ART. XVII – *The Slate Quarrying Industry in Westmorland: Part Two. A Field Survey of selected sites in Troutbeck and Longsleddale.*

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THE first part of this paper[1] covered the history of quarrying in the three valleys of Troutbeck, Kentmere and Longsleddale, and explored the social and economic impact of the industry on this corner of Westmorland. Since its publication another article on slate quarrying has appeared in these *Transactions*,[2] and further documents have come to light which, though largely confirming the account as presented in the previous paper, have refined some points of detail. This paper provides an opportunity to publish this new material and it will be found in Appendix 1.

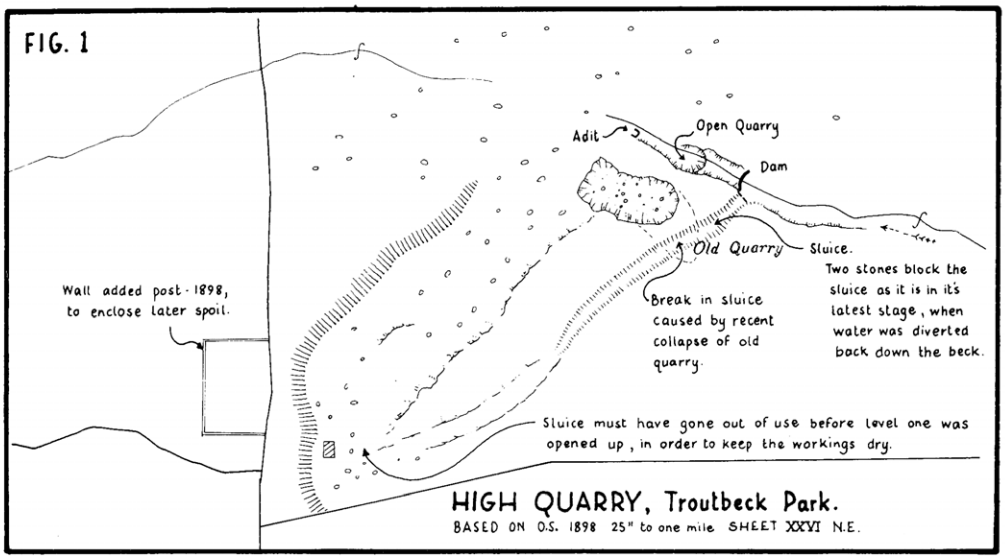
This paper summarises the results of a field survey which was originally carried out at all the quarries in the three valleys. The majority of the survey was undertaken in 1984. The need to carry out such surveys was clearly revealed during the winter of 1987–88 when a flash flood at Wrengill caused part of the quarry banks to collapse into the gill along with some of the riving sheds, and washed away the only surviving length of mineral track in any of the three valleys.

There are fifteen quarries in the valleys and as fieldwork was undertaken at all the sites a large quantity of data has been recorded.[3] Many of the quarries have similar features, and their description can therefore be repetitive. For the purpose of this paper, three quarries have been selected as exemplars, and reference has only been made to other quarries when there are particular points of interest.

The most complex quarries are the High and Low Quarries in Troutbeck Park. A detailed description of the High Quarry has been included as it shows the problems of relating the evidence on the ground to documentary material, and illustrates how the complex stratigraphy of a site can begin to be unravelled through careful observation. Stockdalebank Quarry in Longsleddale, which has not been worked for over two hundred years, is included as it provides an opportunity to investigate unaltered eighteenth century workings. Finally Wrengill Quarry in Longsleddale, which was still being worked in the first half of the twentieth century, is described because it has more surviving machinery than any of the others.

The High Quarry, Troutbeck Park. NY 430069

Though some workings may have been opened up earlier, the first firm evidence we have for activity on this site is William Dowthwaite's contract to drive a new level in December 1753.[4] The earliest map showing the quarry is at the time of the Applethwaite Enclosure Award in 1842. The large open quarry which is the main feature today is shown, but there is no sign of Dowthwaite's level. A level, leading to a closehead quarry, in the gill to the north (see Fig. 1) is a possible site of Dowthwaite's workings. It appears to have been hand drilled and there are the tumbled remains of a number of associated



buildings, including a riving shed in the vicinity. However, if its origins were in the eighteenth century, further development has taken place more recently including an extension of the level, as a sheet of galvanised iron anchored into the roof indicates. For this quarry to operate the beck had to be diverted. This has clearly been done higher up where there is a well-constructed stone dam, and a sluice providing access to a leat that directs the water across the fell above and beyond the large open quarry. Though the leat is not shown on the Enclosure Award map it is clearly marked on the 1859 first edition Ordnance Survey map.[5] There can only be three reasons for building this leat. Firstly it was constructed, as suggested, to divert the water from the beck with the level in it, and its omission from the Enclosure Award map was a mistake, or alternatively the construction of the leat and level dates from between 1842 and 1859; secondly it was constructed to take water for some unknown purpose associated with the workings of the open quarry; and thirdly it served both purposes. In some ways the latter seems the most attractive alternative because of the care taken in its construction and the scale of the enterprise. However, the water diverted down the leat does not seem to have been channelled anywhere where it could be put to use. It seems to have spilled down the fellside depositing a lot of silt to the south of the quarry, and which can still be seen. Recently landslip at the rear of the open quarry has breached the leat.

The Ordnance Survey maps are not detailed enough to allow for much positive identification of features on the ground with those on the map. Apart from the construction of the main part of the building (Fig. 2) there appears to have been no development at the quarry between 1859 and 1898. It is between 1898 and 1920 that most of the developments took place at the quarry, and fieldwork has permitted some tentative conclusions to be drawn.

The main series of quarry workings can be divided into six levels as shown on Fig. 3. On the fellside below the quarry there is a winding packhorse track. The track terminates below the intake wall and there are traces of an incline connecting Level 1

with the top of the track. The intake wall had to be rebuilt between 1898 and 1920 as the quarry bank encroached on the field below.

On Level 1 is the main building (Fig. 2) constructed before 1898, though the porch-like extension was added later. This building may have had several functions, one of which was probably the quarry office. Actual workings at this level originally consisted of a closehead quarry. This is now open to the sky, having broken through Level 2 above. A short length of tunnel continues beyond the quarry, and part way along this the quarrymen hit a spring. All surviving shot holes are clearly hand drilled.

Level 2 was worked at the same time as Level 1, and when the closehead quarry in Level 1 broke through into Level 2, the access to the further faces of Level 2 had to be supported on piles of deads. Level 2 quarry face is now partly buried beneath waste material tipped in from higher workings, thus proving that the higher levels continued to be used after Levels 1 and 2 were abandoned. There were no buildings on Level 2.

FIG. 2

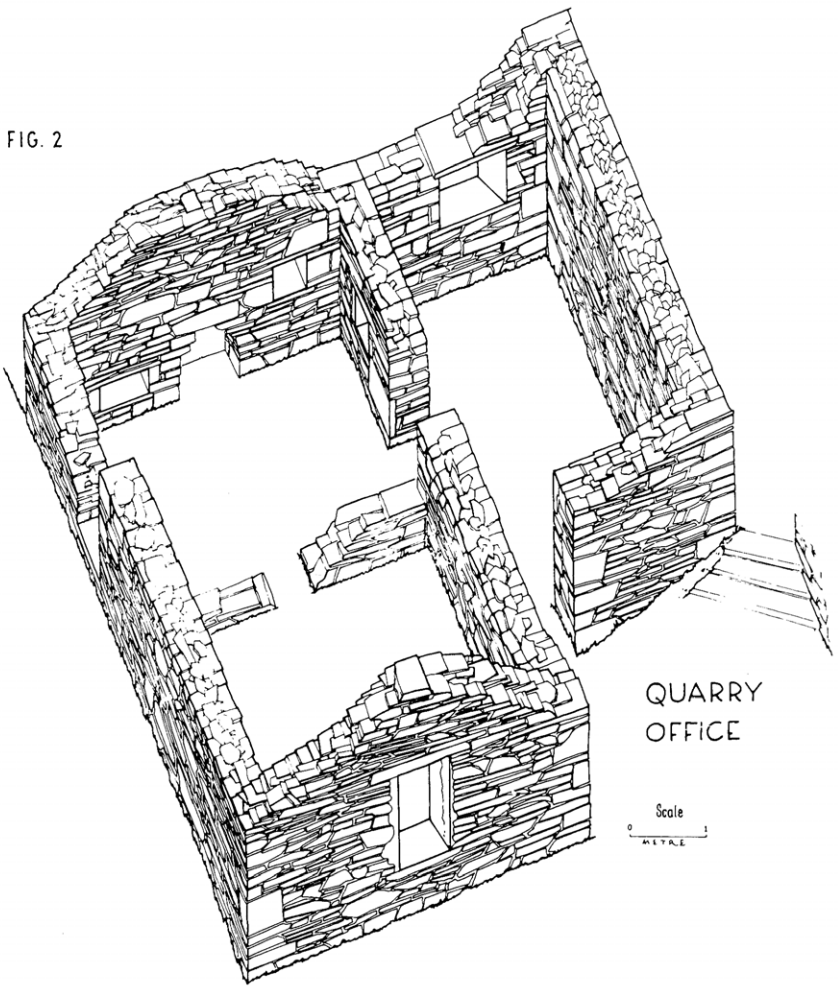
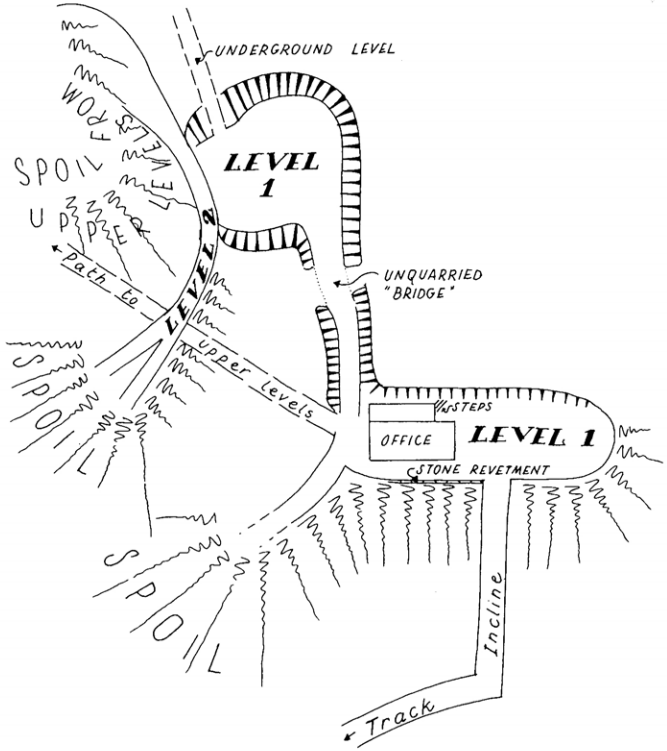
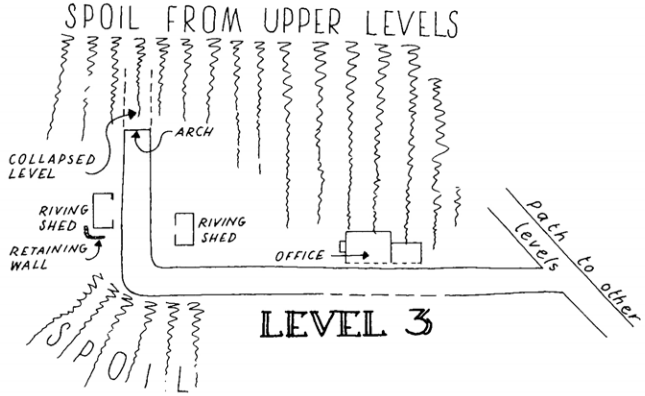


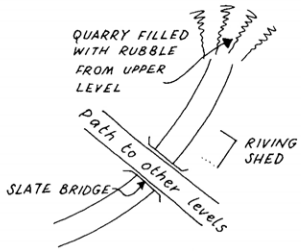
FIG. 3 SKETCHES OF LEVELS AT HIGH QUARRY.



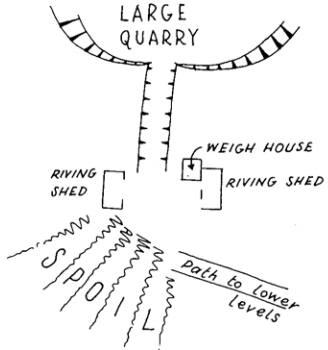
LEVELS 1 & 2



LEVEL 3

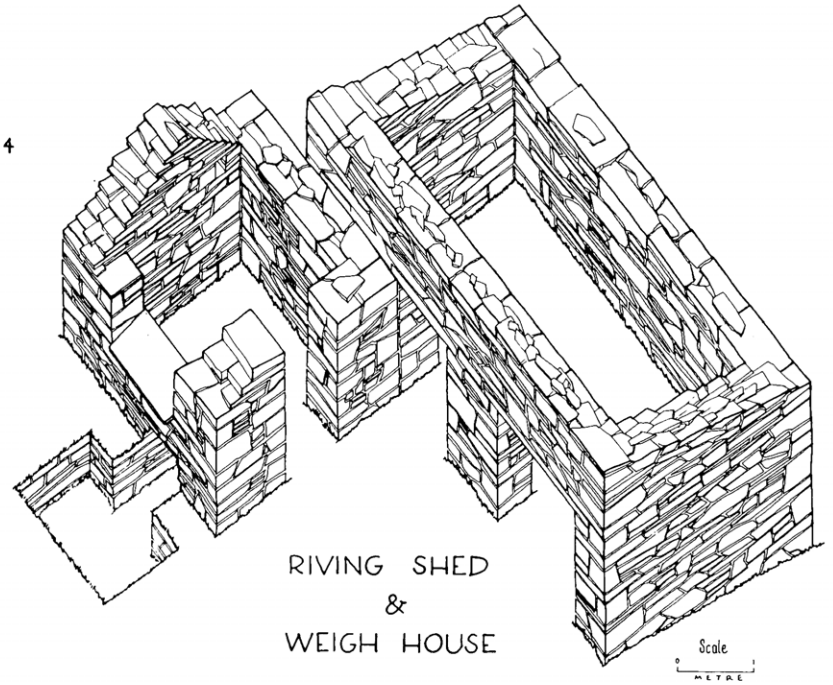


LEVEL 5



LEVEL 6

FIG. 4



All the levels are linked by a path which runs diagonally across the site. Level 3, some way above Level 2, was worked extensively, presumably in the form of a closehead quarry. The large arched entrance to the underground workings remains as one of the main features on this level, though the tunnel behind has completely collapsed. Two riving sheds in good condition remain outside the portal. One probably had a corrugated iron roof as there is an absence of roofing debris around the building. Two other buildings on this level, one with a fireplace, have been partly destroyed by rubble tipped from above.

Level 4 only consists of a small area of working, but a riving shed survives. The workings at Level 5 have disappeared beneath quarry waste tipped from above. One building, presumably a riving shed, partly survives. The most conspicuous feature is the bridge by which the track leading to the top level passes over the tramway from the quarry on this level. In an early period of operations both Level 5 and Level 6 must have been used concurrently.

The highest workings in the sequence come at Level 6. This is the level which provided access to the large open quarry which it entered at floor level. The quarry itself is now partly filled in by a series of rock falls. On the quarry bank there are a number of buildings including two riving sheds and a weigh-house (Fig. 4). The weighing machinery has, however, been removed. This level was the last to be worked, as waste from here covers workings and buildings on all the lower levels.

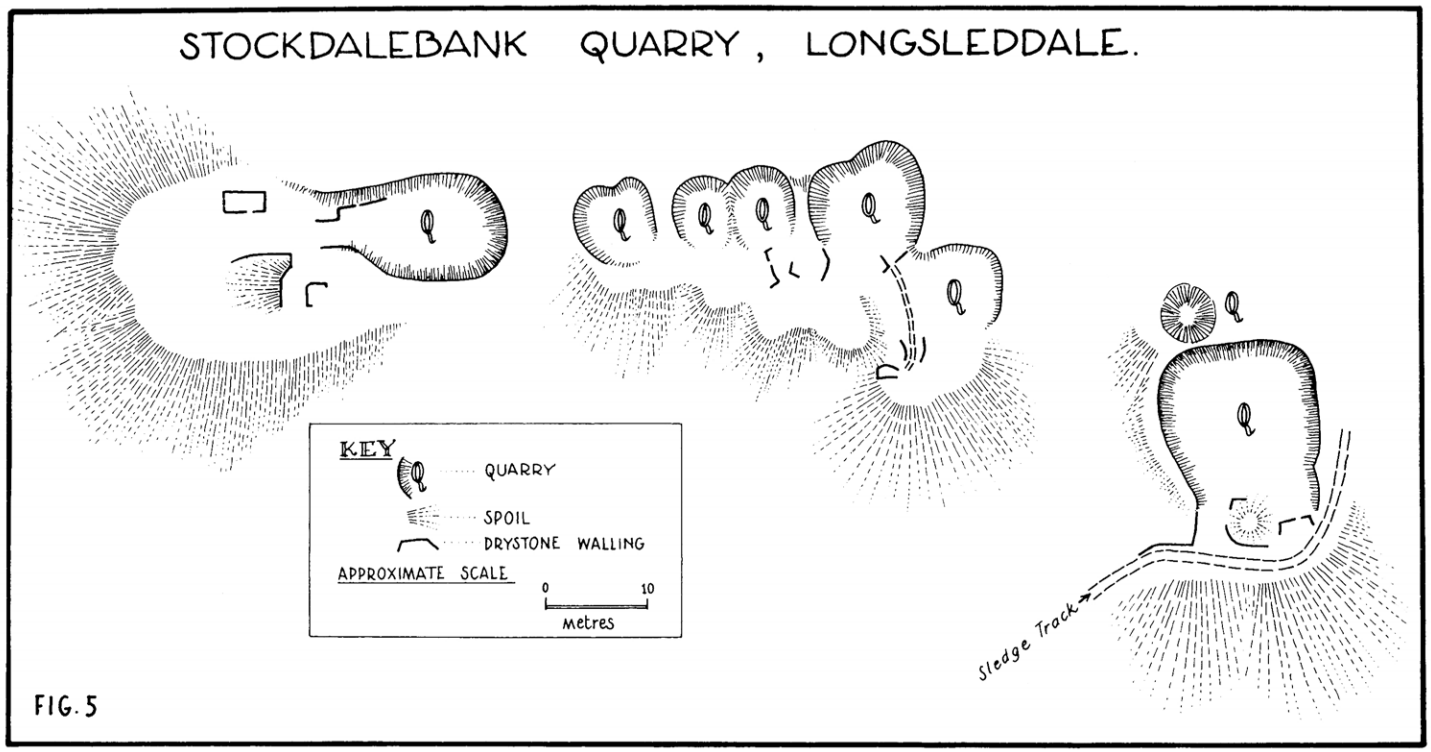
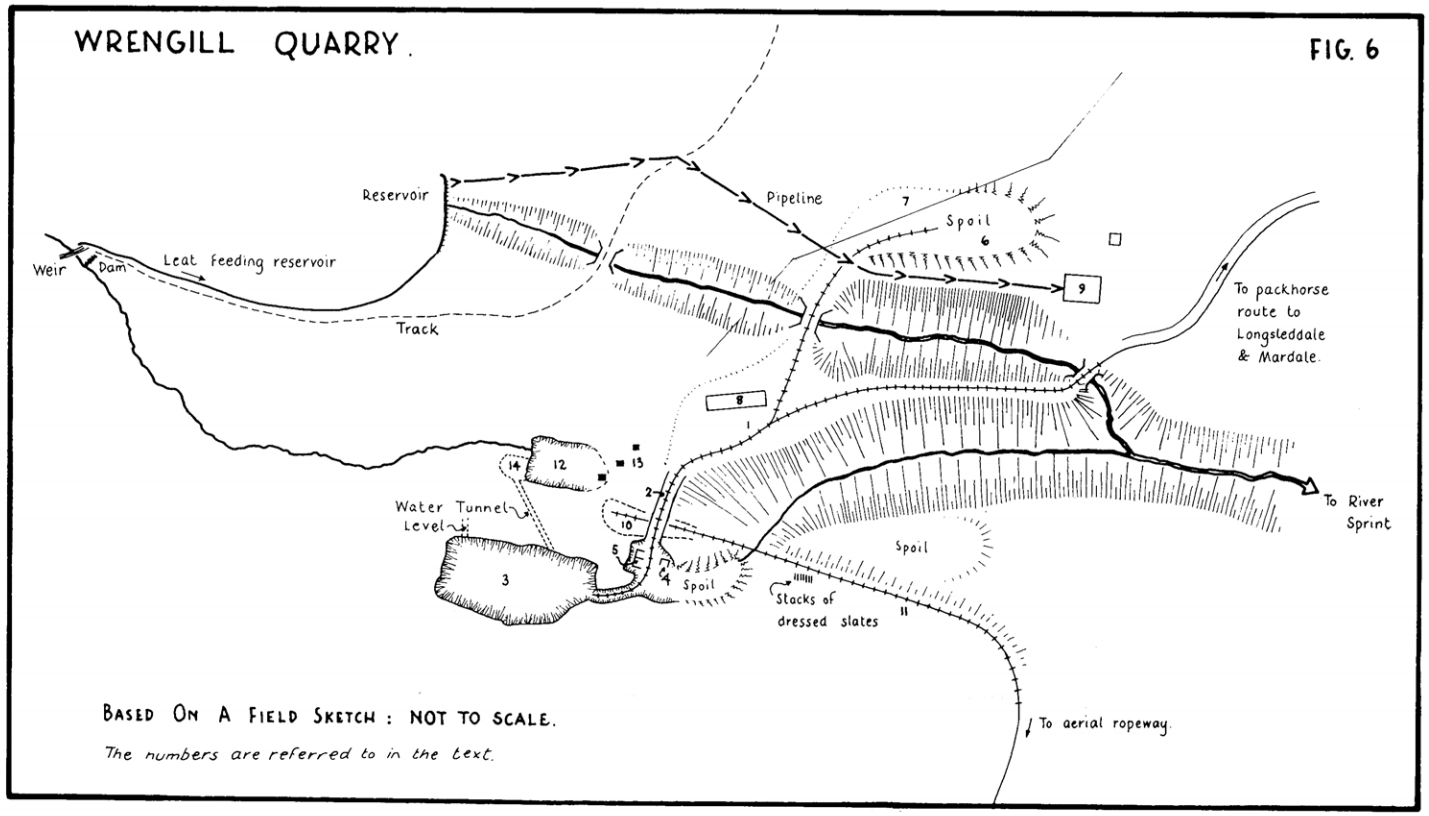

STOCKDALEBANK QUARRY, LONGSLEDDALE.
KEY
QUARRY
SPOIL
DRYSTONE WALLING
APPROXIMATE SCALE
0
10
metres
Sledge Track

FIG. 5


WRENGILL QUARRY.
FIG. 6
Reservoir
Pipeline
Spoil
Weir
Dam
Leat feeding reservoir
Track
To packhorse route to Longsleddale & Mardale.
Water Tunnel Level
Spoil
Stacks of dressed slates
To River Sprint
To aerial ropeway.
BASED ON A FIELD SKETCH : NOT TO SCALE.
The numbers are referred to in the text.

Stockdalebank Quarry, Longsleddale. NY 487056

The small scale workings in Stockdale on the north side of the valley are consistent in size with the limited eighteenth century activity suggested by the documentary sources. These suggest that activity took place between 1724 and 1780, with an emphasis on the earlier years.[6] If it is correct to assume that this quarry has not been used since, and the small scale of the operation would suggest this, then this is one of the few quarries to provide industrial archaeological evidence for the eighteenth century.

The quarries (Fig. 5) are situated along the 950 feet contour. They form a series of minor excavations with only small and intermittent rock faces. Some of them are not much more than hollows in the ground. The largest three have short tracks leading into them from the quarry banks on which there are the fragmentary remains of buildings. The outline of only one survives in any way complete. It was probably used for riving, but its small sub-rectangular shape is in sharp contrast to the standardised open fronted rectangular sheds of the nineteenth century. Large quantities of debris from riving and dressing show that roofing slate was being made here.

There is a very clear sledging route from these quarries down to the track which runs up Stockdale. Part of it is sunken where it alters from contouring to going straight down the slope. As it makes no attempt to zig-zag it was presumably used for sledging rather than pack horses. The track is about one metre wide.

Wrengill Quarry, Longsleddale. NY 475086

(Numbers in the text refer to the numbers in Fig. 6)

This quarry, with its high quality slate, was in production from at least 1724 (see Appendix 1), but no plans or pictures of the quarry have survived from that century. The earliest representations are two engravings from the early nineteenth century. The first by Cook, dated 1813 (Fig. 7), shows a number of quarrymen perched precariously on rock ledges and one sitting on a wooden platform linked by rope to some anchor point above. Below him a horse is pulling a cartload of undressed slates. It is no longer possible to link this view to the surviving remains, but that is not the case with Thomas Allom's picture of about 1830 (Fig. 8). Here it is possible to locate the artist's viewpoint (1). The building on the right has disappeared, but the bridge, now rebuilt, is at (2). The gorge towards the left is the original valley of the river Sprint, but behind the gorge and in front of the sunlight is the main open quarry which is still such a prominent feature (3). Packhorses, as well as carts, were being used in the 1830's.

The earliest quarrying seems therefore to have been carried out at the main open quarry (3). The riving sheds (4 and 5) are obviously associated with that area, but their sound construction suggests a more recent date, implying that the open area continued to be worked, possibly up to the end of the last century. The bridge (2) appears to have been rebuilt, that is if we can trust Allom's picture. The existing piers would not have supported an arched bridge. The large quarry bank (6) is also associated with this working and must anyway predate 1899 as the wall (7) that is built across it is shown on the 1899 Ordnance Survey map.

Some parts of the barracks and blacksmith shop (8) were built before 1899, but the full

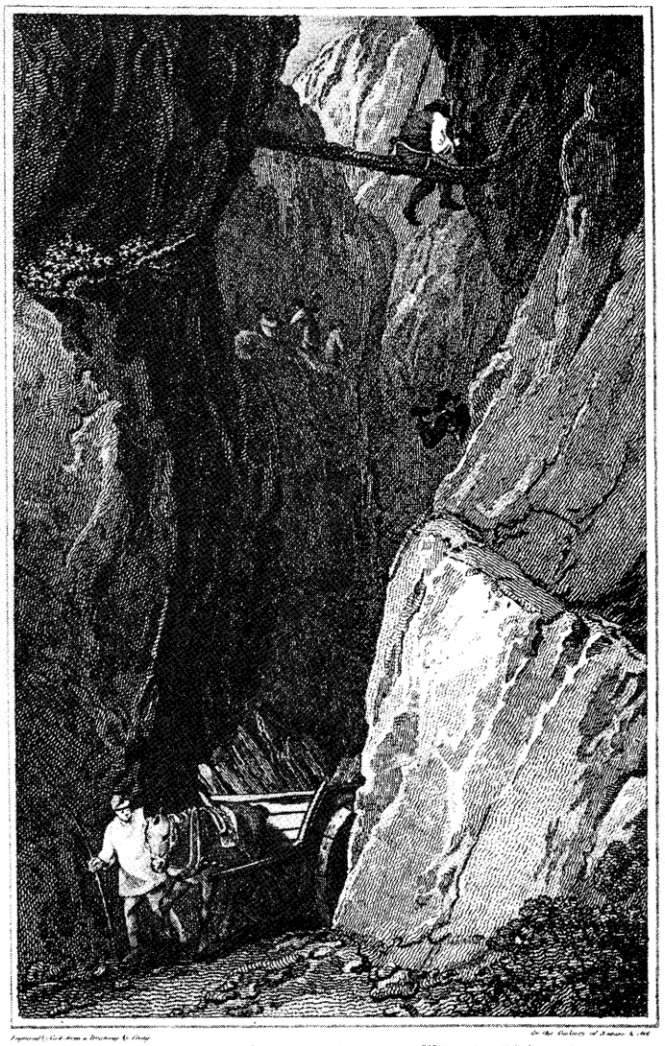


FIG. 7 Courtesy of C. Irwin, The Book House, Ravenstonedale

range of buildings was constructed this century (Fig. 9), as was the turbine house (9) (Fig. 10). These buildings are associated with the last phase of quarrying during the 1930's.

This phase, naturally enough, has created a considerable impact on the landscape. The major area of expansion was underground (10), partly beneath the earlier open quarry (3). A two-foot gauge tramway track was laid from these workings, across a now vanished bridge to the quarry bank on the southern side of the gill. This track was extended, probably in 1946, round the side of the hill to the point where it was presumably intended to link with an aerial ropeway. The tram lines were never laid for

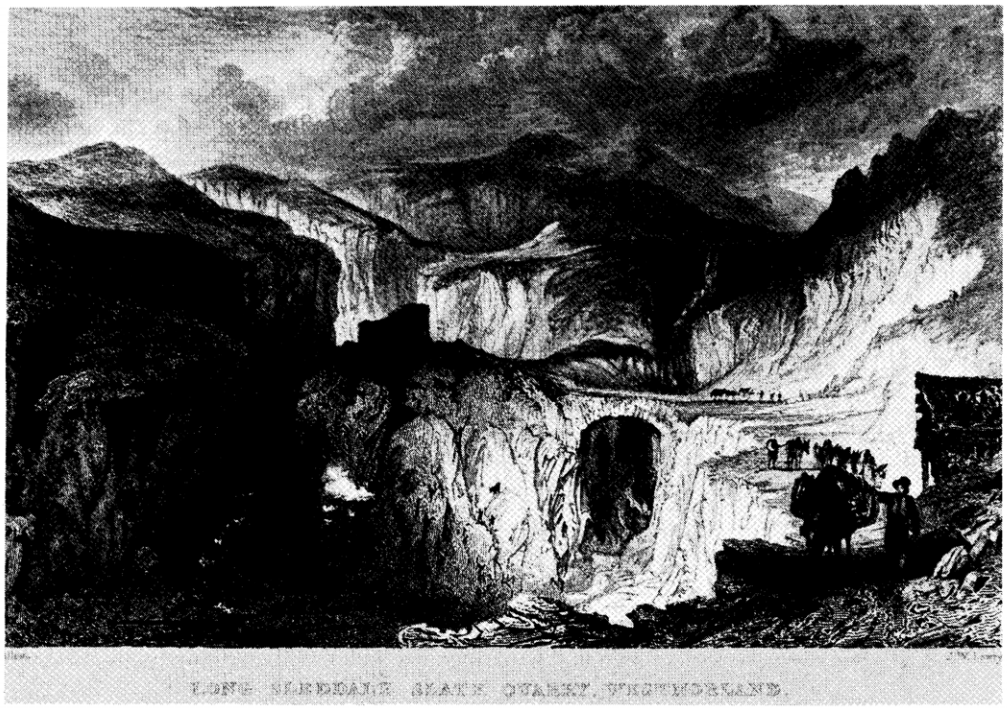


FIG. 8 Courtesy of the Local Studies Librarian, Kendal Library

the full length and the ropeway was never erected. This ropeway, which had been built by Ropeways Ltd., came from the Newton mine in Furness which had closed in 1944. The auction particulars refer to the sale of a half mile length of monocable ropeway with two termini; one mile of three inch circumference rope, eight steel framed trestles with heavy concrete bases, tension weights, sheave wheels and rope skeps. The power was provided by a Robey horizontal two-cylinder steam engine. (The cylinders were 7 inches diameter with a 10 inches stroke. The Fly wheel had a diameter of 4 ft 10 inches.) In addition there was a forty tons steel plate ore bin which was not purchased by the Wrangdale Head Slate Co. Ltd.[7] Though the system was purchased, nothing was constructed on site except for some of the bases for the trestles. Some timber was also acquired.[8] It is not clear why the engine was bought. The ropeway had operated on the flat at Newton; at Wrengill it would have had a vertical drop of some 400 feet, and therefore could have worked by gravity.

Power for the quarry was provided by the pelton wheel in the Turbine House (8). Water was diverted from the beck into a leat which led to a small reservoir. The water passed through a filter into a 28 cm diameter iron pipe, most of which survives except for the last hundred metres. In addition there was a sluice gate in the concrete dam of the reservoir. Though the gate is missing, the surrounding guide rails are still there. The nozzle at the end of the pipe in the turbine house has survived, but the pelton wheel has not. The wheel, which was made in Switzerland, may have been a second-hand one.[9] The tailrace then went through a tunnel and discharged into the beck. The Turbine House provided power for the compressed air drills, the pipes for which survive in the underground section.

FIG. 9 FORGE & BARRACKS, WRENGILL QUARRY.

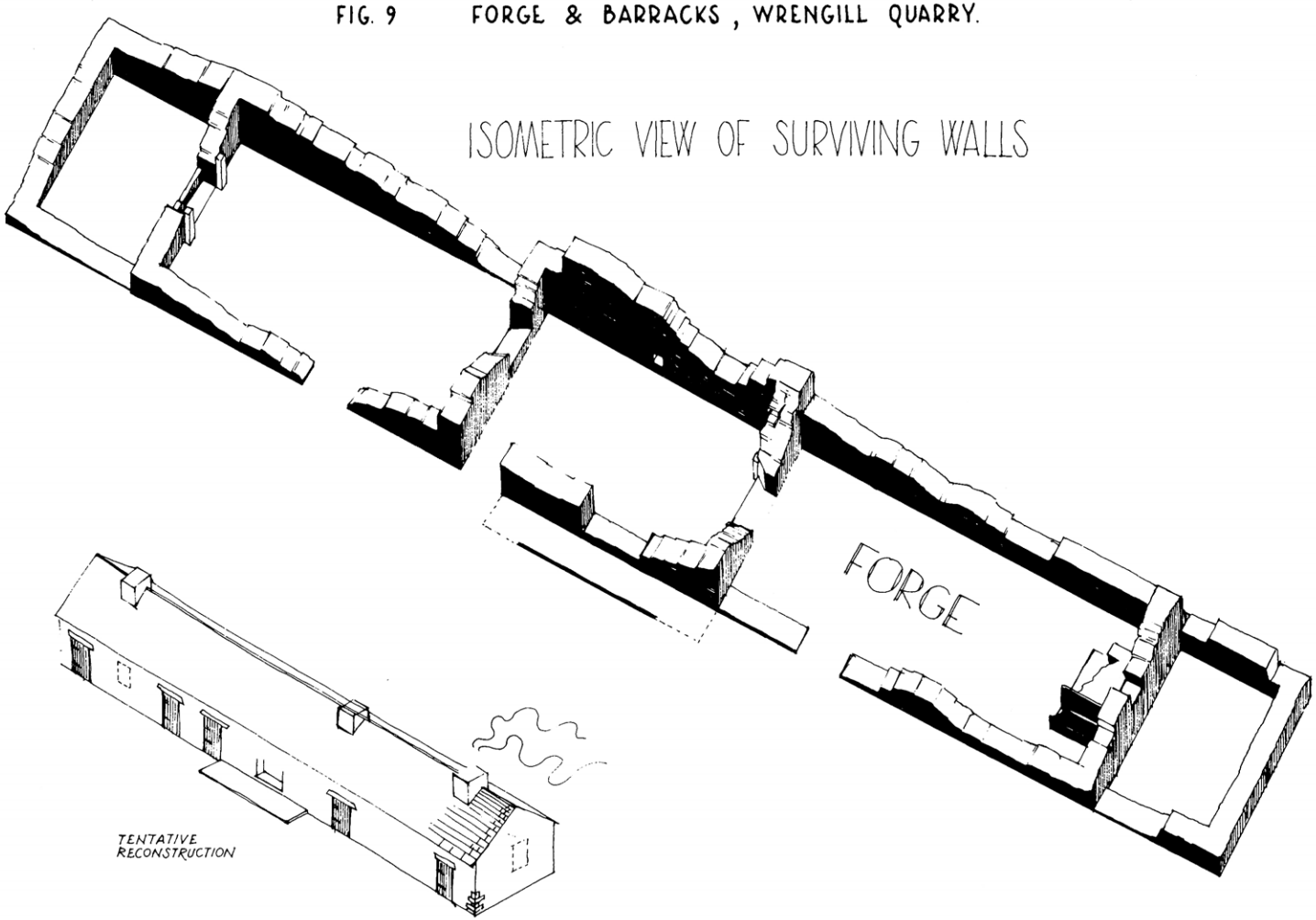
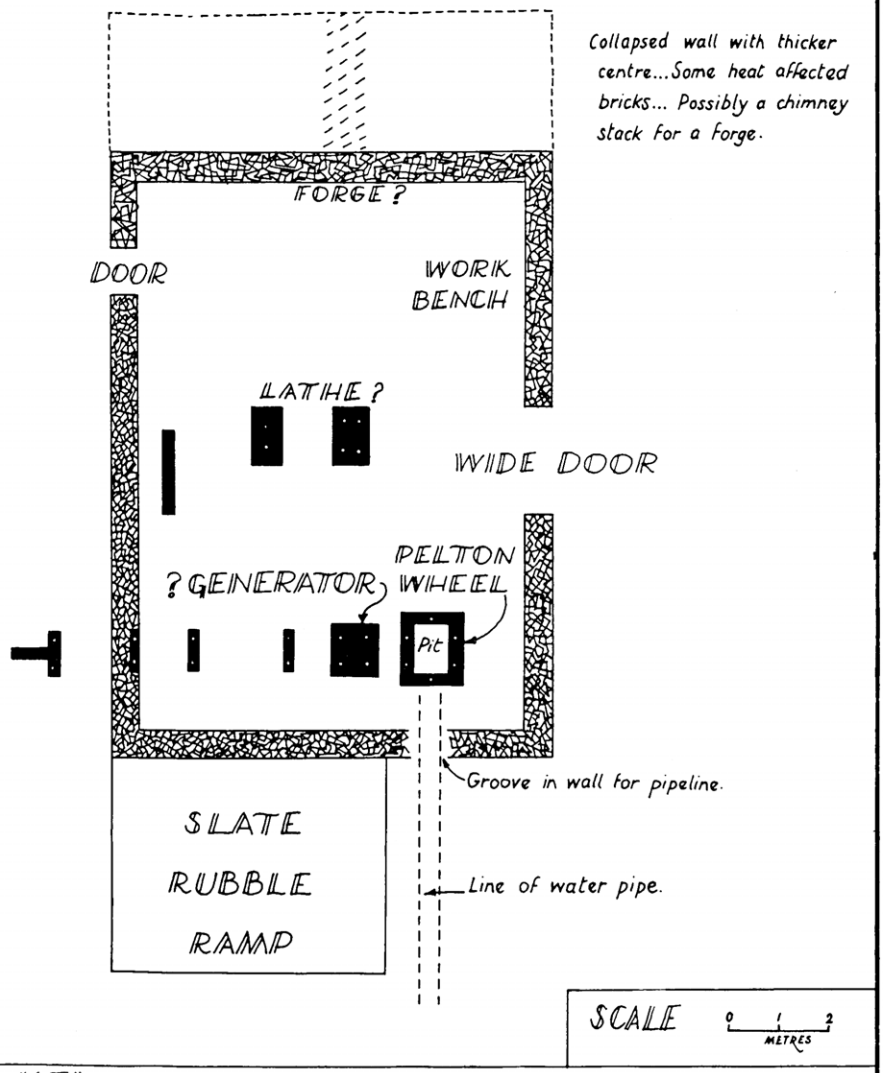


FIG 10 POWER HOUSE, OR WORKSHOP ?



KEY

SLATE RUBBLE WALLS

CONCRETE BASE FOR MACHINERY (BOLTS SHOWN AS WHITE CIRCLES)

A variety of other machinery has survived or is known to have existed at Wrengill. The pair of bellows in the blacksmith's shop was visible during the 1960's, and the adjacent barracks still had beds in after the Second World War. A boiler and parts of a line shaft were, until recently, visible in the beck. The two foot gauge tramway track with a points system could be seen until a few years ago outside the underground workings. The sleepers were of metal, except in the underground section, where the rails were laid on wood. Three types of tramway wagon can be seen abandoned in the surrounding area. One consists of a crude flat bogie with a rectangular channel frame. This may have been home made using commercially available wheels. There is also a tipping wagon chassis of a commercial type, probably built in Britain to a design associated with Orenstein and Koppel of Berlin. In addition there are about seven surviving open "tubs" of colliery type which were almost certainly obtained second hand, along with the track, from a colliery. Photographs of Ashington Colliery in Northumberland, taken in the 1930's, show tubs identical to these.[10] Colliery tubs are not often found at slate quarries.

The most enigmatic part of the workings lies to the north of the main open quarry (12). Here quarrying has taken place in the path of the beck. This required the beck to be diverted. A number of stone pillars suggests that initially this might have been done on a wooden launder (13). However, when quarrying was complete a drainage level was dug from the new hole in the path of the beck to the old open quarry. The water now drains out that way making any further quarrying at (12) impossible and indicating that the quarry at (3) was no longer used. Possibly some further quarrying was done at (14) – the wooden launder above being disused. When all this activity took place is unclear.

Acknowledgements

We are grateful for the support of members of the Cumbria Industrial History Society, including Jonathan Wignall for providing a range of references resulting from his investigations of newspapers; Peter Holmes for information on the tramway system at Wrengill; Anne Hyelman for the discovery of new documentary evidence for Wrengill; and those members of the society who took part in a field survey at Wrengill in July 1987. In addition, we are grateful to Liz Clark for typing the manuscript.

APPENDIX

Kentmere Head Slate Quarries

These quarries do not seem to have been in constant use during the last decades of the nineteenth century. It was previously noted that the executors of Thomas Field were having difficulty reletting the quarries in 1881. Whatever their subsequent history the quarries were closed again by 1896 for, in January 1897, advertisements appeared announcing the reopening of Kentmere Slate Quarries and asking for "a large number of first class quarrymen, both rockhands and rivers, accustomed to open top and underground workings. Also miners for tunnelling work."[11]

The two disputes with local residents in 1913 indicated that there was considerable investment in improving the track up the valley and in providing a compressed air system. Such optimism could be justified on the grounds of increased production during the previous few years.[12]

	JUMB QUARRY			STEEL RIGG QUARRY		
	Tons	*Value* (£)	*Value/ton*	*Tons*	*Value* (£)	*Value/ton*
1908				275	962	£3.10s
1909	5	20	£4.00	290	870	£3.00
1910	198	792	£4.00	400	1,600	£4.00
1911	300	1,200	£4.00	425	1,700	£4.00
1912	230	920	£4.00	470	1,880	£4.00

Wrengill and Stockdalebank Slate Quarries

A letter from John Martyr, the Levens agent, to Lady Suffolk, and quoted by Julian Munby, reveals that both quarries were let from 1724.[13] Robert Wilson who leased Wrengill for twelve years at a rent of £3 per annum must have been responsible for providing the slate for the roof of Burton-in-Kendal church in 1728.[14] Stockdalebank was let to Anthony Bownass for £1. 10s. per annum. This had been increased to 2 guineas by 1735 when Thomas Hall took over,[15] and it was raised again to 3 guineas in 1737 at the same time that Wrengill was increased to £11. The very low rents of 1724 coupled with these rapid increases suggest that any quarrying prior to 1724 must have been fairly unpromising, but that activity in the 1720's and 30's, especially at Wrengill, began to transform the value of these quarries. The rent did not however rise in 1751 when Robert Wilson leased both quarries for £14. 3s. 0d. per annum.[16] The 1750's saw a great expansion at Wrengill as the aforementioned letter reveals with reference to slate being sent to a number of places in the south and several hundred tons going through the port of Milnthorpe. The great demand for Longsleddale slate is also referred to in a letter of 1757 from Ralph Day, the lessee of Troutbeck Park.[17] It is not therefore surprising to find that the rent had increased to £26 in 1760 when James Dowker was granted the lease.[18]

At some point in the next forty years the rent reached £100 per annum. However by the early 1820's the condition of the quarry had deteriorated, though not enough apparently to justify the accepting of an offer of a rent of £20 p.a. for a seven-year term made by Robert Sinkinson and three partners in 1824. George Laing, the agent, suggested that Colonel Howard should not accept it even though Sinkinson was "a man of property" and highly recommended. However by 1829 Sinkinson and two partners were leasing the quarry. It was suggested previously that Sinkinson's interest in the quarry was only a sideline as his house and land in Long Sleddale was highly rated. This is confirmed by the reference to his being "a man of property" as well as a further reference to Robert Sinkinson, woodmonger, offering £280 for coppice wood in Helsington. There is increasing evidence that the quarry owners as well as their workers earned their incomes from a variety of sources.[19]

A reference to the quarry in 1926 is of some interest in the light of the impact of the recent flash flood. The Barrow News reported that a heavy cloudburst had washed 20,000 tons of debris from the quarry, destroying the road. The quarrymen who lived at the workings were isolated by the flood but had with them a good supply of provisions![20]

Notes and References

[1] R. David, "The Slate Quarrying Industry in Westmorland: Part One: The Valleys of Troutbeck, Kentmere and Longsleddale", *CW2*, lxxxvii, 215–235.
[2] J. Munby, "Westmorland Slate at Buckland (Berkshire) and the Bath 1754–9", *CW2*, lxxxix, 233–248.
[3] R. David, *The Slate Quarrying Industry in South Westmorland: The Valleys of Kentmere, Troutbeck and Longsleddale*. (Unpublished thesis for the Diploma in Local History, University of Liverpool 1984.) (There is a copy in the library of the University of Lancaster.)
[4] C.R.O. Kendal WD/TE.
[5] OS 1859 edition. Sheet XXVI N.E. 25 inches : 1 mile.
[6] Levens MS Box 8, 3/102 and Box 6, 14.
[7] C.R.O., Barrow BD/HJ, Box 157. *Barrow Evening News* 26 October 1946.
[8] Interview with John Dawes by Jonathan Wignall 4.1.88.
[9] Personal communication from R.D. Taylor, Sales Engineer at Gilbert Gilkes and Gordon Ltd. who remembers seeing the intact pelton wheel at Wrengill.
[10] Personal communication from Peter Holmes.
[11] *Barrow News*, 2.1.1897.
[12] C.R.O., Carlisle, D/SH/104 and D/SH/1/104. Manuscript notes of J.W. Shaw.
[13] See J. Munby, *op. cit.* The letter referred to is on page 234. Levens, 8.3/102 (draft, part omitted).
[14] C.R.O. Kendal, WPR/10.
[15] Levens MS Box 6, no. 14. Accounts and Leases.
[16] Levens, 8.3/102 (draft, part omitted).
[17] C.R.O., Kendal, WD/TE, Box "Slate Papers".
[18] Levens MSS Box 6 No. 14.
[19] The information in this paragraph is derived from two letters from George Laing to the Hon. Col. Howard dated 13 September 1824 and 22 November 1824. Their references in the Surrey Record Office are 203/30/138 and 203/30/147. I am indebted to Anne Hyelman for drawing my attention to these letters.
[20] *Barrow News*, 16.10.1926.