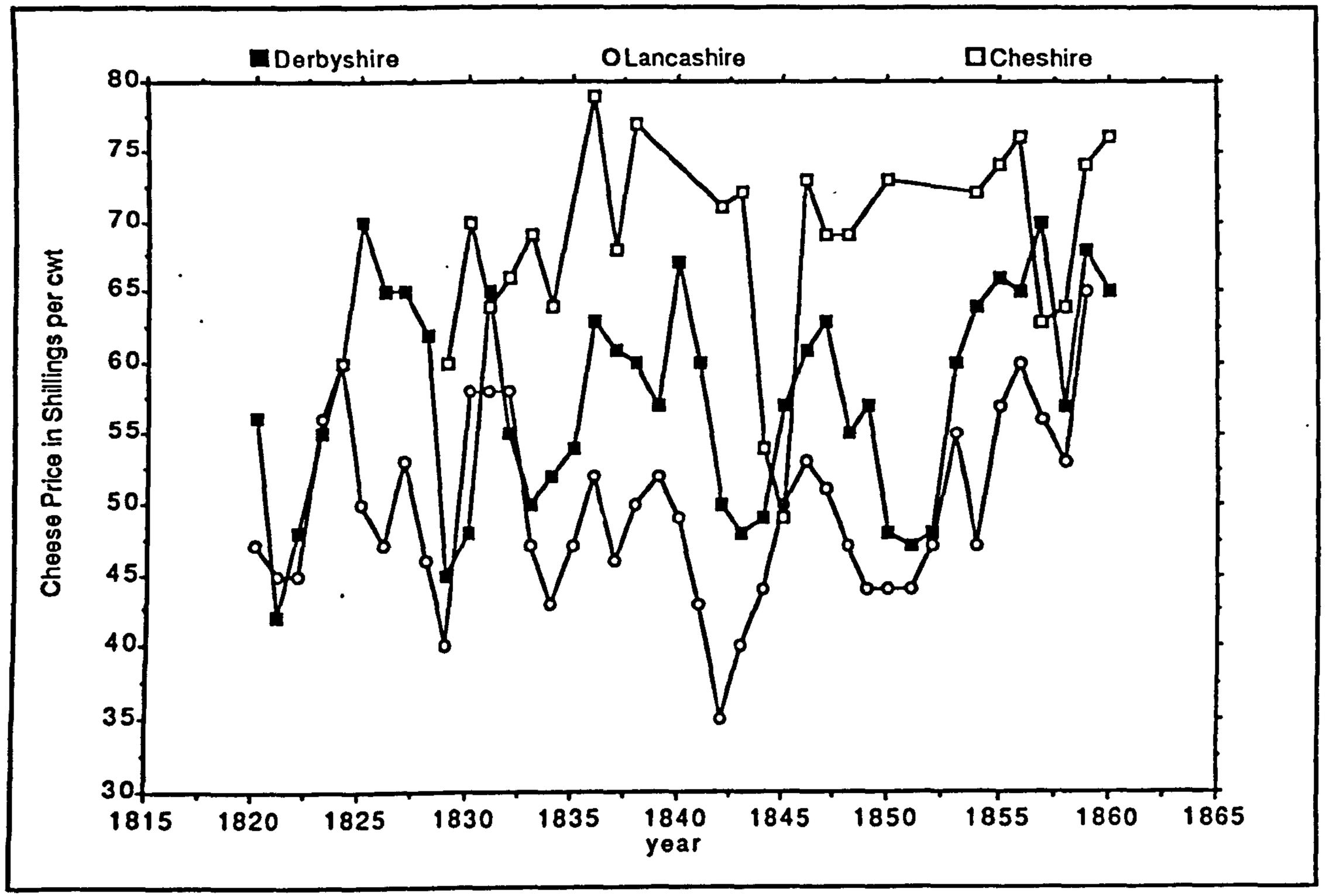


Figure 9.13 Annual Trends of Derby Lancashire and Cheshire Cheese Prices 1820 - 1860.

(Based upon Mingay G.E.ed. 1989 p.1001 and Derby Mercury)

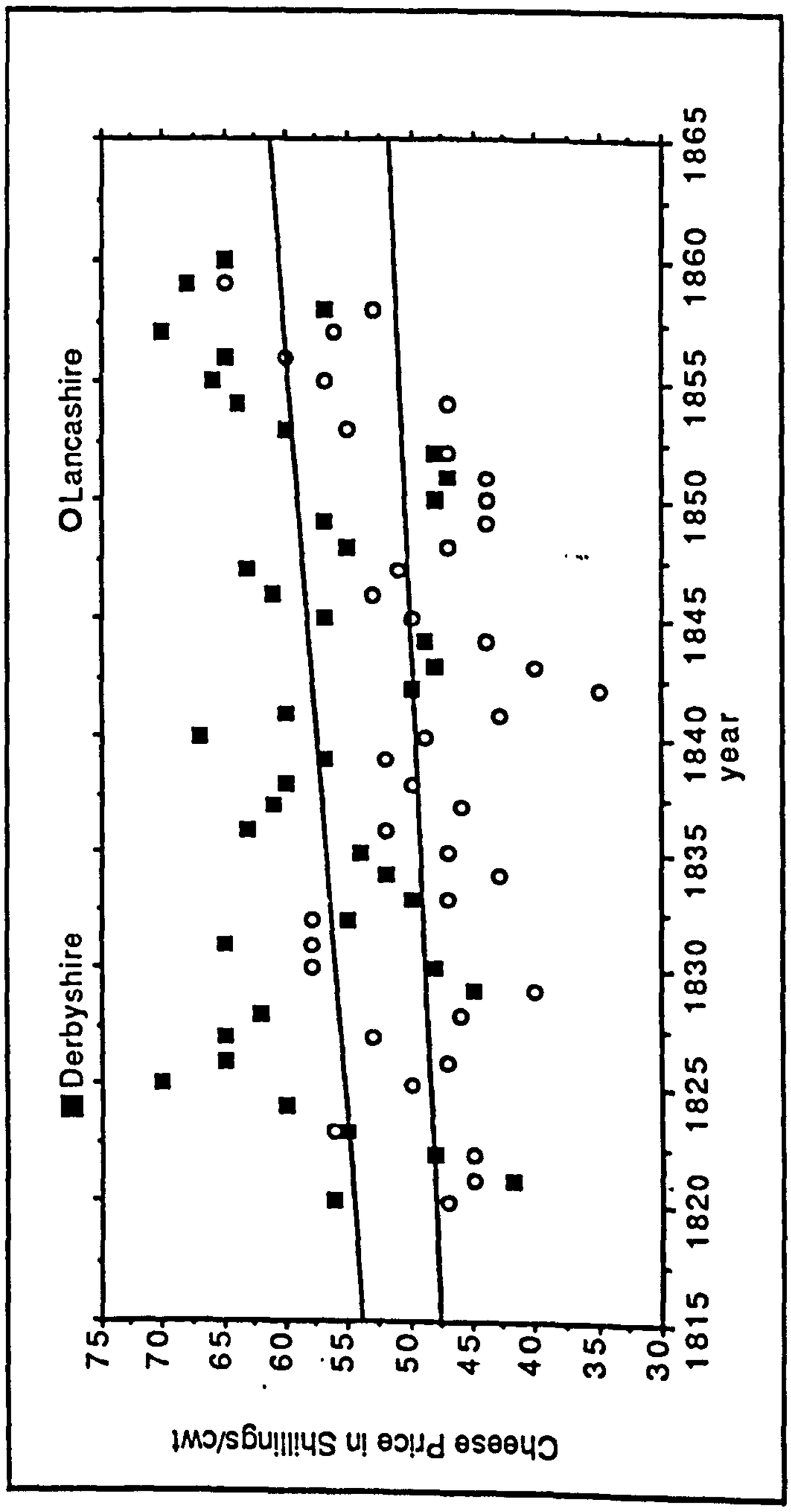


Figure 9.14 Comparison of Overall Trend of Derbyshire and Lancashire Cheese Prices 1820 - 1860.

(Based upon Mingay G.E. ed.1989 and Derby Mercury)

Note that the statistical relationships between price and time are weak. For Derbyshire R2 = .058 and p = .1306 and for Lancashire R2 = .021 and p = .3734.

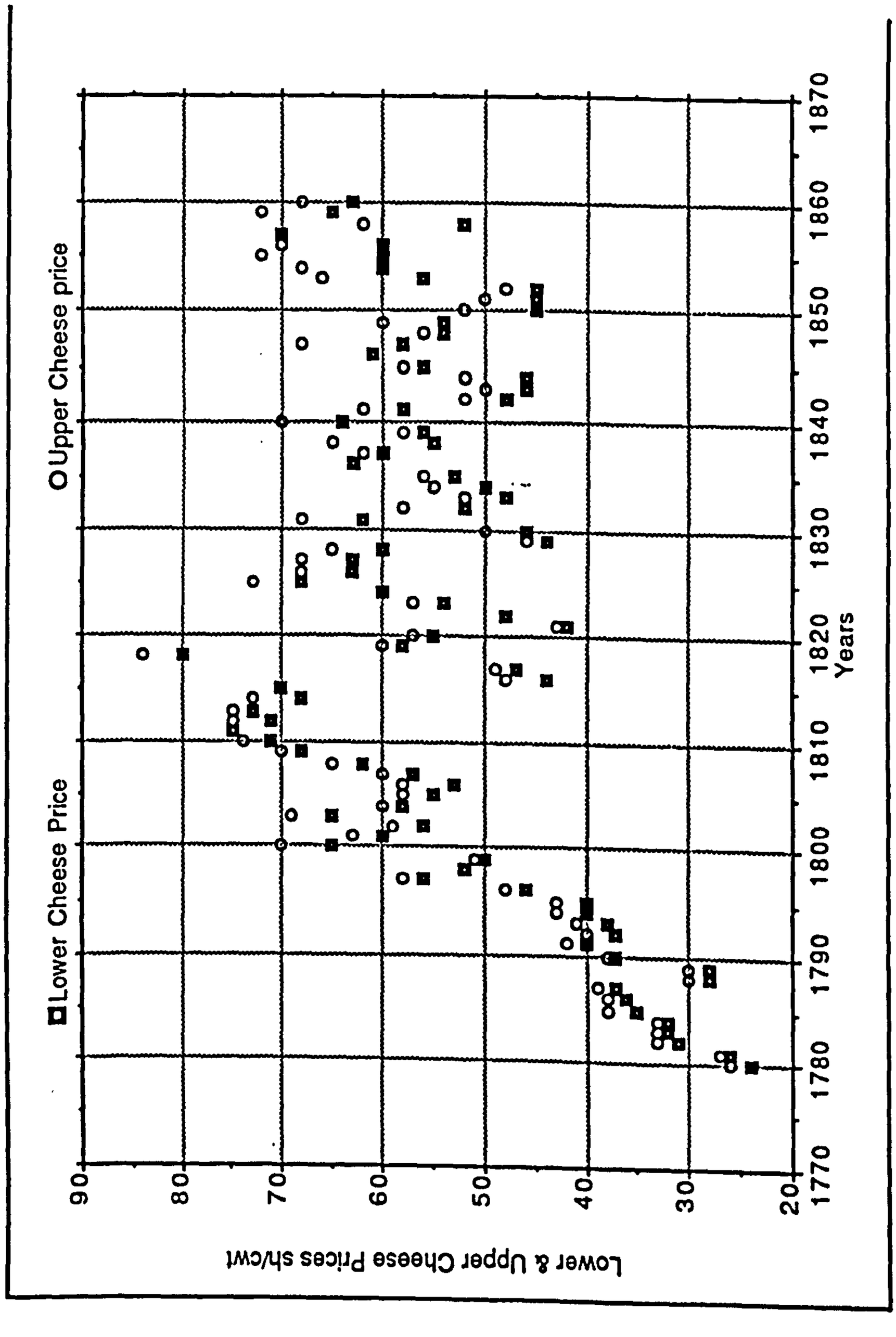


Figure 9.15 Derby Cheese Fair 1780-1860 - Upper and Lower Cheese Prices Obtained.

Note: The range of price is indicative of quality. It appears that the better quality cheese fetched relatively higher prices as time

Table 9.1

References to Dairy Utensils (DU) and Cheese (Ch) in Derby Mercury Farm Sale Advertisements

	'Red Marl'		South of Trent		Shales and Coal Measures		Total	
Decade	DU	Ch	DU	Ch	DU	Ch	DU	Ch
1790	2	3	2	1	-	1	4	5
1800	6	5	5	3	3	3	14	11
1810	8	5	3	3	3	1	14	9
1820	19	16	1	7	6	4	26	27
1830	20	34	7	4	2	3	29	41
1840	16	26	2	3	8	4	26	33
1850	18	13	6	2	4	2	28	17
Total	89	102	26	33	26	18	141	143

Table 9.2

Comparison of Average Prices Obtained at Derby Cheese Fair with other Cheese Fairs in shillings per hundredweight.(Source : Derby Mercury)

	Derby	Chesterfield	Nottingham	Loughborough	Ashbourne	Northampton	Shrewsbury	Worcester	Reading	Newark	Coventry
1780	25	25		24							
1781											
1782											
1783											
1784											
1785											
1786											
1787											
1788											
1789	29	28									
1790											
1791	37		39								
1792	41	42									
1793	41	42						45	37		
1794	47	48									
1795											
1796	49		48	49							
1797	42			42							
1798											
1799	50	50		50							
1800											
1801											
1802											
1803											
1804	57	58				57					
1805											
1806	56	58		55							
1807											
1808											
1809											
1810	72		72	71							
1811											
1812											
1813											
1814											
1815	70		70	70							
1816											
1817	46			46							
1818											
1819	48			49							
1820											
1821	56	55	55	53	57						
1822											
1823	42		42	42							

Table 9.2

continued

	Derby	Chesterfield	Nottingham	Loughborough	Ashbourne	Northampton	Shrewsbury	Worcester	Reading	Newark	Coventry
1824											
1825											
1826	65	65	66	65						75	
1827											
1828											
1829											
1830											
1831	48				49						
1832											
1833	54			53							
1834											
1835	50			51							
1836											
1837											
1838											
1839											
1840											
1841											
1842											
1843											
1844											
1845											
1846	61		61								
1847											
1848	55										
1849											
1850	49				43	47					58

Table 9.3

Derby Cheese Fair - Comment on Trade (Source: Derby Mercury)

	Average Price (Shillings/cwt)	Supply	Buyers	Trade
1810	72	Quantity Large		Flat - Cheese taken home
1816	47	Crowded	Numerous	
1817	48			Brisk
1818	82	Larger than expected		Rather brisk
1819	59	Largest for many years		Brisk - Inferior not saleable
1821	43	Unusually large		
1822	48		More numerous than	
1823	56	Unusually crowded	Numerous	Prices not so low as expected
1826	65	Less than usual severe drought	Demand not brisk	Price lower than expected
1828	63	Very considerable		Sales very rapid
1831	65	Deficiency of make	Numerous	Price high
1832	55	Large supply		Sales heavily affected-prices decline
1834	53	Good supply		Very brisk
1835	55	An unusual quantity		Mostly sold
1836	63	Large quantity		Mostly sold
1837	61			Buying slack
1838	60	Good supply		
1840	67	Much less than usual		
1842	51	Plentiful	Numerous	Few unsold-price low
1845	57	Large		Readily sold
1848	55	Large-quality inferior		Depressed-factors have large stocks
1851	48	Upwards of 600 waggons		
1852	48	Above average		Brisk
1854	63	Rather small		Sold rapidly
1855	64	Very respectable		
1859	65	Below average	Few	Prices declined

	1800	CHANGE FACTOR 1800 - 1870		1870
Dairy Cows- England and Wales	975000			1500000
Dairy Cows- Derbyshire	38000	65	per cent	59350
Dairy Cows- Southern Derbyshire	18800			28800

Cheese Output
Derbyshire

Yield per Dairy Cow in cwt	Conversion Rate Milk to Cheese per cent		
	80	70	60
2	3040	2660	2280
2.25	3420	2990	2565
2.5	3800	3325	2850
2.75	4180	3657	3135
3	4560	3990	3420

Resultant Output in tons

Yield per Dairy Cow in cwt	Conversion Rate Milk to cheese per cent		
	80	70	60
3.25	7670	6709	5752
3.5	8260	7227	6195
3.75	8850	7745	6637
4	9440	8260	7080
4.25	10030	8775	7523

Resultant Output in tons

Table 9.4 Scenarios for Numbers of Dairy Cows and Cheese Production in Derbyshire 1800 and 1870

CHAPTER 10

AGRICULTURE IN SOUTHERN DERBYSHIRE: DISCUSSION AND CONCLUSION

Part 1: The Farm System

The preceding chapters have dealt with a sequence of topics which comprise a wide ranging discussion of aspects of southern Derbyshire agriculture from the late eighteenth century through to the 1870's. The purposes of this chapter are twofold both of which seek to address the questions identified in the agenda for this investigation set out at the close of Chapter 1. The first involves four stages beginning with a review of the basic facts of the spatial and temporal characteristics of southern Derbyshire agriculture which have been identified during the period 1770 to 1870. The second stage considers the economic circumstances which might explain why change occurred while the third seeks to draw separate strands of argument together in order to clarify the mechanisms through which the farming community brought about change. The fourth stage attempts to summarise the linkages between the main elements of the evolving farm system through the development of a structural model. The second purpose of the chapter is to consider southern Derbyshire agriculture in relation to ideas which have influenced thinking about agricultural change in the wider sense: the notion of revolutionary progress, the differentiation between light and heavy land agriculture and the concept of a period of particular prosperity associated with the term High Farming during the 1850's and 1860's.

The fundamental premise has been that the main character of agriculture in southern Derbyshire was founded upon a grass based economy. The produce of the dairy and associated activity was the main enterprise with sheep, beef and arable production as subsidiary rather than alternative activities. Throughout the discussion it has been accepted that southern Derbyshire was not a totally distinct agricultural region as pastoral enterprise

with a strong dairy focus occurred northwards and westwards into the limestone Peak and Staffordshire and southwards and eastwards into Leicestershire and Nottinghamshire. It is the case, however, that red marl country north of the Trent has emerged as having a particular association with dairying. In coming to this view a range of contemporary opinion has been consulted from the early reports of the likes of Young [Young A, 1771], Marshall [Marshall W M, 1796], Brown [Brown T, 1794] and Farey [Farey J, 1817] to the later comment of such as Rowley [Rowley J J, 1853], Morton [Morton J C, 1878], Druce [Druce S B L, BPP 1880-82] and Sheldon [Sheldon J P, 1883 and 1893]. The consistency of their opinion is striking and a clear message emerges of the development of a specialist dairy region achieving greater productivity with the passage of time. In the endorsement and elaboration of this general view the present research is supported by earlier investigations by Bond [Bond J R, 1932], Fussell [Fussell G E, 1951], Henstock [Henstock A, 1969, and Hey [Hey D, 1984]. Indeed Henstock and Hey both point to an early beginning to interest in dairying which was well established by the eighteenth century with cheese as the prime product of the system.

A major concern has been to quantify the characteristics of agriculture. The sources which have been investigated, the sale advertisements and special regular reportage of the annual Cheese Fair in the Derby Mercury in combination with the agricultural census of 1870, also confirm the importance of the dairy herd and of dairy production. The data which has been assembled is varied in character but using the 1870 census as an anchor it has been proposed in Chapters 8 and 9 that, in accord with national developments, the dairy herd doubled in numbers between 1770 and 1870. On this basis the production of cheese was increased by a factor approaching four over the hundred year period given cautious assumptions about average milk yields per cow and the percentage of milk converted into cheese. The growth in the number of milk cows at the regional level of southern Derbyshire and also at county level was accompanied by a steady increase in the size of units of production so that sale advertisements indicate an average farm herd of 11.5 milk cows in 1800 rising to 18.5 in 1870. Working retrospectively from

1800 it is implicit that herds averaged 8.5 in 1770. Such an increase needs to be considered as a component of the change in the total number of livestock units in relation to farm size. The question is whether the extra 64% of units which were characteristic of farm sales by the 1860's as compared with the 1800's meant that farms were managed in a way which enabled more stock to be carried or that average farm size increased which gave farmers scope for keeping more livestock. Perhaps a combination of both trends should be considered although the rather inconclusive discussion of farm size in Chapter 5 indicated that the numbers of very small farms were reduced rather than a clear emergence of more holdings in the larger categories.

Significant growth in the number of cows also implies accompanying and perhaps proportional change in the enterprises associated with dairying namely the fatting of discarded cows, the disposal of surplus male calves and the raising of pigs. Positive development in the dairy sector worked alongside variable change in the lesser sheep sector where numbers have been shown to have declined on the red marl country but to have increased to the south of the Trent. It is the combination of changes in the cattle and sheep populations expressed in livestock units [Table 8.1 and Figure 8.1] which resulted in an increase in the amount of stock carried in southern Derbyshire of about 64% between 1800 and 1870. Adjustment of this order in the dominant livestock enterprises took place against an agricultural landscape previously marked by a movement to the conversion of arable to grass. This adjustment appears to have slowed at the turn of the eighteenth century so that during the nineteenth century the ratio of 70% permanent grassland to 30% arable stabilised until the onset of depression in the 1870's accelerated the move to grass once more. Evidence suggests that small farms of less than 30 acres were all grass so that on the larger holdings which had arable the proportion averaged 40%. The contemporary view expressed by Evershed was that the role of arable was to support the dairy enterprise. It is apparent that the greater proportion of arable was temporary grass and that as the nineteenth century progressed the area given over to green crops for fodder all but doubled. Concurrently the range and

quantities of purchased feed also increased with brewers' grains having particular significance in the southern Derbyshire area with its easy access to the rapidly developing brewing industry of Burton. The major crops for sale were wheat and barley, the former being of general interest to farmers with barley confined to parishes south of the Trent. The line of the Trent has emerged as an important internal boundary with respect to the character of agriculture in southern Derbyshire with the greatest interest in dairying located on the marls and clays to the north but a distinctly more varied agriculture developing to the south where the lighter soils of the Bunter and Keuper Sandstones occur. Even so dairying was the major farm enterprise in all parts by 1870 and in its more specialised form on large farms such as those of Carrington and Archer [see Tables 7.6a and 7.6b] accounted respectively for about 75% and 65% of farm income of which cheese contributed in the region of 50%. Heavy reliance on cheese also characterised the prevalent structural arrangement of small estates subdivided into small family farms. Small farm units were appropriate for dairying but inevitably led to variation in quality of product which became a major problem as cheaper and more uniform imported cheese became available from the 1850's onwards. The system underwent major directional change in the 1870's so that within the space of a decade farmhouse cheese was superceded by the factory product and the sale of liquid milk with the Midland Railway as the controlling organisation.

Given that farmhouse cheese was the major agricultural product of southern Derbyshire throughout the period 1770 to 1870 and one which all but quadrupled in output then it is implicit that the economic climate was favourable to the cheese producer. This was the basic driving force which led to the agriculture of the region assuming the character which it did. Ideally the discussion should focus on profitability to the farmer but the available data relates to price variation for cheese and inference with respect to supply and demand. The rising level of demand for cheese and other commodities must have related to the food needs of a population which approximately trebled between 1770 and 1870. Such a positive analysis of the economic context for agricultural activity has been shown to have been

deceptive as farmers did not work in a stable situation. This is evident from long term price movement and also from the shifts which occurred between consecutive years.

For Derbyshire cheese producers it has been argued in Chapters 4 and 9 that the price trends [see Figure 9.5] based upon the annual autumn Cheese Fair held in Derby provide important evidence as to change in the economic environment. Prices at the Derby Fair reflected the general price offered by factors to farmers during a given year and hence that obtainable for the better quality product sold out of the county. Significantly the prices at Derby Cheese Fair have been shown to have been comparable to those at other fairs in the Midlands and beyond. A general regional indicator of prices and price change from year to year would therefore be similar to that generated for the fair event at Derby.

Important features of the graphs of cheese prices [see Figures 9.6 to 9.15] are the sequence of trends between 1780 and 1810, 1810 to 1820, 1820 to 1840 and from about 1840 onwards. The upward trends from 1780 to 1810 and the readjustment to 1820 are comparable with those for other agricultural commodities including grains. So that the sharp but fluctuating rise in prices through to the period of the French wars followed by a sharp fall once peace had been restored may be regarded as typical of the period. The trebling of the price of cheese between 1780 and 1810 must have been a major stimulus to farmers to build upon the established trend to greater emphasis on dairying and to have thus created a considerable degree of inertia in the system.

The most problematic phase is that from 1820 to 1840 when agriculture generally was depressed. Prices remained stable on average but showed strong annual fluctuations and also moved with the cyclic pattern of trading. In southern Derbyshire the comment of Smith [Smith W, BPP 1833] is clear in signalling difficulty for wheat growing compared with a more positive environment for dairymen. His evidence to the House of Commons Select Committee underlined the real difficulty experienced in making arable farming pay. Landlords were adjusting rents in

order to assist farmers to remain solvent while local custom led to the labour force being retained on the farm rather than being dismissed only to become a burden upon the parish. In parallel to this gloomy situation for wheat growers Smith noted the rise in the price of cheese on account of the growth in the local manufacturing population. Analysis of price trends for the two commodities reveal only a hint of a positive divergence of cheese prices from grain prices after 1820 and it is difficult to be certain that the advantage was with the cheese producer in a majority of years. Perhaps the significant feature of price movement was the extent to which fluctuation of cheese prices was markedly less than that for wheat. Both commodities were subject to extremes of weather which have been shown to have influenced both quality and quantity. Wheat and cheese prices were also subject to cyclic movement in parallel with other commodities so that periodically successive years of falling prices occurred indicative that even an expanding market was well supplied. The much sharper fluctuations in wheat prices created situations where the optimist had reason to believe that at last everything was coming good but indicate that income levels must have moved more widely than for cheese. It could have been that the less volatile price of cheese gave an important dimension of greater financial security than wheat. For whatever reason during the period 1820 to 1850 the dairy farmers of southern Derbyshire had an incentive to increase their output of cheese and to stabilise, reduce or even possibly withdraw from wheat production.

The character of the cheese market eventually changed rapidly and decisively beginning in the 1850's. It is from this time that analysis of relative price trends, as demonstrated by Hueckel, indicate that livestock products moved strongly ahead of grains [Hueckel G, 1981]. The market was stimulated by the war with Russia and prices entered into a phase of predominant upward movement into the 1870's. Even so from this time a sharp increase in the availability of cheaper good quality imported cheese threatened the security of the home producer. Perren [Perren R, 1989 p.255] has argued that the import of cheese was very modest before 1850 and was only really felt after 1870 but the evidence from contemporary commentators including the

promoters of cheese factories suggests that this was not the case. Even in the 1830's there is evidence of concern with regard to Irish imports. The House of Commons Select Committee heard that in Cheshire such imports influenced the viability of trade in the north west. It has been shown in Chapter 9 and elaborated by Tomson [Tomson G A, 1986] that the cheese factory experiment was only marginally successful in maintaining the traditional product and that, despite high prices for cheese, the margin of profit moved decisively in favour of milk.

In considering the factors which in combination might explain how the farm community raised the productivity of their enterprises key matters are the increase in the numbers of stock kept on the land, the likelihood that the general quality of the stock was improved and the clear implication that both the availability and quality of feedstuffs were also enhanced. It has proved difficult to gain an accurate measurement of change in stock rates other than by projecting backwards from the 1870 census and working with a doubling in the numbers associated with dairying and a reduction in the numbers of sheep. The consequent near doubling in the number of livestock units would indicate a need for at least a doubling in the provision of feed over the period 1770 to 1870. As has been argued in preceding chapters the farmers of southern Derbyshire achieved such change through a combination of progressive activities among which working with the land to recognise and enhance its capability was a feature of general importance.

With respect to the character of the land it has been shown in Chapter 3 that this was expectedly variable consequent upon solid and surficial geological and also topographic circumstances. In terms of land capability three types of agricultural environment have been recognised. The contrasts between freely drained sands and gravels, riverine flood plains and varied clays are clear but each underwent important agricultural reassessment as time progressed. The light soils some of which were unenclosed heath until the latter eighteenth century became focal points for arable production, the floodplains perhaps ceased to be the famed grazings of the eighteenth century but were above average quality and the

claylands increasingly supported a pastoral landscape. The floodplains are unusually extensive occupying one fifth of the agricultural area and could have made a particular contribution to the availability of quality grassland in the region. Each environment proved compatible with the prevailing dairy system but it was the greater extent of the clays which had the dominant influence on the southern Derbyshire agricultural landscape. There is an important distinction to be made between the heavy soils developed on the Mercian Mudstone (red marl) and those which occur on clays such as the Oxford and Lias of the English scarplands. The latter have been the type locations for the concept of heavy land farming The marls are at the more manageable end of the spectrum of heavy lands although some of the till covered areas such as Needwood and the clays and shales of the Namurian and Westphalian were of a different order.

The validity of an interpretation of the capabilities and limitations of the natural environment of southern Derbyshire in such terms is supported by those who wrote about the agriculture of this area in the eighteenth and nineteenth centuries. Again the consistency of the approach of these commentators in terms of the importance given to their perceptions of the expression of geology/soil parent material in agricultural landscapes is impressive. The judgments of the likes of Pilkington, Brown, Farey and Rowley as to the environmental basis of agricultural enterprise show that the positive properties of the soils developed on the marl were well appreciated in that good crops of grass and wheat could both be grown. The need to overcome textural limitations through effective drainage were also recognised. It has proved difficult to quantify the progress, extent and impact of this most necessary process. Loans under the government to finance drainage schemes were only taken up to a limited extent and to have influenced 9% of the agricultural area of southern Derbyshire with a focus on arable as much as grassland but comment from judges of the Derbyshire Prize Farm Competition suggests that much had been done by the 1880's. It has been argued in Chapter 6 that there was otherwise considerable effort in the improvement of the physical properties of soil. Marling was of early note and was perhaps overdone but liming was widely practised especially on arable

using the natural resources of Derbyshire and its region.

It is difficult to even guess at the impact of such improvement on the ability of farmers to increase the carrying capacity of the land and the same is true of the fundamental associated matter namely the provision of feed. Grassland was the key to the evolving dairy focused economy. There is an enigma in that the most important identified trend in land use was the increased proportion of land under grass but a major issue was the reported poor quality of much of that grass. It is not easy to determine the extent to which such a view typified southern Derbyshire and the degree to which the productivity of grassland may have been significantly improved during the period 1770-1870. The basic requirements of improved feed provision would have been securing more nutritious and better growth of herbage accompanied by better control of weed growth. The result would be superior grazing and greater hay making potential leading to greater stock carrying capacity. It is evident in Chapter 7 that, in addition to the widely voiced national concerns, local commentators from Farey in the 1800's to Carrington in the 1860's were critical of the quality of much pasture land. Some long established pastures in neighbouring Leicestershire were reported as worn out by Pitt which may well be the reason for the great enthusiasm shown for the quality of water and flood plain meadows. Pitt was also doubtful about the techniques for establishing new pastures which took many years to be effective so that to some extent the legacy of poor pasture reflected the problems of the conversion process. As demonstrated in Chapter 5 they had not been overcome by the 1870's and were particularly difficult for under capitalised small farmers. Many nineteenth century commentators, including those of high reputation such as J C Morton, articulated the particular negative effects of dairying with respect to the steady removal of phosphates from the land. The only exception appears to have been Cheshire where the use of bones is reported as widespread and beneficial but even in this county farmers expressed preference for unimproved pastures in terms of ease of cheese making. Perhaps the issue was also about distinctive quality of cheese make and the problems of using richer milk. Brigden suggests that local distinctiveness in cheese diminished

following basic pasture improvement through drainage and fertiliser usage [Brigden R, 1986 p.85]. Reluctance to contemplate improvement would have been a potent factor in holding back milk yields on many farms and in sustaining low level and low cost management of grassland. It would appear that Beckett's comment [Beckett J V, 1990 p.22] that 'it was well into the nineteenth century before much attention was paid to the quality of grass' is a fair summary of the truth. There are signals of the situation in dairy districts paralleled that of grazing lands in Leicestershire and Northamptonshire. Colyer [Colyer R J, 1977] suggested a cycle of indifferent stock occupying indifferent pastures which was only to be broken when external input of high quality oil cake feed became widely available through the expansion of the cotton industry. The extent of the the use of oil cake in southern Derbyshire is difficult to determine although some dairy farmers were feeding cake in the 1860's and probably earlier. An important supplementary feed produced and distributed widely in the region was brewers' grains and it has been argued in Chapter 7 that the feeding of grains may well have had key role in enabling advance in southern Derbyshire dairying. Grains were used throughout the period 1770 to 1870 and are referred to favourably by many contemporary commentators from Marshall [Marshall W, 1796] and Farey [Farey J, 2 1815] to Rowley [Rowley J, 1853] and Morton [Morton J C, 1865]. The discussion in Chapter 7 concludes that brewers' grains of good quality from Burton on Trent formed a more than adequate substitute for stock feed which may otherwise have been grown as part of an arable subsystem. It is typically difficult to discover whether grains were used by all farmers or simply by an increasing proportion of larger and better farmers. But there is evidence that they were widely used and that even cottagers with few cattle were able to purchase grains for winter feed. The scale of brewing at Burton meant that grains were available in increasing quantities, especially from the 1840's. Feeding grains to cattle would not have had the same beneficial effect in terms of dung as Colyer argues for feeding oil cake but there is support from commentators and from discussion of the chemical character of grains which had a modest yet useful potential to restore phosphates to the land. It follows that if improved

feeding from grass was achieved in southern Derbyshire then the key was the establishment of an upward trending nutritional cycle based upon purchased grains.

Despite the move to a grass based farm system it is evident that arable farming became more sophisticated as time progressed and that this was particularly the case on the lighter soils which were brought into production. On the heavier lands, including the marls, advance also occurred so that the more traditional approaches to arable management gave way to rotations which incorporated brassicas. The more restricted ability to grow root crops imposed by the marl meant that the emphasis shifted towards the more successful mangold and cabbages. Comparison between the 1801 Crop Returns and the 1870 census points to an increased emphasis on brassicas of the order of 80%. Enhanced yields approximating to 20% over this period would have created a capability to provide winter feed in greater proportion than the the increase in acreage. It is apparent from the 1870 census however that green crops were more extensively grown in the south east of the study area and there correlated with greater numbers of sheep. It is evident that some red marl parishes in the core of dairy specialisation west of Derby had the lowest percentages of land in green crops in 1870 which implies that grass and purchased feed such as grains were all important.

Increased productivity has been shown to have been more complex than a larger number of better fed cows on the same area of land but also a matter of improvement of the inherent quality of the animals themselves. In this context the argument which has been developed is in line with the conclusions of Holderness in his review of the evidence for advance in productivity in the dairy sector in the nineteenth century [Holderness B A, 1989 p.159-170]. Discussion as to average milk yields per cow in Chapter 9 has indicated wide variation in opinion and that the range of yield was stable at a potential make of 2 to 5 cwt of cheese throughout the study period. A conclusion that on average yields increased from 2.5 to 3.5 cwt appears reasonable given the weight of the opinion of Morton and Carrington and the modern researches of Taylor and Hallas. Holderness refers to 'repeated evidence of somewhat unchanging yields from good cows'

[op cit p.163]. He does argue for an increase of average milk yield per cow of 33% on the basis of better pastures and purchased feedstuffs which is broadly in line with what is suggested here. Additionally the proportion of poorer animals is likely to have diminished with time. It would also appear significant that Holderness's statement about herd size is in accord with the evidence concerning the numbers of dairy cows offered at farm sales as discussed in Chapter 8. There is support for the view that the landscape of dairying became characterised by larger more productive herds. The rate of change here implied is quite modest if expressed as the addition of one productive cow per herd per decade between 1800 and 1870. In terms of cheese output the increase is approximately two and a half times from 272 cwt to 700 cwt over this time period for the 'average' southern Derbyshire farm which is much in line with the degree of regional change which has been proposed.

An important aspect of the productivity equation also considered Chapter 8 relates to changed preferences with respect to breed of cattle. The average annual milk yield per dairy cow of 250/300 gallons for the late eighteenth and early nineteenth centuries related to Longhorn cattle which were most likely of the traditional type and not necessarily to the 'improved' strain of that breed created by Robert Bakewell. Bakewell's Longhorn seems to have had greater value for meat production although the milk from this breed was richer in solids but lacking in quantity as compared with the Shorthorn which was just becoming popular. Its fitness for fattening was an attraction to dairy farmers who needed to dispose of male calves and also barren or aged cows. A common opinion of writers on the dairying scene in the nineteenth century such as Fussell [Fussell G E, 1966], and Orwin and Whetham [Orwin C S and Whetham E H, 1964] is that the Shorthorn was evolved slowly. Seemingly it was only from the 1860's that the term Dairy Shorthorn, indicating a specialised milk producing animal, could sensibly be used. It is not surprising therefore to come across reference to the prevalence of 'breeds' of dairy cows which were clearly evolved to meet the needs of the local farm system but which were probably influenced by interbreeding with Shorthorns.

With respect to dairy practice some improvement may have taken place through the use of copper vessels, larger vats, and screw presses. The impact on quantity may have been small but more efficient presses could have had some impact on quality and the attractiveness of cheese to cheese factors. The key to good quality cheese remained the skill of the dairy worker at least until the 1850's when, as has been demonstrated in Chapter 9, leading farmers adopted some modest mechanisation. The trend in prices for the best quality cheese at Derby Cheese Fair does demonstrate that these innovations achieved some measure of success though probably at an individual level and with no major impact on dairying across southern Derbyshire as a whole.

A further dimension of the problem as to the mechanism by which increased cheese output was achieved is the interrelationship between dairy cattle and sheep within the total livestock system. Discussion in Chapter 8 has indicated that not all farm sales included sheep. The trends identified point to a growing proportion of farms in the red marl country to the north of the Trent becoming essentially dairy only units but to the south of the Trent the movement was towards a dual livestock system. Also of importance is stability with respect to flock size. By combining sale advertisement data with the 1870 census the extent of opportunity to substitute dairy cattle for sheep has been quantified. The red marl farmers could have effected a 10% increase in dairy cows in the first half of the nineteenth century. They may have been influenced by the push factor of sheep rot which became endemic in southern Derbyshire as much as a concern to increase the size of dairy herds.

In summarising the argument as presented Figure 10.1 seeks to identify the range of factors which contributed to the development of the southern Derbyshire dairy system. It is proposed that the increase in average annual output of cheese per cow was at least 1cwt from 1800 to the 1860's and possibly 1.5cwt over the century 1770 to 1870. When combined with a doubling of numbers of dairy cows regional cheese output increased by a multiplier approaching four. The basis of this improvement was better quality stock ie, fewer poor animals and

a move in favour of the Shorthorn for cross breeding with traditional dairy stock. Substitution of dairy stock for sheep contributed to advance of productivity on the red marl. Changes in dairy technique involving modest mechanisation made a late impact on quantity and quality. While the proportion of land under grassland was increased at the expense of arable the extent of any improvement of quality and productivity of grass remains unclear. Individual landowners and farmers financed land drainage and bought in cake but the only innovation which may have had a region wide impact was the purchase of brewers grains from Burton. Similarly the extension of the proportion of tillage given over to brassicas would have had a parallel influence. Despite the various uncertainties it is the combination of influences which must explain the increase in number of dairy stock kept per acre and the improved output associated with that stock.

Having discussed the factors which appear to have influenced the dominant dairy element of the farm system as it evolved in southern Derbyshire between 1770 and 1870 it is now appropriate to consider the system as a whole. This has been done through Figure 10.2 which has been devised in order to present a model of the system as it has emerged from the discussion which has evolved through this study. The model seeks to identify basic inputs and outputs and the ways in which these related to the organisation of land and associated livestock sub systems.

It is feasible to interpret the model at a range of scales from that of the study area as a whole, to that of subregions and thence to individual farms. In attempting such interpretation it is desirable to quantify at least the basic elements of the system in order that their relative weighting can be more clearly identified. This is quite possible for land use given the discussion in Chapters 5 and 7 plus the livestock trends identified in Chapter 8. The critical problem is the expression of the system in financial terms which is an area where data is notably sparse. The absence of specific farm accounts means the placing of reliance on occasional figures relating to Derbyshire farms and even further afield. However the data for the Carrington farms at Croxden and Castle Hays Farm at Tutbury give

some solidity for the estimates for the close of the study period. Inevitably there is a degree of uncertainty as to the general validity of the figures and the conclusions which might be drawn from them. Nevertheless an attempt has been made to determine the financial significance of four main products of the system namely the dairy, fat cattle, sheep and wheat. In so doing the complicating factor of range in farm size has been taken into account. Figure 10.3 shows the basic characteristics of three model farm types which have been identified, small farms of about 40 acres, middle range farms of 150 acres and large farms of 400 acres. The land use and stock numbers and based upon Chapters 5 an 7 and also the relationship between livestock units and farm size which has been discussed in Chapter 8. The situation as presented in Figure 10.3 relates broadly to the 1850's/60's but given the change in stock numbers on farms over the study period notional totals for late eighteenth century have also been included.

Table 10.1 seeks to put cash values on the data presented in Figure 10.3. The sum of the totals for each farm type does not amount to an estimate of gross income as a number of other items of sale such as peas, beans, barley or horses would need to have been included. As principal components of gross income, however, some useful comparison can be made between farms. In all cases the financial importance of the dairy herd is clearly evident. As expected cheese as the major product of the dairy emerges as the main source of income but there are substantial additional elements of income from sales of calves, discarded, fatted barren cows and pigs. Increased average output of cheese per cow in combination with price change indicates an greater significance for cheese by the 1860's. Given the absence of a clear trend with respect to sheep numbers then sheep appear as making a relatively reduced contribution to farm income.

The calculations also help to put the arable element of the farm system into perspective. As 30% of southern Derbyshire remained in arable through to the 1860's the growing of wheat for sale retained a degree of importance on middle range and large farms. Income from wheat is calculated to have increased on the basis of better yields. Even though the rotational system used by red

marl farmers lacked sophistication localised improved drainage, better quality dung attendant upon the use of brewers' grains and improved seed would have had an effect.

Data on farm outgoings is extremely limited but it is possible to make some approximations of rents and these have been included in Table 10.1. There is an implication that the larger the farm the greater the margin between rent and income. Taking into account the lack of a complete figure for gross income then the small farm makes at least twice the rent and the 400 acre farm at least three times the rent. Holderness [Holderness B A, 1989 p.179], while acknowledging the scale of the difficulty in discussing expense and profit in agriculture, considers the notion of gauging farm income in multiples of rent as helpful. A standard of three rents is regarded as approximating to a break even situation. The figures presented in Table 10.1 certainly indicate that the middle range and large farms would approach this position.

In summary the discussion developed in this chapter has sought to clarify the interrelationship of the major trends identified with respect to southern Derbyshire agriculture. The consolidation of the major dairy enterprise of cheese making is apparent within the regional system and on individual farms of whatever size. There are problems in quantifying the system and the changes which took place. It is evident that an important increase in productivity of farmhouse cheese occurred. The diversity of the southern Derbyshire agricultural landscape needs to be kept in mind. The light lands although spatially fragmented showed in their crop rotations some of the characteristics of more dynamic agriculture commonly associated with such areas while the floodplain lands correlated with extensive grazings. The predominant red marl was well grassed but with some significant residual arable. The overall ratio of about 70% grassland to 30% arable makes interesting comparison with other heavy soil districts. In his comparable investigation of tithe documents in Staffordshire Phillips [Phillips A D M, 1973 p.48] clearly acknowledges the development of dairying in the south east of that county ie, in the areas contiguous with southern Derbyshire where dairying was the main source of

farmers profits. In this area parishes had about two thirds of their land in grass. The inference is that the demands of the dairy systems evolving at that time pushed the arable down towards the 30% level. It is interesting to note that a comparable situation had developed in the Cheshire dairying region [see Davies C S, 1961 and Harley J B, 1973 p.548]. In this sense Derbyshire dairying had the same character as other similarly orientated regions.

As a relatively heavy land area southern Derbyshire seems to have evolved a particular agricultural character as a consequence of the central position of dairying. At the same time it displayed the broad trends attributed to heavy land farming. Despite the relatively favourable nature of marls in relation to many clay based soils the demands for cultivation became less attractive. Perhaps the final word should be left to John Farey who saw the marls 'as inclined to be too tenacious and cold and would repay amply for draining' [Farey J, 1 1815 p.148].

Part 2: Agriculture in Southern Derbyshire 1770-1870: Revolutionary and/or High?

It is the purpose of the second part of this chapter to consider the conclusions as to the agricultural system as it had developed in southern Derbyshire in the light of the conceptual issues raised in the definition of the context for this research in Chapter 1. A range of issues to be considered were identified which comprised the idea of an Agricultural Revolution, the problem as to when and in what form significant advance took place on the upon heavier soiled lands and the concept of High Farming and its applicability to a dairy orientated area.

The key idea that has been a dominant feature in the interpretation of British agricultural history is that of an Agricultural Revolution. It has featured with the term Industrial Revolution as one of a pair of parallel/inter related concepts which characterised the complex processes of economic

advance. As a concept the Agricultural Revolution has undergone fundamental reappraisal [see Beckett J V 1990 chapter 1] indeed Beckett summarises the current view as not one of dramatic revolutionary change but 'rather a long complex process varying considerably in its impact and timing across different farming regions and terrains'. In commenting upon the outcome of this process Beckett echoes Chambers and Mingay [Chambers J D and Mingay G E, 1966] and Mingay [Mingay G E, 1967] with their emphases on the ability of British agriculture to provide 80% of the nations' food needs in the latter nineteenth century even though population had risen by a factor of four in the preceding one hundred years. The argument for significant agricultural change is sharpened when trends with respect to the numbers and proportion of the agricultural population are taken into account. Consequently output per agricultural worker increased dramatically which has been described by Wrigley [Wrigley E A, 1988 p.35] as 'the single most remarkable feature of the economic history of England between the later sixteenth and early nineteenth century'.

Three areas are identified by Beckett as being at the heart of the Agricultural Revolution these are innovation, enclosure and the distribution of land. The changes which have been identified in southern Derbyshire are difficult to match precisely against these specific areas. In the case of enclosure the process was not at the core of change as it occurred between 1770 and 1870 but was a matter of 'tidying' residual patches. Much significant structural change had taken place earlier. The distribution of land appears to have been only marginally changed as the proportion of tenanted land remained very high at about 90%. The family farm continued dominant and the average size was below the norm for the country as a whole throughout the period under consideration. It does appear however that units of production became larger and that the proportion of smallest farms at the lower end of the range was reduced. Change of this order was not sufficient to allow a landscape of large capitalist orientated farms to emerge on the red marls which were at the core of the southern Derbyshire dairying area, although the mixed farms south of the Trent must have had something of this character. The level of innovation embraced by south Derbyshire farming was

limited in a technical sense at the point of cheese manufacture. However the system allowed land improvement through drainage, upgraded feed systems and better dairy stock and sheep. Although it is not possible to be precise about the effects of any of these factors there are good grounds for arguing for a steady enlargement of units of production and at least a doubling of cheese output over the first half of the nineteenth century and a near quadrupling between 1770 and 1870. If this is regarded as significant change through time then farming in southern Derbyshire cannot be said to have been left behind in the general run of agricultural progress.

A further approach to the matter of agricultural change dealt with in some detail in Chapter 1, and considered at a number of points in subsequent discussion, is the concept of sectoral advance which was based on the premise that certain environments were improved earlier and more successfully than others. The distinction commonly employed is rather crude given that the classification of land is highly complex and to reduce the country to light land and heavy land denies this complexity. Some emphasis has been given to variation within the south Derbyshire area to highlight that the red marls are not so limited in their potential as the truly heavy and tenacious clays. In addition the extensive floodplain areas also exhibit pedological diversity. Areas, such as that to the south of the Trent, which incorporate a range of soil types clearly emerge as more varied in their agricultural potential hence the development of a farm system which was mixed in character. However the debate about sectoral advance embraces the detailed discussions of the 1960's reviewed in Chapter 1 as to the extent and timing of the agricultural revolution on the clay lands. The argument has been about the extent to which there was a late surge in improvement and productivity on those lands which were relatively disadvantaged on the basis of their environmental attributes. In its progression a range of contentious issues, as elaborated by Sturgess [Sturgess R W, 1966 and 1967], Collins and Jones [Collins E J T and Jones E L, 1967], Thompson [Thompson F M L, 1968] and Whetham [Whetham E H, 1968], become interrelated. These are focused upon the development of improved feed systems based variously upon the area and

effectiveness of field drainage which has been subsequently addressed by Phillips [Phillips A D M, 1989], and the impact of inputs of fertilisers plus better quality of manure on the general fertility and productivity of the land.

From such debate there emerges the further issue of the generally poor quality of grasslands in England and the extent to which this may have been addressed in particular localities. With respect to southern Derbyshire it has proved difficult to quantify the impact of field drainage on grasslands. It appears to have been somewhat limited from the evidence available but even so the issue of drainage had been alive in the area since the latter eighteenth century and was regarded as well advanced by Rowley in the 1850's [Rowley J J, 1853] and the Prize Farm judges in the 1880's [DPFC, 1881]. Brewers' grains had also been available since the late eighteenth century. In combination with other factors such as the evolution of new dairy orientated cattle and greater specialisation on the production of milk and cheese southern Derbyshire was able to take advantage of the possibilities of the market to effect the steady advance which has been argued for above. The important point which relates to the notion of sectoral advance is that positive movement in Derbyshire farming appears to have been characterised by progress from the latter eighteenth century rather being delayed until drainage and feed arrangements were in place from about 1840 onwards. As a relatively heavy soiled area southern Derbyshire appears not to have shared in the belated occurrence of advance as debated so vigorously by Sturgess, Collins and Jones, Whetham and Phillips.

Notwithstanding this conclusion it is important to consider the period from the 1840's through to 1870 in terms of the farm system having particular qualities which might have given an edge to its productivity. Was there a surge which related in some way to additional improvements that were beginning to be manifested at the heavier end of the spectrum of land quality? Indeed did a system of farming emerge which to some degree might be related to the concept of High Farming as applied particularly to the 1850's and 1860's? It has been shown in Chapter 1 that as an idea High Farming embraced high

productivity at a time of rising prices ahead of the major penetration of the home market by cheaper imported foodstuffs. For the English farmer it meant reaping the benefit of high inputs by creating a cycle whereby profit was reinvested in the form of feedstuffs, fertilisers and drainage to create in its best developed form a system of agriculture in which the livestock and cropping dimensions were integrated to their mutual benefit. The concept was described succinctly by one anonymous correspondent to the Farmers' Magazine [Anon 1, 1851, p.206] as 'bringing out the full capabilities of the land'. The cost implications of such a system was not lost on farmers at the time. Sir R Brisco [Brisco Sir R 1864, p.91] put the question boldly under the headline of 'high farming but where is the money to come from?'. However he clearly recognised the need for inputs as expressed in a philosophy of 'fatten it [the land] by high and liberal management and it will surely fatten you, hunger it and it will hunger you'.

Perry [Perry P J, 1974 p.19] has similarly described High Farming in terms of high investment by both landlord and tenant for high returns which was justified by high prices. While stating that in 'its most conspicuous form' such an arrangement involved the close association of livestock and cereal production he recognises that there was not one single system of high farming. The livestock/cereal system was at the apex of an agricultural pyramid which involved a range of systems which varied in form, efficiency and profitability. On this basis if the southern Derbyshire dairy system is to be equated with the concept of High Farming in any way, and thus perhaps be regarded as 'High Dairying', then it was clearly not the most elevated form of agriculture. Account must also be taken of the perception of dairying as the least esteemed and fashionable branch of farming. Nevertheless according to one of dairy farming's most highly regarded advocates, Joseph Harding of Marksbury, it had made significant progress. Harding [Harding J 1860, p.82] saw matters as follows: 'the spirit of improvement which has been so largely pervaded the agricultural world during the last twenty five or thirty years is not more manifest in the production of corn and meat than it is in the manufacture of butter and cheese and though the latter branch has not derived

as much benefit from the assistance of local or national agricultural societies as the former it has yet made great progress both as to the quantity and quality of its products'. He argued for three categories of improvements in dairy practice as he saw them applied in the West Country and which had impacted upon the productivity of the system. These had been achieved by empirical methods rather through enhanced understanding of the processes involved.

1. Dairy stock showed increased quantity and quality as a result of better housing, better feeding through the provision of roots, meal and cake and improved grassland. Harding noted that the application of bones in Somerset had not been as successful as in Cheshire.
2. Attention to dairy practice had improved quality and reduced labour inputs. This had been achieved through improved cheese presses and the use of Keevil's apparatus in the separation and breaking of curd.
3. Greater awareness of the need to regulate the temperature of cheese rooms so as to maintain the quality of cheese in storage.

The innovations here described involved a range of improvement touching upon all aspects of production and processing. Clearly it depended on arable as well as grassland and Harding [ibid p.83] acknowledged that there 'cannot be as large an increase of produce' in the inevitably more limited circumstances of the dairy farmer. Harding does provide, however, a yardstick against which a claim for High Dairying in Derbyshire might be assessed. Yet somewhat perversely for a Derbyshire based study the most detailed statement concerning the operation of dairy farms on the red marl comes from Evershed's review of Staffordshire farming [Evershed H, 1869]. However the key farms at Tutbury and at Croxden Abbey are near to the county boundary and are located in strictly comparable environmental circumstances. The Croxden farm is described elsewhere [see Carrington W T, 1865] and was the basis for Carrington's account of dairy practice in Derbyshire and Staffordshire. The two farms are well above the norm in terms of size as shown in the summaries of their essential features in Tables 7.6a and b. It is evident that in terms of the management of land and stock many features of the Tutbury and Croxden farms matched

Harding's view of good practice. Significant attention was given to the arable systems in order to ensure high yields of fodder crops while substantial purchases of supplementary feedstuffs were made. Consequently the annual rhythm of feeding stock was well founded in both cases. The relationship between the management of stock and the operation of the arable element of the farms thus appeared mutually supportive and in keeping with the wider concept of High Farming. From the crop rotations practised and the associated inputs of fertiliser it is likely that high yields of grain were achieved, although figures are quoted only for swedes at 25 tons per acre and cabbages at 40 tons. It is further evident in the case of the Croxden farm that Carrington was an expert in the techniques involved in the making and subsequent storage of high quality farmhouse cheese. He had mastered the difficulties of making cheese from the richer milk resultant from high feeding and, given that he was able to produce between 4.5 and 5 cwt per cow each season, may be regarded as a true exponent of 'High Dairying'.

The issue which remains is the extent to which Carrington was an exceptional farmer. In the sense that he wrote about his farming methods and appears highly regarded by Morton as well as Evershed, he undoubtedly was. The occurrence of farmers achieving similar yields late in the eighteenth and early in the nineteenth centuries, as cited by Marshall and Farey respectively, indicates that that comparable levels of productivity and even perhaps 'highness' had been achieved in earlier times. Indeed following Farey there were outstanding farmers in the first decade of the nineteenth century who achieved cheese yields of the order of 5 cwt some of whom had access to the famed alluvial meadows or had created water meadows and whose feed capabilities were exceptional. In the 1850's and 60's there is evidence of the activities of other exceptional farmers who fed cake and grains, managed grass progressively, adopted the new cheese making apparatus and kept quality dairy cattle. However the thrust of the argument in Chapter 9 has been that a lesser yield of 3.5 cwt per dairy cow was the general average for southern Derbyshire and the opinion of Carrington has been significant in coming to that conclusion. The corollary is that the level of inputs could not have been as

great as those achieved by Carrington but even so a general improvement of output of at least 1cwt per cow had taken place as compared with a century earlier. The main aspect of improved feeding apparently common to many was the use of brewers' grains which may have meant that Derbyshire pastures were not so depleted of essential minerals as was complained of with respect to the country at large. There is evidence that the area under green crops was greater in 1870 than it had been in 1801. Indeed the ratios of acreage of hay and green crop to livestock units on a parish basis indicate that the provision of feed from the arable was consistently attended to across southern Derbyshire. However there remains some reservation as to the normal feed regime practised by the ordinary farmer and indeed those farmers in core red marl parishes west of Derby where the proportion of land in permanent grass was over 80% in the 1870's. Here the use of supplementary feed such as grains would have been essential in order to have achieved enhanced productivity. Apart from the doubts as to the quality of grassland which have been debated above support for caution in assessing progress comes from the perspective of the 1880's. Sheldon [Sheldon J P, 1883] noted a move to improvement in dairy feeding in which he emphasised a continuity with 'traditional practice'. The key features were the feeding of brassicas in the autumn and the use of cake and grains in winter.The provision of with indoor housing was another important change. Murray also implied that improvement in dairy feeding occurred later rather than sooner. Writing in 1895 [Murray G 1895 p.16] he stated that 'thirty years ago scarcely any artificial foods were used beyond a few roots and brewers' grains in the winter months'.

It is interesting that the ratio of acres to each livestock unit across southern Derbyshire in 1870 of 3.2:1 is comparable with that which occurred on the Croxden and Tutbury farms. The systems which Carrington and Archer had developed did not support any more stock therefore, and it follows that the difference between these elite farmers and the general run referred to by Sheldon and Murray lay variously in the quality of the stock, the merits of the feed system and the operation of the dairy. The conclusion appears to be that the majority of

farmers, apart from the exceptional or those with all grass small farms, might be regarded as practising middle dairying rather than high dairying. The limited number of complete 'farm surveys' makes it a matter of judgment as to whether the farming which characterised southern Derbyshire was of first or other rank. The verdict concerning southern Derbyshire is hopefully more positive in terms of progress than that of Fussell [Fussell G E, 1949 p.164 and 1953 p.33-4]. In 1953 he wrote in a slight elaboration of his earlier verdict that: 'The indication of a general rise in standards of Derbyshire farming during the four decades of so called High Farming are just as nebulous as elsewhere. The cattle were better in the sense of yielding more milk and meat, some of the new fertilisers, feeding stuffs and implements were used in the county, and a good deal of field drainage had been done; but that is all that can be said. For the rest it went on farming in its accustomed way....'.

In the period 1770 to 1870 southern Derbyshire agriculture can be said to have been partly progressive in the sense articulated by J V Beckett in his review of the idea of an Agricultural Revolution. The longer term nature of positive movement in productivity achieved in southern Derbyshire was such as to set the area somewhat apart from the view that agricultural advance on heavier lands waited upon a range of improvements which became available in the 1840's. It is evident, however, that from the mid nineteenth century some farmers achieved a manner of operation which led to levels of productivity in tune with the concept of High Farming or in this instance of High Dairying. For the majority the evidence suggests that inputs to the system were at a lesser level so that more modest, but none the less improving outputs, were the norm. This broad verdict needs to be considered in relation to the problem of data for the period prior to the 1870's which Taylor discussed when setting the context of his work on the dairy industry in the latter nineteenth and early twentieth centuries [Taylor D, 1971]. While there are evident gaps and shortcomings to the material that has been assembled the wide ranging approach has enabled some measurement of the extent of agricultural change in southern Derbyshire to be achieved. The

essence of answers to the basic questions about stock trends, land use change, land management and outputs posed at the conclusion of Chapter 1 have been proposed and these in turn have allowed the evolving agricultural system to be defined. This in turn has been set against the wider debates concerning agricultural advance whereby southern Derbyshire in the middle decades of the nineteenth century appears as progressive but 'middling' in character.

Southern Derbyshire -
Major Elements of Change in the Dairy System 1770 - 1870

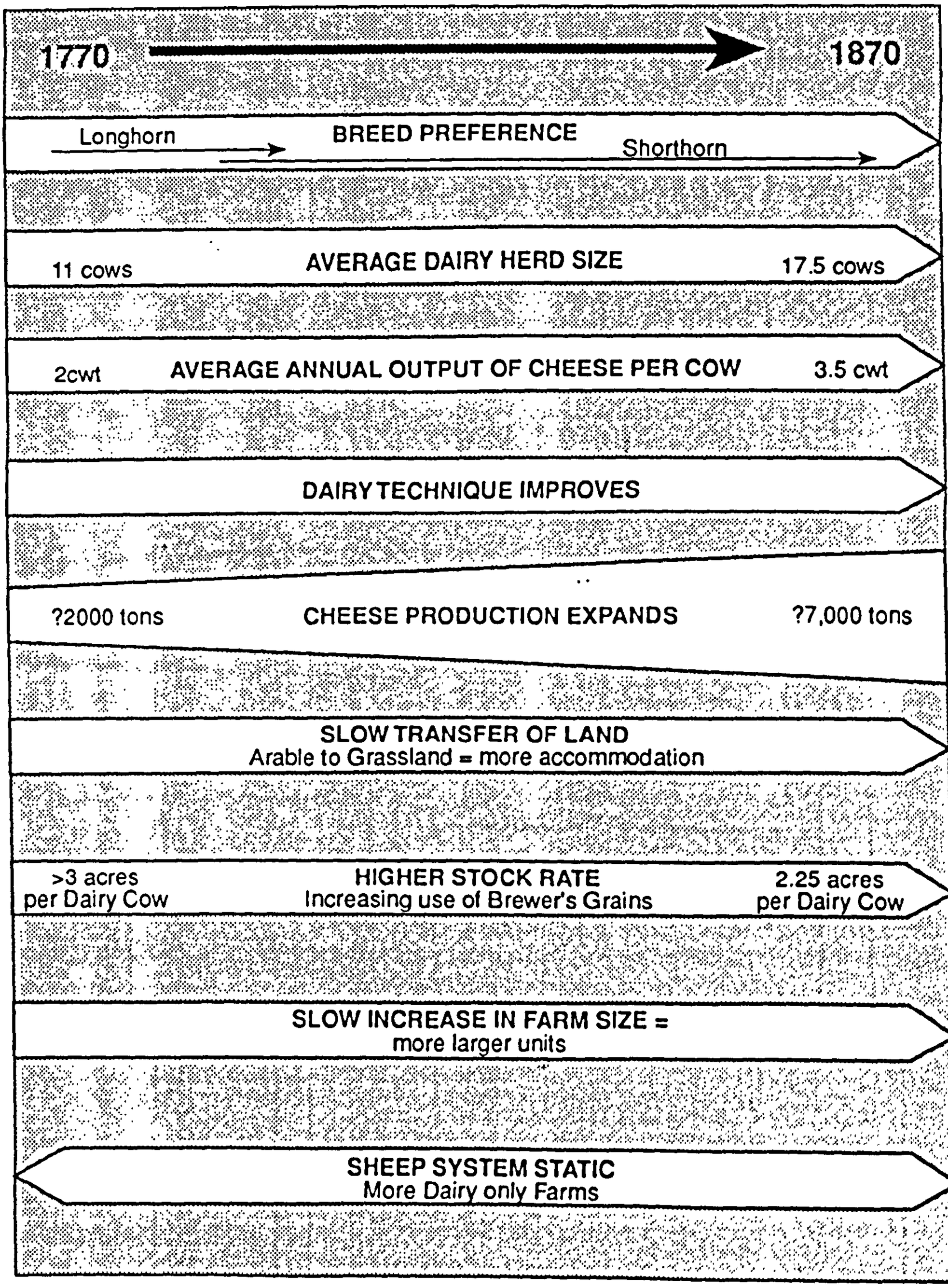


Figure 10.1

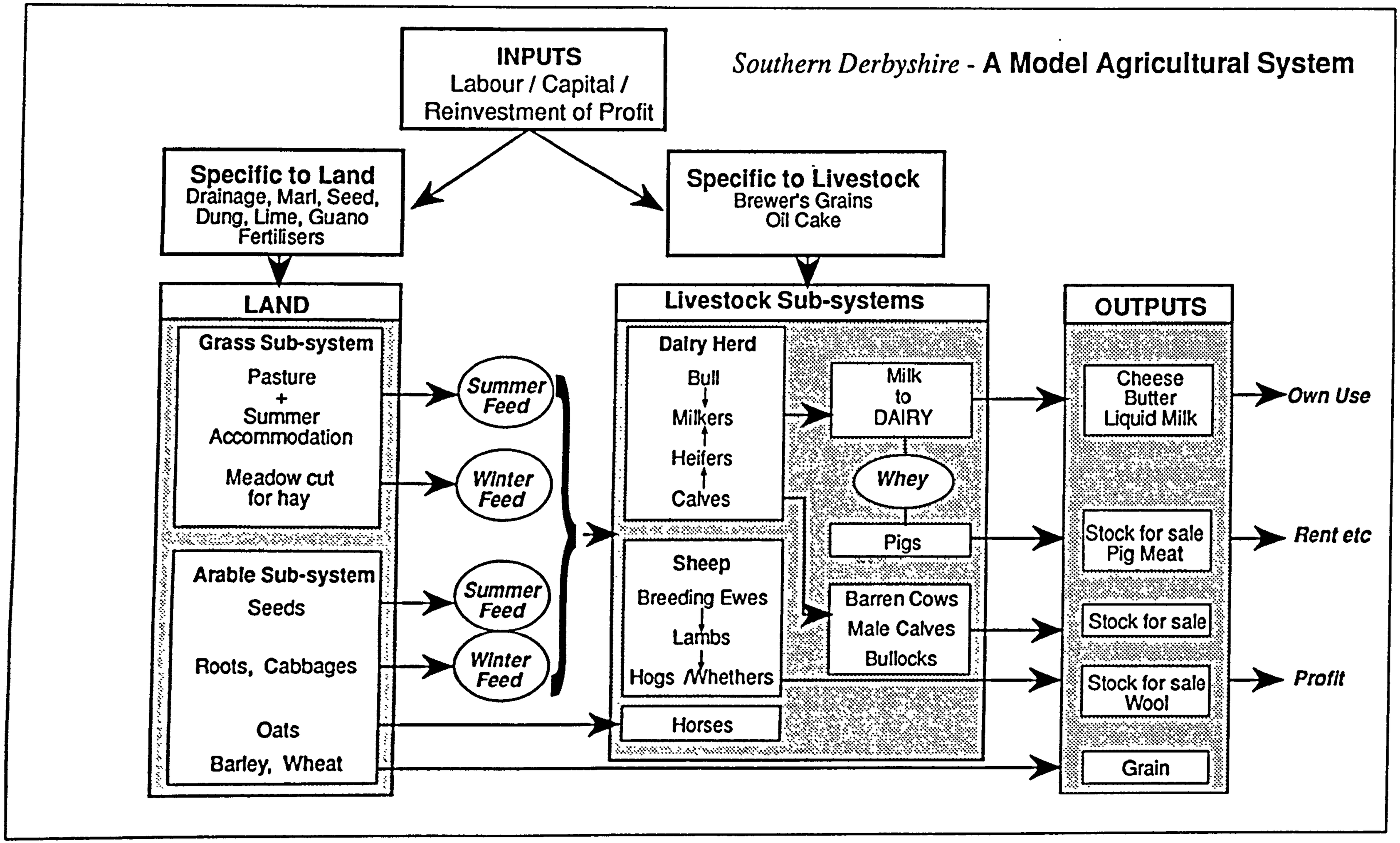

INPUTS
Labour / Capital /
Reinvestment of Profit
Southern Derbyshire - A Model Agricultural System
Specific to Land
Drainage, Marl, Seed,
Dung, Lime, Guano
Fertilisers
Specific to Livestock
Brewer's Grains
Oil Cake
LAND
Grass Sub-system
Pasture
+
Summer
Accommodation
Meadow cut
for hay
Arable Sub-system
Seeds
Roots, Cabbages
Oats
Barley, Wheat
Summer Feed
Winter Feed
Summer Feed
Winter Feed
Livestock Sub-systems
Dairy Herd
Bull
Milkers
Heifers
Calves
Milk
to
DAIRY
Whey
Pigs
Sheep
Breeding Ewes
Lambs
Hogs /Whethers
Barren Cows
Male Calves
Bullocks
Horses
OUTPUTS
Cheese
Butter
Liquid Milk
Own Use
Stock for sale
Pig Meat
Rent etc
Stock for sale
Stock for sale
Wool
Profit
Grain

Figure 10.2

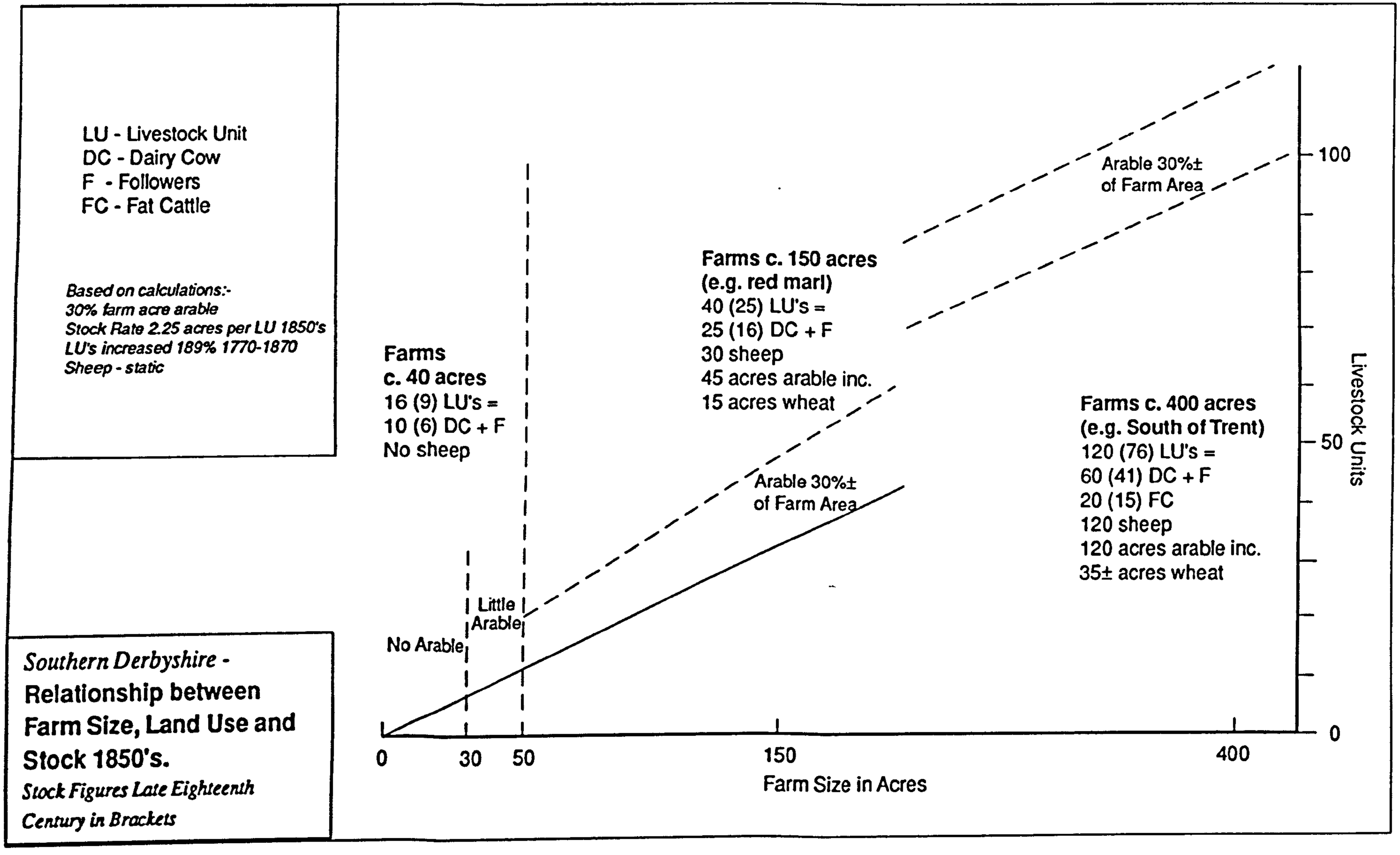

LU - Livestock Unit
DC - Dairy Cow
F - Followers
FC - Fat Cattle
Based on calculations:-
30% farm acre arable
Stock Rate 2.25 acres per LU 1850's
LU's increased 189% 1770-1870
Sheep - static
Farms
c. 40 acres
16 (9) LU's =
10 (6) DC + F
No sheep
Farms c. 150 acres
(e.g. red marl)
40 (25) LU's =
25 (16) DC + F
30 sheep
45 acres arable inc.
15 acres wheat
Farms c. 400 acres
(e.g. South of Trent)
120 (76) LU's =
60 (41) DC + F
20 (15) FC
120 sheep
120 acres arable inc.
35± acres wheat
Arable 30%±
of Farm Area
Arable 30%±
of Farm Area
No Arable
Little
Arable
0
30
50
150
400
Farm Size in Acres
100
50
0
Livestock Units
Southern Derbyshire -
Relationship between
Farm Size, Land Use and
Stock 1850's.
Stock Figures Late Eighteenth
Century in Brackets

Figure 10.3

Southern Derbyshire -
Comparison of Estimates of Major Sources of Annual Farm Income Late Eighteenth and Mid Nineteeth Centuries.

	Late Eighteenth Century	Mid Nineteenth Century
40 acre farm	Dairy Cows £90 (Cheese £32) Rent £55	Dairy Cows £200 (Cheese £105) Rent £ 80
150 acre farm	Dairy Cows £240 (Cheese £ 90) Sheep £ 70 Wheat £ 90 Rent £206 / 5 / 0	Dairy Cows £500 (Cheese £285) Sheep £ 90 Wheat £135 Rent £300
400 acre farm	Dairy Cows £615 (Cheese £225) Fat Cattle £300 Sheep £300 Wheat £210 Rent £550	Dairy Cows £1,200 (Cheese £ 690) Fat Cattle £ 480 Sheep £ 360 Wheat £ 315 Rent £ 800
	Basis of Calculation:- Dairy cows producing £15± per head i.e. cheese 2.5cwt @ 40/-, milk, calves, pigs and fatted calves. Fat cattle fetching £20 per head. Ewes making £2/10/- ± per head i.e. wool, hogs. Wheat making £6 per acre. Rent 27/6 per acre *Sources:* *Pitt W (1808, 1809),* *Farey J (2. 1815, 3. 1817),* *Mingay G. E. ed. (1989),* *Derby Mercury.*	 Dairy cows producing £20± per head with cheese 3.5cwt @ 60/-, Fat cattle £24 per head. Ewes £3 Wheat £9 per acre. Rent 40/- per acre *Sources:* *Rowley J (1853),* *Mingay G. E. ed. (1989),* *Derby Mercury.*

Table 10.1

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The letters in brackets are used to identify manuscript sources in the text of the thesis.

Chatsworth House Archives [CA] [Various Estate Records]

Derby Local History Library [DLHL] [Land Tax Returns, Tithe Surveys, Census of Population, Miscellaneous papers]

Derbyshire County Record Office [DRO] [Enclosure Maps and Award Documents, Tithe Surveys, County Rate Assessments, Vernon Estate Papers, Every Estate Papers, Harpur Crewe Estate Papers]

Keele University Archive - [Sneyd] [Sneyd Manuscripts]

Lichfield Diocesan Record Office [LDRO] [Tithe Surveys]

Public Record Office [PRO] [Tithe Surveys IR 18, Tithe Files IR 29, Corn Office Papers MAF 10, Registers of Advances under the Public Money Draining Acts IR 3/5, Agricultural Census 1870 MAF/236,248,249]

Staffordshire County Record Office [Tithe Surveys]

Sudbury Estate Office [Miscellaneous papers]

Sudbury Hall [Maps]

Parliamentary Papers

Parliamentary papers are identified by BPP followed by the year in the text.

1818 Parochial income tax assessments 19/72.
1833 Report of the Select Committee into the present state of agriculture and of persons employed in agriculture (particularly the evidence of W. Smith).
1837 Select Committee of the House of Lords appointed to enquire into the state of agriculture.
1844 Select Committee on Commons Enclosure
1844 Parochial income tax assessments 32/464-5.
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1860 Parochial income tax assessments 39/64-66.
1868-9 Reports of the Commissioners on the employment of children, young persons and women in agriculture (particularly the evidence of G Culley)
1880-82 Reports of the Commissioners - Royal Commission on Agriculture (particularly the report of S B L Druce)

Newspapers, Periodicals and Directories

Agricultural Gazette, 1874 to 1880, [referenced as Ag G with issue date in the text.
Bagshaw S, [1846] History, Gazeteer, and Directory of the County of Derby, Sheffield.
Derby Mercury 1780 to 1870, [referenced as DM with issue date in the text].
White F, [1857] History, Gazeteer, and Directory of the County of Derbyshire, Sheffield.

Contemporary Books, Pamphlets and Articles

Abbreviations are:
Ag G - Agricultural Gazette
F Mag - The Farmers' Magazine
JBWES - The Journal of the Bath and West of England Society
JBDFA - The Journal of the British Dairy Farmers Association

JRASE - The Journal of the Royal Agricultural Society of England

Anon 1 [1851] High Farming on Strong Land *F Mag* 1, 206.
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Twentieth Century Books,Articles and Theses

Abbreviations are:

A H R	Agricultural History Review
E H R	Economic History Review
E M G	East Midland Geographer
J R Met Soc	Journal of the Royal Meteorological Society
J Trans Hist	Journal of Transport History
TIBG	Transactions Institute of British Geographers

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