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KEIGHLEY COAL

(A history of coal mining in the Keighley district)

by

M.C. GILL

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Cover illustration:
Reopening a shaft into the Rough Holden Coal (Keighley News, 28/09/1929)

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INTRODUCTION

This monograph could not have been written without access to the late Paul Davison's collection of notes, plans, papers etc relating to Keighley Coal, which was donated to the Cliffe Castle Museum in Keighley. Paul was a keen amateur geologist, who worked for the former Keighley Borough Council. He had studied local glaciation, but his enduring interest in the coal seams around Keighley continued until his death in 1998. Unfortunately, whilst Paul had begun drafting chapters for his own monograph, illness overtook him and he was unable to advance that aspect of his work.

The present author, who worked in the coal industry from 1969 to 1974, also has a long held interest in the local coal pits. In his case, however, this interest was eclipsed by his interest in Yorkshire's lead mines. Nevertheless, he was inspired by Les Tyson's work on coal mining in the Yorkshire Dales to volunteer to examine Paul Davison's material and file it in a more accessible way than the folders it was being kept in. That done, he realised that this information could be supplemented by his own research and knowledge of the subject and prepared for publication.

What has emerged is a monograph covering a ten mile section of the Aire Valley and its catchment areas between Keighley and the outskirts of Skipton. The area's coal seams are in the Millstone Grit Series, except for those in the Lower Coal Measures at Reedshaw Moss, Harden and Sawood. The first of those is part of the Lancashire coalfield and others are in the Yorkshire coalfield. Their characteristic thinness meant that there were no large collieries in the modern sense, but a number of small mines which were generally worked by a few local men and proved surprisingly long-lived. It is likely that many of the colliers supplemented their earnings by farm work or by having a small-holding.

Wherever possible, an outline of each seam's geology and a history of the ownership of the coal has been given, along with the locations of the workings where these are known. Regrettably, what few plans have survived tend to be very vague and lack features to correlate them with the surface. This is even more problematic in those areas which have been built over. The National Grid References of shafts should, therefore, only be taken as an indication of their likely location. A wide range of primary sources has been used and these have been set down in a bibliography as a guide for further research.

KEIGHLEY

Keighley appears in the Domesday Book and was awarded its market charter in 1305, but it was never a genteel town. Indeed, it was rapidly moving away from any such aspiration by 1805, when Dr Whitaker, reflecting the ignorance of many, wrote that Keighley had "*little which can interest the eye, the memory, or the imagination*".

Historically, the area's principal employers were farming and domestic woollen textiles, but this began to change after 1752 when the roads leading from Keighley to Kendal, Bradford and Halifax began to be turnpiked. A further boost came in 1773, when the Bingley to Skipton section of the Leeds and Liverpool Canal was opened, with wharfs at Riddlesden, across the Aire valley. The town joined the industrial revolution in 1780, when Yorkshire's first cotton spinning mill, the Low Mill, was built there. It was quickly followed by other mills. At first, they used the River Worth and the North Beck to drive their waterwheels but, as output grew, this was not enough and so steam powered mills were built. Some coal was imported on the canal, but more was brought into the area, by road, from mines around Colne, in Lancashire, and Denholme, on the way to Halifax. As will be shown, however, local mines served some of this rapidly growing market for around sixty years.

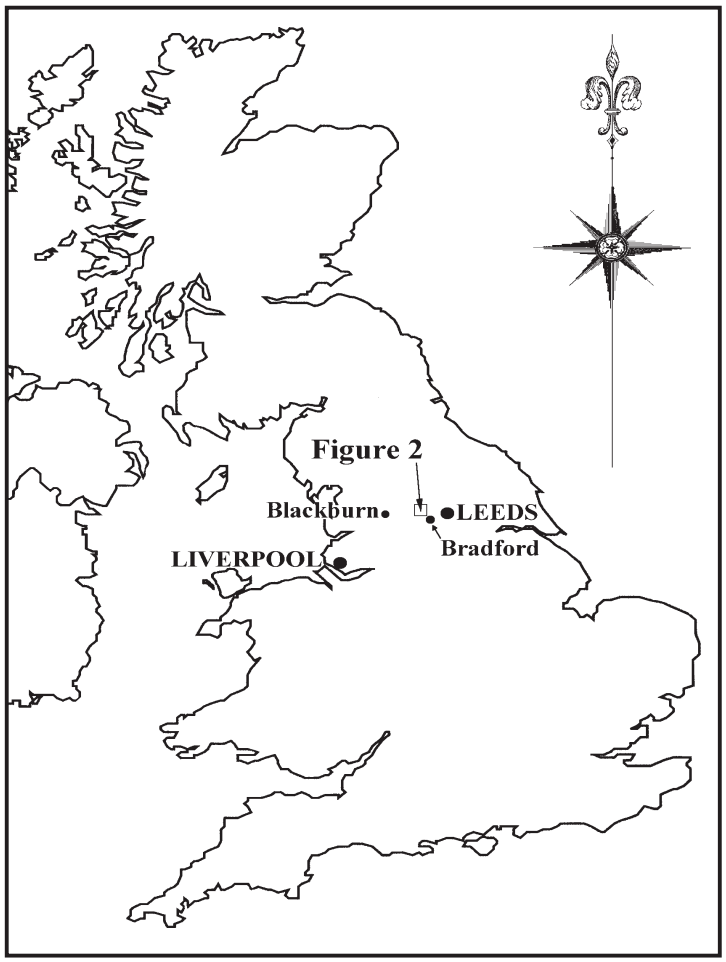

Fig. 1 Location map for Keighley Coal.

The production of cotton was overtaken by that of worsted cloth after the 1820s, but Keighley was never simply a 'weaving town', because numerous small foundries were opened and light engineering thrived. There were also manufacturers of textile machinery, dyers and bleachers, and bobbin mills. The Midland Railway Company extended its Leeds and Bradford line through Keighley in 1847, and a branch of the Great Northern Railway linked Keighley with Halifax in 1884.

Keighley's industrial base was such that its successful petition for parliamentary borough status in 1879 claimed it had "*one tenth of the mills, nearly one-eighth of the spindles, and nearly one-twelfth of the looms employed in the worsted trade throughout the United Kingdom*". It dominated "*the trade of making worsted spinning machinery*", and also produced looms, lathes and machine tools. In one year, the town had made 64,000 washing and wringing machines and 10,000 sewing machines.

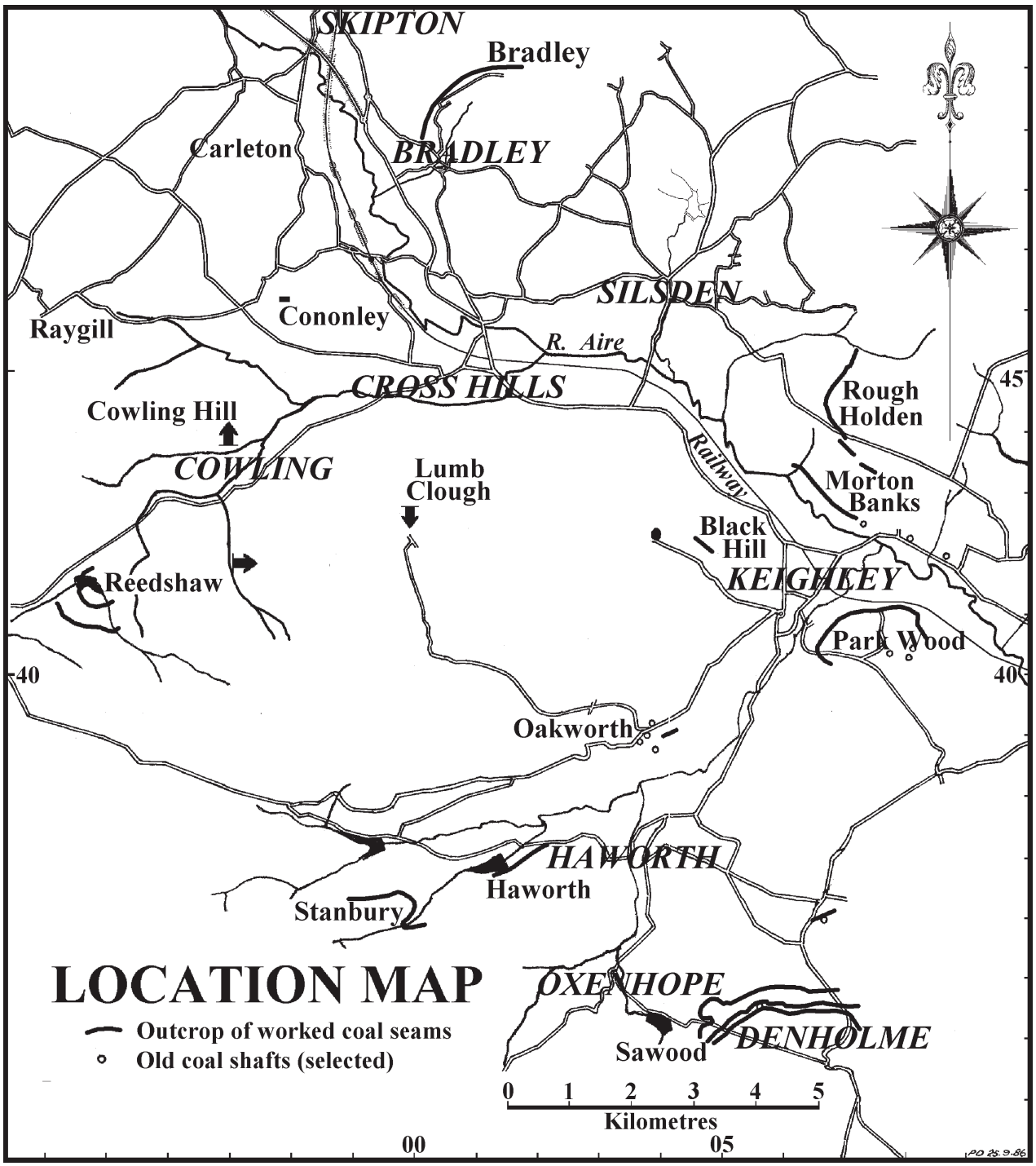

Fig. 2 Location map of coal seams around Keighley.

As part of Bradford Metropolitan District since 1974, the town has lost most of its independence won for it by the 19th century industrial leaders. The textile mills have nearly all closed and many have been demolished, and the same is true for large parts of the founding and engineering industries. Nevertheless, the town is still a centre for employment and it has a vibrant commercial heart. The town's newspaper, the *Keighley News*, was founded in 1862 and is still going strong. So is its public library, which was Britain's first Carnegie Library.

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AN OUTLINE OF COAL MINING TECHNIQUES

The early miners were lucky because most of the seams outcrop on the steep valley sides and, although covered by boulder clay, could be found where streams cross them. Unfortunately, the seams also often dip into those hillsides. This meant that the workings became rapidly deeper as they followed the seam, making them hard to drain, and that sinking new shafts was an expensive option for extending a mine's life. Most early workings were, therefore, confined to a narrow strip of day holes and shallow shafts along the outcrop.

At places like Rough Holden, where the land above the seam does not rise so quickly, the coal has been worked from a large number of fairly shallow shafts over a moderately large area. One common requirement of early coal mining leases was that previous workings were to be backfilled using spoil from the next pit to be worked. Such shafts are sometimes called 'bell pits' because it was once believed that early miners simply sank them into the seam and removed the coal until the ground became unstable and collapsed to give a characteristic bell shape. The miners were then believed to have moved a short distance away and sunk another shaft to repeat the process. However, modern opencasting of old workings has shown that, whilst a few shafts were worked like that, many were much more complex, with pillars of coal left for support. Early 17th century references to drainage tunnels, called soughs, at Rough Holden suggest that by then at least these workings were being developed in a systematic way.

Fig. 3 Jack Roll (Agricola, 1555)

The early miner, and probably many of his successors, would have had a simple range of tools. He would have used either a pick or a hammer and chisel to cut the ground by hand. Blasting would have been reserved for breaking the very hardest areas of rock. To get the coal, he would first have picked out the shale, either above or below the seam, and then used wedges to break the coal into clean, largish lumps. He would have had a rake for pulling the broken coal towards him, and a shovel for loading it into the basket which was used to drag it to the shaft. Timber props were set using a saw, to cut them to length, and a hammer to drive them home.

Coal was lifted from these shallow pits, which were probably no more than a few tens of feet deep, in buckets using jack rolls. Soughs allowed mining to become deeper and, by extending the workings, employ more miners to get the coal. This then raised the problem of moving coal from the face to the surface. Railways were not common underground until the later 18th century and in the small local pits probably not even then. One answer was to sink deeper shafts, nearer the working face, and fit them with horse gins or whims to lift greater amounts of coal than could

be done using jack rolls. We know that this was done at Morton Banks, where the name 'Gin Pit Field' has survived, and at other local pits where there are references to gin drivers.

In the early 19th century, some of the pits at Riddlesden were sunk below the watertable and the water was pumped from them by steam engines. Such expenditure implies an even greater degree of organisation, and plans of the workings show them to be laid out systematically, with thought given to drainage and ventilation over a much larger area. No record of firedamp explosions has been found in the mines described, but occasional small 'flashes' were a likelihood because the miners would have been using naked lights. An often greater problem was the accumulation of carbon dioxide in the workings which, being odourless, could suffocate men.

The plans of Morton Banks and Riddlesden Collieries show that they were worked by driving roughly parallel stalls, between 30 and 100 feet long, at 15 to 30 foot centres. Their spacing and size would depend on the strength of the roof. There is nothing to suggest that regular cross-gates, or thurlings, were driven, as in the 'bord and pillar' technique, or that the intervening pillars were removed.

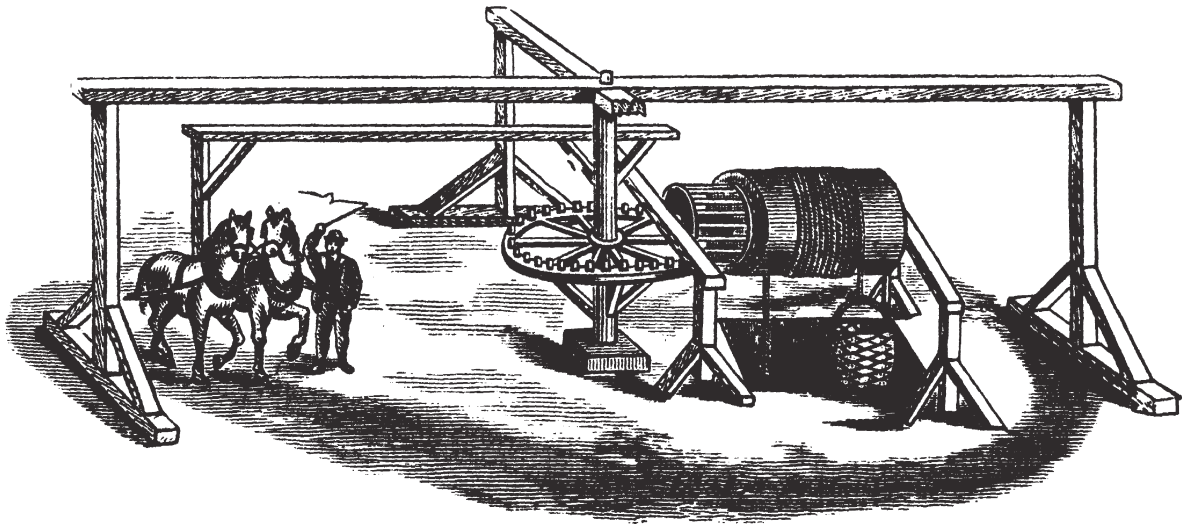

Fig. 4 Typical 'Cog & Rung' Gin (Galloway, 1898)

Contrary to what might be expected, the coming of the canal and even the railway did not spell the immediate end for local mines as cheaper, higher quality coal was imported. With so many mills changing to steam power from their original waterwheels, and new, larger mills being built, coal was in demand. Unfortunately we have no scientific data on the burning characteristics of local coal, but anecdotal evidence points to it having a high ash content. One is forced to wonder, therefore, if it would have burned quickly enough to have been much use in mill boilers, where the aim was to raise steam quickly and maintain a working pressure. Perhaps, for the small, early mill engines this was not a critical issue. For higher elevation communities, like Oxenhope, Haworth, Oakworth and Stanbury, the proximity of local coal was probably even more important to the retention of mills as they switched from waterpower, but mines at Laneshaw Bridge and Denholme probably supplied them.

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Plates 6, 7, 8, 9 & 10 are reproduced from the Keighley Photographic Society's archive by the kind permission of the Keighley Local Studies Library.

PUBLICATION AND RESEARCH HISTORY

Interest in the nature and disposition of the local coal seams was stimulated by the work of Geological Surveyors in the area around 1870. In particular John Brigg, a local textile magnate and amateur geologist, became interested in them, both as part of his hobby and as a possible source of fuel for local mills during the 'coal famine' of the early 1870s. In remarks addressed to a meeting of the Geological and Polytechnic Society of the West Riding of Yorkshire, held in Leeds in July 1871, it appears that he was working on microscopic sections of what he called the 'low coals', which were those below the coal measures proper:–[1]

> "*We have thin seams of coal in different horizons of the strata, which were worked within the last 20 years, but they do not supply us with good fossils. They are now neglected on account of the cheap railway carriage from the coal fields proper, but they may at some time be found valuable if the price of coal continues to increase as it bids fair to do.*"

The first attempt to rationalise the various seams is made by Green's memoir on the *Geology of the Yorkshire Coalfield* and the associated mapping.[2] The surveyors were able to identify many areas of coal working, but made many mistakes in trying to correlate them. This particular problem was helped greatly by the work of Bisat, who recognised that the zonal distribution of various goniatites could be used as a means of identifying stratigraphical horizons.[3] Remapping during the 1930s and around 1990 has done much to clarify the position by recognising more faulting and reinterpreting the positions of some beds.[4,5] Nevertheless, faced with poor exposures, caused by boulder clay etc, and the absence of active mining, there are still problems to be solved.

Historical and archæological interest began as items in local histories, often relating to the business interests of such major landowners as the Cliffords of Skipton Castle. The interests of local amateur organisations, such as the Keighley Naturalists, led people like Villy to examine the many heaps of scoriæ found in the Aire valley and to speculate on their origins.[6]

The early proponents of mining history, who were becoming active by the late 1950s, tended to ignore coal and ironstone in favour of lead mining. Nevertheless, members of the Northern Cavern & Mine Research Society were anxious that this should not be so and, in the 1960s, a number of them began looking at other extractive industries in the Aire Valley. The result was a paper by the late Michael Dickinson, reporting on an anomalous level in Lumb Clough at Sutton in Craven, and a second paper by Dickinson, this time with John Holding, which outlined the position using readily available sources.[7,8] The latter, in particular, was intended to encourage more detailed work such as, for example, the re-examination of archæological features seen during the work at Lumb Clough. The latter had been described as a possible iron smelting site, but Dickinson was able to identify an unknown lead smelting site there in the early 1970s.[9]

Also during the 1970s, a local historian, called Thompson, who was interested in the Stanbury and Haworth area, began publishing a series of booklets which often included snippets on the local mines. Indeed, one volume was dedicated to the Stanbury coal mines.[10]

A spell as a mature student in the early 1980s allowed Bill Lakin to indulge his interest in mining by taking Dickinson and Holding's theme and expanding it to include lower coal measures mines between the west side of Bradford and the north side of Halifax.[11] Although never published, copies of his dissertation were lodged in a number of places and it is an important source for anyone wishing to know more, in particular, about the mines of Denholme and Wilsden, which fall outside the scope of this monograph.

Similarly, W.B. Trigg's series of papers on *The Halifax Coalfield*, parts I to V of which were published by the Halifax Antiquarian Society in its volumes from 1930 to 1932, gives valuable information on an area of true coal measures which abuts the Keighley coalfield.[12-16]

As part of his enduring research into the Cliffords of Skipton castle, the late Richard Spence produced two papers on their mining interests, one covering their Westmorland estates and the other their Yorkshire estates.[17] The latter paper has been invaluable in understanding the early 17th century coal pits at Silsden, Bradley and Carleton, and this information has been supplemented by Crossley and Hill's study of Silsden.[18]

The present author's monograph on *The Yorkshire and Lancashire Lead Mines* appeared in 1987 and greatly expanded our knowledge of lead mining on Cononley and Glusburn Moors, as well as at the various smaller mines and trials in the area.[19] Soon after this, the Cononley Mine's engine house and associated surface features were consolidated and made accessible to the public. In the late 1990s, this largely historical work was enhanced by a paper on the population make-up of Cononley and a volume of production and ownership statistics for Yorkshire's non-ferrous metal mines.[20, 21]

The application of archæological techniques to the study of mining sites also took off in the late 1990s. One of the pilot sites was the Cononley Lead Mine and its surface and underground remains were both subjected to minute re-assessment.[22,23] Unfortunately, no local coal mining site has attracted such a detailed examination, but it would be a worth while activity.

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GEOLOGICAL OUTLINE OF THE KEIGHLEY DISTRICT

The surface rocks in the Keighley district mostly belong to the Millstone Grit Series (Namurian), but there are three small areas of Lower Coal Measures (Westphalian A) strata – to the south-east of Oxenhope, at Long Lee and on Reedshaw Moss, near Cowling.

The total thickness of the Millstone Grit series is nearly 5000 feet. When the Millstone Grit was deposited 300 to 400 million years ago, West Yorkshire was the delta of a large river system that flowed across a landmass located to the north. The river drained into a marine basin further south. The mud and sand of the delta respectively, became shale and sandstone, interspersed with occasional coal seams. At that time, because of plate tectonics, northern England was located near the equator.

The coal seams are derived from tropical swamp vegetation, which included tree-like ferns. They decayed under special conditions and were compressed as they were buried beneath further sediments as the deltas slowly subsided. For an elementary account of the process see *The Origin and Evolution of Coal* by P.J. Adams.[1] The vegetation that was to form coal had a root system which drew necessary minerals for growth from the ground beneath leaving a subsoil, termed seat earth, which was deficient in some minerals. These subsoils became ganisters (hard, fairly pure sandstone) or fireclays and have been extracted for use as refractory material.

During the Namurian period the turbulent depositional environment of the delta with its many phases of erosion curtailed the lateral spread of both the sandstone and coal horizons, in some cases to less than half a mile. By the time the overlying Coal Measures were being deposited, the deltaic environment was less turbulent allowing the sandstone and coal horizons to develop extensively.

The sediments in the Millstone Grit series show a certain rhythm or cyclicity of deposition – ideally starting with a coal, followed by a marine shale, shale, sandstone, seatearth and another coal. The cycles are rarely complete either because of non-deposition or subsequent erosion. The marine shales are often thin and contain many fossils, often crushed flat, but also occasionally solid in concretions. These marine bands usually contain goniatites. A number of published papers, beginning with W.S. Bisat's 1924 paper, greatly facilitate the identification of individual marine bands and hence the associated coal seam.[2] Goniatites have been particularly useful for establishing marker horizons in the Millstone Grit.

After deposition and lithification, the region was subjected to tectonic forces which, other than the Pennine fold in the west and the Bradley anticline in the north, produced very little folding around Keighley. There was, however, considerable faulting. For instance, the south-east trending Rivock Fault on Rombalds Moor which terminates the outcrop of the Rough Holden Coal at Dirk Hill Sike has a throw (vertical displacement) of over 500 feet, but most local faulting is much less than this. There are many smaller faults in addition to those shown on the British Geological Survey's geological maps.

GENERALISED VERTICAL SECTION

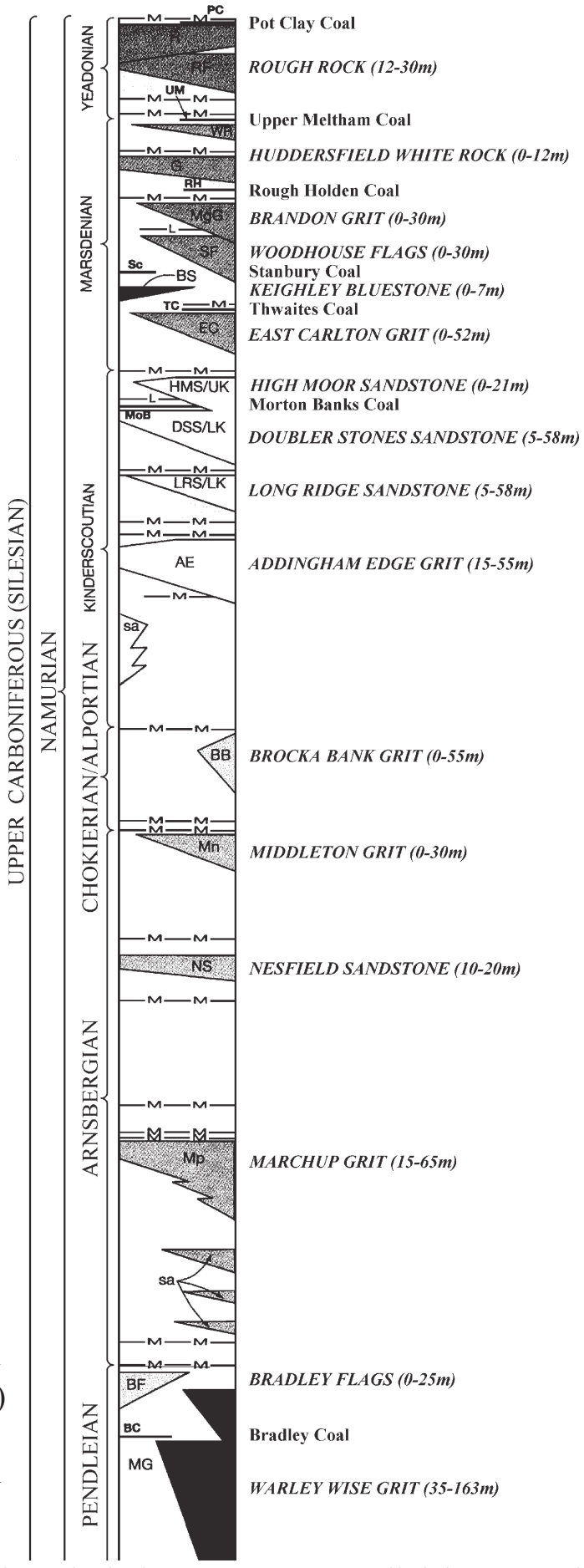

Fig.5
Based upon Geological Map Sheet 69 (Bradford) S&D, 2000, 1:50,000 by permission of the British Geological Survey.

The overall effect of the tectonic disturbances in this district is to give the rocks a general dip to the east or south-east, although the individual blocks between the faults may be tilted in any direction. Faults are a problem for miners because the continuation of the seam across a fault may be many feet above or below their current workings. Seams may "roll over" into a fault plane, i.e. increase their dip or gradient, making it more difficult to work. Also, faults often act as conduits for water, especially in shallow seams.

Fig. 5 shows a generalised geological column of the Keighley District. It must be understood that the sandstones and the coals both often occur over quite restricted areas and nowhere in the area can a complete sequence of strata be found in any one place. The coals and sandstones vary in character laterally and vertically from place to place and, with very few exceptions, cannot be identified in hand specimens without palæontalogical or microscopic evidence.

The thin fossiliferous marine bands are widely spaced and often obscured at outcrop. The geologist is thus driven to attempt the identification of sandstones from their lithological and mineralogical characteristics. This can sometimes be misleading and geological mapping can contain errors which can be rectified when new data becomes available. The author of the Bradford and Skipton geological memoir drew attention to this very problem in the Keighley District.[3] The problems are accentuated where strike faulting is suspected.

The quality of the coal depends on many factors, including the type of the original vegetation and, particularly, the amount of inorganic sediment, i.e. silt or clay, deposited in the vegetation. This sediment may occur as "dirt bands" several inches thick, that separate individual beds of coal, which often get mixed with the coal during working. Sulphur is an important impurity in coal. It affects its burning properties, and the amount of sulphur dioxide released into the atmosphere on burning. It is thought to have got there in three possible ways: as a constituent of the material forming the coal; as redisposition by sulphur-rich water percolating into the seam; or by contamination of the original peat swamp by marine incursions. The coals around Keighley, whilst being bituminous, have a rank which is at the lower end of the scale for that type of coal.[4] The "rank" of coal reflects its position in the coalification or carbonisation series extending from peat through to lignite (rank over 900) and bituminous coal (rank 900 to 300 approx.) to anthracite at the highest (rank 100). The depth of the seam through geological time, and the amount of pressure to which it has been subjected, are important factors in raising its rank.[5]

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ROUGH HOLDEN (or RIVOCK EDGE) COAL

INTRODUCTION

Silsden was a small village until the mid-19th century, when it too became dominated by textile manufacturing and its population grew rapidly. The early industry relied on handloom weaving, but power looms were introduced at Becks Mill in 1838. Apart from being an early hotbed of Primitive Methodism, Silsden's other claim to fame is as a former centre of nail making. That trade was introduced in the late 18th century by William West and there were still 80 nail makers in the 1881 census. The town also has a long connection with coal mining and the first part of Howden Road, from the town centre to Brunthwaite Lane, was shown as 'Coal Pit Lane' on the 1st edition OS map of 1848, but none of the pits appear to have been working then. Jenning's Surveys of 1686 and 1737 have a 'Colliers Hill' and a 'Cinder Hill', both in Holden Park. They are field numbers 1027 and 1026 in the 1846 tithe award. Another Cinder Hill, near Crow Trees on Silsden Moor, at SE02584949, is probably associated with the Bradley Coal.

There are a dozen or so field names which include 'kiln' or 'limekiln', most which can be traced to the late 17th century. Many of them were probably no more than sod kilns, which have left little trace, and got their stone from glacial drift. There were canal-side kilns on Hainworth Lane (two), by Bruntcliffe Bridge (one) and where the canal crosses Holden Beck (two). Only the last two survive.

The workings in the Rough Holden Coal were at the head of Holden Gill, nearly two miles east of the town. The seam outcrops on the west side of Rivock Edge, above Riddlesden, and runs southwards, for almost a mile, from the Rivock Fault at Dirk Hill Sike (SE072453) to near the junction of the Silsden to Morton Road with Banks Lane (SE070440). A faulted extension, some third of a mile south-east of the road junction, is shown on the 1876 and 1936 Geological Survey maps. The 1936 map also shows a further 650 feet of uncertain outcrop near Heights Farm. Both are in Morton township.

The 1st edition Ordnance Survey 1/10560 sheet of 1848 shows 124 'old pits' in Silsden and a further 25 in Morton. Such shallow pits are often dismissed as bell pits, but a note of caution must be sounded. Whilst some may indeed have been simple, small-scale workings, experience is showing that the majority were likely to have been associated with more complex workings. As will be shown, the mines were being worked systematically by the early 17th century. Evidence of the pits, mostly as small mounds, was clearly visible north of the Silsden to Morton road until they were landscaped between 1988 and 1990. Parts of the reclaimed area have been planted with trees. Nevertheless, a careful search near the footpath will reveal evidence of a few mounds and many fragments of coal. The name 'Holden Colliery' is given to the old workings on the 1848 Ordnance Survey sheet, whilst Brigg refers to this seam as the Rivock Edge Coal.