Manufacturing amidst green fields: the buildings of a mid-Victorian dairy farm

by

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This analysis of a 19th century North Shropshire dairy farmstead, and the study of contemporaneous papers and books on farm building design provides an opportunity to reflect on the thoroughness of the mid-Victorian quest to improve agricultural productivity. As the century progressed fewer and fewer landlords were content with the ways of farming being directed solely by lore passed from father to son. Whitegates farmstead was anything but the creation of parochial yokels: its form reflects the most advanced scientific thinking of its time. In the layout and design of this farmstead and the materials used in its construction can be observed the utilization of the latest published theories in farm building design. Here can be seen the principles of the industrial revolution and advances in manufacturing processes applied to agriculture.

[NB. The measurements in this paper are given in feet (ft) and inches (in.) as was customary in the High Farming years here described].

INTRODUCTION

The years between 1840 and 1880 were unprecedentedly golden for farmers in the UK.[1] During this period healthy profits were made in both the arable and livestock sectors. In these 'High Farming' years landlords and farmers alike looked to build upon their profits through upgrading their farms. Up and down the country huge sums were ploughed into improving the land and modernising farmsteads. The scale and extent of endeavour is reflected in the fact that the majority of the nation's historic farm buildings date from this forty-year period.

Through the 18th century and the first half of the 19th century, treatises on farmstead design had been penned by certain architects and enthusiasts for agricultural improvement. However, the singular appearance of most farm buildings of this period stands as testament to the fact that these one-off publications reached only a small audience: Most of those improving their farmsteads did so with little recourse to any published guidance. All this changed in the High Farming years. In the 1840s the *Journal of the Royal Agricultural Society* (*JRAS*) started to feature illustrated articles which gave in depth consideration to the layout and function of new farmsteads where 'farming was carried on scientifically'.[2]

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The dissemination of the latest ideas on farmstead design, through such well circulated publications, ensured that landlord and farmer alike no longer needed to be so reliant on the native wit upon which their forefathers had depended. The consciously measured form of the vast majority of farm buildings constructed during the High Farming years attests to the fact that those who designed them did so with the benefit of the guidance set out in publications such as the *JRAS*.

In England and Wales in 1851 one quarter of males aged over twenty were employed on the land.[3] During the High Farming years these our forebears applied the advances of the industrial revolution to agriculture, reaping the benefits of applying scientific thinking to methods of farming, not least through the mechanisation of processes hitherto undertaken by hand. While documentary evidence of the advances they made is set out in the pages of agricultural journals, physical evidence of their endeavours can also be discerned in the layout of the land. However, by far the most telling evidence survives in the form of the remaining mid-Victorian farmsteads. Combine the published guidance on farm building design and construction with the evidence surviving in countless handsome farm buildings and much can also be understood of the advances made in agriculture during the High Farming years, as well as about the lives and labours of a large proportion of the working population.

However, whilst the history and the buildings associated with other key mid-19th century activities and processes, such as the cotton mills, the urban manufactories and the dockyards, have all been quite thoroughly considered, relatively little is known by the public of the work places, the working practices and lives of the significant percentage of the population who laboured on the land. It should be a concern to us all that in addition to being little understood, this rich and eminently tangible historical resource is now under threat. Of all the different historic building types farm buildings are recognised to be the most at risk.[4] The threat is double edged.

The first concern relates to decay, brought on by disuse. Times are hard in all farming sectors: for decades the accepted wisdom has been that in order to survive the farmer must move on from traditional practices and above all, expand. On most farms economies of scale have long since rendered the historic working buildings too small and inconvenient to accommodate the increased quantities of feed, seed, grain and fertilizer stored; the greater number of beasts housed; the size of modern machines and farm vehicles. Relatively cheap to construct, capacious and uncomplicated by narrow openings, low roofs or cross-walls, the ubiquitous portal frame has ensured the old farm building's relegation to lesser functions or no purpose at all. With little incentive to spend scarce funds on the maintenance of their redundant old farm buildings, many farmers have let them slip into disrepair.

The second threat to historic farm buildings relates to their being compromised through uninformed alteration. Aware of the surfeit of well built but disused farm buildings, the Government has made efforts to render it easier for owners and developers to convert them to new uses. Now subject to lesser planning restrictions, those looking to convert unlisted farm buildings are required to give consideration to little more than their scheme's impacts on setting and external appearances. This threat is compounded by the fact that just 5% of historic farm buildings are afforded

protection through listing.[5] By Historic England's admission this building type has been comparatively poorly covered by the system: often located off the beaten track, many farm buildings were never even surveyed by the listing inspectorate. Would that Historic England had the funds even to contemplate the commissioning of a listing review of this embattled building type. Although there can be no doubt that historic farm buildings are key survivals in the landscape, a significant proportion are at risk through disuse and decay. For some the possibility of conversion to a new use does offer a hope of survival, but at what cost if the alterations are to be made from an uninformed standpoint?

WHITEGATES FARMSTEAD – A CASE STUDY

This article focuses on the changes made to a single farmstead in the 1860s, at the height of the High Farming period. It considers the theories expounded in the literature of the time and highlights the extent to which these can be seen in the layout of the farmstead and the constructional form of its buildings. It is hoped that this article might show us that firstly, the heritage significance of farmstead buildings of the High Farming years extends way beyond just their visual appeal, and secondly that these buildings can play a key role in helping us towards a better understanding of the lives of our agrarian ancestors. For those keen to do the right thing when turning their farm buildings to new uses the author highly recommends the measured guidance provided by Historic England, not least in its 'Farmstead Assessment Framework : Informing Sustainable Development and the Conservation of Traditional Farmsteads' (London, 2015).

Whitegates Farmstead - 21st Century Context

In 2011 the tenant farmer of Whitegates Farm (Fig. 1) retired. His prize herd was sold and the farmstead's collection of brick built 19th century farm buildings and 20th century portal frame sheds fell quiet. The farm buildings were adjudged to be insufficiently commodious or well equipped for modern farming so the land was let to neighbouring farmers and the farmstead turned to use as a family home. All buildings of a post-High Farming era construction date were removed, returning the arrangement to something of its mid-Victorian appearance.

The process of converting the shippon (or shippen, as cow houses were often called in North Shropshire) to residential use involved the removal of secondary fabric, not least the 1950s concrete flooring. When lifted it was discovered that this had been cast directly on to the original brick and concrete floor surfaces. The opportunity was taken to record and analyse the makeup and arrangement of these remarkably undisturbed primary floor coverings. The findings of such study, together with broader consideration of the farmstead's little altered assemblage of 19th century buildings provided evidence sufficient to compile a report on the way the shippon appeared and was used in the 1860s. This served as a key guidance document for those planning the works to convert the building to its new residential use.

Fig. 1
Whitegates Farmstead, March 2015. In the foreground is the (former threshing barn) carthouse (*c.*1845 & 1869). The farmhouse (1822) stands at the head (north side) of the stackyard. On the left (to the west) is the stables/grainstore (*c.*1845) with the site of the pigsties (1865) and the laundry (1865) beyond. On the right (east) side of the stackyard is the shippon and its fold yard (1865).

The pre-High Farming form of Whitegates Farm

> 'No one can have travelled much in the rural districts of England, even those which are comparatively well cultivated, without being struck, if he have any sense of neatness and order, with the ill arranged and patchwork appearance of many of the farm buildings, which are often placed, in relation to their different parts, in utter defiance of the economy of labour in the case of cattle; and what is still worse, with little regard to the production and presentation of the manure' (John Grey, 1843).[6]

In the 18th century the land about Whitegates farmstead formed a small part of Sir Richard Hill's sizeable estate.[7] By the 1820s this farmland was in the ownership of another major landowner, John Whitehall Dod, who invested in his new asset. In 1822 he built a new farmhouse for his tenant at Whitegates.[8] This new brick built house was graced with a plain but proportioned principal frontage which looked out onto the fold yard. Behind this south facing elevation, and the single depth domestic quarters within, was the dairy, where cheese and butter making was carried out.

The tithe map of 1838 (Fig. 2) shows the all-but square planned farmhouse, complete with the front garden between it and the fold yard. The open ground to the south of the

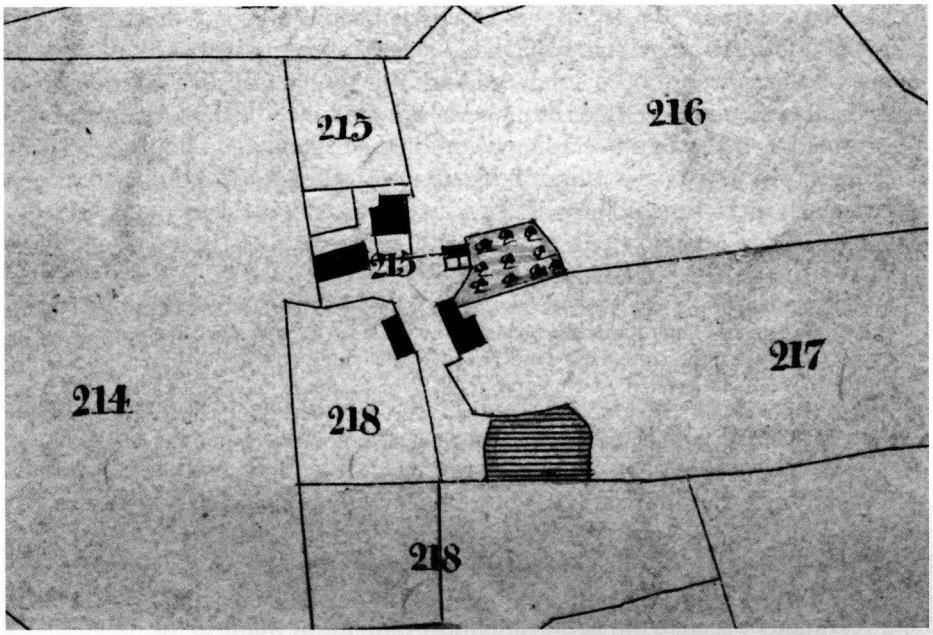

Fig. 2
Detail of Whitegates Farm from the Tithe Map, surveyed by Bate and Timmis of Whitchurch 1838. On the *Tithe Apportionment* 215 is described as 'House, Buildings, Yard, Garden Etc.'
Shropshire Archives 2848/5

Fig. 3
The early High Farming years buildings on the south (left) and west (right) sides of the farmstead's original fold yard (built mid-1840s). In the 1860s this fold yard was to be turned to use as a stackyard and the threshing barn on the south side of the yard remodelled for use as a cart house and implement shed. Its loft was used for hay storage. The south (left hand) end of the building on the west of the yard was always used as a stable (with hay loft above), the remaining part of this building being used as a cart shed with grain store above.

farmhouse, described as a 'Yard' in the Tithe Apportionment, was asymmetrical, with substantial buildings arranged somewhat haphazardly along its west and east sides. Offset to the east of the house stood a small orchard and the farmstead's pigsties. From the cartographical evidence it seems as though the siting of each of the farmstead buildings was determined as much by the configuration of the existing field boundaries as it was by their relationship with each other. In his essay of 1850 on the construction of farm buildings, Sir Thomas Tancred noted:

> 'A well arranged set of farm-buildings is a rare exception to the general rule. Those which are commonly seen have been erected and altered piecemeal, to suit the immediate wants of different tenants, at the least present outlay, and with little reference to any general and uniform plan. The progressive changes, too, in farm management, consequent on improvements in agriculture, have rendered many buildings, which may have been well contrived when first erected, now inappropriate. Whatever the cause, the result too often is a chaos of confused erections scattered over a wide space, with no systematic connexion between the parts, entailing, on the one hand, much useless expense on the landlord in repairs, and, on the other, great waste of time and labour, with a difficulty of proper superintendence, on the occupier'.[9]

The First Phase of High Farming Improvements

Evidence of the fact that Dod, the landlord, did well during the early Victorian High Farming years can be seen in the significant improvements he made to the homestead: The substantial old farm buildings to the west of the yard were pulled down for replacement with two new buildings which formed the south and west sides of a now more consciously laid out fold yard (Fig. 3). Built of bricks very similar to those used in the construction of the house, this pair of farm buildings was almost certainly erected in the early 1840s.

The building on the west side of the yard survives in remarkably unaltered form. Divided by a cross wall which rises to support the purlins, this farm building's larger northern part served as a two-bay cart shed at ground level with a granary above. The upper floor's primary purpose can be read from the thickness of its flooring (required to carry the weight of the grain), the trap door (for hoisting and lowering sacks of grain) and the glazed windows (to illuminate the interior whilst providing a barrier to birds). This two storey building's southern part was occupied as stables with hay loft above. On the stables' west wall can be seen evidence of the primary high level hay rack which will have been charged through the gap at the western end of the loft flooring. Home to both waggon and hackney horses, the stables' 19ft breadth was sufficient to accommodate four stalls measuring 4ft 9in. each.[10]

The primary form of the early High Farming years building on the south side of the yard has been obscured for it was significantly modified in the 1860s. However, sufficient evidence survives to appreciate that this mid-1840s building was constructed as a threshing barn. The brickwork at the eastern end of its north (yard fronting) elevation is all that survives of the primary construction. The only walling in this building to have lost-brick ventilation, the primary walling extends to a point some nineteen feet from the building's north east corner. It is understood that the westernmost of these surviving primary bricks originally formed part of the jamb walling of a substantial full height door opening. Providing through-access for fully laden carts, this door opening would have given onto

a threshing floor with capacious well ventilated storage spaces to either side.

The Tithe Apportionment provides vital evidence with regard to the farming operation at Whitegates Farm at about the time that Dod was constructing the two new farm buildings. In 1840 this farm's homestead and 92 acres were tenanted by Joseph Bate who farmed 13 of his acres in pasture, 8 as meadow and 70 in arable. With three-quarters of his land utilised for growing cereal crops, Bate would have had need for a threshing barn in which to store stooks, process his crops and store his straw. In the first years of their use the 1840s threshing barn (to the south of the yard) and the stables-cum-granary (to the west) functioned alongside the old building to the east of the yard. It might reasonably be assumed that this earlier building to the east of the yard served as a shippon (cow house).

In his essay on farm buildings in 1843, John Grey stressed: 'The advantage of having good farm-offices, and the points to be aimed at in their construction - namely convenience, accommodation, and economy; economy, not only in their first erection, but in the good future saving of labour, arising from a compact form and good arrangement'.[11] The construction of the early High Farming threshing barn and the stables-cum-cart shed certainly served to regularise the plan form of Whitegates Farm's fold yard. Each of these buildings will have met the tenant's needs better than the buildings they replaced. Furthermore their closer proximity to one another, and also to the shippon, will have improved efficiency through reductions in the distances travelled on a daily basis by the farm labourers. There can be little doubt that through the 1840s and 1850s, while the tenant reaped the rewards for farming Whitegates Farm in a more efficient manner, Dod in turn charged him a handsome rent. The arrangement was to come to a halt in 1864 when Dod sold up.

Improvements to the Farmstead in the 1860s

In 1863, the year before Whitegates Farm changed hands, work was completed on the construction of the Nantwich to Market Drayton railway line. The 'Gingerbread Line', as it was to become known, opened up access to and from a hitherto pretty inaccessible rural corner of Shropshire.[12] In this lush rolling countryside noted for the quality of its grassland the dairy farmers soon found that, through the railway, they had a quick and reliable means by which to get their milk, their butter and cheeses to new markets, not least to the burgeoning city of Manchester.[13]

It is a matter for speculation whether the railway's arrival served to elevate Whitegates Farm's sale price. John Pemberton Heywood, the new owner of this 92 acre farm, was a man of business and will have been aware of the opening up of new urban markets for the farm's produce. At this, the height of the agricultural boom, Whitegates Farm's new owner was to invest heavily to maximise its efficiency and profitability.[14] Analysis of the works commissioned by this landlord tells of the confidence of landowners at this time and their keenness to embrace modern scientific methods of farming.

Heywood purchased Whitegates Farm as part of a larger land holding. Keen to maximise his rents through investing in improvements, on some of his more run down farms Heywood commissioned the construction of entirely new farmsteads. This approach was not required at Whitegates Farm for here the farmhouse was just forty-two years

old and two of the three key farm buildings had been up for no more than two decades. However, Heywood wasted no time in calling for work to commence on the replacement of the old shippon (Fig. 4). The new building was sited in a location which further regularised the rectangular 'in front of the house' yard arrangement (Fig. 5). The new shippon comprised a forty yard long rickyard-flanking cowhouse with projecting eastern wings at its northern and southern extremities. Providing winter accommodation for fatstock, milking cows, their calves and indeed for bulls, the new shippon had numerous door openings, was generously fenestrated and well ventilated. Constructed to an exacting design specification with materials of the best quality, the form of the building tells of the new landlord's zealous eagerness to improve. The farm records for 1865 provide evidence of the time and the considerable sums spent on the new building:[15]

Levelling	4 men, total of 105 days	£ 10.10.0
Sawing	1 man, 42 days	4.4.0
Bricks	making of 99,100 bricks	94.3.9
Ironmongery		18.11.6
Glazier		5.18.1 ½
Painter		6.18.8
Drain pipes		0.18.6
Messrs Anthony & Harrison (suppliers of wood)		113.7.9
Messrs Powell (contractors, of Prees, Shropshire)		504.15.6
TOTAL sum expended		£ 759.7.9½

In his essay of 1862 on farm buildings, John Elliot noted that 'wherever farming [is] carried on scientifically, and wherever the great truth [is] recognised, its profits mainly depend on small economies throughout'.[16] With the northernmost parts of the new shippon constructed on the site of the old piggery, the farmstead improvement works of the mid-1860s also required the construction of a new piggery. The first edition Ordnance Survey map clearly records the existence (in 1879) of five new sties immediately to the south-west of the house. In conformity with the guidance of the time the new piggery was much closer to the house and the dairy than that which it replaced. This will have economised on the distance travelled by those feeding the pigs. Whilst the keeping of pigs was clearly a subordinate farming activity to the main business of rearing and milking cows, pigs were useful in that they ate food which otherwise might go to waste, the household swill and the bi-products of the dairy such as whey. The increase in sty numbers at Whitegates, from two prior to the mid-1860s improvements, to five afterwards, attests to the nature and extent of changes made and the consequent increases in the yields from the dairy.

The construction of the commodious shippon and the increase in the size of the piggery plainly reflect the fact that in the mid-1860s Heywood's tenant, William Clutton, changed Whitegates Farm from being a mixed farm to a dairy farm. This change in emphasis will have served to render the south-of-the-yard threshing barn all but obsolete. Heywood's accounts for the year 1869 record funds expended at Whitegates in partially

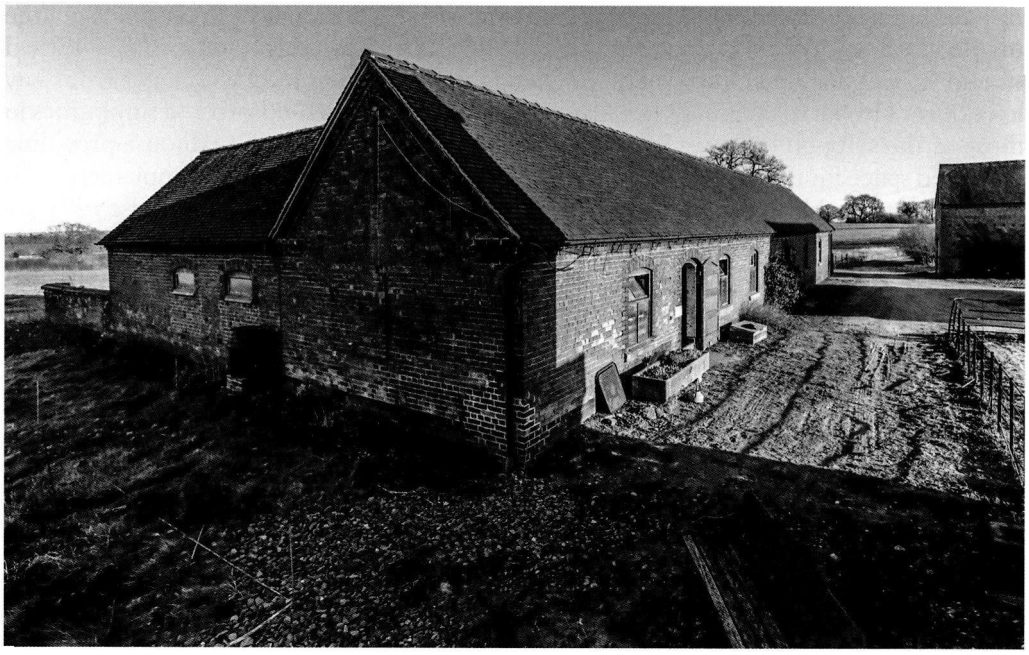

Fig. 4
The shippon photographed from the north-west.

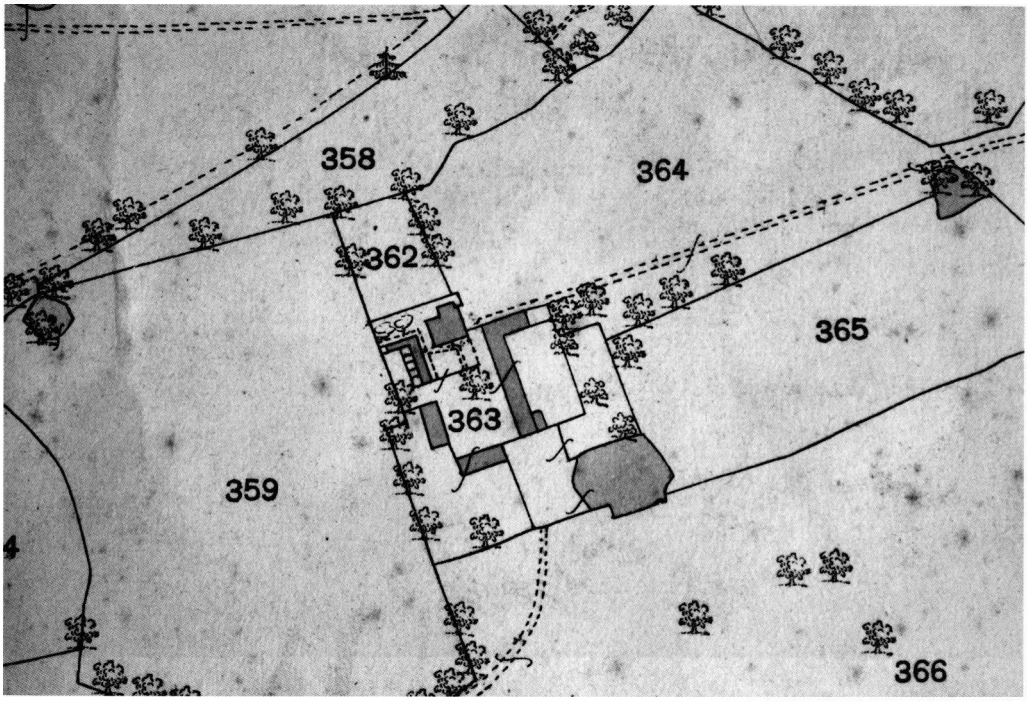

Fig. 5
Detail from the 1st Edition 25" Ordnance Survey, showing the layout of Whitegates Farmstead as surveyed in 1879.

dismantling the threshing barn for replacement with a 'carthouse'.[17] Emerging from the original footings of the threshing barn the new two storey building provided three enclosed storage spaces (for farm implements and waggons) at ground level with a generous hay loft above. This farm building's new door openings and doors show marked similarities to those of the shippon built just four years before. With the new-built carthouse providing increased space for the storage of waggons, carts, coaches, traps and farm implements, it is considered probable that from 1869 the beneath-the-granary two-bay carthouse will have been freed for occasional use for the storage of feed and the housing of farm machinery.

Progress in farming technology and practices will have negated any concern that the removal of the threshing barn might otherwise have occasioned with regard to the loss of space for storing stooks. By the 1860s it was generally considered that hay, straw and corn tasted sweeter and kept better when stored in ricks rather than barns.[18] It might be imagined that from 1865, once the new fold yard to the east of the shippon was in existence, the old fold yard was turned to use as a rickyard. As and when needed an outside contractor will have brought a steam engine and threshing machine to the farm, threshed the stooked crops in the open air with the straw being stored in the carthouse loft and the bagged grain removed to the west-of-the-yard first floor grainstore.[19]

The primary form and use of the 1865 shippon

Whitegates Farm's shippon is single storeyed and comprises one long north-south range (the cow house) from which project two eastern wings. The internal breadth of the range, as well as the wings, is 16ft. The main range's internal space measures 123ft in length, the north wing is 30ft in length and the south wing is 10ft long (Fig. 6).

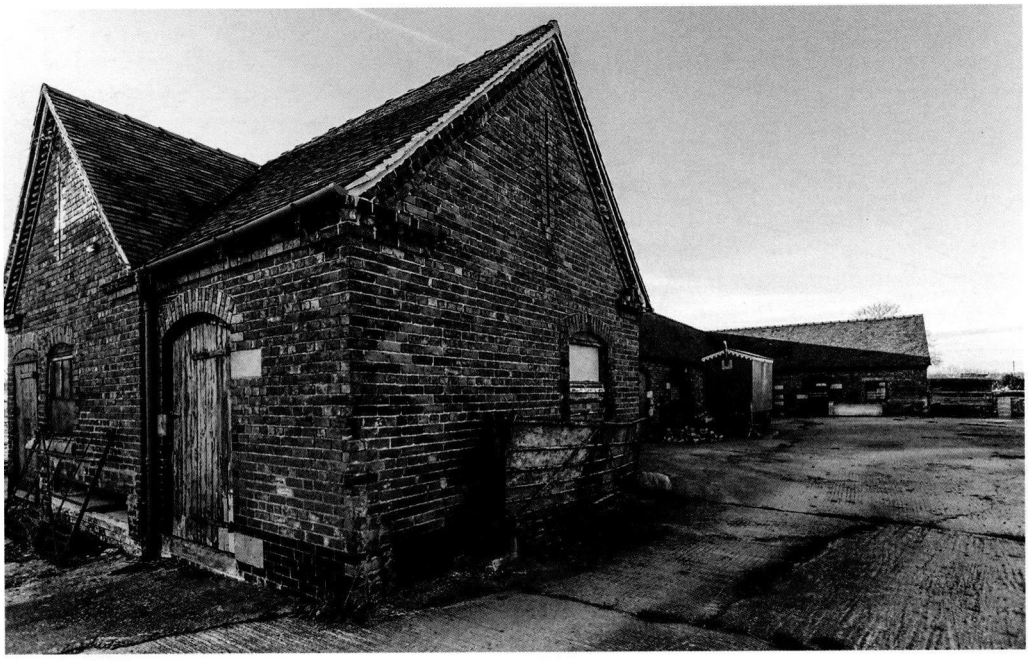

Fig. 6

View of the shippon from the south-east. In the foreground can be seen the isolation pen and on the other side of the fold yard is the hammel and northern calves pen. The lengthy cowhouse joins these two eastern wings.

Fig. 7
The cowhouse photographed from the north, prior to the removal of the 1950s flooring. In the foreground can be seen the northern cross passage and at the far end the southern calves pen. In its primary form this long range was divided into two parts separated by the central food preparation room.

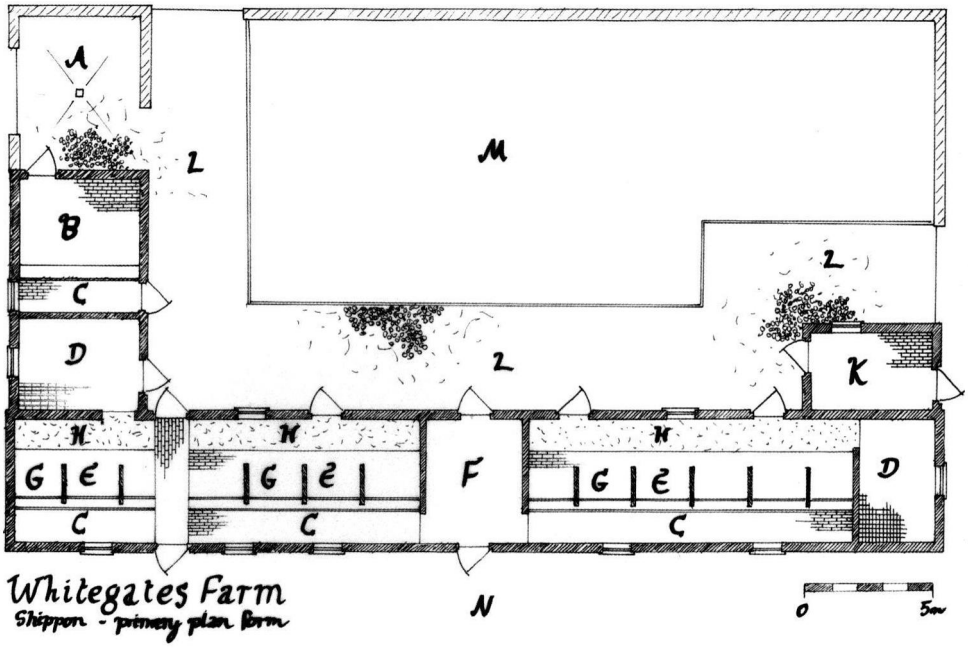

Fig. 8
Plan (drawn by Sean Pemble) showing the envisaged primary form of the 1865 built shippon. A – Hammel Yard; B - Hammel Loosebox; C – Feeding Passage; D – Calves Pen; E – Cow House; F – Feed Mixing Room; G – Stall for pairs of cows; H – Cleansing Passage; K – Isolation Pen; L – Fold Yard (cobbled access route); M – Fold Yard Midden; N – Stackyard.

By 1865 the merits of over-wintering cattle indoors were well understood: in 1834 the popular commentator on agriculture William Cobbett had declared that dairy cows would produce one and a half or twice as much milk if wintered inside.[20] Furthermore it was acknowledged that there were economies to be made since cattle kept in cow houses expended less energy in keeping warm and thus needed to be fed less than their counterparts outside.[21] Keeping the cattle inside during the winter months spared the fields from becoming poached.[22] An added benefit was that the dung produced whilst the cows were housed at the farmstead could be collected with relative ease, stored and in due course put to good use.

The chief elements of Whitegates Farm's shippon were its cow houses (Figs 7 and 8). These would have served as home to as many as twenty-four dairy cows.[23] They were tethered in pairs in 7ft wide stalls running spine-like down the length of the shippon.[24] To the west of this alignment of stalls ran a line of mangers from which the animals fed. Between these mangers and the west wall of the cow house ran a 4ft wide north-south aligned front feeding passage (Fig. 9). A second passage of comparable breadth ran along the foot of the east wall of the cow house. This, the 'cleansing passage', was made of concrete (Fig. 10).[25] At the centre of the cow house was a 16ft by 14ft vestibule accessible via door openings to both east and west yards. Further internal door openings provided routes through from this, the feed preparation room, to the north and south feeding passages.

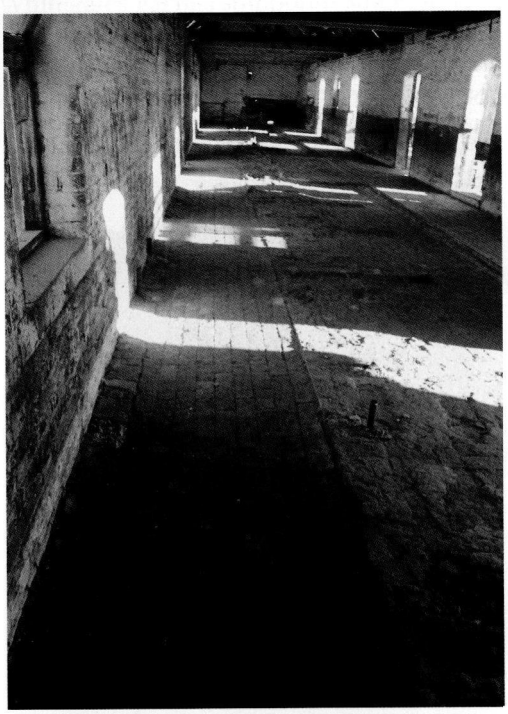

Fig. 9
Removal of the 1950s concrete floor covering exposed the brick floor of the feeding passage, bounded on its east (right) by the brick footings of the mangers. Between the shafts of light can be seen stubs of slate, the last remnants of the stall dividers. To the east (right) of these can be seen the cleansing passage.

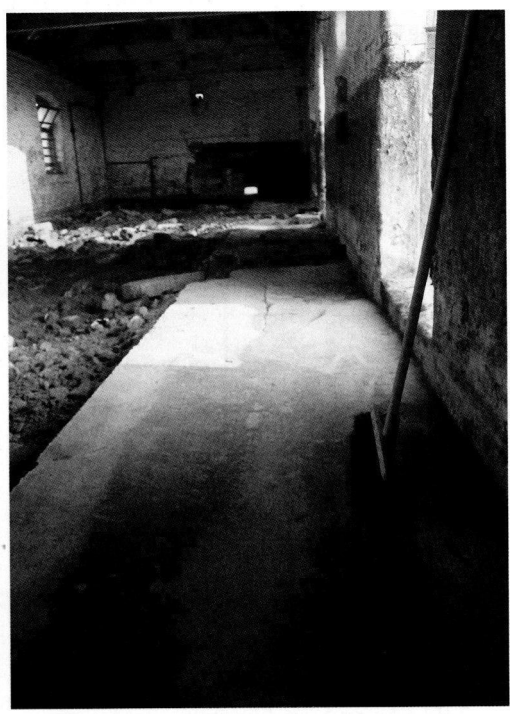

Fig. 10
The smooth concrete of the cleansing passage which ran along the foot of the east wall of both the north and south cow houses.

At the south end of the cow house a room of 10ft by 16ft was accessed by a door at the south end of the cleansing passage. This room housed calves belonging to cows tethered in the stalls of the southern cow house. It was common practice to install calves pens at the ends of cow houses at this time for few cow houses were of sufficient breadth to permit the calves to be tied up immediately behind their mothers. As Stephens and Burn advised (in 1861), 'for convenience the calves ... should be ... put in numbers together in large loose-boxes at the ends of the byre, and let loose from both places at stated times to be suckled'.[26]

A door opening at the north end of the cow house gave on to a second calves pen, this one 12ft by 16ft and located in the north wing. From here (and the aforementioned calves pen to the south) the calves could be brought directly to suckle from their mothers in the cow house. The north range's calves pen was bounded on its east side by a cross passage. Accessed by a door from the fold yard, this allowed food to be delivered to young stock housed in a loosebox to the east. With a footprint of 10ft 10in. by 16ft and furnished with a manger running the length of the feeding passage, this eastern loosebox was in fact a hammel giving onto a small open yard to the east. Hammels were used chiefly for housing heifers. In his *Book of the Farm* (1854) Stephens highlighted the advantages of housing fatstock in a hammel as opposed to stalls. Provided with both shelter and fresh air, cattle housed in the hammel, he noted, were cleaner and had better hair and feet.[27]

Though again 16ft in breadth, the south wing projects to less than half the length of the north wing. This single celled space was lit by just one window in its east elevation. It had door openings in its north and south elevations and never any internal access through to the cow house. This loose box will have been built to serve a number of purposes, from isolation pen for sick beasts to calving pen or a place in which to accommodate a bull.

Key Consideration I: Economies of Circulation

> 'So much of the cost of all farming is reducible to labour, and so much of this labour is connected with the homestead, that the arrangements of the latter should be especially framed so as to economise time. To ensure such a result, the buildings should be so placed in respect to each other that no ground should be traversed twice without result, and no step taken beyond what is necessary. The great principle of profitable circulation should be apparent throughout' (John Elliot,1862).[28]

Those planning the mid-1860s works of improvement at Whitegates Farm will have given very careful consideration to the siting of the new shippon (Fig. 11) in relation to the existing farmstead buildings. Key to the functioning of the improved farmstead was the walled yard built to the east of the shippon. The introduction of this new yard for the cattle and their manure served to free the old yard for other purposes, not least easy circulation. Farm hands walking from one part of the old yard to another will have no longer been encumbered by the need to travel amongst livestock and their mess, and time will also have been saved through there now no longer being a requirement to close any gates behind them. The form of Whitegates Farm's new yard was unusual. Such a yard might be expected to have incorporated a shelter shed for from the late 18th Century it was commonly understood that in order to thrive cattle needed to be 'totally secure from the wind'.[29] The fact that such shelter sheds were not built in the new fold yard shows that

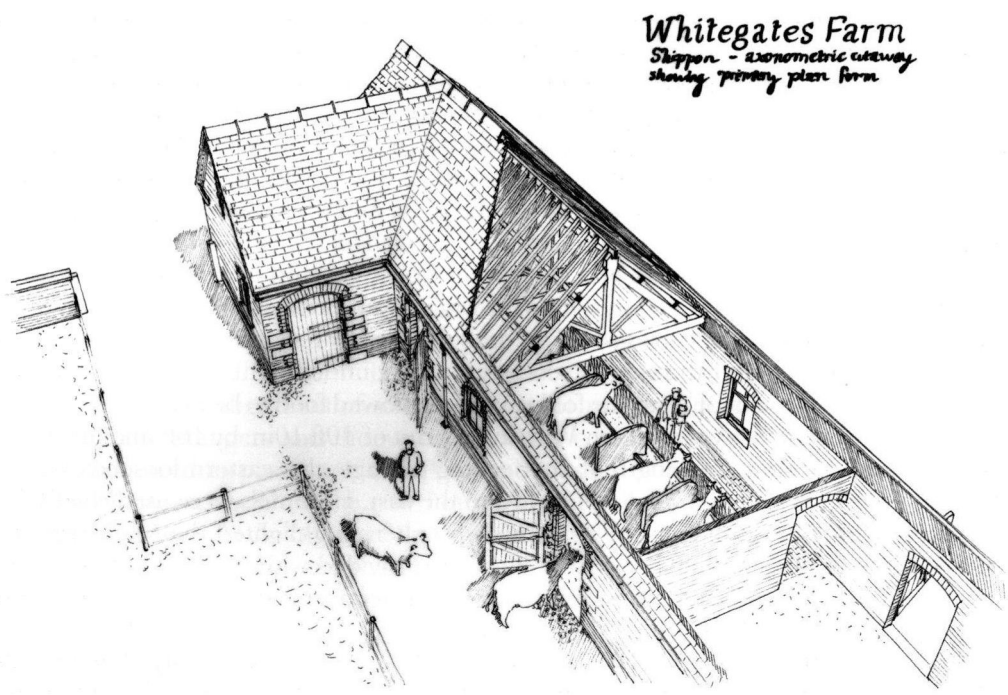

Fig. 11
Bird's eye cut-away view illustrating the layout of Whitegates shippon as it is understood to have appeared in the late 1860s.

it only rarely served as a holding place for cattle, its key purposes being firstly to serve as the place in which manure was collected and stored and secondly to provide a route through which cattle could be brought to and from the shippon.

The way in which the shippon, the stackyard to the west of it and the fold yard to the east were used is informed by appreciation of the fact that the shippon's main range had two through passages, one at its centre and the other providing a route to and from the fold yard's north-west corner. Excavation of the northern of these two cross-passages revealed a twelve-course wide butt-jointed blue brick path, the paving bricks set in an east-west alignment. Evidence that it was never the intention that the livestock should access the stackyard can be seen in the differences in the detailing of the cross passages' door openings: the internal jambs of the doors to the fold yard were constructed with bull-nosed blue bricks, the internal jambs of the stackyard doors were made with square arrised regulars. All doors off the fold yard into the shippon's northern calves pen, the north and south ends of the cow house and the isolation pen feature jambs constructed with the more cattle-friendly bull-nosed bricks.

The mixing house between the cow houses required a door onto the fold yard for from here the farm hand would walk along the yard's cobbled fringe, taking the prepared feed to the beasts in the isolation pen and those in the hammel. Home to a chaff cutter and a turnip slicer or pulper, this 14ft by 16ft feed-preparation room would have been

where the hay and straw was cut into short lengths, the turnips and mangel worzels broken down into edible portions, the linseed cake (which was bought in slab form) cut up, the oats bruised and beans kibbled.[30] The chief routes of access across the stackyard will have been those which provided passage between this mixing room and the respective place of storage of the straw, hay, grain, beans, roots, cake and other foodstuffs required to feed the cows.[31] Once the feed had been prepared the farm hand had immediate access to straight feeding passages down which to travel to feed the tethered cows. In his prize essay 'Fittings for stables and byres', published in the *Transactions of the Highland Agricultural Society* in 1857, Moreton listed the benefits of the new approach to feeding cows in stalls via feeding passages. The task of feeding the animals from a passage was quick and easy, since charging 'terminating' (mangers) 'at a dead wall' required the farm hand to walk further, negotiating the cows as he went. The downside was that the feeding passage required the cow house to be 'proportionately wider'.[32]

Key Consideration II: Manure Management

Professor Tanner observed in 1860: 'The manure of the farm: When we consider the influence that this fertilizer has upon the produce, and consequently upon the profits, of the farm, we have a strong inducement to give the matter our careful attention'.[33] Although Whitegates Farm's fold yard is now entirely covered with a thick layer of 1950s concrete, from observation of exposed areas and the evidence of documentary sources it is understood that it was set out and functioned in the following way. The central part of the fold yard will have been sunken and unpaved. It was to here that all of the livestock's dung was barrowed and left to rot. The depth of the midden pit will have been determined by the quantity of dung accumulated over the course of a year. The liquid run-off from the cow houses, the calves pens, the isolation pen and the hammel will have been channelled to this midden via pipes or gutters. This pipework or guttering will have run beneath or across the causeway which ran around the yard providing proper access (bovine and human) to the building's entrances. Although long since covered, it is understood that this fold yard causeway will have taken much the same form as the 12ft 6in. wide cobbled causeway which skirts the yard frontages of the stables and carthouse. Any such fold yard causeway will have been fenced to ensure that the cattle being moved to or from the shippon might be kept apart from those which on occasion were put in the fold yard (as much as anything to tread down the manure).

Within the shippon the 4ft 2in. wide concrete passageway running along the eastern wall of the cow houses served as the catchment zone for the dung and urine produced by the stalled cows. These cleansing passages also served as the route by which the cattle accessed their stalls. So as to assist with drainage and cleaning out, the concrete cleansing passages had smooth surfaces and were graded in such a way as to encourage the urine and liquid muck towards the several seep holes which ran through each cow house's east wall to the fold yard's midden.[34] Evidence of the fact that iron or wooden wheeled wheelbarrows were used to transport any remaining muck from the cowhouse to the fold yard midden can be seen in the extent of localised wear at the centre of several of the door openings' threshold stones.

The hammel and the isolation pen also had gulleys through which the highly valued liquid manure trickled through to the midden. These spaces likewise needed regular

cleaning to barrow the more solid manure to the fold yard. Such cleaning out was not required in the shippon's two calves pens. Here the muck of milk-fed calves, which was more fluid than the muck of beasts fed on hay, cereal crops and roots, fell through gaps in the slatted flooring to drain away into the fold yard's midden. The calves in the calves pens stood upon a flooring of blue bricks laid (butt jointed) end to end with an open gap of 0.3in.(8mm) between each 'course'. The alignment of the courses' brick ends permitted this floor covering to be borne on ranks of half-brick thick, red brick support walls. In the half-brick wide gap between each support wall was installed a line of bricks set on a gradient running down to a central transverse drain. Although a number of 19th century writers on farm buildings commended the provision of such through-floor drainage in calf pens, it is understood that few of these complicated and comparatively costly drainage systems were ever installed (Fig. 12).[35]

Key Consideration III: Light and Ventilation

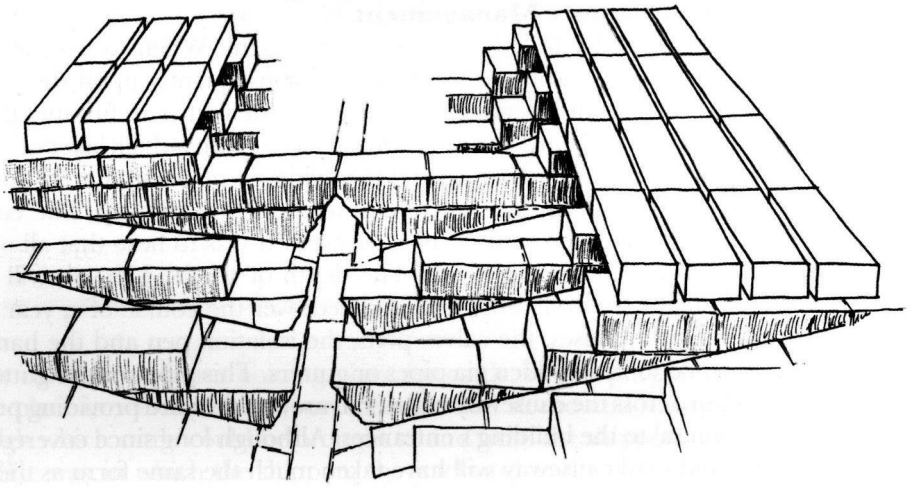

Fig. 12
Sketch (by the author) recording the form of the drainable floor found in the north and south calves pens.

> 'Warmth creates fat; but too much warmth melts it; and this must be guarded against, and the means afforded of regulating heat and cold, otherwise it will be found that what was right for one season would be wrong for another. It is the same with light. Its presence is an absolute essential to health; but its excess during the summer months is injurious, and at such times flies torment the animals to an injurious extent; control therefore, over the admission of light is indispensable' (John Elliot, 1862).[36]

By the mid-19th century lighting and ventilation had become key matters of consideration for those designing cow houses.[37] With the merits of ventilation advocated and the need to avoid draughts understood, mid-Victorian writers on farm buildings were keen to promote ventilation through the roof-space. At Whitegates endeavours to supply fresh air to the cows and regulate the temperature within the shippon saw the tiles left untorched and ridge tiles with generous nibs installed.[38] The latter provided an

inch-wide ventilation gap at high level throughout the building. Tall slit lights in the gables facilitated further through breezes. At ground floor level some of the window openings were fitted with a hit-and-miss ventilation system (Fig. 13) and all glazed windows had opening hoppers. Furthermore in addition to their use for the passage of livestock, many of the doors were divided into upper and lower halves, the upper half being opened when required for ventilation and indeed light. Whilst rising heat and foul air will have been lost through the roof, the gable slits and through the ridge ventilation, the existence of the hit and miss shutters, the hopper windows and the half doors meant that the farm hands had the ability to regulate the flow of air and temperature within the shippon.

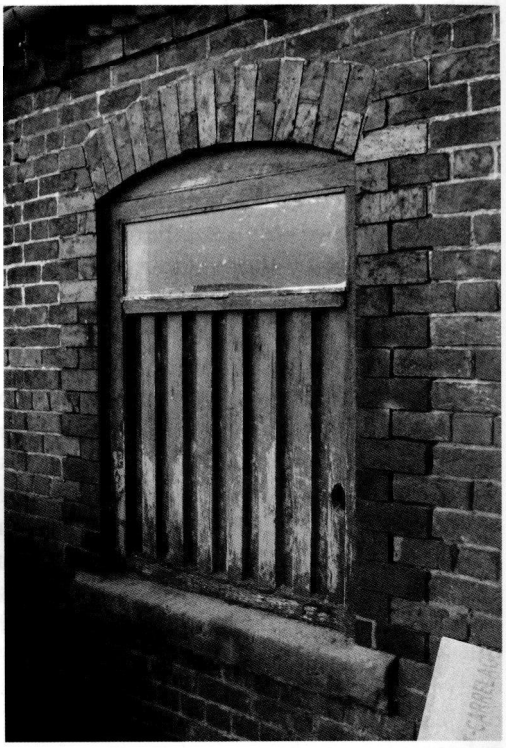

Fig. 13
Primary part glazed, part hit-and-miss ventilation window. Located in the east wall of the northern cow house, this was the only window of its type to survive to the 21st century. However, when the two windows in the north elevation were removed for replacement, tell-tale mortice holes were found in the soffits of their sills – evidence sufficient to suggest that both originally appeared and performed as the window illustrated. As the window of the south calves pen was found to be secondary and much altered, it is considered likely that this opening was also originally fitted with a matching part glazed, part hit-and-miss ventilation window.

It was not until the mid-19th century that it became accepted that cattle did well in cowhouses which were generously fenestrated. At Whitegates shippon the north and south cow houses were lit by windows in both east and west walls as well as rooflights in the eastern pitch. The northern calves pen was lit by one of the hit-and-miss ventilated windows and a rooflight and single windows provided light to the southern calves pen and the isolation pen respectively. What is interesting to note is that in the design of the hammel the loosebox had no windows of its own, being lit only by daylight from the hit-and-miss ventilated window in the adjacent feeding passage and, when open, light from its two-divisioned external door. The prevailing wisdom must have been that young stock would do best when housed in pens which had good ventilation but which were only dimly lit.

CONCLUSION

Many of the mid-Victorian papers published by the *JRAS* on farm buildings gave detailed consideration to the best and most cost effective materials to use in their construction. There can be no doubt that in addition to the thought given to planning the siting of the Whitegates Farm shippon, its layout and its built form, great care was also taken in the

selection of the materials used in the building's construction. The shippon has substantial 13in. thick red brick walls. The use of blue bricks for the building's plinth and for the jambs and the heads of doors and windows was both prudent and practical for these bricks are impervious as well as hard wearing. The blue bricks also served an aesthetic role, giving greater definition to the doors and windows, and indeed also to the arrow slit vents, strengthening them as visual punctuations in the elevations. With the sills and threshold stones made of Grinshill sandstone, high quality softwood timber used for the trusses, purlins and rafters, and hard wearing blue roof tiles, Whitegates Farm's shippon was constructed of high quality materials. It was also designed and detailed with great care and built to a high standard of workmanship.

Heywood and those whom he employed to design and construct Whitegates Farm's shippon approached their task with great purpose. Had the building been constructed fifty years earlier it would doubtless have been built to a homespun design making the best of knowhow passed from father to son. Not so this shippon of the High Farming years. This building is a classic product of that fervid debate, promulgated by (and recorded for posterity in) the *JRAS*. This small rural 'agricultural manufactory' is a relic of the zealous mid-Victorian adherence to the then new scientific approach to farming.

Earnestly expressed and diligently applied, the mid-Victorian theories on farm building design were to be quite quickly outmoded. In the last decades of the 19th century, as studies undertaken by Augustus Voelcker and others established the benefits of over-wintering cattle in covered yards, the focus of efforts moved away from the fine tuning of the farmstead's cow house. Furnished with proper rainwater disposal systems the new covered spaces in the farmstead guaranteed the provision of manure which was undiluted and of 'twice the value' of that gathered from yards left open to the elements.[39] Writing in the *Journal of the Royal Agricultural Society of England* in 1890 W.J. Moscrop reported, 'now, in letting farms, almost the first thing asked is,'will you cover the yards?'.[40] Such progress in the ways of farming rendered Whitegates' once state-of-the-art shippon, and its open fold yard, out of date. Through the 20th century the shippon was subjected to a succession

Fig. 14
Whitegates Farmstead in its last months as a working farm, April 2010.

of adaptations to render it more compatible with new ways of farming. Less and less well suited to modern farming techniques, in the first decade of the new Millennium it had to be conceded that the shippon and the farmstead's other historic buildings were beyond viable agricultural use (Fig. 14).

In the planning of the scheme to vest the shippon with a new purpose careful consideration has been given to the potential impacts of proposals on the building's historic interest. Handsome, well built and with a generous collection of primary doors and windows, the shippon has proved relatively easy to convert to domestic use (Fig. 15). Retaining its external appearance as a farm building, all primary door openings have been kept, the wooden doors repaired and – in order to render the interiors fit for human habitation – secondary wood framed glass doors installed within the reveals. All window openings have been retained and new building regulations-compliant windows have been made. With their double glazed units, the new wood-framed windows match the primary windows in their functioning as well as their appearance. Rooflights – those 'it's a barn conversion' giveaways - have been studiously avoided. The only tell-tale signs of the new domestic use are the extract vents for the boilers and the black flue pipes for the two wood burning stoves.

In converting the interiors the aspiration has been to provide comfortable accommodation whilst retaining something of the shippon's historic feel. To this end the calls to insulate and 'plaster out' the internal faces of the external walls have been resisted: the shippon's interior retains its 'brick painted white' walling. Unmolested by sandblasting or redecoration, the open-to-view trusses and purlins maintain their historic limewashed

Fig. 15
Whitegates Farmstead in the immediate aftermath of the shippon's conversion, November 2016

appearance. The internal spaces have inevitably had to be subdivided. However a memory of a focal part of the primary arrangement has been restored through reinstatement of the mid-cowhouse food preparation room for use as a kitchen. Again echoing the primary arrangement, the route of the northern feeding passage has been reimagined as a long corridor serving the rooms of the range's north end. The documentary research and fabric analysis - undertaken to better understand the shippon's primary form and use – has been key to ensuring that the conversion works have been planned from an informed standpoint. The upshot, it is hoped, is that key heritage significances have been preserved whilst the building has been vested with a use which will render it viable for many decades to come.

ACKNOWLEDGEMENTS

The author would like to express his gratitude to Edward Peters for his kind assistance in analysing Whitegates shippon's historic fabric and for his guidance on how it would have functioned.

Thanks are also extended to Sean Pemble for his interpretive drawings (Figs 8, 11) and to Chris and Libby Middleton of 10stop photography for consent to use their photographs (Figs 1, 4, 6, 7, 15).

NOTES

1. P.J. Perry, 'High Farming in Victorian Britain Prospect and Retrospect', *Agricultural History* 55, 2 (April 1981), 156.
2. John Elliot on the matter of improved farm buildings, 'Abstract Report of Agricultural Discussions' *JRAS* 23 (1862), 471.
3. Saville, J., *Rural Development in England and Wales 1851-1951* (1957), 1.
4. In their research for 'Historic Farm Buildings: Constructing the Evidence Base' (2005) Peter Gaskell and Stephen Owen found working farm buildings to be 'the largest category of listed buildings at risk'.
5. See Gaskell, P., Edwards B. & Bibby, P., 'Historic Farm Buildings: Extending the Evidence Base' (2009), 2.
6. Grey, J., 'On Farm-Buildings', *JRAS* 4, (1843), 1.
7. A prominent Methodist and for twenty-six years a Tory MP, Sir Richard Hill, 2nd Baronet (1732-1808) was also noted for having developed the remarkable landscape garden in the grounds of his country seat at Hawkstone.
8. The farmhouse is dated on its east gable where there is a brick with '1822' scratched into it.
9. Tancred, T., 'Essay on the construction of farm buildings', *JRAS* 11 (1850), 192.
10. Arthur Young, *Rural Economy* (1770), 15, noted that a farm with 80 acres of arable land would require four horses. In *The Development of Farm Buildings* (1969), 124, J. E. C. Peters contends that stalls needed to be of sufficient breadth (5ft – 6ft) to enable the ploughman to groom his horse. At Whitegates Farm the generous space between the stalls and the stable entrance may have been used for such a purpose.
11. Grey, J., 'On Farm-Buildings', *JRAS* 5, (1843), 3.
12. The Wellington and Drayton railway line was completed in 1867.
13. Improvements in transportation proved key to the year-on-year increases in milk production/ consumption in England in the late 19th century. By 1900 the population was drinking 600 million gallons of milk per annum, over three times more than had been consumed in 1861 (J. Lake, *Historic Farm Buildings* (London 1991), 129).
14. Not least in relation to the installation of field drains.
15. Accounts held in the Heywood family archive.
16. Elliot, J., 'Farm Buildings', *JRAS* 23 (1862), 471.

17. Heywood's Accounts' record the time spent by different tradesmen on the Whitegates Farmstead improvement works of summer 1869. Labourers were employed for a total of 90¾ days; sawyers 72 days; carpenters 95½ days and bricklayers 88½ days.
18. Peters, J. E. C., *The Development of Farm Buildings in Western Lowland Staffordshire* (Manchester 1969), 66-67.
19. The income generated by a farm of this size would have been insufficient to enable the tenant to afford to own a threshing machine let alone a steam engine.
20. Cobbett, W., *Cottage Economy* (London 1834) referenced in Peters, J. E. C. *op.cit.*, 131.
21. Dean, G. A., *The Culture, Management and Improvement of Landed Estates* (London 1872), 108.
22. Further to his visit to Staffordshire in 1869, H. Evershed made note of the fact that milking cattle were housed inside between November and May. *JRAS* (1869), 268-71.
23. H. Stephens and R. S. Burn make reference to a dairy farm of 130-170 acres as having 'a stock of cows from 14-24 with young beasts and horses', *Book of Farm Buildings - their arrangement and construction* (London 1861), 254.
24. ibid. 'seven feet is considered in the dairy districts a fair-sized double stall for two cows', 343.
25. The term is used in H. Stephens and R. S. Burn, *Book of Farm Buildings* (1861), 18.
26. ibid, 348.
27. H. Stephens, *The Book of the Farm* (London 1854), 291-2, as referenced by J. E. C Peters (1969),162.
28. Elliot, J., 'Farm Buildings', *JRAS* 23 (1862), 473.
29. Young, A., *The Farmers Guide* (London 1770), 54.
30. Peters, J. E. C. *op.cit.*, 88. Guidance on this specific part of Whitegates shippon was set out in a letter to the author from J. E. C. Peters, 27th October 2015.
31. Whilst hay and straw were stored in the carthouse's generous loft space and the grain in the grain store, it is not entirely clear exactly which of the spaces in the carthouse were turned to use for storage. A further unknown relates to the question as to whether the tenant at Whitegates Farm engaged with the common practice of boiling feed to render it more digestible. There survives no evidence of such practice at Whitegates – there are no signs on the surviving farm buildings of the former existence of hearths, chimney breasts or stacks.
32. Stephens and Burn, *op.cit.*, 335-6.
33. Excerpt from Professor Tanner's Prize Essay on 'The Application of the Manure of the Farm' published in the *JRAS* (1860), 329.
34. Canted downwards towards the east wall, along its length the cleansing passage rose and fell, the lowest point of each ripple corresponding to a gulley in the east wall. The difference in surface height between the highest and lowest points of the cleansing passage's smooth concrete surface was measured at 5in. Such through-wall drainage points were also observed at the foot of the fold yard fronting the walls of the north and south wings of the shippon.
35. In correspondence with the author (letter of 29.09.2015), J. E. C. Peters referenced G. A. Dean, *The Land Steward* (1851) and R. Scott Burn, *Practical Architecture as Applied to Farm Buildings* (*c.*1900). In *An Encyclopaedia of Agriculture* (1842) J. C. Loudon commented on a calves pen with a slatted floor.
36. Elliot, J., *op.cit.*, 472.
37. Stephens and Burn, *op.cit.*, 343-4.
38. Torching – the application of mortar between the slates/tiles and the batons as a means to help secure the roof covering. Torching reduces the through-roof air-flow and serves as insulation.
39. Lake, J., *Historic Farm Buildings* (London, 1989), 125.
40. Wade Martins, S., *Historic Farm Buildings* (London 1991), 74.