

Ecological destruction in the 16th century

THE CASE OF ST LEONARDS FOREST

by Sybil M. Jack

Despite the protests of Elizabeth's foresters, human activity over a short time decisively altered the ecological system in St Leonards Forest: the indiscriminate felling of saleable timber together with the direct and indirect effects of iron mining and smelting in the 16th century virtually eliminated oak and beech and these did not reappear as the forest regenerated. This in turn had a disruptive impact on the deer population which dwindled and disappeared, leaving the area by the 19th century more or less sterile. This sequence of events appears to be merely a particular illustration of a more general trend in the forests of 16th-century England.

This study is an attempt to illustrate, in microcosm, how man's activities in the 16th and early 17th centuries decisively and destructively altered the ecological structure of the marginal lands in the county of Sussex. It is a small reflection on P. A. J. Pettit's study of the royal forests of Northamptonshire in which he comments on the multitude of conflicting interests, the absence of a consistent or positive forest policy in the period, and the effects of this on the Crown's exploitation of a considerable potential asset.¹ It also reflects on Cyril E. Hart's study of the Forest of Dean and George Hammersley's assessment of the exploitation of the crown woods.²

Sussex was very similar to Northamptonshire in the structure of the local countryside. In Sussex too, parks were 'relatively more numerous in the vicinity of the forests . . . and distinguished them by many aristocratic seats'.³ Sussex, however, was not a traditional centre of royal forest activity and there were few proceedings by the justices charged with the protection of the forests. The one exception was the investigation into Ashdown Forest in the reign of Edward VI caused by Seymour's attainder, and this already makes gloomy reading.

The forest is described as 'a barren ground' which 'hath no covert of any underwood saving great Trees and insomer of the covers of birchen trees'; in addition, 'there is no fair laund in it but only hethers and they are not playne but all holtes'. The lodges for the foresters and walkers were ruinous as was Newbridge lodge. Even so, there were still 300 red deer and 700-800 fallow deer.⁴ The fragile forests of

Sussex continued to be devastated despite the passing of an Act of Parliament⁵ which laid down detailed and comprehensive rules about how and where trees might be cut and harvested, and it did so because the government of the day, in the last resort, paid more heed to the immediate political pressures which it faced, rather than to the long-term good of the country. The pre-existing acts relating to the forests were reinforced by new Acts in Elizabeth's reign, all to no purpose. 1 Elizabeth cap. 15 prohibited the felling of oak, beech or ash of a breadth of more than one foot square within 14 miles of the Thames, Severn and Wye. This produced a spate of letters of exemption.⁶ 23 Elizabeth cap. 5, trying to keep up with the problem, forbade any felling within 22 miles of London or the Thames and four miles of downs between Arundel and Pevensey. 27 Elizabeth cap. 19 restricted the cutting of wood usable as cloven wood in Sussex, Surrey and Kent. None of this had any long-term effect.

The great forest of Anderida, which had once stretched across the Weald through Kent and Sussex, had been eroded throughout the Middle Ages by assarting and cultivation, but the heathlands with their thin and poor soils had been prudently left to the wild animals whose hunting was a sport both legally for the rich and illegally for the poor.⁷ There were a number of such areas, all of which were coveted by the aristocracy for reasons of prestige and status. These included Ashdown Forest, the forest of Weybridge and Sapley, innumerable parks and the place which will be the focus of this study, St Leonards Forest, with its associated dispersed

parks of Sedgwick and Chesworth, and the parks of Beaubush and Shelley. At the beginning of the 16th century this was still a heavily-timbered country, with large stands of good timber trees such as oak and beech.

The status of the areas in Sussex regarded as forests, gives rise to some debate. C. R. Young accepts the idea that only a king can hold a forest and does not accept that the areas in Sussex, all of which were at some stage in the hands of a subject, were forests which came under royal forest law, even when the vagaries of politics brought them back into crown hands.⁸ If one accepts the authority of the contemporary judge, Roger Manwood, who wrote the definitive work, *A Treatise of the Forest Laws*, Young is wrong. Manwood specifically refutes the idea that no subject of the realm could be seised of a forest and in doing so mentions St Leonards Forest by name. He admits that there had been legal argument about the issue, and that a forest granted away by the king might be 'but a chase' in the hands of the subject if certain magical legal words are omitted from the grant.⁹ If, however, the magic words, *cum omnibus incidentibus appendiciis et pertinentiis* are included in the grant, then the grantees holds a forest, and can have all officers that 'belong unto a forest'. He may hold a court of attachment every 40 days and also a court of swannimote, but may not hold a forest eyre without a special commission from the king. The case of Lord Dier in 1&2 Elizabeth established this for Weybridge and Sapley, and it seems to have been the case for St Leonards as the archives at Arundel Castle preserve some of the records of the court of attachment and swannimote for St Leonards.¹⁰

Manwood, who was closely connected in his legal career with the Cinque Ports and the Howard family, would undoubtedly have known. These areas then were, to use Manwood's words, 'Territorie[s] of woody grounds and fruitfull pastures, thereby is declared what manner of territorie of ground a forest must be, that is to say a territory of woody ground stored with great woods of coverts for the secret abode of the wild beasts, and also with fruitfull pastures for their continual feed'. Manwood argued that if either of these two essential characteristics were missing, it would cause 'the exile of the wild beastes from the Forrest to some other place'. Without thick coverts for the animals they would leave to find coverts elsewhere and would then, being outside the bounds of the forest, be hunted

and killed. Were there insufficient 'fruitful pastures' from which to feed, they would again leave and risk being hunted and killed. That being so, 'it is manifest, that a Forrest cannot haue continuance without woody ground and fruitfull pastures. And so consequently it followeth, that to destroy the coverts of the Forrest is to destroy the Forrest it selfe: Also, to convert the pasture grounde, meadowes and feedings into arable land is likewise to destroy the Forrest.'¹¹ Manwood may have been writing from observation, for this is what happened to the forests in Sussex in the 16th and early 17th centuries.

St Leonards Forest lies on high and barren ground, sharply indented with blind valleys separate from ordinary manorial jurisdiction across the boundaries of two parishes, Beeding (or Seal) and Nuthurst. It was, in the 16th century, generally agreed to have a circumference of 25–30 miles, marked off by a palisade fence to discourage the deer from getting out. For the hunting and preservation of game it was organized along fairly standard lines and was divided into five walks, each presided over by a keeper whose rights were established by vague, inconsistent and often disputed custom. The keeper claimed, amongst other things, fee-trees, fee-bucks and rights to approve the temporary use of the land. The deer, which often had to be handfed, numbered several hundred of various types. The keeper's rights to pannage and herbage-grazing cattle and sheep were granted separately. The right to fee-trees was reserved to the owners. The forest also included a number of small ponds in which fishing rights were available and the prime and jealously guarded role of the area was clearly and unequivocally a recreational one — probably the more highly prized for the fact that it was less a source of economic wealth than a cost. The forest belonged to the Howard family, but it was frequently in royal hands, and was eventually actually sold to the monarch in return for a long lease on equitable terms.¹²

Not all the land within the forest belonged to the Howards, however. Various local landowners had freehold within its bounds and some lesser men had land by copy of court roll. In the early years of the century it was part of the property usually reserved as jointure for the Norfolk dowagers, and for many years was in the hands of Agnes, the long-lived widow of the 2nd duke, who lived in her palace at nearby Horsham, where she supervised the upbringing of the well-born girls of the family and affinity — not very well, if her granddaughter,

Catherine Howard, who was one of them, really behaved as was alleged. For that the dowager was attainted, but the 3rd duke was allowed to administer the lands until her death. Since the duke was almost immediately attainted, the land remained in crown hands until Mary's reign, was returned to the duke then, but in 1562–3 exchanged by the 4th duke with Elizabeth in return for a long lease. What this did, however, was to open up the administration of the woods, as distinct from the forest or the land rights, to the royal court. Since there were many in the court, the government and elsewhere who were hungry for timber, priority between those with legitimate demands on the woods became an unresolved problem.

The growth of the iron industry in the area made other demands on the local resources. By the 1570s there were a dozen forges and furnaces within a ten-mile radius of the forest, apart from the furnace and forge within it which had a lease that in the usual way entitled the tenant to wood for repairs to the buildings, hammers and wheels. Not only were ironmasters interested in timber, they were equally, if not more interested in water supply. A long-lasting, reliable source of water was hard to come by in Sussex and yet essential if the forges and furnaces were to be kept in operation. St Leonards' deep, blind valleys offered two magnificent ponds with an almost inexhaustible supply of water. In the 1550s John Broadbridge had built a dam which significantly extended and deepened Hawkins pond. Neighbouring ironmasters had encroached on the edges of the forest to improve their own catchment areas, and this too disrupted and altered the existing ecological balance.¹³

The administration of the woods in crown hands had been one of the most inefficient areas of royal estate management from the time of Henry VIII. Control of the local administration by the central woodward was virtually non-existent. The disorder noted and identified at the end of Henry's reign and again in the enquiries under Edward had not been rectified during the re-organization of the financial structure and the absorption of the land courts into the Exchequer.¹⁴ Indeed, far from any improvement in control in this area, the reverse may be true. The old rule that the chief justice of the forest had to authorize the sale of woods had given way to a situation in which an exchequer warrant was sufficient. This led to trouble particularly perhaps in areas where royal control was partial and recent.¹⁵

We do not know, for example, who appointed the verderers in St Leonards. Theoretically, it was the forest JPs who presided at the swannimote which was supposed to meet three times a year and enrol warrants to fell trees and examine offenders. It is not clear if the court even met after Howard influence was withdrawn.

It was evidently comparatively easy for those with warrants from the crown to operate without proper supervision and common for such warrants to be issued without any reference to expert advice on the management of the resource. Consequently, those with access to court favour could seek to benefit from the as yet untapped resources of the St Leonards Forest area, unchecked by anyone with a responsibility for the long-term preservation and maintenance of resources. Warrants for timber were soon being issued, some for the construction of royal buildings such as the Exchequer, but some, indiscriminately, to local people.¹⁶ Warrants were issued in such a way that the holders cut down trees on copyhold land contrary to the rules relating to copy on that manor.¹⁷ There were also battles between private individuals over rights to timber and ore in the area on copyhold or freehold land.¹⁸

The keepers and rangers of the forest protested vigorously. The effects of logging on the wild beasts and their vital coverts, particularly if done at times of the year when the animals were dropping their fawns, was disastrous to the well-being of the animals. Increasing human access to the area was deteriorating the forest cover. Pursuit of those causing the damage in the local courts was difficult. The keepers had problems in fulfilling their responsibilities. Recourse to the Exchequer was eventually attempted but Exchequer commissions took time, action to produce fines for spoil in the Exchequer was a long slow process, and in the meantime the damage was done.¹⁹

This was not the only effect that the cutting was having on the forest area, however. The long-term dangers of the procedure were forcibly pointed out some time between 1566 and 1572 by the deputy surveyor of woods, Roger Taverner, who was conducting a long, and eventually unsuccessful campaign to preserve the southern landscape.

Taverner produced a well-reasoned assessment of the resource after making a survey. The forest, he said, was well supplied with desirable timber, especially oak and beech, 'of a very great age and of a great length' but the manner of its growth was

not such as to encourage natural regeneration even if 'standells' were left in accordance with the already existing acts of parliament. This was due to the effect of the wind in the exposed slopes. The trees growing there grew in 'plumps' together, preserved from overthrow 'by reason that the uttermost trees of the said plumps defend the wyndes from the innermost and the innermost trees growing thick do keep the uttermost from falling, by their nigh standing with them'.²⁰ The creation of gaps and glades in these plumps which had been going on since the area had come into the queen's hands was giving the wind 'apt entrance' and would soon blow down, bruise and break the remainder, therefore leading to the rapid decay of the whole. In addition, the undergrowth was being destroyed by the method of cutting. Taverner proposed changes to the administrative procedures so that proper forestry methods could be enforced. These, he said, would ensure that timber suitable for the navy could be preserved and fuel committed for the iron mills properly harvested so that a continual supply of 500 loads a year for 100 years or more might be assured. If this were not done, then the timber would be destroyed in a way that would be quite unprofitable as well as bad husbandry. A 'load' of wood is a confusing term, but so far as timber is concerned represents 50 foot cubed for squared timber and 40 foot cubed for logs. A cord is a stack eight foot by four foot by four foot, no piece being less than three inches in girth. The volume is 128 foot cubed (3.624 m cubed) and weight c. 3300 lb (say 1500 kg).²¹

These sensible and professional recommendations may have checked the flow of warrants for a time, but as the queen was still prepared to grant warrants with little attention even to whether the commitment could all be met, the situation did not improve for long. One reason for this may have been that Taverner was not on hand and the perquisite that the deputies obtained of four pence on each tree marked for sale, and a shilling in the pound on wood sales encouraged them to overlook infringements.²² Another reason of course was the rising price of the cord of wood in the area. In 1562–4 a cord cost 10d.–11d., in 1570–4 it was 12d. By 1586 it was 24d. and 30d. by 1591.²³ Intermittent surveys of the great timber show a steady diminution of resources. In Sussex as in Northamptonshire, proposals for enclosure and plantation were not practical politics.²⁴

A further change to the established ecology came

from the increasing number of inhabitants. The developing exploitation attracted sawyers, carpenters, ash-burners, wood-brokers, clapboard makers, ship-board makers, coopers and others to the area, as well as the ironworkers. The great majority were incomers, as a search of the surviving parish registers and the evidence of later depositions makes clear. Many needed housing and some erected cottages, probably illegally, in the forest itself and the neighbouring parks, while the ironmasters were also erecting housing for their workers. In 1576 an inquisition showed, amongst other things, this increasing population pressure. At least ten tenements had been built in the four years since the forest had come to the queen.²⁵ Trouble arose between those who normally rented the herbage and pannage for their cattle and pigs, and others who complained about the overgrazing of their resources by the animals of the squatters. And, of course, the deer were once again disturbed.

The regular cutting of wood and working of the furnaces in the whole area meant the constant coming and going of carriers and wagons and the building of new access roads and bridges which themselves consumed more timber. One built in St Leonards for 'carrying coal to the hammer' accounted for one small oak, one beech and several birches. Enlarging the ponds caused other areas to be flooded at certain times and rendered useless for grazing. Enclosures and 'howes' were increasing at the expense of the deer. On the other hand, when the keepers burned the heath to improve the pasture, some young trees were also burned which caused friction with the woodcutters.

Although fuel for the ironworks should only have involved 'tops and lops', repairs to the works legitimately used full oaks and other trees — one occasion 2–3 oaks and 20 small beeches were used — which was again unpopular with the surveyor of woods. The making of charcoal in large quantities also had its effects. The charcoal was made from 'the body of birches', while 'herdells of the boughs thereof' were used 'for the defence of the wind for hurting of the coalpits'. Ultimately, the preservation of the game was not compatible with disturbance of the undergrowth, nor woodcutting with cattle-grazing and the increasing frequency of personal encounters also exacerbated the pressures of conflicting demands.

The deputy surveyor of woods had to act by bringing suit against the offending individuals.²⁶

Thus we find Taverner in dispute with Roger Gratwick and others over their manner of executing a warrant from the queen to Gratwick for 1000 trees. It was agreed that the cloven wood of these might be valued at £40. The queen had granted 1000 more to Mr Moore. These went to building Gratwick's dwelling house, Horsham mill, the schoolmaster's house and a number of small cottages.²⁷ No proper account had been given to the woodwards. The trees had been selected by the grantee in association with George Hall, whose commission as under-surveyor seems to have been assumed rather than granted, and there were objections to the areas in which they had been selected, the area having been chosen more for convenience than for good sylvan husbandry. 240 trees had been felled in 'Mr Merry's walk' since 1581 and 140 in John Asshely's, to their inconvenience. The case also involved a protracted argument about the methods used in felling and bringing down the wood and the effects this had on the surrounding coverts. In another case Taverner took on Thomas Shirley and John Middleton.²⁸

The effects of mining on the forest were equally deleterious although mining in those days took place in small bell-shaped pits. Numerous pits dug close together, however, created areas in which, it was said, no trees or plants would grow.

The situation was deteriorating rapidly. When George Hall and Sir Thomas Shirley were given one warrant for timber in 1579 and yet another warrant for great timber in 1580, the new surveyor, John Taverner, declared that there were not enough suitable trees to fulfil the warrant. By the first warrant the queen had granted Sir Thomas (for £60 and a rent of £66 13s. 4d.) 2000 cords of beech, birch and oak yearly within St Leonards. The second had granted a further 2000 cords.²⁹ When a commission of inquiry was established 19 years later it was to ask such basic questions as 'whether is there at this present any wood left standing fit to be fallen and employed for the cordwood' and 'Has Shirley made spoil?' George Hall's schedules and notes made surprising reading. From 1579–98, 60,981.5 cords had been cut for Shirley himself, 4035 more for John Middleton as assignee and 10,000 for Roger Gratwick as Shirley's assignee, a total of 75,016.5, leaving only 696 cords standing. This gave rise to further trouble as accusations were flung at those who had got in early, that they had illegally appropriated the trees as the Shirleys' warrant had priority. In terms of the environment, who cut the trees hardly mattered,

the destruction was irreparable. By the end of the 16th century, interest in the forest was dying down. With only 696 cords of wood left standing, not enough for existing commitments, business had to move elsewhere. Ruthless exploitation, little or no replanting, together with the diverting of water-resources had left the land eroded. Even so, John Taverner was to fight a few rearguard skirmishes over the remaining timber. The survey taken in 1604 makes gloomy reading.³⁰ Even more ironic was that a further special commission revealed that many of the worst offenders had not even been paying the small assized rents due for their holdings in the forest.³¹ By James' reign there were other pressures on the forests and parks, many of which were being disparked, and after grubbing and stubbing the roots of the trees, the barren soil was marled to make it fitter for tillage.³²

With the timber gone, the deer, as Manwood knew, diminished and the keepers kept up the paling fences with less care. In the 1630s Sir Henry Compton, apparently tired of the passage of red and fallow deer and cattle to his great detriment, thought it worth attempting bringing the matter before the Exchequer court to get some things put right. The series of questions put on his behalf to the witnesses concerned the decay of the park palings and the number of the surviving deer, the constant issue of waste and felling timber trees and the burning of heath in new and unusual places. As Manwood had foreseen, there were but some six score deer left and they destroyed other men's corn and were likely to be killed. Sir Walter Covert as tenant to Sir John Caryll, who had obtained both from Elizabeth and James an extended lease of the forest for 50 years, let in larger quantities of sheep and cattle. Their browsing further denuded the woodland cover leaving little for the deer, though his own supporters held that he had nonetheless increased the number of deer. Caryll further let sections of the parks and forests to farmers with permission to turn it over to tillage.³³ The land was duly ploughed and improved and the tenants found to their fury that the local rector promptly demanded his tithes, arguing that the doe traditionally accepted in lieu of tithes had applied only to the unimproved lands.

By Charles I's reign, the situation had deteriorated yet further. A survey of woods in St Leonards Forest showed no great trees or valuable timber saving one old tree worth £1 and other young timber worth £30.³⁴ In the circumstances, the commission set up

in July 1633 to investigate the enforcement of the Elizabethan forest acts with which we started, was something rather more than 'too little too late'.³⁵ There was no improvement by the 1650s when the commonwealth undertook a further survey.³⁶

Was the destruction effectively impossible to avert given the demand for wood? The commonwealth survey observed 'there hath been very great destruction of wood but sufficient if coppiced to make good the said coals' (250 loads a year was in question). Hammersley has argued that there would have been an adequate supply of wood for the existing ironworks for ever if it had been properly coppiced.³⁷ I. B. Mason, on the other hand, has argued that a large furnace producing about 800 tons of pig iron would be satisfactorily maintained by 7000 acres of wood, plus 6000 if all had been refined. So that assuming that a third of the

countryside was under wood, c. 50,000 acres represents a working radius of about five miles — much less than the Wealden furnaces had.³⁸ Whether this is true or not, for an area like St Leonards it would have meant changes, since coppicing the wood would have affected the deer and the ecology of the area would have been changed.

The mischief was that as the farmers left, the land proving often unsuitable for long tillage, the wood that regenerated was of a different kind. Oak and beech were no longer to be hoped for. Ash and thorn and scrub were what appeared. This was no ground for the deer, and they disappeared, as doubtless did many woodland animals of less interest to man. In the 19th century Horsfield in his *History of Sussex*, dismisses the St Leonards area in a few words as a 'wild and in great measure sterile district' — a far remove from its attractions in 1500.³⁹

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NOTES

¹ P. A. J. Pettit, *Royal Forests of Northamptonshire: a Study in their Economy 1558–1714*, Northants Record Society **23** (1968), xvi.

² Cyril E. Hart, *Royal Forest: a History of Dean's Woods as Producers of Timber* (Oxford: OUP, 1966). G. Hammersley, 'The Crown Woods and their exploitation in the 16th and 17th centuries', *Bulletin of the Institute of Historical Research* **30** (1957).

³ Hart, 4.

⁴ Public Record Office (hereafter PRO) Exchequer Forest Proceedings E32/1(197) relates to Ashdown forest, but is an isolated case. It was taken in a forest court because the Earl of Wiltshire had been attainted. The later accounts, printed in M. S. Giuseppi, 'The accounts of the iron works at Sheffield and Worth in Sussex 1546–1549', *Archaeologia* **64** (1912) Appendix 1, 290ff., exist because Thomas Seymour had in his turn been attainted. The forest courts had evidently been in the hands of the Earls of Arundel for a long time as the occasional extent taken on a death in royal hands shows: e.g. PRO Exchequer Special Collections (SC) 6/1019/23 (1420s).

⁵ 35 Henry VIII cap. 17 required the reserving of twelve standards on each acre.

⁶ Some, but not all of these are enrolled in the *Calendars of Patent Rolls* e.g. 1558–60, 96, 326, 340; 1560–63, 342, 478.

⁷ It was famous at the time. William Camden mentions it in his *Britannia: a Chorographical Description of the . . . Kingdoms of England, Scotland and Ireland and the Islands Adjacent from the Earliest Antiquity*, 2nd edn (London, 1806) **1**, 210.

⁸ C. R. Young, *The Royal Forests of Medieval England* (Leicester: Leicester University Press, 1979).

⁹ Roger Manwood, *A Treatise of the Forest Laws* (London,

1598), 13–20.

¹⁰ Arundel Castle Archives nos 814, 815.

¹¹ Manwood, 2–3.

¹² T. W. Horsfield, *The History, Antiquities and Topography of the County of Sussex* (Lewes: Sussex Press, 1835) **2**, 3, 195–6, 221–2, 247, 249, 251, 257; James Dallaway, *A History of the Western Division of the County of Sussex, Including the Rapes of Chichester, Arundel and Bramber with the City and Diocese of Chichester* (London: T. Bensley, 1815–30) **2** Pt 1; Mark Tierney, *The History and Antiquities of the Castle and Town of Arundel, Including the Biography of its Earls from the Conquest to the Present Time* (London: G. & W. Nicol, 1834); more can be gleaned, however, from the various accounts of the Howard lands when they were in royal hands: PRO SC 6/Henry VIII/3496; SC6/Philip and Mary/284, 285, the survey in Exchequer Depositions E 178/2274 and Thomas Howard's inquisition *post mortem* in 1554 PRO C142/103/56.

¹³ There is some reference to this in E. Straker, *Wealden Iron: a Monograph of the Former Ironworks in the Counties of Sussex, Surrey and Kent, Comprising a History of the Industry from the Earliest Times to its Cessation; Together with a Topographical Survey of the Existing Remains from Personal Observation* (Newton Abbot: David & Charles 1969 reprint of 1931 edn), 60, 105, 110–11, 141, 417, 433, 434, 441, 458; this has been updated in H. F. Cleere & D. W. Crossley, *The Iron Industry of the Weald* (Leicester: Leicester University Press, 1985) but the innumerable lawsuits show further details.

¹⁴ Commissions were the standard way of enquiring into abuses which came to the Exchequer's attention. A number of these are to be found enrolled on the memoranda rolls for example PRO Roll E368/336 (LTR Hilary 1&2 Philip and Mary), commissions rot. 3.

¹⁵ Warrants are to be found in various miscellaneous

collections, for instance, PRO Exchequer E315/460; there are various notes about the claims for timber and disputes thereupon in British Library, Add. MS 33,142 which is a volume of materials of the Covert family.

¹⁶ PRO Exchequer Decrees and Orders, E123 contain some of these, e.g. E123/3 Trinity 12 Elizabeth, 60 oak trees out of the forest of St Leonards to be delivered to Magdalen College to rebuild the bridge at Bramber; others are cited in lawsuits e.g. Exchequer Bills and Answers (English Bill proceedings), E112/45/19 (Elizabeth I).

¹⁷ Copyholders, for example, claimed that 'Canterbury hold' gave them all the wood growing on their copyholds to their own use, PRO E 112/45/73; similar claims occur in E112/45/82 and 91.

¹⁸ PRO Exchequer Commissions of enquiry E133/1107; the list of private cases in which exploitation of timber was at issue brought in the Exchequer is lengthy, one may suffice as an example, PRO E112/45/55 Ashburnham v. Slowright.

¹⁹ For example PRO E178/2281 presentments in 18 and 36 Elizabeth concerning spoil of the queen's woods in Beaubush park.

²⁰ PRO Exchequer Land Revenue Forests LR9/17/841.

²¹ W. Beswick, 'Old weights and measures', *Sussex Industrial History* 7 (1976), 21.

²² See Pettit, 31.

²³ C. E. Brent, 'Rural employment and population in Sussex 1550–1640', *Sussex Archaeological Collections* 116 (1977–8), 45.

²⁴ Brent, 54–5.

²⁵ PRO State Papers (SP) SP12/95 no. 20.

²⁶ S. M. Jack, 'Sources in the Public Record Office for the history of the Wealden iron industry', *Wealden Iron*, 2nd series 2 (1982), 21–9; PRO E112/45/29.

²⁷ PRO Exchequer Depositions E134/Sussex 27 Eliz/Easter 16.

²⁸ PRO E112/45/94.

²⁹ PRO E178/2313,4640.

³⁰ PRO Exchequer Land Revenue Misc Books LR2/198 ff. 73–4.

³¹ PRO E178/4643.

³² PRO E112/127/188.

³³ PRO E112/127/188;203;233.

³⁴ PRO E178/5866.

³⁵ PRO E178/7312.

³⁶ PRO Exchequer Commonwealth Surveys E317 Sussex 35.

³⁷ G. Hammersley, 'The charcoal iron industry and its fuel 1540–1750', *Economic History Review* 2nd ser. 26 (1973), 593.

³⁸ I. B. Mason, in *Wealden Iron Research Group Bulletin* 11 (1977) about a cord an acre. See also Cleere & Crossley.

³⁹ Horsfield 2, 221–2.