

Methods of Mining

The early miners work ore veins where they were outcropped, mainly in cliffs and rocks with just a thin soil cover. Once an ore vein's direction was determined it could easily be worked by digging trenches or shafts along its expected course.

In medieval times wealthy local men formed partnerships to work areas of land, mining ground was measured in 'meers; in Swaledale this was 30 yards along the vein with 7 ½ yards on either side, this provided sufficient space for sinking a shaft, building spoil heaps and putting up a small building. Shafts were typically less than 100 feet due to the weight of the rope needed to bring the ore, men and equipment up via hand operated jack rollers.



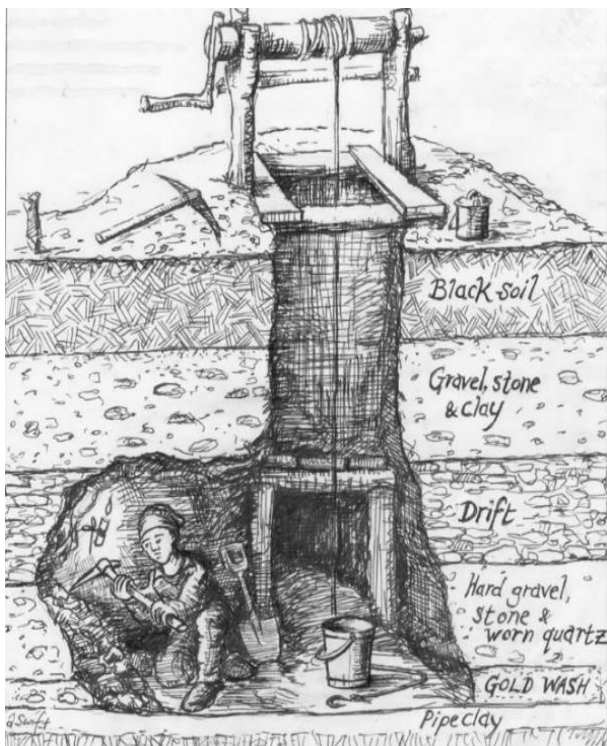
In the 18th century deeper shafts were sunk as these were wound by horse whims. Only a short distance could be worked either way from the shaft due to poor air quality and unsafe roofs so new shafts were regularly sunk along the ore vein which has left rows of circular 'bell pits' running along many of the moor tops around Swaledale.

Ore was brought to the surface in large buckets (*kibbles*). The miners had to climb up and down the shaft via wooden bars (*stemples*) driven into the shaft walls to form a ladder. This was very dangerous and resulted in frequent accidents and fatalities due to miners losing their footing on the stemples.

Another early form of mining was '*hushing*' which was used for both prospecting and working veins on hillsides. This involved releasing great volumes of water that would tear down the hillside, washing away all top soil so exposing the underlying rock and ore veins. Complex water systems were cut into the moor to collect water into reservoirs which were dammed, often with stones and turf, and located above the area to be hushed. Once the water had been released, the rock face was worked and then hushed again to wash away all the remaining loose debris. This method was very destructive and has left a striking landscape in both the deep ravines in the side of the gills and the high content of stones that washed down into the becks and eventually the river Swale. Hushing also polluted the water with poisonous minerals and lead being washed down stream.

As Swaledale has many steep sided gills and valleys, horizontal tunnels or 'levels' were cut into hillsides. These allowed access to ore at greater depths and also provided a means of draining mine workings of water as they were usually driven at a slight incline so water could run out. The incline also made it easier to pull the heavy laden waggons downwards out of the workings. Levels were driven after the creation of the larger mining companies as they required significant capital investment and did not always yield a high return. Initially these were typically 3'6" high by 1'62 wide, but by the late 18th century levels measured 6'6" by 4'6" so they could be fitted with narrow rail tracks on which horses could pull the waggons. This allowed numerous veins to be worked from one entry point and resulted in dressing floors being built near key level entrances.

Wherever possible miners worked up the vein so the mined material would fall instead of having to be lifted out a worked area. This technique was called 'stoping' and often resulted in the mined waste rock 'deads' being stored in the worked out area to save the time and labour of having of bringing it out to the surface. If there was a likelihood that ore could be present above or below a level a 'sump' or 'rise' was driven downwards or upwards.



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Miners typically used simple hand tools to drive the levels and extract the ore; hammers, picks, and crowbars. Before the use of dynamite, plugs and feathers were used; these consisted of two pieces of iron (feathers) being inserted into cracks in the rock and then driving a wedge (plug) between them to force the rock. From the 17th century gunpowder was used for blasting the rock, and from 1866 dynamite was then used. This was dangerous work as sparks from the implements used to set the charges could cause explosions before the men or boys had cleared the area. Dynamite also created huge amounts of dust in confined areas which took a long time to clear due to the poor ventilation, this had a detrimental impact on miner's health and boys were employed to turn large fans, called Windy Kings, to help clear the dust.