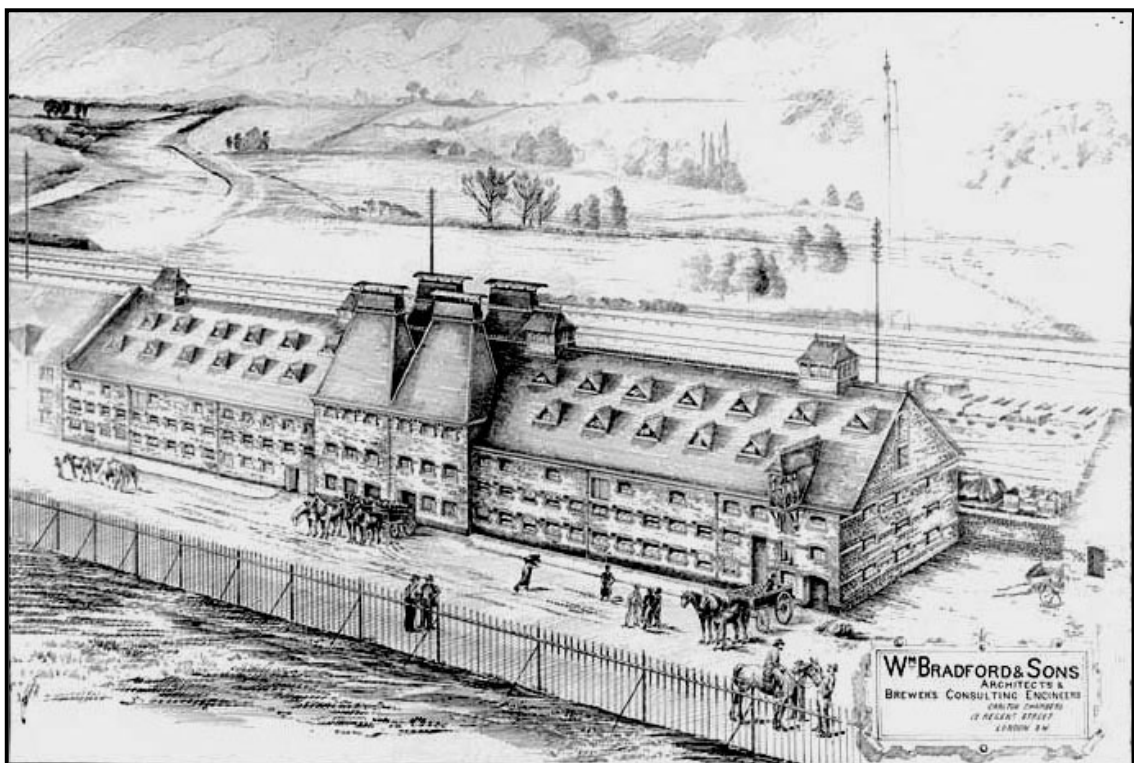


STRATEGY FOR THE HISTORIC INDUSTRIAL ENVIRONMENT REPORT No.1

MALTINGS IN ENGLAND



REPORT BY AMBER PATRICK

FOR



ENGLISH HERITAGE



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REPORT BY AMBER PATRICK

DATE JULY 2004

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Beavan's Maltings, Warminster.

[BB95/05270]

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MALTINGS IN ENGLAND

CONTENTS

SUMMARY

PART ONE

1 MALT PRODUCTION AND THE BREWING INDUSTRY

History of malt production, its distribution and its relationship with the brewing industry.

2 THE MALTING PROCESS AND ITS BUILDING COMPONENTS

A description of the Malting Process and its components and the changes over time.

3 MALTINGS - THE BUILDINGS

The chronological and typological development of the buildings, the arrangement of their components and the regional variations.

4 BIBLIOGRAPHY

Appendix A: County characterisations

Appendix B: County totals

Appendix C: Malthouse features

PART TWO

1 ASSESSMENT OF THE NATIONAL RESOURCE

SUMMARY

This report will seek to characterise and assess the malting industry

- by providing a summary of its process and historical context;
- by outlining the historical development and typology of its buildings and their distribution;
- by establishing the known stock of surviving buildings of the industry by county;
- by indicating the adequacy of protective designation of these buildings.

Maltings are an obvious starting point for the study of the brewing and distilling industries. They comprise an unique yet ubiquitous building form within the landscape of our cities, market towns and countryside. Their study illustrates the changing influences through time, of farming practice, legislation, building technology and transport systems as well as more specialised changes in malting and kiln technology with the development of mechanised handling and power systems. Malt, until the 20th century, was, with a few exceptions produced in floor maltings. The floor maltings as a building form is under extreme threat. Out of the thousands that once existed across the country there are only a handful still in operation and the industry has concentrated on a few sites employing a building technology more akin to chemical refineries than the traditional building forms. The redundant floor maltings, many of which are listed and occupy attractive sites have, for the last couple of decades, been a popular target for residential and commercial conversion schemes with the consequent loss of historic detail.

An analysis of the Listed Building system in November 1996 indicated that over 600 maltings (in some form or other) were listed, with a geographical spread across the whole country. There were, however, notable concentrations in the eastern region - Essex (50), Suffolk (44), Hertfordshire (37), Norfolk (19), and Cambridgeshire (16) - and in the west of the country Gloucestershire (42) Shropshire (37). Wiltshire (33), Devon (20), Avon (16), Somerset (16) and Dorset (17). Most (588) are listed Grade II, but a late 17th century malthouse at Kirklees Park in Yorkshire is listed Grade I in its own right (and a further six by association with other historic buildings) while seven were listed in their own right as Grade II* (and a further 20 by association at this grade). No malthouse now a standing building above ground is scheduled, but a number of the cave maltings in Nottingham are scheduled, and malthouses forming part of such sites as Castle Acre Priory and Lindisfarne are included within the scheduled area.

In England the main use of malt was for brewing beer. Beer has been made on a domestic scale throughout history and on a local level in taverns from medieval times onwards but in the 18th century the development towards large-scale industrial breweries started and was to continue throughout the next two centuries. In consequence, there were not only many maltings of various sizes, but they were wide spread across the town and country. Prior to the mid 19th century when building materials were easily moved round the country, the construction of maltings very much reflected the local vernacular traditions.

Today, few malthouses survive unaltered. The study of their buildings, often as they become subject to listed building applications or are re-developed as part of the general planning process has enabled a detailed understanding of the buildings and their development to be

obtained. There have been four specific county surveys: Essex, Hertfordshire, Kent, and Nottinghamshire which have included all malthouses, ranging from complete examples to those where there is now minimal evidence that the building was once a malting. The range of individual building recorded is wide starting from the 16th century up to and including the 20th century. The majority of surveys have been prompted by listed building/conservation area consent applications and this has resulted in a very differing geographical coverage. Despite this it has been possible to distinguish areas where one type of malthouse is more prevalent than another. This study is based on the findings resulting from the surveys, together with a study of historical printed sources (see bibliography) which have provided details of early malting practices. In turn, the evidence from the surveys, both broad based and individual enable the recommendations in Part Two to be made.

The report is divided into two parts which are different in character and purpose.

Part One seeks to characterise the industry by outlining its development, its processes and its buildings while Part Two addresses the current situation as regards survival and protection and recommends further action. Thus Part One provides the context to Part Two which is topical and dynamic and therefore less permanent.

Part One

History of malt production, its distribution and its relationship with the brewing industry.

A description of the malting process and its components and the changes over time.

The chronological and typological development of buildings, the arrangement of their components and the regional variations.

Bibliography

Appendix A County characterisations

Appendix B County totals.

Appendix C Malthouse features

Part Two

Assessment of the national position.

SOME DEFINITIONS

Whilst most of the terms and definitions used in this document are self-evident, some require further explanation. In particular the method of measuring has changed not just from imperial to metric but also changed from a largely volume based system to a weight based one. Thus the majority of measurements in this text are given in imperial with a metric equivalent, but the volume measurements have been translated into a metric weight equivalent.

Quarter: volume based measurement:

8 gallons = 1 bushel	volume
8 bushels = 1 quarter	
quarter = 336 pounds or 3 hundredweight (malt)	volume to weight
6.56 quarters = 1 tonne (malt)	
4.92 quarters = 1 tonne (barley)	

Steep: a vessel usually part of the structure of the malthouse in which the barley was soaked in water to start germination. Some 16th century steeps were small lead vessels which were not necessarily fixed in the same way that later ones were. Later steeps were constructed of stone or brick and made water tight. While latterly they were constructed of cast iron and most recently of steel.

Pneumatic malting system: One in which air is forced through the batches of growing grain, thus removing the need for other forms of ventilation. Pneumatic malting is now synonymous with mechanical malting where the batch is also turned other than by hand. In the Saladin box system large screws move up and down and turn the grain. In the drum system, the drums rotate, slowly, and in that way the grain is turned.

PART ONE

MALT PRODUCTION AND THE BREWING INDUSTRY

Malt is artificially germinated grain, usually barley, with germination arrested at the critical point by kilning. It is a prime ingredient in the production of beer and whisky. It is also used in the food industry for a range of products, including biscuits, breakfast food, vinegar and bread, and dark malts are used for colouring in the manufacture of food. There are references to malt being produced in England since the eleventh century, but early production was possibly in barns and the kilning may have been done in domestic ovens. However, for at least the last 500 years it has also been made in purpose built maltings with kilns specially designed to cure the green malt. These buildings are known as floor maltings because the germinating barley was spread out to grow on a floor. Inevitably as a successful industry the production of malt was seen as a generator of government revenue. From 1644 onwards a tax was imposed on malt with the rigorous period of enforcement being from 1827 to 1880 when the tax was finally repealed. Although a pneumatic system of malting had been introduced in 1878 it was not until the malt tax was repealed that it could be more easily implemented in the form of Saladin's box system and Galland's drum system. Both these systems were also fully mechanised.

Beer was the staple drink before the introduction of tea and coffee and it remained so for those who could not afford the latter. In consequence not only was the brewing industry substantial & ubiquitous, but also the malting industry, although the latter is less well documented. There have always been significant differences in the organisation of the malting and brewing industries. Prior to the 18th century both the malting industry and the brewing industry were generally small scale. But while the brewing industry was small scale it was also often domestic. In the mid-18th century some sixty per cent of beer production was private, and much of the rest was brewed by retail brewers operating from inns. Up to that time, the common brewers as commercial brewers were known, only accounted for a small proportion of the national production, while retail brewers, those that brewed their own beer for sale on the premises were, with the exception of London, of much greater significance.



1. Beer - The End Product

In contrast, in the malting industry, although the production of malt may have been small scale it was not domestic in the same way as the brewing industry. It was in the hands of specialist

maltsters who were a feature of almost every market town. Thus while a household might produce its own beer, it was less likely to produce its own malt, unless on a farm. Even where there are references to malt mills in probate inventories, this should not be taken to mean that those households made their own malt, rather that they brewed their own beer. Thus generally it is rare to find malt mills in early maltings, because milling was part of the brewing as opposed to the malting process. An exception is at Hamlet House, Chetnole, Yetminster, Dorset (listed Grade II*) where there is a small malt mill at the end of the malthouse next to the house with a chute from the storage floor to the mill.

Changes in the brewing industry inevitably meant changes within the malting industry. With commercialisation came an increase in size on the part of the breweries and by the end of the 18th century many cities, and London especially, were served by large common breweries and the proportion of malt consumed by home brewing declined to well under half the total output. The retail brewers however, held sway in many areas and even as late as 1831 common brewers were of negligible significance in many rural areas and surprisingly only had a minor impact in some large cities such as Manchester (23% of the malt brewed) and Leeds (21%).

As common brewing increased there was a desire to control the production, and hence the cost, and quality, of the malt the brewers were going to use. There were several ways of achieving this. The most obvious was by having a malthouse on the same site as the brewery, operated by the brewery itself and this was to become an increasingly common occurrence, as at Letheringsett Brewery, Norfolk. A second way was to own malthouses elsewhere, either within the same locality, or, with an improved transport infrastructure provided by canals, and in particular railways, at some remove.



2. The Malthouse, Letheringsett Brewery, Letheringsett, Norfolk. [BB97/05513]

The canal side maltings at Stanstead Abbots are an example of the former and Seed's Maltings in Worksop of the latter. These maltings were often but not always located where the barley was grown. Thirdly, the brewery did not own the malthouse but the maltster was contracted to produce only for that brewery. Lastly, there remained, of course, a number of independent maltsters, sales maltsters, who owned or leased



3. The Maltings, High Street, Stanstead Abbots, Hertfordshire. [AA98/05287]



4. C. E. Seed's Maltings, Worksop. [A Patrick]

their maltings and were not tied to any particular brewery, and therefore sold their malt on the open market. In the 20th century, just as with brewing where there was rationalisation and amalgamation within the industry, the malting industry also experienced the development, through amalgamation, of large firms operating on a national basis. Inevitably, with the establishment of these large firms operating huge maltings and large brewery concerns preferring to place large orders for malt, there was less need for small maltings.

Distribution, Location, and Transport

Good quality barley prefers light, free draining soils and a climate that is not too wet. These conditions favour the east and south of the country and it is these areas that became the granary of England, supplying London and later brewing centres such as Burton-on-Trent (fig. 5). The focus on malting in these areas has been strengthened by the county surveys of maltings in Essex, Hertfordshire, including the Essex-Hertfordshire border, and Kent and Nottinghamshire. However, from the outset, the malting industry was to be found throughout the country, showing that demand for the product overcame geographical disadvantages of soil and



5. Bass Maltings, Wetmore Road, Burton-on-Trent.

[AA012346]

climate. By the 18th century maltings were to be found in almost every sizeable town and their structure and building materials reflected the local vernacular. A crude analysis of 1830s trade directories shows that maltings were indeed just as numerous in western counties such as Gloucestershire, Shropshire, Devon and Somerset, as in Essex, Hampshire and Hertfordshire. (See Appendix A)

There is no doubt that supplying London, the naval dockyards and military bases stimulated a demand for malt which could only be supplied from a distance. In consequence a coastal trade from Essex to London developed, as did one along the navigable rivers Lea, and Thames and their tributaries, and even down the Great North Road. As a result, towns such as Ware, and Bishops Stortford, and Reading, Wallingford, Abingdon, Newbury, Henley and Banbury became well-known for their trade in malt. Dorset and Hampshire supplied malt to the Royal Dockyards. However, it should not be thought that the south-east had a monopoly of the trade in malt. The river Severn provided a conduit for Bristol's malt, and the river Idle for Nottinghamshire's malt.

In the 17th and 18th centuries maltings were often built where the product was required. Until well into the 19th century in rural areas this might be on a farm. Farm maltings are often difficult to identify now because of subsequent re-use. In towns it was common to find maltings behind houses which front onto main streets. These are commonly referred to as burgage plot malting in that they were built on the original medieval burgage plots, that at

Marshfield being a good example. Burgage plot maltings may be found when excavating urban sites. They were, by the nature of the plots, long and narrow which was not a major handicap, and in time, some were enlarged and expanded beyond the burgage plot. Unfortunately, in many cases they were demolished to make way for other uses and now the only evidence for them is a house name or an early map reference. One of the areas where many burgage plot maltings survive is Ware, Hertfordshire, between the High Street and the Navigation.



6. Burgage plot malthouse at Marshfield, South

Historically, as demand increased, burgage plot maltings moved to the sites along side the Great North Road, and later the Lea and Stort Navigations. The malt traffic on the Great North Road was so great that there were complaints about the excessive wear to the road surface.



7. Baird's Maltings, Sydney Buildings, Bath.
[A Patrick]

The migration to transport related sites was accelerated with the development of the national canal network. As the network grew, malthouses were built alongside canals. Such examples include what later became Baird's malthouse in Sydney Buildings, Bath, alongside the Kennet and Avon Canal (fig 7). Another example is Grove Mill Malthouse, Retford, Nottinghamshire which is on the side of the Chesterfield Canal, and a still later example is at Langley Green, Oldbury, West Midlands, alongside the Titford Canal (fig 8), part of the Birmingham Canal

Navigation. This trend was further accelerated in the second half of the 19th century with the development of the railway system. Rail access now became the dominant location factor. Sometimes malthouses were built at the point of barley production as in the case of the Bass maltings at Sleaford, Lincolnshire (fig 9), which is the largest set of floor maltings now surviving,



8. Langley Maltings, Oldbury, West Midlands. [AA98/05284]



9. Bass Maltings, Sleaford. Lincolnshire.
[BB82/099971]

or at the point of import such as at Mistley and Ipswich where Californian barley was unloaded. In other cases the maltings were in the brewery town, in particular Burton-on-Trent. A surviving example being on Wetmore Road (see fig 5). Sometimes, the maltings would be located in-between the barley growing lands and the brewery, for example Worksop in Nottinghamshire, on the edge of the barley lands supplied by a Sheffield brewery, Thomas Berry and Co. While in the south of the county Shipstone's maltings at Beeston supplied



10. Beeston Maltings, Nottinghamshire [BB017932]

Nottingham (fig 10). Sometimes, as in the case of Newark-on-Trent, Nottinghamshire, where there were numerous maltings these were located to benefit from both water and rail transport.

It should be pointed out however that some late, medium sized and large maltings and especially those serving their own breweries, did not have either river or rail access, for example, at Cheltenham, the Cheltenham Original Brewery's malthouse on Henrietta Street was built with only road access. Likewise Free Rodwell's Maltings Nos 3, 4, and 7 School Lane, Mistley had no rail access.



11. Malthouse, Henrietta Street, Cheltenham, Gloucestershire [BB98/21450]



12. Free Rodwell's maltings, Mistley, Essex. [NBR 83272]

THE MALTING PROCESS AND ITS BUILDING COMPONENTS

Introduction

Malt is artificially germinated grain. Almost any grain can be malted but barley is the most usual raw ingredient for making malt. Malt until the 20th century was, with only a few exceptions, produced in floor maltings. These floor maltings were usually purpose built structures which had a number of distinctive features, most noticeably long elevations with regularly spaced windows and pyramidal roofed kilns.

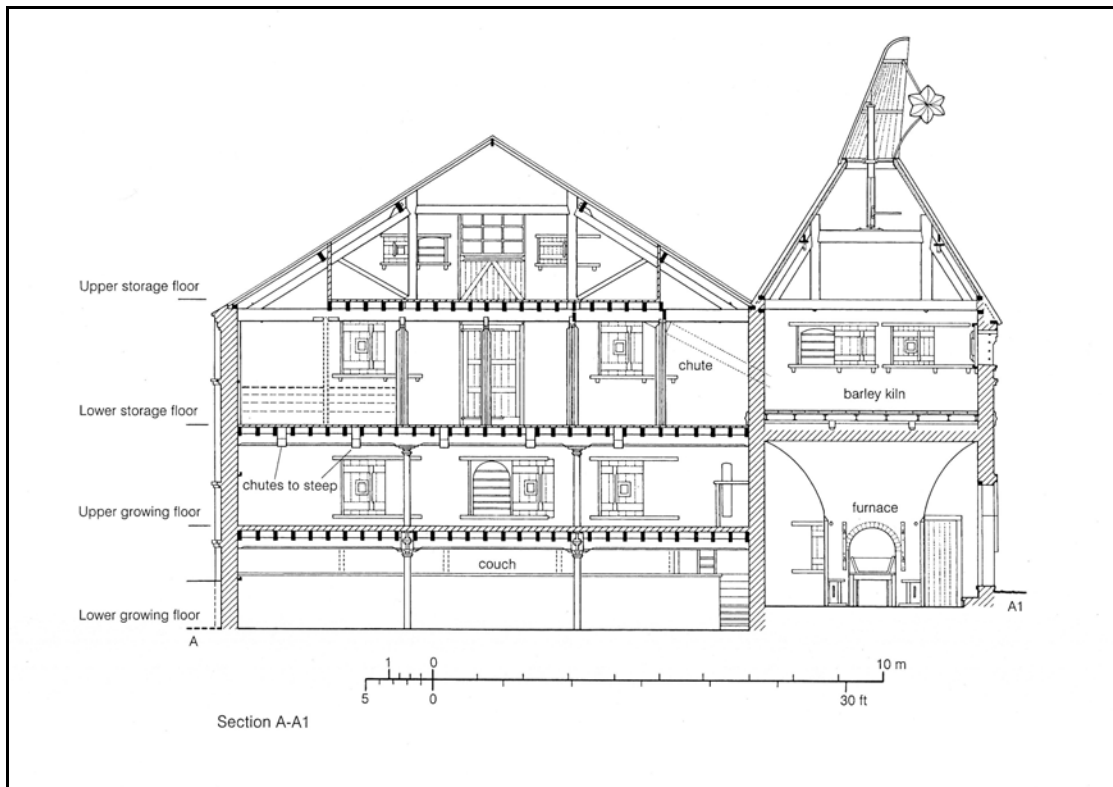
Malting was, and to some extent still is, a seasonal process, and historically took place between the months of October and May. Those few maltings still working usually close for a month in the summer, normally July. This, however, is more for convenience than because of the impossibility of making malt due to the summer temperatures. Today most, although not all, floor maltings have air conditioning systems. This enables an even temperature to be maintained all the time and therefore malt can be made all the year round. The month's closure is thus now primarily a time for cleaning and repairing equipment, thus retaining the tradition of the summer closure period. Seasonal production also fits in more or less with the traditional harvest time of the summer months, although the barley is now ready earlier, in July and August, as opposed to the period prior to the mid twentieth century when the harvest was later, in August to September. The change in the harvest date is due to changes in sowing times and the use of different varieties of barley.

Barley Storage, Drying and Cleaning

The barley has to be cleaned and stored prior to use to ensure its dormancy is broken. In the pre-industrial period when most maltings were small scale operations, the barley was either stored in ricks and a granary on the farm until shortly before it was used. The threshing and winnowing would remove most of the small stones and the chaff, but there was probably additional dressing at the malthouse, and simple cleaning equipment can be found in early malthouses. Later, when the barley came from the farm directly after harvesting there were more substantial grain cleaning or dressing machines as well as specific machines for removing half corns, all driven by some form of power. Although, barley on the straw could safely be stored in a rick, when it was stored in the malthouse, it was often necessary to reduce the moisture content in the barley to about 12 per cent so that it could be stored safely. Special barley kilns were built from about the mid 19th century, an early and original example being at Warwick and Richardson's Brewery Maltings, Northgate, Newark on Trent, Nottinghamshire which was built in 1864 (fig 13). Prior to the construction of special barley kilns, it was usual to gently dry the barley on the malt kiln.

The storage area for barley in the early small-scale malthouses was usually minimal and was directly above the steep, with sufficient grain being available for just a few batches with the major quantities stored on the farm. What storage there was in the maltings, was usually in wooden bins. As malthouses increased in size, and as the barley crop was stored on site, it was necessary to have greater storage capacity, and much of a floor, which in large maltings was often a loft floor in the roof, or a block at the end of a malthouse would be utilised for barley storage as at No 4 Weymouth. The storage bins were still constructed of wood, to ensure

adequate moisture control as at No 1 Weymouth. Later still, in the twentieth century, barley was stored in separate concrete silos.



13. Cross-section through barley kiln of Warwick and Richardson's Brewery Maltings, Newark

In small maltings where the barley was stored above the steep it was a simple matter to open a chute and let the barley drop into the cistern. Even in large maltings where more barley was stored, that for immediate use was nearly always stored above the steep. In the more highly mechanised maltings of the later 19th century, the barley would be transferred by auger. Likewise in the modern maltings similar mechanical means are used.



14. Malthouse No 4 Weymouth. - barley storage [BB95/08104]



15. Malthouse No 1 Weymouth. - barley storage. [BB95/07354]



16. Watton Road malthouse, Ware. - showing lucam. [BB92/26490]

The storage and cleaning of both barley before the malting process started and the malt at the end of the process are essential parts of the process and require dedicated areas within the building. Externally the storage areas of a malthouse can usually be recognised by taking in doors above ground level. Often these doors would have a hoist canopy or lucam above them as at Watton Road, Ware (fig 16). As storage required a lot of space an area of maltings with few or no windows (or just small dormers in the roof) can indicate a storage area (fig17). Sometimes the storage block might be structurally distinctive perhaps in the form of a cross wing, or covered in weather-boarding or with some other distinguishing features. Mechanical handling, in large maltings, sometimes required a power house, but often an engine was just located in the corner of the building!



17. Dormers, Gosford Road, Beccles, Suffolk [BB92/07348]

Steeping

The first stage in the malting process, after drying and cleaning is the steeping of the barley in the cistern to begin germination. Early 16th and 17th century steeping cisterns were often lead vessels and not a built-in part of the structure of the malthouse. From at least the end of the 17th century the most usual type of steeping cistern, until the last quarter of the 19th century, was a rectangular trough constructed of stone or brick and made water tight with either lead or later cement,



18. Steep, Wetmore Road, Burton-on-Trent, Staffordshire. [AA012376]

or tiles as at Wetmore Road Maltings, Burton-on-Trent. Often there was a well nearby. At various periods, the dimensions of steepes, and even the slope of their floors, were controlled by the provisions of the Malt tax. Then, in the last quarter of the 19th century there were two crucial developments.

Steeps were still rectangular in shape but were constructed of cast iron and flat bottomed as at Boroughbridge (fig 19). Then, with the repeal of the Malt tax in 1880, self emptying hopper bottom steeps, also made of cast iron were introduced, as at Weymouth No 4 (figs 20 & 21). Today, self-emptying steeps are of steel, and round as opposed to square in shape, with conical hopper bottoms, as at Beeston (fig 22).



19. Cast iron steep - flat bottomed - Boroughbridge, North Yorkshire. [AA98/02213]



20. Top cast iron steep - hopper bottomed – Malthouse No 4. Weymouth. [BB95/08086]



21. Bottom cast iron steep - hopper bottom – Malthouse No.4. Weymouth. [BB95/08101]



22. Steep - round steel - Beeston, Nottinghamshire. [BB017946]

The water in the cistern was ideally about 54°F (12.5°C). At a temperature lower than this growth would be retarded and at a higher more water would be taken up. The steeping period generally lasted between two and three days, or 60 and 72 hours, although there are references to foreign barleys needing to be steeped for up to 100 hours. The length of time the barley was steeped would depend upon several factors: the type and quality of the barley, whether the water was hard or soft, and the temperature of both the air and more particularly the water. Today, in the more mechanised maltings it is common to steep for just 48 hours, and with warm water as at Beaven's Maltings, Warminster (fig 23).

The steep water is changed several times during the steeping process, and the grain is rested for 8 and 12 hours between each wetting. This practise of resting the grain has not always been in operation, and until at least the 1820s it appears to have been more usual to allow the barley to remain in the water for the whole period of the steep, with out any rest periods or any change of water. In fact it was recommend as unwise to change the water in the winter when it was cold. At some periods of rigorous tax implementation the emptying of steeps was controlled by the excise-man who used lead seals on the drain cocks. The aim of steeping is to give the barley sufficient moisture to ensure perfect and regular germination. The moisture content of the barley after steeping should be 40 to 45 per cent.



23. Steep - Beaven's Malting, Warminster, Wiltshire. [BB95/05256]

Once the barley had been steeped it had to be removed from the cistern. In the rectangular flat bottomed steeps, the usual method of emptying



24 Shovelling wetted barley, Beaven's Maltings, Warminster, Wiltshire. [BB95/05244]

was by shovelling the wet grain out and into the couch frame or onto the growing floor. Prior to the repeal of the Malt tax, the steeping cistern was located either on the bottom floor, or the middle floor of a malthouse with three growing floors, or sometimes in a two growing floor malting on a mezzanine floor in between the growing floors. When the steeps were located on the middle or mezzanine floor the men threw the steeped grain up or down as required (fig 24). With the advent of mechanisation it was possible to empty them by auger. Then, with

the introduction of hopper bottomed steeps, there was no question of emptying the steeps by hand. They were simply emptied by gravity. This did mean, of course, that such steeps always had to be located on the upper floors of a malthouse. Once the bottom chutes were opened the steeps emptied themselves (fig 25).

In floor malting the wet grain still had to be spread out to grow and it was common to use barrows to move the wet barley to the appropriate part of the growing floor and then spread it by hand (fig 26).



25. Emptying steep – Tucker's Maltings, Newton Abbot, Devon.



26. Barrow - Tuckers Maltings, Newton Abbot, Devon

In pneumatic maltings using Saladin boxes, or drum, the grain was moved by chute or auger depending upon which was most appropriate, from the steep directly to the box or drum for germination - there was no couching.

Couching

The next stage in the malting process was couching whereby the steeped grain was rested for a period, in a heap of sufficient depth, so that it could gain a little heat. During the operation of the Malt tax, which was repealed in 1880, couching was obligatory and was the part of the process during which its volume was measured by the Excise men. To ensure uniformity the couch was constructed according specific regulations, but is best described simply as a rectangular frame of which three sides were permanent and the fourth was removable, to enable the grain from the couch to be spread out more easily. The legislation even specified the height above the couch as well as the steep.

In the 17th century it would appear that couching might be as long as three nights. By the 18th century this had been reduced to 30 hours and was so specified in the Malt tax Legislation. Then in 1827 the laws relating to the Malt tax were changed again and couching was reduced to 24 hours. After the repeal of the Malt tax couching was sometimes still practised but it did not have to be undertaken in a frame, nor did it have to be for a set number of hours. The surviving evidence for couching is therefore limited to slots for the couch boards either in walls or on the cast iron columns closest



27. Couch - Cley Road, Swaffham, Norfolk. IBB95/022231

to the steep, as at Cley Road Swaffham (fig 27) or sometimes thickened patches of plaster on the walls adjacent to the steep. The introduction of hopper bottomed steepes, meant couching was seldom practised, and couching, as such, is not possible when malt is made in a box or drum maltings. Once couching was complete, the maltsters shovelled the barley out onto the germinating floors.

Growing

From the couch or the steep the soaked barley was spread out onto the floor to grow on a germinating floor. These long open floors usually with restricted head-room and often supported by ranks of wooden or cast iron columns give maltings their characteristic external massing and distinctive internal appearance. The best growing floors were covered with a screed surface, or quarry tiles laid on the diagonal as at Beeston (fig 28), but other materials used included slate



28. Growing floors - note the red tile. Beeston, Nottinghamshire. [BB017952]

as at Swaffam (fig 29), asphalt, brick pammets, or tamped chalk. Wood was generally avoided in this damp environment and features such as skirting boards were often of slate or corners were finished with tiles. The number of germinating floors in any one maltings might vary from one to six. In pneumatic maltings the boxes or drums were usually on one floor, the saladin boxes at Gainsborough being typical (fig 30).



29. Slate growing floor - Cley Road, Swaffham, Norfolk. [BB95/02228]



30. Saladin boxes - Gainsborough, Lincolnshire. [AA98/03369]

The time over which the barley is germinated to the point when it was ready to be kilned has been steadily reduced. In the 16th century it was usual for the steeped grain to be on the growing floor for more than three weeks, but by the 18th century this had shortened to less than three weeks. By the second half of the 19th century the growing time had been reduced to 14



31. Tucker's Maltings, Newton Abbot, Devon

days and this growing time continued according to manuals until at least the 1930s. Today growing may be as short as four days, although it is more usually six days. The depth of the grain on the growing floors can vary from four to eight inches (10 to 20 cms) depending upon the weather and other conditions (fig 31). The temperature on the floor ranged from 56°F (13°C) to 65°F (15°C) or even 70°F (22°C) with the higher temperature being reached at the end of growing.



32. Downing's Maltings, Gloucester. [BB94/17197]



33. Anchor Brewery, Boroughbridge, North Yorkshire. [AA98/02214]

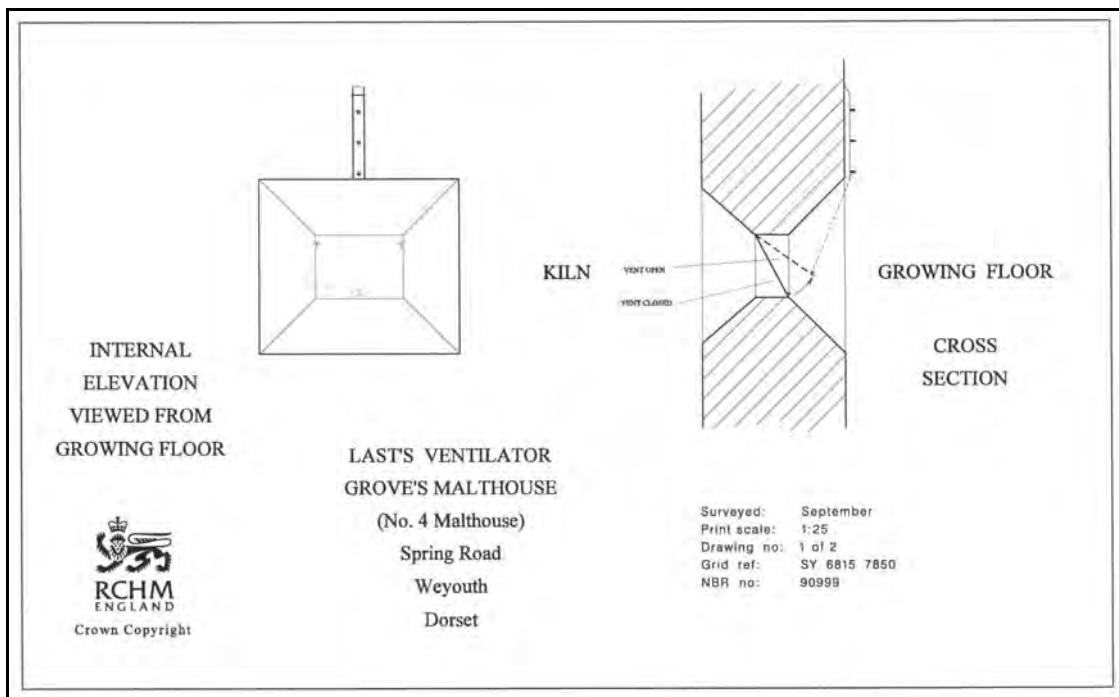


34. Mistley, Essex. [NBR 83272]

To maintain an even temperature in a malthouse ventilation was provided, traditionally by windows and louvers in the long elevations of the building. As figures 32 to 35 illustrate there is a wide variety in the form of these louvers. The louver apertures could be opened or closed as required to increase or reduce the air flow depending upon whether it was hot or cold outside. Occasionally there were attempts to provide additional ventilation, and one such example was Last's patent (in use by 1889) which utilised the draught provided by the heat of the kiln to increase the air flow across the growing floors. The only identified extant example of this is Malthouse No 4 at Weymouth (fig 36). Then gradually during the second part of the twentieth century, refrigeration air



35. Malthouse No 2. Weymouth. [BB96/08799]



36. Last's Patent Ventilator.



37. Air conditioning unit - East Dereham, Norfolk. [BB93/10023]

conditioning units were introduced to floor maltings (fig 37). This enabled them to continue working during most of the summer months when in the previous century there had been no alternative but to close the maltings because the temperatures for germination were too high.

The growing batch of wetted barley is referred to as a "piece". Traditionally there are two methods of floor working, piece and strip malting. In the former, the batch of malt is moved down the germinating floor as it grows and in some maltings approximately halfway through the process it was moved, by hand winch and basket, from the bottom floor to the top or upper floor. In strip malting, the batch is not moved down the floor but remains in the same position being turned as necessary. As germination progressed the

rootlets began to grow and it was necessary to turn the growing grain to prevent it from matting together and to ensure the growth was/is even. Originally turning was done by hand using a broad flat bladed shovel. Later ploughs, which were a three pronged, flat bladed 'fork' as at Beavens, Great Yarmouth (fig 38). were used and more recently, in the 20th century mechanical turners, commonly a Robinson turner, rather like lawn mowers, were used (fig 39). It was rare for there to be any greater mechanisation of turning, but the last floor maltings to be constructed, that at Market Street, Grimsby built for Sanders in 1952/3, had a mechanical turner which moved up and down the floors turning the pieces as required. The sound it produced was remarkably similar to grain being turned by shovel!



38. Malt plough - Beaven's Maltings, Great Yarmouth, Norfolk. [BB94/08087]

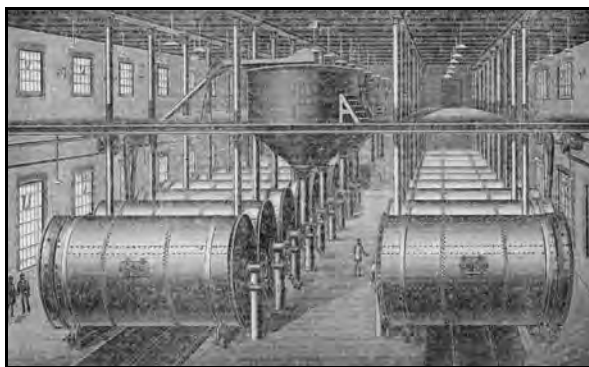


39. Robinsons turner, Great Yarmouth Maltings, Norfolk. [BB94/08086]

In the last quarter of the 19th century, pneumatic malting was introduced to England from Europe. There were two systems: the Saladin box system and the drum system, originally developed by Galland. In both these systems the steeped grain was transferred to a box or a drum and then the turning was done by mechanical means (fig 40). In the box a set of large screws was moved up and down the box to turn the grain and prevent the roots from matting together. In a drum the grain was turned by rotating the drum and thereby rolling over the growing grain (fig 41).



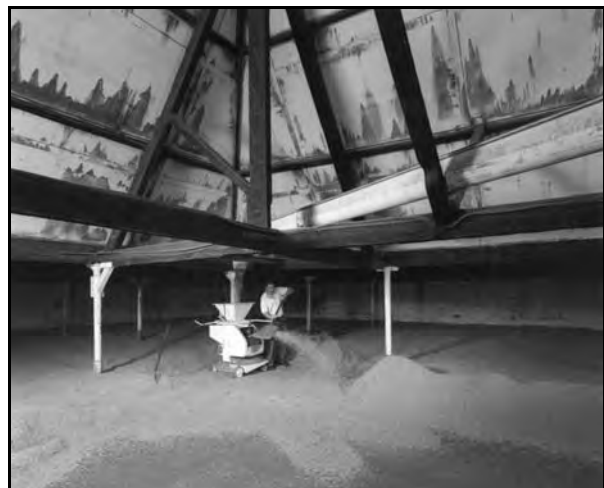
40. Saladin box screws, Paul's Maltings, Gainsborough, Lincolnshire. [AA98/03373]



41. Malting Drums, The Plough, Burton-on-Trent. [Brewers Journal]

When growing was finished, the green malt has to be moved either into a heap for withering or straight onto the kiln (fig 42). Transferring the green malt to the kiln was hard work but, until the advent of wide spread mechanisation, was often done by men with shovels. In consequence where the malthouse had more than one growing floor, the kiln drying floor was often below the top germination floor. This made shovelling the wet grain from the top floor

onto the kiln easier. In other arrangements, men simply had to throw up the wet grain onto the kiln floor while in some cases the green malt would have been moved up by hoist and basket. Even in maltings built in the late 19th century it was not uncommon for green malt to be transferred to the kiln by basket and hoist, although such maltings often seem to have acquired mechanical means fairly soon after construction, for example Malthouse No 4, Weymouth. Mechanical means meant that the grain was moved either by shovel or later by power shovel to a Jacobs ladder or bucket elevator.



42. Loading the Kiln, Dereham, Norfolk. [BB93/10026]

Withering

At the end of the growing period it was not uncommon to wither or dry off the green malt before putting it onto the kiln for curing. Thus the green malt was heaped up and allowed to lie for

twelve hours. It was considered good practise to wither, although with improved kilns being increasingly used from the late 19th century onwards, its practise became less essential. It should be noted however that it was still referred to up to the 1930s when the withering temperature was about 60°F (15.5°C) to 63°F (17.2°C) for English barleys and as high as 65°F (18.3°C) for foreign barleys. The moisture content was ideally 43%. Resting the green malt before kilning is still practised sometimes in floor maltings, but the practise has generally died out and it is not possible to wither in mechanical maltings.

A study of a malthouse from its exterior only will not reveal the exact location of steeping, couching and growing, but this part of the process as a whole can be recognised by the long elevation of a building with regularly spaced louvred or shuttered windows. Quite often the windows are only in every other bay. In some early small malthouses the bottom floor elevation was completely blank.

Kilning

When the green malt, as partially germinated barley is called, has reached the required extent of growth, it is ready to go to the kiln. The kilning of the malt arrested germination and therefore halted the breakdown of the starch molecules. It reduce the moisture content, to about three per cent which is necessary for safe storage and produces an ideal grain for grinding to grist in the brewing process. Kilning also gave colour and flavour to the malt



43. Perforated Kiln Tiles, Warminster Maltings, Wiltshire. [BB95/05264]

It is very likely that in the early years malt was kilned in domestic bread ovens, and there are references which refer to drying malt in the sun! Purpose-built malt kilns were in existence by at least the thirteenth century. At that date the malt was dried on hair cloths. It would seem that later on some kilns had their hair-cloths laid on perforated stone tiles, although it was more common for the hair cloths to be laid on what are referred to as wooden rafters. It was still common to lay the malt on a hair-cloth in the 18th century, but as early as the 1730s other materials were being used and they included iron plate frames and tile frames, both of which had holes in them, and brass wired frames and iron wired frames. The remains of perforated ceramic tiles are sometimes found in the vicinity of old maltings from the 18th century onwards. By the mid-19th century the perforated tiles were of a standard size, a foot square (30cm square) (fig 43). A few firms became well-known for their manufacture. Woven wire floors remained in use but few now survive and by the last quarter of the 19th century wedge wire kiln drying floors were becoming more commonly used (fig 44).



44. Gosford Road, Beccles, Suffolk. Wedge wire drying floor. [BB95/01927]

The green malt is laid on the drying floor to a depth of about eight to twelve inches (20 to 30cm), although in the 18th and 19th centuries the depth might be as little as 4 inches (10cm). The length of time it took to kiln the malt has varied over the centuries. In the 16th and 17th centuries the literature is not specific, simply stating that the malt is kilned until it is done and a check is made by hand. By the 18th century it would seem that kilning lasted sometimes as little as four hours, and sometimes as much as twenty hours, although the length of kilning seems to have depended in part upon the construction of the kiln and the type of fuel being used. During the 19th century the kilning time increased and was generally three or four days. On some modern kilns, the curing time has been reduced to just twenty four hours. The temperature varied according to how well the kiln was constructed and the type of malt being made, but could be as high as 220°F (105°C). In the first quarter of the 19th century it was recommended that for the making of pale malt the temperature should be 120°F (31°C) and that for brown malt should be 147°F (46.1°C). The malt was turned during kilning, by hand in the early days, and later on by mechanical turners. In the 18th century turning every two, three or four hours was recommended.



**45. Suxé Furnace - Malthouse No 4
Weymouth, Dorset. [BB95/08083]**

A variety of fuels have been used in the kilning of malt. Straw was popular in the 16th to 18th centuries as was wood and fern. The type of fuel use also depended upon what type of malt was being produced. Well-dried billets were used for the kilning of brown malt. It was always considered that coke was the best, especially for making pale and amber malts. By the 19th century the usual fuel was anthracite or coke and as the combustion products usually passed directly through the malt a fuel of low arsenic content was essential. By the later 20th century gas or oil are used, with gas usually preferred to oil while anthracite is still used in Suxé anthracite hopper furnaces (fig 45).

There are few structural details available on the early kiln furnaces. The simplest were open fire baskets placed in a room under the drying floor with usually a deflector plate above the basket to disperse the heat evenly around the drying floor. Bricked-in furnaces with fire bars in a stout shaft of stone or brick seems to have been in use from at least the 18th century with the disperser plate in a heat chamber immediately below the kiln floor. Characteristically these kilns were rectangular with the kiln floor supported by brick or stone vaulting in various arrangements (figs 46-48).



**46. Malt kiln furnace - Burghley Park,
Cambridgeshire. [BB95/02438]**



47. Malt kiln furnace, Market Deeping, Lincolnshire. [BB91/16455]



48. Malt Kiln furnace, Market Deeping, Lincolnshire. [BB91/16450]

These developed into shaft furnaces, which on a much large scale were built into the 20th century. Patent kilns seeking improved distribution of heat sometimes by means of a fan were introduced by a number of firms, including H.J.H. King, Robert Boby, Robert Free, and E.S Beaven (fig 49). Later, as mentioned above, the Suxé anthracite furnace was introduced. After the repeal of the Malt tax when much larger maltings were being built, doubled-floored kilns, which were popular elsewhere in Europe, were introduced through the advocacy of designers such as H. Stopes. However, after a couple of decades of popularity the difficulty experienced in getting the correct balance of temperature between the two floors caused this arrangement to fall out of favour.



49. Beavens kiln furnace, Warminster Maltings Wiltshire. [BB95/05274]

When kilning was completed, the malt was removed promptly from the kiln. Traditionally by men shovelling the malt off. Later there were more mechanical means, either by dropping it through the floor into chutes, or, more recently, by the floors tipping up and the malt dropping into hoppers and chutes.



50. Exterior of Malt Kiln, Clearbrook, Midford, Somerset. [BB96/10262]

Kilns, where they survive, are the most distinctive external features of a malthouse. Early maltings might have round, cone shaped roofs. Generally surviving kiln roofs are pyramidal in shape, (fig 50) although sometimes they had a rectangular-shaped hipped roof with cowls protruding from the ridge, or a long ridge vent cowl. If the distinctive roof structure has disappeared (or never even existed), it is possible to recognise kilns by a number of other features. A particularly distinctive feature of kilns is the presence of the bosses of tie bars. Kilns often needed additional support and this was

sometimes supplied in the form of buttresses or massive metal iron girders, usually placed vertically. At ground floor level there were/are iron gridded doorways and where the kiln elevation is unaltered there are usually blank elevations with no windows except just under the eaves. Kilns are the features most often uncovered in archaeological excavations. It is also worth noting that later malthouses often had a barley drying kiln attached to them, usually near the steep.

Malt Storage and Cleaning

Finally, the kilned malt was dressed (the rootlets removed and the grain cleaned) and then stored until it was required for brewing usually for at least a month before it was used (fig 51). Unlike barley storage, it was usual for the malt to be



51. Grain Cleaner, Downing's Malthouse, Gloucester. [BB94/17203]

stored at the maltings, sometimes in a block beyond the malkiln, or on a floor adjacent to the kiln in the main body of the building. To reduce the likelihood of malt gaining moisture it was stored in wooden bins where the wood would absorb any excess moisture though in some prestigious late 19th century maltings metal (zinc) lined bins were installed, for example Malthouse No 4 at Weymouth (fig 52). Later in the mid-twentieth century concrete malt silos gained in popularity, although not all maltings had them installed.



52. Malt storage bins, Malthouse No 4, Weymouth. [BB95/08090]

Other features

From the above description it is obvious that the grain is regularly moved from one part of the building as the process of malting progresses. This has resulted in certain features the survival of which can be used to determine how malt was made in a particular building. Ordinarily the main source of power was man and in the early years it was common for malt to be moved around by throwing, hoisting, and dropping. This movement of grain is indicated by hatches in floors and walls, and doors onto kiln drying floors, and chutes in floors and walls. Sometimes in early maltings a simple hoist might survive. Externally there might be the remains of a hoist housing. Sometimes a horse pulley would be used to hoist barley up onto the storage floors. Horse pulley wheels survived until the maltings were converted at Malthouse No 2 at Weymouth and at the "Old Malthouse" at Boroughbridge in North Yorkshire. Later on with increased mechanisation and with more power, hoisting became more sophisticated, and bucket elevators, and associated machinery such as line shafting, bearing boxes, augers, elevator boxing, belt conveyors and motors may still survive in a disused malting. The power for increased mechanisation was not often provided by an engine in a separate engine house, but more usually the engine of whatever type (steam or gas, and later electric motors) was located in a corner of the malting. (Engine houses were to be found however at large maltings such as Sleaford, Barnetby-Le-Wold and Beeston).

One feature outside the malting which is sometimes to be found on site or nearby, is housing for the head maltster and the main workers, as indicated by the name "malting cottages" as at East Dereham, Norfolk. At other times nearby houses might be used and there is often no indication of their former use as maltsters' cottages. Exceptionally, where the scale of malting was huge, little estates were built by the owners of the maltings, for example at the Bass Maltings at Sleaford, Lincolnshire and for Free Rodwell's maltsters at Mistley, Essex. In these instances it was not only housing which might be associated with maltings but other social features such as hotels, such as the Carr Arms Hotel at Sleaford, and chapels.

A Typical Maltings

Thus in summary it is possible to determine that a typical malting will have a number of separate components or sections some of which will be clearly visible from a simple external inspection. There will be the barley storage and cleaning area, and possibly a barley kiln nearby. Some of the barley storage will almost always be above the steeping cistern. Adjacent to the steep is the couch frame, when they were obligatory. Beyond, and on the same level as, or below or above, as appropriate, are the growing/germinating floors where the steeped barley was spread out to grow. Adjacent to the growing floors but not always a direct extension are the malt kilns. Finally adjacent to the kilns is the malt storage and cleaning area. All but the steeping and couching area can usually be seen from external features.

Maltings - the Buildings, and their development over the centuries

The malting industry is characterised by its distinctive buildings reflecting the peculiar requirements of malting. The major requirement was for a great deal of well-ventilated floor space where an even temperature could be maintained over the growing grain. This was easier to achieve in buildings that were long rather than broad and generally maltings were twice as



53. Peach's malthouse, Newark, Nottinghamshire. [BB93/23808]

instead of glazing (fig 53). Evenness of temperature was achieved by low headroom to the growing floor, often less than 6 feet (1.8m), and sometimes by making the bottom working floor semi-basement. Indeed the received wisdom as late as the mid-19th century was that the best malt was made on a single floored maltings and where possible the floor should be below ground level. With the introduction of more sophisticated air flow systems in the later 19th century, head room tended to be increased (fig 54). These long ranges typically end in a kiln with a distinctive roof structure as discussed above.

long as their width and this ratio was maintained as malthouse grew in size. Thus malthouses in the 18th century might be 60 feet (18.3 m) long by 20 to 30 feet (6.1 m to 9.15 m) broad while by 1900 they could be up to 140 feet (42.5 m) in length and 60 feet (18.3 m) wide. Ventilation was achieved by small windows along the length of the building and these usually had shutters or louvres



54. Growing floor at Malthouse No 2, Weymouth, Dorset. [BB95/07426]

The trend over the last four centuries was for malthouses to get larger and this trend accelerated greatly with the coming of the railways in the mid-19th century and the repeal of the malt tax in 1880. This enabled increased capacity to be achieved by building multi-storey maltings (fig 55).



55. Free Rodwell's Malthouse No 1, Mistley, Essex. [BB96/05599]

The size of a maltings was conveniently expressed in terms of capacity of its steep which determined the size of each piece being worked through the building. Even as late as the early 19th century malthouses were commonly less than 15 quarters (2.28 tonnes) in capacity. This rose to 30 quarters (4.57 tonnes) by the second quarter of the 19th century. By the end of that century there were several maltings of 150 to 250 quarters (22.87 to 38.11 tonnes) capacity and maltings of 70 to 100 quarters (10.67 to 15.24 tonnes) were the norm. As each additional quarter steeped was reckoned to require an extra

200 square feet (70 m²) of floor area, the effect of these dramatic changes in capacity on size of buildings and especially on their height, was dramatic. The following section illustrates how these factors were expressed over time in the buildings themselves.

Early Maltings: 16th and 17th Century

As discussed above specialised maltings, which may initially have been simple barn-like structures, seem to have developed from medieval times onwards as indicated by the survival of the name “malt house”. No medieval malthouse as a building type has been identified, although recognisable cave maltings survive from the thirteenth century and kilns of a fourteenth century date have been excavated. It is likely that the fabric of any extant malthouse has been subsumed into associated buildings. An analysis of the Listed Building System database does give mention of two 14th century and six 15th century buildings with malting associations. By the 17th century when commercial malting was on a scale that warranted taxing, malthouses had become distinctly recognisable buildings. Most industrial and commercial buildings of a 16th or 17th century have undergone some alteration but there are several early examples where at least the building is of an early date even if there is some doubt as to whether it was built as a malthouse. The Listed Building analysis throws up mention of 30 16th century and 102 17th century malthouses though in many cases little physical evidence of the industrial use survives. It is in the earliest period where there seems to be a possibly significant connection between malthouses and church owned properties. As monasteries brewed beer they would also have needed malt and may have chosen to make their own. Or, the apparently significant connection may simply reflect a better survival and excavation rate: more monastic/church sites have been investigated and therefore more malthouses have come to light.

Possibly the earliest type of malthouse is the simplest, the two storey type. Here the process is linear in that the growing barley moves along the bottom and only growing floor to the kiln which is at one end. The top floor is used for grain storage. The early, seven bay, clunch and rubble built 17th century attached malthouse at St Lucian's, Lower Wharf, Wallingford in Oxfordshire, the late 16th century timber-framed malthouse at Church Farmhouse, Edgton, Shropshire (which retains its drying floor and brick kiln) and the Old Malthouse at Wightwick Manor, near Wolverhampton all seem to be examples of this type.



Boyes Croft, Great Dunmow, Essex (Grade II*) is definitely identified as an early example of a malthouse of the 16th century and it is worth considering the building in greater detail (fig 56). The main part of the building, the part where the malt was grown is the oldest part with timber framing and a crown post roof of the 16th century. The kiln is a later, almost certainly early 19th century addition, and the present steep is also a later addition, probably 18th century. Despite this there is little doubt that the building was built as a malthouse, so it is reasonable to assume this was, at the very least, not an untypical layout for an early malthouse. Both floors were used as growing floors, and this arrangement of growing floors is known as the Ware pattern (see below).

56. Boyes Croft, Great Dunmow, Essex before restoration. [A Patrick]



57. Malthouse, Harvington Hall, Worcestershire.
[Miss Ann Thomas]

hoist and associated hatchway on the top floor. There is little doubt that growing was undertaken on the bottom and top floors and the middle floor was used for storage of the barley for immediate use and the kilned malt. One cannot be certain that this was the original arrangement, but it is of a recognised form referred to as the Newark pattern of malthouse (see below). A second early example of this pattern is to be found at Chipping Campden. This building is of a 17th century date. The top floor of this three story building had a thick plaster floor, the middle floor was of wooden boards and bottom floor was a mixture of stone, brick and plain earth.

Another early example is the malthouse at Harvington Hall, Worcestershire. The building, which is small, of three storeys and of a rectangular shape is itself Elizabethan, although the kiln is almost certainly not Elizabethan in date, and may be a later re-build of the 18th or 19th century. Its internal arrangement is revealing. Starting at the top floor, this consists of a thick layer of plaster screed, the middle floor is of wooden floor boards and bottom has been recently covered in concrete. There is a



58. Long elevation, Chipping Campden, Gloucestershire. [AA95/04686]

The 18th Century

The physical survival of malthouse increases greatly in this period and the Listed Building Survey analysis indicates that there are 197 references to 18th century malthouses, over 30% of



59. Malthouse, Fulbourn, Cambridgeshire.
[BB94/02640]

the total listed. The listed examples very much reflect the local vernacular building traditions in their construction as at the malthouse at Fulbourn. (fig 59). Thus many farm maltings are barely distinguishable from other farmyard buildings, but in towns they are more easily recognisable. Most listed examples have lost their internal features and are merely shells but a particularly complete example listed at Grade II* is the malthouse in the grounds of Shepherds' Hill, Penrith. This retains a well, a large stone trough, a furnace and fire doors, its drying floor, brick vaulting and its king post roof.

Survival is very uneven across the country. Thus some counties such as Berkshire with a large, well-documented, 18th century trade in malt have relatively few surviving malthouses of the period while a county such as Derbyshire though less noted for its trade in the county as a whole, has several 18th century malthouses at Ashbourne, Dale Abbey, Ilkeston, Long Eaton, Stoney Middleton, Matlock, Bull Bridge, and Shardlow.

In step with the increasing size of breweries towards the end of the 18th century, one would expect a trend for larger maltings, and this did occur in some locations such as the Norfolk coastal town of Great Yarmouth, but this type of development was by no means universal. The small-scale maltsters with an entirely local trade were still a feature of the industry well into the 19th century. Improvements in inland navigation throughout the century and the construction of much of the canal system towards its end brought into being maltings whose trade was water borne and not restricted to local markets. These typically served growing industrial towns such as Leeds, ports such as Liverpool and Hull and the developing specialist towns such as Burton-on-Trent. Thus on the river Severn there were 45 malthouses recorded in Tewkesbury in 1781

and numerous maltsters in Gloucester involved in shipping malt to Bristol and South Wales. Though the city maltings of this date have gone, there is still a comparatively large example of a shipping malthouse at Haw Bridge, Tirley on the Severn, between the two towns. Elsewhere in Gloucestershire there are numerous rural examples some of which as at Frampton-on-Severn and Brockhampton retain important internal features. Their building material reflects the local vernacular and thus the



60. Stone built malthouse, Brockhampton, Gloucestershire. [BB94/13843]

malthouses of the Cotswolds (fig 60) and in the Forest of Dean tend to be of stone whereas those in the Vale are of brick. Other 18th century maltings of note are to be found in Kent, Lincolnshire, Norfolk, Staffordshire and Sussex (Appendix A). Two particularly good examples are The Street at Boxley, Kent which is built of brick on the ground floor and ashlar chalk on the upper floor and it retains its steep and two kilns (subsequently converted for hops), and at Alton in Staffordshire which is almost completely underground.

The 19th Century

As might be expected there are more malthouses listed for this century than any other, with some 43% of the overall total. There is also a much higher rate of recognisable examples with most entries being listed in their own right rather than by association with another historic building. The century witnessed a general increase in size of maltings, reflecting a similar increase in size and importance of common breweries. In the case of maltings, however, the rate of increase was dramatically accelerated by the repeal of the malt tax in 1880 which

facilitated much larger production units with different internal arrangements and by the more widespread use of mechanisation. The repeal of the malt tax made it more economic to build bigger maltings, and in particular ones with more storeys, but it was the availability of mechanical handling and in particular grain moving equipment which enable maltings to be worked with more than a couple of storeys. Examples of multi-storeyed maltings include

Weymouth No 4, and Fremlins Brewery Malthouse, Faversham, Kent.



61. Malthouse No 4, Weymouth, Dorset. [BB95/08097]



62. Fremlins brewery malthouse, Faversham, Kent. [BB96/01754]

The century also witnessed increasing sophistication in the arrangement of processes and in constructional techniques. At the beginning of the 19th century there were three patterns of malthouse in operation, the simple two storey type, the Ware type and the Newark type. What is certain is that the one new type and one hybrid type appeared late in the 19th century. First was the multi-storey type which seems to have been built for the first time in the 1860s, at least all the examples which can be securely dated were built no earlier. Examples include Warwick and Richardson's Brewery Maltings, Northgate, Newark built in 1864, and several examples in Pontefract and elsewhere in Yorkshire. Then following the repeal of the malt tax in 1880, the multi-storey - Ware hybrid type appears.

At the beginning of the century most maltings were of fairly simple construction, their load bearing walls built of preferred local materials, wooden floors covered in an impermeable



63. Midford, Clearbrook, North Somerset. [BB96/10269]

material such as plaster screed or later tiles and carried on wooden joists and beams perhaps supported by wooden storey posts. Thus stone was commonly used in the north and west of the country, and in the oolitic limestone areas. Elsewhere, in the Midlands and South, brick was used. Fairly early in the century cast iron columns replaced wooden storey posts but with rare exceptions such as the "fireproof construction" of the Midford maltings near Bath which had stone jack arching carried on inverted Y profile cast iron beams, maltings otherwise remained conservative in their construction (fig 63). The roof

structures were predominantly queen post, although smaller maltings might have a kingpost roof structure and more rarely a simple prop system was used for example at The Walls Maltings, Mistley, Essex.

The increase in size, however, was to bring changes in their construction and design. Firstly the massively strong wall required by taller maltings witnessed brick replacing stone universally. Then, towards the end of the century, concrete and steel were selectively introduced for floor construction. Concrete was even used as the major building material, as at the so-called Kiln Warehouse at Newark, c.1860, (fig 64) but this early use of mass concrete had few, if any, emulators. The introduction of hopper bottomed steeps, the mechanical handling and turning of grain (fig 65) and patent kilns all had repercussion for the construction of the buildings. Thus after the repeal of the malt tax, steeps could easily be located high up in the building just below

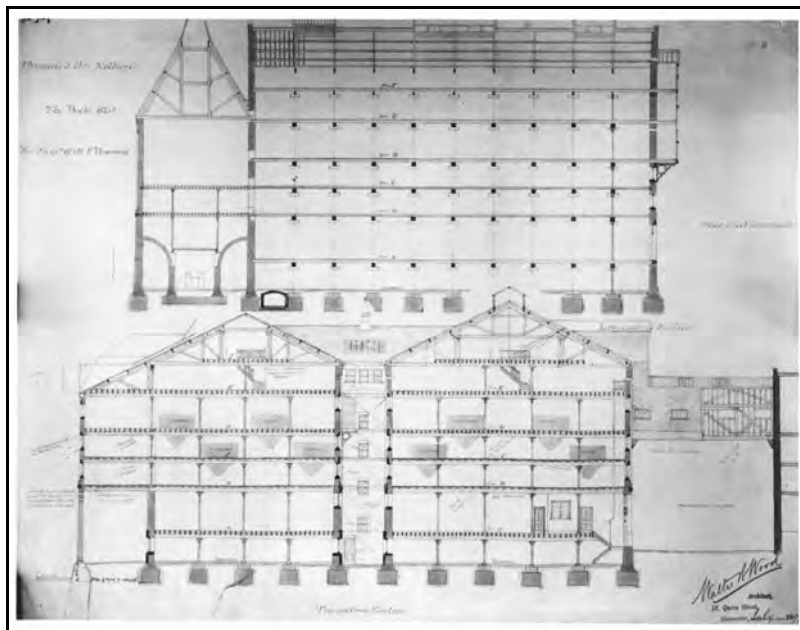


64. The Kiln Warehouse, Trentside, Newark before the fire of 1992. [A Patrick]



65. Turning grain, East Dereham, Norfolk. [BB93/10019]

the attic stores and gravity could be used more effectively to ease the movement of grain. This allowed as many as four or five growing floors and multiple steeps with the consequent need for mechanical transfer of grain to the kilns which themselves might have more than one floor. This new freedom of arrangement is shown in the architect's drawings for Downing's Maltings at Gloucester (fig 66). All



66. Architect's Drawing: Steeps and Growing floors, Downing's Maltings, Merchants Road, Gloucester. [BB94/17508]

these changes require power and for the first time engine houses became a feature of maltings. The adoption of entirely different malting techniques such as pneumatic malting had a profound effect on the construction of buildings and though such maltings appeared at the very end of the century, they are considered under the twentieth century.

Secondly the appearance of maltings changed with the rise of the specialist designer. Hitherto maltings had been essentially very plain functional buildings achieving any aesthetic effect by



67. Exterior Malthouse No 2 Weymouth, Dorset. [BB95/07423]

the massing of their distinctive components. From the 1860s onwards some attempts were made to liven up the appearance of maltings with the use of patterned brickwork and making a feature of sack hoist canopies (fig 67). By 1880 there were several specialist brewers' and maltsters' architectural firms, mainly based in London and Nottingham, but conducting work all over the county. Henceforth maltings exhibited common design features such as arcading

between buttresses, prominent engine houses and ornate office blocks. Maltings also continued to be designed within the industry with no less dramatic effect. At the turn of the century Robert Free designed his own maltings at Mistley while the massive Shobnall (Burton) and Sleaford Maltings were the work of Bass's engineer-cum-architect, H. A. Couchman (fig 68).



68. Bass Maltings, Sleaford, Lincolnshire. [BB82/09997]

The 20th Century

Floor malting continued throughout the twentieth century despite the introduction of pneumatic maltings. Likewise, and perhaps surprisingly floor maltings continued to be built, in particular during the first decade of the twentieth century, as at Mistley (fig 69) and it was not until 1952/3 that the last one was built at Market Street, Grimsby for Messrs Sanders (fig 70). It was highly automated. There is significantly one complex which was completed in the middle of the first decade of the twentieth century which is probably the largest ever built, the Bass Maltings at Sleaford. The site included eight



70. Sander's Malthouse, Market Street, Grimsby. [BB96/02207]

large maltings linked by gantries, and between the centre two blocks, an engine house, and a central barley garner and drying kiln.



69. Free Rodwell's Malthouse No 7, Mistley, Essex [A Patrick]

Early pneumatic malting plants often were not dissimilar from ordinary floor maltings, and it was not until after the second World War that distinctive pneumatic plants were built, for example at Louth, Wallingford and Bury St Edmunds. Often pneumatic plants are located in buildings which might house any light industrial plant.

The malting industry has never stood still and new developments continue, with some of the most recent being at Kentford in Suffolk. One building, however, which can be said to stand out in more ways than one is the Bass tower maltings in Burton-on-Trent. It is quite literally a tower of substantial height and can be seen from many view points in the town.



71. Pneumatic maltings, Louth, Lincolnshire. [AA98/03378]

The Established Typology

It is perhaps easiest to start this section with details of the types of buildings which have evolved, and then consider their development and whether there was any particular chronology. Maltings are very much functional buildings and each part of the process is often recognisable from the building's external features.

It would appear that in addition to simple single and two storey maltings there are at least two other early types – the Newark and the Ware types. Surviving examples indicate that from at least the 17th century all three types co-existed and thus there is no simple chronological development. Thus Boyes Court, a Ware type, predates Newark examples at Chipping Campden, Uley and Harvington Hall and many simple two storey maltings elsewhere.

Two Storey Pattern

Then there is the two storey type which as its name implies was a malthouse with only two storeys. The bottom one was the one on which the barley was grown and the top one was for storage of the barley and the malt. The steep was at one end of the building and the kiln was at the opposite end.



72. Malthouse, Ane, North Yorkshire. [A Patrick]

Ware Pattern

The Ware type, named after the town of Ware in Hertfordshire, is a malthouse which has separate provision for storing the malted grain. The barley storage is thus at one end of the building, then next to it the growing section, then the kiln(s) and finally beyond the kilns the malt storage.

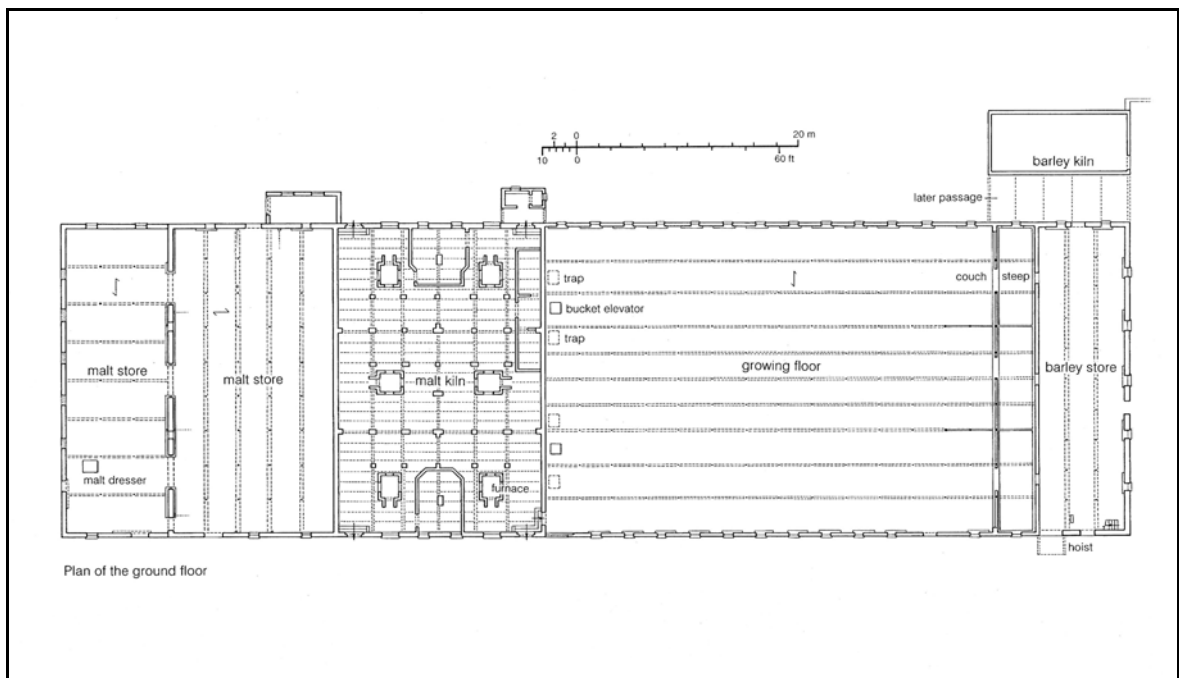


73. Maltings in Ware, Hertfordshire. [BB92/01273]

It is worth noting that this is the only type where it is possible to distinguish externally between the barley storage and the malt storage. The Ware type of malthouse may have any number of storeys.

Boyes Croft is now a Ware pattern malthouse, however it has been altered over time, with the steep dated to the late-18th century and the kiln and malt store dated to the early 19th century.

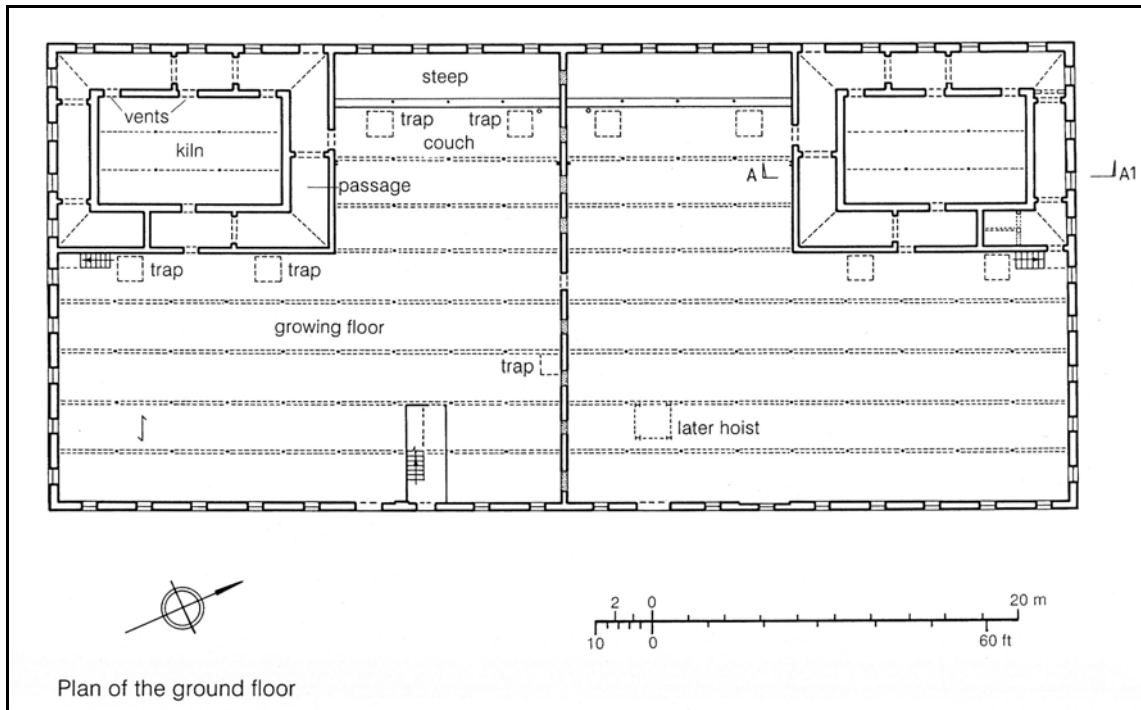
Therefore caution should be used when stating that an early malthouse is of the Ware pattern, or indeed any particular pattern. Despite this need for caution, it can be said that maltings do usually conform to typical layouts, but sometimes with variations.



74. Plan of the ground floor. Langwith Maltings, Derbyshire (demolished)

Newark Pattern

Then there is the Newark type. This type usually had three storeys, (though see below) and usually the bottom and top floors were the ones on which the barley was grown, with the barley and malt storage areas on the middle floor, but of course separate. The steep was more or less



75. Plan of the ground floor. Kiln Warehouse, Trentside, Newark.

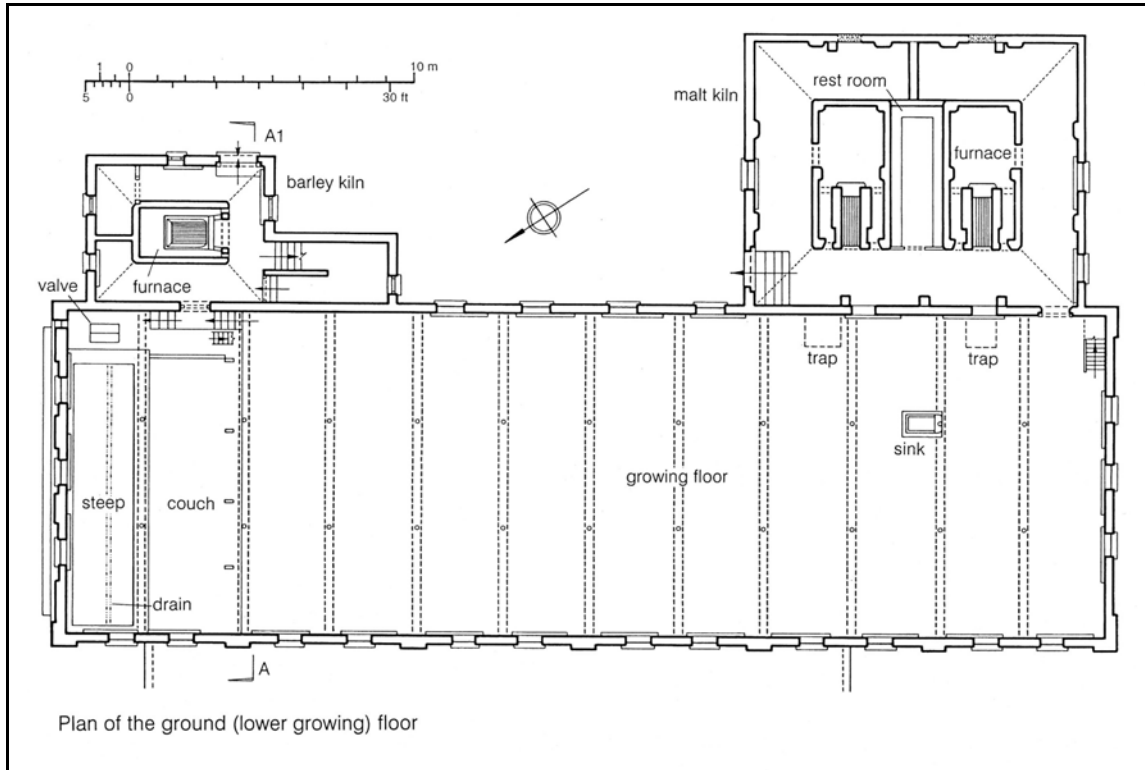
next to the kiln and the working pattern was such that the soaked barley was emptied from the steep onto the bottom growing floor and moved along that floor until it was part grown. It was then moved (hoisted) to the top growing floor and worked back to the kiln, the furnace of which was usually by the steep on the bottom floor. There is, however, at least one example with only two storeys, Boxley, Kent, and sometimes there was a fourth loft storey.



76. Malthouse, Frampton-on-Severn, Gloucestershire.
[AA005837]

Multi-Storey Pattern

A variant of the two storey is the multi-storey. The principle is the same, the bottom storeys are used for growing and the top one or two, depending on the overall number of floors, were for storage. The steep was at one end of the building and the kiln(s) were at the opposite end..



77. Plan of the ground floor. Warwick and Richardson's Brewery Maltings, Northgate, Newark.

Hybrid: Multi-Storey - Ware Pattern



78. Malthouse No 4 Weymouth, Dorset. [BB95/08097]

Finally there is the hybrid multi storey Ware type. In this type either barley storage or the malt storage is at one end of the building as in the Ware type of malthouse, but unlike that type not at both ends. Then, whichever of the barley or malt is not at one end is stored on the top floor(s) as in the multi storey type of malthouse. Obviously if the malt storage is at one end of the building, then the kiln will be between it and the growing floors. Therefore it is usually possible to determine which is a barley storage area and which is a malt storage area.

Pneumatic Maltings

Pneumatic maltings are a type on their own, and certainly by the mid 20th century they cannot be said to resemble any of the earlier maltings. That is not the case with some of the late 19th century pneumatic maltings which were laid out very much like a traditional floor maltings.

There had been two largely unsuccessful attempts to develop pneumatic maltings in the mid 19th century. The first attempt was by Patrick Stead in 1842 and then in 1852 Tizzard developed a different system. However, it was not until 1878 that a true pneumatic malting was developed although it was still not mechanical, and turning the grain was done by hand! The building of the first English pneumatic malting does survive at Beeston, Nottinghamshire (not listed), although there is no particular evidence of its early use.

The national development of pneumatic maltings (that is pneumatic and mechanical) did not begin until the late 1880s. There were two types of system. One uses a rotating drum to turn the sprouting grain and the other is a box in which the grain is turned by large moving screws. Both systems had air forced through them which was the pneumatic part of the process. The earliest Saladin (box) plant was at Wainford, Norfolk (1891) and the earliest drum malting was at Sawbridgeworth (1896). Thereafter a number of pneumatic maltings were built, mainly for breweries and distilleries (English) and more rarely for malting firms. The one notable exception was the drum maltings at Sawbridgeworth (Lower Sheering, Essex) for H. A. & D. Taylor. It would appear that the breweries and distilleries had more money to invest in this new invention which would in any case save them money in the long run. Most of the evidence for the installation of pneumatic plant comes from the *Brewers' Journal* and that appears to have reported primarily on drum maltings. Thus it should not be taken for granted that Saladin plants were not installed, rather they were not consistently reported. In addition these, old floor maltings were sometimes converted, for example at South Milford, North Yorkshire was converted to a drum malting. It ceased to operate in the late 1990s.

Although pneumatic maltings were built from the 1890s onwards, it was still common for floor maltings to be built, in particular in the first decade of the 20th century, and even thereafter, in the 1920s, 1930s and with as we have seen the last one being built in 1952/3 at Grimsby. In fact it was not until after the Second World War that pneumatic plant really began to supersede floor malting. New plants were built in the 1950s at Louth, (Saladin), and at Wallingford and at Bury St Edmunds, for example. These new plants looked less and less like traditional maltings, and more and more like any other factory, for example French and Jupps modern drum maltings at Stanstead Abbots are in plain factory buildings.



79. Saladin Box Maltings, Gainsborough, Lincolnshire.
[AA98/03358]

Regional Distribution of Types

The various types of maltings discussed above do not have specific geographical locations. All types, as far as can be judged from the approximate number of 400 maltings studied, appear across England. However, certain types do predominate in specific areas. Thus the Newark pattern is found in Newark. In that town the examples are large scale for example the Concrete Maltings, Trentside, Newark, South Block (Grade II*), North Block (Grade II). Smaller and earlier examples are to be found in the Cotswolds and along the limestone ridge of the south west with examples at The Old Brewery, Brockhampton, Gloucestershire (Grade II) and at Eastcourt, Wiltshire (Grade II). The Newark type is also found in Dorset, Kent, Lincolnshire, Oxfordshire and Suffolk.

The two storey type again is to be found in a number of counties but so far the greatest number appear in East Anglia. The best examples were the Brooks Maltings, The Walls, Manningtree/Mistley, Essex (Grade II). However, examples are also to be found in Derbyshire, Gloucestershire, Norfolk, North Yorkshire and Suffolk.

The Ware and Multi-Storey patterns are perhaps most widely spread. There are good examples of the former in Ware itself at Hoe Lane and Kibes Lane (Grade II). It is also found in Derbyshire, Dorset, Essex, Lincolnshire, Norfolk, Nottinghamshire, Suffolk and Wiltshire.

The Multi-Storey maltings are to be found in Cambridgeshire, Devon, Dorset, Essex, Gloucestershire, Hertfordshire, Lincolnshire, Staffordshire, Nottinghamshire, Suffolk, South, North and West Yorkshire with a particularly good example in Bristol, St Andrews Street, Montpelier (Grade II).

Hybrid Maltings have mainly been found in Dorset, Essex, Hampshire, Kent, Lincolnshire and Staffordshire, but were no doubt the more usual type for some of the later maltings.

Conclusion

Maltings are a distinctive building type latterly typified by long elevations of regularly spaced louvred windows with a distinctive kiln at one end. However not all maltings are clearly recognisable as such as they may lack a kiln or the long elevations of regularly spaced windows. Historically malt has been produced in structures specifically designed for the purpose of making malt from at least the 13th century (Nottingham's cave maltings). Equally early maltings are the less likely to be recognisable as such, and there is also little doubt that malt was made in barns and probably kilned in a bread oven. Despite this maltings have been a recognisable feature of our landscape from the beginning of 16th century and survive as such into the 21st century. They are to be found along lines of communication: rivers, canals and railway lines. They are found in urban areas, cities, towns and villages, and in rural locations, on farms or more or less in isolation (Coryton, Devon). As the need for floor made malt has diminished, so new uses have had to be found for the maltings buildings. Now that there are just six working floor maltings, it is appropriate to assess how the other maltings no longer in use as such should be managed. Important and typical features need to be retained when the inevitable conversion takes place, for if the maltings are to survive at all they have

to have an economic use. Part Two of this report discusses the future of malthouses whether in use as such or not.

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