# MEMOIRS
# 1968




Davis, R.V, 1968
"A Brief Account of the Geology, History and Mechanisation
of the Snailbeach Mine, Shropshire"
Memoirs, NCMRS, pp.52-62

Published by the

THE NORTHERN CAVERN & MINE RESEARCH SOCIETY
SKIPTON U.K.



**NB**
**This publication was originally issued in the 10 by 8 inch format then used by the society. It has now been digitised and reformatted at A5. This has changed the original pagination of articles, which is given in square brackets.**

# A BRIEF ACCOUNT OF THE GEOLOGY, HISTORY AND MECHANISATION OF THE SNAILBEACH MINE, SHROPSHIRE.

by

R.V. DAVIS

The metalliferous mining field of south Shropshire has never received the same acknowledgement as it's contemporaries in Cornwall, the Pennines, or Lakeland; yet it has produced over the centuries, a significant amount of lead and barytes, and some zinc. The following quote from "British Mining" by Robert Hunt in 1887 is a good illustration …

"It is unsurpassed by any district in the United Kingdom or, as a lead mining district, probably in Europe. The most important mine is Snailbeach, which has been worked ever since the last century, and has [52] made immense profits for about ninety years, having on the average raised 2,000 tons of lead ore every year. It may be considered as one of the most important lead mines in the Kingdom …. yet taking into consideration the permanence of it's workings and the length of time it has been making profits, it will probably be found that Snailbeach has yielded larger returns than any other lead mine in England."

The mining area covers a tract of countryside consisting of roughly parallel ridges trending N-S, more precisely, the valley between the Stapely ridge to the west and the Stiperstones ridge to the east.

Geologically, the age of mineralisation here is far older than the Wharfedale fields, being exclusively Ordovician, whereas the latter is of the Carboniferous Era.

Geographically the mining field lies in close proximity to the Industrial Black Country, and therefore was well located for the rapid adaptation of steam power in it's infancy.

Although the mineralised area is comparatively small, a full account is far beyond the scope of this article, therefore the Snailbeach mine has been chosen as being typical for the purpose of giving a brief outline of the South Shropshire Field.

## GEOLOGY

The ores occur in veins, flats, and pipes, related to a pattern of NW/SE and ENE/WSW faults and fissures. Primary mineralisation occurs along the veins, while secondary mineralisation occurs along the bedding planes, weakened during subsequent folding in the Uriconian Vulcanicity. It appears that faulting was confined to the pre-Ordovician strata, the overlying Silurian

strata only exhibiting simple folding. Therefore, the Silurian strata, not containing any fissures, acted as a ceiling to mineralisation. Naturally, the veins are best developed in the harder beds (Mytton Grits), which afforded more free Circulation, and were ill suited to the intercalated Hope Shales, which were more difficult for the ascending minerals to negotiate. There is some speculation as to the origin of the ores, but a metasomatic/hydro-thermal mode of occurrence associated with a plutonic granitic intrusion is the most acceptable. Supporting this theory is a main zone of copper deposition in the Pre-Cambrian, and successive zones of zinc, lead and barytes in the overlying Ordovician strata. Subsequent faulting has caused the Ordovician lead/zinc/barytes zone to lie in the same horizon as the Pre-Cambrian copper zone. Close examination of the copper-bearing veins (not in the Snailbeach mine) show that this zone has been leached, and there could [53] be a zone of secondary enrichment at a greater depth yet undiscovered. At Snailbeach the Mytton Grits and overlying Hope Shales dip at 50° WNW. The mineralised zone is confined to the Hytton Grits at the base of the Ordovician sequence, by the underlying Stiperstones quartzite, and the over lying Hope Shales and Stapely Ashes. It can attain a maximum. possible depth here of almost 1,200 yards, of which the upper part is by far the most productive. Observations show that lead gives way to zinc below the 402 yard level.

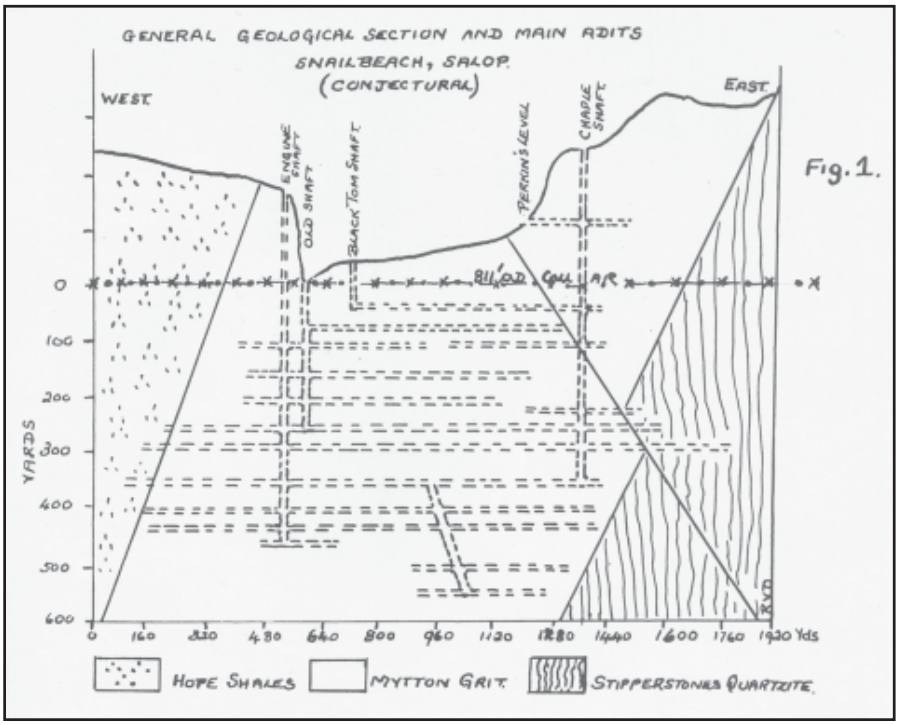
Calcite occurs as the primary gangue mineral in the Ordovician zones. Barytes has a wide distribution throughout the formation, occurring in bunches of commercial quantities in strata well above the lead zone, but being relatively absent below the 252 yard level.

Four adits and four shafts gave access to the workings on three veins. (Plate 9, fig. 1.)

**Black Tom Vein.**
Average width – 3½ft. Dips south. Worked from Perkin's level above the 40 yard level for barytes.

**South Vein.**
About 90ft. south of the main vein and not significantly productive, it was worked by cross cuts from Main Vein and stoped to the east of engine shaft on the 184 yard level, and to the west on the 252 level.

**Main Vein.**
Average width 8ft. but up to 22ft. at depth with 300ft. long ore shoots. It dips steeply south at approx. 68°-77° to the vertical. Where it unites with Black Tom vein between the 40 yard and the 80 yard levels, a 40ft. wide ore body occurs. There is extensive stoping of the vein over it's whole length from the 40 yard to the 552 yard level. (Plate 10, fig. 1.)


GENERAL GEOLOGICAL SECTION AND MAIN ADITS
SNAILBEACH, SALOP.
(CONJECTURAL)
WEST
EAST
ENGINE SHAFT
OLD SHAFT
BLACK TOM SHAFT
PERKIN'S LEVEL
CHAPLE SHAFT
Fig. 1.
YARDS
0
100
200
300
400
500
600
0 160 320 480 640 800 960 1120 1280 1440 1600 1760 1920 Yds
HOPE SHALES
MYTTON GRIT
STIPPERSTONES QUARTZITE

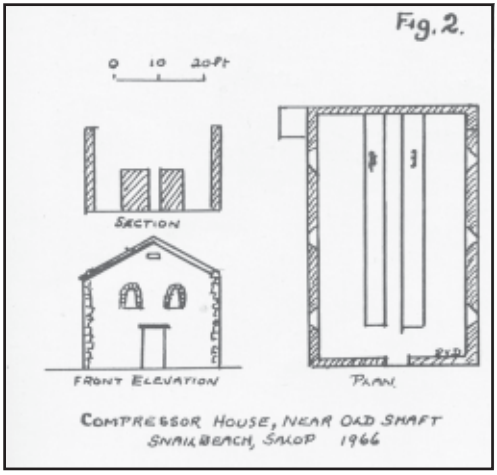


Fig. 2.
0 10 20 Ft
SECTION
FRONT ELEVATION
PLAN
COMPRESSOR HOUSE, NEAR OLD SHAFT
SNAILBEACH, SALOP 1966

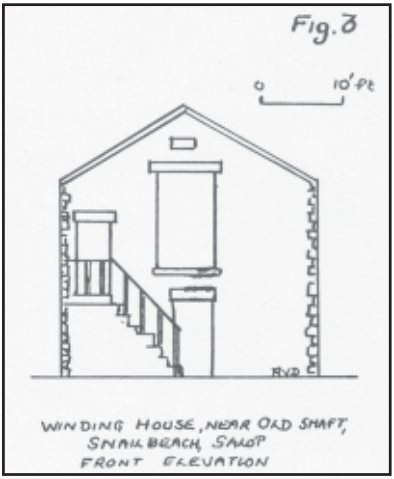


Fig. 3
0 10' Ft
WINDING HOUSE, NEAR OLD SHAFT,
SNAILBEACH, SALOP
FRONT ELEVATION

PLATE 9.

## HISTORY

Extremely little documentation relating to the mines of the district is known to exist. Three pigs of roman lead have been found, one case in Hadrian's reign, and found in 1796.

Reference is made to lead mining in Longleat manuscripts as being carried out in the Middle Ages on what was then the Estate of the Earls [54] of Stafford.

The first records concerning Snailbeach are of a John Clifton, working a mine in the Hogstow Forest in 1552. Expansion first came late in the 17th century when Derbyshire miners were contracted to excavate shallow workings, for a royalty of 1/7th of the ore mined, or 1/9th of the lead smelted. In 1761, Thos. and Powys and partners worked a trial, and five years later a series of shafts were sunk along the main vein, and worked by the same partnership until 1772.

In 1782, the Snailbeach Mining Company was formed by Thomas Lovett, who controlled the mining and exploration until the company was reconstituted by Act of Parliament in 1867. The company went into voluntary liquidation in 1885, because mining was rendered uneconomic due to a depressed lead market. It was immediately reformed and continued to run on a smaller scale until 1912. In the 19th century the mine was said to have produced the greatest volume of lead for its area in the world.

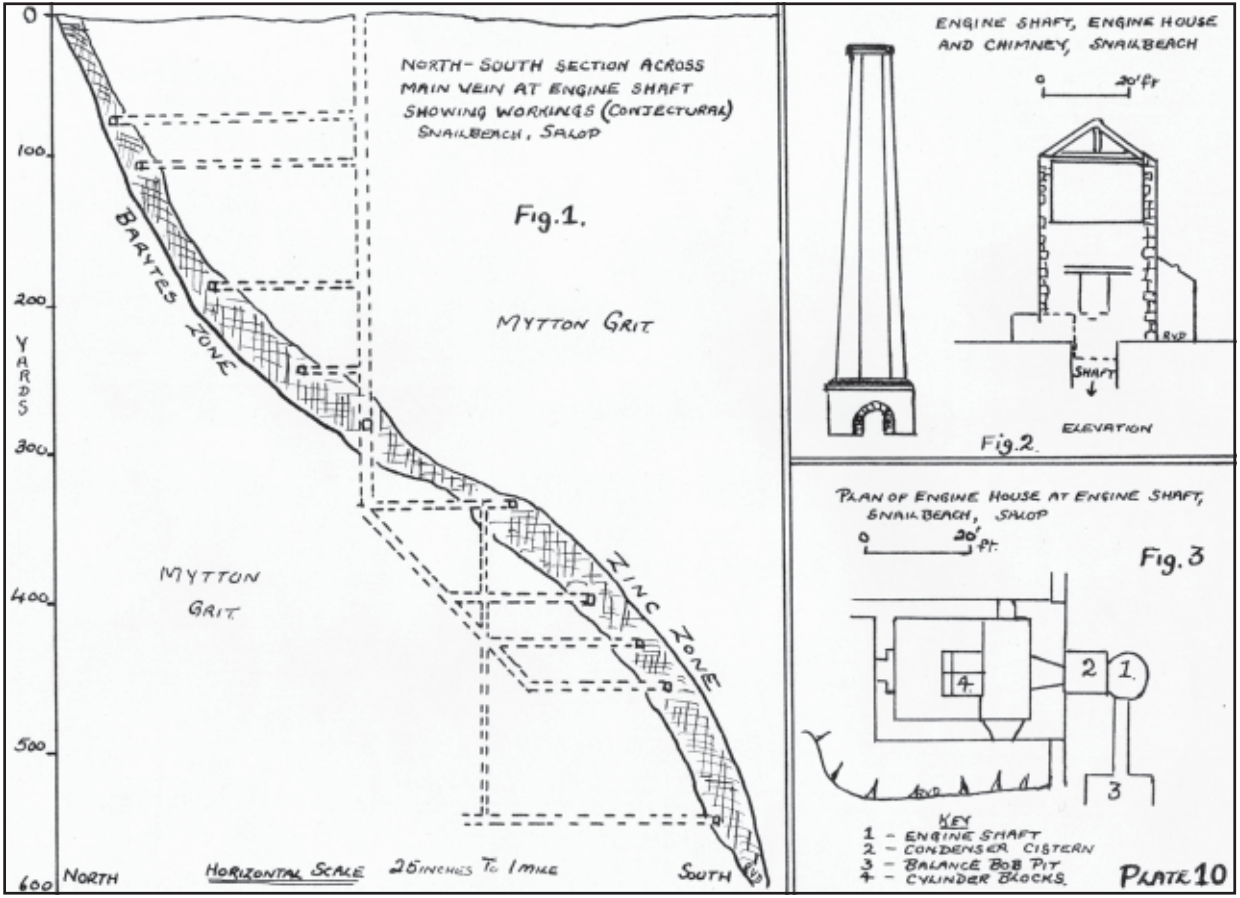
A great impetus was given to the mining in 1861 "Then the Minsterley rail spur was opened. In 1905, the Halvan Company obtained it's lease to extract barytes, which it did in the levels above 112 yards until 1928. Small scale adit workings continued until 1948 and it was resumed periodically until 1955. Now the sole activity is by a Mr. J. Roberts who is slowly removing the vast dumps of crushed calspar, marketed as pebble-dash to the building trade.

Although mining was well established by the early 18th century, there seems little evidence of a comparable system to the Barmaster's Court, which existed in the Wharfedale, Derbyshire and Mendip fields. This is probably due to the very scattered nature of the workings. All development was controlled by the Earls of Bath and Tankerville, who were joint owners of the mineral rights.

Plate 13 gives surface details of the mine as it appeared in 1881.

## TECHNICAL DEVELOPMENTS

Naturally, early mining ventures were limited to surface scratches and shallow workings sunk on to the vein, and deeper mining necessitating pumping is of a comparatively recent date.


NORTH-SOUTH SECTION ACROSS MAIN VEIN AT ENGINE SHAFT SHOWING WORKINGS (CONJECTURAL) SNAILBEACH, SALOP
Fig.1.
MYTTON GRIT
BARYTES ZONE
MYTTON GRIT
ZINC ZONE
YARDS
0
100
200
300
400
500
600
NORTH
HORIZONTAL SCALE 25 INCHES TO 1 MILE
SOUTH
ENGINE SHAFT, ENGINE HOUSE AND CHIMNEY, SNAILBEACH
0 20 Ft
SHAFT
ELEVATION
Fig.2.
PLAN OF ENGINE HOUSE AT ENGINE SHAFT, SNAILBEACH, SALOP
0 20 Ft.
Fig.3
1
2
3
4
KEY
1 - ENGINE SHAFT
2 - CONDENSER CISTERN
3 - BALANCE BOB PIT
4 - CYLINDER BLOCKS
PLATE 10

As shown on the section, (Plate 9, fig. 1) underground workings were reached by four main shafts and a haulage level. Lord's Hill or Chapel shaft, Old or Ladder shaft, George's or Engine shaft, Black Tom shaft and Perkin's level. There are still visible remains near each shaft (Plate 12) though these are rapidly deteriorating.

[55]

**Black Tom shaft.** (Plate 11, figs. 1 and 2).
This small 40 yard shaft is situated 160 yards ENE of Old shaft in a wood behind the cottage of Mr. J. Corfield, and until very recently was marked by a twin wooden pulley headgear and wooden winding shack. The shaft is quite old and gives access to a 100 yard crosscut to the Main Vein stope. It was sunk in 1820 to a depth of 40 yards, and yielded a very small amount of lead ore and a vast amount of barytes. In 1860 it was the chief barytes producer, worked in 90ft. stopes and deepened to 80 yards. The hanging wall was very stable, and little timber was used throughout. The upper stopes on Black Tom Vein are exposed in two places where the ground has fallen into the workings, and access can be gained, with care, by ladder. Haulage was by horizontal horse gin, being replaced in 1882 by a 12" dia. steam engine. The vein varies in width from 6' to 12', and is mainly composed of barytes and calcite, with traces of granular galena. Barytes production reached its peak in 1914-l923. In the woods near the shaft is a large iron self-feeding saw bench, and a sizing tromell.

**Perkins Level.**
(Also known as Roberts Level and Lordshill Mine in later times).

The portal is located 1,300 yards ENE of Black Tom Shaft, near the reservoir built to provide water for the boilers and dressing floors. It is marked by tips and buildings. This level was used as the main haulage-way, connecting with both Black Tom and Main Veins. There is abundant evidence of excessive stoping here; the uppermost levels being exposed on the left of the road at the summit of the hill leading to Chapel Shaft. A section across the vein as seen in one of the 4' cranches, shows massive barytes and calcite dross, with a slender string of galena. At the mouth of the adit is a small crusher (never used) a washing Kiln and trommel, several barrel and box shaped kibbles (Plate 12, fig. 1) full of galena smalls, and a stock-pile of barytes. Some mineral lines are still ' in situ'. There is evidence of other adits above Perkins Level; one is in use as a local water supply (flooded to a depth of 4') and the others have collapsed and grassed over.

**Chapel Shaft.**
(Also known as Lordshill Shaft).

Collar at 1050' O.D. 720 yards E of Old Shaft.

This shaft is located on the left hand side of the road opposite the Chapel, on the back of the Lordshill ridge - actually in the grounds of the Prison Farm. It is covered with large wooden planks. The [56] shaft is 342 yards deep, (Note that all Snailbeach Mine measurements are in yards, taken from the collar of Old Shaft), and was a main haulage shaft from the 552 yard level, sunk originally to prove the vein in the east. It also marks the eastern end of underground mining, where the copper content of the vein was increasing. At the collar are the remains of mountings of a horizontal steam engine, and a flue with small red-brick chimney. Before the engine was installed in 1862, haulage was by a converted ship's capstan.

**Old Shaft.**
(Also known as Ladder Shaft).

Collar at 811' O.D. 447 yards SSE of Snailbeach Farm.

The shaft is located directly below the tall red-brick chimney at Snailbeach, and is marked with a collapsed, wooden head-gear, and an iron man-cage. The head-gear is fitted with a single pulley, fitted in 1895 after an incident when seven men were killed. In a report to the chief Inspector of Mines in 1897, Mr. Atkinson said, "The fatal accident by which seven lives were lost was caused by the breakage of a winding rope at Snailbeach Lead Mine, in Shropshire, about 6.15 a.m. on the 6th of March 1895. The rope worked in a shaft 252 yards deep, and was composed of steel wire". It was of best steel, 160 fathoms by 3½" circumference, weight l6 cwt. 1 qr. 10lb., price £48/ ton. Bought in October 1885, it was in continuous use until it broke eight years later! The working load was 25cwt. and consisted of seven men in a cage, weighing (plus chains, etc.), about l3½ cwt. The rope made 30 to 40 trips up and down the shaft per day, and apart from raising 40 tons of barytes, was exclusively used on the cages. It wound over a 81 8" dia. pulley, on to a 7' dia. drum. It was of ample strength for the job. The rope broke when the cage was on its third trip of the morning, being half way down the shaft; and the 7' 6" high cage was reduced to 18" by the impact. On examination, the rope clearly showed a fracture caused by severe internal corrosion, although the rope remaining on the drum, pulleys and cage, was all in good condition. The jury later returned a verdict of "Accidental death, caused by the breakage of a defective rope. The jury think that the rope has not been properly looked after, and has been used too long". Much has been written concerning the accident which was the most tragic of the whole district, and is still talked about to this day.

The shaft connected directly with the 252 yard level, and was the main access to the workings, by twin cages. There was a lodge at the bottom where a hundred men could wait at the end of each shift. Access to the rest of the workings was by ladders. The first record of this shaft is in 1797, when it was 180 yards deep, and needed very little [57] timber.

SNAILBEACH MINE

FIG 1. WINDING HEAD-GEAR, BLACK TOM SHAFT. AUG. 1967.

FIG. 2. TROMMEL, BLACK TOM SHAFT. AUG. 1967

PLATE. 11. Photos. R.V. Davis.

Near by is the portal of the haulage level from Engine Shaft, with a dated keystone 1846. Also clustered around here are a very interesting collection of remains:-

### Compressor House

(Plate 9, fig. 2 and Plate 12, fig. 2).
This housed a large Siemen and Edwards, horizontal engine fitted in 1881, and was sold in working order to Grereford Colliery. Its mounting blocks remain.

### The Winding House

(Plate 9, fig. 3).
Rather an ornate frontage, this building housed a horizontal steam, double-drum winder, sold as scrap in 1927.

### The Forge

This building still contains the hearth, bellows, anvils and all the tools ‘in situ’. Ownership is by Mr. J. Roberts, who denies access. Efforts are being made by several interested parties, to transfer the complete contents to a museum; with little current success.

### The Engine Shed

Here the Companies two steam locomotives were housed. The line ran via the smelt-house, to Pontesbury, where it collected coal. One of the reasons for it being built was to avoid paying excessive road tolls.

### Engine Shaft

(Also known as Georges Shaft).

(Plate 9, fig. 1, Plate 10, figs. 1, 2, 3, Plate 12, fig. 2).
Collar at 940' O.D. 120 yards S of Old Shaft.

This is the deepest shaft at Snailbeach. It led to a recorded six levels in 1820 and was sunk at the rate:- in 1872 to the 462 yard level, in 1884 to the 492 yard level. In 1896, the Duke of Bath [58] discontinued royalties for three years to provide money to reach the 552 yard level, and to drive exploratory cross-cuts in new ground. The latter of these two ventures failed. Engine Shaft was a main haulage and pumping shaft, sunk on the vein, and drops to the 462 yard level. It is located between the massive Engine House and the Boiler House. The original drainage of the mine was by a 1200 yard long adit, running WNW of Old Shaft from the 112 yard level on Main Vein; 360' W of Old Shaft. The water drove a 36' dia. water-wheel, sited on the

banks of Hope Beck at Cliffdale Barytes works. This wheel drove a system of rods which ran along the adit, and worked the pumps through an angle piece. In 1858 this system was replaced by a 61" dia. Steam engine of the Cornish type, with a 6½" dia. pump. It was a double acting engine with a cataract valve at the base. The 36' long beam had an uneven action; the cylinder stroke being 6', and the pump stroke 9'. The working pressure was 50lb./sq.", and worked without a condenser in later years, at a rate of five strokes per minute. When in 1892, pumping from 480 yards to the drainage level at 112 yards, it worked at 5,200 gallons per hour. Most of the water came from the upper levels. The pump operator earned £1 per week; he started the engine at 3 a.m. each day, and ran the pump from 7 a.m. to 5 p.m. each day except Sunday. To drain the mine for twenty-four hours in summer took five hours pumping, against seven hours in winter. Pumping stopped in 1910, and the engine was sold in 1913, when the mine flooded to adit level.

The lever-wall of the Engine House is six feet thick, and the grit beds show the position of the cylinder (Plate 10, fig. 3). It was held down by bolts which, by the depth of the holes, appear to have been over nine feet long. The position of the condenser tank was on the shaft side of the Engine House. Haulage was by a 'clock-spring' type of system using a flat steel rope, parts of which are seen in the open stope above Perkins Level at Lordshill, and as structural supports round the bee-hive condenser at the smelting works. By this method the lifting capacity and momentum increased proportionally to the diameter on the winding drum and the engine run on one third power and input. Opposite the Engine House on the other side of the shaft, was the Boiler House. Fuel was winched up the incline (see map), by a steam winch, housed in the Boiler House. The incline can still be traced by wires running through the trees.

### The Chimney

(Plate 10, fig. 2, Plate 12, fig. 2).

This is easily seen for miles around. Situated above the Engine House, it is the tallest in the district, made octagonally of red brick on a square grit base. It serves the flues from the Engine Shaft [59] boilers and the smelt-works to the NW.

At the Engine Shaft, the vein content is of the pre-described pattern: barytes was extracted from between 60 and 240 yards in 1914, the main lead zone was below, and the zinc content increased at depth. At the 552 yard level, the vein was 20' wide, chiefly calcite gangue with two inches of ore.

### Yew Tree Level

A brief mention should be made of this small working sited 350 yards SSW of Chapel Shaft. It is said to have been driven on a small vein. On close

examination, the tips show mainly country-rock, with some calcite and traces of barytes and galena. The adit entrance has collapsed and grassed over, but a small stream runs out, to mark the exact position.

### Scutt Level

(Also known as Scott Level).

Portal is 200 yards NW of Engine Shaft, opposite the junction of the Snailbeach road with the main Bog road.

Nothing much is known about this level. It is doubtful if it was ever mineral producing. More likely it was a haulage level from the Engine Shaft stopes, which supplied the Lower Works with material.

### The Magazine

This small rectangular building, erected in 1863, was designed to make one way traffic from the hatch, after receiving explosives.

### Lower Engine House

At the junction with the main road, on the periphery of the tips, is a small, red-brick engine house. This housed a small engine, and there are remains of a fly-wheel pit and cylinder mounting-blocks.

The chimney seems to be false. This building is comparatively recent, and was used in processing the tips.

### The Smelt House

The ore was carried both by aerial ropeway and locomotive ½ mile NW of the mine. It was built in 1863, and fell into disuse in 1895. Little now remains in its original condition, as the buildings are being converted into a farm and private dwelling. However, the [60] position of six hearths can be traced, and wou1d appear to be of the reverberatory type. Close by is the condenser - of a most unusual pattern. It consisted of the six hearth flues and the Exit-chimney flue, all equally radiating round the base of a red-brick bee-hive.

SNAILBEACH MINE.

Fig 1 KIBBLES OF GRADED PbS, PERKIN'S LEVEL. AUG. 1967


Fig 2. CHIMNEY, ENGINE HOUSE, and COMPRESSOR HOUSE. AUG. 1967

PLATE 12. Photos: R.V. Davis

## Minera1 Production

The figures below are not intended to be a comprehensive record of output; only to serve as a comparative index against similar areas.

**Lead.** The chief period of productivity was 1845 to 1912 = 131,913 tons

| | | |
|---|---|---|
| 1768 to 1772 | = | 502 tons of ore. |
| 1782 | = | 108 " " " |
| 1782 to 1805 | = | £29,215 royalties. |
| 1805 to 1811 | = | £1,000/ a royalties. |
| 1811 | = | £3,165 = 1,321 tons of ore. |
| 1882 | = | 1,575 tons + 500 oz. of Silver = £11,997. |
| 1845 to 1880 | = | av. of 2 to 3,000 tons/annum. |
| 1886 to 1901 | = | av. of 1,000 tons/annum. |
| 1906 | = | 673 tons @ £8,132. |
| 1913 | = | 13 tons. |

**Barytes.** Production was first mentioned in 1837.

| | | |
|---|---|---|
| 1857 | = | 30 tons. |
| 1861 | = | 30 tons. |
| 1865 to 1913 | = | 42,327 tons. |
| 1882 | = | 346 tons @ £191. |
| 1905 | = | 3,729 tons. |
| 1906 | = | 296 tons @ £1,138. |
| 1914 to 1918 | = | av. of 5,000 tons/a. |

Final mining done in 1955.

**Zinc.**

| | | |
|---|---|---|
| 1858 to 1883 | = | 4,392 tons. |
| 1873 | = | 873 tons. |
| 1882 | = | 68 tons @ £295. |

There were only five mines producing zinc.



**Selected Bibliography and Acknowledgements.**

Shropshire Archives.
Davies Gilbert. Phil. Trans. 1830.
VCH - Shropshire (Proof Edition).
Geol. Survey. Bulletin 14. Economic Mems. Vols. 2, 24.
Local trade directories, journals and maps.
The Mining Journal.

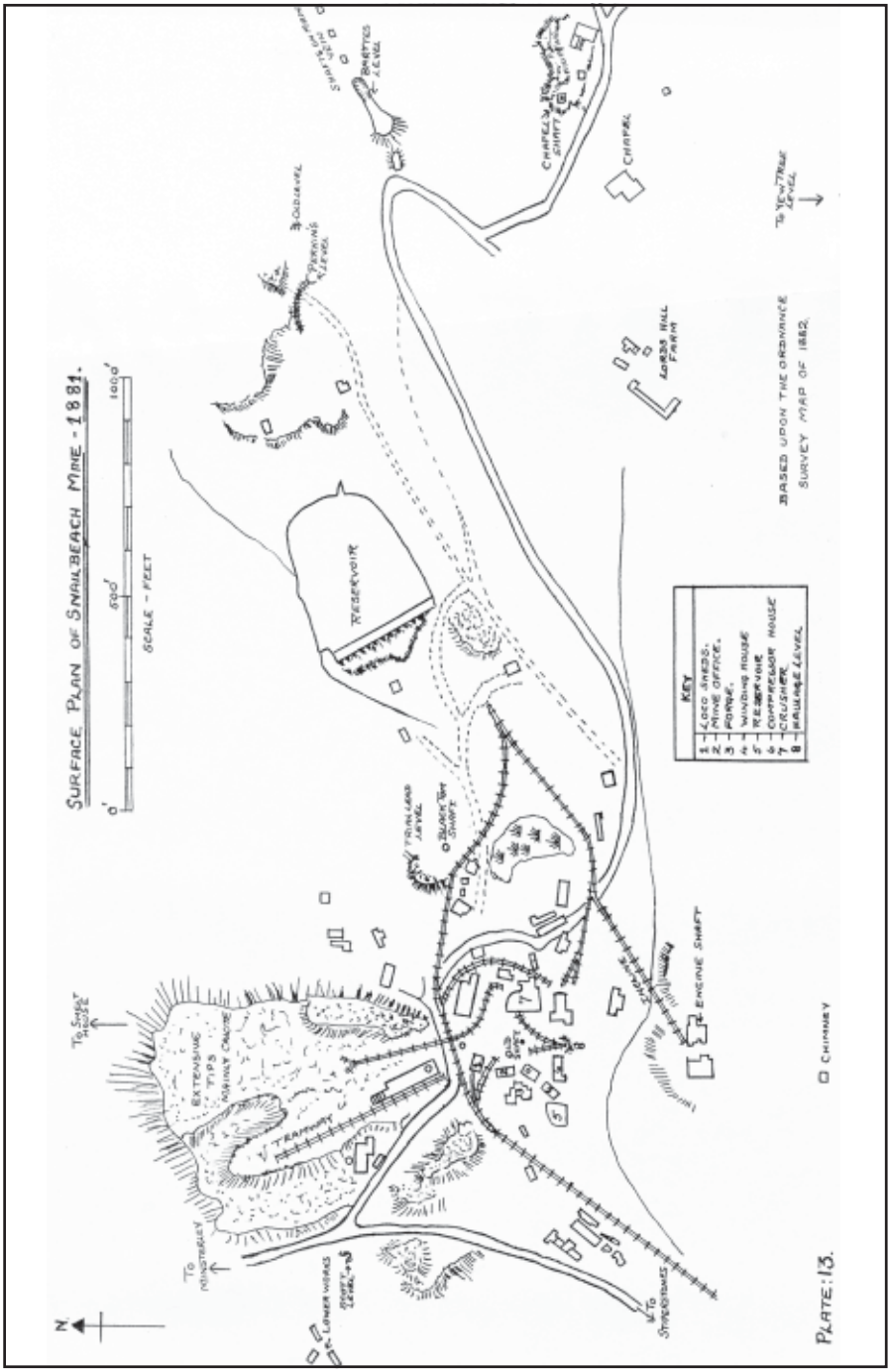
Oswestry and Shrewsbury Reference Libraries.
British Mining. R. Hunt, 1887.
The Boulton & Watt Collection, Birmingham.
T.C.F. Hall's Report to the Directors of the Shropshire Mines Ltd.
- Private MSS.

Grateful thanks are extended to T. Davies, Esq. for access to unpublished data; D. Adams, Esq. for use of Club Cottage and contents (both of The Shropshire Mining Club); Messrs. Hewitt and Caufield, old miners who worked at the mine; Miss R. Baker, for prolonged assistance; and to J.C. Wade, Esq., who first interested me in the area.

**NOTE:**
Many different sources have been consulted, and in many instances conflicting facts occurred. The facts used here were those most readily verified in the Field.

August, 1968.

—ooo0ooo—


SURFACE PLAN OF SNAILBEACH MINE - 1881.
0'
500'
1000'
SCALE - FEET
KEY
1 - ADIT ARCH.
2 - MINE OFFICE.
3 - FORGE.
4 - WINDING HOUSE
5 - RESERVOIR
6 - COMPRESSOR HOUSE
7 - CRUSHER
8 - RAILWAY LEVEL
BASED UPON THE ORDNANCE SURVEY MAP OF 1882.
RESERVOIR
CHAPEL
ENGINE SHAFT
TRAMWAY
CHIMNEY
N
PLATE: 13.