

## Excavation and Conservation works at The Golden Valley Colliery, Bitton

### John Cornwell I

#### Introduction

To the north of the River Avon between Bath and Bristol lies the high dome of the Kingswood Coalfield. Defining its eastern exposure is the broad valley of the Warmley/Siston Brook. Running parallel, further to the east, lies yet another more hidden valley - that of the Boyd River.

Arising from springs at the base of the Cotswold escarpment, close to the Motorway M4 crossing at Tormarton, the diminutive stream of the Boyd is joined near Doynton by the Abson brook to then cut a north-south defile, known as the Golden Valley, to emerge into the main valley of the Avon at the village of Bitton. In cutting its way through the younger Triassic Marls a narrow patch of the underlying coal measures has been exposed in the floor of the Golden Valley for a length of approximately 1 mile between Redfield Bridge (OS ST690714) and Boyd Farm (formerly Boyd Mill, OS ST685705).

#### History of Mining

It is not clear when local working in and around the exposure first occurred, documentary evidence would appear to suggest the early years of the 18th Century. This also indicates utilisation of water wheels to pump out coal shafts, for example a sale document of 1726, in retaining Coal mining rights to the Vendor - Thomas Edwards his Heirs & Assigns - reserved rights not only to work coal but also "likewise to make Dreins and Aqueducts for carrying the water in and through the said premises<sup>(1)</sup>. Confirmation is obtained in a document held by the Gloucester Record Office relating to a dispute in 1814 between the owners of Boyd Mill and the Mill located next upstream (New Mill).

The legal Brief as prepared at that time summarised that - "The commencement of the stream of water is about 3 miles from the Plaintiff's Mill [New Mill] and supplies 5 Mills before it comes to this. About 40 years since the remains of a ruinous Coal Work supplied the place where the Plaintiff's Mill now is together

with a wnter wheel for the purpose of pumping water out of such Coal Pit".

Robert Newman in proof of evidence stated that he "hath known the place where the Plaintiffs Mill is erected upwards of 70 years, that it was then a Coal Pit - that the wheel was against the hedge, that about 44 years since one Barnes used to land some lime coal there - that Barnes filled up the holes - that Witness rented grounds near there. That there was a little house which was used as a Counter to keep an account of the coal".

George Robbins, a Millwright of Bitton, stated that in 1775 he was "employed by a Mr Barnes of Bristol to make a water wheel for a Boring Mill 18 feet high 4 feet wide to run 18 inches in tail water. That previous to his making such wheel the place where the Plaintiff's Mill now is it was a ruinous Coal work".<sup>(2)</sup>

To date the sites of 10 shafts have been plotted, from old records, in the area south of Redfield Bridge - all sunk between 1700 and 1800. Others have been indicated on the ground by coal dust blackened patches disclosed by ploughing and in particular when a gas main was laid along the valley a few years ago

#### The Golden Valley Coal Company

On the 3rd September 1798 a mining partnership was drawn up between Aaron Brain and James Quarman, Edward Stone (the elder), Edward Stone (the younger), Samuel Brain, John Brain, William Lacey and Stephen Matthews. All except Stephen Matthews were signatories of a 21 year coal mining lease dated 19th July 1798, the Lessors being George Flower of Saltford (gentleman) and Mary Flower of Bitton (widow of Lamorock Flower  
- owner of Boyd Mill).  
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The lease is in the Gloucester Records Office and consist of two pages 30 inches by 26 inches, the interesting part of the document states:  
"and grant unto the said Aaron Brain and William Lacey Full And Free leave Liberty And Licence for them the said Aaron Brain and William Lacey their executors administrators and their agents

workmen and servants to enter into and make and open one or more new pit or pits and out of each pit or pits to raise and land any coal that is lying or abiding under ground in six certain pieces or parcels of pasture land of them the said George Flower and Mary Flower called or known by the several names of The Sheppards Leazes, The Three Acres, The Long Leaze, The Five Acres and the Land-furlands situate on the Upton side of the Brook or river at or near the Mill now in the possession of the said Mary Flower . . . and to draw any level or levels and to erect a fire engine or engines for draining and carrying away all such water as shall or may annoy obstruct or hinder the working of any mines veins or seams of coal as shall be so found in upon or under the ground aforesaid. . . ."

In 1808 the first entry in the only surviving Minute Book of the Mining Partnership refers to a meeting of the Colliery Proprietors on the 18th April when Aaron Brain was asked to " Look out and Purchase from 20 to 40 fathoms of secondhand shides and rods which are expected to be wanted for the prosecution of the work".

This is clear evidence that shaft sinking was still in progress in 1808, and that it is

unlikely that the pumping engine had yet been installed. It is highly probable that water was previously being raised in a kibble or hudge by a horse gin. Also at the same meeting Aaron Brain was "empowered to purchase in the best manner possible a secondhand boiler of such dimensions as he may deem proper". Was the secondhand boiler for the intended pumping engine, or was it to be used as a spare or stand-by boiler for a Steam Winder or 'Whimsey'?

A meeting on the 11th July 1808 "Resolved - on the recommendation of Aaron Brain that the Whimsey should be removed at a convenient time from the present situation to the upper pit in Mr Ferris's ground". This raises the unresolved question, where was Mr Ferris's ground; is this one of the pits situated on the hillside between Upton Cheney and the Old Pit? At this untimely point the entries in the kminute Book cease for 11 years.

On the 3rd May 1819 the proprietors resolved " that the Company do purchase the Atmospheric Engine now standing at Staple Hill". This engine belonged to Mr Peterson and Mr Boulton, the Partnership paid £113, exclusive of House, Spring Beams & Shears. In all probability this





Bitton Parish Tithe Map 1840. The Old Pit is at Plot 1040, New Pit at Plot 108, and the Furnace, Plot 1049

was the very same engine as was advertised for Auction at Staple Hill Colliery in Felix Farley's Bristol Journal 6th and 13th March editions. The Auction Sale, due to take place on 16th March 1819 included - together with two other steam engines and five Horse Wheels - 'A Capital Atmospheric Steam Engine, equal to the power of Forty horses, 1 Boiler, 2 Lifts of Cast Iron Pumps, which are worked by the above Engine, with Capstan complete'.

The Minutes also tell us that "in contemplation a new company is about to be formed at Staple Hill, it is agreed to offer that Company when formed the use of the engine, if it is desirable to them at £20 p Ann. on their engaging to give it up on having 6 months notice from the Golden Valley Company".

Although the proprietors do not say where the atmospheric engine was to be re-erected it was very likely intended for the New Pit, half a mile away on the opposite side of the Boyd valley, near the top of what is now Newpit Lane, where sinking commenced about 1823 and took 7 years to complete.

At a meeting in October 1821 Aaron Brain told the proprietors that "a 'Whimsey of greater power is necessary for the work and will greatly benefit it". As the New Pit did not reach depths where a steam winder would be needed until the mid or late 1820s, this whimsey must have been intended for the Old Pit, to replace an engine with less capacity.

It appears that the New Pit came into production in 1830 or soon after, and later became one of the two downcast shafts linked underground for the Golden Valley complex, the upcast shaft being an adaption of a separate older pit, upon which a chimney and furnace was erected to ventilate the whole of the underground workings. The Old Pit became a pumping pit and served as a secondary exit for the New Pit, although 30 tons of coal per week were still raised at the Old Pit as late as 1877 - possibly for the boilers and Ventilation furnace.

In May 1841 Mr E Waring visted the colliery on behalf of the the Childrens Employment Commission who were investigating the conditions and treatment of child labour. The under-ground manager, William Bryant age 41, stated that not more than eight boys under 13 were employed the

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youngest was about 11. He also had six lads under 18 earning from 1s 6d to 12s a week, "all are carters, they require no special door-keepers, they work a seam 2½ feet thick but it can be irregular, they work from five in the morning until one in the afternoon".

The report also states that the foul air is kept under by ventilation, but is often troublesome. Unfortunately it does not give details. The under-manager does say that one man fell down insensible from foul air, but was restored on being taken into fresh air.

Mr Waring also examined William Short aged 11, "he carted a bushel and a half up a ladder by the girdle, says it does not hurt him now, but used to at first". William Short's wages were 4d a day.

One cannot undertake a history of the Golden Valley Collieries, however brief, without some comment on the long list of fatal accidents which occurred between 1800 and the closure of the pits in 1898.

<u>Date</u>	<u>Type of Accident</u>	<u>Fatalities</u>
<u>1794</u> (Not Golden Valley Old Pit, probably one of the pits in the field to south of the Old Pit.)	Shaft	1
<u>19th March 1801</u> Francis Bryant, Coalminer aged 10 years, killed by falling out of the 'cart' in descending the shaft.	Shaft	1
<u>6th April 1801</u> Thomas Burgess, Coalminer aged 44, killed by large stone falling on his head as he was descending the shaft	Shaft	1
<u>4th January 1809</u> William Jay, Coalminer	???	1
<u>23rd December 1834</u> Between 5 and 6 in the morning, a number of colliers descended the shaft of the New Pit, which was 936 feet deep, the rope suddenly snapped, precipitating the men 900 feet down the shaft. 4 men were dashed to pieces, while the other 4 men were so lacerated, it was felt that there was little hope of their Survival.	Shaft	8

Miraculously a boy Daniel Harding, and a collier, Joseph Bawn, grabbed a chain which hung in the shaft to serve as a guide.

Once the men on the pit bank realised that men were clinging to the side of the shaft, a man was sent down with a rope with a noose to render assistance. The person descending the shaft then came across Daniel Harding first, who cried out "Dont mind me, I can still hold on a little longer, Joseph Bawn, who is lower down is nearly exhausted, save him first".

The man was lowered further and found Joseph Bawn as described by the boy, and after bringing him up safely, again descended, and succeeded in bringing Daniel Harding safely to the surface.

It is recorded, that from the time of the accident until the boy was 'brought to bank' fifteen to twenty minutes passed.

<u>1839</u>	Shaft	1
<u>1839</u>	Fall of roof	1
<u>1853</u>	Fall of roof	1
<u>10th December 1863</u> John Fudge and George Bush were killed by falling down the New Pit Shaft. The engineman Samuel Fudge, was in the habit of winding by the indicator, but at 5 a.m. on this dark morning it became deranged and deceived him with regard to the position of the 'cart' in the shaft. The two men were drawn up over the pulley, they then fell down the shaft which was over 900 feet deep.	Overwind	2
<u>1881</u>	Fall of roof	1
<u>1881</u>	Fall of roof	1
<u>26th March 1882</u> 3 men suffocated when attempting to extinguish an underground fire. This accident occurred on Sunday 26th March 1882. Smoke was seen to be issuing from the top of the New Pit shaft. The bailiff and his son, with another man, gave intructions to raise steam on the winding engine at the Old Pit, which at that time was used for pumping and was also the second means of egress from the workings of the New Pit.	Underground Fire	3

The bailiff intended to descend the Old Pit and travel underground to the pit bottom of the New Pit. When the bailiff reached the bottom of the shaft the empty budge was sent up to the surface, which was the usual custom as the shaft



Photograph taken circa 1872, showing Abraham Cook (with Top Hat) Bayliff of Golden Valley Colliery, with his son 'Young Abe' to his left. Both were to suffocate in the 1882 fire at the Pit. Jim Cook (the miner with a candle in his hat) lived until 1904.

was wet and hemp rope was used. After half an hour the signal was given to lower the hudge, which was done immediately. As no futher signal was given to raise it again, the hudge was left at the pit bottom.

Sometime later, as the men at the top felt that something might be wrong, they had the hudge brought back to the surface. They then descended and found the dead bodies of two of the men close to the shaft. The third body was found further into the heading. The men who first went down experienced a strange smell not unlike sulphur, their lights were put out, and they became giddy and had to return to the surface.

Some water was turned down the shaft, and very soon after other men were able to descend and recover the bodies. The owner then closed down the shafts, with a view to extinguishing the fire. No one was then allowed to enter the colliery until the fire was thought to be out.

When it became possible to descend the pit, it was found that a large heap of coal and some timber near the bottom of the New Pit shaft had been on fire. It was thought that one of the workmen coming out of the pit on Saturday, had thrown down the end of his candle, which had ignited some dry timber at the side of the underground road

During the Inquiry it was disclosed that the winding engineman was stone deaf. Mr.Bain advised that some one should be appointed in his place; the jury also adopted Mr Bain's recommendation that Abraham Cook, senior, and Abraham Cook, junior, and Alfred Walter, were accidentally suffocated in the Old Pit, Golden Valley.

1885 Fall of roof 1

1896 Tram accident 1

Whilst riding up the engine plane on a full journey, contrary to rules, a miner was crushed against the roof, receiving injuries from which he died.

The last accident at the Golden Valley Colliery was in March 1897. It was fortunately not fatal. A workman had his foot crushed at the Pit bottom by the cage alighting on it in consequence of his standing too near the shaft.

This is certainly not a complete list of fatal accidents that occurred. at the Golden Valley Colliery. I have a strong feeling that there were many individual fatal accidents which were not recorded. It was only after 1852 that the Mines Inspector reported every fatal accident. Prior to 1852 if an accident was not reported in a newspaper it is unlikely to be picked up in the 1990's. The early Coroner's records have been found to be incomplete. It is only from a pencil addition to one of the mine plans held at Gloucester Record Office that we learn " G Green had his thigh broken Feb 1 and deceased Feb 22 1881"

One sad but interesting episode in the history of the Golden Valley Collieries was a murder, which it is thought took place at the Old Pit in April 1886.

A vagrant Thomas Fennel, who was also known as Lazarus, was in the habit of sleeping in one of the boiler houses at the Old Pit. This naturally upset Aaron Brain who instructed the engine driver William Pratten to order Fennel, and another man, James Church, off of the site. Fennel is alleged to have threatened Pratten who then threw a bucket of water over Fennel. Some hours later a party of men from the pit found Pratten dead in the boiler house, with a head wound. Fennel was later found hiding in a pig-stye at Upton Cheyney, but he only received 6 months in Gaol, when he was tried at the Assizes for the murder, as he was deemed to have acted "under great provocation"!

As previously mentioned, an old pit in the Boyd Field was reopened and repaired, for use with a ventilation furnace. This furnace and chimney was built alongside the top of the shaft sometime between 1830 and 1870 to become the upcast shaft for the Golden Valley Colliery. The shaft, with its horse gin circle, is shown on the Tithe map of 1840, but the furnace is not specifically shown so it may well not have been built until after 1840.

A lease dated 1877 describes the furnace as a Chimney and Cowl with an underground connection to the Golden Valley Colliery, but furnace and underground connection are not shown on any of the colliery plans of that period. The rent for the shaft and furnace in 1876 was £22 per year; this was raised a year later to £28.<sup>(3)</sup>

By the late 1870s most if not all available reserves of coal were exhausted, the production for the last 20 years of the Pit's life was augmented by robbing the underground roof supporting pillars. The output of coal for the last year was 8,969 tons, which is approximately 175 tons per week. The workforce was thought to be around 70 or 80 men and boys.

The Colliery was offered up for sale in February 1898, a notice on the front page of the Colliery Guardian states - "This Old-Established Colliery that has been worked more or less for upwards of 60 years, and is well known in the market as an Excellent Smith's & House Coal. To Capitalists prepared to spend a moderate sum in developing The Parrot Seam eastwards, and the House Coal to the deep, a very profitable Colliery should be easily es tabi shed".

According Mr Tony Brain the colliery did not reach the reserve price and was withdrawn, and then sold off piece-meal. The mining rights were eventually purchased by Phillip Fussell owner of the Hole Lane Colliery to the west, not to work them but to prevent any future encroachment from the Golden Valley Colliery's extensive workings. It is very obvious that the Golden Valley Colliery was completely worked out by the 1880's. How the colliery managed to keep working until 1898 is a mystery, the plans of the colliery <sup>(4)</sup> show that the company had robbed most of the pillars in the Parrot Vein and New Smiths Coal Seam. Development headings had been driven in search for unworked coal, but most headings end in a vertical trial borehole, which in most cases found little or no coal.

Unknown to the colliery proprietors, on the south side beyond the Willsbridge Fault lay many thick seams of high quality coal, including the Doxall, The Toad Vein, Kingswood Great Vein and the Ashton Series of seams. In fact a new virgin coalfield lay to the south of the Fault.

**The geology of the Golden,Valley Collieries.**

The coal seams of the Bitton District belong to the Third group, or Lower Series, which was by far the most important of the three groups.

Running south from the bottom of Redfield Hill for approximately 1 mile is a small area of exposed coal measures. In this area four of the seams of the third group are known to outcrop;

some of these seams further outcrop in the field behind the Golden Valley Old Pit in the following order, north to south.

Parrot Vein, Buff Vein, Ragg Vein and the Millgrit Vein.

The outcrops of the remaining seams are concealed by the later beds of Blue and White Lias Limestone and Red Triassic Marls, close to the village of Upton Cheyney.

The Golden Valley seams dip south west, with a dip of 12 inches to the yard, or 1 in 3, easing out in depth. 1,200 feet to the south of the Old Pit lies the Willsbridge-Bitton Fault. This fault runs in an east-west direction, having its down throw to the south side, and as such it forms the southern limit of the workings from the New and Old pits.

Shaft Section of Golden Valley Old Pit

<u>Seam</u>	<u>thickness</u>	<u>depth</u>
Millgrit Seam	2' 6"	26'
Rag Seam	2' 0"	74'
Devils Seam	not known	282'
Buff Sea	not known	300'
Parrot Seam	1' 9"	421'
Little or Brimstone Seam	not known	456'
Muxen Seam	Bad	???
Coking Coal	2' 0"	774'
New Smiths-Coal	2' 0"	938'
Kenn-Moor Seam	2' 0"	980'

The Kenn Moor and New Smiths Coal were apparently worked by a level heading or 'Pound Branch' driven eastwards from the Old Pit shaft at or about the Parrot seam level to intercept these lower seams in their outcrop concealed beneath the younger strata of the hillside towards Upton Cheyney.

The shafts of both the Old and New Pits were sunk through hard Pennant sandstone rock, which included the Millgrit and Rag Coal seams. There

was also possibly a seam known as the Black seam which has not been included in the shaft section, as its position is not clear. Some plans also make reference to a little worked Cuckoo Seam which is probably an alias for one of the others listed.

Shaft Section of the Golden Valley New Pit.

<u>Seam</u>	<u>thickness</u>	<u>depth</u>
Coal measures (Pennant grit, with thin Fig and Francombe seams)		504'
Millgrit Seam	2' 6"	506'
Rag Seam	2' 0"	554'
Devils Seam	? ?	762'
Buff Seam	? ?	780'
Parrot Seam	1' 9"	901'
Little or Brimstone Seam	? ?	936'

The colliery was worked to a considerable depth - 2000 feet. In fact very few collieries in England ever worked such thin seams to such depths at a profit. and it can only be accounted for by the high value placed in particular on the Parrot Seam Coal for Smithying purposes, with its almost anthracite like qualities.

The depth of the New Pit shaft was 936 feet. The deepest workings, adjacent to the Willsbridge Fault, were reached by a continuous set of inclines following down the Parrot Seam. First by an 800 yard long incline from the pit bottom, worked from the pit bank by the winding engine; then an incline 50 yards long, worked by a wheel and rope; followed by an incline similar to the last, 50 yards long; then an incline 60 yards long, up which the putts were dragged by manual labour. There appears to have been a similar arrangement at the Old Pit, which was probably in limited use as late as the 1870s when reworking of the coal pillars, left for roof support, was taking place.

Restoration of the Ventilation Furnace

BIAS members first involvement in the Golden Valley Colliery was as a direct result of concern being felt at the rapidly deteriorating condition of the Ventilation Furnace chimney.

By 1982 a gaping hole had appeared in its eastern side, which with the super-abundance of ivy growing from the top - giving the appearance more of an 'Ivy Tree' rather than a chimney - threatened its total collapse. The first thought was only one of recording, the gaping hole giving a rare opportunity of access for measurement.

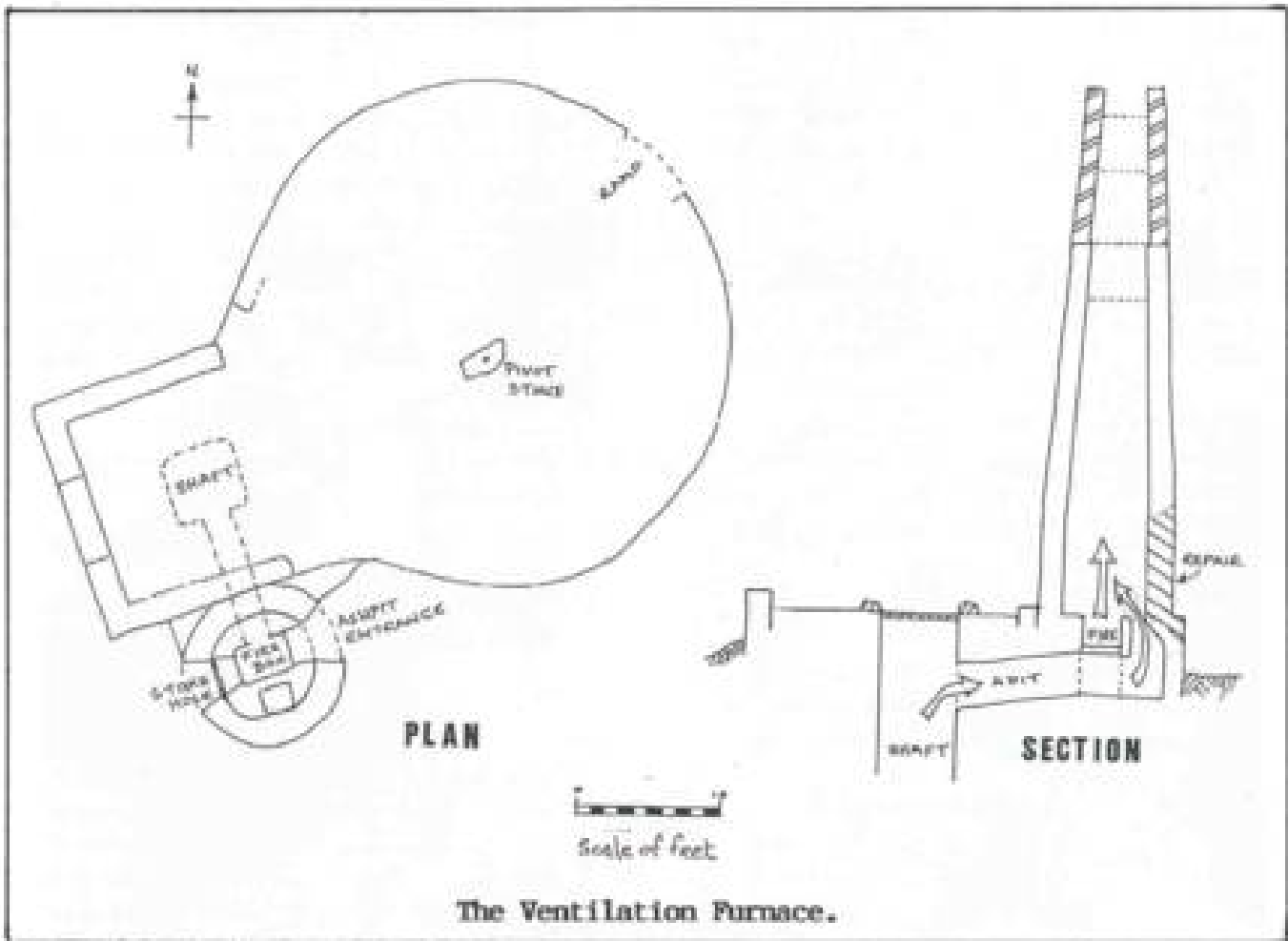
Permission was consequently sought, and obtained, from the then owner, Miss Watts of Bitton, to carry out some exploratory clearance of rubble and to survey the structure whilst it still stood.

As can be seen from the diagram, its principle is very simple - a coal hearth, at the base of a chimney, was lit to cause hot air to rise, thus strongly drawing up air beneath its grate. The ashpit below had an airtight exterior door and also an open flue or adit connecting into the top of the mineshaft. This shaft also had airtight doors sealing its top, so that the only place from which air could be drawn by the fire was the mineshaft and its connected workings. With one or more 'downshafts' connected into the underground workings, fresh air was drawn down into them and through the mine to re-emerge, polluted with the mine gasses, through the furnace.

The Golden Valley pits were fortunately free of explosive gasses - candles and open oil lamps were used to the very final days without any consequent accidents occurring. They did however have to worry about lack of Oxygen in the deep and constricted workings.

Later forms of this furnace type of ventilation were normally located underground so that the 'upshaft' itself could act as a chimney, when it was found that this could be made safe to operate even in 'firey' pits. Later again these furnaces were superseded by mechanically driven fans, so that the survival of a surface ventilation furnace in anything like its original condition is very rare indeed; certainly nothing else quite as complete as the





The Ventilation Furnace.

Golden Valley Furnace is known elsewhere in the United Kingdom.

The survey soon revealed unexpected features such as a by-pass flue to the side of the fire bed, to double the amount of 'pull' from the chimney, and that the top of the chimney was built of brick, Cornish Mine style, rather than just the Permian Stone visible lower down. Also the existence of an adjacent circular raised platform, virtually intact, with central pivot stone of a Horse Wheel or winding 'Gin'.

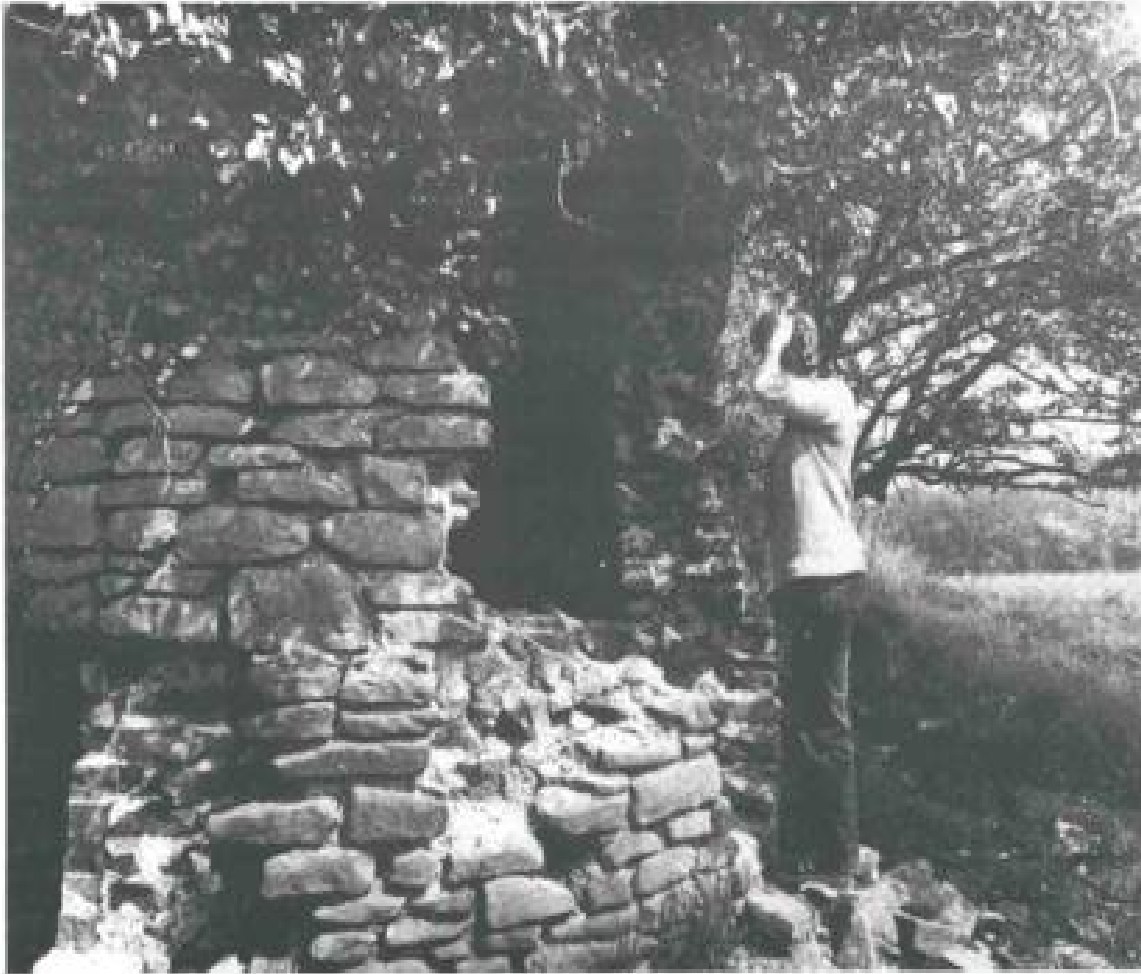
It also revealed just how perilous a condition the chimney was in, with the lintel of the furnace charging hole literally supported on one end by ivy boughs and very little else. A cast iron trampoline acting as lintel to the ashpit access hole on the far side of the chimney was also cracked in half giving little or no support.

Having completed the survey and reported this to Miss Watts she agreed that some attempt should be made to try and save the chimney, and we undertook - somewhat rashly but with lots of enthusiasm - to see what we could do. This began 4 years of week-end toil, first bringing in

Hydraulic Pit Props to avoid immediate calamity, then removing stone from the base of the hole to reach a secure foundation on which to rebuild; then rebuilding the top of the internal by-pass flue at the same time as filling in the hole; only progressively removing ivy boughs to keep its support to the last possible moment.

New bricks were brought in to rebuild the missing side pier to support the charging hole lintel, ensuring that all the new work we put in could in future be readily identified from the old. With the aid of the hydraulic pit props the chimney was raised sufficiently to re-bed the lintel to its proper level; and then to replace the broken lintel on the far side with a suitable length of steel railway line.

The day came when we could tackle the major task of removing the ivy from the top two-thirds of the chimney - now well dead having been left over winter with severed roots. On the Week-end of 13 May 1984, tower scaffolding was hired (funded by BIAS) and a grand 'ivy pulling' was enjoyed by the normal 3-4 workforce, specially augmented for the occasion by BIAS members and others. Apart from bending one of the lightweight scaffolding poles, all went well



Doreen Martin, inspecting the Furnace in 1982

leaving the chimney naked and proud, ready for the job of rebuilding the top 4 courses of brickwork, plus the raking out and total repointing of the structure.

This work necessitated long term hire of scaffolding - at that time well beyond our means - and we did what we could in the meantime by filling in cracks accessible by ladder, placed both outside and inside the chimney shaft.

One more surprise was in store when we cleared rubble from out the connecting flue to the shaft. The local National Coal Board Officials had assured us that the shaft had been safely recapped by contractors in 1959. They were as horrified as we were when inspecting the underside of the capping by taking in powerful lamps via the flue. It proved to consist of rubber conveyor belt laid across small section railway line, many of which rails were not resting on the stone lining to the shaft. The 'concrete cap' consisted mostly of gravel with little cement to bind it.

A quick consultation resulted in N.C.B. permission for us to remove the defective capping and replace it with strong steel quarry

mesh bedded on borehole drilling rod well concreted in. This had the advantage of leaving the shaft safely open to public inspection, or at least down as far as its flooded water level only 16 feet below.

It also opened the opportunity of re-firing the furnace for demonstration purposes, in that air could now enter the flue direct from the surface. Having laid the quarry mesh and raised the shaft stone lining to form a kerb, the shaft top surrounding was gravelled over neatly, all to the satisfaction of the N.C.B. who remarked "an elephant could now safely dance on it".

Early opportunity was taken of trying out the furnace with a wood fire - it was so effective that you could hear air roar down through the mesh on top the shaft. A photograph and short article duly appeared in the December 1985 edition of 'Coal News'.

In the search for suitable scaffolding our salvation finally appeared in the form of Mr Aplin of Old [formerly 'New'] Mill. We had been carrying out a small exploratory excavation of disused water culverts on his property when he mentioned that he had some old scaffolding in



De-ivying the Furnace Chimney, May 1984

the Mill building that he had bought second-hand some years ago, but had never had the need to erect it. He would like to see what it looked like when put up, and that we were very welcome to borrow it on free loan, so long as we carried it over to the furnace field, erected it, and in due course, put it back in the Mill ourselves.

Needless to say we jumped at the opportunity, with John Taylor displaying both skill as an erector and a head for heights greater than his assistants - who ventured to the upper levels only when these were safely clamped. Being sufficient for a double tower to the height that we required meant that the scaffold had to be taken down and re-erected on four occasions to complete the circuit of the chimney. This was duly accomplished, the top brickwork relaid and the chimney exterior totally repointed.

Incidentally the mortar we used, on advice, was 1 part Portland Cement to 2 parts Hydrated Lime and 5 parts Quarry Dust. This was thought to be strong enough to bear the loads whilst not being too strong a mix to the detriment of the sandstone and bricks, giving a degree of flexibility to avoid future cracking. It also closely matched the original mortar in appearance.

Whilst carrying out these works, our attention was drawn to a copse two fields away containing the site of the Old Golden Valley Pit which we were assured now contained nothing but a spoil heap, a capped shaft and a rubbish tip. More of this later, but we duly finished the Ventilation Furnace works, complete with explanatory plaque, in time for an official unveiling and ceremonial re-firing in October 1986.

### **The Excavation of the Golden Valley Old Pit.**

The site of the New Pit, adjacent to and halfway up the Lane named after it, was self evidently barren. All that remained visible in the fields was a small levelled out spoil heap further down the hillside, close to the river.

The site of the Old Pit had been visited on a number of occasions by members of BIAS and it was reported that little remained of the site apart from the capped shaft which had been broken open on the northern side. A prominent spoil heap occupied the northern corner of the small copse, which comprised of several large

Oak trees and many mature Ash trees, with a mass of Elder growing under the Ash trees.

Robin Stiles and the author visited the copse in February 1985, when the vegetation was low, and immediately saw from scattered stonework that there was some potential in the site.

Permission was sought to investigate the site, and obtained, from the owner who was a descendant of the very same Brain family who were involved in the sinking of the pit as lessees and eventually became the landowners.

Exploratory work commenced on the area to the north of the shaft, where it was thought the pumping engine house would be situated. The very first days digging revealed the corner of the pump house bob wall and the foundation remains of its arched opening, all built of pennant stone. Some weekends later a cast-iron link typical of those which connected the wooden balance beams of early steam engines to the pump-rods was unearthed on the side of the shaft. It was obviously lost by the workmen removing the engines and boilers from the site.

Eventually the entire layout of the engine house and the area between it and the shaft were uncovered. The only finds apart from the link, were 1 bowl of a clay tobacco pipe, and a brass tap which may possibly be the tap which supplied water to the open topped cylinder.

After the removal of the fill in the engine house, which was mainly coal waste, clay roof pantiles, and mortar with large lumps of dressed or rough pennant sandstone, it was found that the remaining structure of the pump house was in fairly good condition. The house was found to be 18 feet in length, 14 feet wide and standing 12 feet to its highest remaining point.

The house was clearly a standard early 19th century structure, with a tiled roof, its walls built entirely from pennant sandstone, and with a square chimney built on to the back of the house. The brick work around the window and joist holes was obviously added at a later period.

It is thought that the original engine cylinder sat vertically on some form of mounting at ground level, the valve gear would have also been situated on the ground floor. The first floor would have given access to the open topped cylinder, with a second floor for access to the

wooden beam and the platform around the outside end of the beam.

It is very likely that the house only had one window, its opening still exists on the eastern side of the house. With the close proximity of the haystack boiler on the western side of the house windows would have been out of the question.

The interior of the engine house had been completely stripped of all iron-work, timber and good dressed stone. The only features of interest were four vertical wrought iron bolts, 18 inches high, which were built into the back of a ledge which ran round the north, east and western sides of the house.

The bob wall, which had contained the best masonry, was robbed down to 8 feet on the eastern side and almost to ground level on the western side. The walls were found to be 3 feet thick, except for the bob wall which was 5 feet thick, with the normal opening at ground level, which forms the doorway into the engine house.

The one puzzling feature, which has not been explained, is the poorly built ledge, 3 feet

deep, which runs around the interior of the engine house at a height of 4 feet. This feature is clearly a later addition, and is possibly a modification made late in the life of the pit after the old pumping engine was removed to allow for a smaller engine to be installed.

In the back wall of the engine house are the end impressions of two iron 'T' beams, 2 inches thick and 1 foot 2 inches high, which were laid 4 feet apart and appeared to rest on the ledge. It is now impossible to say whether the iron beams were installed for the change of engine or whether they were part of the original installation.

Unfortunately we cannot say whether the pumping engine was of a Newcomen or a Single-acting Watt type. We can only safely say that the engine did not have parallel motion. A Newcomen engine is more likely, as almost all collieries in the Bristol coalfield used the Newcomen type engine in the early 1800s, usually with the addition of a separate, condenser as the Watt patent had by then expired.

The next phase of work was the removal of the fill from the site of the boiler which was



**view of Old Pit site looking South from the rear of the Haystack boiler setting.**

built against the western side of the pumping house. Eventually the setting for a large haystack boiler, 14 feet in diameter, and for a small egg-ended boiler, 16 feet long and approximately 6½ feet in diameter, was uncovered.

Almost all the of the original boiler setting was constructed from pennant sandstone, only the firebox and flues were built in firebrick. In later repairs common brick was used, even the sections of the firebox were later constructed from ordinary bricks, which were supplied by the Cattybrook Brick Company. Very few marked firebricks have been found on the site. Where these are imprinted they are mostly of a Staffordshire manufacturer that cannot be closely dated (Rufford' and 'Hickman'). One or two of 'crowned' B imprint were found which may have come from the Brain fireclay works at Crews Hole.

A interesting feature was a large diameter earthenware pipe inserted in the front of each of the boiler fireboxes. The probable reason for these pipes was that the efficiency of the boilers had become seriously impaired by thick deposits of hard water limescale (lumps of

'furr' over eight inches thick were found on site) so the pipes supplied extra air under the firebars for a hotter fire.

The clearance of the interior of the boilers and immediately surrounding area was the most difficult and heaviest work on the site where spoil material had slumped and solidified over the remains. Removal took almost a year to complete. At one stage in the excavation of the haystack boiler a barrow-way was constructed over and across the firebox and boiler setting. This enabled barrows of spoil to be moved over the boiler and tipped directly into the shaft. In some areas the depth. of fill was 15 to 20 feet deep. As the site was known to have been working in 1898 and demolished in 1900-1 there was no true stratification to record, all clearance work consisted of carefully removing the fill down to the ground or floor level.

As work on the boilers proceeded, it soon became apparent that the brickwork of the flues and boiler settings was in a very unsound condition. The fire-bars had been removed and the lintels which supported the fire-bars had been torn from the brickwork of the fire box, leaving large holes. Most of the brickwork above the back of



Egg Ended boiler setting, note large pipe for additional draught.



Restoration in progress to western wall of Pumphouse and to the Haystack boiler setting.

the fire box and the flues had been burnt away by the hot corrosive gases. At this point it was decided to stop excavation and concentrate on conservation of the brickwork of the boilers.

Throughout the excavation all good bricks and reasonable pieces of pennant sandstone had been saved, as it was felt that original material would be needed when restoration was under way. Many original Cattybrook bricks had been found in the fill in the boilers in near perfect condition. We soon realised that the only way to save the boiler setting was to remove the crumbling and broken bricks and replace them with the salvaged bricks, making sure we only replaced 'as existing' and not be tempted into rebuilding by guesswork.

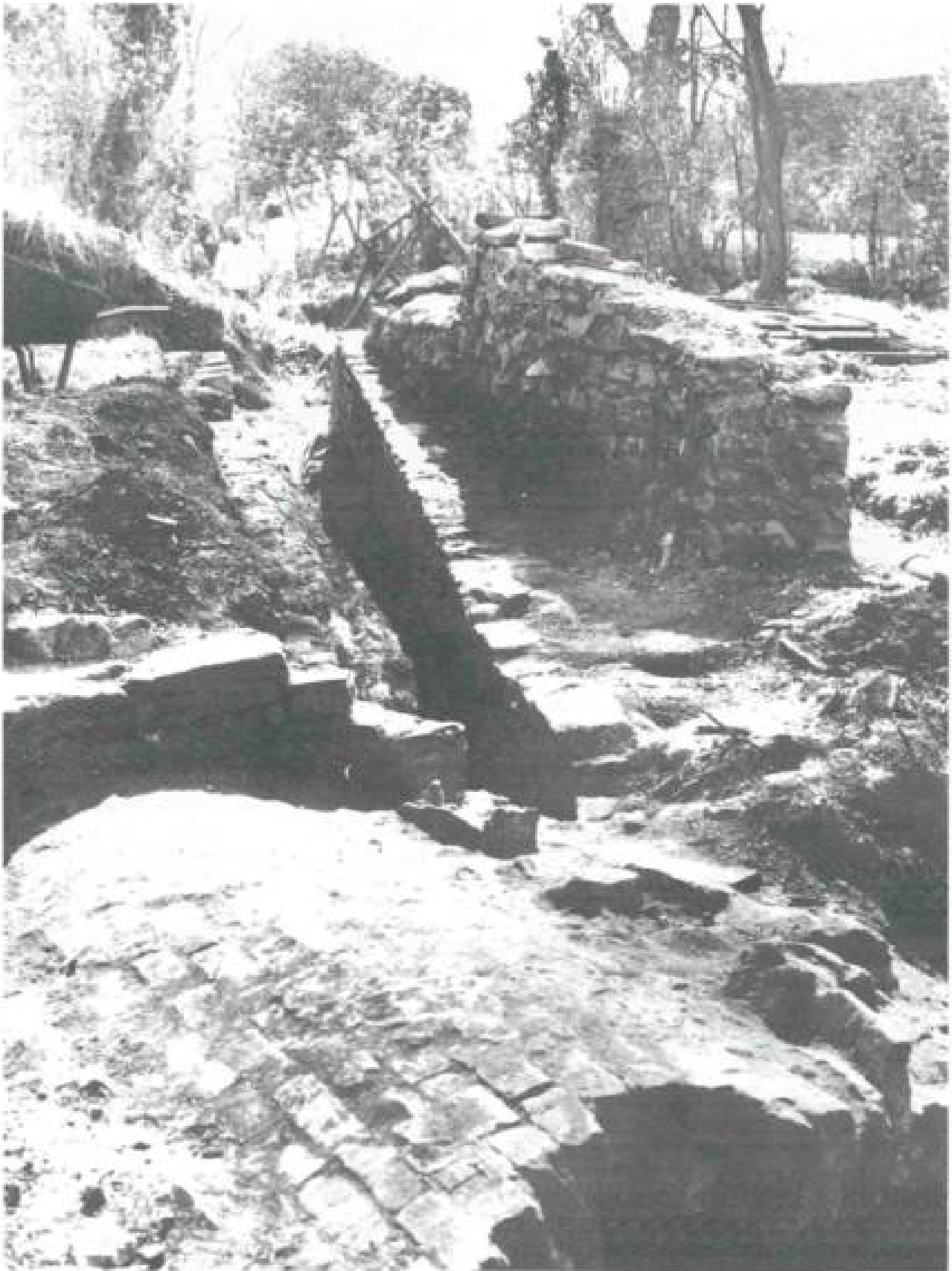
One feature common to the two boilers is a rear passageway, which originally had an arched roof, big enough to allow access for a man with a wheelbarrow to remove ash and cinder from under the two fireboxes.

An interesting and spectacular find, on the opposite side of the shaft to that occupied by the pumphouse, was the clear evidence of an underground haulage system being driven from the

surface by the colliery winding engine. This find consisted of a stone built channel, running back through the heapstead from the shaft, which would have carried the endless rope or chain of the underground haulage system. Running along the floor of this channel there is to be seen a continuous pile of compacted coal dust, in the top of which there is a groove worn clear again by the chain. At the point where the chain left the heapstead this groove has cut well into the stone of the channel floor forming a pronounced 'V' shaped slot.

The shaft end of the channel had been sealed off at some time (possibly in 1959 when the shaft was capped by N.C.B contractors) with the stone lining of the shaft itself made good, but we found - immediately behind the repaired lining - remains of the deep slot necessary to house a large pulley to carry the chain down into the shaft.

The third and final phase of the excavations, was the removal of the fill which covered the colliery winding engine foundations. These foundations comprised of a winding engine house facing north into the site, with a flywheel pit and separate drum pit situated on its eastern



Channel for underground haulage system, leading to shaft (under brick arch capping) in foreground.



side; and with a boiler house built against the western side of the engine house.

The site of the winding engine and boiler had been located in 1988, but complete excavation of the boiler was not possible at that time as a very large ash tree had grown over it. This however was resolved when the high winds of last winter blew down many of the trees on the site.

Again it is not possible to say whether the winding engine was a Newcomen or a Watt type, the presence on the site of a large pit for a condenser does not mean that engine had to be a Watt, and many early steam driven collieries did use rotative Newcomen engines even though these were comparatively inefficient for the purpose. It can however be said that the balance of probability in this instance more favours a Double-acting Watt .

The winding engine was a typical rotative beam winder of the early 19th century. It was enclosed in a house which is slightly smaller than the pumping engine house, the house dimensions are 15 feet in length and 14 feet wide, the pit for the winding drum or reel is 16 feet long and 9 feet wide. This engine not only

wound, it also drove the underground haulage system. Unfortunately no trace of the haulage system survives in or around the winding drum pit, but it is in line with the channel leading to the shaft.

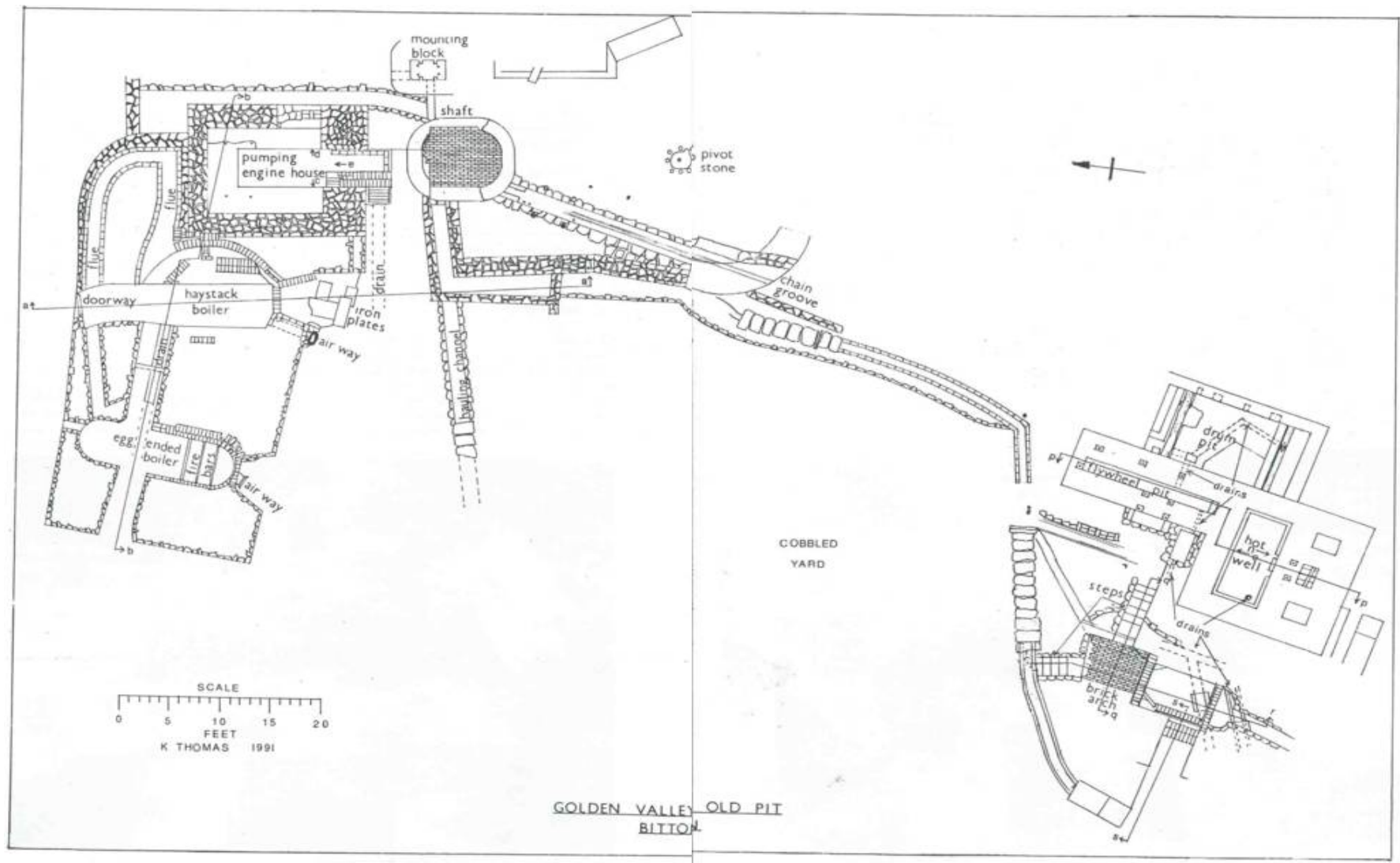
The engine appears to have had a 14 feet long beam, and a cylinder of approximately 30 inches in diameter, with a stroke of around 4 feet. The diameter of the flywheel was about 12-13 feet. The engine was fitted with a condenser. The condenser pit is brick built 9 feet by 4 feet This pit is now is 6 feet deep in places, some of the top brickwork having been broken away particularly from the eastern end. The walls of the entire pit are covered with a thin calcareous deposit which must have originated in splashing from the wooden or metal tank in which the condenser was presumably situated. In the bottom of the western end of the pit is a cast-iron pipe which serves as a drain.

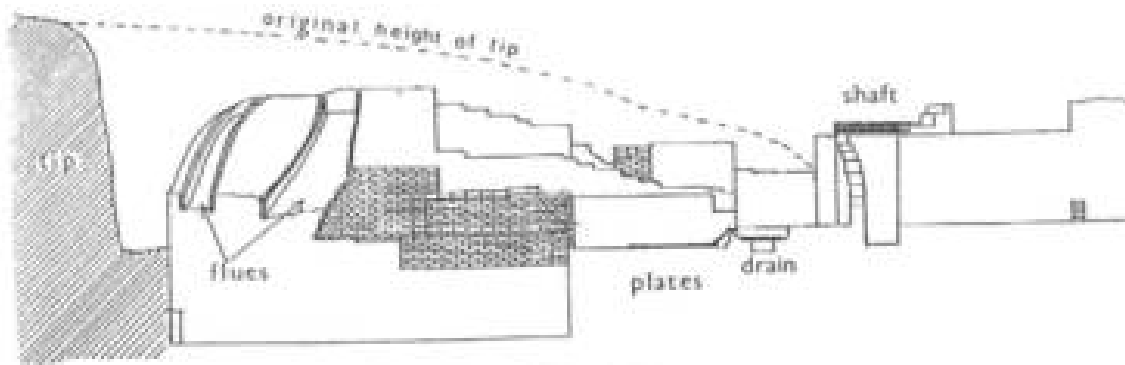
18 inches in front of the bob wall is a narrow well-like pit over 8 feet in depth, the sides of which are covered with a calcareous deposit, 10 inches thick in some places. This pit obviously contained a pump which was driven from the outside end of the beam by a plug rod, again



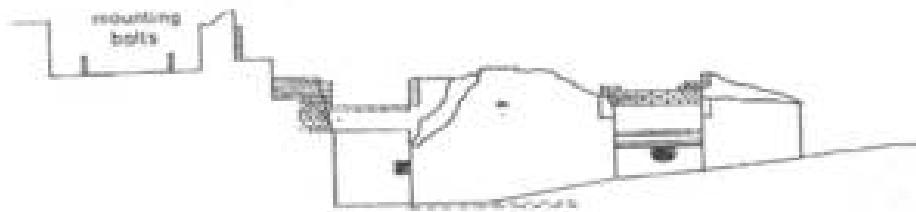
Foundation of Winding Engine, from the South, with bolt fixings for cylinder, large pit for Condenser, and long pit for flywheel. Boiler setting and steps to left.



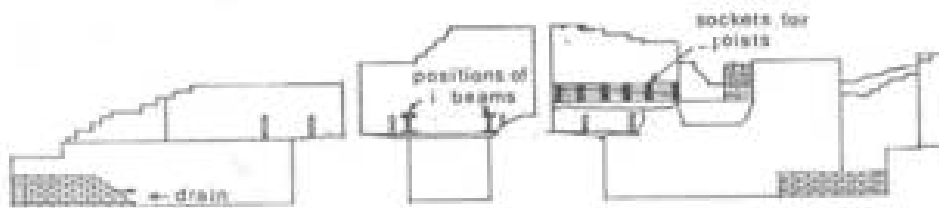




SECTION THROUGH a-a



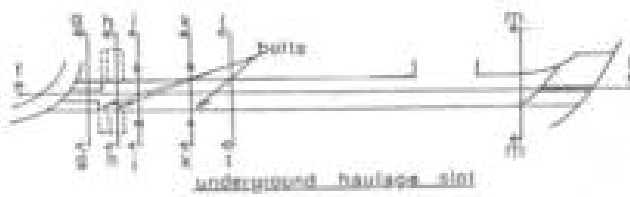
SECTION THROUGH b-b



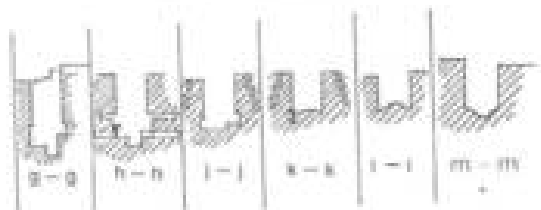
VIEW ON c

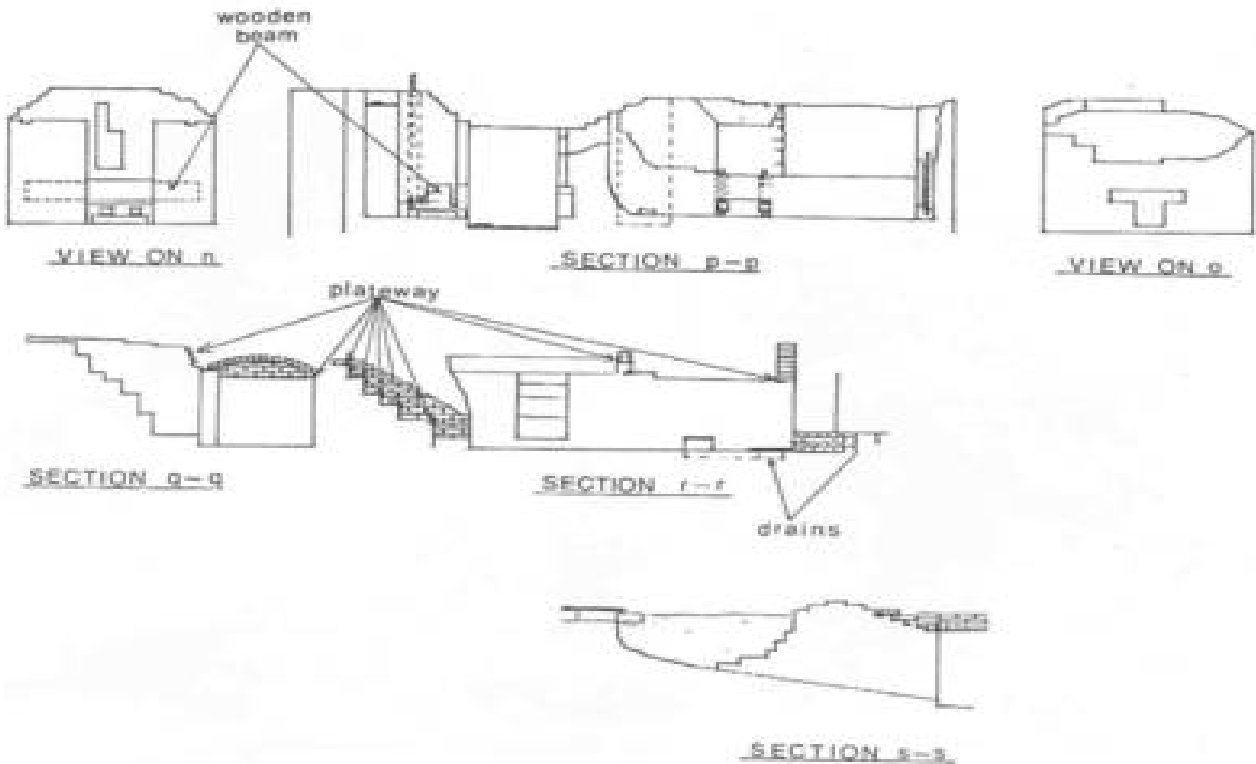
VIEW ON e

VIEW ON d



section i-i





unfortunately no timbering or iron-work remains. Water drains into it from the drum pit via the flywheel pit

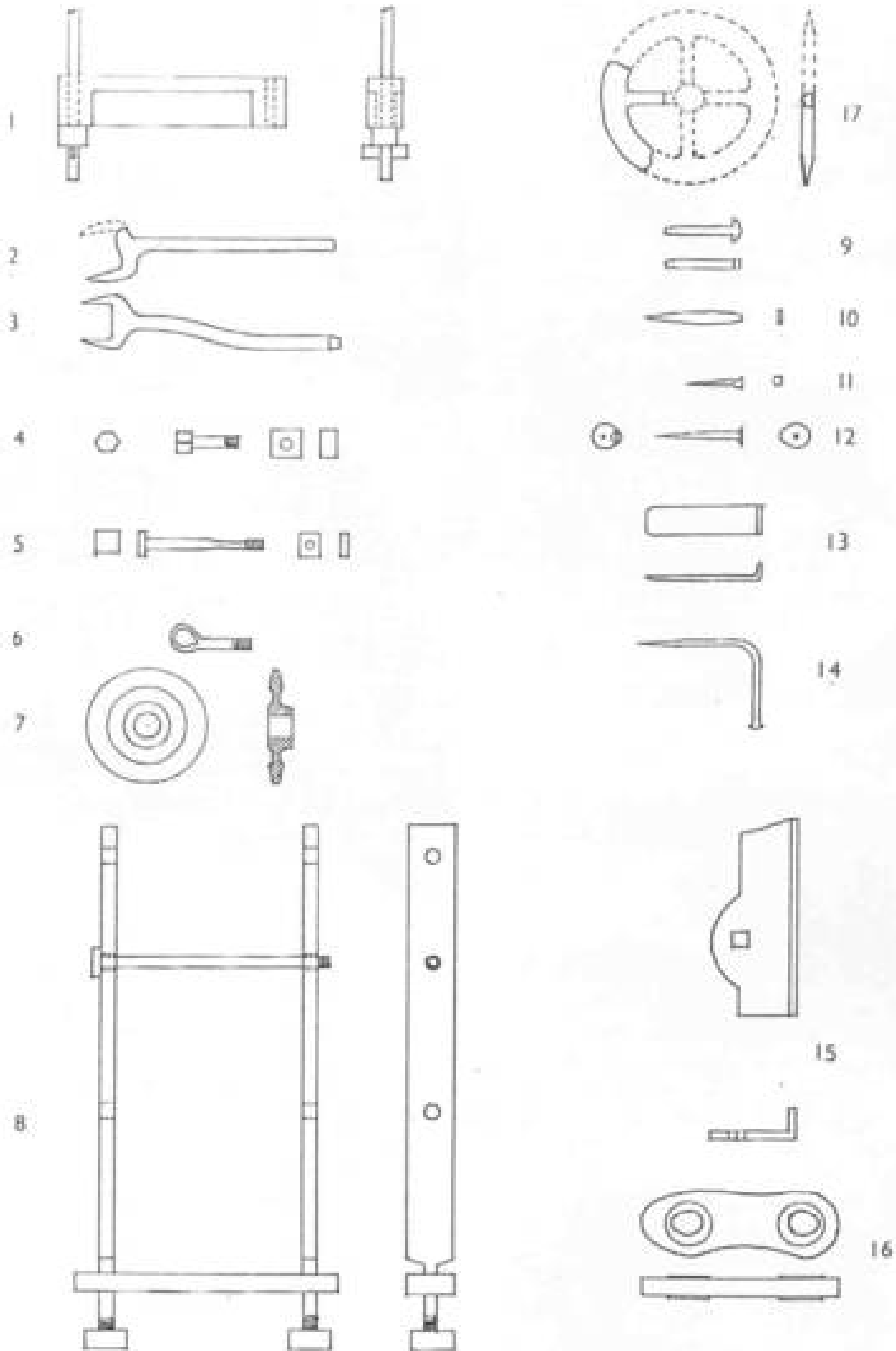
To the west of the engine house are the foundations of the boiler, which served the winding engine. The original boiler was of a haystack type, the shape of which can still be seen beside the still useable steps leading down into the chamber at the northern end of the firebox. The setting was evidently later converted to take an egg-ended boiler. The original steps, which were used for servicing the haystack boiler at the northern end, still survive but are blocked at the top where a drain was later installed to take the rainwater away from the area of the pithead.

When the large ash tree was blown down in the storms of last winter, the only damage was the destruction of the arched brick roof of the chamber on the northern end of the boiler. The roof of the chamber was the floor on which the stoker stood when firing the boiler. It is intended to rebuild the brick roof, probably with the original brickwork.

The mineshaft is stone lined and is typical of many in this coalfield sunk around 1780-1800, they are nearly always square or rectangular with rounded corners. The dimensions of the Old Pit shaft are 8 feet by 5½ feet, a section is given in the previous remarks on geology.

The shaft was originally divided into two by a brattice - the pump rods and rising main being in the northern part adjacent to the pumphouse. Winding was carried out by a hudge in the southern section. Although the shaft was flooded to within 12 feet of the surface, when an original inspection was made by the author with the aid of a powerful mining lamp no shaft fittings were visible, even though the beam penetrated the flooded shaft for some 30 feet. All shaft fittings had been removed, possibly with the aid of a hand capstan - the pivot stone of which has been uncovered 18 feet from the shaft on the spoil heap.

A cast-iron pipe that would have formed part of the rising main in the shaft was recovered from an adjacent field and brought back to the site. We assume that this had fallen off of a cart when the engines and fittings were being salvaged, and that it was too heavy to lift back



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# BIAS JOURNAL No 23 1990

## METAL OBJECTS FOUND DURING EXCAVATIONS

1. IRON CASTING. These castings were found in the hot well and under the wall between the condenser pit and the flywheel pit of the winding engine in two pairs. These castings were used to secure the lower end of long bolts which fastened the cylinder and the crank end of the flywheel to the structure. The bolts had no thread at the lower end and were secured by wedges driven through the shafts of the bolts with a collar between the wedges and the castings.
2. SPANNER. This spanner which had one jaw broken off was found near the winding engine. Made of wrought iron it is 16½ inches long and approximately 3 inches across the flats.
3. SPANNER. This spanner was found in the bottom of the flywheel pit. Made of wrought iron it is 17 inches long and 2¾ inches across the flats.
4. HEXAGONAL BOLT WITH NUT. This bolt and nut was found on the heapstead. Made of wrought iron it is 4 inches long and ¾ inch in diameter. It was possible to unscrew the nut which exposed a well preserved section of thread, the thread was 8 teeth per inch with an angle of 70 degrees between the teeth.
5. SQUARE HEADED BOLT WITH NUT. Found on the heapstead, made of wrought iron it was 7¾ inches long and ¾ inch in diameter. Although the shank was badly corroded it was possible to separate the nut exposing a well preserved section of thread. The thread had 10 teeth per inch and an angle of 70 degrees between the teeth.
6. EYE BOLT. Found near the shaft. Made of wrought iron 5½ inches long and ¾ inch in diameter with 10 teeth per inch and an angle of 77 degrees between the teeth.
7. WHEEL. Three of these wheels were found on the heapstead. Made of cast iron 7¾ inches in diameter and 1½ inches thick with a hole 1½ inches in diameter for the axle. These wheels probably were used on small carts or drams which ran on plateway rails.
8. BRACKET. Found in drum pit. Made of wrought iron. Two of these brackets were found in slots in the floor of the drum pit with 12 inch square timbers through them. These brackets were used to reinforce the joints between the horizontal and vertical timbers, and were bolted to the vertical timbers using bolts 15½ inches long by 1½ inches in diameter.
9. BROAD NAIL. Found near shaft. Made of wrought iron 5½ inches long with ½ inch square shank.
10. OVAL FLAT NAIL. Found on heapstead. Made of wrought iron 6¼ inches long and 1½ inches wide at widest point.
11. NAIL. Found on heapstead. Made of wrought iron 3½ inches long with ¾ inch square shank.
12. LARGE HEADED NAIL. Found on heapstead. Made of wrought iron 6 inches long with ½ inch square shank with large offset head with small hole in it.
13. WEDGE. Found near shaft. Made of wrought iron 7½ inches long, 1¼ inches wide and ¾ inch thick.
14. LONG NAIL. Found on heapstead. Made of wrought iron 13½ inches long with ¾ inch square shank bent at right angles.
15. PLATEWAY. Sections of plateway were found all over the site in short broken lengths. It was also used in constructing lintols to carry brickwork and also to cover drains. Made of cast iron this example is 3¾ inches wide by 2 inches high and ½ inch thick with a 1 inch square fixing hole.
16. LINK. Made of cast iron 13 inches long and 1½ inches thick. This link was found near the shaft and formed part of the chain which connected the wooden bean of the pumping engine to the pump rods.
17. WHEEL (part of). Made of cast iron 11½ inches in diameter and ¾ inches thick. This fragment of a wheel was found on the cobble yard and was probably used on a cart or dram running on plateway.

on, being just left there in the field for 80 years. Mr Comer, the farmer who donated it, also gave us a cast-iron steam pipe which was in use as a drain. Both these artifacts are now back on the site from which they must have come.

An interesting survival is a length of 'rope run' channel leading to the manually operated capstan which was used for changing or repairing the pump rods in the shaft. This channel, which is 2 feet wide, 2 feet deep and covered with stone slabs, runs from the shaft in a westerly direction. The site of the capstan is thought to be under the large oak tree on the edge of the site. All pumping engines with pump rods needed a set of shear legs, which were positioned directly over the wooden pump rods, or 'shides', in the shaft. A rope from the capstan ran under a side pulley, then up through the shears to another pulley on top, which could be up to forty feet above. The shear legs needed enough height to allow a full length of pump rod to be drawn vertically from the shaft.

Excavation of the site is now vitually complete with only the cobbled yard that covers the area stretching between the two boiler complexes and backed by the line of the mine hepstead, still to be fully cleared of its shallow covering of spoil.

Future efforts will now be concentrated on carrying out conservation works, both in consolidating all exposed colliery remains, so they may survive yet another 100 years, and also in re-landscaping works - particularly replacing undergrowth and the storm losses from the surrounding copse that do go to make it such an attractive site and haven for wildlife.

### References and acknowledgements

Much of the historic information on this colliery has been collected and saved by the Brain family, including the original Minute Book of the Colliery Company, to whom we are also greatly indebted for their consent to excavate and record the site of the Old Pit.

Similar courtesy has been. extended to us by other adjoining landowners, as mentioned in the text, without whose friendly assistance very little could actually have been achieved.

1. Deed of Conveyance dated 20th April 1726, as listed in an Abstract of Title of 1921 held by Miss Watts in 1986. (The land with the furnace was subsequently purchased, at Auction, by Mr Cliff Elliot)
2. G.R.O. - Sherwood Mss. DI85(v) 33.
3. Indenture of Annual Tenancy dated 25th March 1877 between Blanche Bushe of the Old Manor House, Keynsham. and Frederick Falkner of the City of Bath, Banker, Aaron Brain of Bitton, Colliery-Proprietor, and Richard Bryant Cater of the Market Place, Bath, Wine Merchant. Two Closes of land Known as 'Boyd Fields' together with 'the right to use and enjoy the shaft situated in one of the closes and the Chimney and Cowl thereon or thereto and the way and passages underground connecting such shaft with the Golden Valley Colliery'. in the Title Deeds also held by Miss Watts in 1986.
4. A set of the underground working plans of the Golden Valley Colliery during its last 33 years are held at Gloucester Record Office under their Ref. D421 E20 P48a