

## CHAPTER 1

### ASPECTS OF WITCHCRAFT AND BRITISH SOCIETY

Historians, pamphleteers and contemporary authors concur on only one aspect of the sixteenth and seventeenth century witchcraft debate in Britain\* and that is its existence. Whilst the thesis concerns itself with the effect many changes had on the common people, it proposes to offer another explanation which has not previously been raised or thoroughly researched. Symptomatic evidence inferred from the descriptions of domestic animal deaths and illness can be linked to plant ingestion. A distinct possibility exists that the reason underlying accusations of witchcraft which were associated with the more unusual animal and production losses, was related to plant ingestion. The thesis proposes to examine this link but the examination must be set in the context of the religious, social, judicial, economic and agricultural climate of the period.

Religion has dominated the witchcraft issue and the preoccupation of historians with religion has led to an over indulgence in religiously based explanations. The Reformation and Henry VIII's dissolution of the monasteries engendered many changes, not the least of which was the reduction of the Mass to a commemorative rite by 1552 and the constant reversal of religious policies by successive Tudor monarchs. The relative sanity of Elizabeth I's reign resulted in a reasonably uniform policy of religious toleration in England and Wales. A similarly related attitude toward religion was not evident in Scotland.

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\* Britain, in this instance, includes England, Scotland, Wales, The Isle of Man, the Orkney Islands and the Shetland Islands. The Channel Islands of Jersey and Guernsey are excluded because of the heavy influence of European attitudes to witches which existed on the islands during this period.

The effect of all these changes on the common people probably depended largely upon the depth of their local minister's religious commitment but there can be no doubt that the loss of ritual and spiritual ease experienced after the abolition of the Confessional and the Mass, was deeply felt by a population whose sins were not now so easily expiated. The feeling of insecurity was the most dire result of spiritual unease foisted upon the common people by the religious intelligentsia of the period.

This feeling of insecurity was heightened by the cessation of the social security hitherto provided by the monasteries as their loss meant the demise of a support system. The monasteries provided a bulwark against misfortune, poor harvests, illness, old age and poverty which was removed by the sale or destruction of monastic properties and the eviction of nuns, priests and ancillary staff. Paralleling the effects of what became known as the Dissolution, was the gradual demise of the English manorial system which had existed since the Norman conquest of 1066. This system ensured that the responsibility for the welfare of retainers and employees rested with the lord of the manor rather than with the individual. Social mores in the early sixteenth century were emphasising an individual's responsibility for his or her self, a move which reflected the breakdown of the traditional ideals of charity towards one's neighbour. This more individualistic approach, coupled with economic pressures, led to the migration of families or parts of family groups, to the town in search of employment and the rise of the nuclear family, as opposed to the extended family, of previous generations.<sup>1</sup> Widows, grandparents and unmarried family members were left more or less to their own resources.

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1. Burstein, S, "Folklore, Rumour and Prejudice", Folklore, Vol. 70, 1959, p. 375

The family, as such, was subject to major changes as an imbalance between population and resources resulted in population redistribution from villages to towns and from villages to forest and uplands as land was cleared in response to population pressure. Amongst the lower stratum of society, the neighbours, rather than the kinsfolk, probably provided the majority of assistance on a daily basis, a situation which eventually led to tension as neighbours grew tired of the demands made upon them.

The Poor Laws provided some relief from this situation and a government response to the economic changes of the sixteenth century. Reaction to the poor on a municipal level was strengthened by the Act of 1536 which encouraged parishes to erect poor houses and collect for the poor each Sunday. Acts of 1552 and 1563 underlined the fact that voluntary contributions to the poor box by parishioners was not overcoming the problem. Parliament seemingly over reacted to these previously ineffectual measures by introducing in 1572 an Act which provided the death penalty for an individual convicted of a third vagrancy offence. It also threw the burden of caring for the impotent, settled poor onto the parish and made contributions to the poor box compulsory. In 1576 an Act required the establishment of houses of correction in every county and another of 1589 endeavoured to deal with the continuing housing problem for the poor. The entire Poor Law situation was thoroughly dealt with in the Acts of 1597 and 1601 when the control of poor relief was placed under the control of Churchwardens of the parish and four overseers. Overseers were supervised by Justices of the Peace and the laws were administered by the Privy Council. The Poor Law provided some relief from neighbourly tensions by requiring family,

grandparents, parents and children, to support their own poor. However, the law could not help all the poor, nor could it relieve the dependency of many individuals on their neighbours.<sup>2</sup>

Many poorer families were tolerated as long as life remained static but the instant crops failed, livestock died or some catastrophe was wreaked on village members or the village as a whole, toleration vanished. The community recalled a real or imagined injury or injustice meted out to the locally suspected witch or an act of maleficia initiated by the supposed witch and accusations ensued. The farming community was the most prominent when it came to the denunciation of witches.<sup>3</sup>

Older women, single women and widows particularly were especially susceptible to witchcraft accusations when viewed in an agricultural context. Nearly all women accused of witchcraft practices in relation to livestock deaths and disease, crop losses, losses of butter churnings, beer brewings, cheese makings and bread bakings were widows, spinsters or the aged, usually female, members of the community. The examinations of witchcraft accusations on a county basis in the thesis confirms

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2. Houlbrooke, R.A., The English Family 1450-1700, London, 1984, p. 27 & 53  
 Youngs, J., Sixteenth-Century England, Harmondsworth, 1984, p. 262-278  
 Bindoff, S.T., Tudor England, Harmondsworth, 1951, p. 292-294  
 Waters, C., An Economic History of England, London, 1945, p. 254-260  
 Wrightson, K., English Society 1580-1680, London, 1982, p.140-142  
 Beier, A.L. The Problem of the Poor in Tudor and Early Stuart England, London, 1983, p. 4 - 12
3. Deacon, R., Mathew Hopkins; Witch Finder General, London, 1976.

this view. A dichotomy exists in regard to the position of women in sixteenth and seventeenth century Britain as in many key areas before the law and society they were vulnerable and powerless but this powerlessness was counterbalanced by a comparatively strong social position particularly in Scotland and Wales and the non-aristocratic levels of society in Britain. The position of women suffered from the sinning role of Eve and her succumbing to the evil and temptation in the Garden of Eden, thus emphasising that women required moral, physical and spiritual caretaking by men. English common law took its cue from the Scriptures and extended the concept by stating that a wife was subject to her husband and her goods became his, particularly if she had offspring. Husbands could only be punished for their treatment of wives if the wife was killed or maimed, a law which was enforced from 1450-1700. On her husband's death the widow was entitled to a third of his lands but all property rights were rescinded if the woman was proved to be adulterous.<sup>4</sup> This situation prevailed amongst the middle and upper ranks of society but, in contrast, it was customary for a copyhold tenant's widow to retain occupation of the tenant land until she either died or remarried, a widow's estate settlement which caused bitterness amongst prospective tenants when the widow was long lived.<sup>5</sup>

Women did not exist as far as criminal law in Scotland was concerned and were not admitted as witnesses in a court of law until an Act of 1591 allowed female testimony in witchcraft cases. Civil law was entirely different as women were agnatic, i.e. they remained members of their own clan and remained members of their original family after marriage thus enabling them to retain control over their dowry and possible inheritance of property and land tenancies. Witchcraft accusations

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4. Houlbrooke, R.A., op.cit., p.107

5. Stenton, D.M., The English Woman in History, New York, 1957, p. 101

in Scotland show instances of women paying rent and owning "gear" or livestock when they were married.<sup>6</sup>

The position of women in Wales during the sixteenth and seventeenth centuries is more difficult to outline, as aspects of the status and role of women in Welsh society need more research. The codification of Welsh law, thought to be due to Hywel Dda in the tenth century, provided a guide to Welsh law and customs and placed a great deal of emphasis on the role of women in society. Whilst the authorship of the laws is disputed, the laws themselves are real enough but their earliest written versions date from the thirteenth century. Welsh women could not inherit their fathers' estates but neither could they be married against their will and, under certain conditions, they also had the right to dissolve their marriages. The terms of dissolution include, among others, three acts of unfaithfulness on the husband's part and his attempt to bring another woman to cohabit with him under his wife's roof. The Act of Union in England in 1536 brought Anglicisation to Wales and it is difficult to determine what effect this had on the traditional Welsh customs amongst the common people. However, research has thus far indicated that witchcraft was not rampant in Wales and this may reflect a lack of misogyny in Welsh society, probably influenced by centuries old laws and customs relating to women and their place in Welsh society.<sup>7</sup>

In contrast to this relative lack of legal power, was the power each woman maintained in her own microcosm, the home, farm, or manor. The

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6. Larner, C., Enemies of God, London, 1981, p. 51 - 52
7. Smith, A.G.R., The Emergence of a Nation State, London, 1984, p. 12, 37, 102, 389 - 390
- Vaughan-Thomas, W., Wales A History, London, 1985, p. 74 - 77
- Penman, S., Here be Dragons, Glasgow, 1986, p. 290 - 293
- Senior, M., Portrait of South Wales, London, 1974, p. 69

womenfolk in farming communities were the most powerful in the sense that they had more control over their lives and their well-being largely rested in their own hands through the caretaking of their homes, children, garden and yard where the cows were milked, pigs and poultry fed, butter and malt made and the spinning done. The majority of farms and small-holdings regarded the dairy, poultry yard and vegetable plot as the housewife's sole responsibility and she herself marketed her own produce thereby gaining a say in the disposal of the profits.<sup>8</sup> All women of whatever marital status took full part in the agricultural work of their village despite the constant interruptions for childbirth.<sup>9</sup>

The family was dependent on the woman of the house in sickness as well as in health because the women did the doctoring and nursing, as doctors were concentrated mainly in the towns and cities. Doctoring had a bad reputation during this period and most sixteenth and seventeenth century classically trained physicians were ignorant of and indifferent to the homegrown medicinal herbs available to them. They were also antagonistic towards the herbalists and traditional practitioners of medicine.<sup>10</sup> Housewives who could write kept books on herbal remedies for cordials, physics and receipts\* which were handed down from generation to generation and collected from friends and acquaintances. If the lady of the house was well versed in her herbal lore then she was a respected member of the community and if she was also a lady of a manor or the local vicar's wife, her practice included the whole village in times of sickness. Her still room remedies contained the herbs grown in her own garden or which grew wild in the neighbouring countryside.<sup>11</sup>

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8. Plowden, A., Tudor Women: Queens and Commoners, London, 1979, p.4  
Houlbrooke, R.A., op.cit. p. 107

9. Stenton, D.M., op. cit., p. 118; Houlbrooke, R.A., op. cit. p.209

10. Griggs, B., Green Pharmacy, London, 1981, p. 84, 109, 57, 62-70.

11. Hole, C., English Home Life 1500-1800, London, 1947, p. 16

Griggs, B., op. cit., p. 88-93

\* Term for medicinal prescriptions during this period.

The importance of this role increased still further after the loss of the monastic institutions.

The dependency of the community on its womenfolk in their roles of housewife, doctor and farm partner had its negative side as it resulted in a vulnerability which made the women more susceptible to witchcraft accusations and prosecution. Socially based reasons for the upsurge of witchcraft accusations are numerous but many documented witchcraft cases emphasise the lack of neighbourliness and charity towards those in need. Feelings of guilt amongst the non-charitable instigated witchcraft accusations against those seeking help.<sup>12</sup> Witchcraft accusations represented a tension gauge and provided a release in village communities which were small interdependent microcosms. Books per person were few and often religiously orientated and the real sensations of village life were the everyday occasions of birth, death, marriage, feuds and quarrels, a situation in which groups of gossips could be potent vocal forces in the life of the community.<sup>13</sup> Storehouses of potential testimony built up over years of tension and subdued stress, a fact which is amply reflected in the hereditary nature of witchcraft exhibited in the witchcraft trials of Essex and Lancashire,<sup>14</sup> which spanned two or more generations and involved women of Chelmsford, St. Osyth and Pendle Forest. This information was readily available when individuals were accused of witchcraft.

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12. Thomas, K., "Witches"; The Listener, 12 March 1970, p.340  
 Macfarlane, A.D.J., "Witchcraft and Conflict" in Marwick, M.G., ed., Witchcraft and Sorcery: Selected Readings, Harmondsworth, 1970, p. 297-304  
 Smith, A.G.R., op. cit., p. 204
13. Trevelyan, G.M., English Social History, London, 1948, p. 321-322  
 Houlbrooke, R.A., op. cit., p. 110
14. Kittredge, G.L., Witchcraft in Old and New England, New York, 1956, p. 359  
 Sharpe, J.A., Crime in Early Modern England, 1150-1750, London, 1984, p. 78 - 79, 87

Popular sixteenth and seventeenth century British witchcraft was explanatory by nature as popular tradition used witchcraft to explain mysterious injuries, illnesses and events which were outside the understanding of society. Injuries and death to people were the prime consideration of the community but the most important secondary consideration, as far as the community was concerned, was the damage meted out to livestock and cessation of various forms of farm production attributed by the people to witchcraft. A large number of accusations concerned the death of livestock, crop failure, disease and failure of animals to thrive. Essex accusations give a good indication of the numbers as nearly thirty per cent of all accusations related to animal injuries and death.<sup>15</sup>

Social and economic upheavals are sequential in effect and precipitate changes within society and the economy which brings out an important aspect of the witchcraft issue. Major witchcraft outbreaks occur more regularly in prosperous counties rather than poorer counties whereas it is logical to assume that the opposite would occur. In Essex in the 1580's and 1590's good harvests were experienced, yet this period had the highest accusation rates.<sup>16</sup> Similarly in Scotland the fertile areas of the eastern seaboard, the southwest, the lowlands and the borders underwent major outbreaks of witchcraft but the poorer Highland regions never experienced the witch hunts of the Lothians, Fife, Aberdeen and the Borders. This is more than probably related to the richer agricultural areas' economy undergoing greater levels of change than the poorer regions.<sup>17</sup> But it is also important to

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15. Macfarlane, A., Witchcraft in Tudor and Stuart England, London, 1970, p. 154

16. ibid. p.152

17. Larner, C. Witchcraft and Religion, Oxford, 1984, p.26

remember that Highlanders have a tradition of believing in the second sight and supernatural occurrences. It is more than likely that the clan system, which was still extant in Scotland at this time, ensured the caretaking of all members of this extended family under the auspices of the laird, thus eliminating a lot of social stresses.

Many of the agriculturally advancing regions were affected by the rise in population which was outstripping agricultural activity. The rising agricultural prices curbed real wages. Unemployment, under-employment and an increase in the number of small farmers whose existence grew more precarious was another disturbing aspect of change in the rural community. Resultant specialisation in animal farming and industry replaced self-sufficiency in some regions and people found it difficult to sustain themselves in dearth years, particularly when these came in a series rather than intermittently.<sup>18</sup>

The existence of higher rates of witchcraft accusations in prosperous areas explained the low rates of accusations in Wales, a relatively poor agricultural country. Insufficient research has not enabled a clarification of the witchcraft issue in Wales but the general trend does not involve largescale witch hunts and, even where accusations arose, death was not the common outcome for the suspected witch.\*

Economic changes were generated in the agriculturally advanced counties as the influence of trade, money, urban markets and the

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18. Outhwaite, R.B., "Dearth, The English Crown and The Crisis of the 1590's" in Clark, P. (ed.) The European Crisis of the 1590's, London, 1985, p. 33

\* This applies in Flintshire, one of the wealthier agricultural areas of Wales and which is examined in Chapter 10.

proximity of the London/Edinburgh generated markets, changed the system of rents and subsistence agriculture to crop specialisation,<sup>19</sup> forcing out and evicting small-holders from the common field villages which were caught within the maze of agrarian changes. Enclosures generated a change from community farming to individualised farming without the benefit of common grazing. By 1550 a large amount of land had been enclosed but it was the continuation of the enclosures which caused problems during the sixteenth century. Engrossing absorbed entire farms into larger units used mostly for sheep farms. Sporadic risings took place all over the country and these accompanied the seizure of pasture land and enclosures.<sup>20</sup> An examination of changes in agricultural activity and practices shows a close paralleling with witchcraft accusations as the two are closely related.

Witchcraft in sixteenth and seventeenth century Britain was the product of change. Economic factors, social changes, religious dissension, political machinations, judicial and medical changes all contributed to the rise of witchcraft accusations. This thesis, however, concerns itself with an aspect of the witchcraft debate which has hitherto remained unconsidered. Through the evidence presented in trials, depositions, documented accusations and reported witchcraft incidents relating to the death, disease and illnesses of domestic livestock, and the loss of agricultural production, the thesis seeks to provide an alternative explanation for these incidents which were used to convict people of witchcraft. These incidents can be explained and attributed to plant ingestion by sixteenth and seventeenth century livestock and the effect the ingested substances had on the animals and the products, such as meat and milk, produced by these animals.

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19. Rowse, A.L. The England of Elizabeth, London, 1950, p. 71

20. Beier, A.L., op. cit., p. 9

Priestley, H., Voice of Protest, London, 1968, p. 81

Sharp, A.G.R., op. cit., p. 169

The thesis is concerned only with those witchcraft incidents relating specifically to animal deaths, disease and illness. Poisonous and toxic chemicals commonly present in the fields and foods of the community's livestock, eaten unwittingly or through excessive hunger, caused symptoms which led the owners to believe that their livestock had been overlooked or bewitched. All witchcraft accusations relating to animal losses have a potential relationship to plant ingestion, a relatively simple and explainable link in the immediate working world around the sixteenth and seventeenth century farmer and the community.

The examination of this aspect of the witchcraft phenomenon is faced with some conceptual problems. Sixteenth and seventeenth century Britain was a diverse geographical landscape and this, combined with the changing nature of agriculture during this period, resulted in very different agricultural practices in each county. It is vital to place the witchcraft related livestock incidents within the context of their immediate environment and specificity is a key factor.

All the plants cited in Chapter 4 are related to livestock and production losses but not all of them are found growing throughout Britain. Plants specialise in order to survive in an environment and the effects of location, soil and climate regulate plant growth. Plants native to Scotland and Wales can be irrelevant when considering cases of livestock incidents in Cornwall or Essex. Not all plants are native to Britain and many of the plants were introduced with each new wave of settlers from Roman times onwards and, because of this, it is important to verify the introduction dates of plants. The date indicates whether the plant has had sufficient time to become naturalised before and during the sixteenth and seventeenth centuries. A variety of plants became naturalised after the dissolution of the monasteries and the destruction of monastic

gardens. The annual/biennial breeding cycles of plants hastened their dispersal in the natural environment and in this way the plants became accessible to livestock.

Plants are affected by the agricultural variations in each county and the changes which agricultural techniques were undergoing in this period also affected plants, an aspect which is examined in Chapter 2. Each example of a witchcraft livestock case will be placed in its county of origin and the key factors which influence the case within that county will be examined.

In this way, a framework will emerge which expands the context in which animals became involved with witchcraft, in turn stressing the animal association with witchcraft and the interdependency of animal and product losses in the community. Domestic animals were a vital part of farming community life and this will become apparent in the following chapters. The examination of the relationship between livestock and the community necessitates detailing the agricultural practices within the county, the dependency of the community on the animal and its place in the economy of the community. It is apparent from the outset that the probable major cause of accusations of witchcraft relating to animal losses and the blighting of crops, beer, bread and animal products, will primarily be economically based. The loss or potential loss of income motivated most witchcraft accusations in the case studies.

Animal and product losses cannot be attributed to an individual's fear of the witch, because no amount of belief in the powers of a supposed witch could engender the same fear in an animal as it could in a person. If an individual believes strongly enough in the power of a witch, then he or she will either die or become ill as a result of that fear. Animals have no such belief and, in view of this, it is logical to assume that

something in the natural environment killed or diseased that animal and the animal's symptoms induced its owner to believe that the animal was bewitched. A large number of the cases show accusations resulted months and sometimes years after a witch cursed the accuser's cattle, sheep, pigs, milk, butter, beer, crops, cheese or bread and it is somewhat illogical to assume that the accusation was not an excuse to punish someone for the victim's losses. A long enough wait would eventuate in the curse coming to rest on the animal.

The rationale behind the thesis hinges on an explanation based purely on popular belief with a sound agricultural basis, the beliefs of the people who populated the countryside, towns and villages of Britain. The explanation is based on community outlook rather than the intellectual concept of the witchcraft issue in this era.

The analysis of witchcraft related livestock cases in Britain must begin with an examination of the agricultural environment in order to gain an overall view of British agriculture. The general trends which influenced farming techniques and initiated change are important in relation to the tensions they generated within the community. A great deal of information concerning the welfare of domestic animals is vital in order to understand the reasons why so many witchcraft cases are related to livestock loss or disease and loss of farm production. It is probable that poor animal welfare practices, if at fault, were unintentional but perpetuated through ignorance and lack of scientific knowledge. An investigation of agriculture and livestock husbandry will either support or refute this concept and indicate the true nature of sixteenth and seventeenth century animal husbandry.

The next chapter will present an overview of sixteenth and seventeenth century agriculture with particular reference to those changes which affected an agriculturally dependent society and helped engender witchcraft beliefs in regard to animal and product losses amongst the populace.

CHAPTER 2THE CHANGING NATURE OF THE AGRARIAN SITUATION

British agriculture in the sixteenth and seventeenth centuries was not uniform, a diverse landscape generated different farming practices and techniques. Whilst some counties retained traditional farming practices, others were undergoing changes which altered the framework of agrarian life and, in turn, wrought changes in the social structure of the communities within the counties.

The purpose of this chapter is to examine the changing nature of the agrarian situation, to summarise the general farming techniques and to pay special attention to the effects these changes had on animal husbandry. The state of livestock management and caretaking principles will be examined in Chapter 3.

It is apparent from the outset that not all the effects of new techniques, fodder crops and the extent of enclosures, engrossing and the loss of commons, were felt in all counties and, therefore, this chapter is more generalised in outlook. The division into counties of the witchcraft related livestock/agricultural incidents in Chapters 5, 6, 7 and 8 includes brief outlines of the effect the agrarian changes had on the communities in the specific counties represented in the case studies.

Some attention must be paid to the effect new arable farming techniques had on the community, as new changes added to and, in some cases, generated tension in the village community. The productivity levels of agriculture during this period are important, because the levels affected the population. A good harvest ensured the economic survival of the farm unit and its dependent people but a bad or poor harvest jeopardised the welfare of all those dependent on the farm, both animal and human.

Product specialisation and localisation of agricultural products and the exchange of them for industry produced goods was developing.

Nevertheless, the majority of people were engaged solely in providing for their family's immediate needs. The breeding and caretaking of sheep, cattle, horses, poultry, goats and pigs ensured a supply of clothing, meat, milk, butter and cheese. Grain growing on strips and patches of land in the common open field system, provided bread, beer and fodder crops.<sup>1</sup>

Farming was still undertaken generally in open fields, two or three great fields being divided into strips belonging to many individual landholders and intermingled rather than grouped together for the convenience of each individual farmer. Each year one field was fallowed and used for pasture. Villages had belts of woodland and wasteland for animal pasturage and the entire system was undertaken under communal control, which also dictated the number of animals a farmer could possess.<sup>2</sup> The system was not as inefficient as has been claimed, as the ploughing was generally done jointly, thus eliminating travel between plots and the balks were used as part of the drainage system, mown for hay or grazed by animals. Inefficiencies that arose in the common field system resulted from non-cooperation between neighbouring plot owners and tensions arose when drains were kept uncleared and flooding ensued on the adjoining plot. The incentive for a farmer to do well in this situation was also negated if a poor husbandman worked the adjoining plot and there was always a difficulty in policing property rights.<sup>3</sup>

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1. Hay, Denys, Europe in the 14th and 15th Centuries, London, 1966, p. 15 - 16, 318  
 Youings, Joyce, Sixteenth Century England, Harmondsworth, 1984, p. 25  
 Clay, C.G.A., Economic Expansion and Social Change: England 1500 - 1700, Vol. 1, Cambridge, 1984, p. 58 - 60  
 Smith, A.G.R., The Emergence of a Nation State 1529 - 1660, London, 1984, p. 10 - 11
  2. Ault, W.O., Open-Field Farming in Medieval England, London, 1972, p. 15 - 18
  3. McCloskey, D.N., "The Persistence of English Common Fields" in Parker, N.N. and Jones, E., (eds.) Essays in Agrarian Economic History, Princeton, 1975, p. 76 - 81

The sixteenth and seventeenth centuries saw far reaching changes in British agriculture and this was stimulated by increased population and urbanisation. Whilst sixteenth century Britain remained nine-tenths agrarian in occupation, the gradual rise in prices before and after the accession of the Tudors made it imperative for people to increase the productivity of their land to sell produce at a better price on the market.<sup>4</sup> The land was required to produce more, stock needed improvement and unused or waste land had to be brought under production.<sup>5</sup> Economic change was assisted and even implemented by an attitudinal change amongst the community. Entrepreneurial and profit-making activities supplanted the concept of growing food only for the immediate family's survival and the commercial exploitation of the land brought changes, the effects of which percolated through society.

New systems of wholesale trading grew up in response to demands from the capital cities from 1570 onwards and the trade demanded food-stuffs and agricultural raw materials from commercial producers. Consequently the commercial producers wanted to expand their acreage and consolidate.<sup>7</sup> The consolidation and re-organisation was achieved through engrossing, or purchasing/leasing the holdings of other farmers, and enclosing which was the taking in of common or uncultivated land and converting it into arable or improved pasture for the encloser's personal use.<sup>8</sup> There are four different movements as far as enclosures

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4. Elton, G.R., England Under the Tudors, London, 1965, p. 224, 229
  5. Thirsk, Joan (ed.) The Agrarian History of England and Wales, Vol. IV, 1500 - 1640, Cambridge, 1967, p. 161
  6. Elton, G.R., (ed.) The New Cambridge Modern History Vol. II, The Reformation, 1520 - 1559, Cambridge, 1958, p. 48  
Elton, G.R., England Under etc. op. cit., p. 229
  7. Clay, C.G.A., op. cit., p. 68 - 69
  8. *ibid*, p. 69

are concerned; grouping together strips of the open field, increased cultivation of former waste land, the turning of demesne and wasteland into sheep runs and the enclosure of wasteland for arable farming.<sup>9</sup>

Enclosures were not uniform all over the country and the actual occurrence of enclosing was not merely a profiteering venture or a situation where rack-renting and evictions were commonplace. Vast areas of arable did not become pasture overnight.<sup>10</sup> The encloser could continue arable farming on the enclosed land and the labour economy would scarcely be affected but the pasturing of enclosed land seriously altered labour needs. By this means depopulation, eviction and unemployment often resulted from the conversion of arable to pasture.<sup>11</sup> The law permitted enclosure where there was mutual agreement amongst neighbours and where the livelihood of those who were enclosed remained unthreatened. But this mutuality was rare.<sup>12</sup> Allegations of arbitrary enclosure are extant and the majority of them relate to improvements or intakes of waste land. This often curtailed the commonspasturage and the users of the commons were concerned at the threat to their livelihood and, in the long term, their survival.<sup>13</sup>

Kent, Essex and Devon had been enclosed at a very early stage, prior to 1500, because of the abundance of pasture land in all these counties and because the peasant farmers agreed to a change in the status

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9. Waters, C.M., An Economic History of England, 1066-1874, London, 1925, p. 178 - 180
10. Ramsey, P., Tudor Economic Problems, London, 1972, p. 19 - 20
11. *ibid*, p.20
12. *ibid*, p. 20 - 21
13. Hoskins, W.G. The Making of The English Landscape, London, 1977, p. 142, 153

quo in order for the overall enclosure to occur. Tudor squires diminished enclosure operations during the middle decades of the sixteenth century but enclosures spread by agreement amongst all the free-holders led to change from the last quarter of the sixteenth century to the Civil War.<sup>14</sup> Change also occurred during this period in Suffolk, Worcestershire, Shropshire, Leicestershire, Northamptonshire and the Isle of Wight but Yorkshire, Lincolnshire, Gloucestershire and Oxfordshire were hardly affected.

The situation in the Midlands was very different because of a large population, scarcity of land and the predominance of grain growing which depended for its success on the openfield system and common rights. Throughout Mary's and Elizabeth's reigns sporadic risings occurred stemming from enclosures. They were accompanied by the tearing down of the enclosures and the driving away and selling of sheep. Pasture lands were seized by those in power and disturbances continued into 1589.<sup>15</sup> The main agrarian grievances stated by the <sup>East Anglian</sup> Norfolk rebels of 1549 was their policy of antirack-renting, loss of common rights and that no lord or gentleman should be allowed access to the commons. They also cited debasement of the coinage and inflation as inducing hardship.<sup>16</sup> In this sense enclosures cut deeply into rural life<sup>17</sup> and the Midland revolt of 1607 prompted the establishment of the Inquisitions of Depopulation. The Inquisitions found that 70,000 acres over six

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14. Elton, G.R., The New CMH, op. cit., Vol. II, p. 42  
Smith, A.G.R., op. cit. p. 170

15. Priestly, Harold, Voice of Protest, London, 1968, p. 81 - 82  
Smith, A.G.R., op. cit. p. 170

16. Ramsey, P., op. cit., p. 41 - 42

Jones, Whitney, R.D., The Mid-Tudor Crisis 1539 - 1563, London 1973, p.114, 116 - 119

17. Elton, G.R., The New CMH., op. cit., Vol. II, p. 42

counties had been enclosed from 1578 to 1607. Twenty-seven percent of the enclosures occurred between 1578 - 92 and sixty-one percent between 1593 - 1607.<sup>18</sup>

The problem of enclosures was localised within six Midland counties and serves to exemplify the plight of many small farmers in Tudor times who were dangerously placed and vulnerable where the move to enclose was strong. Their vulnerability lay in the means used to undermine them, i.e. rack-renting, arbitrary fines and invasion of common pasture rights. Survival often depended on the landlord as the Midlands were farmed on an open-field system with nucleated villages, subsistence rather than commercially orientated agriculture, a three field system of rotation and limited numbers of sheep and cattle per villager. The rights of copyholders, copyholders with inheritance, customaries, and tenants could all be undermined by increased or non-renewal of rents, fines, charges and leasehold payments at the landlord's discretion.<sup>19</sup> Leicestershire is a case in point as one village in three, or ten percent of the land, was affected by enclosure and this represented a great deal of hardship and unemployment as re-employment was difficult to find in this region.<sup>20</sup>

Whilst a minority of the peasants suffered acutely, the majority remained much as before, governed more by the climate and seasons than greedy landlords. Nevertheless, during the sixteenth and seventeenth centuries many enclosures were economically beneficial and did increase

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18. Ramsey, P., op. cit., p. 27

19. Ramsey, P., op. cit., p. 27 - 40

20. *ibid.*, p.40  
Smith, A.G.R., op. cit., p. 170

For a detailed account of the effects of enclosures see:

Clay, C.G.A., op. cit., p.67 - 99, 134

Kerridge, E., Agrarian Problems in the Sixteenth Century and After, London, 1969, p. 94 - 119

Kerridge, E., The Agricultural Revolution, London, 1967, p.19-40

the productivity of the land. Perhaps historians have overemphasised the more negative aspects of enclosures during this period and underestimated the more positive ramifications of enclosures. One distinctive social aspect of the Elizabethan and Stuart ages was the rise of the yeoman whose place was between that of the gentry and husbandman. The sixteenth century represented an unprecedented opportunity for the yeoman as the demand for foodstuffs and wool, combined with his own individualism, enabled him to be flexible in his methods and consolidate /expand his holdings and enclose. Monastic lands were available for purchase from Henry VIII's time and the sale of crown lands in order to raise money for the crown provided further opportunity for land acquisition. Large estates were breaking up thus enabling smaller pieces to be purchased and the commercial interest increased the buying and selling, especially in the south and east. Leasing was also popular amongst yeomen who could either be the lessor or leasee and so the process of land consolidation engendered a place for yeomen in society.<sup>21</sup>

The yeomen had access to published works on livestock management, bees, orchards, cattle raising, fish ponds and many other aspects of farming but whether or not they used these publications is another matter. There is some evidence to suggest that yeomen acquired more knowledge from sources amongst the gentry who tended to accumulate published works on farming. Thomas Tusser's 1557 publication of Five Hundred Points of Good Husbandry did make a good impact on yeomen generally.<sup>22</sup> Many yeomen joined the ranks of the Puritans in the

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21. Campbell, Mildred, The English Yeoman, London, 1960, p. 50-100  
Hoskins, W.G., Provincial England, London, 1965, p. 151-169

22. Schmidt, A.J., The Yeoman in Tudor and Stuart England, 1961, USA, p. 13 - 15  
Fussell, G.E. Old English Farming Books 1523 - 1793, Aberdeen, 1978, p. 8

seventeenth century<sup>23</sup> and of the witchcraft accusations examined in later chapters, many were brought by yeomen, rising yeomen or the wealthier members of a rapidly polarising community. The rise of Puritanism has been closely linked with the rise of witchcraft accusations in this period.

Increased demand for food brought the need for improved land and arable farming techniques. Technical advances concentrated mostly on ways of overcoming pasture shortages which limited livestock numbers and therefore limited manure supplies, thus limiting crop yields. From 1510 onwards, farmers who could afford it, carted fertiliser in the form of chalk, marl and calcereous sand for pasture application as well as lime, town organic waste, stable manure, street refuse, malt dust, soap ashes and pulverised iron slag.<sup>24</sup> The fertilising resources of the Tudor farmer were limited as dung supplies were scanty, due to the poor nutrition of the livestock. Livestock spent their time on the common and their excreta could be accumulated only if they were housed in stalls overnight or during winter. The sheepcote was cleared once a fortnight to obtain the available manure.<sup>25</sup> Vegetable waste was a more certain supply and other methods included mixing soil with animal excreta and dovescote collections, perhaps the principle here being the scarcer the more valuable. During this period all farmers had the worry of insufficient manure and all sources were valued because the quality of the crops grown depended on the amount of manure available.<sup>26</sup>

Harvest was a vital fact of economic life. A bad harvest reduced the grain yield ratio. In the 1520s, one third of the population lived below the poverty line, i.e. could not provide enough

23. Schmidt. A.J., op. cit., p. 26

24. Clay, C.G.A., op. cit., p. 126 - 127

25. Fussell, G.E., "Crop Nutrition in Tudor and Early Stuart England", The Agricultural History Review III:II (1955) p. 95 - 96

26. *ibid.* p. 97

sustenance for themselves, another third just above it and the lower orders spent eighty to ninety percent of wages on food and drink.<sup>27</sup> Harvests came in a series of good and bad runs and no indication is given as to how a bad, wet harvest affected foot rot and murrains amongst animals. Between 1646 and 1661 there were five bad harvests in fifteen years.<sup>28</sup>

The pressure of population on available land, harvest fluctuations and the need to feed many more people, led to an increased demand for land. Disafforestation, or the clearing of forested areas, continued actively throughout the centuries as woodlands were supplanted by pasturage and arable and as the demand rose for wood as a building material and industrial fuel.<sup>29</sup> Many peasants needed the woodland for survival as it was a major part of their domestic economy, giving them grazing and woodcutting rights which were often customary. Matters were not alleviated with the beginnings of pleasure grounds and parkland construction by some landed gentry who ousted the tenants and turned their farms into parkland.<sup>30</sup> Land extension was also undertaken by drainage

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27. Hoskins, W.G., "Harvest Fluctuations and English Economic History, 1480 - 1619", The Agricultural History Review, XII:I, (1964), p. 29 - 33
28. Hoskins, W.G., op. cit., p. 33 - 42  
 Hoskins, W.G., "Harvest Fluctuations and English Economic History 1620 - 1759", The Agricultural History Review, 16:II, (1968), p. 17  
 Clarkson, L., op. cit., p. 26, 29  
 Clay, C.G.A., op. cit., p. 53
29. Thomas, K., Man and the Natural World, Harmondsworth, 1983, p. 193 - 201  
 Clarkson, L., op. cit., p. 23
30. *ibid.*, p. 200 - 203

of marshland, the fens, filling in coastline sections, ley farming and the creation of water meadows by land-owners and wealthy farmers.<sup>31</sup>

Improvements in the methods of pasturage and arable farming techniques were attempted although farmers were ignorant of soil chemistry, animal and plant physiology and the cause of and cure for plant blights and animal diseases. An added difficulty was the regional nature of British agriculture which slowed the adoption of those techniques dependent on trial and error.<sup>32</sup> The more conservative peasant farmer was more likely to adhere to old methods of husbandry because his profit and survival margin was so much closer and vital to him than they were to the more moneyed landholder. The risk was greater and was often considered too great to take despite promised increased returns.<sup>33</sup>

The most important improvement as far as the subject matter of this thesis is concerned is the introduction of new fodder crops. In order to expand livestock numbers it was necessary to find the means to feed the animals well throughout the year. The natural food for herbivorous domestic animals is pasture herbage and this natural grassland normally includes a large variety of grasses, legumes and herbs.<sup>34</sup> During this period animals were directly dependent on the same agricultural practices as their owners and could depend only on the area available to them from which to forage in order to obtain enough food to maintain health and reproduce themselves.

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31. Clarkson, L., op. cit., p. 23 - 24

Ramsay, P., op. cit., p. 45

Clay, C.G.A., op. cit., p. 127 - 129

Darby, H.C., The Draining of the Fens, Cambridge, 1956 for a complete overview.

32. Mingay, G.E., (ed.) The Agricultural Revolution, London, 1977, p. 16 - 17

Clay, C.G.A., op. cit., Vol. I, p. 64

33. *ibid.*, p. 64

34. McDonald, P. et. al. Animal Nutrition, Edinburgh, 1969, p. 295

Sixteenth century pasture consisted mainly of natural grass and weed growth which was nutritionally low in value. At the turn of the sixteenth century, continuing into the seventeenth century, the systematic application of hay dust or sweepings from the hay loft floor, brought an upsurge in pasture growth although it still consisted of a wide variety of plant species.<sup>35</sup> Sainfoin, clover, trefoil and rye grass grew spontaneously all over the country and the practice emerged of cultivating them selectively.<sup>36</sup> The process was slow because many British farmers maintained the view that grassland was natural and therefore need not be cultivated<sup>37</sup> and, although large numbers of species and grass varieties were indigenous to Britain, only about twenty of them were useful to the farmer. Permanent pasture's most valuable plants are those that can flourish despite animal hooves and these include perennial rye grass, smooth stalked meadow grass, wild white clover and others. The value of the grass is dependent on its environment, the purpose for which it is to be used by the animal, i.e. milk production or fattening, its chemical composition, palatability and digestibility. The value of grazing on the wasteland was also variable due to the fact that the less palatable grasses predominated because livestock ate them last, thus increasing the plant's survival rate.<sup>38</sup> This reduced pasture production by reducing the palatable grasses for livestock.

Common pasture in sixteenth and seventeenth century Britain consisted of flourishing furze and bramble, gorse which was used as a fodder crop in Wales, nettles, thistles, docks and perennial indigenous grasses. The chalk lands encouraged sheep fescue and other fescue grasses, burnet

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35. Clay, C.G.A., op. cit., p. 131

36. *ibid.*, p. 132

37. Fussell, G.E., op. cit., p. 73

38. *ibid.*, p. 73 - 77

and nutritious grasses, herbs, brambles, whitethorn and scrub timber trees. On the lowland wastes, cocksfoot, meadow fescue, foxtail, rye grass and clover flourished.<sup>39</sup>

The nutrients supplied by winter grass and cattle feed such as hay, straw and pulse were useless if they did not include clover, dandelion, honeysuckle and cowslips, because the animals were provided with bulk but little sustenance. The waterside meadows were fertile because of their winter flooding but continuous sowing for hay made them mossy and necessitated a succession of cereal crop plantings and then a hay dusting in order to return them to hay quality meadows.<sup>40</sup> Hay quality is vitally important for the well-being of animals in winter and it should be a nutritious, mineral-rich and medicinal fodder which can maintain an animal during winter. It is doubtful if this was fully appreciated during the sixteenth and seventeenth centuries, nor was it fully appreciated that hay should be used to line animals' stomachs with bulk food to prevent colic when animals are turned onto wet, lush or spring grass.<sup>41</sup>

In order to improve pasture, Tudor and Stuart farmers used forage seeds of clover or grass honeysuckle, meadow clover, vetches, sainfoin, gallion or petty muggalt, wild fitch and cat grass. Small wild mallow, crowfoot, plantain, carrot, laughing smallage, small rampions, wort balm and butter wort were also used. Clover or trefoil was the most favoured by the Tudor advisers but they appear to be confused as regards the nature of trefoil, using it as a term for nonsuch clover, sainfoin

39. *ibid.*, p. 77 - 78

40. *ibid.*, p. 35 - 36, p. 79 - 80

41. Bairaclì Levy J. de Herbal Handbook for Farm and Stable, Emmaus, 1979, p. 134

and lucerne. Rye was used in the second half of the seventeenth century as a crop but not prior to that period.<sup>42</sup>

New forage crops were required to feed stock during the winter, either in the field or in the byre. The return of many of the Civil War exiles from the Low Countries introduced new fodder crops to Britain and among these were turnips and carrots.<sup>43</sup> Turnips were introduced in the Suffolk Duns in 1646 - 1656 and these were drawn in autumn and mixed with straw and hay to feed animals in the winter. The remains of the crop were pulled in March but some were left to seed. Root crops were used a great deal in Suffolk as the county produced large crops of carrots for London and for fodder.<sup>44</sup> From 1600 onwards Dutch clovers, trefoil and sainfoin were introduced to improve the native varieties. Clovers fixed the nitrogen quality of native grass by one hundred percent and the immediate effect was to raise the stocking rate on the holdings.<sup>45</sup>

Now that inroads had been made to ensure the beginnings of regular livestock feed supplies, the sixteenth and seventeenth century farmers needed to improve the quality of their livestock. It was essential to improve the quality of their animals in order to improve milk yields, reproductive capacity and to shorten the time between birth and sale of the animal. The following chapter will indicate the nature of livestock husbandry extant during this period.

42. Fussell, G.E., op. cit. p. 80 - 82

43. Clay, C.G.A., op. cit., p. 131

44. Fussell, G.E., op. cit., p. 37 - 38

45. Trow-Smith, R, A History of British Livestock Husbandry to 1700, 1957, p. 257

Clay, C.G.A., op. cit. p. 132

CHAPTER 3DOMESTIC ANIMAL MANAGEMENT: QUALITATIVE CARE?

The procedure for caretaking domestic animals throughout sixteenth and seventeenth century Britain needs to be examined in detail as some of the validity of the link between witchcraft and livestock losses hinges on the quality of care undertaken by the community in regard to its livestock. Modern research has indicated that even with quality care of livestock, animals are still being poisoned by toxic plant ingestion.\* It is probable that the husbandry practices extant in sixteenth and seventeenth century Britain were such that they enabled community suspicion to rest on individuals for the occurrence of abnormal and unusual behaviour amongst domestic animals. This chapter examines the type and quality of care meted out to domestic livestock.

The sixteenth and seventeenth centuries saw the beginnings of change in livestock husbandry techniques due to the influence of a rising population, the return of both the Marian and Civil War exiles from Europe, and specialisation in agriculture. The literary information available during this period, whilst widely read and practised upon, did not greatly improve the overall standard of livestock management. Of Fitzherbert, Tusser, Mascal and Markham, who together spanned a century of publication, not one recorded any substantially new advances on the principles of livestock management.<sup>1</sup>

Fitzherbert's Boke of Husbondrye was the first work on farming printed in England and appeared in 1523. The contents were based on practical experience but many others, who published after Fitzherbert, were guilty of plagiarism and unacknowledged translations of foreign agricultural treatise and heavy borrowings from the classical authors of Greece and Rome. The

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1. Trow-Smith, R.A. A History of British Livestock Husbandry to 1700, London, 1957, p. 235

\*Livestock deaths occur frequently in Australia from the ingestion of lupins, ragwort, oats and many other plants and this has prompted the publication of many books and articles in order to inform farmers of the need to carefully monitor livestock in susceptible periods.

published works were popular and widely read because of the prominence of agriculture in the daily lives of the populace during the Tudor and Stuart periods.

However, the works may not be taken as an absolute indication of farming practices of the period as, no doubt, each reader adopted only those aspects of the works which he or she felt was relevant to his or her situation. The popularity of the works does indicate, however, that most readers thought worthy of practical application, the information contained within them. Enterprising individuals were anxious to learn of new methods and to adopt them if a profit could thereby be gained.<sup>2</sup>

Farming practices were carried out on a traditional basis in each county and passed on verbally to each successive generation. It was not until the advent of the printing press that agricultural information was printed and published in quantity. Prior to that, only handwritten treatise, such as those of Walter of Henley and Bishop Grosstet, were available. Dissemination of information was, therefore, limited largely to the local area and, even with printing, the accessibility of many farming texts was probably beyond the pocket of the average farmer, particularly those of the lower classes.

The publication of Thomas Tusser's A hundreth good pointes of husbandrie, in 1557 and its expansion to Five hundreth good pointes in 1573 did not add to practical farming methods, as it was more a rhyming guide to Essex and Suffolk farmers for the year. Tusser himself was an unsuccessful farmer but Leonard Mascall published respected works on plant grafting, The Husbandrie, ordering and Government of Poultry in 1581 and The first book of cattel...Wherein is showed the government of oxen, kine, calves... and similar books on horses, sheep and goats in 1596. His book on poultry was the first English book published on the subject and he regarded poultry keeping as an important aspect of farming.<sup>3</sup>

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2. Fussell, G.E., Old English Farming Books 1523 - 1793, Aberdeen, 1978, p. 1 - 2

3. *ibid.* p. 9 - 10

Mascall's work on cattle was an important influence but most of the information in it had been obtained from earlier writers and the classics. It made the colour of the beast an important selection criteria but, as most cattle in Britain during this period were red or black, his contribution to breed improvement methods was negligible.<sup>4</sup>

Barnaby Googe published a work in 1577 entitled Four Bookes on Husbandrie... in which he added the practical experience of his friends to classical writings. He stated that oats, trefoil or clover were good pasture grasses but forage grasses such as trefoil, grandtrefle and alfalfa/lucerne are indistinguishable to him.<sup>5</sup>

Many works appeared on the subject of horse management as the horse was the only form of transport, other than the ox-cart, during this period. Horses were also a bloodstock industry and pleasure to the upper classes, hence the interest in the works of Thomas Blundeville, Nicholas Malbie and Christopher Clifford. These authors covered the topics of riding, breeding, keeping, farriering and doctoring all breeds of horses.<sup>6</sup> Beekeeping was another important aspect of farming life in the Tudor period but, as no cases dealing with bees in relation to witchcraft have been unearthed, there is little point in pursuing information on bees available to the farmer in the 1500's.

Tudor writers on agriculture and domestic livestock laid the groundwork for the seventeenth century writers. Their writings were repetitive and most unscientific in their approach and it remained for the writers of the next century to begin the study of agriculture from a more scientific base.

Gervase Markham published a great deal of work between 1600 - 1640 but many of his works are repetitive and, in some cases, Markham's authorship is contestable. Horse management and disease was an all

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4. *ibid.*, p. 11

5. *ibid.*, p. 12 - 13

enduring topic during this period and many people produced works on the diet, disease and caretaking of the horse. Markham's other major interest was the management of cattle but his selection criteria did not differ from Mascall's or Fitzherbert's colour methods.<sup>7</sup>

Samuel Hartlib arrived in London in 1628 and published many works, of which few were original. Hartlib did not claim the work as original however, and included many concepts and ideas from European authors, as well as those of Sir Richard Weston. Weston preached the use of clover, turnips, the four-course agricultural system and the growing of flax.<sup>8</sup> Hartlib did however publish a tract as his own which was written by either Gabriel Plattes or Cressy Dymock and which called for the establishment of an agricultural college. This important concept had to wait a further three hundred years before it was implemented.<sup>9</sup>

From 1620 - 1660 few books were published which dealt generally with agriculture. The emphasis of those works which were published was on enclosure, arterial drainage and reclamation of the Fens. William Cole's Art of Simpling of 1656 details the history of plants, fruits, herbs and flowers of Britain but makes no mention of animals and their husbandry.<sup>10</sup> Walter Blith published innovative books in 1649 and 1652 but their advocacy of drainage, enclosure, ley farming, the use of manures and plantations and the advice to farmers to grow clover, sainfoin, dye plants, hops, saffron, rape, cole-seed, hemp

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7. *ibid.*, p. 21

Markham, G., Cheape and Good Husbandry, London, 1676, p. 71

8. Fussell, G.E., *op. cit.*, p. 42 - 43

9. *ibid.*, p. 45

10. *ibid.*, p. 51

and flax were too far in advance of his time and were not taken seriously. It was not until a century later that farming had progressed sufficiently in outlook to implement his methods.<sup>11</sup>

A peculiar work, whose translator has remained anonymous, was published in 1657 under the title A discourse of the knowledge of Beasts, wherein all that hath been said for and against their ratiocination is examined. The book was written by Cureau de la Chambre and was a French work dealing with animal psychology. Fussell has been unable to locate a copy of this work, which is a pity as it may have shed much light on attitudes to animals during this period.<sup>12</sup>

The period 1661 - 1700 produced pamphlets and publications on the unemployed poor, drainage and enclosure, gardening and orcharding and the beginnings of a primitive biochemistry which dealt with animal and plant organ functions. Plant physiology was becoming of interest amongst those of the Royal Society, and other works on vegetation, plants and gardening, indicate that a science was beginning to develop where superstition had previously dominated.<sup>13</sup> The Restoration period produced literature geared to the great interest in gardening and the laying out of grounds. Almost all the published works are those of secondary authorities who either translated European works or gathered information from previously published British works and published them under their own names.<sup>14</sup>

This short appraisal of the literary works published in the sixteenth and seventeenth centuries and pertaining to domestic animal management, husbandry and farming, underlines the dearth of new and innovative information available to British farmers in this period.

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11. *ibid.*, p. 52 - 53

12. *ibid.*, p. 54 - 55. The work is last mentioned in An Index on Horses and Equitation by F.H. Huth and published in 1887. Enquiries at the National Library, Canberra, have also proved fruitless.

13. Fussell, G.E., *op. cit.*, p. 56

14. *ibid.*, p. 67 - 68

Knowledge was available to those who could read and were financial enough to purchase farming treatise but, had they done so, it is questionable if the information would have availed them much. Most of the works were general and, given the regionalisation of British agriculture, much of the information as regards farming would not have benefited farmers with specific regional variations. No information was forthcoming as to soil types or chemistry and animal breeding was unconsidered in the genetic sense. This is not to say that every effort was not made to improve the farming situation but the age was still unaware of so many agricultural principles which were as yet un-researched. Examples of these included the principles of genetic selection, good nutrition throughout the animal's life and particularly during pregnancy, and the vital effect nutrition had on an animal's productive capacity. The writers of the period promised the followers of their methods much but their prescribed methods achieved relatively little in terms of the promises made.<sup>15</sup> Tudor and Stuart livestock husbandry was greatly influenced by the demand for meat and other livestock products from the growing urban centres, such as London, Edinburgh and others. Almost every individual county had its own types of livestock as the environment helped control the type of animal which populated any natural area and influenced the variety and shape of different animals.<sup>16</sup>

Almost every small farmer who owned some land during this period had a house cow. As Sir Kenholm Digby wrote in 1658 "there's not the meanest cottager but hath a cow to furnish his family with milk; 'tis the principal sustenance of the poorer sort of people....which makes them very careful of the good keeping and health of their cows."<sup>17</sup>

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15. *ibid.*, p. 42, 46

16. *ibid.*, p. 172, 231

17. Sir K. Digby, A Late Discourse...Touching on the Cure of Wounds, 1658, p. 117 quoted in Thomas, K., Man and the Natural World, Harmondsworth, 1984, p. 98

Therefore the loss of a cow through disease or accident meant that the struggling farmer underwent a major disaster because a supplier of food and income had all gone at the same time.<sup>18</sup> Replacement was expensive and the cow's demise affected the farmer on more than an annual basis as the life expectancy of a cow was a good twelve years.

The techniques of Tudor and Stuart dairy farming were subject to many difficulties when viewed in terms of modern agricultural practices. Farmers had little or no choice of cow breeds because in most parts of the country the farmer could not improve the type and was handicapped by the size of his holding. The breeds of cow available were also limited because there was little or no comprehension of genetic breeding.<sup>19</sup> Mascall gave a very inadequate guide to the choice of beast and there was far too much importance attached to the colour of the animal.<sup>20</sup> Breed distinction was also by horn shape and size but neither Fitzherbert nor Markham offer good advice as regards replacement and selection.<sup>21</sup> There were three distinct breeds in England, the long-horn cattle from Yorkshire, Lancashire, Derbyshire and Staffordshire which were generally black with large black tipped white horns. The second breed was the Lincolnshire cattle of the fens and marshes which were pied and bred principally for meat. The third type was the red Somerset and Gloucestershire cattle which were the best milkers.

Milk cattle were considered to be better off thin than fat as fat supposedly stopped the milk. Consequently short rations were recommended and consisted of grass in summer and hay in winter. Despite this, cows had a long milking life and some cows were still milking at twelve years, although the best yields were produced at six. The selection principles which governed a good dairy were stated by Markham

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18. Fussell, G.E., op. cit., p. 1

19. ibid, p. 10, 12

20. Trow-Smith, R., op. cit., p. 235

21. Fussell, G.E., op. cit., p. 10, 12

"the Cow chose for the Dairy must have all the signs of plenty of milk : as a crumpled Horn, thin Neck, a hairy dew-lap, and a very large Udder, with Teats long, thick and sharp at the ends: the Udder to be either all white (of what colour soever the Cow be) or at least the fore part thereof."<sup>22</sup>

Samuel Hartlib outlined qualities which had little or nothing to do with milking or breeding capacity. Contemporary writers on dairy cow husbandry did little to assist the dairy farmer as each was biased towards the cow type of his own county. Consequently, Markham believed that red cows gave the best milk and black cows gave the best calf<sup>23</sup> whilst Fitzherbert stated that a good milk cow should be a proved milker.<sup>24</sup> The fundamental principles of calf-rearing were the same as they are today but calves were left with their mothers if they were to be grown on and fattened up by their owners, particularly in the case of calves for veal consumption.<sup>25</sup>

Butter and cheese producers must have noted the cow with the highest milk yield, the best calf producer and the best food converter but whether the farmer was actively able to choose his breeding pattern is in some doubt.<sup>26</sup> Cows which were expected to live off grass and hay<sup>27</sup> were limited in both milk production and reproductive capacity because

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22. Markham. G., The English Housewife, 1683.

23. Markham, G., Cheepe and Good Husbandry, London, 1676, p. 71

24. Fitzherbert, J., The Boke of Husbandrye, London, 1534, p. 52-53

25. Trow-Smith, R., op. cit., p. 235 - 238

26. Fussell, G.E., op. cit., p. 12

27. Trow-Smith, R., op. cit., p. 237

of poor nutrition. The farmer could not increase his herd unless he increased his holding and in places where community organisation was strong, such as the Midlands, the number of cattle owned by each individual was stunted due to the number he could legally graze on the common.<sup>28</sup> The ability to segregate cows from the village herd was impossible until large scale enclosure and land distribution had occurred<sup>29</sup> which meant that breeding was haphazard and dependent on what bull was available on the common at the time. The scientific knowledge of breeding came much later, in the 1800s, and genetic principles were totally unknown during this period. Any selective breeding that did occur was carried out on appearance which was fraught with difficulty because of the problems encountered when distinguishing genetic features due to poor feeding which tended to commonise stock.<sup>30</sup>

The whole concept of breeding was also severely hampered when information concerning the bull, such as Edward Topsell gave farmers, persisted.

"Every Bull is sufficient for ten cows, and the Bulls must not feed with the cows, for two months before their leaping time, and then let them together without restraint. If the Bull then be slow and heavy, take the tail of an Hart and burn it to powder, then moisten it in wine and rub therewith the genitals of the Bull, and he will rise above measure into Lust - wherefore, if it be more than tolerable, it must be allayed with oil. They are a great while in copulation, and some

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28. Fussell, G.E., op. cit., p. 5, 10

29. ibid., p. 5, 10

30. ibid., p. 10 - 11

have guessed by certain signs, whether the calf will prove male or female: for, say they, if the Bull leap down on the right side of the Cow, it will be a male, if on the left a female. If a man then desire a male calf, then let him tie up the right stone of the Bull at the time of copulation: and for a female, bind up the left."<sup>31</sup>

Nevertheless, at least the agricultural writings indicate that farmers were thinking about breed improvement. The role of the bull was not considered of real importance as far as breed improvement was concerned until 1750.<sup>32</sup>

Beef production was a slow process as bullocks fattened very slowly, taking from four to five years from birth to market. The whole process may have been shared by two or three owners as the animals were sold from their breeding grounds in western and northern England, Wales and Scotland, and gradually made their way southwards to be fattened.<sup>33</sup>

The situation in Scotland as far as dairy cattle were concerned was worse than that of England. Cattle were usually in such poor condition that they calved every two years due to poor pasture and the butter was made from the cow's entire milk not the cream alone.<sup>34</sup> In the Midlothian parishes of Calder the people knew that if the plant scabious or Eastning Wort was fed to the cows they would come into season<sup>35</sup>

31. Topsell, E., History of Four-Footed Beasts, London, 1607

32. Fussell, G.E., op. cit., p. 14 - 17

33. *ibid.*, p. 238

Thirsk, J. (ed.) op. cit., p. 186

34. Fenton, A., "Skene of Hallyard's Manuscript of Husbandrie", The Agricultural History Review XI:II, (1963), p. 80 - 81

35. *ibid.*, p. 80

but even that was no guarantee of a pregnancy or a calf carried full term.

Scottish husbandmen were almost always tenants at will with no written leases and were therefore subject to the whims of the landlord. If a written lease did exist it was for only one, three or five years and the principal effect of this system was negligible land improvement because of lack of time or stimulus. Between the 1620's and 1630's an increase in tacks or leased land occurred because of the prosperous nature of Scottish agriculture which largely followed the English pattern during this period. Improved crop yields, large extensions of cultivated land, particularly in the Lothians, and the expansion of the coastal grain trade occurred along the eastern seaboard and the rich arable regions. All this affected tenants who carefully worked out their livestock numbers according to pasture quality but tenants were significantly disadvantaged by the practice of "rouping", or granting the holding to the tenant who offered the highest rent. This frequently led to tenants over-estimating their ability to pay<sup>36</sup> and this limited the scope of the tenants to caretake their livestock and brought to a minimum the profit margins obtainable from their land.

Scotland was the greatest breeding ground of cattle for southern England by the mid-seventeenth century but there is every indication that a spasmodic trade to England also existed in the sixteenth century.<sup>37</sup> The Scots cattle paid customs duties and the majority of them went through Carlisle from the major breeding grounds of Galloway. Between eleven thousand and sixty thousand moved south in this manner per annum.<sup>38</sup>

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36. Whyte, I.D., "Written Leases and their Impact on Scottish Agriculture in the Seventeenth Century", The Agricultural History Review, 27:I (1979) p. 1 - 6

Fenton, A., op. cit., p. 79

37. Trow-Smith, R., op. cit., p. 223

38. Chartres, J.A., Internal Trade in England 1500 - 1700, London, 1977, p. 20

County varieties of cattle there may have been but the droving trade from both Scotland and Wales ensured a variety of cattle types throughout Britain.<sup>39</sup>

The cattle trade appears to have been the economic backbone of Wales and although the Welsh droving trade is difficult to quantify, approximately seventy thousand Welsh beasts were moved into England annually. The trade developed from the second quarter of the sixteenth century and grew with the pacification of the borderlands. Wales produced a significant proportion of English beef until the trade peaked in 1640 then declined<sup>40</sup> as the Civil Wars greatly hampered trade.<sup>41</sup> The mountainous regions of North Wales were dependent almost solely on cattle as the land precluded virtually all crop sowings and arable husbandry.<sup>42</sup> Store cattle, mainly black in colour, were common on English pastures during this period as the droving trade increased with the improvement in pastoral husbandry productivity. Anglicisation, The Great Pestilence in Wales and the Glendower revolt brought the demise of the small peasant herdsmen on the hills and the beginnings of the enclosure of North Wales. Valleys were enclosed first and then the summer grazings on the hills.<sup>43</sup>

Stimulus for the droving was the profit from selling store cattle in England but what came first, the demand for stock which encouraged land improvement or the land improvement which made surplus stock, is now unknown. The black cattle came from Brecon, Montgomery, Anglesey,

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39. Thirsk, J., (ed.) op. cit., p. 187

40. Chartres, J.A., op. cit., p. 21

41. Thirsk, J., (ed.) op. cit., p. 142

42. *ibid.*, p. 142

43. Trow-Smith, R., op. cit., p. 213

Caernarvon, and The Castle Martins of Pembroke. Reds originated in Flintshire, central and south Wales, as did the browns and some browns also came from Montgomery.<sup>44</sup>

Sheep were the next most important animal after cattle and they were prized for the wool and dung which was an important fertilizer. Sheep need care and tending because they are susceptible to both predators and to weather changes.<sup>45</sup> As Tusser points out, farm animals, particularly lambing ewes, need to be cherished in bad weather.<sup>46</sup> The demand for wool from the fifteenth century onwards appears to have been insatiable and consequently landlords whose rent rolls were declining, sought to convert their tenant farmed land into pasturage. The result was the loss of the remaining tenants' economy and/or the overstocking of the commons with landowners' sheep.<sup>47</sup> Sheep were often seen as a threat to the welfare of the tenant farmer and with good reason.

Sheep husbandry was much better documented than other types of farm stock management and this was due largely to Henry Best who resided in Yorkshire and had the foresight to write down his sheep management programme in 1641.<sup>48</sup> Male sheep were called tups and were divided into three groups, hung tups, or rams with two testicles in the scrotum; close tups, rams with both stones in the ridge of the back; and miggon tups, or rams with one testicle undescended. Female sheep are referred to as gimmers from their birth to clipping; gimmer

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44. *ibid.*, p. 214 - 216

45. Ault, W.O., *op. cit.* p. 46

46. Tusser, T., Five Hundred Points of Good Husbandry, 1573.

47. Youngs, J., *op. cit.*, p. 57 - 58

48. Robinson, C.B. (ed.) Rural Economy in Yorkshire in 1641, being the Farming and Account Books of Henry Best, of Elmswell, in the East Riding of the County of York, Surtees Society xxxiii, Durham, 1857.

shearlings from their first to second shearing and ewes after their second shearing. The ratio of rams to ewes was 1:30 but ewes were not mated until they were two years old. Rams were worked from fifteen months of age to six years and the ewes were "flushed" or fed on good pasture in order to take the ram. The quality of spring pasture fixed tuppung time and Tudor and Stuart shepherds followed this policy.<sup>49</sup>

Lambing was one of the most important aspects of the sheep farmers' year and Gervase Markham had some very sound advice to profer the shepherd. It is worth noting because it indicates that, even though the general level of advice to sheep farmers was not high, every effort was being made to educate sheep husbandmen.

"If a lamb be born sick and weak, the Shepherd shall fold it in his cloak, blow into the mouth of it, then drawing the Dam's dug, shall squirt milk into the mouth of it. If an Ewe grow unnatural, and will not take her lamb after she hath yeaned it, you shall take a little of the Clean of the Ewe (which is the bed in which the Lamb lay) and force the Ewe to eat it, or at least chew it in her mouth, and she will fall to love the Lamb naturally. But if an Ewe have cast her Lamb, and you shall have her take to another Ewe's Lamb, you shall take the Lamb which is dead, and with it rub and daub the live Lamb all over, and so put it to the Ewe; and she will take to it as naturally as if it were her own."<sup>50</sup>

Arable areas lambed between the beginning of January and the end of March to ensure they were strong enough to go out into the meadows and graze the stubble before May. On the common pasture lambs were weaned

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49. Trow-Smith, R., op. cit., p. 241-243

50. Markham, G., Cheap and Good Husbandry, 1613.

when the ewe drove them off, as there was often nowhere else for the owner to put the lambs. Dairy sheep were weaned on the 21st May or at sixteen to eighteen weeks if the owner had additional space to put the lambs. Dorset and Wiltshire could cater for the early lamb trade to London but northerners could not fatten a wether for up to four years for the butcher.<sup>51</sup> Sheep were the most numerous of all livestock, there being eleven million in 1695, and the trade in them moved from the north and west to the south and east. Large numbers resided in the Home Counties but a considerable proportion, eighteen percent, came from Wales but the Welsh mountain sheep had a bad reputation for its wool and the clip was small. However, the mutton was sweet and the Welsh wool and sheep trade eventually replaced the beef drove to England.<sup>52</sup>

Shearing occurred in mid-June and sheep could be shorn three days after washing and dipping. Tusser gives advice on how to undertake both washing and shearing. After shearing the wool was rolled up and stored on a damp-free floor and each sheep yielded approximately 2½ lbs. of wool.<sup>53</sup> Large slaughterings occurred only if the hay crop had been very poor and normally the culled and fat sheep only were killed. Winter feed for sheep included grass, hay or straw, peas, chaff, mashes of barley, beans and acorns. Ash, elm leaves and holly were fed if the winter was very bad. In the spring the sheep were sent out to graze the tares, and green shoots of rye and wheat.<sup>54</sup> The pasture and market changes of the sixteenth century saw long-haired sheep move into the midlands as the wool trade was by now the most important internal trade and became concentrated in the west midlands which supplied the wool.

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51. Thirsk, J, (ed.) op. cit. p. 187

52. Chartres, J.A., op. cit., p. 22 - 23, 218 - 219

53. Trow-Smith, R., op. cit., p. 245 - 246  
Tusser, Thomas, Five Hundred Points of Good Husbandry, 1573.

54. Thirsk, J. (ed.) op. cit., p. 187 - 188

The textile regions were the southwest, East Anglia, Yorkshire, Essex and Lancashire and demand was so great that by 1700 wool was being exported to these textile manufacturing centres from Lincolnshire.<sup>55</sup>

The wool boom had begun to decline towards the latter part of this period although the flock was still kept largely for wool rather than meat. However, commercial butcher-orientated farmers were beginning to emerge and the "flying flock" was bought in off the farm and sold from the same farm for commercial profit. Nevertheless, sheep were still sold at four years as it took that long to grow them out.<sup>56</sup> Sheep were susceptible to many diseases and pests and one of these was liver fluke, when livers broke apart and gave the sheep water bellies and galls. The farmer sought to cure it with tar, the cure-all for all external problems. North countrymen used to grease their sheep all over with tar and butter to stop the rot and help animals combat cold. Markham recommended rue and wormwood poultices for red water, coltsfoot and lungwort for husk, young nettle juice for sturdy, rosemary for pox and coriander for worms.<sup>57</sup>

Braxy was another sheep disease and losses amongst sheep occurred in early winter and spring and outbreaks were often associated with night frosts. Losses were mostly amongst yearlings in good condition and death was due to a bacterial infection in the sheep's fourth stomach. Death is quick, sometimes a few hours, and the symptoms are blood-flecked noses and mouths on the dead sheep. Louping-ill was a virus disease which affected sheep and was caused by tick bites. The virus can invade the sheep's nervous system, resulting in trembling, i.e.

55. Chartres, J.A., op. cit., p. 27

56. Trow-Smith, R., op. cit., p. 247 - 248

57. *ibid.*, p. 249 - 250

violent muscular spasms followed by a period of excitability, uncertain gait and finally, an inability to stand. Death follows rapidly.<sup>58</sup>

Many different breeds of sheep existed from county to county, but the principal types were the mountain breeds, short wool breeds and long wool breeds, with variations throughout the counties. Sixteenth and seventeenth century farmers believed that the environment and the feed shaped the breeds and that if the sheep was moved out of one environment into another, it would acquire the characteristics common to its new home. Selective breeding did not occur as the concept of selecting better stock was rendered insensible in view of the concentration on environment causing factors.<sup>59</sup> The communal living places of all livestock meant that animals bred at random with no segregation in terms of reproduction.

Tudor and Stuart times were not noted for pig husbandry improvement as pigs were kept mostly for domestic use. They were raised for food as a cheap source of meat for the small farmer's family. The best pig was long, deep sided and deep bellied with thick thighs, short legs and a thick neck. The colour was variable, ranging from white through to shades of black and they were swill fed morning and evening. Pasturage and fattening was done with mast, dry peas, beans, whey and buttermilk.<sup>60</sup>

Tusser recommended ringing pigs and castrating them at two weeks old. He included female pigs in this castration process, stating that they should be opened up and spayed. The survival rate if this was implemented can only be surmised. Pigs were bred at a year old and kept producing six to eight piglets per litter for six years and Tusser recommended farrowing in a sty with cleanliness practised at all time.

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58. Barrington, J., Red Sky at Night, London, 1984, p. 48 - 73. The book gives details of sheep farming in Perthshire today just as it was in the sixteenth and seventeenth centuries.

59. Thirsk, J., (ed.) op. cit., p. 188 - 191

60. Ault, W.O., op. cit., p. 49 - 50

Trow-Smith, R., op. cit., p. 250 - 251

Thirsk, J., (ed.) op. cit., p. 192 - 193

Pigs did well except for the measles (Erysipelas) and were the least ailment stricken of all sixteenth and seventeenth century domestic animals.<sup>61</sup>

Pigs were widely kept and in the east and the midlands of England perhaps half the labourers had a pig but they were rarely kept in the west and north<sup>of England</sup> before 1640 when the potato had been introduced, which provided food and fodder. Wales and Cornwall were major breeders of pigs but commercial pig keeping was grassland or forest orientated prior to 1700 because of the cheap mast or nut supplies. Hampshire was the best bacon producing county and pigs came from Oxfordshire and Buckinghamshire to finish in the woodlands.<sup>62</sup>

St. Denis's Day, 9th October, was the traditional day to loose pigs to fatten in the woodland regions. They fed on the fallen beech-mast and acorns but had to be ringed, or have a ring through their noses, to prevent them from rooting up pasture land. Tusser points out that pigs take great pleasure in eating the mast<sup>63</sup> but both beech nuts and acorns are poisonous if consumed in large quantities. Beech nuts contain a glycoside which causes gastro-intestinal distress and excessive amounts of raw acorns, young leaves and parts of the oak tree are poisonous because of the high concentration of tannins or astringent acidic constituents of these plants.<sup>64</sup>

Horses were the third most important livestock raised during the sixteenth and seventeenth centuries. They were used mostly for transport and provided mounts for the military, although the carthorse was used for field labour. Farmers bred horses to sell for transport, the cavalry and as saddle and coach horses. The English horse was small and

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61. Trow-Smith, R., op. cit. p. 251 - 252

62. Chartres, J.A., o. cit., p. 25 - 26

63. Tusser, T., Five Hundred Points of Good Husbandry, 1573

64. Lewis, W. and Elvin-Lewis, M., Medical Botany, New York, 1977, p. 32

needed improvement and from the fifteenth century onwards, stallion bloodstock was imported from Europe. Horses were reared throughout the forest areas of England and, whilst some were wild, others were farm bred. The vales of England were noted particularly for the draught horses and these were bred for endurance. Horse raising was based mainly on the pastoral areas and this was probably due to the availability of fodder.<sup>65</sup> It was during this period that horses became a general purpose farm animal, used for carting and draught: the animal was eaten only if a real dearth situation prevailed.<sup>66</sup> Thomas maintains that horses were badly treated, overloaded, worked until they dropped and fed on grass only and when the horse was worn out, it was quickly discarded.<sup>67</sup>

Most certainly the survival of the horse would have been beset with difficulties if the advice Markham had to offer was an indication of horse husbandry.

"If your horse be tired with journeying, your best help for him is to give him warm urine to drink: and letting him blood his mouth, suffer him to lick up and swallow the same. Then if you can come where any nettles are, rub his mouth and sheath well therewith: then gently ride him until you come to your resting place, where set him up very warm, and before you go to bed give him six spoonfuls of aqua vitae to drink and as much provender as he will eat."<sup>68</sup>

This was to be applied particularly in hot weather and no doubt the application of stinging nettles to the animal's mouth and sheath would have urged him on considerably.

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65. Trow-Smith, R., op. cit., p. 252-253, Thirsk, J. (ed) op. cit., p. 191 - 192

66. Chartres, J.A., op. cit., p. 24

67. Thomas, K., Man and the Natural World, Harmondsworth, 1983, p. 100

68. Markham, G., op. cit., 1613

Trow-Smith maintains that horses were pampered compared with other animals as they were fed hay, beans, malt, oats, wheat, barley, chaff, peas and vetches and were handfed throughout the year.<sup>69</sup> It is probable that this applied only to those horses owned by the gentry.

Very little literature was available for the guidance of the ploughman and few agricultural writers had anything to say on the management of the working horse. Horses are frequently mentioned in by-laws concerning tethering as the headlands, roadsides and other unploughed bits of ground were used by farmers to tether their horses. Sixteenth century county by-laws stated that horses could not be tethered amongst haycocks until the hay was carried away but lanes and headlands in the grain fields could be used for tethering.<sup>70</sup> Mares and foals were subject to many by-laws because the foals caused problems even though their dams were tethered.<sup>71</sup>

Poultry was another source of food for the husbandman and included chickens, ducks and geese if the common rights were good.<sup>72</sup> Poultry was generally kept for home consumption but places such as East Anglia exported fowl, the Fens reared ducks and cereal regions reared geese, hens and turkeys for internal trade. West Wales specialised in wildfowl and by the late seventeenth century Scotland supplied England with eggs but the trade declined after 1680.<sup>73</sup> From the 1540's onwards the keeping of swans for meat consumption was becoming important in the Fens and necessitated a code of regulations on their keeping. During the latter half of the fifteenth century and throughout the sixteenth century the

69. Trow-Smith, R., op. cit., p. 255

70. Ault, W.O., op. cit., p. 43

71. *ibid.*, p. 44

72. Thirsk, J., (ed.) op. cit., p. 194

73. Chartres, J.A., op. cit., p. 26 - 27

county was divided into areas suitable for holding large numbers of birds which were bounded by areas to prevent their spread. The Fens became the most important swan-rearing area in the country and comprised Cambridge, Huntingdon, Northampton, Lincoln and Rutland in 1563 - 64 and the western third of Norfolk.<sup>74</sup>

Goats were kept in the mountainous regions as they were adept at acquiring food where cattle and sheep could not. They were used for meat, milk, hides and clothing, particularly in Wales. Rabbits were another source of income for those who were willing to construct warrens to contain the rabbits and were mostly located in wasteland areas with poor soil.<sup>75</sup>

The appraisal of livestock husbandry techniques extant in Britain during the sixteenth and seventeenth centuries, indicates that the care-taking practices of the community were still relatively poor. The examination of the standard agricultural texts used by the reading public provides ample evidence of the poor nature of qualitative care of domestic animals.

During this period all types of livestock had no chance to reach their full potential because, even though the animals were not starved, the poor quality food and poor nutritional level concealed the animal's full development potential. The ability of sixteenth and seventeenth century domestic animals was permanently hampered and the animal never had the opportunity to milk, flesh out, and reproduce to its fullest capacity.<sup>76</sup> Livestock management did not undergo any significant change

74. Ticehurst, N.F., in Darby, H.C. The Draining of the Fens, Cambridge, 1956, p. 10

75. Thirsk, J. (ed.) op. cit., p. 194 - 195

76. Trow-Smith, R., op. cit., p. 258

from Fitzherbert's publication to that of Edward Lisle's, a period of one hundred years.<sup>77</sup> The static nature of livestock management principles has been reaffirmed by this brief examination of the state of sixteenth and seventeenth century livestock husbandry.

The chapter has shown that veterinary knowledge was very limited and consisted mainly of traditional methods with recourse to various herbal treatments, the efficacy of which was not always evident or forthcoming. Scientific understanding of cause and effect of illness, disease and plant ingestion, was in its infancy and there was definitely no concept in Britain during this period of bacteria and germ invasion of living organisms.

The level of qualitative care of domestic animals in sixteenth and seventeenth century Britain was not high. A climate existed whereby the general populace could willingly believe that animal losses and illnesses were due to maleficia on the part of other individuals. The understanding of the effects of plant ingestion on animal welfare was, at best, basic and the uncertainty of livestock survival made owners very susceptible to blaming the death or illness of an animal on a suspected witch. The social and agricultural climate, therefore, existed in sixteenth and seventeenth century Britain which enabled the accusations of witchcraft to be levelled at individuals for agricultural loss.

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77. *ibid.* p. 234 - 235

CHAPTER 4HERBS AND PLANTS AND THE EFFECTS OF THEIR INGESTION  
ON THE LIVESTOCK OF SIXTEENTH AND SEVENTEENTH CENTURY  
BRITAIN

The viability of the thesis rests on substantiating the link between plant ingestion and domestic animal losses. The previous chapters indicate that the social climate prevalent in the sixteenth and seventeenth centuries supported a belief system in witchcraft practices at the popular level. The agricultural situation, whilst undergoing changes through enclosures, the introduction of some new crops and husbandry techniques, was responding to the demands of growing urban centres and an ever increasing population. These changes created a climate of uncertainty and insecurity amongst the populace. This provided an environment for witchcraft accusations at the popular level, particularly among the farming communities. Nevertheless, it is a large step from this prevailing situation to suggest that plants were responsible for many of the deaths and illnesses of domestic animals and the cause of the loss of agricultural production in the sixteenth and seventeenth centuries.

Prior to examining the herbs and plants which existed in the natural environment of the village, the farmer and the accused witch, it is important to understand why it is feasible to link plant ingestion with animal losses and to further link these with witchcraft accusations.

Plants are a major part of the natural world and heavily influence the well-being of domesticated animals, both now and in the sixteenth and seventeenth centuries. "Natural environment" is an all inclusive term used here to designate the fields, forests, ponds, hedgerows and village gardens which surrounded the living place of the community.

Oversimplification of the effect of the natural world on the lives of people in this period, would result in a grave misjudgement of the reality of living within the confines of that natural world.

Poisoning by unknown substances is commonplace amongst domestic animals in modern times, despite technological innovations which have led to an understanding of plant chemistry and physiology. There is no reason to assume that farmers in the sixteenth and seventeenth centuries were immune to toxic and poisonous plants which affected livestock. Modern farmers have the benefit of a scientific revolution to aid them but medical and scientific knowledge during the sixteenth and seventeenth centuries was not advanced enough to understand the chemical reasons why a plant was harmful, harmless or healing. Scientific research has expanded our knowledge of the chemical structures and the composition of the active constituents of plants.

The active principles of plants, those agents which affect animal organisms, are divided into toxic and non-toxic groups. The toxic group is poisonous to the animal, whereas the non-toxic group is harmless or therapeutic. The two groups necessarily overlap and overindulgence in either can be harmful to the animal. This is because a correct dosage is healing but an increased dosage of the same plant is harmful. In earlier times plants were venerated for their powers and no-one sought to discover why or how plants possessed these powers; the possession was an undisputed fact and seemed to border on magic. In the sixteenth century it was known that certain plants had spectacular effects on animals and people but the problem was that early physicians could not come to terms with the dosage. Examples of this include digitalis from the foxglove, ergot alkaloids and plants

containing aconite. The limit between the dose that cured and the dose that killed was beyond their knowledge.<sup>1</sup> This was because people were unaware that each plant consisted of so many components such as acids, sugars, glycosides, mucilage, volatile oils, gums, tannins, minerals, mineral traces, starch, steroids, resins, esters and vitamins and had no concept of the effect all these components had on the animal's body.<sup>2</sup>

The development of these components is part of the plant's survival mechanisms. Plants need to be toxic as part of their own defence in the face of the onslaught of continually grazing animals. Natural pasture and grasslands, as well as cultivated pasture and fodder crops, consist mainly of flowering plants, or angiosperms, and these plants have evolved versatile and numerous poisons to combat overgrazing. Alkaloids, cyanogenetic glycosides, cardiac glycosides and saponins are the most prominent plant defences. Alkaloids occur naturally in plant tissues and have a marked toxic effect on animals because they contain nitrogen, which affects the nervous system and blood vessels. Alkaloids are therefore physiologically active and, although few affect the heart, some can raise or lower blood pressure through their effect on the central nervous system. They also affect circulation and respiration by acting as depressants or excitants. Alkaloids are also difficult to come to terms with as far as farmers are concerned, because they generally keep well in dried plants and are, therefore, even harder to eliminate from the domestic animal's diet when hay and dry fodder are fed.<sup>3</sup>

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1. Stary, F. and Jirasek, V, Herbs, London, 1973, p. 4 - 5  
Schauenberg, P. and Paris, F., Guide to Medicinal Plants, Connecticut, 1977, p. 10, 20
  2. Grigg, B., Green Pharmacy, London, 1981, p. 71 - 72
  3. Stary, F., and Jirasek, V., op. cit., p. 15  
Schauenberg, P. and Paris, F., op. cit., p. 13, 22.  
Lewis, W. and Elvin-Lewis, M., Medical Botany, New York, 1977, p. 14

Glycosides also occur naturally in plants and have a pronounced physiological action on animal tissues. Plants produce glycosides through special metabolic processes and their concentration in plant organs depends on the age of the plant. The glycosides can be cyanogenetic or cardioactive. Cyanogenetic glycosides engender reactions similar to those exhibited by cyanide poisoning, such as frothing at the mouth, staggering and sudden death and are found widely in the grass family. Cardioactive glycosides react specifically on cardiac muscles and occur in many plant families.<sup>4</sup>

Other components of plants which are relevant to livestock losses and illnesses are the saponins, which irritate mucous membranes and destroy red blood cells by breaking them up, and this makes saponins potent blood poisons. The oxalates, or oxalic acids, are the only organic acids produced by plants which are toxic to animals under natural conditions. They occur as sodium, potassium and calcium and too much of any of these acids generates specific responses in the animal. Nitrates are the only other compounds which are mentioned specifically in the text of the thesis and they often reach dangerous levels in crop plants, such as oats. The high levels of nitrates are the result of excessive manuring or fertilisation of the land. After digestion, the nitrates are converted into nitrites which are far more toxic, particularly in ruminants.<sup>5</sup>

Many environmental factors markedly affect the presence or absence of poisonous principles in plants. These include seasonal variations, soil types, the growth stage of the plant and whether it

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4. Hungerford, T.G., Diseases of Livestock, Sydney, 1975, p. 1090 - 1112

Stary, F., and Jirasek, V., op. cit., p. 17; Lewis W. and Elvin-Lewis, M., op. cit., p. 14, 18, 19

5. Lewis, W. and Elvin-Lewis, M., op. cit., p. 19 - 20

Dent, C., "Nitrate and Nitrite poisoning of livestock." Agfact A.O. 9.9, 1985, p. 1 - 2

Stary, F., and Jirasek, V., op. cit., p. 19

is fed to livestock in a dried or green state. Some plants are dangerous if they are eaten too quickly or too slowly and toxicity can be increased if the plants are mixed with other incompatible plants. Local livestock can be immune to the plant, whereas newly introduced livestock are adversely affected by ingestion of the same plant. Alternatively, local livestock may suddenly decide to eat a plant they have refused to consume on previous occasions and this is generally a reaction to fodder shortage. The plant toxin may be cumulative in effect and the results of over-consumption of the plant become obvious only after a period of time has elapsed since its consumption. Examples include bracken, ragwort and perennial ryegrass.

Lack of food induces hungry animals to eat fodder they have previously avoided and fertilisation of fields renders harmful previously harmless plants.<sup>6</sup> The sixteenth and seventeenth century owners of the affected livestock failed to understand the relationship between the death or illness of their livestock and plant ingestion. This incomprehension encouraged the belief that the cause of livestock losses was the result of witchcraft practices. The plants examined in this chapter represent a small number of those plants which affect domestic animals on ingestion. These plants were also either native to or naturalised in Britain by the sixteenth and seventeenth centuries.\*

Events and symptoms which were considered attributable to witchcraft, centred around specific areas. The plants which are examined in this section of the thesis correlate the symptoms which result from plant ingestion with the popular concepts of livestock bewitchment.

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6. Hungerford, T.G., op. cit., p. 1090 - 1112

\* Appendix II gives a more detailed list of plants which cause livestock loss and disease.

The sudden death of an animal with no apparent cause was a common charge levelled against a suspected witch. The death was of even more concern to the owner if it was prefaced by strange behaviour. This can include such symptoms as foaming at the mouth, a gradual stiffening of part or whole of the body eventuating in death, the careering of the animal around the field in ever diminishing circles, with eventual collapse and death, and other abnormal types of behaviour. Other symptoms exemplified by animals thought to be bewitched included a gradual wasting illness which could end, and often did, in staggering, paralysis, spasms, convulsions, listlessness interspersed by periods of intense excitement and then death.

Spontaneous abortion or abortion of any kind amongst animals and for which there was no apparent cause, was of great concern because the loss meant another year's wait for a replacement and the loss of income from the sale or breeding of the young animal. Bloody or pink tinged milk was a popular example of bewitchment. As far as the populace of sixteenth and seventeenth century Britain were concerned, bewitchment was also the cause of spoiled beer, ruined bread bakings, crop failures, the inability to grind grain and lost butter and cheese makings. Unusual weather, unaccountable losses of men at sea due to unnatural storms and unexplained fires were also attributed to witchcraft.

Animal afflictions and death from plant ingestion presents a conceptual problem, as it seems inconceivable that animals did not possess an innate awareness of what was edible and inedible in their natural environment. Wild animals instinctively know what to eat and what heals them when they are injured or ill, but this innate awareness is bred out of domestic livestock and the restrictions placed on them by their man made and dominated environment makes them susceptible to the consumption

of incorrect fodder. Domestic animals eat what is available in their confined, enclosed and "force fed" environment and eat whatever is provided in times of shortage, overpopulation or confinement, thereby suffering the consequences of this type of diet.<sup>7</sup>

Agricultural practices directly affected livestock through the introduction of new crops, techniques, increased emphasis on fertilisation through manure applications and enclosures. The domestic animals which dwelt in this realm were subject to the vagaries of their owners and caretakers. The large number of witchcraft cases relating to animal loss and production loss underlines the important role domestic animals played in the sixteenth and seventeenth century communities.

The natural food for herbivorous animals is pasture herbage and this natural grassland included a large variety of grasses, legumes and herbs.<sup>8</sup> Root fodder crops which were coming into vogue during this period included beet, carrots and swedes but most farmers regarded grasslands as a natural gift and did not seek to improve the pasturage. Winter fodder was supplied by hay and this conserved the green pasture and ensured a supply of fodder for periods when livestock could not graze, either in poor weather or British winters.<sup>9</sup>

The subject matter of this chapter concerns plants, herbs and fodder crops which existed in the sixteenth and seventeenth centuries. They can be directly linked to witchcraft accusations amongst the populace in England. It is perhaps unfortunate that the most feasible way to present these plants is in catalogue form. Each plant must be analysed in terms of its entry into the British natural environment and, most importantly, the effect each plant had on the livestock of the

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7. Bairacli Levy, J. de, Herbal Handbook for Farm and Stable, Emmaus, 1977, p. 9 - 16

8. MacDonald, P., et. al. Animal Nutrition, Edinburgh, 1969, p. 295

9. *ibid*, p. 314; Bairacli Levy, J. de, *op. cit.*, p. 134

period. The combination of references to old herbal texts and new scientific texts has been undertaken in each entry, to ensure the exactness of the information pertaining to each plant. By presenting the information in a catalogue form and in alphabetical order, using the common names of the plants, the information contained therein can be readily referred to when each witchcraft case is examined in its county context in Britain.

Monkshood or aconite, Aconitum napellus, is a native of Britain and was known to the Anglo-Saxons as Thung or "poisonous". Gerard is incorrect when he says that the plant is a stranger in England<sup>10</sup> as it is found mainly in the western counties and south Wales. In the thirteenth century, Myddval physicians in Wales regarded it as an important herb to grow. The plant is deadly to horses, cattle and goats and, despite the fact that horses can eat dried monkshood, in its green state it causes nasty symptoms. Horses suffer spasmodic vomiting, regurgitation of a frothy mucous, intense colic, paralysis and dilated pupils. Death is by asphyxia. Cattle are unable to rise and have cold skins. Their pupils are dilated and both their pulse and breathing rates are almost imperceptible. All these symptoms are caused by aconitine, a poisonous alkaloid that causes death through skin absorption and vapours through the nose, as well as ingestion. The plant is particularly fond of growing near sheep-pens and stables.<sup>11</sup>

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10. Gerard, J, Herball, compiled by Marcus Woodward from the edition of T.H. Johnson, 1627, London, 1927, p. 228. I would like to thank my parents for their gift of this book which has been of inestimable help.
11. Fisher, J. The Origins of Garden Plants, London, 1982, p. 51  
 Grieve, M. A Modern Herbal, Harmondsworth, 1978, p. 6, 10  
 Everist, S.L., Poisonous Plants of Australia, London, 1981, p. 596  
 Le Strange, R. A History of Herbal Plants, London, 1977, p 6 - 7  
 Schauenberg, P. and Paris F., op. cit., p. 22

The ash tree, Fraxinus excelsior, is beneficial to animals as the leaves are mildly laxative and act as a tonic. The problem with the ash arises in the autumn when the ash leaves and branches are fed to cattle during the scarcity of fodder. Consumption of the leaves and shoots makes rank the butter churned from the cows' milk. It is interesting to note that the Midlands grew the best ash, a native British tree, as later analysis indicates that rank butter and milk featured in witchcraft accusations for the Midlands. This region encompassed the counties of Northamptonshire, Leicestershire, Warwickshire, Bedfordshire, Derbyshire, Herefordshire, Shropshire, Staffordshire and Worcestershire.<sup>12</sup>

Belladonna or deadly nightshade, Atropa belladonna, was introduced to Britain by the Romans and was used as an anaesthetic in the early monastic houses. The plant is considered a native of the southern counties and Gerard records it as growing in Lincolnshire and the Isle of Ely, although it is confined to calcereous soils, wooded hills and thickets and in chalk or limestone areas. It is rare in Scotland and field poisonings were uncommon. The plant is important in relation to witchcraft accusations because cattle exhibit a frenzied response after ingestion. They then become paralysed and die. Horses, rabbits, sheep, goats and pigs are unaffected by the consumption of belladonna but cattle suffer from the effects of the alkaloid atropine. They also suffer impaired vision, pupil dilation, constipation, pain in their hind limbs, rapid pulse and breathing difficulties.<sup>13</sup>

Bittersweet or Woody nightshade, Solanum dulcamara, abounds in woodlands, hedges, thickets and along riverbanks throughout Britain

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12. Addison, J., Plant Lore, Surrey, 1985, p. 10; Bairaclí Levy, J. de, op. cit. p. 37; Grieve, M. op. cit., p. 66

Thirsk, J. (ed.) The Agrarian History of England and Wales IV 1500 - 1640, Cambridge, 1967, p. 89, 99

13. Fisher, J., op. cit., p. 25, 33; Everist, S.L., op. cit., p. 623; Grieve, M., op. cit., p. 583; Le Strange, R., op. cit. p. 48-49; Gerard, J., op. cit., p. 74

where it is an indigenous plant. The poisonous alkaloid affects cattle, horses and sheep by paralysing the central nervous system. The heart and respiration rates are slowed and this causes vertigo and delirium. Death is caused by convulsions.<sup>14</sup>

The Blue periwinkle, Vinca major, was well known in Roman times and is mentioned in the Saxon herbals as "joy of the ground". The plant<sup>was</sup> well known to Culpeper and can be considered well naturalised by the sixteenth and seventeenth centuries. Alkaloids are the poisonous principles and these reduce blood pressure, dilate blood vessels and stimulate bowel movements in sheep, cattle and horses. Sheep suffer death rapidly after ingesting the plant and cattle are affected with rapid breathing, apparent blindness and frothing at the mouth. Horses are more acutely affected with diarrhoea than other animals and die from poisoning ten days after the symptoms begin.<sup>15</sup>

Bracken, Pteridium aquilinum, is one of the most common British plants and it flourishes on heaths and moors. The entire plant is poisonous and domestic animals are constantly exposed to it, particularly in the high summer when other foodstuffs are short and the animals eat bracken in order to satisfy their hunger.<sup>16</sup> The plant is not a <sup>medicinal</sup> herb and no mention of it is made in the old herbals.

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14. Everist, S.L., op. cit., p. 660; Grieve, M., op. cit., p. 589 - 590; Le Strange, R., op. cit., p. 234 - 235; Gerard, J., op. cit., p. 83 - 84
15. Rhode, E.S., The Old English Herbals, New York, 1971, p. 9, 21  
Grieve, M., op. cit., p. 629; Fisher, J., op. cit. p. 24;  
Le Strange, R., op. cit., p. 257  
Culpeper, N., Complete Herbal, reprinted by Omega Books, Hertfordshire, 1985, p. 221  
MacBarron, E.J., Poisonous Plants, Melbourne, 1963, p. 32
16. Lehane, B., The Power of Plants, London, 1977, p. 32  
Grieve, M., op. cit., p. 306

Protracted feeding on bracken eventuates in bracken poisoning and symptoms may not appear for days or weeks after ingestion. Also, the symptoms vary between different types of livestock. As far as cattle are concerned, the commonest form of poisoning is the enteric type, where the symptoms are dullness, fever, loss of appetite, blood stained urine and frequent bleeding from natural openings and sometimes through the skin. The laryngitic type of poisoning is sometimes seen in calves whose symptoms are dullness, listlessness, excessive mucuous discharge via the nostrils and mouth and blood accumulations in the throat, which cause breathing difficulties. This is usually fatal and death is preceded by high temperature, although there are no signs of external bleeding.<sup>17</sup>

Horses experience lack of co-ordination of movement with pronounced staggering, awkward stance with spread feet and an arched back. Severe muscular tremors result in the animal going down and struggling, with convulsive/seizures and tetanic spasms prior to death.<sup>18</sup> Sheep are less susceptible than cattle but northern England experiences atrophy of the retina or "bright blindness" in sheep fed bracken on a long term basis: this especially affects hill sheep.<sup>19</sup> Pigs were used to clear fields of bracken and were poisoned by eating the rhizomes. The symptoms included listlessness and depression of appetite but from fifty-six to seventy-two days after feeding on bracken began, the pigs collapsed, had difficulty breathing and died of acute heart failure within six hours.<sup>20</sup>

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17. Everist, S.L., op. cit., p. 778 - 779

McBarron, E.J., op. cit., p. 25

18. Everist, S.L., op. cit., p. 779

19. *ibid.*, p. 780

20. *ibid.*, p. 780

Bracken contains four potentially toxic compounds, thiamase I which produces bracken staggers in horses and bracken rhizome in pigs; shikimic acid which produces the tumours found in bladders and gastro-intestinal tracts of sheep and cattle after long consumption of sub-lethal quantities; bone-marrow toxin which is an unidentified compound causing bracken poisoning in sheep, specifically related to disorders in the bone-marrow, and prunasin which is a cyanide intoxicant found in British bracken and which is avoided by deer and wild animals.<sup>21</sup>

Cabbage, a member of the Brassica oleracea family, was introduced to Britain by the Roman legions and both the red and white cabbage were recorded in herbals of the fourteenth century. Gerard ~~was~~ also well acquainted with the cabbage.<sup>22</sup> Excessive consumption of cabbage by livestock leads to a condition known as kale anaemia and it is indicated by an appetite loss, general weakness, a fall in milk production, heart rate increases and scouring. Poisoning is more likely to occur when matured and flowering plants are consumed. The cabbage also produces bloat if it is eaten in quantity but the occurrence of bloat is less common than from other plants with this characteristic.<sup>23</sup>

Buttercups, or Ranunculus, are a large genus of plants which are native to Britain but most species are potentially poisonous because of the irritant glycosides they possess. Ranunculin is a glycoside which breaks down to protoanemonin and this causes severe mucous membrane irritations and blisters the skin. Other symptoms of poisoning include severe gastro-intestinal irritation, abdominal pain,

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21. *ibid.*, p. 777

22. Thompson, K.F., "Cabbages, kales, etc." in Simmonds, N. Evolution of Plant Crops, London, 1976, p. 49 - 50; Gerard, J., *op. cit.*, 66 - 67; Fisher, J., *op. cit.*, p. 24

23. Everist, S.O., *op. cit.*, p. 213; McBarron, E.J., *op. cit.*, p. 139

salivation, diarrhoea, depression or excitement and, occasionally, blood stained urine. Most remarkably, in regard to the plant's link with the witchcraft issue, is the blindness and convulsions which can occur prior to death.<sup>24</sup> Cattle tend to avoid the buttercup genus but do eat it when the plants are mixed with grasses and dried fodder. The buttercup can act as a stimulus for the production of good milk colour and therefore affects the butter made from the milk.<sup>25</sup> Horses are unaffected by the dried buttercups and pigs are very fond of the bulbous buttercup roots.<sup>26</sup>

Wild celery, Apium graveolens, is native to Europe and common in the dry pastures and chalky cliffs of Britain.<sup>27</sup> The high level of nitrate found in the celery tops results in poisoning in dairy cattle because the nitrate converts to nitrite in the bloodstream.<sup>28</sup> The symptoms which are most outstanding in terms of relating the plant with witchcraft are the spontaneous abortions, convulsions, pinpoint haemorrhages in most organs and the occasional lack of symptoms prior to the sudden death of the animal.<sup>29</sup>

Chickweed, Stellaria media, is common throughout the temperate areas of Britain and grows wherever man has settled.<sup>30</sup> It is a very

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24. McBarron, E.J., op. cit., p. 53; Everist, S.L. op.cit., p. 600, 42
25. Bairaclı Levy, J., de. op. cit., p. 45; Addison J., op. cit., p. 174; Grieve, M., op. cit., p. 150.
26. Grieve, M., op. cit., p. 139
27. ibid., p. 182
28. Everist, S.L., op. cit. p. 195
29. Dent, C., op. cit. p. 2
30. Grieve, M., op. cit., p. 195

accessible herb as far as animals are concerned and it is rich in copper.<sup>31</sup> Herein lies the difficulty because, although all animals can consume the herb without ill effects, sheep must be prevented from gorging themselves. Lambs are particularly susceptible to the digestive upsets which follow consumption as copper poisoning is the result.<sup>32</sup> Sheep are susceptible to both an over supply and insufficient supply of copper and both situations result in death but only too much copper causes poisoning.<sup>33</sup>

The corn cockle, Agrostemma githago, contains an irritant poison and the poisonous principles are mainly concentrated in the seeds.<sup>34</sup> The plant is native to Britain and grows mainly as a weed in cereal crops. For this reason, poisoning occurs only when contaminated grain is fed to livestock. The poison affects poultry, cattle, pigs and horses and occurs when the corn cockle seed gets into the milled grain. Symptoms of acute poisoning are found in all livestock, other than pigs, and include severe gastroenteritis, foetid diarrhoea, muscular weakness in some instances and breathing difficulties, ending in a coma prior to death.<sup>35</sup> However, it has been proved that the seed must be crushed as animals generally refuse wholegrain with corn cockle seed in it. The ground seed is more toxic and appears as small black specks in the milled grain.<sup>36</sup>

The curled dock or yellow dock, Rumex crispus, contains a poisonous principle called rumicine. Rumicine is an irritant to

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31. Balracli, Levy, J. de., o. cit., p. 49

32. ibid., p. 49

33. Hungerford, T.G., op. cit., p. 1063

34. Grieve, M., op. cit., p. 232; Everist, S.L., op. cit., p.133

35. Grieve, M., op. cit., p. 223; Everist, S.L., op. cit. p. 133

36. Addison, J., op. cit., p. 68; Everist, S.L., op. cit., p. 133; Grieve, M., op. cit., p. 223

cattle, especially pregnant cows and their calves. This native of Britain, mentioned by Gerard, induces symptoms of unsteady gait, swaying hindquarters and the eventual collapse of the animal. The animal finds it impossible to rise, an interesting characteristic when examining witchcraft cases where the collapse of an animal and its inability to rise are often stated in the depositions.<sup>37</sup>

Deadnettle or henbit, Lamium amplexicaule, is native to Britain and Gerard mentions it growing in Kent, Essex and Middlesex. The plant contains a poisonous principle that induces staggers. Two kilograms of deadnettle consumed on a regular basis result in staggers after thirty days. The condition becomes obvious when the animals are moved from field to field. Sheep, cattle and horses are affected and, if moved, they lag behind with their heads lowered, pushed forward and their backs hunched. If they are driven further, they then experience rapid breathing, stop, shiver and die if they are moved. Ewes transmit the toxin to their unborn lambs but suckling lambs are unaffected. However, if the lambs are partially weaned then they are more susceptible than older animals, and fat animals are more likely to be affected than leaner animals.<sup>38</sup> The poison is therefore specific but, despite this, the plant is very relevant to the witchcraft/plant ingestion link.

Turner's Herbal of 1551 mentions the field larkspur, Delphinium consolida, as does Tusser in 1572 and Gerard in 1636.<sup>39</sup> The plant grows wild in cornfields and woody places and is found in the sandy,

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37. McBarron, E.J., op. cit., p. 61; Grieve, M., op. cit. p. 259; Gerard, J., op. cit., p. 98 - 99

38. Everist, S.L., op. cit., p. 381; McBarron, E.J., op. cit. p. 38

39. Rohde, E.S., op. cit., p. 75; Gerard, J., op. cit., p. 249-251; Le Strange, R. op. cit., p. 102

chalky cornfields of Cambridgeshire. Alkaloids of the field larkspur closely resemble aconitine, the active principle of monkshood. Cattle and sheep are both affected but cattle feel the poison more severely, exhibiting a stiff gait, uneasiness, a straddled stance which is followed by collapse. This occurs several times and the animal either recovers or dies. Severely affected animals have a rapid weak pulse and their respiration is poor. Nausea leads to vomiting which causes the animal to choke to death on its own vomit. Death occurs anyway as respiratory paralysis is the final symptom.<sup>40</sup> The alkaloids delphine and ajacine also cause stomach upsets and nervous disorders.<sup>41</sup>

Drop water or hemlock water, Oenanthe crocata, has the common name horsebane and is prevalent in the southern English counties where it grows near running water and ditches and is thereby easily available to cattle. The cattle are poisoned by the roots of the dropwater and die in agony as the plant induces severe states of convulsion.<sup>42</sup> Water dropwort, Oenanthe phellandrium, is less poisonous than <sup>Oenanthe</sup> ~~crocata~~ but the fresh leaves are injurious to cattle as they produce a kind of paralysis on ingestion, although dried leaves have no ill effect. This common British native plant is found in ditches and by the sides of ponds.<sup>43</sup>

Ergot fungus, Claviceps purpurea, is a spore-bearing fungus which is parasitic and feeds on and totally replaces the ovaries of various grasses, mainly rye. The fungus existed throughout Tudor and Stuart Britain wherever grass and cereal grain growing occurred as the rye itself was cultivated in Europe prior to Roman times.<sup>44</sup>

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40. Everist, S.L., op. cit., p. 599

41. Grieve, M., op. cit., p. 464; Everist, S.L., op. cit., p. 599; Lewis, W. and Elvin-Lewis, M., op. cit. p. 31

42. Grieve, M. op. cit., p. 363; Lehane, B. op. cit., p. 130

43. Grieve, M., op. cit., p. 264

44. Stary, F. and Jirasek, V., op. cit. p. 102.

The animals ingested the contaminated grain and one of two types of ergotism eventuated. Gangrenous ergotism was the more common and more obvious form of the disease and developed slowly whilst ingestion continued. Cattle are affected with lameness in the hind feet especially, and gangrene of the feet and sometimes of the ear and tail tips occurs. Cows' teats become discoloured. A constricted band is clearly visible between the healthy and gangrenous tissue of the limbs and it is the gangrenous part which will eventually slough off. The most telling aspect, as far as the relationship between ergot and witchcraft is concerned, is the spontaneous abortion associated with the consumption of ergotised grain amongst pregnant animals, particularly cattle. Large quantities of ergot alkaloids affect the action of the uterus by encouraging the muscles of the uterine walls to contract, thereby causing premature births.<sup>46</sup>

Most poisonings occur in the late autumn and early winter but, although the incidence can be widespread in an area, only a small number of animals in a herd are affected at any one time.<sup>47</sup> The infestation is more likely to occur where early summer rains are followed by a relatively dry period.<sup>48</sup> Ergot poisoning also affects horses which can die from ingestion of ergotised oats and suffer a similar symptomatic response as cattle.<sup>49</sup> Convulsive ergotism, the second form of ergot poisoning, affects cattle who become nervous and excitable and walk or run with a swaying unco-ordinated movement.<sup>50</sup> Both aspects of ergotism relate to witchcraft in the sixteenth and seventeenth centuries and

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46. Everist, S.L., op. cit., p. 803

Cartwright, L., A commonsense Guide to Medicinal Plants, Sydney, 1985, p. 16

MacDonald, P., et. al., Animal Nutrition, London, 1975, p. 396

47. McBarron, E.J., op. cit., p. 3

48. *ibid.*, p. 3

49. Ramsbottom, J., Mushrooms and Toadstools, London, 1953, p. 142

50. Everist, S.L., op. cit., p. 804

examination of the case studies clearly outlines the actual occurrences of this phenomenon.

Papaver rhoeas, the field poppy or red poppy is native to Britain and grows amongst the grassland, wasteland, arable and on the borders of fields, as Gerard mentions in his Herball.<sup>51</sup> It is poisonous when ingested in large quantities and is usually consumed when it is mixed with other fodder, particularly meadow hay. Rhoeadine is the alkaloid which has been isolated from the plant and it is slightly narcotic, causing excitement, an increased respiration rate, stoppage of digestion and sometimes coma but death is rare. However, modern research has shown that the ingestion of the poppy can cause blindness in horses.<sup>52</sup>

Neolithic man brought flax or linseed, Linum usitatissimum, from Europe when he crossed the Channel to settle in Britain and early records show that the plant was grown in Egypt before 1000 B.C. The plant grows mainly in winter in the eastern counties and the alluvial soils of Lincolnshire.<sup>53</sup> The poisonous principle is a cyanogenetic glycoside named linamarin and amounts vary in each plant as they are influenced by genetic make-up, the growth stage of the plant and the seasonal conditions.<sup>54</sup> Cases of poisoning occur amongst sheep, cattle, horses and pigs after consumption of flowers, seeds and wilted plants and the symptoms resemble those of cyanide poisoning with frothing at the mouth, staggering and then sudden death.<sup>55</sup>

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51. Fisher, J., op. cit., p. 23; Gerard, J., op. cit., p. 95; Le Strange, R. op. cit., p. 199 - 200
52. Everist, S.L., op. cit., p. 567 - 568; Grieve, M. op. cit., p. 651; Hungerford, T.G., op. cit., p. 1146
53. Gerard, J. op. cit., p. 126; Grieve, M., op. cit., p. 318; Fisher, J., op. cit., p. 21  
Durrant, A., "Flax and Linseed" in Simmonds, N.S. (ed.) op. cit. p. 191 - 192
54. Everist, S.L. op. cit., p. 511
55. Fisher, J. op. cit., p. 39; Hungerford, T.G., op. cit. p. 1151

The common Foxglove, Digitalis purpurea, is native to the British Isles and is found in shady places, in open woods and on heaths. Gerard states that they like barren ground and grow under any hedge. The plant likes acid soils and is found growing in South Devon particularly but it is not found in the Shetlands or in the eastern counties. The plant is distributed from Cornwall and Kent to the Orkneys.<sup>56</sup> The poisonous principles are a mixture of twelve cardiac glycosides and the effect can be cumulative but is usually instantly fatal. Animals refuse to eat this plant in its green state<sup>57</sup> but when the foxglove is harvested in the meadow hay, the animals consume it unwittingly. The symptoms are not pleasant to witness and include gastric disturbances, blood stained diarrhoea, drowsiness, loss of appetite, frequent urination attempts with the production of abnormal urine and serious heart action disturbances.<sup>58</sup>

The Romans introduced hemlock, Conium maculatum, into Britain and coine and other alkaloids present in the leaves, stems and fruit are the poisonous principles. It is found growing in hedge banks, neglected meadows, waste ground and along the borders of streams.<sup>59</sup> All classes of livestock are susceptible to the poison, cattle, sheep, horses, pigs, goats and poultry. The effect on ingestion is dullness, loss of muscle power and a stumbling and falling which progresses to complete paralysis without convulsions. A loss of temperature is

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56. Le Strange, R., op. cit., p. 103; Fisher, J., op. cit., p. 39; Grieve, M., op. cit., p. 322; Gerard, J., op. cit., p. 182
57. Grieve, M. op. cit., p. 323; Le Strange, R., op. cit., p. 105;
58. Everist, S.L., op. cit., p. 620
59. Fisher, J. op. cit., p. 26; Le Strange, R., op. cit., p. 88 - 89; Everist, S.L., op. cit., p. 718; McBarron, E.J., op. cit., p. 76  
Lowenfeld, C. and Back. P., The Complete Book of Herbs and Spices, Wellington, 1976, p. 141; Grieve, M., op. cit., p. 393

experienced along with a rapid pulse, frothing at the mouth and death from respiratory failure.<sup>60</sup> These effects alone would cause deep concern to livestock owners but hemlock also causes congenital deformities in calves and piglets when their pregnant mothers have ingested hemlock in hay or pastures.<sup>61</sup> Grieve cites Cole's Art of Simpling which refers to the effects of hemlock on asses. The sleep induced makes the animal appear dead, to the extent that the asses' owners have "flayed off their skins, yet after the hemlock had done operating they have stirred and awakened out of their sleep, to the grief and amazement of their owners".<sup>62</sup>

White horehound, Marrabium vulgare, was noted as being common by 1440 and is native to most of Europe. It is regarded as being indigenous to Britain and is common in Norfolk and Suffolk where it is brewed as an ale.<sup>63</sup> Horehound is mentioned because it taints the meat of sheep and, although the plant is generally unpalatable to them, younger, less selective animals, will eat it when other pasture is almost entirely eaten down. The plant was widespread due to its popularity as a domestic medicine and animals would have had easy access to it.<sup>64</sup>

Hedera helix or common ivy was flowering in Britain before the last glaciation<sup>65</sup> and sheep, goats and deer are very partial to it. Over-eating, however, leads to poisoning of the animal, particularly pregnant ewes which are most susceptible in winter.<sup>66</sup> It is mentioned

60. McBarron, E.J., cop. cit., p. 76

61. *ibid*, p. 76; Everist, S.L., op. cit., p. 718

62. Grieve, M. op. cit., p. 393. No bibliographic details given for Cole.

63. Fisher, J. op. cit., p. 39; Grieve, M. op. cit., p. 415

64. Mc Barron, E.J., op. cit., p. 77

65. Le Strange, R. op. cit., p. 174 - 175; Fisher, J. op. cit. p. 12

66. Bairacli Levy, J. de., op. cit. p. 78-79; Grieve, M., op.cit., p. 441

particularly because it was valued as an ingredient when brewing grain as it clarified, improved the flavour and gave the brew "keeping strength". The loss of beer brewings is a common complaint against those accused of witchcraft practices.<sup>67</sup>

Laburnum, Cytisus Laburnum,<sup>was</sup> introduced to Britain from Europe prior to 1597 so it may be considered to be on the edge of the sixteenth and seventeenth century timespan, as far as its relationship with witchcraft is concerned. Browsing cattle and horses are poisoned by the foliage and pods which induce the specific reactions of intense sleepiness, followed by vomiting, convulsions, coma and a slight frothing at the mouth and unequally dilated pupils. Death eventuates either through the convulsions or a terminal coma.<sup>68</sup>

The exact date of the introduction of lucerne, Medicago sativa, to Britain is somewhat disputed. Trow-Smith states that lucerne was introduced as a new fodder crop from 1600 onwards and Samuel Hartlib refers to its cultivation in England in his Legacie of 1655. The referral is contained in letters written to Hartlib by R. Child which are entitled "A large letter concerning the Defects and Remedies of English Husbandry, written to Mr. Samuel Hartlib."<sup>69</sup> It is known that lucerne or alfalfa was introduced from Spain to Italy in the sixteenth century and from there to the rest of Europe.<sup>70</sup>

Lucerne causes trefoil dermatitis which is noted in cattle, sheep, horses and pigs. Outbreaks occur mostly in the spring when

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67. Le Strange, R., op. cit., p. 132 - 133

68. Grieve, M. op. cit., p. 460 - 461

69. Fussell, G.E., Old English Farming Books 1523 - 1793 Collieston (Aberdeen) 1978, p. 43 - 44

Trow-Smith, R., A History of British Livestock Husbandry to 1700, London, 1957, p. 257

70. Lesins, K., "Alfalfa, lucerne" in Simmonds, N.W. (ed.) op. cit. p. 167

71. Everist, S.L., op. cit., p. 470 - 471; McBarron, E.J., op. cit., p. 81

luxuriant growth is evident in the crop and symptoms resemble those of photosensitisation, but occur only when the animals are exposed to sunlight. Inflammation of unpigmented skin, such as lips, nostrils, eyes, ears, back and exposed sides and elbows, particularly in shorn sheep, causes fluid accumulation under the skin. The skin then begins to exude plasma and scabs form, the ears droop and sometimes sloughing occurs.<sup>71</sup> Lucerne also causes red gut in sheep which results in death during warm dry autumn conditions. Red gut begins when the lining of the bowels becomes engorged with blood and the bowels then twist and obstruct the blood flow. The affected sheep isolate themselves, become depressed, lie down and die. The plant is a major cause of bloat in cattle and has oestrogenic compounds, the effects of which on domestic livestock fertility is not understood but research is continuing.<sup>72</sup>

The lupin, Lupinus, was a native of Europe and was known to have been introduced to England by John Tradescant in the 1600s. However, this may have been only the garden variety as the lupin was well known to the Romans who valued it as a food, fertiliser and cattle fodder.<sup>73</sup> Lupin seeds contain alkaloids which are difficult to remove and they cause lupinosis. Mammals are susceptible to lupinosis which is caused by a fungus, Phomopsis leptostromiformis, and this lives on the lupin head and instigates the chemical changes in the lupin. Lupinosis occurs mainly in summer when humidity is high and after there has been a lot of rain. Sheep are mostly affected but

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71. Everist, S.L., op. cit., p. 470 - 471; McBarron, E.J., op. cit., p. 81

72. Everist, S.L., op. cit., p. 471; McBarron, E.J. op. cit., p. 81

73. Fisher, J., op. cit., p. 93; Le Strange, R., op. cit., p. 167; Smith, P.M. "Minor Crops" in Simmonds, N. (ed.) op. cit., p. 312 - 313

cattle, horses and pigs can be poisoned. The affected animals develop liver damage which is exhibited by dullness, loss of appetite and condition, jaundice, occasionally photosensitisation and the animals are difficult to move around.<sup>74</sup>

Mint, Mentha viridis, dates back to Roman times and is mentioned by Gerard as a popular domestic medicine in the sixteenth century. The plant grows near water and damp, waste places. It is harmless to domestic livestock but it reduces the flow of milk in lactating animals if it is eaten in large amounts.<sup>75</sup> Cessation and curtailment of milk production was a common complaint amongst the accusers of witches and mint is included in the herblist for this reason.

It is unknown when oats were introduced to Britain but Gerard does refer to a native oat growing, especially in Lancashire where the oats were used to make bread and beer.<sup>76</sup> Oats, Avena sativa, were an extremely useful forage crop in the sixteenth and seventeenth centuries but they can cause poisoning under certain conditions. Nitrate/nitrite poisoning occurs when there is a high concentration of nitrate in the soil and the weather is cloudy and livestock are fed stemming oats or oat hay. The nitrate is converted to nitrite on digestion and this is a blood poison. Symptoms fall into two groups, lethal and sub-lethal. Lethal doses result in low blood pressure, increased heart activity, coma, respiration, twitching of muscles and then collapse. Sub-lethal doses are indicated by spontaneous abortion, depression of lactation, discoloured urine and digestive disturbances but the animal does recover.<sup>77</sup>

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74. Everist, S.L., op. cit., p. 465 - 467; Grieve, M., op. cit. p. 502

75. Bairaclli Levy, J., de. op. cit., p. 59; Gerard J., op. cit. p. 154 - 155; Grieve, M., op. cit., p. 597, Le Strange, R. op. cit., p. 179

76. Grieve, M. op. cit., p. 597; Gerard, J., op. cit., p. 24; Holden, J.H.W. "Oats" in Simmonds, N. (ed.) op. cit. p. 88-89

77. Everist, S.L., op. cit., p. 299; Dent, C. op.cit., p. 2

Grass tetany is the name given to the illness which occurs when livestock consume lush young oats. They exhibit symptoms of excitement, loss of co-ordination, loss of appetite with muscular twitching, salivation and teeth grinding. This eventually leads to aggressive behaviour in normally docile animals. The staggering increases and prostration eventuates and this occurs mostly with cattle but horses and sheep can be affected.<sup>78</sup> Oats are also responsible for "fodder crop" poisoning, a complex whose cause is unknown but which affects dairy cattle and sheep. The disease may affect 70% of the herd and the most marked effect is the loss of milk supply and depressed appearance. Sheep eating young oats develop a stiff gait, isolate themselves, get the staggers and lie down to die. Cases vary from field to field on farms. Rickets and bone fragility is also exhibited by young lambs grazed on oats and this is important in accusations dealing with "broken" bones amongst large flocks of sheep. The removal of the animals from the crop brings them back to normal, although milk production takes longer to re-establish itself.<sup>79</sup>

Pheasant's eye, Adonis annua, is indigenous to Britain<sup>80</sup> and possesses cardiac glycosides which affect heart activity on ingestion and which also act as a gastro-irritant in sheep, cattle, horses and pigs. The animals have profuse diarrhoea with gastro-enteritis, laboured breathing and internal mouth blistering. It is the cardiac glycosides which induce the most obvious response and, depending on the amount ingested, lead to death or severe illness.<sup>81</sup>

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78. Everist, S.L., op. cit., p. 297 - 299

79. McBarron, E.J., op. cit., p. 6 - 7

80. Fisher, J., op. cit., p. 65

81. Everist, S.L., op. cit., p. 597; McBarron, E.J., op. cit. p. 90

Privet, Ligustrum vulgare, was originally cultivated in monastery gardens for the berries which yielded a green dye but from 1540 onwards the plant was carried through Norfolk, Suffolk, Essex, Yorkshire and Lancashire by the Huguenots who settled in these areas.<sup>82</sup> The poisonous principle is uncertain but horses, cattle and sheep can be poisoned either by eating the berries or leaves. The symptoms are severe gastric irritation, vomiting, purging and pain, whilst horses lose the power in their hind-legs and have a slight temperature increase with pupil dilation.<sup>83</sup> It was the loss of power in the hind-legs which mostly concerned the accusers in witchcraft cases, as the loss of the animal for work or transport greatly affected the running of the farm.

Purslane, Portulaca oleracea, is not native to Britain but Gerard records it in his Herball. The poisonous principles are oxalate and nitrate which affect cattle and sheep.<sup>84</sup> The oxalate, an acid, produces a kidney blockage in sheep and hungry sheep and cattle develop listlessness, staggering, shortness of breath and varying degrees of scouring. The effects of nitrate are even more toxic, producing abortion, pinpoint haemorrhaging of organs, vomiting, diarrhoea and excessive salivation.<sup>85</sup>

Fisher maintains that the radish reached Britain with the Romans<sup>86</sup> but Grieve asserts that the wild radish, Raphanus raphanistrum, from which all radishes are descended, did not reach Britain until 1548: although Gerard mentions four varieties extant in 1597.<sup>87</sup>

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82. Fisher, J., op. cit., p. 33, 71 - 72

83. Everist, S.L., op. cit., p. 555

84. Grieve, M., op. cit., p. 660; McBarron, E.J., op. cit. p. 42

85. Dent, C., op. cit., p. 2; McBarron, F.J., op. cit. p. 42

86. Fisher, J., op. cit., p. 24

87. Grieve, M. op. cit., p. 667

Lambs can die within two days of eating the flowering tops of the radish plant and exhibit loss of muscle tone and jaundice.

Cattle lose their appetite over several weeks and become listless with paralysis. Others become excitable and nose encrustations sometimes occur. However, it is the abortions which occur in cattle after their ingestion of this plant which are of particular interest as this was a major cause of witchcraft accusations.<sup>88</sup>

Senecio jacobaea or ragwort is a native of Britain and the plant can grow up to 1,200 feet above sea level, making it a vital poisonous herb in cases in upland Scotland, Wales and England. The plant particularly likes hedgerows and grassland and Gerard comments on the fact that it likes moist fields and the borders of fields. Ragwort has five different poisonous principles which cause lesions on and cirrhosis in the liver. Under natural pasture conditions, the process is slow because the ragwort alkaloids are cumulative in nature and it is the accumulation of the alkaloids within the animal which gradually destroys the liver.<sup>89</sup> Cattle, horses and sheep are susceptible and after twelve months on pasture interspersed with ragwort plants, the animals become dull, experience a loss of appetite, have jaundiced, staring eyes, lose weight and have a diminished milk supply with an acid taint to their milk. Their skin, especially that of the udder and teats, is scabby and vision is impaired. Staggering and persistent diarrhoea are accompanied by thirst, loss of condition, the eventual cessation of milk and a failure to eat. Death eventuates after a slow, languishing illness.<sup>90</sup> Animals are exposed to large

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88. Everist, S.L., op. cit., p. 215

89. Lehane, B., op. cit., p. 129; Gerard, J. op. cit., p. 63; Schauenberg, P, and Paris, F, op. cit. p. 51

90. Everist, S.L., op. cit., p. 92

doses of ragwort alkaloids by consuming hay cut from ragwort infested pasture. The poisoning occurs when supplementary feeding takes place during long spells of cold weather and fodder scarcity. Cattle fed this hay die quickly because the alkaloid accumulation in the liver is faster as the alkaloids are not destroyed in the cutting and drying process.<sup>91</sup>

Perennial ryegrass, Lolium perenne, is very abundant in meadows, pastures and waste places throughout Britain and is a hay and pasture plant which likes wet and uncertain climates. The length of the plant varies, according to the kind of soil in which it grows, long in good soil and short in poor soil. It was the first herbage grass to become a crop plant and reached Britain in prehistoric times. There are several alkaloidal principles in the chemical structure of ryegrass, as well as a fungi which causes facial eczema and ryegrass staggers. Cattle, sheep and horses of all ages, but particularly young animals, are affected and the condition causes stumbling and falling. "Staggers" is the name given to the result of ryegrass ingestion in domestic animals. Drowning can occur near water as the animals are so uncoordinated. Accidents and starvation cause death, as well as the actual condition, because of the effects the alkaloids have on the animals. The attacks are precipitated by exercise.<sup>93</sup> Tiny nematode worms and bacteria on the seed heads have also been found in ryegrass and post mortems reveal that they cause pale crumbly livers and haemorrhages.<sup>94</sup>

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91. Grieve, M., op. cit., p. 669; Baircli Levy, J. de. op. cit. p. 105; Schauenberg, P. and Paris. F., op. cit., p. 22

92. Rose, F. Grasses, Sedges and Rushes, London, 1966, p. 37; Borrill, M., "Temperate Grasses" in Simmonds, N. (ed.) op. cit., p. 140

93. Everist, S.L., op. cit., p. 323 - 326; McBarron, E.J., op. cit. p. 15

94. The Land (newspaper) Thursday, 18th March, 1982, p. 55

St. John's wort, Hypericum perforatum, is indigenous to Britain and was mentioned in herbals from 1440 onwards. Gerard mentions that it likes pastures and it does grow in open woods, hedges, along the wayside, on grassy banks and in uncultivated ground. It was a very popular herb in the sixteenth and seventeenth centuries, because it was credited with protective powers against evil spirits and witches. A common custom was to hang sprays of the plant above doors and in churches on the eve of St. John's Day, 24th June, when witches were believed to be most active. The herb was more than likely to have been very accessible to livestock if the populace was spiritually dependent on the plant.<sup>95</sup>

The poisonous principle is hypericin which is a primary photosensitiser and animals suffer from the effects at any time, but particularly when other feed is scarce or the plant is young. The toxin persists in hay and old standing plants. Symptoms appear only when there is light and are not apparent when the animal is shaded or the weather is cloudy. Horses are the most violently affected of all livestock but sheep and cattle are affected on all areas of exposed skin, such as the ears, teats, udders, face, lips and white coloured skin areas. The animal rubs itself raw and the bacterial infections, which then take over these areas, often cause death. The milk supply is suppressed in lactating cows and the animals often act as though demented, charging about the field and even throwing themselves into the water. Eventually, they lose condition and some convulse and die.<sup>96</sup> This type of behaviour makes the plant of prime

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95. Gerard, J., op. cit., p. 123 - 124; Grieve, M., op. cit. p. 707; Fisher, J., op. cit., p. 39; Le Strange, R., op. cit. p. 142 - 143

96. Everist, S.L., op. cit., p. 364; McBarron, E.J., op. cit. p. 99

importance in the witchcraft issue as several cases describe this type of activity almost word perfectly.

The scarlet pimpernel, Anagallis arvensis, has a toxic, volatile oil and a toxic glycoside which poisons horses, sheep, cattle and birds. The plant is indigenous to Britain and grows in waste places, the dry sandy edges of the fields and especially cornfields. Gerard tells us that the pimpernel grows almost anywhere. The plant produces symptoms of gastro-intestinal irritation, loss of appetite, pain throughout the body and violent headaches.<sup>97</sup>

Field stachys, Stachys arvensis, is often called stagger weed and is native to Britain, although it is uncommon in Scotland. It is a woodland plant which grows in copses and sometimes amongst heath and moor plants.<sup>98</sup> The poisonous principle is unknown but it appears only in animals under stress, such as walking any distance or too much activity as at shearing. Seeds are more toxic than either young or old plants and individual variations in susceptibility occur amongst sheep, cattle and horses, as well as pigs who exhibit symptoms of weakness or paralysis in the hind and fore-quarters. Horses have collapsed when at work and some die because the symptoms emerge only after exercise and the toxic action is cumulative. If animals are forced to move, then their gait becomes staggered, shivering attacks occur and there is urinary irritation. If exercise continues, the animals die and recovery is only temporary if they are rested.<sup>99</sup> The collapse of the animal whilst it is at work also provides a keen reference to the witchcraft/livestock related literature.

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97. Everist, S.L., op. cit., p. 587 - 588; Grieve, M., op.cit., p. 633; Gerard, J., op. cit. p. 140 - 142

98. Grieve, M., op. cit., p. 97

99. Everist, S.L., op. cit., p. 387 - 388

McBarron, E.J., op. cit., p. 45

Sweet clover, Melilotus alba, was a common crop in the sixteenth century, seeding freely and spreading in a wild condition wherever it was grown and Gerard mentions it growing between Essex and Suffolk.<sup>100</sup> The plant is not toxic when grazed but horses, cattle and sheep can be affected by spoiled hay. Animals with sweet clover poisoning die from either internal or external bleeding. The symptoms of the acute poisoning are large swellings under the skin anywhere on the body but particularly on the back thighs and about the shoulders.<sup>101</sup> Mucous membranes become pale and haemorrhages in the internal tissues occur so that there is pallor and weakness just prior to death. The blood's clotting ability is also reduced so that any wound causes uncontrolled bleeding and death occurs in such situations as calving, dehorning and castration.<sup>102</sup>

Tall fescue grass, Festuca arundinacea, is distributed throughout Britain and has different native strains for different regions. The grass is shorter for pasture and hills and grows tall in low lying meadows and waterside areas.<sup>103</sup> The poisonous principle is probably due to mycotoxins which are produced by parasitic fungi and cattle appear to be the only affected animals. They develop fescue foot which is characterised by weight loss and lameness in the hind limbs, on the left side first, and then gangrene of the feet and tail. Sloughing off of part of the hoof or affected limbs occurs after a line appears separating the good and bad or gangrenous parts of the hoof or limb. Not all animals in the herd are susceptible and it can affect individuals only within the herd.<sup>104</sup> This grass can be

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100. Grieve, M., op. cit., p. 525

101. Everist, S.L., op. cit., p. 472 - 473

102. ibid., p. 473

103. Hubbard, G.E., Grasses, London, 1972, p. 145

104. Everist, S.L., op. cit., p. 320 - 322; McBarron, E.J., op. cit, p. 24

directly linked with witchcraft accusations, as its effect on limbs is often cited in the witchcraft literature.

The thornapple, Datura stramonium, is mentioned in Gerard's Herball and he records that it is difficult to grow but that he has "dispersed through this land" the seeds of the thornapple. The plant was cultivated mainly in London towards the close of the sixteenth century and was mostly a garden plant.<sup>105</sup> All parts of the plant are poisonous and the toxicity is not reduced by drying. Animals, who usually refuse to eat this plant due to its disagreeable odour and nauseous taste, are poisoned through contaminated hay. The alkaloids affect all types of livestock and poultry and the symptoms are lack of saliva, dilated pupils, excitement and mental impairment followed by depression. The breathing is slow and irregular and becomes weakened, eventually killing the animal.<sup>106</sup>

Traveller's joy, Clematis vitalba, is native to Britain and Gerard records that the plant can be found on the borders of fields and in hedges in Kent, Essex, and London but has not heard that the plant grows in the north of England.<sup>107</sup> The plant contains a violent poison called clemantine which affects cattle if the plant is ingested in large quantities. Cattle have difficulty in breathing, grunt a lot and have swollen, red, protruding eyes. There is a loss of muscle tone and ulceration of the muzzle is accompanied by abdominal pain which eventuates in death.<sup>108</sup>

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105. Gerard, J., op. cit., p. 81; Fisher, J., op. cit. p. 60 - 62; Grieve, M., op. cit., p. 803

106. McBarron, E.J., op. cit., p. 104; Grieve, M., op. cit., p. 803

107. Gerard, J., op. cit., p. 213 - 214; Fisher, J., op. cit., p. 66

108. Everist, S.L., op. cit., p. 598; Grieve, M., op. cit., p. 206

Trifolium is the genus name given to clovers and different species of clover and, when eaten by sheep and cattle under certain conditions, can cause reproductive organ disfunctioning. Female and castrated male sheep are the most affected but cattle can also be influenced when the animals eat entirely or mainly clover forage. Clovers were introduced to Britain from the 1600's onwards from Spain, Holland and Germany, as a forage crop.<sup>109</sup> Formononetin is the major causative poisonous agent in the plant and its concentration is governed by age, growth stage and low levels of phosphate in the soil. The disease syndrome it induces includes reduced fertility, difficult lambing, prolapse of the reproductive tract, high tail and increased death rates amongst ewes. Lactation also occurs in virgin ewes and in wethers who are also susceptible to the growth of a false bladder and urinary obstruction. The plant is a hormonal interferent, the effects of which are still under scientific review<sup>110</sup> White clover causes bloat in the springtime and the red clover causes the same condition in the autumn but supplementary feeding lessens the effectiveness of the causative agents.<sup>111</sup>

The Marian or variegated thistle, Silybum marianum, is a native of Britain and grows profusely in ground which has been neglected.<sup>112</sup> Livestock do not normally eat this plant, except when hungry, although goats are partial to the plant. The poisonous principle is nitrate and the symptoms are similar to those exhibited with nitrate/nitrite

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109. Trow-Smith, R., op. cit., p. 257; Evans, A.B. "Clovers" in Simmonds, N. (ed.) op. cit., p. 176

110. Everist, S.L., op. cit., p. 490 - 492

111. McBarron, E.J., op. cit., p. 139

112. Grieve, N. op. cit., p. 794, 797

poisoning from oat ingestion. Cattle are mostly affected and sheep are also susceptible to the effects of ingestion but horses are rarely affected. The symptoms of nitrate/nitrite poisoning include blue lips, gums and the insides of the eyelids, chocolate coloured blood and others already mentioned. The animal either recovers or dies, depending on the dose, either lethal or sublethal.<sup>113</sup>

Wood-sorrel, Oxalis acetosella, is included in botanical lists prior to 1440 and occurs all over Britain as Gerard states in his Herball. It likes to grow in woods and under bushes but the plant contains oxalates and can be toxic because of its acidity. The signs associated with wood-sorrell poisoning are muscular trembling, a staggering gait leading to collapse specifically on the brisket with legs outstretched. The most significant aspect of the plant, as far as its relation to witchcraft accusations is concerned, is that milk from cows which have eaten this plant is very difficult to churn into butter.<sup>115</sup> It flowers from Easter to Whitsuntide but its effects are felt throughout the year.<sup>116</sup>

The Yewtree, Taxus baccata, is a widely spread native of Britain and it owes its spread to its significance in the Druidic religion which dominated Britain in pre-Roman times.<sup>117</sup> The leaves, seeds and fruit are poisonous as they all contain the alkaloids taxine and milossin. Cattle are mainly affected and the symptoms are dependent on the amount

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113. Dent, C., op. cit., p. 2; Everist, S.L., op. cit., 186-187; McBarron, E.J., op. cit., p. 31

114. Gerard, J., op. cit., p. 264; Fisher, J., op. cit., p. 40 - 41; Grieve, M., op. cit., p. 750 - 751

115. Everist, S.L., op. cit., p. 562

116. Grieve, M., op. cit., p. 751

117. *ibid.* p. 866

ingested as the yew leaves and branches were often fed to animals to supplement fodder shortfalls in autumn and winter. Peracute poisoning resulted in sudden death with no prior symptoms, a common cause of complaint in the witchcraft issue. Less acute poisoning has a delay of up to, but no more than, an hour before symptoms of trembling, breathing difficulties, sometimes a collapse and then rapid death occurs. Subacute poisoning results in vomiting, diarrhoea and nervous signs.<sup>118</sup> Horses, in particular, should be disallowed access as it takes only 500 grams of needles to bring a horse down in twenty-five minutes.<sup>119</sup> The alkaloid depresses the heart action by slowing it down and preventing the dilation and contraction of the artery.<sup>120</sup>

Many other grasses, herbs, trees and plants affect domestic livestock after ingestion but the thesis has limited itself to those which produce the most outstanding effects.<sup>121</sup> The establishment of a direct link between accusations of witchcraft and symptoms of plant ingestion is problematic in the short term because of the nature of the documented evidence. No connection between plant intake and resultant illness has been scientifically proposed for human beings and the concept certainly has not been proposed or documented in the case of animals in the sixteenth and seventeenth centuries.<sup>122</sup>

Outright documented evidence which directly corroborates the link between plant ingestion and witchcraft accusations does not exist in the literature of the sixteenth and seventeenth centuries. Substan-

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118. Everist, S.L., op. cit., p. 688 - 689

119. Schenk, G., The Book of Poisons, New York, 1955, p. 17

120. Everist, S.L., op. cit., p. 688

121. Appendix II gives a more complete list of plants which affect livestock and which have a potential link with witchcraft.

122. Mingay, G.E. (ed.) The Agricultural Revolution, London, 1977, p. 31

tiation of the thesis concept is therefore dependent on what can be ascertained from examinations of primary source material. This documentary evidence includes trial records, written accusations, Assize court records, Quarter Sessions rolls, Diocesan rolls, depositions, pamphlets and any other literature where an authoritative account of a witchcraft occurrence is cited.

The most outstanding difficulty encountered in the compilation of the thesis has been the lack of symptoms detail in the records. The symptoms exhibited by the animal prior to its death/illness or unnatural behaviour, are hardly touched upon by the recorders of the cases. No doubt this is because the symptoms are virtually irrelevant when paralleled with the legal fact that a suspected witch was on trial. Importance was placed on the fact that maleficia was thought to have occurred and the woman/man was on trial for the results of that maleficia. How she/he achieved the death or illness of the animal and what symptoms it exhibited, were secondary in regard to the guilt or innocence of the accused person.

The following chapters will substantiate the link between domestic animal loss, plant ingestion and their relationship to witchcraft accusations in sixteenth and seventeenth century Britain. This will be achieved by examining the case studies in which animal or production losses occur. Only those case studies which have the most unusual symptoms and details are examined in the thesis and Appendix I gives a more complete list of cases where a potential to link witchcraft and livestock/product losses exists.