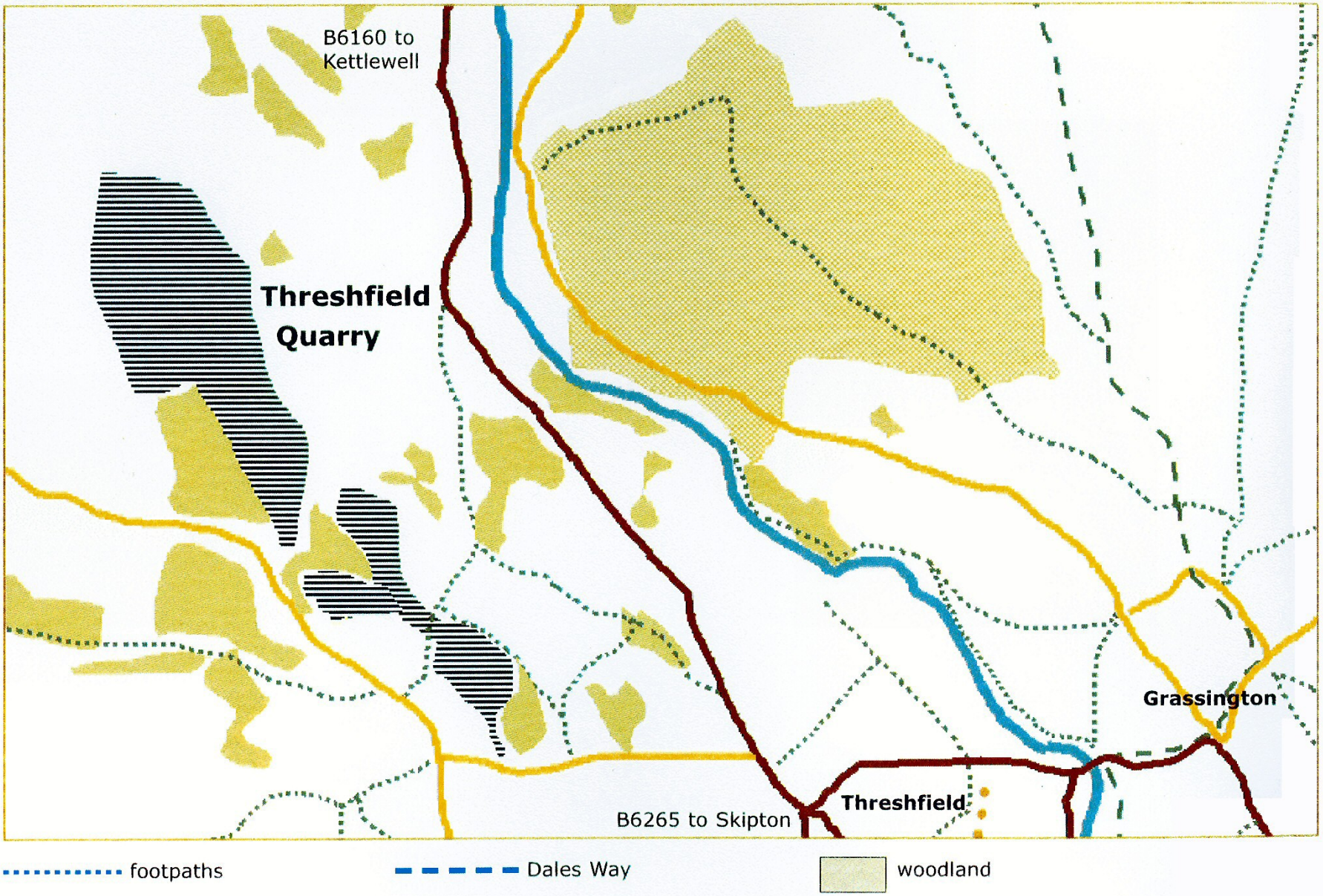
Threshfield Quarry

Industrial Heritage in the Yorkshire Dales


B6160 to
Kettlewell
Threshfield
Quarry
Grassington
Threshfield
B6265 to Skipton
footpaths
Dales Way
woodland

Contents

Illustrations

Front cover: Painting of Threshfield Quarry in the 1920s by J.C.Midgley
Inside front cover: Map of the area around Threshfield Quarry.

Back cover: Aerial view of Threshfield Quarry in 2004 © Tarmac Ltd

Why is there a quarry here?

350 million years ago the Threshfield area was at the bottom of a warm, shallow sea, with waves lapping against coral reefs along a nearby tropical coastline. This scene lasted with minor fluctuations for around 60 million years, from 359 to 299 million years ago (the Carboniferous Period). During this time the shells of countless tiny creatures built up on the sea floor and became compressed to form limestone. The shells, and the rock they formed, are almost entirely made up of calcium carbonate. The calcareous remains of the corals survived as isolated rounded hills called reef knolls.

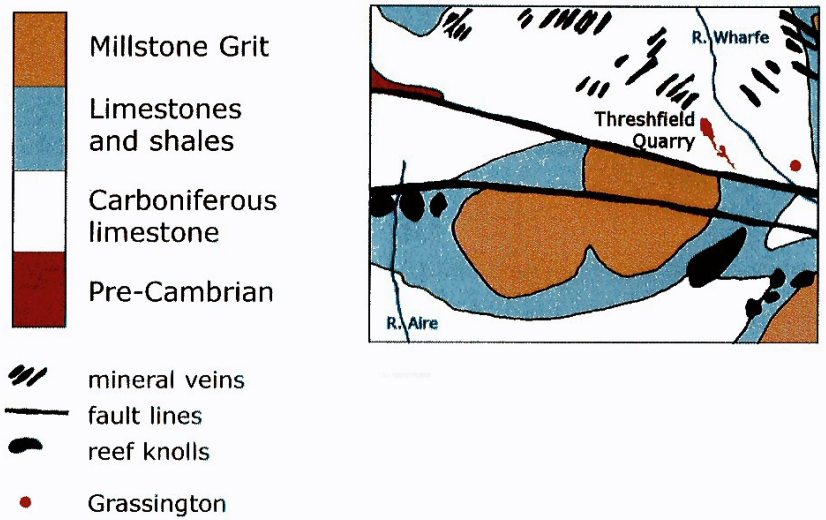


Fig. 1 Simplified geological map of the Threshfield area.

In the Threshfield area a different kind of limestone occurs that contains high values of magnesium carbonate. These pockets of dolomitic limestone are browner than the grey calcium carbonate limestone, and part of the early quarry at Threshfield was known locally as 'The Brown Hole'. Because of their different chemical composition, the different types of limestone that were quarried at Threshfield had different uses, including dressing fields to improve their fertility and treating magnesium deficiency in cattle. When burnt in a kiln the stone was turned into lime for making mortar, cement and plaster, but more recently stone from Threshfield was used as aggregate or coated stone for the construction industry.

What was here before the quarry?

During the early development of Threshfield Quarry there was much less concern for its impact on the landscape than there is now. On either side of the quarry traces of ancient settlements and field systems survive, and aerial photographs taken after the Second World War show features that no longer exist in the quarried area. They include an ancient settlement, a droveway and an old mine shaft, and were among many features in the Dales first recorded during the twentieth century by Dr Arthur Raistrick. His work gives us an idea of the wealth of historical evidence around Threshfield, and along with studies of the geological and biological diversity of the area helps us to recognise its importance on an international scale.

We now know that people began visiting the area as the ice retreated at the end of the last glaciation, over 10,000 years ago. The most visible evidence in the landscape today, though, spans a period of some 3,500 years from the Bronze Age (around 2,000 BC) to Medieval times.

At the start of this period the first permanent settlements were created - small family farms on the light, well-drained limestone soils.

Fig. 2 Some aspects of the ancient landscape around Threshfield Quarry.

These early farmers began a process that significantly changed the appearance of the Dales landscape. Their farms were initially clearings in the woodland that covered the region, and more and more of this woodland was cut down as the farms expanded. Changes in climate also played a part: areas that were fertile and attractive at first were abandoned as they became over-worked and climatic conditions worsened - but there are many questions about this process that still remain to be answered.

Fig. 3 An artist's impression of the early farming landscape at Threshfield, around 4,000 years ago.

During the Middle Ages the pattern of modern settlements and fields gradually evolved. German-speaking settlers, the Angles, moved into the area and many of the modern villages bear names in their language - English. Later still Norse settlers brought their own influences, including a strong contribution to the local dialect. Many of the abandoned prehistoric settlements by this stage lay under sheep-grazed turf, and this has helped to preserve them up to the present day. The Dales have been said to contain some of the best preserved ancient landscapes in Europe, and this is certainly true of the area around Threshfield Quarry.

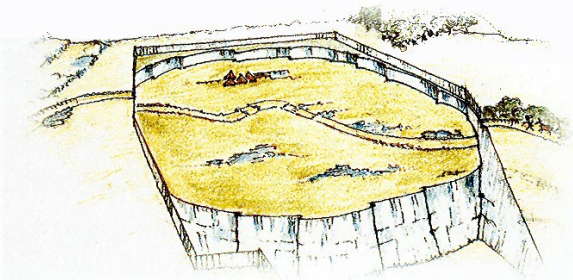
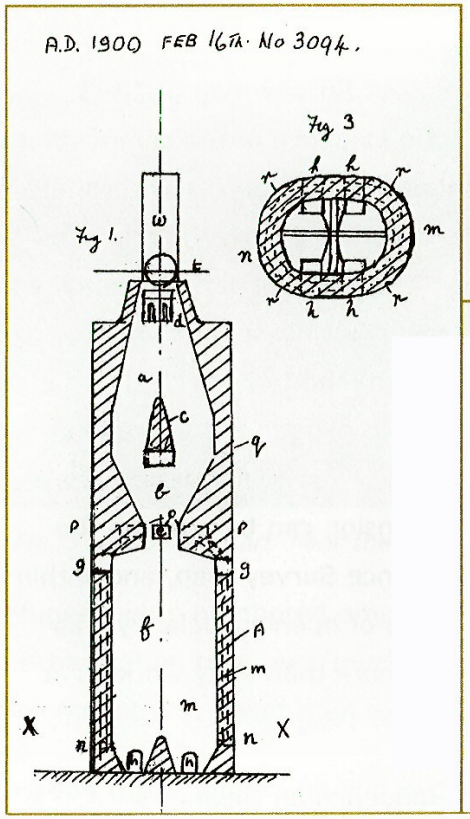


Fig. 4 Features in the landscape can be linked on either side of the quarry.

In recent years detailed work has added to the broad picture painted by Dr Raistrick. The droveway still exists on either side of the quarry, but no evidence survives to link it to the nearby homestead. On the eastern side of the quarry, a complex area of settlement and fields dates to the early centuries AD. The droveway linked this settlement to higher fields or enclosures that now lie on the western side of the quarry. We can begin to see how, thousands of years before Threshfield Quarry was opened up, the landscape was organised around the small farming communities of the area.

The life of Threshfield Quarry



A kiln wall: firebrick inner lining clad in a steel casing
a upper calcining chamber
b lower calcining chamber
c,g fuel feed holes
e aperture for partly calcined stone to feed from **a** to **b**
m vertical hot air flues
o holes to recirculate hot air into the calcining chambers
p - p at Threshfield, everything below this level was dug through solid rock
t dampers to control air intake
h draw holes to extract calcined lime

Fig. 5 Drawing from William Spencer's patent for 'improvements in kilns for burning or calcining limestone or the like'.

With an expanding population in the seventeenth century and the growth of cottage industries, people often needed extra space in their homes for workshops. Single storey houses could be built with crude walling, but for a second floor a good strong mortar, using lime and sand, was required to hold the wall-stones together. Rooms that were used as workshops were whitewashed with lime to improve the light for weaving and other crafts. Limewashing of farm buildings, such as dairies and the entrances to milking areas in field barns, exploited the antiseptic properties of lime.

Across the country, farmers had known for a long time that spreading lime on their land would enrich it and increase productivity. With agricultural improvements in the eighteenth century more lime was needed, and this was particularly so during the Napoleonic wars when the demand for grain could not be met with the help of imports.

Limestone has to be burnt to turn it into lime for these and many other uses. Hundreds of small lime kilns were built in the Dales during this period, exploiting the local limestone outcrops through small scale quarrying. Many of these field kilns can still be seen today, and they are an important feature of the Dales landscape.

At the end of the nineteenth century the burning of lime was being developed on an industrial scale, and patents were granted to William Spencer of Lothersdale for a design that became one of the national industry standards.

The Threshfield Enclosure Award of 1827 designated two public quarries, one on Threshfield - Malham Moor, including a field lime kiln, and the other in Skirethorns Wood beneath Round Hill. These two sites were set aside for the allotment holders to obtain stone for repairs and for 'the getting of limestone and burning the same into lime' which could be done 'there or elsewhere' - but it could only be for their own use and could not be sold on.

Fig. 6 The Spencer kilns at Threshfield Quarry in 1963.

The Ordnance Survey map of 1893 shows little evidence of the commercial exploitation of limestone at Threshfield. It was not until the early years of the twentieth century that John Delaney, an entrepreneur businessman living in Settle, leased land from the Wilsons of Eshton Hall to expand the operation. Having started in 1902 the early phases of this expansion can be seen on the 1907 Ordnance Survey map, and within fifteen years of opening Delaney was employing more than sixty workers at Threshfield.

A major influence on Delaney's investment at Threshfield, and William Spencer's operation at nearby Swinden quarry, was the opening of the Yorkshire Dales Railway from Skipton to Threshfield in 1902. The rail link allowed large quantities of lime and limestone to be sent down the dale, while in the other direction coal was brought in to fuel the limekilns - Delaney's own coal mine on Threshfield Moor was not able to provide enough fuel for the kilns and closed down after only three years.

Coal was used as fuel in four large kilns to burn limestone from the quarry and turn it into lime. A fifth kiln was added in 1934 (on the extreme left in Fig. 6) to feed the nearby hydrating plant. Bags of hydrated lime were taken down the tramway to the rail head in Threshfield, from where they were carried on the main rail network as far as Scotland.

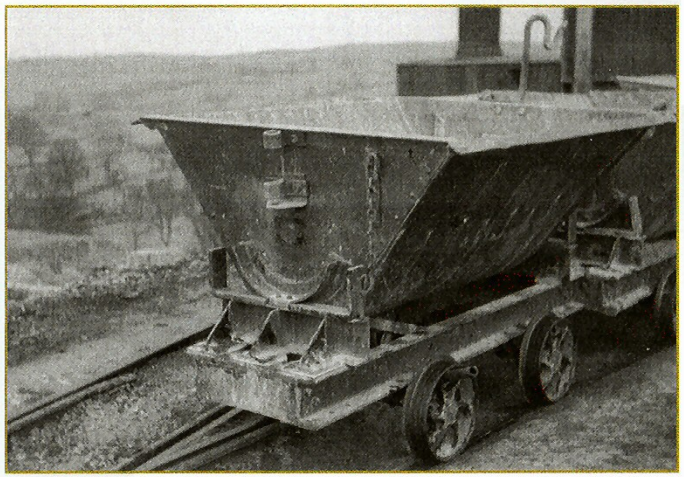


Fig. 7 A 'Jubilee Cart' near the kilns at Threshfield.

The whole operation, including the short-lived coal mine on Threshfield Moor, was linked by narrow gauge railway tracks. Carts carrying stone or coal were hauled by hand and linked on to a continuous wire rope. This system, which was originally powered by a stationery steam engine, pulled them up the incline to the kilns, and along the tracks across the fields. The link to the railhead in Threshfield carried up to 1100 carts a week at the height of operations.

During the Second World War Italian and German prisoners of war worked in the quarry, and after the war European refugees were numbered among the workforce. After 1945 increasing mechanisation took over much of the hard labour of the early quarrying jobs, but also meant that fewer men were needed.

In 1964 the lime burning and hydration operation came to an end, when new management at the quarry decided to concentrate on producing crushed stone and agricultural limestone. Over its ninety year life the quarry expanded many times, and under its present owners, Tarmac Limited, output ranged from 500,000 to 1,000,000 tonnes per year.

Fig. 8 The narrow guage railway and rope haulage system.

Fig. 9(a) Aerial photograph of Threshfield Quarry in 2004 © Tarmac Ltd.

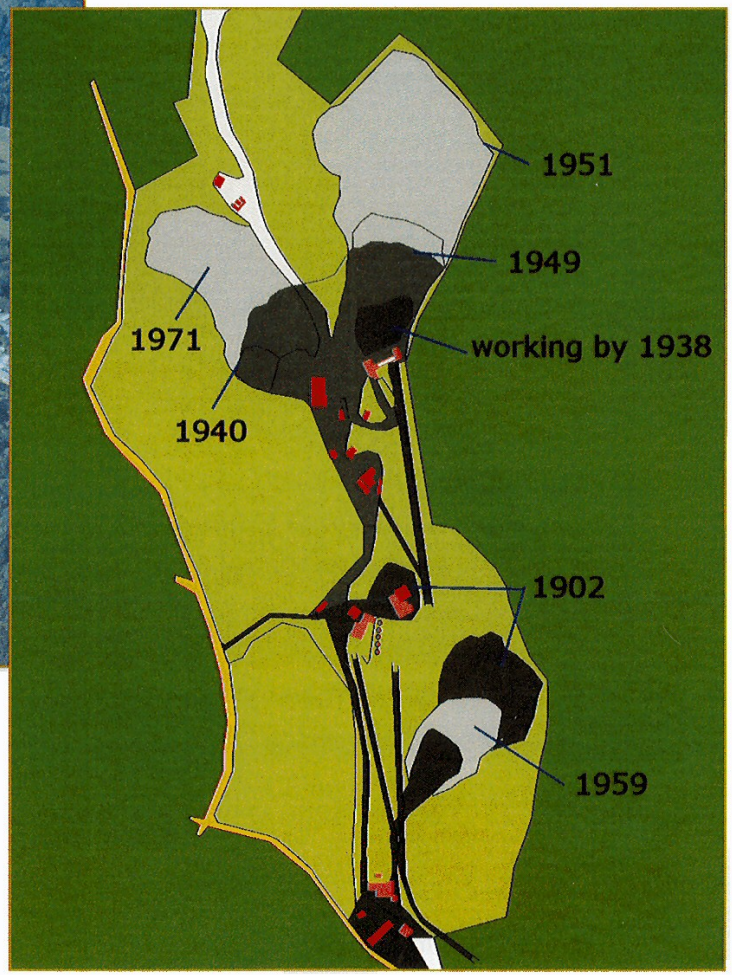


Fig. 9(b) Broad phases of the development of the quarry. Darker shaded areas are earlier.

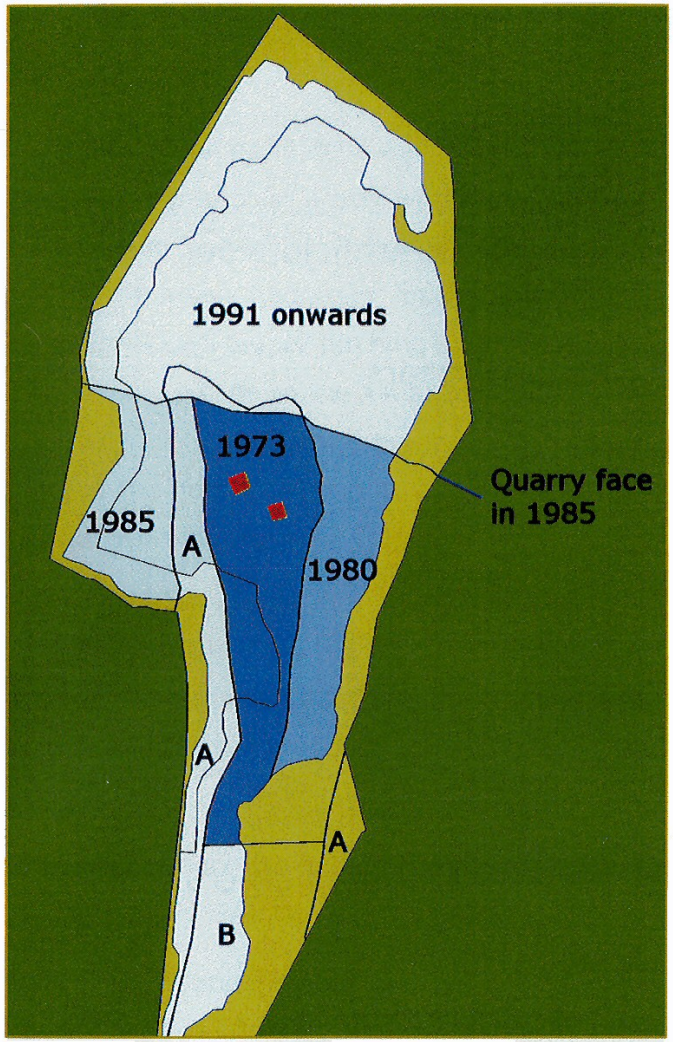


Fig. 10(a) The development of the northern part of the quarry.
Fig. 10(b) Aerial photograph taken in 2004 © Tarmac Ltd.

Settle Limes Ltd applied for planning permission for a northward extension of the quarry in 1952, but work did not begin until much later. Permission was initially refused for the areas marked A on Fig. 10(a), and further details were requested for area B. Quarrying began in 1973 and continued up to the present limits of the quarry over the next 20 years.

Summary of main events in the life of Threshfield Quarry

1902 John Delaney purchased mining rights for coal and lime getting in Threshfield. Four limekilns were built at the quarry over the next few years.

1905 The coal mine on Threshfield Moor was abandoned after just three years.

1921 John Delaney died. His business continued under his daughter's management.

1934 A fifth kiln was built to supply hydrating plant.

1935 The company purchased the freehold of Threshfield Quarry.

1939 Formation of Settle Limes Ltd

1949 The "Brown Hole" quarry was abandoned as worked out.

1961 Settle Limes Ltd bought out by ICI Mond Division

1964 The kilns and hydrating plant were decommissioned, and work concentrated on crushed stone and ground agricultural limestone.

1965 Northern area of the quarry leased to Mountain Limestone Ltd

1966 ICI Mond Division bought out by Tarmac

1979 Mountain Limestone Ltd was purchased by Tarmac, the present owners of the quarry.

Working at Threshfield Quarry

Quarrying in the early days was organised between four groups of workers. The *shot firers* were responsible for drilling holes in the limestone to blast a new working face. Then the *barers* came in to prize off any loose stone and make the face safe. Any blasted stone too big to smash up was reduced by the *poppers*. The *breakers and fillers* then smashed the stone into smaller pieces with heavy hammers, loaded the kiln carts and pushed them to the weighbridge before hitching them onto the rope system that pulled them up the incline to the kilns. Before 1921 men were paid a shilling (5p) per foot for drilling; there were between 16 and 20 breakers and fillers at the quarry, who in 1904-05 were paid 6d (2.5p) per hour for a 55 hour working week.

Fig. 11 Extending the quarry face in Threshfield Quarry.

There was also a strict demarcation of tasks at the kilns. *Packers* were responsible for loading the kilns with stone and fuel. *Lime drawers* emptied the kilns and filled the rail wagons; the *fireman* was responsible for maintaining the burn.

As the quarry developed through the twentieth century these hard jobs were increasingly mechanised, improving output considerably and leading to state-of-the-art crushing machinery that can now be seen in nearby Swinden quarry.

Quarries are dangerous places. Without the modern day focus on the health and safety of those who work in them, there were inevitably accidents. Recorded incidents from quarries in Craven show injuries from blasting, rock falls or runaway carts. As well as the dangers of quarrying the stone, burning limestone brought its own risks. Those working around the kilns were exposed to the caustic effects of the lime, which could damage clothing and burn skin. These men would smear animal fat on exposed skin in an attempt to protect themselves, but sometimes incidents such as 'blow-back' resulted in serious burns.

The landscape of Threshfield Quarry

Threshfield Quarry lay at the hub of a wide area of industrial activity. Coal mining on Threshfield Moor is recorded from the 17th century in the estate archives of the Cliffords of Skipton Castle, and Sir Matthew Wilson of Eshton Hall. Unrecorded mining may well have begun earlier, but this was a time of industrial expansion when the demand for coal was rising. In 1603 miners from Derbyshire came to the Grassington area to develop lead mining on the Duke of Cumberland's estate. Wood and coal were used to fuel the smelt mill that processed the ore from the greatly expanded workings.

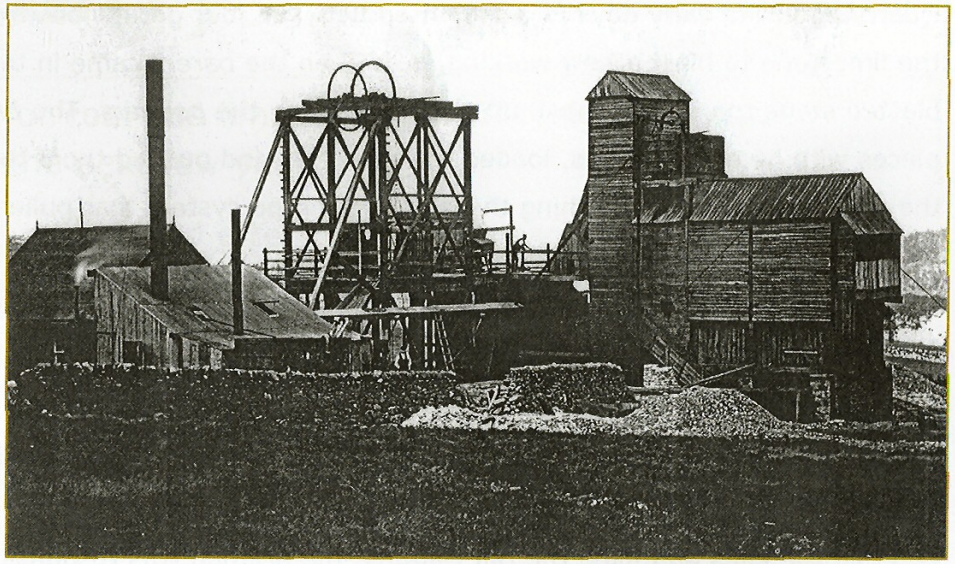


Fig. 12 John Delaney's coal mine on Threshfield Moor.

Threshfield Moor is pock marked with dozens of shallow shafts, each surrounded by the upcast waste material from the excavations. Although the Coal Authority does not have official records of mining here before the twentieth century, clues can be found in the local census returns where mining-related occupations are listed.

The 1841 census of the Threshfield area, in the Parish of Linton, shows the Lambert, Stayles, Paley and Heaton families engaged in coal mining. In the 1861 census Joseph Lambert is recorded as a coal proprietor, as well as farming 60 acres in the area, and this close association of the Lamberts was to continue for the next 30 years with the Dolphin and Constantine families also heavily involved.

With the expansion of quarrying in the early 1990s to take advantage of the new railway line between Threshfield and Skipton, John Delaney and William Spencer were looking for sources of coal to fuel their limekilns.

However, the early workings on Threshfield Moor were to cause problems for the development of coal mining there, and the colliery that Delaney established in 1902 soon ran into difficulties. The coal was of poor quality, and needed cleaning before it could be used. Geological fault lines, along with the many earlier shafts dug by 'the old men', made the venture unworkable. After operating for only three years the colliery manager, Leroy Marshall, signed off the abandonment plans in November 1905.

It was stated at the time that John Delaney's colliery on Threshfield Moor lost him around £30,000, but this was to be quickly offset by the fortune he made from his quarries in Craven and his rapidly developing coal empire across the north of England.

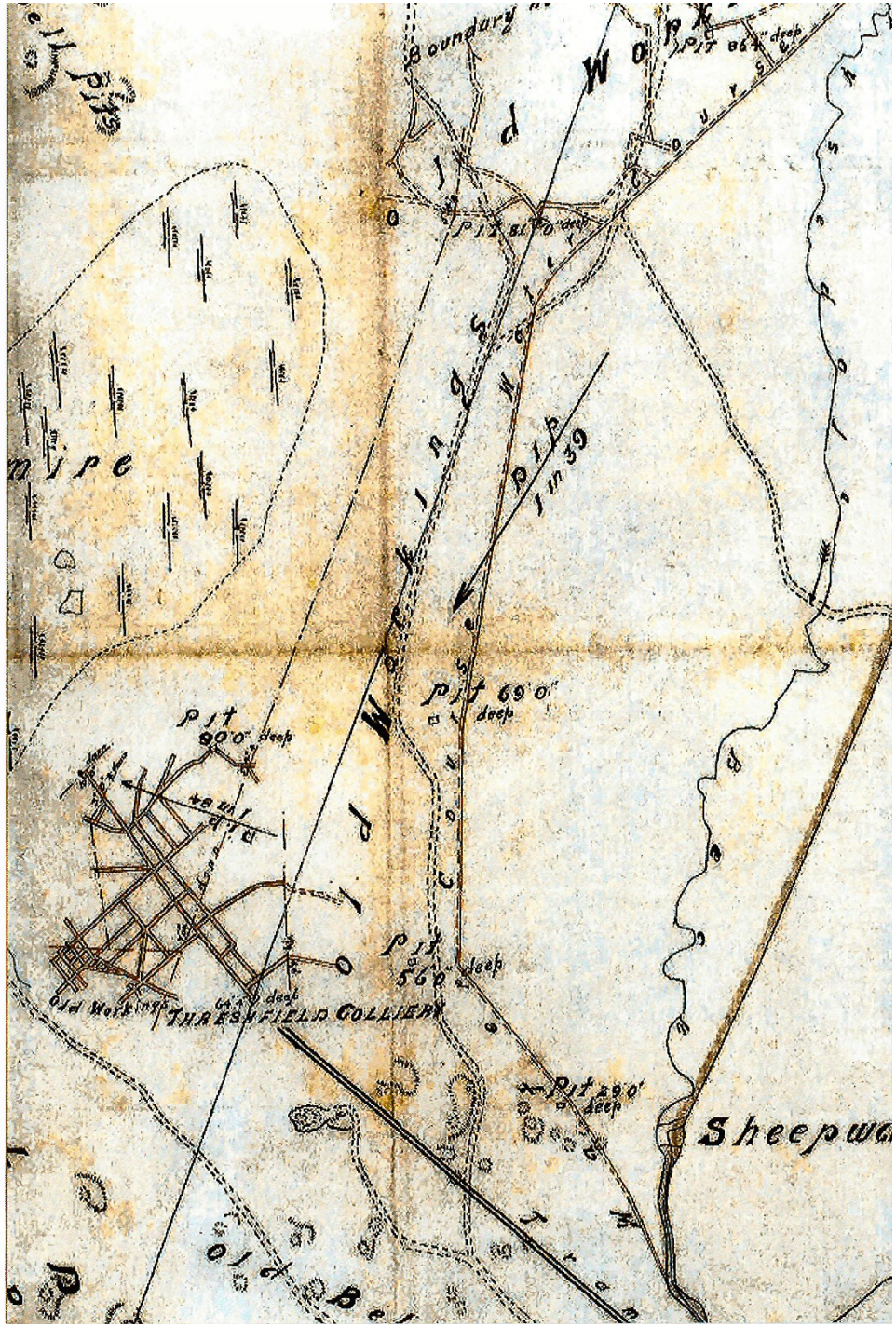


Fig. 13 Part of the map of Delaney's coal workings on Threshfield Moor.

The rail link to Threshfield Quarry

Anyone living near a working quarry today will tell you about the impact of transporting stone from source to market. During the Industrial Revolution the development of bulk transport by canal and railway was tremendously important, and Delaney's interest in exploiting the limestone at Threshfield may be closely related to proposals for a railway heading up Wharfedale from Skipton.

The idea, and possible routes, had been discussed for over half a century. Eventually, in August 1897, the Yorkshire Dales Railway Bill was presented before Parliament for approval.

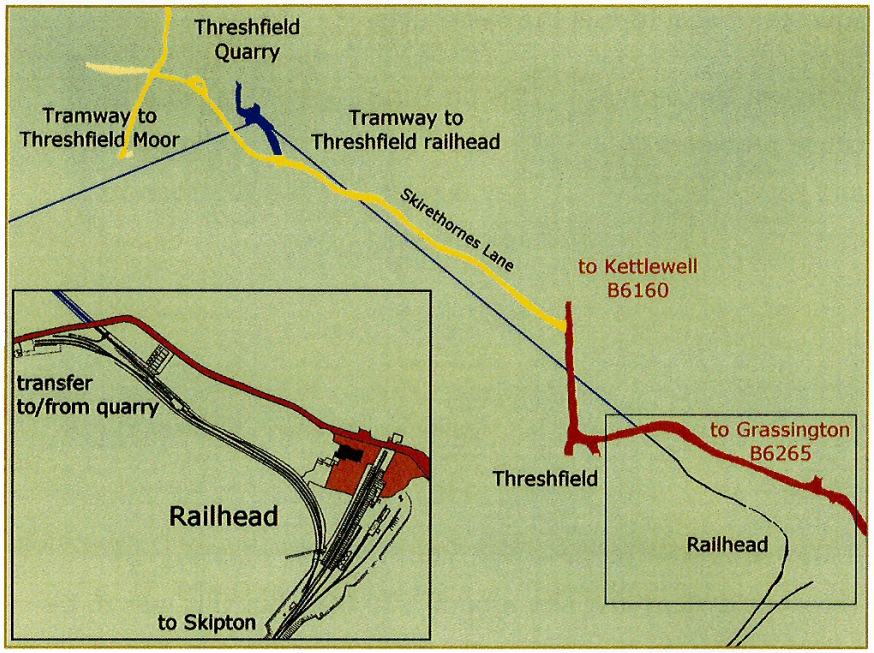


Fig. 14 The continuous rope tramway links to Threshfield Quarry.

The original plan was for 'as cheap a contract as possible', with single line working, no turntable and a minimum of engineering. Problems of geography - the river Wharfe and differences in height of the land on either bank - meant that the line terminated in Threshfield and did not cross the Wharfe to Grassington. Construction began in June 1900 and the line opened two years later on the 29th July 1902, the same year that John Delaney bought the mining rights for coal and limestone at Threshfield.

In 1904 Delaney built a tramway to link Threshfield Quarry with the railhead, just as another tramway linked the quarry to the coalmine on Threshfield Moor. The rails were 2 feet 6 inches apart (0.76m) and ran for over a mile (1.6km) from the quarry, through a tunnel beneath the main road near the present day Threshfield Garage. An endless loop of rope that ran along the tracks was turned by a steam engine, and the loaded carts were hitched onto it by hand.

Industrial Heritage at Threshfield Quarry

All of the activities described so far in this booklet have left traces in the landscape in and around Threshfield Quarry. Construction work relating to the quarry has been matched by changes, clearance and new workings that have overlain or removed earlier evidence. If you know what to look for, though, you can still see the remains of where the huge kilns once stood in the quarry, and the tramways that linked the quarry to the coalmine and railhead across the fields. Many fences around the quarry are made from short lengths of iron rail from the tramways, and fire bricks from the kilns have found their way into stone walls.

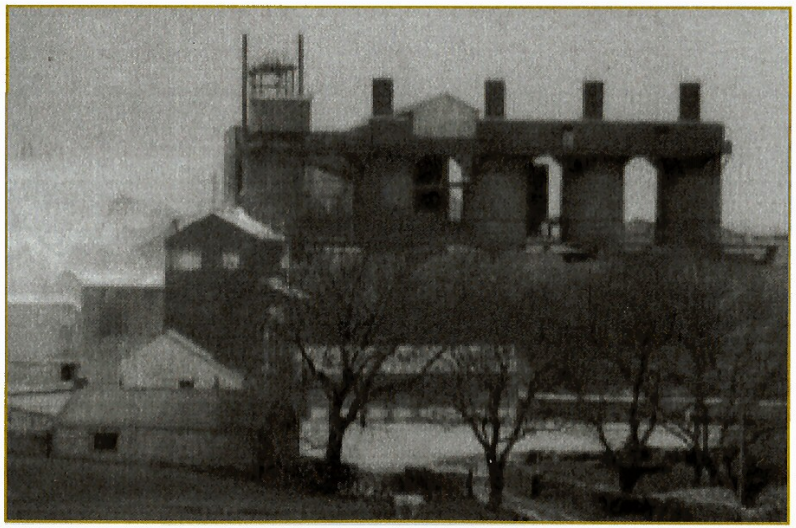


Fig. 15(a) The kilns and hydrating plant in 1963. The original entrance to the quarry was along the track from bottom right.

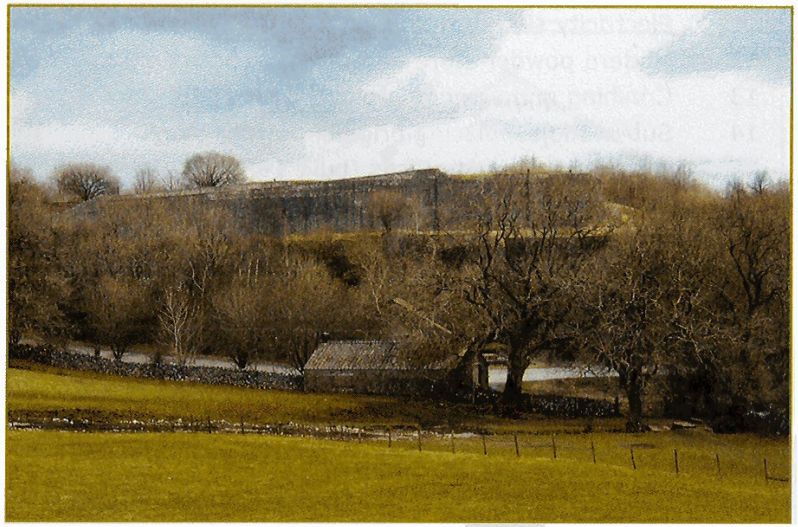


Fig. 15(b) The same view in 2008. The electricians' workshop in the foreground is readily identifiable, and the buttresses where the kilns stood can be seen.

Much of the plant and machinery has now been stripped from Threshfield Quarry. A few early buildings survive, including the bag store for the hydrating plant and the electricians' workshop that can be seen in both of the photographs in Fig. 15. All the buildings standing on the site in 2008 have been recorded and photographed, and further details can be seen on the website (see inside back cover).

1	Weighbridge and office, 1958 - 1986.
2	Shed.
3	Garage.
4	Ambulance station.
5	Boiler house, chimney, blacksmith's shop.
6	Kilns.
7	Store for crushed limestone. Existing shed.
8	Hydrating plant.
9	Bag store.
10	Electrician's workshop.
11	Electricity sub-station, built 1948.
12	Modern powder store and crusher control shed.
13	Crushing and screening plant, built 1948.
14	Sub-station replacing original powder store.
15	Weighbridges and offices (built 1980s).
16	Stone cabin.
17	Wheel wash.
18	Workshop.
19	Shed.

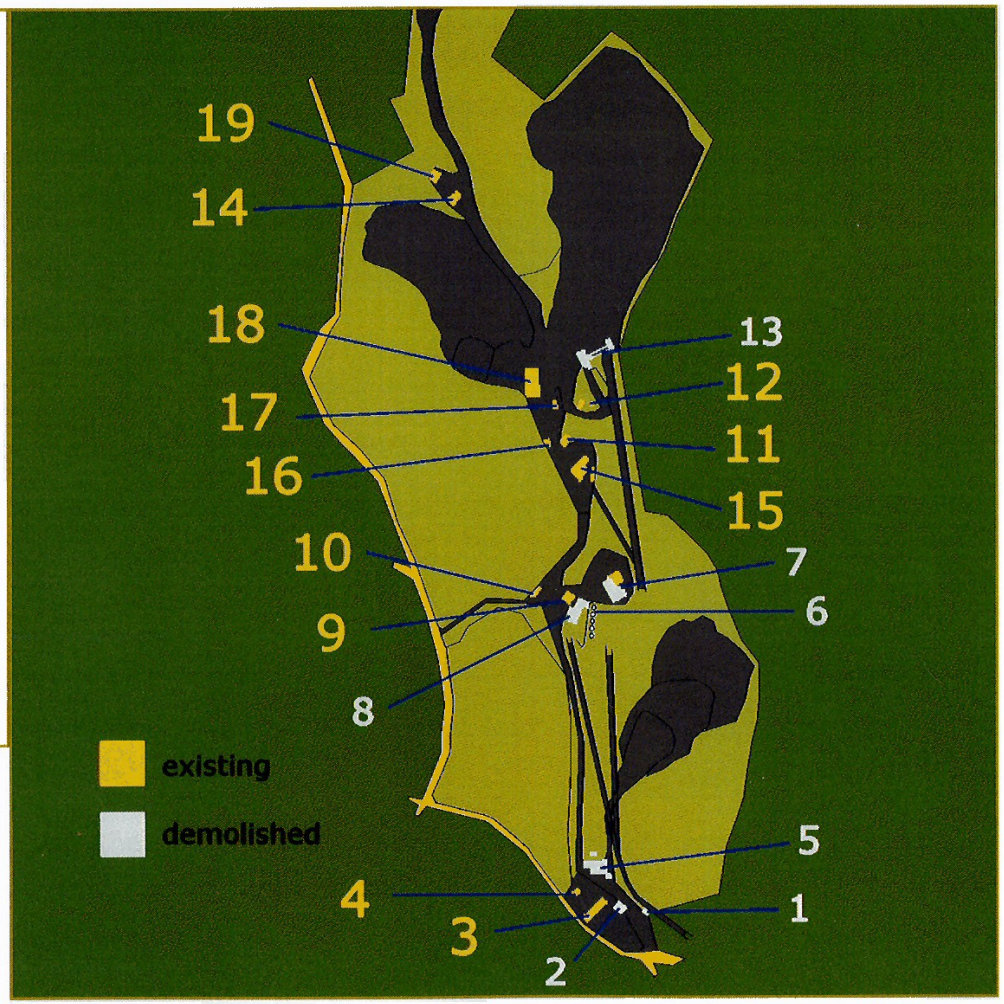
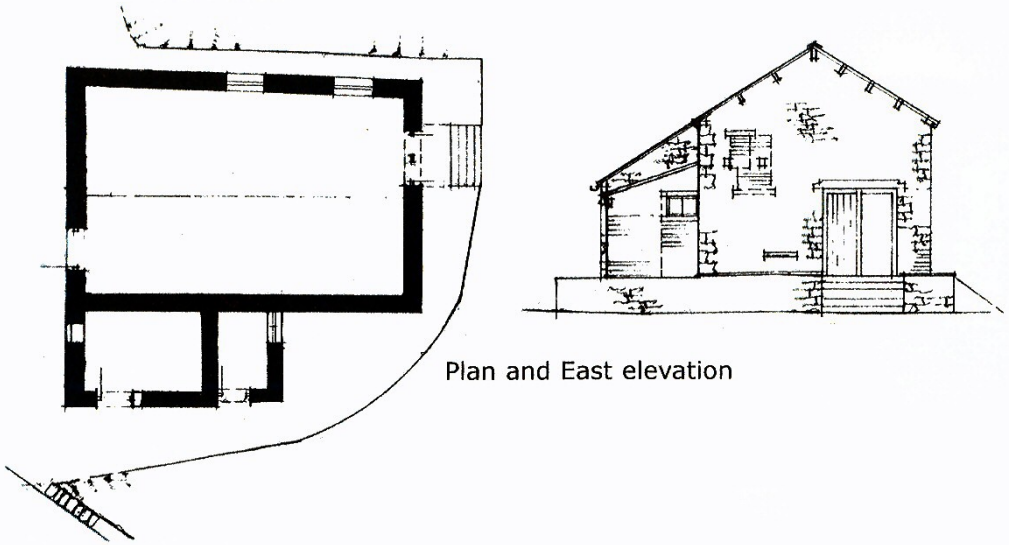


Fig. 16 Identification of existing and demolished buildings in the lower part of Threshfield Quarry.



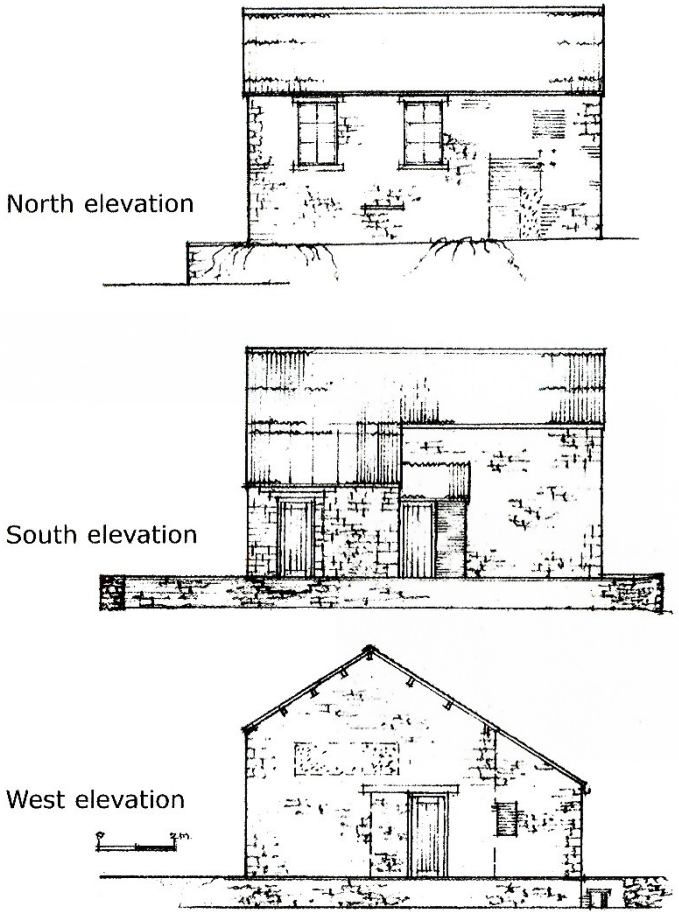


Fig. 17 The Community Project's detailed record of the bag store for the hydrating plant (no. 9 on Fig. 16), built in 1934.

Fig. 18 Buildings at the junction of the inclines to the kilns (top left) and the tramway to the railhead in Threshfield. This is the modern entrance to Threshfield Quarry, seen here in the mid-1960s before the approach road from Threshfield was widened (bottom right).

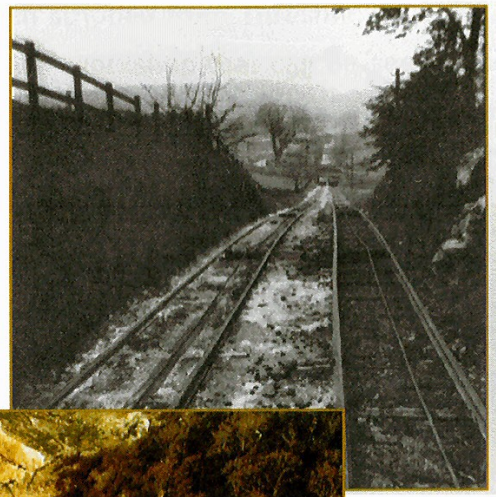


Fig. 19 The tramway from the quarry to Threshfield in 1963 (l) and 2008 (r).

Fig. 20 A wooden sleeper and section of iron rail from the tramway.

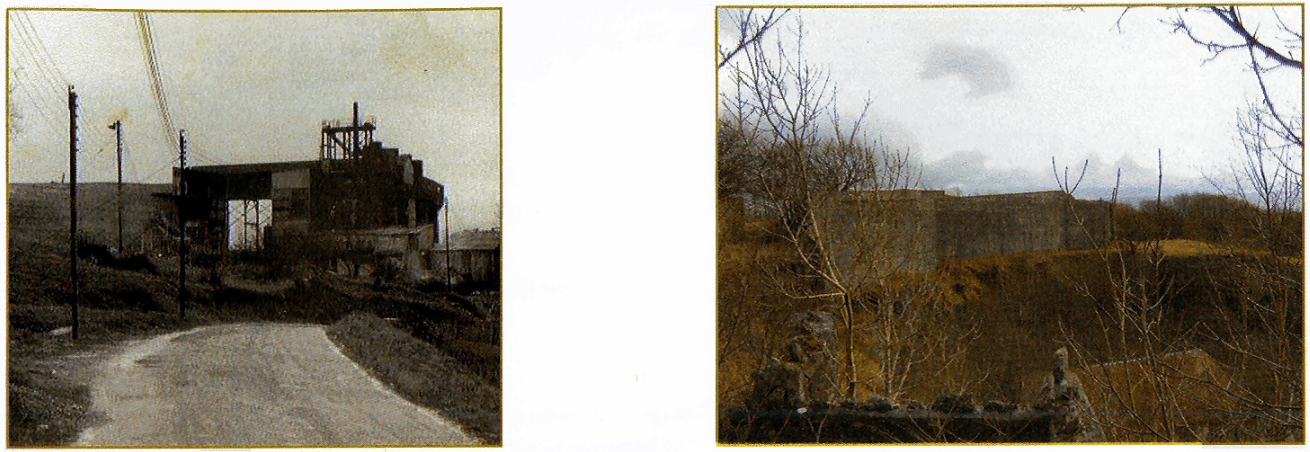


Fig. 21 The kiln superstructure in 1963 (l) and the brick buttressing that remains in 2008 (r). The 2008 view is taken across the 'Brown Hole', one of the original quarries.

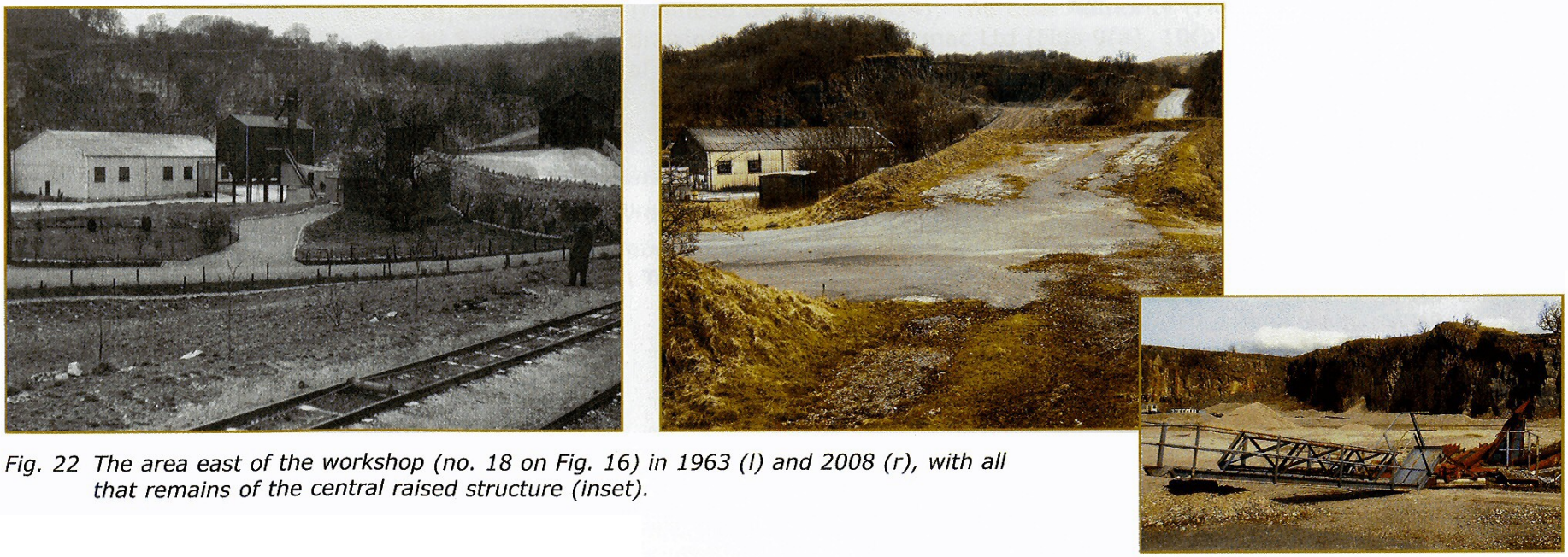


Fig. 22 The area east of the workshop (no. 18 on Fig. 16) in 1963 (l) and 2008 (r), with all that remains of the central raised structure (inset).

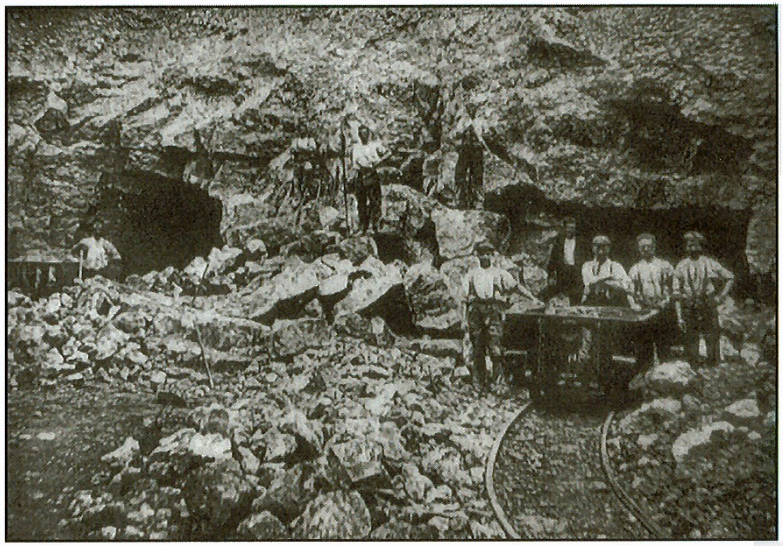


Fig 23 *Unique industrial heritage at Threshfield Quarry. The limekilns were set on solid rock bases, through which the draw holes were carved by hand. Threshfield Quarry is the only place in the country where this technique is known to have been used.*

above: *digging out the draw holes in the early 1900s.*

top right: *the draw holes in 2008, partially blocked and hidden by vegetation.*

right: *inside one of the draw holes. Brickwork, iron hoppers and chutes have survived the demolition of the kilns in 1968.*

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Further reading:

Binns, D. 1990 *The Yorkshire Dales Railway. The Grassington Branch.* Skipton, Northern Heritage.

Johnson, D. 2002 *Limestone Industries of the Yorkshire Dales.* Stroud, Tempus.

Additional information can be found on the project website at ydlrt.co.uk The booklet is printed by Pioneer Press, Skipton, and published by the Yorkshire Dales Landscape Research Trust, Kettlewell.

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