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MINING REMAINS IN THE ISLE OF MAN

by A. Pearce & G. Rose

These are the results of a fortnight in the Isle of Man in July 1978. It is a preliminary study of part of the mining remains on the island and it is hoped that it will stimulate interest in this neglected area.

Metal mining has been carried out in this island from an early date, originally for lead, copper and iron and latterly for zinc. Like mines everywhere in Britain, falling prices at the turn of the century caused the mining industry in the Isle of Man to decline. At the present time there is no mining activity on the island but recent mineral prospecting may mean the rejuvenation of the industry. Mining records are sparse: these are mostly at the Manx Museum at Douglas, the Isle of Man Forestry, Mines and Lands Board and in private hands. Some useful information has been gathered by the Manx Mines Research Group, now unfortunately disbanded, and the Isle of Man Natural History and Antiquarian Society.

Due to the absence of indigenous coal supplies, the motive power for winding and pumping came mostly from water - waterwheels, turbines and water pressure engines. It is not intended to enlarge on this subject in this article as it has been adequately described elsewhere (Jesperson, 1970; Gillings, 1975).

THE MINES VISITED

1. Laxey Mine (SC 432854)

This was the largest and richest mine on the Island. It is not covered in this report because it is hoped that it will be the basis of a future article by an ex-member of Manx Mines Research Group.

2. Beckwith Mine (SC 249778)

This was a large mine in Glen Rushen with excellent surface remains (Fig. 1). The pumping engine house (one of the few on the island) still stands but unfortunately the shaft is filled to the surface. Nearby are the washing floors, excavated a few years ago by M.M.R.G. Several shafts can be identified, mostly filled, and a length of flat winding rope lies in the grass. To the west, Foulders Shaft is open but flooded to near the surface. Next to this is a pumping shaft, apparently filled, with the top of a pump rod sticking out. From this, the line of a flat-rod system can be clearly followed down the hillside to the site of the waterwheel which operated it (Fig. 2). The waterwheel has collapsed into its pit and is still there. As can be seen from the diagram, the flat-rods initially ran through an arched tunnel before emerging onto the surface. The exhaust water ran through an adit-like tunnel to the nearby stream. There are two open levels in this mine complex.

New Day Level (Fig. 3) is open for about 1700 feet and can be followed to Edmunds Shaft which has now been filled with domestic rubbish. The level also connected with Beckwith Shaft but has collapsed before that point. Cross-cuts into the vein are in unstable rock and have collapsed. There is bad air at these points.

Old Day Level (Fig. 4) is open for about 200 feet and ends in collapses in bad ground.

3. Snaefell Mine (SC 408873)

The main adit has collapsed just within the entrance and the two open shafts are flooded to near the surface. A chimney still stands and various opinions have this as being used for ventilation or as a back-up pumping engine. Old photographs show that the main motive force in use was a waterwheel. Nearby is a trial level (Fig. 5), open for about 200 feet but the only mineralisation seen was a quartz vein.

4. Langness Copper Mine (SC 284660)

The only surface remains at this mine (Fig. 6) of interest are the engine house, which probably housed a horizontal steam engine, and the double-walled powder house. The scant records indicate that jaw crushers were used and the suggested mode of operation is shown on the diagram. All shafts are securely capped but there is an open adit just above sea level which probably acted as a pumpway. The method of pumping is unknown.

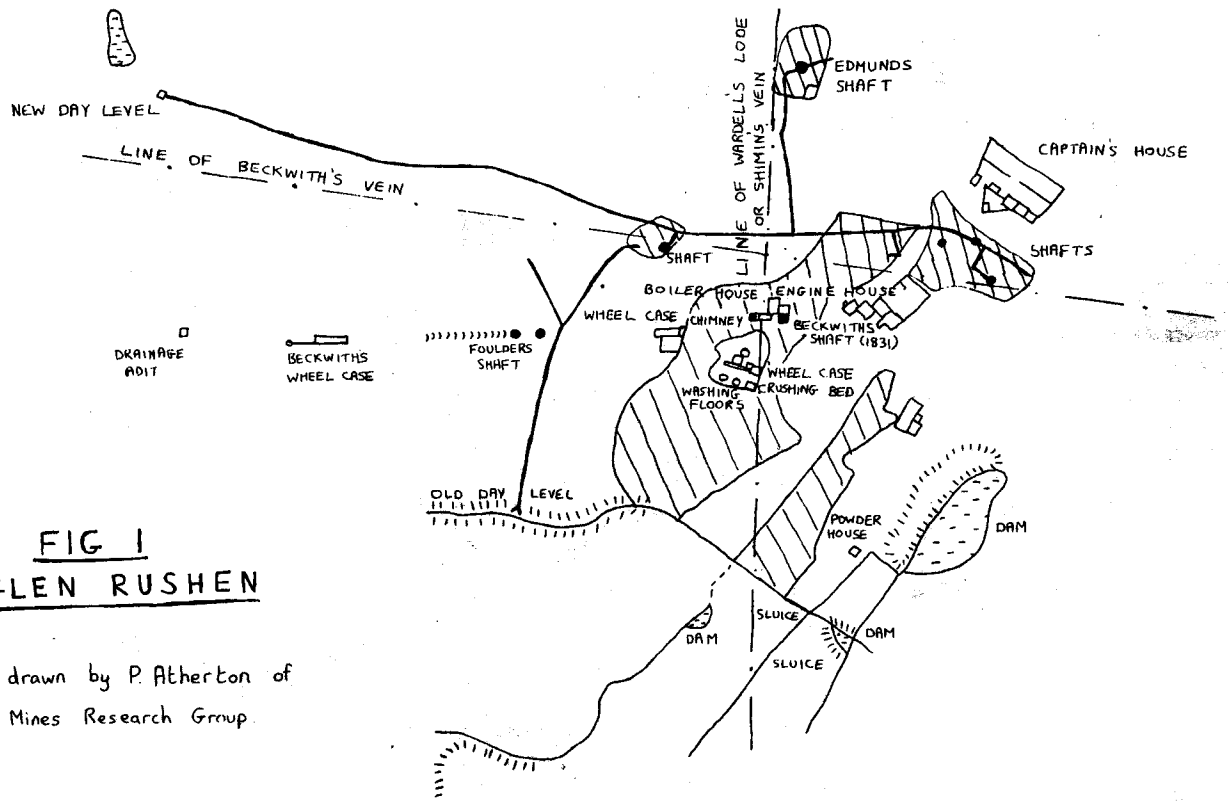
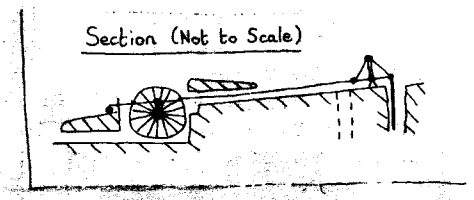


FIG 1

GLEN RUSHEN

Plan drawn by P. Atherton of Manx Mines Research Group.

Beckwith Mine Shaft 185 Fathoms.
Reaches Old Day Level at 15 Fathoms.
" New " " " 35 Fathoms.



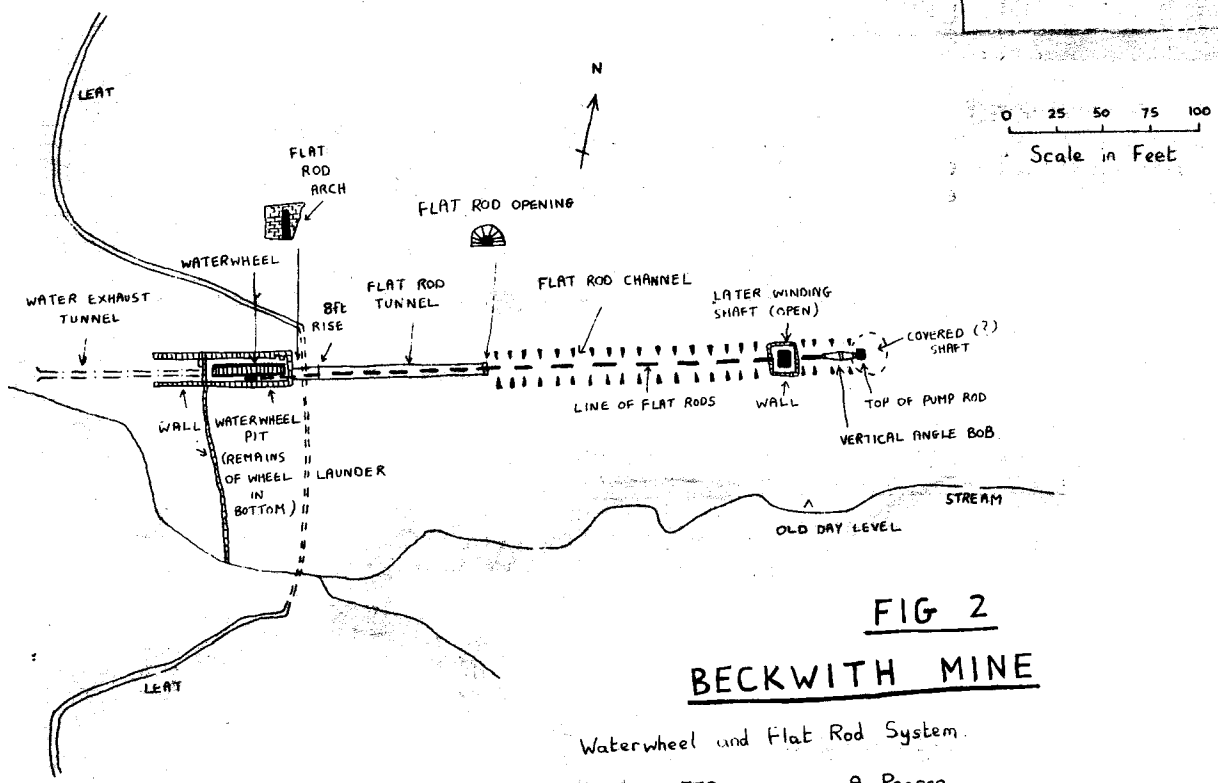


FIG 2

BECKWITH MINE

Waterwheel and Flat Rod System.

N.G.R. SC 249778

10/7/78

A. Pearce
G. Rose

FIG 3

NEW DAY LEVEL

N.G.R. SC 249781

Surveyed by Pacing 10/7/78

A. Pearce
G. Rose

Bearings incorporated from Survey by A. Gillings, I. Hume & M. Simpson 31/8/77.

0 50 100 150 200

Scale in Feet

* BAD AIR AT THESE POINTS.

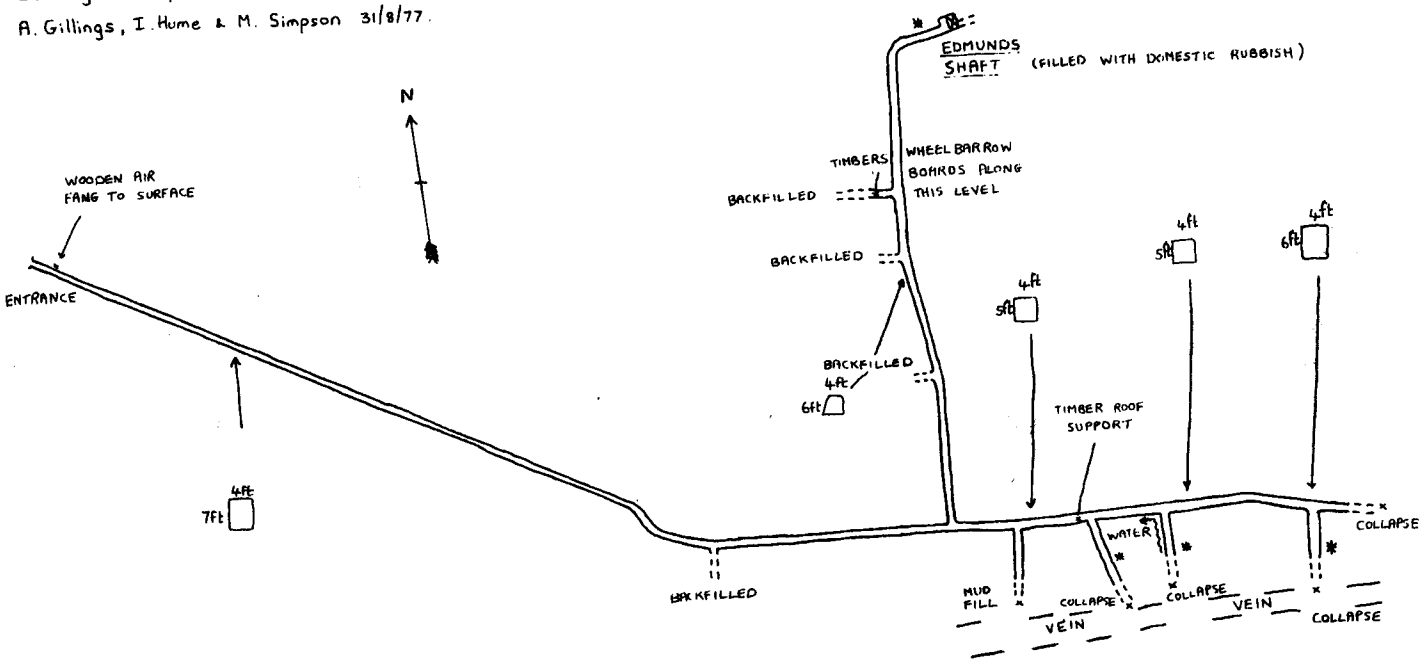


FIG 4

OLD DAY LEVEL

N.G.R. SC 250778

Surveyed by Pacing & Compass 10/7/78

A. Pearce.
G. Rose.

0 10 20 30 40 50

Scale in Feet

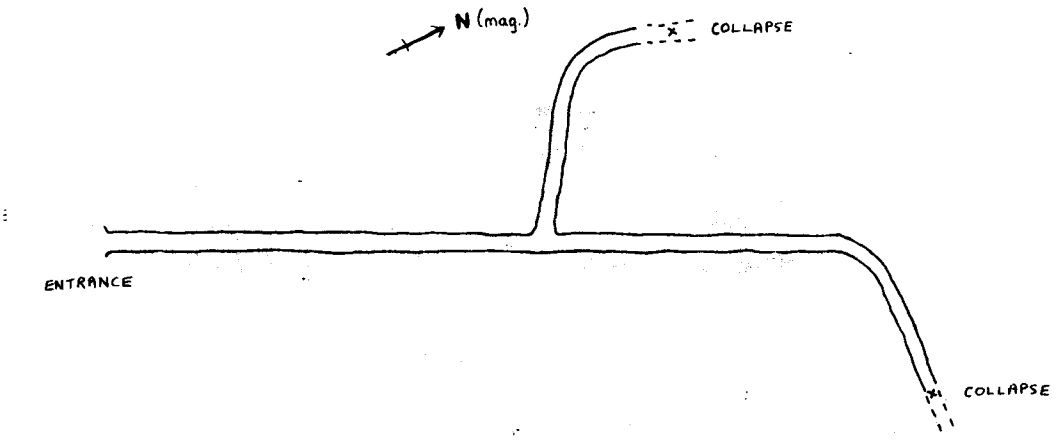


FIG 5

ADIT NEAR SNAEFELL MINE

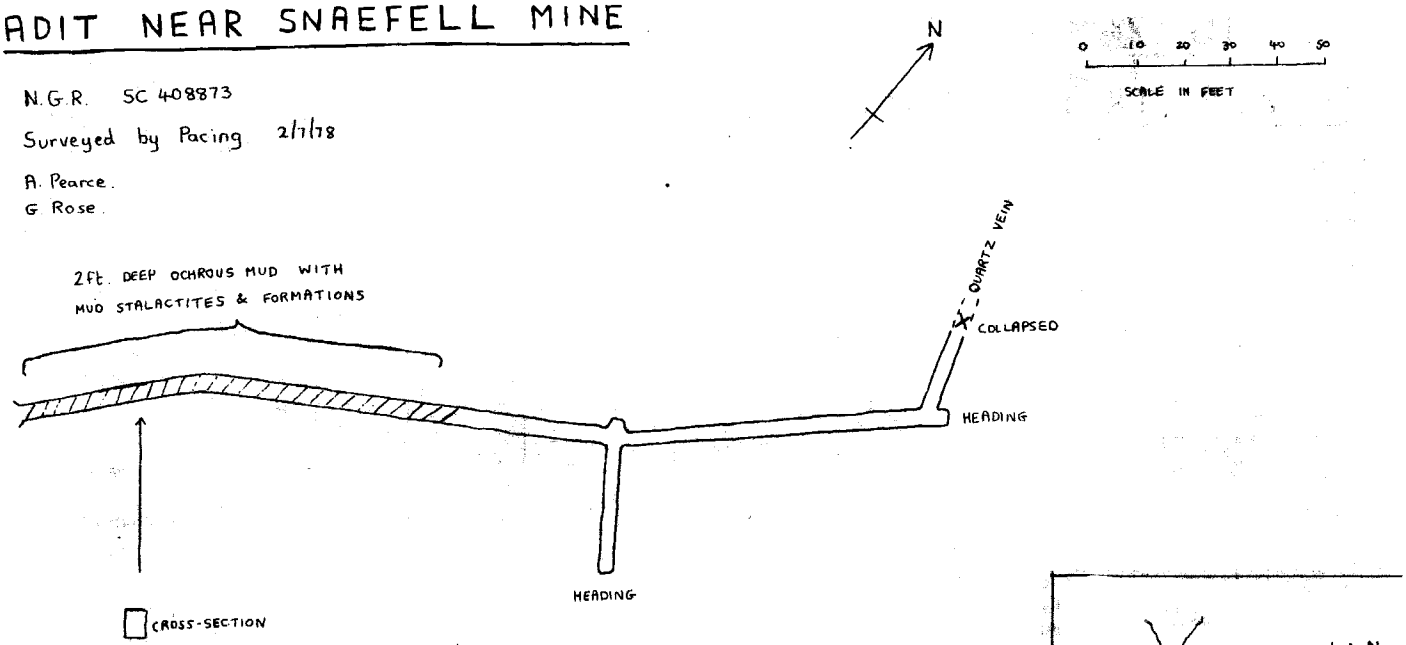


FIG 6

LANGNESS COPPER MINE

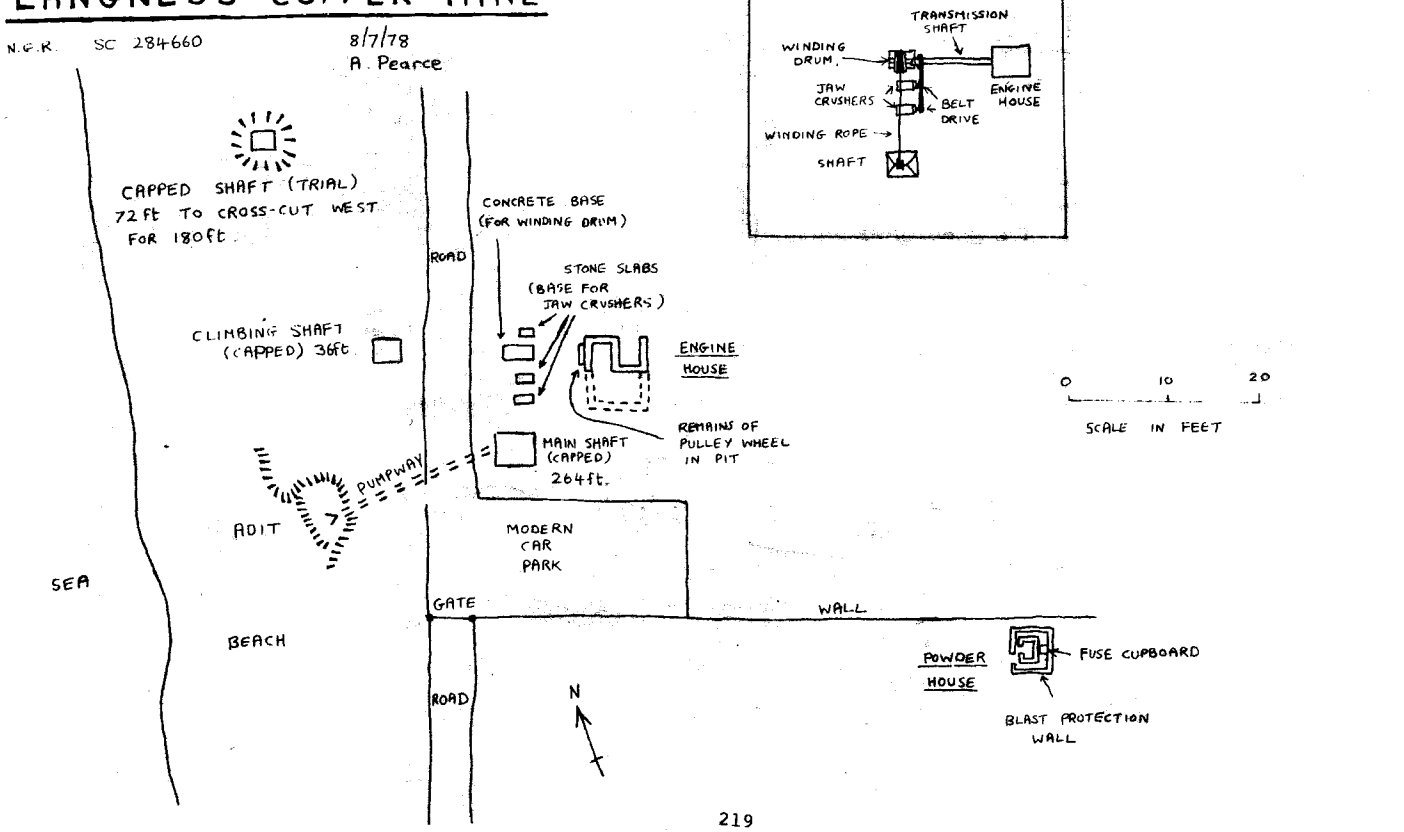
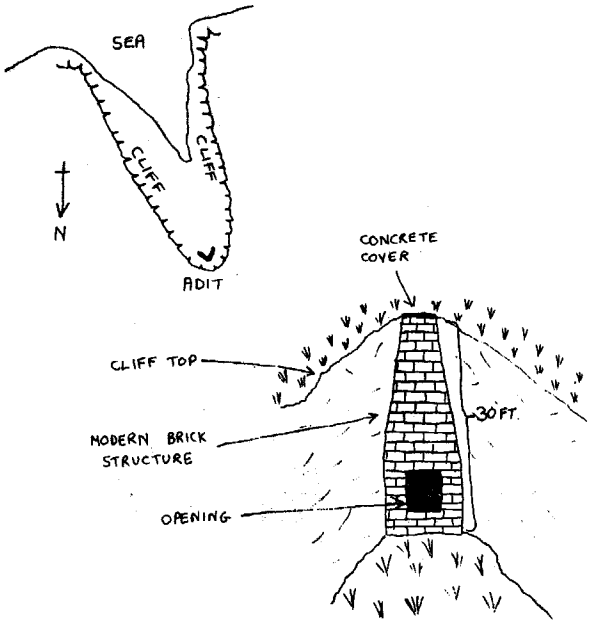


FIG 7

COPPER TRIAL, LANGNESS

N.G.R. SC 285654
8/7/78 (NOT TO SCALE)
A. PEARCE



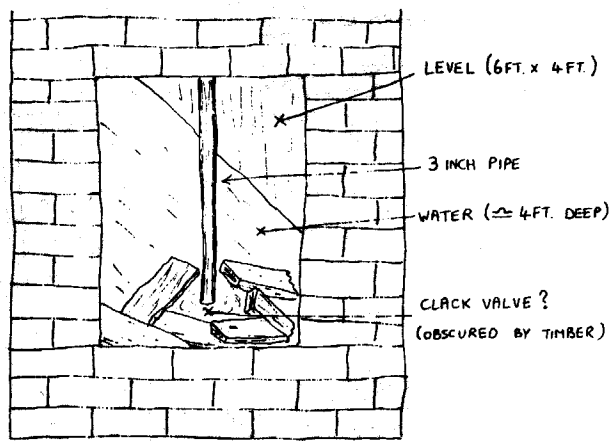
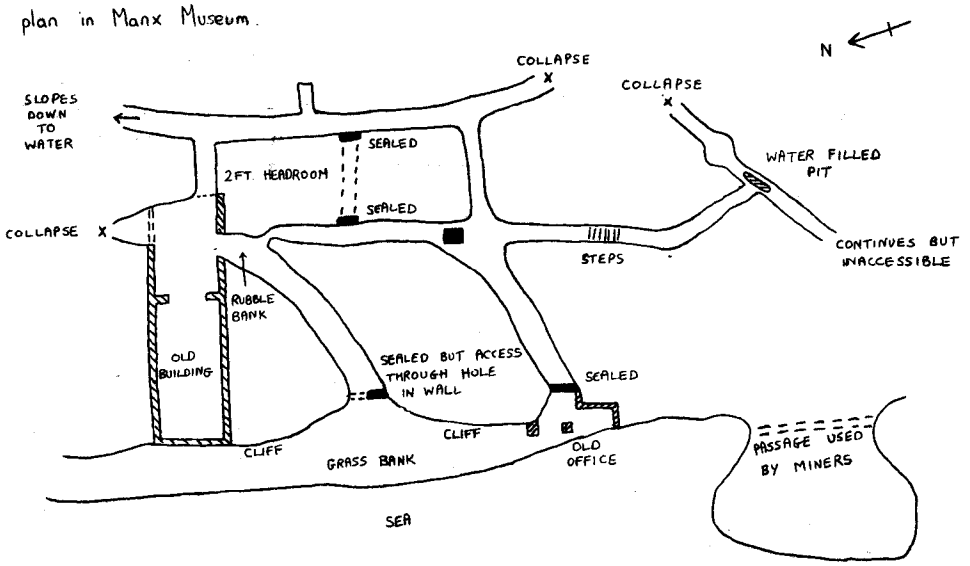


FIG 8

NORTH BRADDA MINE

Copied from a plan in Manx Museum.



5. Copper Trial, Langness (SC 285654)

This level (Fig. 7) was not explored. It seems to have been adapted in recent times as a water supply for the nearby lighthouse. Probably superseded by mains supply and the pipe removed at top of 'tower'. The top has been concreted over.

6. Cliff Adits at Bradda Head (N.G.R. SC 185705)

A series of exploratory trials were explored but none were of any great size. North Bradda Mine (Fig. 8) can only be visited at low tide and we were unlucky at the time of our visit! At South Bradda Mine are the remains of an engine house on the cliffs but no trace on any open workings.

7. Niarbyl Antimony Trial (SC 214774)

This adit was not explored but traces of mineral can be found in the tips.

8. Glen Maye Mine (SC 229798)

There are two unexplored open adits and a filled shaft at this mine (Fig. 9) as well as the remains of the two waterwheels. The suggested layout of the flat-rod system is shown in the diagram.

9. Ballaglass Mine (SC 464898)

A partly obscured open adit, the remains of the waterwheel pit and buildings are all that remains at this site. The possible site of the shaft is shown on the diagram.

10. Maughold Ironstone Mine

An old plan shows three adits but we were only able to find the one on the beach. This was securely bricked up. On the cliff top above was the remains of a chimney with a flue descending to the mine site. It is possible that smelting was carried out on site.

11. North Laxey Mine (SC 427889)

This mine (Fig. 16) is in the upper part of the Cornaa Valley and has excellent surface remains which are in need of preservation. The country rock here is slate and the vein runs N-S, dipping to the west. The vein is mostly quartz with galena, in the deeper levels barytes and pyrites occur. Little is known of its history apart from the fact that it operated from 1856 to 1897, the total production of ore being 1763 tons. Sir W.W. Smyth, Chief Mineral Inspector for the Commissionery of Woods and Forests, made a series of reports between 1857-1888 as follows:-

> "In 1857 at 10 fathoms there was a little ore only a few inches wide. In 1860 the South Shaft was at 40 fathoms and the lode still small and producing only a little ore. In 1865 some orey ground had been found in the 60 fathom level South but the end got into black ground (slate?) bedded rather flatly and not promising. In the following year the same level had poverty-stricken white quartz for its vein-stone, in 1869 in the 110 fathom level of South Shaft the lode proved quite poor on the South but bolder and better on the North. The discovery of ore in the 96 and 84 North driving where there was a really tolerable lode led to the renewed sinking of the old (North) shaft which had previously stopped at 38 fathoms. In 1872 the North Shaft was down 120 fathoms and the lode there 4-5 feet wide but quite worthless. In the 110 level half way between the shafts the vein was also of good size but calcareous and unprofitable. In 1876 the lode at 136 fathoms down was sprinkled with lead and zinc and in the following year at 146 fathoms it was dull quartz with a few large crystals of calcspar in the cavernous hollows".

Much work was carried out at the mine, as shown by the size of the spoil tips and the fact that levels were driven at 12, 27, 38, 50, 60, 73, 84, 96, 110, 121, 136, 146 and 170 fathoms. Judging from the amount of surface plant installed and the size of operation, this mine must have made an overall loss from the small amount of ore raised.

The layout of the shafts, waterwheels and buildings on the mine (see Fig. 16) has raised a number of problems which we hope we have answered below. We would welcome any suggestions or alternative theories.

The South Shaft is 10 feet square and is flooded to within 40 feet of the surface. The following is an account of a descent of the shaft by P. Atherton of M.M.R.G. and two members of Derbyshire Caving Club a few years ago:-

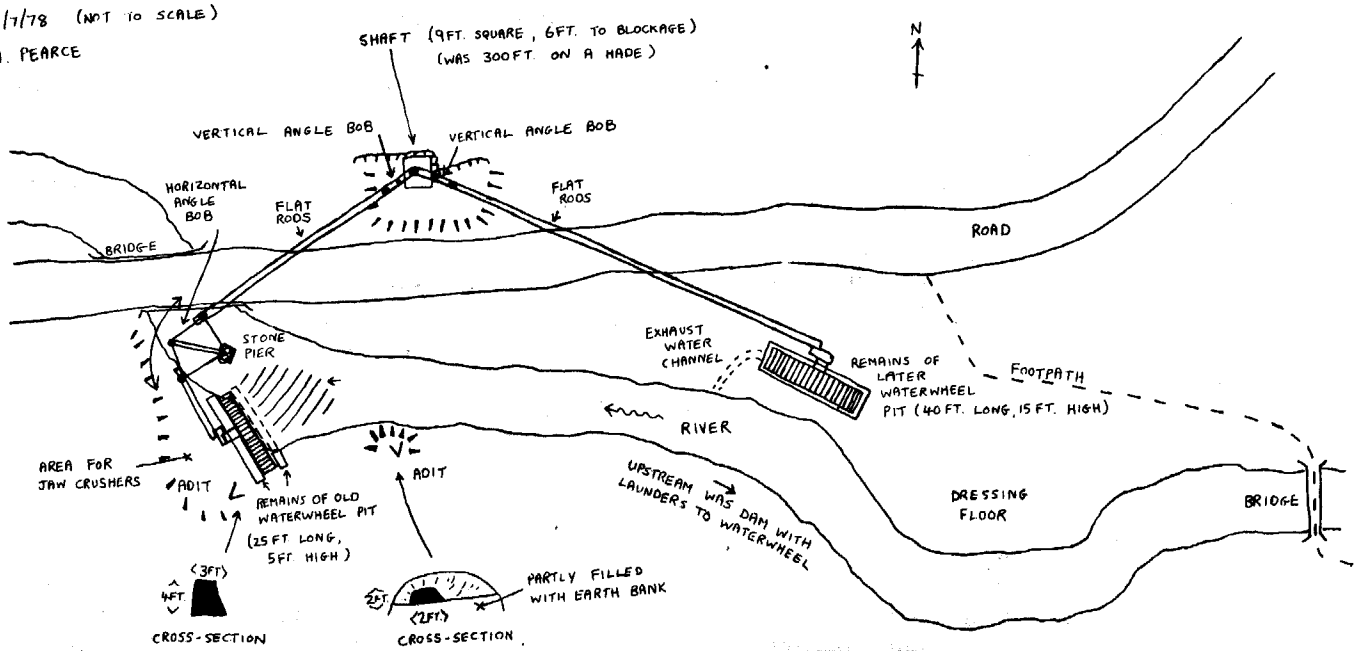
> "15 feet down the north side of the shaft is a short level running north for 80 feet (see Fig. 10). It ends in a choke. Due to the lie of the land this would hit the surface 100 feet down the valley. A kibble was found in this level in remarkable condition. This kibble is complete, made of wood with iron bands around it and a metal handle. Also running along this level and out into the shaft is a light railway track. The track consists of standard 1 inch section lines, the gauge being 2 feet,

FIG 9

GLEN MAYE MINE

SUGGESTED LAYOUT OF FLAT RODS ADDED

N.G.R. SC 229798
9/7/78 (NOT TO SCALE)
A. PEARCE



c. 1740	EARLY TRIALS.
1826	TRIALS BY ISLE OF MAN MINING CO.
1832	LEVEL DRIVEN INTO SOUTH SIDE OF GLEN, NOTHING IMPORTANT DISCOVERED.
1850	PEEL CASTLE & GLEN MAYE MINING CO. LTD ERECTED WATERWHEEL, DRIVING PUMP AND CRUSHERS, 20FT. × 4FT.
1861	WATERWHEEL MALICIOUSLY DAMAGED BY INSERTION OF WEDGE IN COGS.
1866	NORTH FOXDALE MINING CO LTD ERECTED NEW WATERWHEEL UPSTREAM CALLED 'MANA ERIN', 34FT. × 4FT.
1870	MINE LIQUIDATED.

FIG 10

NORTH LAXEY MINE

PLAN DRAWN BY P. ATHERTON OF MANX MINES RESEARCH GROUP.

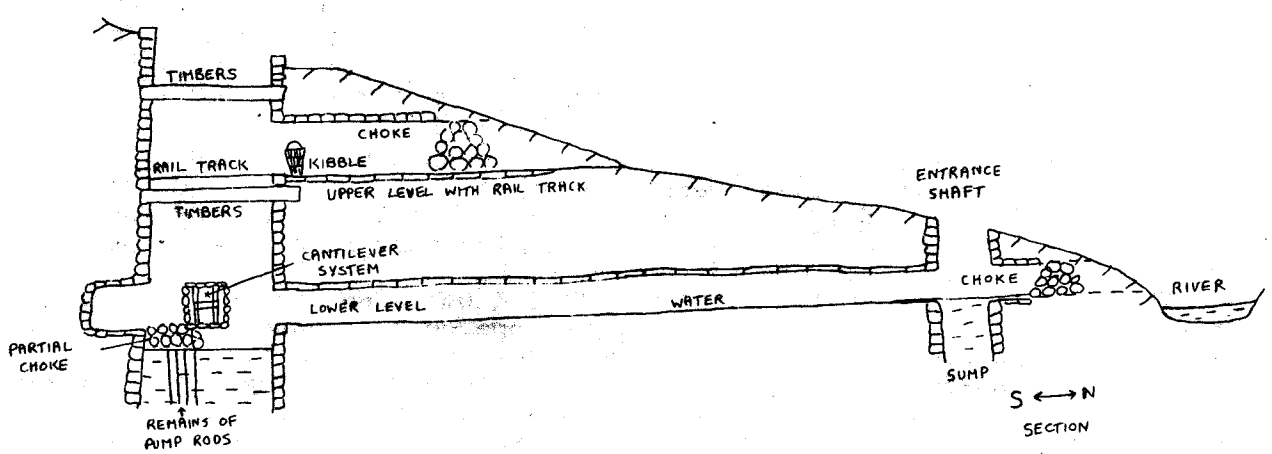


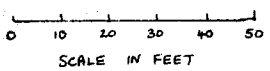
FIG 11

NORTH LAXEY MINE

N.G.R. SC 427889

SURVEYED BY PACING 7/7/78

A. PEARCE
G. ROSE



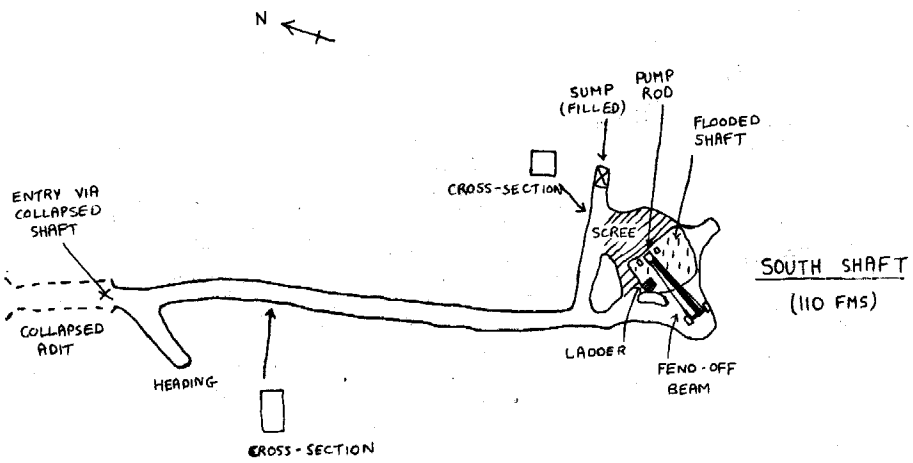


FIG 12

FEND-OFF BEAM

VIEW OF FEND-OFF BEAM AND PUMP ROD IN SHAFT.

7/7/78

A. PEARCE

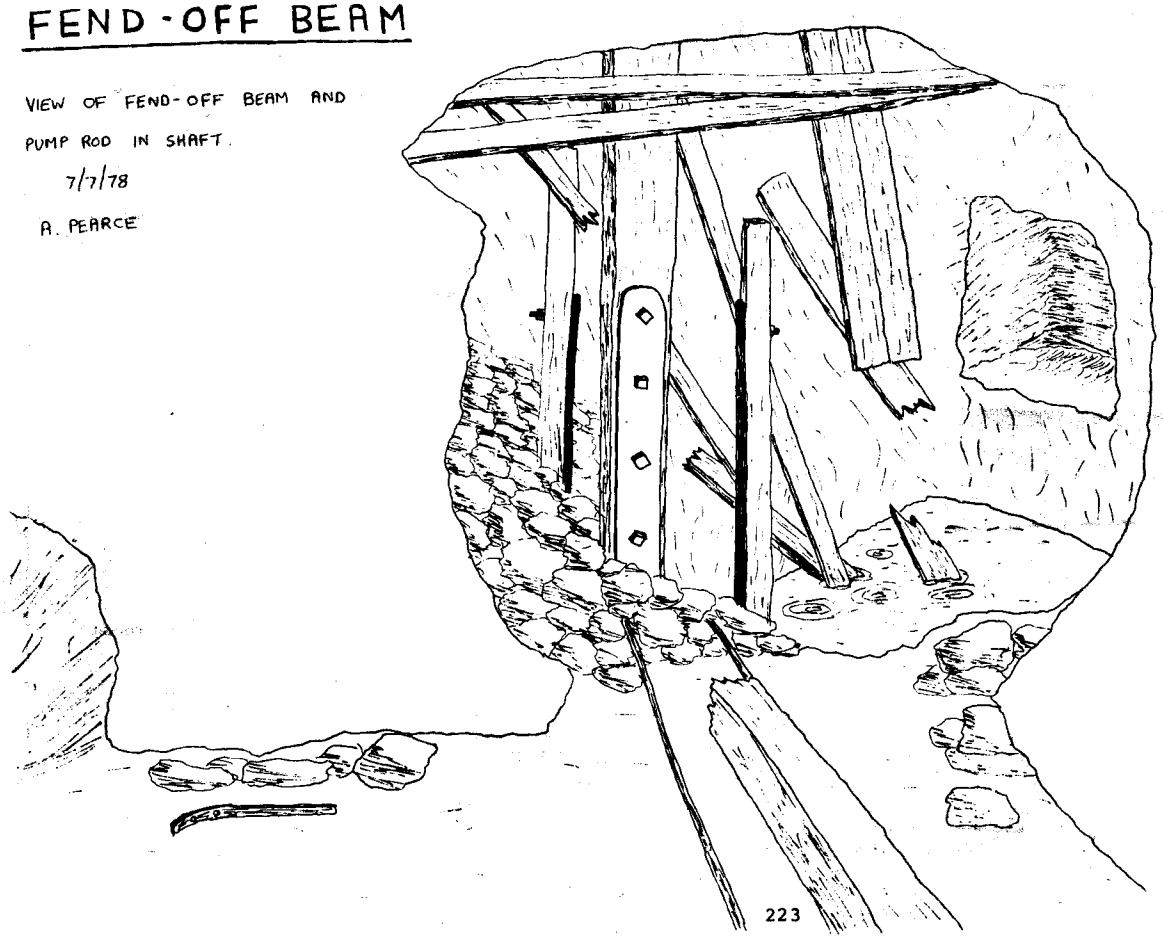


FIG 13

FEND-OFF BEAM

PLAN OF BEAM AND PUMP ROD

7/7/78

A. PEARCE

G. ROSE

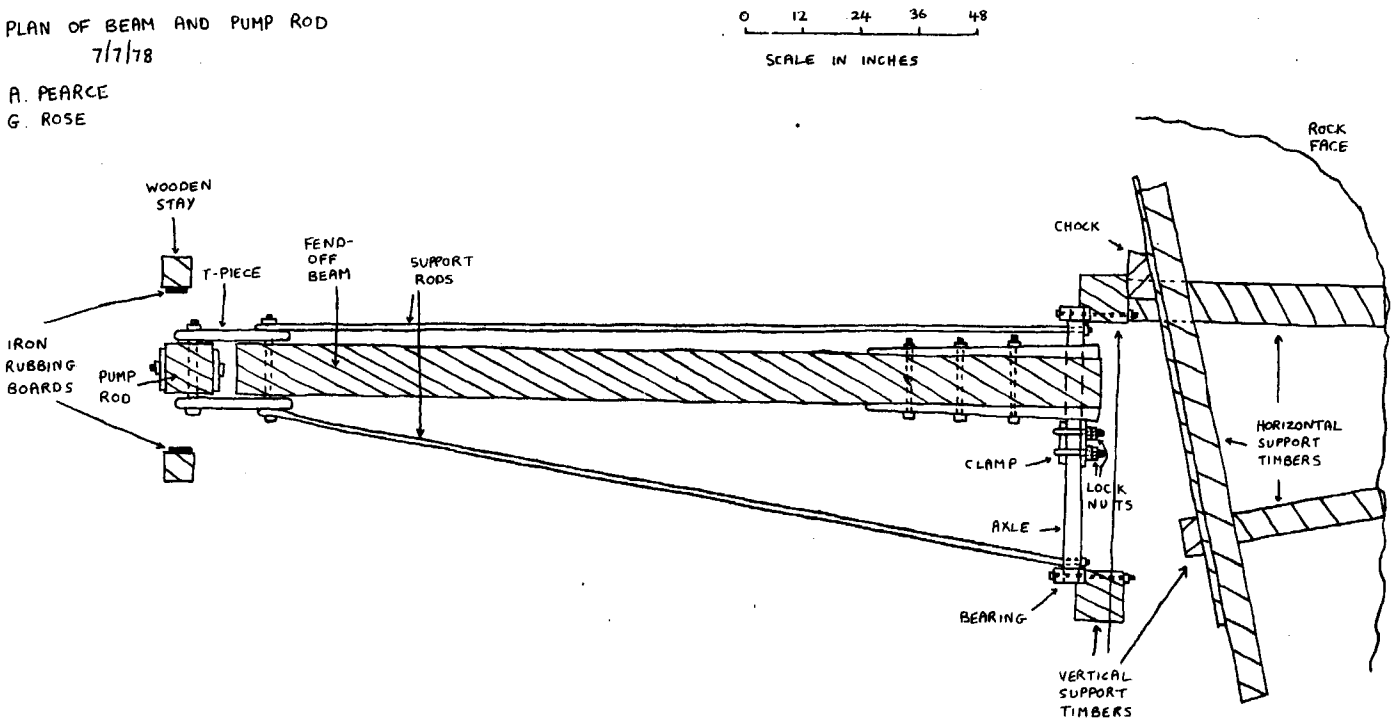


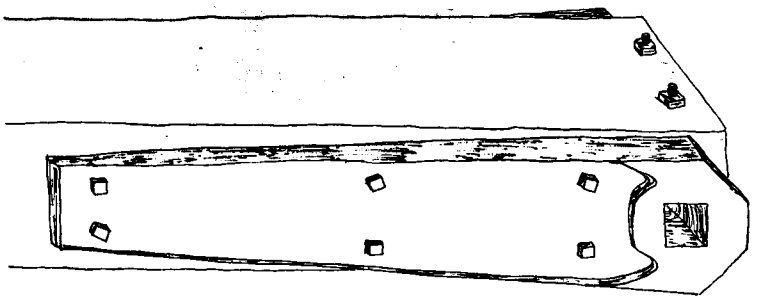
FIG 14

FEND-OFF BEAM

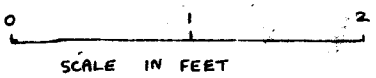
7/7/78

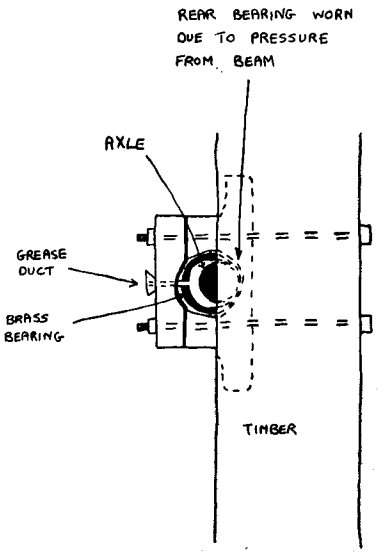
A. PEARCE

G. ROSE



DETAIL OF BEAM





DETAIL OF BEARING

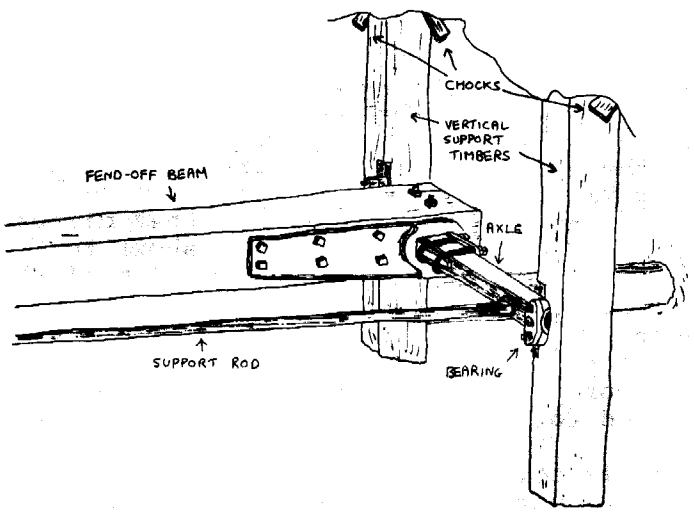
FIG 15

FEND-OFF BEAM

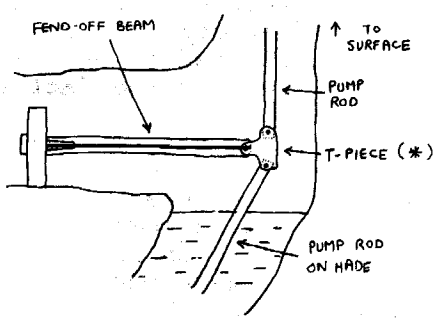
7/7/78

A. PEARCE
G. ROSE

* DETAIL OF T-PIECE MOSTLY CONJECTURE BECAUSE OF RUBBLE OBSCURING IT.



SIDE VIEW OF BEAM



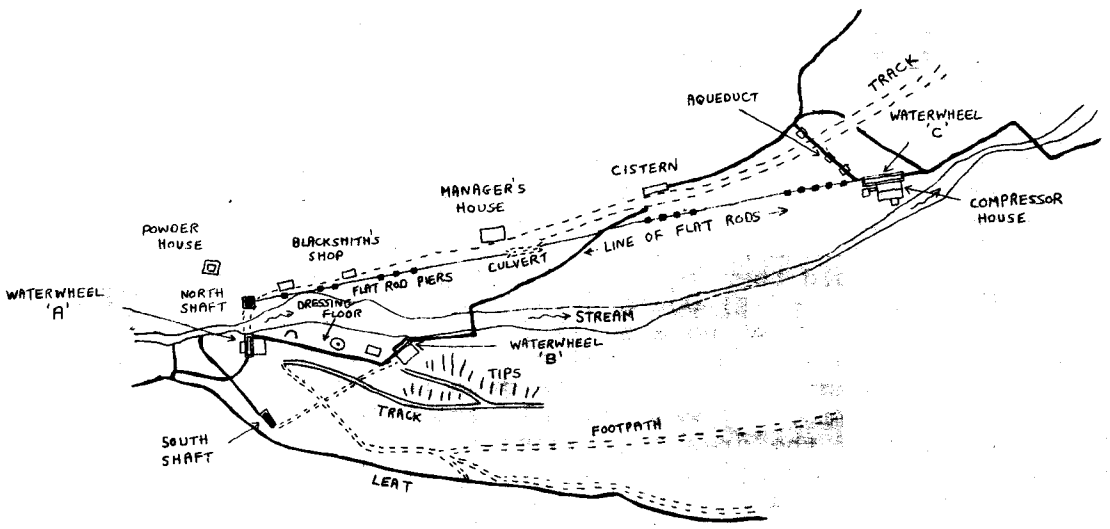
SUGGESTED METHOD OF OPERATION

FIG 16

NORTH LAXEY MINE

N.G.R. SC 428889
7/7/78

A. PEARCE
G. ROSE



"25 feet lower down directly below the higher level is another level running westwardly to join a second level on the west side of the shaft. At the junction of these levels the passage runs north in the same direction as the top level. This was followed by an entrance shaft about 200 feet further down the valley. Here access to the surface is possible but is dangerous due to two main features:

"(1) On the sole of the level at the daylight end is about 9 inches to 1 foot of water. On the mining plan, a winze down to the next level is shown and this was found to be correct.

"(2) The adit at one time obviously continued and came out to the surface lower down the valley near the river bed. The side of the entrance shaft has crumbled and the rock here is very loose, most of it almost certainly resting on the side of the winze.

"The top level was most likely used for bringing out the ore whilst the lower level was probably used as a discharge for the water lifted by the pumps".

On our visit, the shaft by the adit entrance had completely collapsed and entry was possible by scrambling down the rubble slope (Fig. 11).

In the shaft, the pump rods are still in position (Fig. 12) and attached to them is a Fend-Off Beam (Figs. 13-15). A fend-off beam was used where the vertical angle of a shaft changed and the motion of the pump rods had to be changed also. It acts as a pivot (Fig. 15) and consists of a wooden beam strengthened with two tie rods. By moving the beam along its axle, the position of the pump rods in the shaft can be altered. The forces acting on the fend-off beam would tend to push it backwards if the shaft inclined underneath it. This is confirmed by the fact that the bearing has had greater wear towards the rear and the frame is heavily shored with timber to prevent movement in that direction. A fall of rubble has partially obscured the T-piece but sufficient shows to guess at its shape. Running vertically for a short distance either side of the pump rod are metal strips mounted on timbers. There are rubbing boards which help to prevent excessive lateral movement of the pump rods. A fend-off beam is usually 2½ times as long as the stroke, so the stroke of the pump rods in the shaft must have been about 6 feet. In a corner of the shaft is the top of a ladderway, so the shaft must have been used for the purposes of climbing, pumping and winding.

On the surface, the shaft is at an angle to, and about 80 feet away from, the waterwheel which was used to operate the pump rods and winding rope. This was probably because the waterwheel was originally installed to operate in North Shaft, then adapted when the main operation was transferred to South Shaft. As North Shaft was again used in the latest operations it is likely that winding was possible in both shafts. The pump rods in South Shaft were operated by flat-rods from the waterwheel. A horizontal angle bob was positioned approximately half way to alter the direction of movement. The remains of the three supports for this bob can be identified. The waterwheel must also have operated a winding drum which had to be capable of movement in two directions. It is presumed that the position of the drum was in the double-walled structure at the side of the waterwheel pit. A possible mode of operation is shown in Fig. 17.

The output shaft (A) from the waterwheel would turn two pulleys (B and C). Another shaft (D) would be connected via a spur wheel (I) to the winding drum (J). Two bevel wheels (E and F) face each other and run loose upon the shaft (D). Pulley (B) would turn bevel wheel (E) in one direction by means of a flat belt. The other pulley (C) would turn the other bevel wheel (F) in the opposite direction by the simple procedure of twisting the connecting flat belt. By means of a clutch (G), either wheel can be firmly connected to the shaft (D) and turn it in the appropriate direction. A handle (H) would operate this clutch system. The motion of the shaft (D) would then be transmitted to the winding drum via the spur wheel (I). A brake strap (K) would have to be incorporated into the system. By use of the clutch, brake and a skilled operator, winding could be satisfactorily carried out. Again a horizontal pulley would be required to change the direction of the winding rope from the drum to the shaft. The waterwheel itself (see 'A' in Fig. 18) was probably about 40 feet diameter.

Next to this is the area of the dressing floors (Fig. 18). The ore would be brought up the shaft in kibbles and transferred to waggons in the level. It would then be wheeled out to the tips. Loads with a high proportion of pure ore would be tipped down an ore shute in front of the level mouth. At the bottom of this is a flagged area with a semi-circular wall around it. This would be the knocking floor where women would break up the lumps to produce pieces of solid ore which would be barrowed to the ore-house. The wall would be for protection from the weather, it would be thatched with an open side. Waggons containing ore mixed with other veinstuff would be taken further along the tips to the ore hopper. From here it would be barrowed across to the

FIG 17

WATERWHEEL - DRIVEN WINDING DRUM

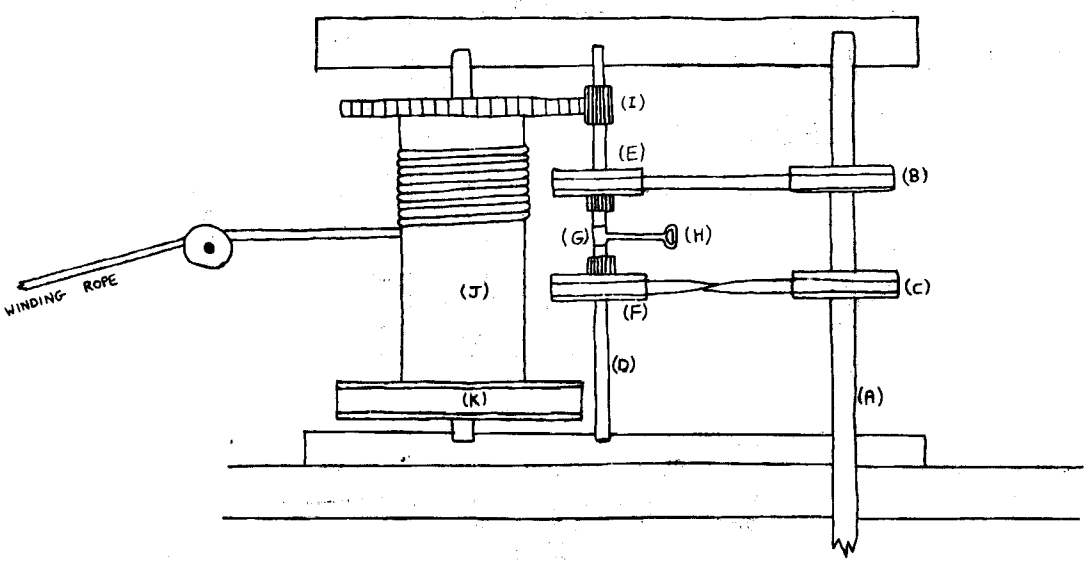


FIG 18

NORTH LAXEY MINE

N.G.R. SC 428889

7/7/78

A PEARCE

G. ROSE

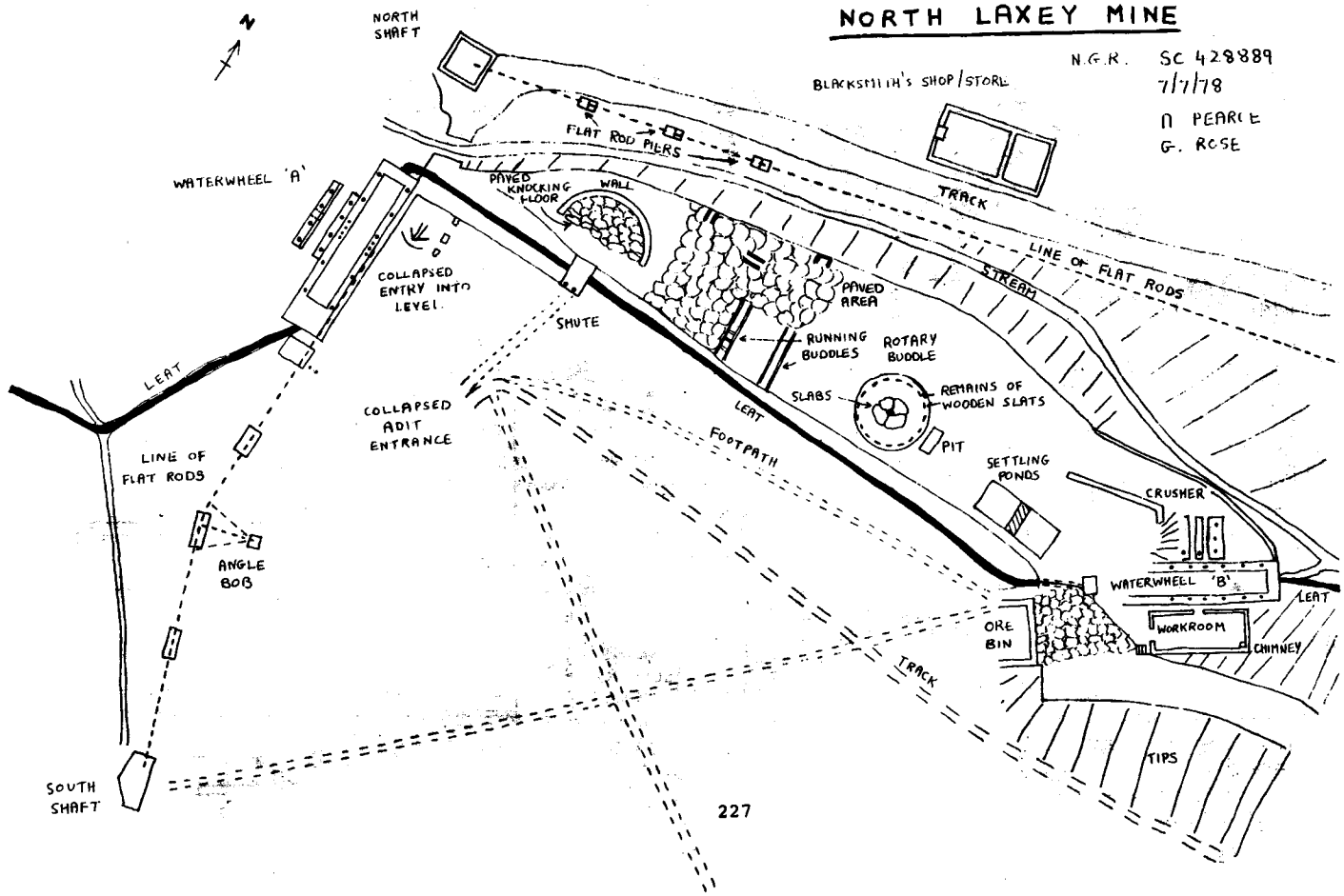


FIG 19

NORTH SHAFT

7/7/78

A. PEARCE

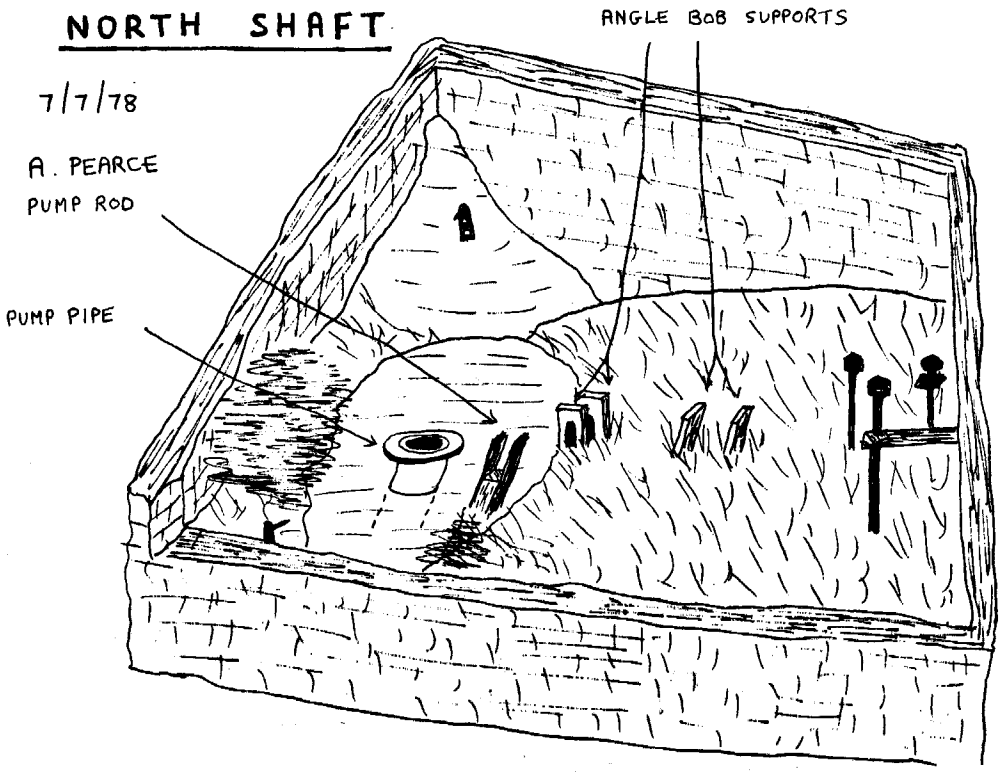


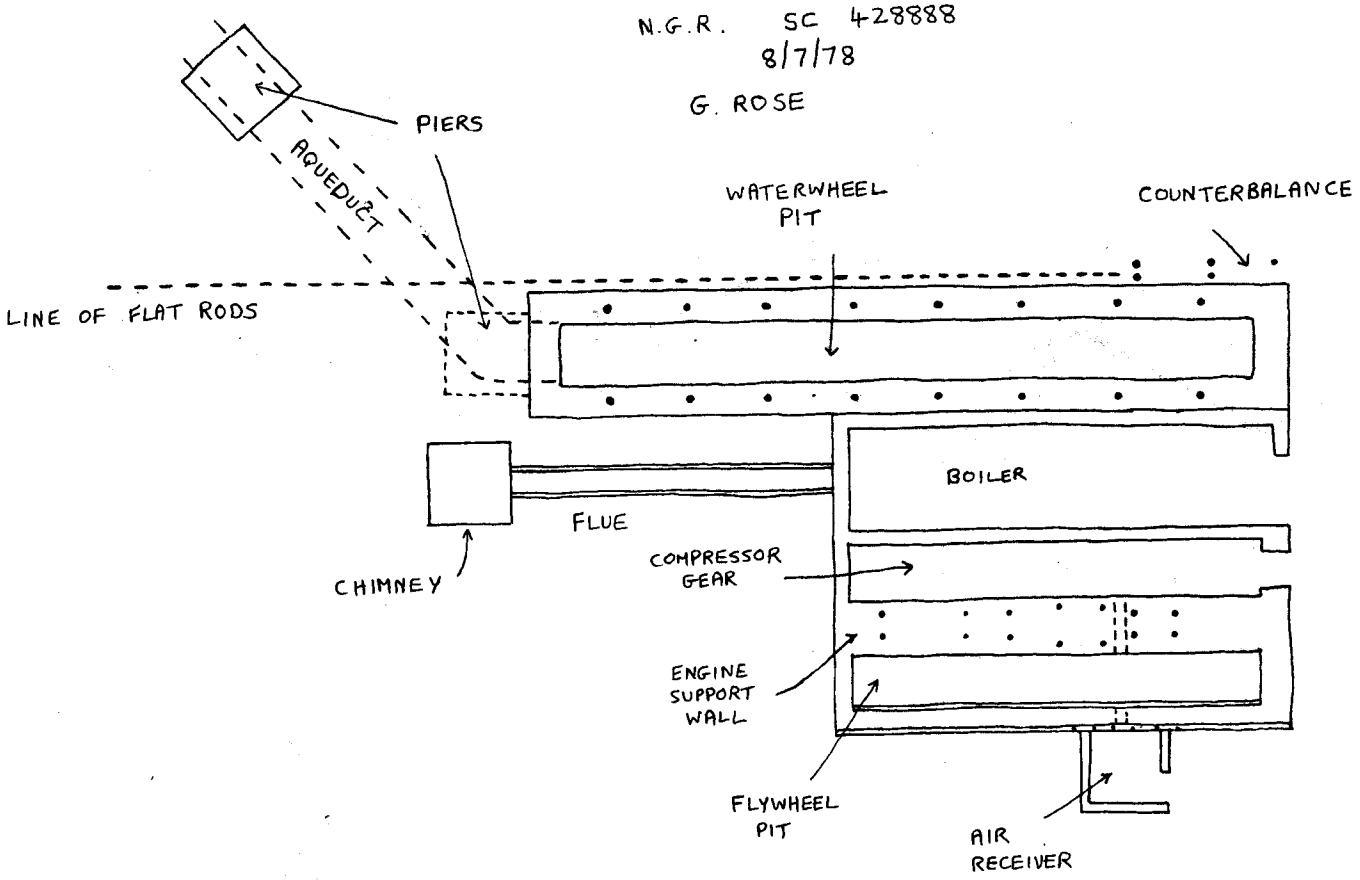
FIG 20

ENGINE HOUSE / WATERWHEEL 'C'

N.G.R. SC 428888

8/7/78

G. ROSE



waterwheel-operated crusher (see B in Fig. 18). The wheel would be about 40 feet in diameter. The crushed material would be barrowed to the two running buddles where the larger pieces of ore would be separated. The slimes (still containing an amount of ore) would flow along launders on the surface to the settling ponds, where excess water would drain off through launders beneath the dressing floor. These traverse the complete floor and flow out into the stream. The concentrated slimes in the ponds could then be processed through the rotary buddle to reclaim the small particles of ore therein. The waste slimes would be channelled into the pit at the side and would flow into the stream via the covered launders. Waggons containing waste rock would be taken to the end of the track and emptied onto the tips.

Other buildings on the site can be identified (Fig. 16). On the hillside is the powder house which consists of a square building with a surrounding high wall to absorb the force of any accidental explosion. This design is common in the area. On the opposite bank from the first-mentioned waterwheel is North Shaft (Fig. 19) which was probably only used for pumping. Nearby is a large two-storied building which was probably the store/blacksmith shop. Downstream is another two-storey building which was the Manager's House. About 700 feet further downstream is the site of another larger waterwheel and an engine house (Fig. 20). Feed water for this was carried along launders on an aqueduct hence it would probably have been of the breast pitchback variety similar to the famous Lady Isabella Waterwheel at Laxey. Two of the piers are still standing while the third has collapsed. The waterwheel was probably about 60 feet in diameter and operated a flat-rod system via a crank. As can be seen from Fig. 16, the flat-rods travelled about 800 feet to the North Shaft where they operated pump rods via an angle bob. At North Shaft the mountings for the angle bob can be seen, together with the top of the pump rod and pipe which are sticking out of the water. The flat-rods were carried on stone pillars apart from a section in the middle where they were carried through an arched culvert.

The boiler house of the engine can be identified and its flue and chimney are still standing. From examination of the engine mountings, it would appear that a horizontal engine was mounted on the middle wall of the engine house with a flywheel in the pit at the side. The function of this engine is obscure but it cannot have been for winding in view of its distance from the shaft. It was suggested that it could have been for operating the flat-rods in drought conditions. This again is unlikely since a drive shaft from the engine to the crank would require strong mountings. The walls between are thin and cannot have been load-bearing. The small building attached to the side is a clue, together with the fact that the engine was a later installation as it does not appear on the early O.S. maps. It must have been used to operate a compressor for the rock drills underground. Compressed air drills were only introduced into most mines late in the 19th Century. The small building would be for the air receiver while the compressor unit itself would be on the other side of the engine from the flywheel. The same company operated both North Laxey Mine and Glen Cherry Mine downstream. The engine house is halfway between the two, hence it could supply compressed air to both mines.

In the Isle of Man leats, or lades as they are locally known, are a speciality, In view of the short horizontal distance from the high ground of the island to the sea, the ground slopes steeply. Watercourses run full in wet weather and dry up in summer. Since most of the motive power utilised water, a method had to be found to ensure a steady, continuous flow. This was done by digging miles of zig-zagging leats and using dams and cisterns to store water. At this mine the leat system was devised to utilise the water to the full. On the hillside above South Shaft was a dam fed by surface water drained from the surrounding area. A sluice directed water into a leat which bypasses South Shaft and bends upstream where it turns back on itself at a further sluice which could control the flow of water. Two run-off channels (slightly higher in level than the main leat) would prevent the leat system flooding in times of heavy rain. In case local flooding caused water to flow down the shaft, the latter is walled and has a water channel at the side to take away the water. This channel runs into the main leat and before a further bend is another sluice and run-off channel. The leat then ran into a launder which directed the water onto the waterwheel. From there it ran alongside the dressing floor, apart from a supply needed for the buddles, and fed the crusher waterwheel. It was then carried over the stream in launders, under the track and into a small cistern. After this it was joined by a feeder leat and flowed across the aqueduct, already mentioned, to the big waterwheel. The exhaust water ran along a leat and over the stream to operate a further waterwheel at Glen Cherry Mine downstream.

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