

THE EXPLOITATION OF THE HORTON FLAGS—CONSIDERED AS AN EXAMPLE OF INDUSTRIAL ARCHAEOLOGY

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ABSTRACT

A small outcrop of Horton Flags, which are of Silurian age, was quarried at five points near Helwith Bridge, in North Ribblesdale, for over 200 years. Large, smooth pieces of Flag, impervious to moisture, were fashioned into objects that were of basic daily use in the locality. Flags were used as flooring, shelving in kitchens and dairies, large cisterns to hold rainwater and small troughs from which farm stock might drink. A great many pieces are to be found within a few miles of Malham Tarn Field Centre. There are gate stoops, road bridges, “throughs” in drystone walls, a rich variety of objects made from slate at some local churches and, on Swarth Moor, Helwith Bridge, mere (boundary) stones that marked the extent of local peat workings. Data concerning the geology, history, exploitation and use of Horton Flags are presented and discussed, together with methods used by the author to record the best surviving examples and suggestions for further study.

GEOLOGY

HORTON FLAGS are sedimentary rocks of Silurian age which underlie Moughton Fell and are very evident through outcropping between the villages of Stainforth and Horton-in-Ribblesdale (see Figures 1 and 2). Here they give a dark appearance to what is elsewhere a valley noted for its limestone. Drystone walls are good indicators of local geology and so it is possible to see where limestone is supplanted by the Flags. Man-made outcrops caused by extensive quarrying are everywhere. Notice also a fine exposure of vertical Flags beside a modern road-widening scheme between Helwith Bridge and Studfold (Fig. 2). Another fine example of exposure by man is a cutting of the Settle–Carlisle railway to the south of Helwith Bridge (Fig. 2), and permission might be obtained locally to view it from adjacent land. The Silurian attains its highest elevation (356 metres) on the south-east of Moughton Fell, where the Flags are present as steeply-dipping folds. At Coombs Quarry, near Foredale, eroded Flags that dip towards the south are seen to be strikingly overlaid by the horizontal beds of Carboniferous Limestone. The best Flags for commercial use occur at Helwith Bridge; elsewhere they tend to be thinly laminated and rather flakey. Slight variations in tone occur, but generally they are blue–grey when dry, appearing dark blue when wet. Associated with the Flags is Moughton Whetstone, which is named after the use to which it was put—the sharpening of tools. This Whetstone occurs in a small area on the western side of Moughton Fell.

HISTORY

Certain use of Horton Flags in local structures dates from the early part of the 18th century. Flag does not appear to have been a significant part of the structure of the churches themselves, but as early as 1722 pieces that had been sawn and smoothed were

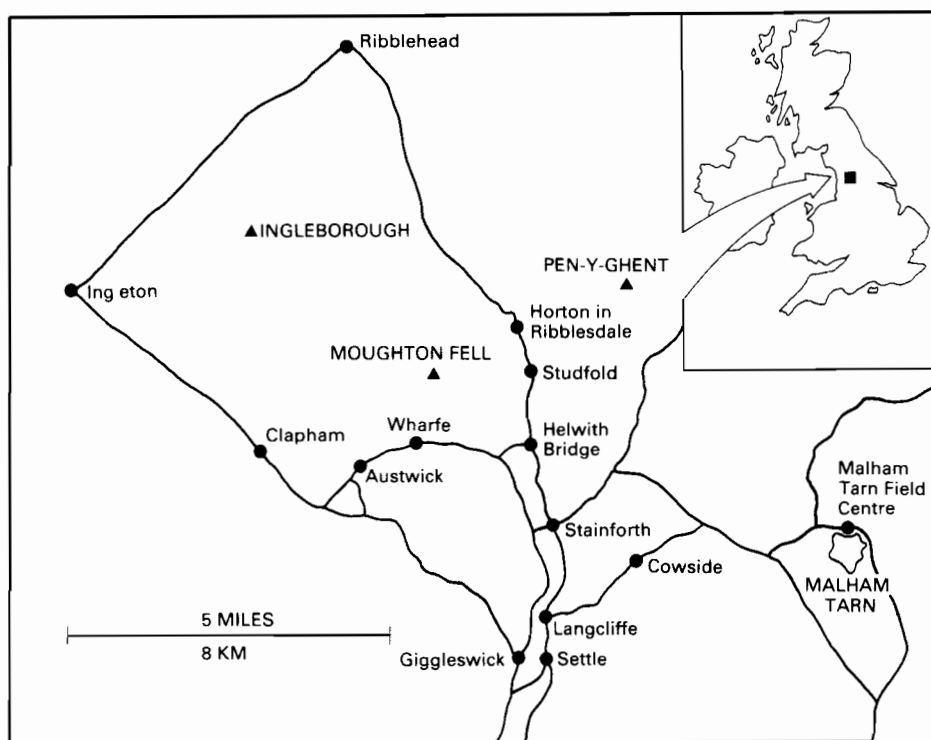


FIG. 1.
The location of the Study Area.

being reared as memorials in the churchyard at Horton. The earliest of them had tomb-plates fixed (these, taken inside the church for safety, may now be seen fixed to a window ledge). Flag is found in many old—i.e. 17th century—farmhouses, especially at ground level or in cellars. Flagstones used as flooring were invariably set in sand and positioned so cleverly that it is difficult to find an appreciable gap between them.

By the 1760s, the Flag had become a favourite material for tombstones. Lettering was a skilled job. There is a stone on a garden wall at Studfold on which someone appears to have practiced the craft. In the churchyard at Horton, memorial stones have a moderate amount of decoration, finely finished. A flower-like emblem is popular—and doubtless very difficult to cut. Decorations were incised on the upper edges of some memorials. Old tombstones in the churchyard at Settle (the church was opened in 1838) are of Horton Flag. An immense piece, used as a memorial, is affixed to the inside of the porch at Giggleswick.

That a small number of quarries existed in 1774 is indicated by the case then made out in favour of a canal for Settle (a fanciful idea that did not materialise). Those who supported the idea, in presenting their case, mentioned “many inexhaustible quarries of blue-flags, grit flags, excellent blue slate, and grit-slate in the neighbourhood of Settle, which will undoubtedly pass along this branch. . .” Early in the 18th century, Flag was being used at the Tannery in Settle, where its special qualities were ideal for holding liquids. The first detailed reference to a quarry—Coombes, high on Moughton (see Fig. 2)—appears in “Tour to the Caves” by John Hutton (first edition 1780). He found that “the stones are of a blue kind, like slate, from one to three inches thick; some are two or

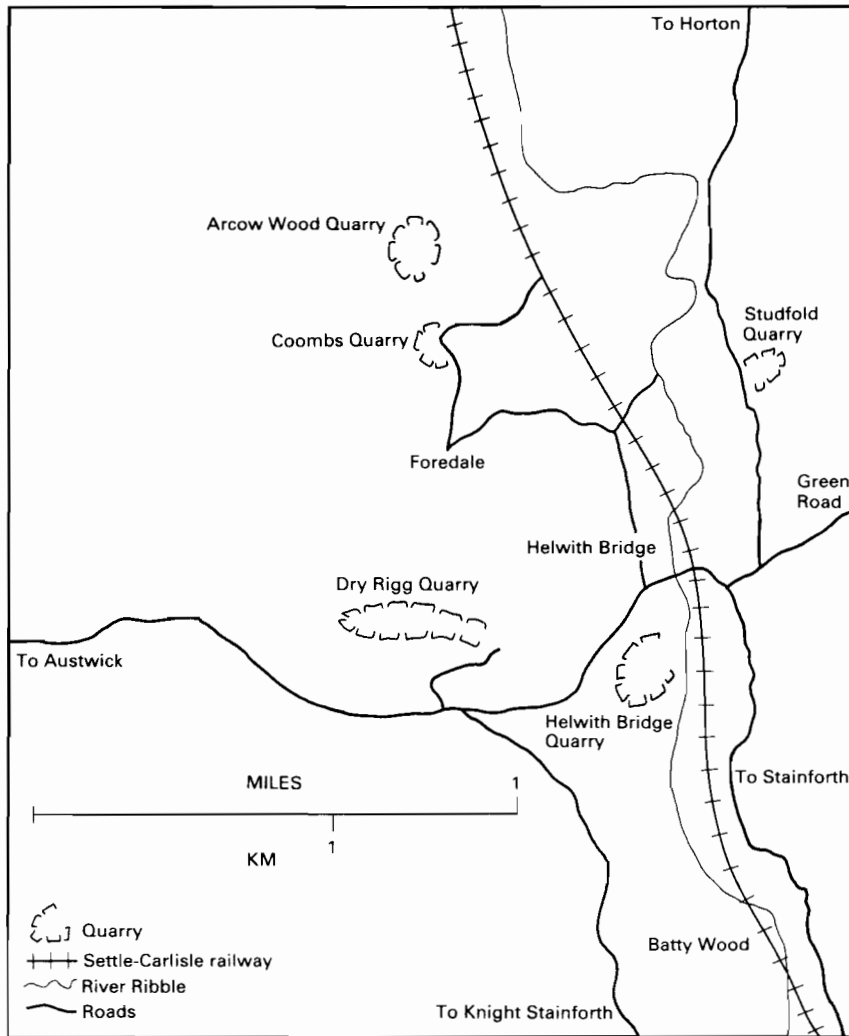


FIG. 2.
The quarries, and other sites of interest.

three yards broad, and five or six yards long". Hutton mentioned among the uses of the Flag; floors in houses, gateposts, footbridges and partitions between the stalls in stables and cow-houses. Hutton recorded that some flooring was "laid over cellars on joists", which is the case with houses in Victoria Street, Settle. (The partitions in cow-houses are known locally as "boskins". See Fig. 4).

During the Enclosures, Flag was a handy and suitable material for building walls, being used mainly for "throughs" except in the immediate vicinity of Helwith Bridge, where Flag was common enough for entire walls to be made of it. A wall on Moughton Fell is composed of upstanding pieces of Flag. So large are some pieces of Flag that two or three, laid side by side, provide a roof for an outbuilding.

The quarry at Dry Rigg (Fig. 2) yielded a type of roofing material known as Swarthmoor Jack, used towards the end of the 19th century by some local builders. Flags needed



FIG. 3.

This wall composed of Horton Flags can be seen at Studfold. The inscribed stone appears to be the work of an apprentice to the trade of quarryman who was trying out a variety of chisels.

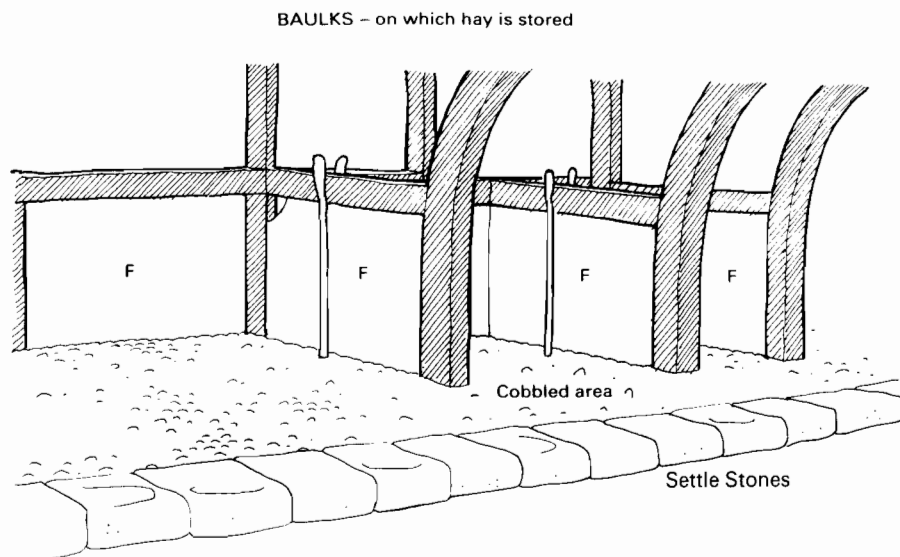


FIG. 4.

Sketch of the interior of a shippon near Austwick (pieces of Flag indicated by letter F). The division between two stalls is known as a boskin.

for roofing were hammer-trimmed. All the skills for quarrying and handling Flags were well developed by 1818, as shown by Norcliffe House in Austwick, constructed that year by the Rechabites from Rochdale. The premises, composed of two dwellings, with a meeting place on the top floor that was reached by an exterior staircase, incorporated Flags in the form of floors at ground level, and also well-fashioned lintels. The outside area was adorned by Flags used for gate stoops, path, path edging and (laid flat) adornments for the tops of walls. Not surprisingly, the home of the Ralphs, 18 Victoria Street, Settle, was well-decked with Flag, for the families were quarry owners. William Ralph, who died in 1895, was described as a "flag dealer and quarryman". He was succeeded in the business by Christopher Charles Ralph, commonly known as Kit, who was the last to quarry Flag in the old way. Kit died at Whitkirk, Leeds, in 1945. Henceforth, the quarries were to be devoted to the production of roadstone and aggregate. When Mr. Frank Maude was manager at a roadstone quarry at Helwith Bridge in the 1920s, someone might request a piece of Flag for a gravestone; otherwise "there was no call for Flag at all".

THE QUARRIES

Flag was difficult to work. One hoped to find a piece of the appropriate size. If hand-tools were used, "pieces would fly in all directions". Hammer-trimming might be employed to reduce the width of the edges; otherwise the Flag was cut by a form of sawing, using a piece of metal without teeth and employing sand and water, the sand providing the necessary abrasion to enable the metal to cut through the Flag. At one local mill it is believed that wire was used instead of a piece of metal.

The last quarry to be operated in the traditional way was Helwith Bridge, (Fig. 2) to the south of Swarth Moor. For some years, up to the 1914-18 war, it was used by Christopher Ralph with only two helpers. He also owned the inn at Helwith Bridge, and some land on which he kept two horses. With the help of his quarrymen, he made hay in sufficient quantities to feed the horses through the winter. He also kept one or two cows for milk.

The quarry face extended to some 182 metres long, up to 9.1 metres deep. The Flags, being aligned almost vertically, were thus conveniently obtained. Holes were bored at the base of the quarry face to hold black powder (gunpowder). When a large piece of Flag had been brought down, it was split, using tapered metal plugs about 12 cm long. When Flags were needed for high quality work—as for the construction of water troughs or cisterns—special care had to be taken when quarrying the material. A slab was detached by being freed at the top with the use of iron wedges, a cut being made along the bottom of the selected material. Flags were conveyed to the sawmill on trolleys running on a tramway. The mill, standing beside the river Ribble, used water power. A waterwheel, of the undershot type, was removed from this site in 1935. Removed to Horton-in-Ribblesdale, the waterwheel was re-designed for use as an overshot type, providing power for an electric generator.

Coombs Quarry (Fig. 2) was the one visited by John Hutton in the 18th century. It was the first of the Flag quarries to close. In latter days, it was the site of a powder-house in which explosives were stored prior to being used at the limestone quarry at the top of Moughton Fell.

Arcow Wood (Fig. 2) has been the scene of extensive quarrying; a vast area has been opened up and exploited for roadstone. Within living memory, there was a small quarry



FIG. 5.

A porch of high quality workmanship. The use of Flag extends to ledges within the porch. The farm is near Settle, in North Ribblesdale.

with a woodland setting. Cabins were erected of Flag to accommodate the workers in wet weather. There was also a blacksmith's shop.

The area of Coombs Thorn Quarry was obliterated as Dry Rigg quarry (Fig. 2) was extended. Flag quarried at Dry Rigg was taken to Silloth House, near Wharfe, to be sawn

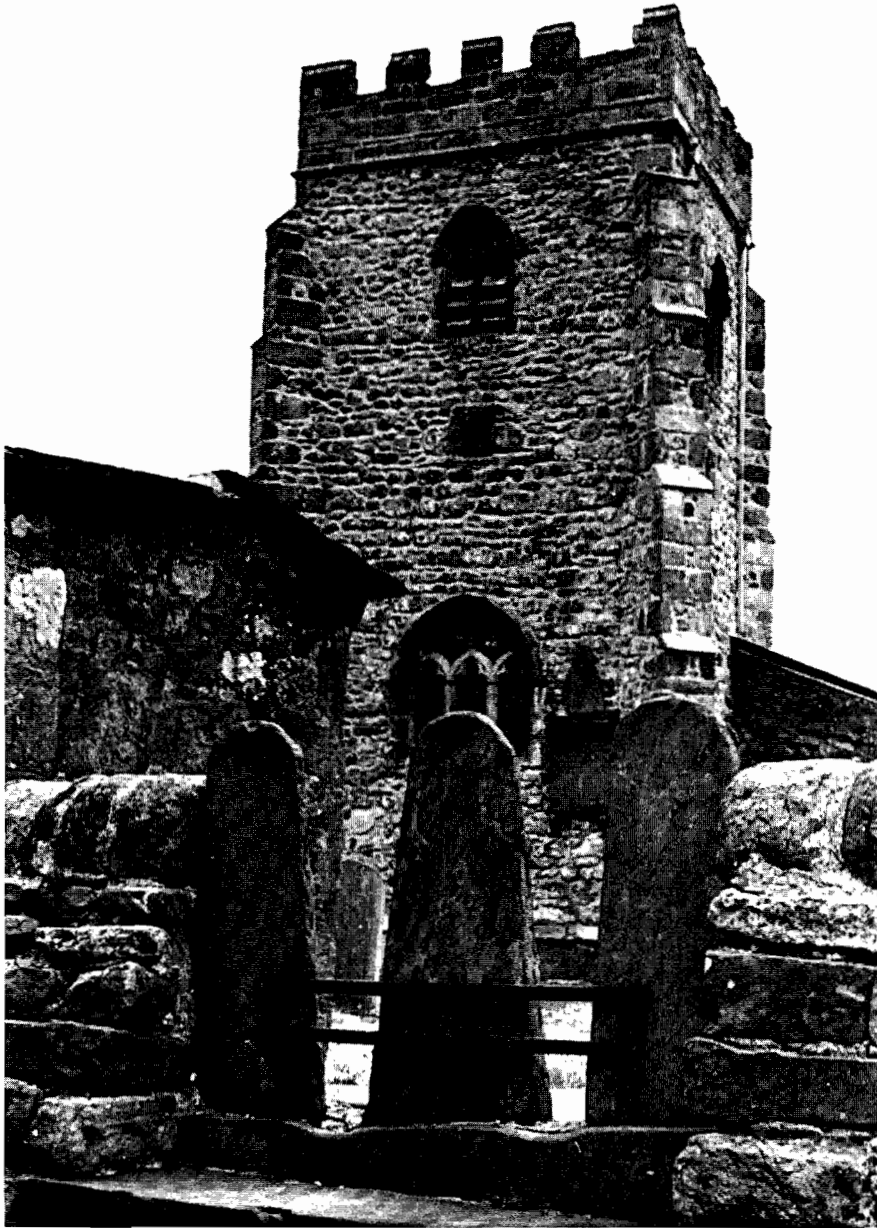


FIG. 6.

Horton-in-Ribblesdale Church. Flags have been used to roof the lychgate and for the stile.

and polished at a mill operated by water power. The present Dry Rigg was opened by a Cullingworth man, Mr. Walker, in 1938.

No one remembers when Studfold Quarry was used, but it is undoubtedly of great age, its Flags having thicker laminations than those obtained from Dry Rigg or Arcow; they were also harder. It is believed that most of the Flag used for monuments came from

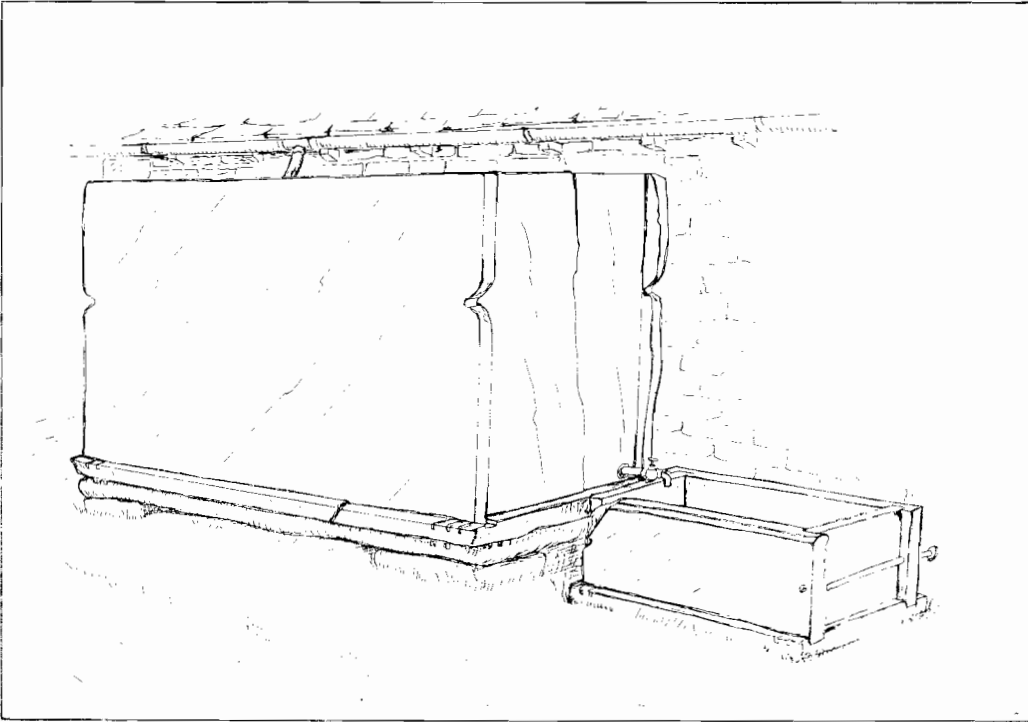


FIG. 7.

A large cistern connected by tap to a drinking trough. The indentations at the corners of the cistern were caused when the bolts broke away. Notches on the base were made at a sawmill and grooves cut out to accommodate the sides of the cistern. (Drawn by G. Hollingshead).

this quarry. In 1941–42, when the mineral rights were owned by George Greenwood, of Halifax, Flag that had already been quarried, and which lay in heaps, was sent to Halifax, to be crushed as aggregate.

THE USES OF FLAG

Flag is durable when its edges are protected from weathering. Large flags used on footpaths show little wear after many years. Large pieces used to roof outbuildings have endured because the joints were overlapped by other Flags. Quite a number of monuments in graveyards, these pieces of Flag being reared vertically and unprotected, have become frost-shattered.

Flooring. The Flags were moved into position on rollers and rested on beds of sand. The Flag was said to “sweat” and was “always wet in winter”. When wet, this substance becomes very slippery. Blue Flags laid indoors were often washed with “blue” (skimmed) milk and became dark and glossy.

Water Cisterns. A large cistern (Fig. 7), taking rainwater from the roof of a building by means of guttering and a pipe, has been a valuable means of retaining water on the surface in a limestone area where natural drainage is often underground. Cisterns were also used

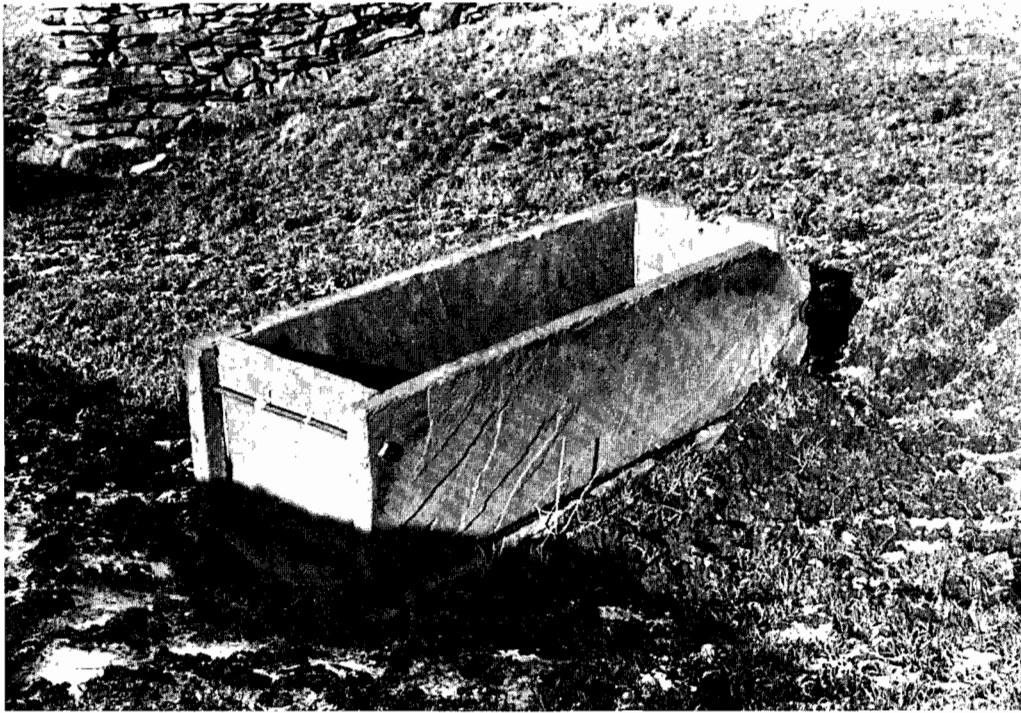


FIG. 8.

A field trough made of Horton Flags. Such a trough was a common feature on farms in North Ribblesdale. Joints were sealed with white or red lead!

in gritstone districts. A cistern for the storage of rainwater became known in some districts as a “soft water tank”, and at a number of farms there are three taps in the kitchen—for hot, cold and “soft” water. Most cisterns were set up outside a building, but some notable instances of indoor cisterns are known. Water collected in this way was not for human consumption, being used often for washing purposes. In a limestone area, a major advantage was that rainwater, being “soft”, did not cause soap to be wasted.

A cistern comprises five, sometimes six, pieces of Flag: two sides, two ends, a base and a cover, the latter being devised in several close-fitting sections to permit ease of removal. The base and sides of a cistern are grooved. As the cistern was assembled, any joints were made watertight by the use of white or red lead, which was sometimes mixed with putty. Extra rigidity was provided by bars of iron at the ends. The irons passed through holes in the Flag sides and were bolted tight. Thus did the craft of quarryman and the craft of blacksmith combine in a purely local way. Two large cisterns in a barn at a farmhouse near Giggleswick, hold a total of 1400 gallons (6370 litres). Water descends by gravity flow to a stable beneath; the pipe runs under the farmyard into the kitchen of the farmhouse (where three brass taps can be seen, the central tap being for “soft” water).

Troughs. To this day, farm animals in many fields in highland Craven rely entirely on a local rather than a piped supply of water. Troughs are much smaller versions of the cisterns, being similar in style and construction and invariably standing beside them. Some troughs were fitted into a gap in a drystone wall, providing water for stock in two

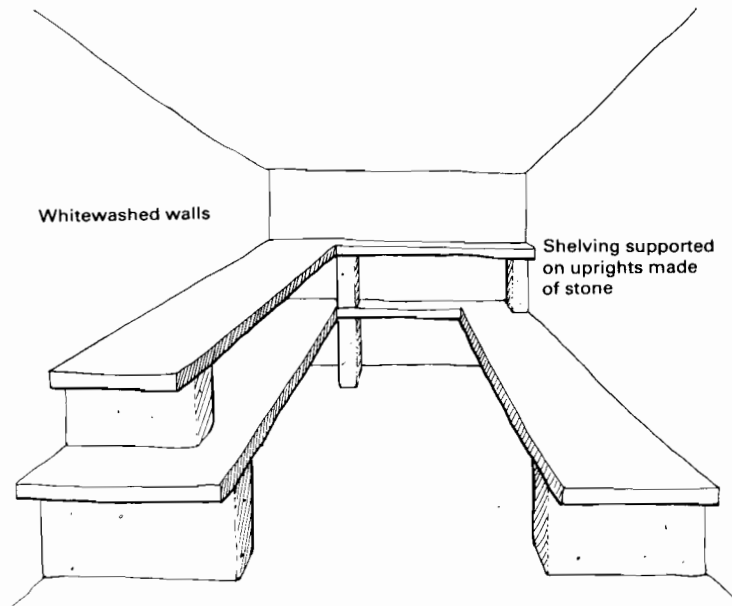


FIG. 9.

A typical dairy at a North Ribblesdale farmhouse, showing the use of Horton Flag as shelving. The holes in one shelf were made when milk was allowed to settle in large metal trays known as "leads"; the "blue" milk was drained away into pails, leaving the cream—for butter-making—on the sides of the "lead".

fields. A modern example has a small chamber to house the water valve, for this is on the mains supply.

Brewers' Vats. Fermenting vats made of Horton Flags are still in use at the brewery of Samuel Smith, Tadcaster. (At John Smith's brewery in that town they were removed early in 1970 and replaced by vats of stainless steel). The vats were transported from Helwith Bridge to Tadcaster in sections, laid flat, on a horse-drawn wagon. Such fermenting vats are known as "Yorkshire Squares". Beer, being only slightly acidic, did not permanently affect the Flag (strong acids would eat away the carbonate in the rock). Flag was used because the material was relatively cheap, was available in the north and could be fashioned into vessels of an adequate size for breweries of that era. Horton Flags were once carted to the railway station at Settle and consigned, as vats in sections, to breweries in Northern Ireland.

Shelving (Fig. 9). A local term for shelving at farms is "benks". The use of Horton Flags for this purpose had two great advantages over other materials. The flags are always cold to the touch, which was vital in hot weather when food or liquid was kept cool only with great ingenuity on the part of the farmer's wife, and the milk that lay on the surface of the flag could easily be wiped off. Flag was therefore hygienic. One of the oldest examples of such shelving reveals it to be made of Flags that are fairly rough, and irregular in width. In 19th century farmhouses, shelves—frequently set in large cellars—were beautifully sawn and polished, the surface being kept to a marble-like sheen by frequent spillage of milk.



FIG. 10.

A stile at Sherwood Farm, near Helwith Bridge. This stile and the wall are composed of Horton Flags, pieces of which provide a canopy at the farmhouse door behind.

A farmer's wife at Wharfe, near Austwick, recalled that the dairy of her home faced north, and it was always cool. At a time when butter was made regularly on the farms, the coldness of the Flag kept the butter firm until it could be taken to market.

Walls. Around Helwith Bridge, the drystone walls (Fig. 10) are composed almost entirely of pieces of Flag; elsewhere it was used as "throughs" or as gate-stoops. Flag for walling was being sold in 1923 at "a shilling a cart load". If two courses of "throughs" were incorporated in a wall, the top "through" would be 45.5 cm or 61 cm, and the bottom about 80 cm. Gate-stoops varied in size and thickness; also in pattern, but generally they were shaped to the walls, to create a neat appearance (Fig. 11). A typical stoop was 109 cm by 48 cm by 5.08 cm. One form of stoop has three holes, into which the ends of bars of wood were slipped to provide a stockproof barrier at the entrance to a field.

Boskins. These, you may recall (see Fig. 4), are the divisions between the stalls in a shippon. Flag boskins are found in quite a number of outbarns in North Ribblesdale, being invariably set in a wooden frame. (Flags were also used as panels between sections in outbuildings.)

Foot-scrapers. Many of these remain, some of them being dated, (invariably from the latter part of the 19th century). An example outside the porch of Horton-in-Ribblesdale church has a diameter of 45 cm, and a thickness of 8.2 cm (Fig. 12). There is a possibility that the circular pieces of Flag on which scrapers stand were from holes cut out from pieces intended as covers for brewer's vats; some enterprising quarryman, and the local blacksmith, created an object that was useful and decorative.

Gravestones and Memorials. A brief investigation of those in the churchyards at Horton, Giggleswick and Settle reveals a Flag tombstone of the Green family dated 1767 at Horton, an oblong Flag to the Bolland family (1774) composing part of the church path at Giggleswick and, inside Horton church, a two-piece memorial to Proctor of Studfold, yeoman, dated 1789. At Giggleswick, there are Flag tombstones of late 18th century date, the details being on brasses attached to the Flag. A two-piece base to the Birkbeck memorial is inscribed at the bottom "Leyland and Bromley, sculptors, Halifax and Leeds". In Settle Church, special use was made of the Flag as the base of the marble memorial erected by the Midland Railway Company and fellow workmen to the memory of those who died during the construction of the Settle-Carlisle Railway (1876-1896).

RECORDING

My investigation into the uses to which Horton Flags had been put took place in 1980 and 1981; so little research had been carried out that I had to devise my own method of inquiry and my own technique for recording examples. Much time was spent in conversation with older people in the district. Simple drawings of items made from Flag were made at the time of investigation, and sometimes the perspective was deliberately distorted, as in the case of shelving in a farm kitchen, where there must be space left for measurements. At home, simple drawings were developed into neat illustrations. Attempts were made to group items, such as gate-stoops. One page of illustrations relates to the boundary stones of Swarth Moor, each being represented by a drawing on which are measurements and details of any inscriptions.

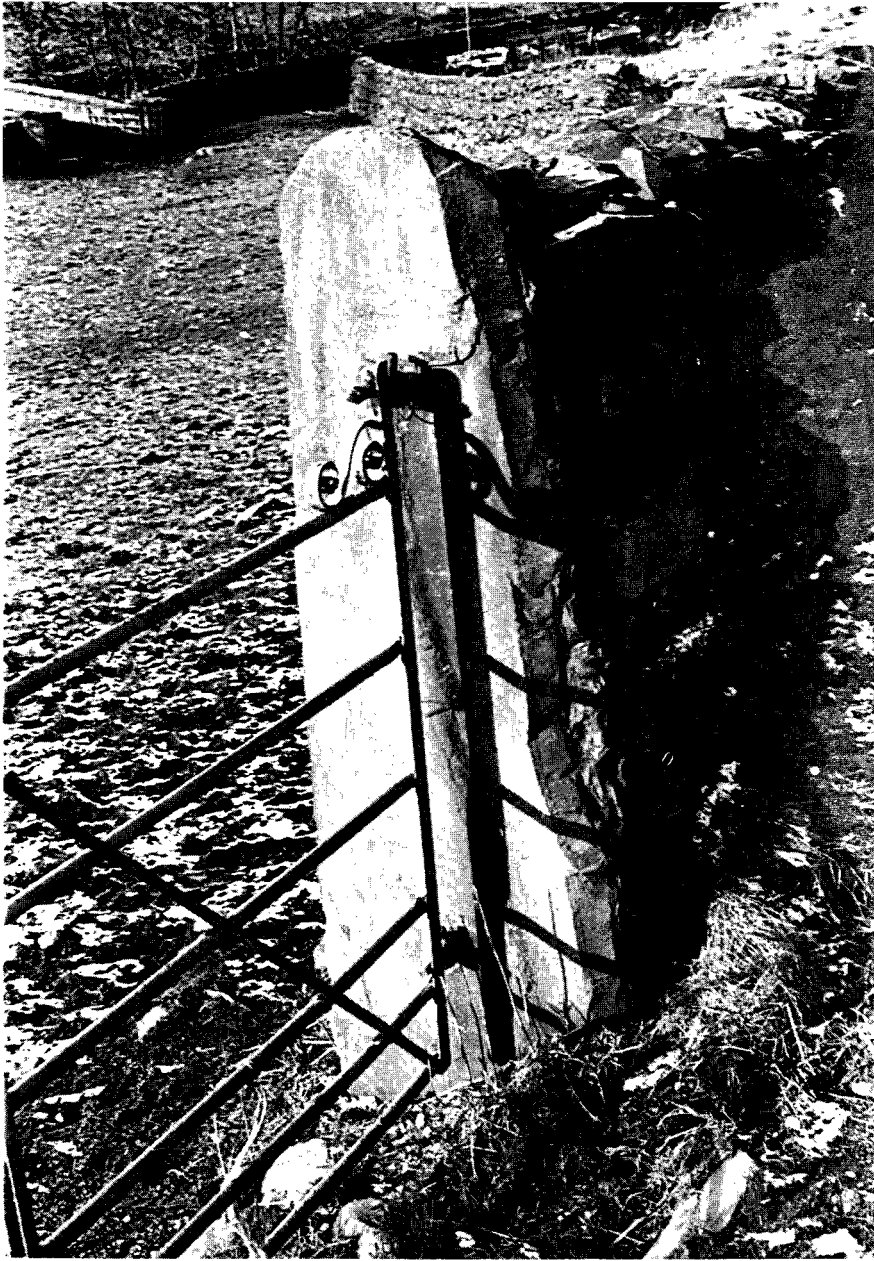


FIG. 11.

A gate stoop of Horton Flag, the edges roughly shaped. Such stoops are a common feature in North Ribblesdale.



FIG. 12.

Horton-in-Ribblesdale Church. The path and circular base of the foot scrapers are composed of Flag.

Now that the most urgent work has been done, future studies could usefully record each significant piece and plot its geographical location. More historical research could be undertaken with reference to old documents. Hopefully, some outstanding items in Flag can be preserved when their useful life is over.

ACCESS

The quarries are on private land; permission to enter them should be sought from a responsible person.

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APPENDIX

Examples of the use of Horton Flag

Horton-in-Ribblesdale Church and Yard (GR 810722) See Figs. 6 and 12. Look for monuments in (and on the outer walls) of the church. Within, on a window ledge, are brasses that originally adorned memorials outside. The churchyard paths are of Flag; and so are the bases of the foot-scrapers just outside the porch. Gravestones of Flag include some that have been given simple decoration. The lych gates are roofed with immense pieces of Flag bolted together.

Helwith Bridge (GR 810695). Virtually every building has large amounts of Flag, which has also been used to pave the yard in the area of the old mill and provide substantial sections of local walls. Notice, in particular, three huge pieces of Flag standing near the steps of the old mill, which is now a private house. The walls of the mill include pieces of Flag of considerable length. Here and on the building, where once the quarryman's two-wheeled trap was kept, sections of iron rail provide durable lintels.

Foredale (GR 803700). The road from Helwith Bridge to the quarries eventually bears left and extends to a row of cottages high on Moughton Fell. This is Foredale, close by old Coombs quarry. Outbuildings at Foredale Farm (dated 1731) show an ingenious use of Flag. A large sheep house was built entirely of this material.

Bridge near Cowside (GR 845667). Look under the bridge to see large pieces of Flag side by side, secured by pieces of iron, bolted into position. The bridge's central support is protected by Flags, two having been angled to deflect the stream, and held firm against the current by strong bolts.

Giggleswick Churchyard (GR 812641). *Settle Churchyard* (GR 819639). Much evidence of Flag in the form of paths and memorials.

Linton Court (GR 819636). Enormous cistern and a very stylish Flag porch can be seen in the yard of this house (as you walk to a building developed as a centre for art).

JOURNAL OF BIOLOGICAL EDUCATION

The Journal was launched by the Institute of Biology in 1967. It is now in its nineteenth year of publication. During this time it has gone through a number of changes—of format, of appearance and of potential readership.

The last change in style was in 1981 when radical changes were introduced to give the Journal a more attractive appearance and to aim it more specifically towards secondary school biology teachers. However, it was, and is, still intended to act as a forum for discussion of issues broader than the school biological curriculum.

One of the changes has been to introduce a number of new sections. One of these, 'Practical Biology' consists of contributions *from* practising teachers *for* practising teachers. This has proved to be one of the most successful of the innovations. A recent issue, for example, included articles on practical aspects of investigating the growth of your hair, a new approach to the traditional flask eye model, plant responses to shading, and the medical origins of some food plants.

Many areas of biology are changing rapidly and textbooks can soon become out of date. In the 'Update' series we invite experts to explain, for the lay person, the important developments in their fields.

The teaching of ecology and the whole area of conservation are topics that the Editorial Board believe are of especial importance. Over the years many staff at Field Studies Council Centres have provided valuable contributions. These include a classic paper by Rupert Booth and Charles Sinker¹, a look at the value of long-term ecological experiments with the Nettlecombe Grass Plots², the use of Woodlands³, and a particularly interesting pair of papers that looked first at the interactions on a rocky shore where a freshwater stream entered⁴ and then at a microcomputer program⁵ based upon the data from the same site.

A feature of particular interest to teachers is the occasional resource lists; in recent volumes these have included audiovisual aid suppliers, computer programs in biology, and audiovisual materials for genetics. These are supplemented by reviews of audiovisual materials, software and books.

Biology is too important a subject not to poke fun at it and a surreptitious look at 'Out of Focus' would have recently revealed details of the RATS (Rabbits and Teaching in Schools) Project, and the problems of the out-of-school visit.

If you have a good idea for biology teaching and want to pass it on, or want to air your views on a controversial topic, why don't you get in touch with me? We may be able to work something out to contribute to Biological Education generally. If you do not already contribute or subscribe to the Journal and would like to see a copy let me know. I will be pleased to send you a specimen copy and details of how to order it.

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