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LEAD MINES AND MINING AT CONONLEY. NEAR SKIPTON. YORKSHIRE.

Robert T. Clough, A.R.I.B.A., F.S.A.(Scot).

The mining ground at Cononley in the Duke of Devonshire's Liberty and some four miles south of Skipton in Craven, was once extremely prosperous. In 1530 a grant was made by Henry VIII for the working of lead on Glusburn and Cononley Moors and two shallow shafts are known to have been sunk at this period. In 1542, the shrewd Henry Neville bought for £2,490 land in the parish of Cononley, together with a considerable area of land in the adjoining parishes of Carleton, Cowling and Bradley; all of these areas he realised as being likely to bear ore. We do not know a great deal of these early ventures and it is not until 1742 that we read in the Kildwick Parish Registers, that one Richard Braithwaite, "Steward of the lead mines at Cononley", was married to Ann Smith; the curate adding the note in the register that: "the lead mines have long ago ceased to be worked".

The mineralised area is situated in the Limestones of the Lothersdale Anticline, (see, "Geology of the Country between Bradford and Skipton", H.M.S.O., 1953, Lead, pp.151-2) and lead mining has been carried on intermittently since the introduction of gun-powder in the seventeenth century and in a simpler manner from a considerably earlier date. The Main Vein (see Figs. l and 2) coincides with a large fault in the Millstone Grit trending west-northwest and hades to the south-west, the downthrow being in that direction. Mining in later times was by shafts and adits serving seven (see Fig.3) levels, the deepest being some 45 fathoms. There are seven shafts along the. Main Vein, with the South Vein extending for a short distance.

In addition to galena the Main Vein has yielded a little-blende, smithsonite, barytes, with calcite and iron-pyrites. A seam of coal 15 inches [40] thick was encountered in the workings north of Weasel Green, (see, Green and others, "The Geology of the Yorkshire Coalfield," Mem. Geol. Survey, 1878) From an examination of the site the smelting mill appears to have been about sixty feet long, with a lean-to portion facing Gibb Hill. There were two ore hearths and a roasting furnace, details of which are not now available.

The main period of the mines' activity was between 1830-63; 1848-63 being the most successful years, when the average yield was 342 tons. The last ore was got from Good Hope Shaft in the spring of 1887, (see late J.W. Moorhouse for details of this last working, in this issue of Trans. N.C. & M.R.S.)

There is little published information on the Cononley Mines, with the exception of a paper by J. Ray Eddy, F.G.S., the Duke of Devonshire's Mineral Agent, entitled: "On the lead veins in the neighbourhood of Skipton", (In Proc. Yorkshire Geological and Polytechnic Soc., New Series, Vol. VIII, Pt.1,

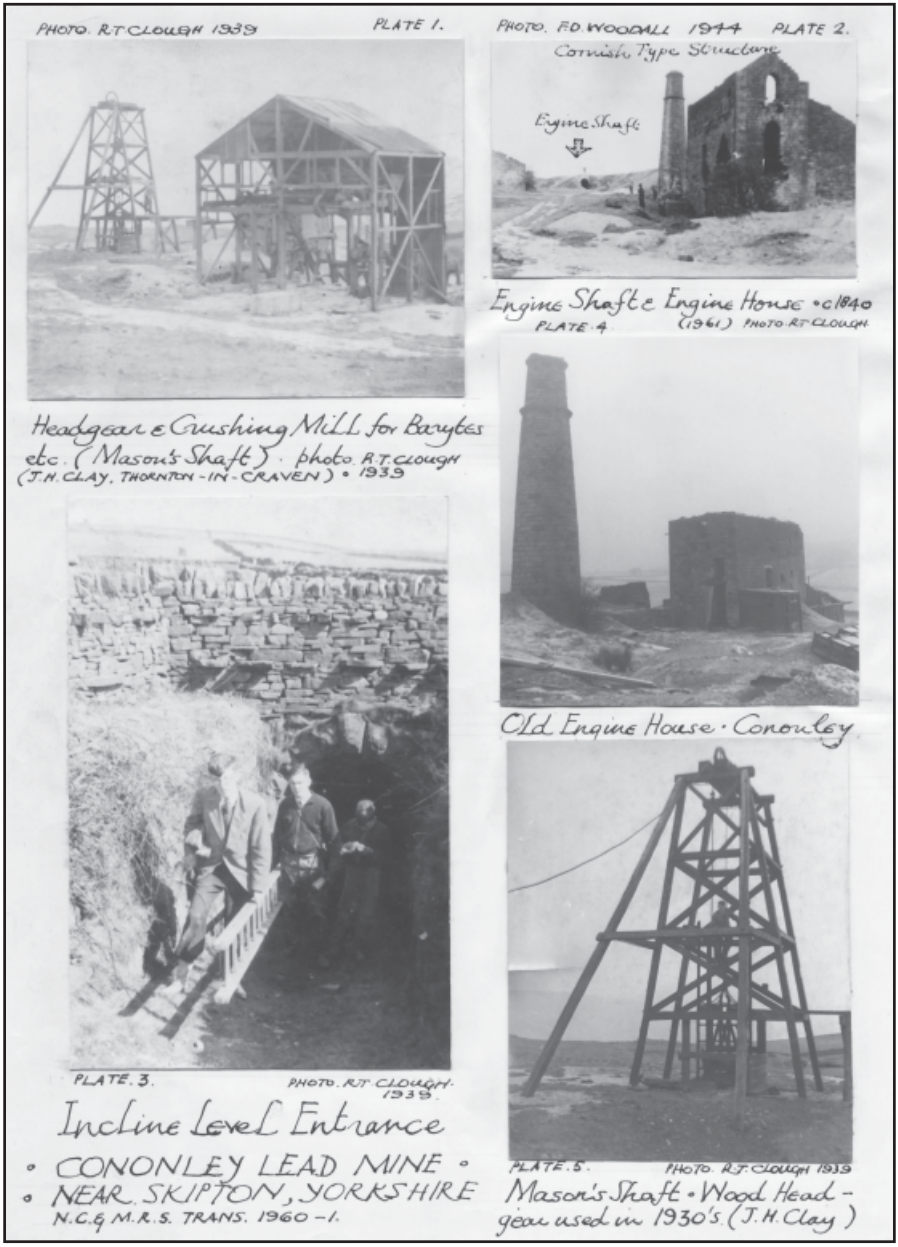
pp.63-69). This scarce paper is now given in its entirety, as it is felt that to amend it in any way in the light of more recent investigations, would destroy some of the value of this contribution.

"Before directing attention especially to the subject of my paper, it is due to tbe Members to explain that it was first proposed that the Lead Veins in the Grit-beds of Craven should be considered but ultimately the veins described by the present title were preferred. This change practically leaves me a somewhat barren subject, because the Cononley Lead Mine has been entirely abandoned for several years in the eastern part, and almost so in the western, and it is the only place near Skipton, where the regular working of a vein has been carried on.

"A paper on the larger and much more interesting Mining field in Wharfedale may prove welcome on some future occasion when you may be inclined to extend your excursions to that district." The main vein is part of a large "fault", the throw of which has never been truly ascertained [41] by the miner, partly because the sides have been rarely seen, and further on account of the disturbed state of the strata where the walls of the vein have been proved. It is the most southern of all the lead producing districts of our county, removed some ten miles from the nearest mine, properly so called, and fourteen miles from those producing lead ore in the Grit-stone beds. These veins also proved the rare, perhaps the only exception in the investigations made by Mr. C. Moore, of Bath, which seems to establish the "existence of organic remains in the earthy matrix of mineral veins in the carboniferous rocks." Again the main vein is the only one amongst the grit producing mines of Craven which has yielded lead ore in quantities commercially valuable, whilst traversing highly disturbed strata, and with accompanying masses of shale in the vein itself; the veins in the other mines requiring the beds to be comparatively regular to prove productive, and then as a rule becoming small and poor on the approach of the shale either as a "cheek" of the vein, or thrown in as a leader, or accompaniment of the vein.

"The Cononley mines were worked very many years ago, certainly before the introduction of gunpowder into this district, but only to a shallow depth, except in one place. The workers were stopped in their progress by the combined drawbacks of too much water and too little lead ore. In one place however, on the crown of the hill, eastward, and near to Mason's shaft, they got down to the depth of our Upper Adit Level, or 24 fathoms from the surface at that point. Here the vein was poor.

"Some time subsequent to 1830 Messrs Hall of Newcastle began the deep adit level crosscut from a point in Nethergill, to the west of the village of Cononley, about 525 feet above the level of the sea, with the view of intersecting and draining the main vein at that depth. After driving through several faults and much disturbed ground for a distance of 90 fathoms, these gentlemen gave up the trial and the crosscut was continued on behalf of His



Grace the late Duke of Devonshire. The vein was met with after a total drivage of 205 fathoms.

"I will briefly state the principal levels [42] and shafts in the mine before speaking of the nature of the vein itself. The deep adit driven east nearly to, and west to the ends of the mine: the middle level, 10 fathoms higher, originally driven from a rise eastwards and extended to near the east end, and westward beyond Taylor's shaft; the upper adit, 10 fathoms higher still, extending from the surface eastward the whole distance; and Briggs level, a superficial adit, begun at the surface east of the engine shaft and continued to the east end of the mine. Below the deep adit, the 15 fathom level was driven some distance east and west to a distance beyond Taylor's shaft, the 25 a short distance east and west of Engine shaft crosscut, and the 45 fathom level which extended but little from this crosscut. There is also an old adit crosscut driven from the southwest side of the hill in the Glusburn ground, with two small shafts upon it, but this does not communicate with the mine proper. The principal shafts are Taylor's, at the end of the main crosscut sunk to the deep adit level, eastward from this engine shaft to the 45 fathom level below the deep adit; and Garforth's and Mason's shafts both sunk to the deep adit only. In this part of the mine an "inclined plane", or shaft, was extended from the surface to the deep adit eastward. Westward of the main crosscut are Remfry's shaft to the deep adit, and Good Hope shaft, which has of late years been sunk to a level about 10 fathoms below the deep adit.

"At this, the western part of the mine, exists the only chance I know of at present for any further development of the Cononley Main Vein.

"The principal crosscuts which have practically proved the worthlessness of the side veins north and south of the main fault vein are, eastwards, the old Glusburn adit crosscut, Brigg's crosscut, the middle level north and south, and the upper adit south; in the centre of the works the upper adit north, middle level south, deep adit north, and the 15, 25, and 45 fathoms crosscut south. In the west end, the deep adit south, and one north (not shown on plan).

"Besides these works there have been drivages at the upper adit, middle level, and deep adit in the south vein which returned some ore under very [43] different conditions to those observed in the main vein; and also an adit level driven and a shaft sunk into the Gib Hill, on a vein which never produced any ore; through this level and shaft – at a later date – the smoke from the smelting mill was conveyed for the purpose of facilitating a further condensation of the fumes.

"The main vein has a general direction of 32° W. of N. Mag. varying from 45° W. of N. in the ore-bearing part of the lode to 27° W. of N. in the poor ends of the mine. The "underlie" or "hade" southwest in the latter is 20° from the vertical, and in the former about 10°. In depth, this vein should receive the south vein, which with a hade of 6° from the vertical to the north-east might have been expected to be a valuable feeder of the old vein, but both failing in depth this junction downwards has not been experienced.

“Between the deep and the upper adits, the main vein varied in width from a mere joint to 5 or 6 feet; and in the bearing-length about the latter it increased in some parts to 20 feed wide or more, yielding ore in one place close to the surface clay.

“Below the adit the good part of the vein produced lead ore to a depth of 8 fathoms, and a little to the 15 fathoms level under the adit, but practically the vein failed at the depth of 15 fathoms, or a total depth from the surface at the engine shaft of 50 fathoms.

“As will be seen from the plan the main vein was regularly productive for a comparatively short length of ground, the whole of the lode driven on east and west proving unremunerative, though not entirely barren.

“In the productive channel of ground bounded by the main and south veins were several strings or smaller vein-branches, which leaving the old vein on its south side, robbed it, but not having strength to carry on to the south vein failed to enrich that lode east of the crosscut south of Garforth’s shaft.

The main vein above the upper adit widened [44] out, and for a very short length on the north-west and near to Garforth’s shaft was worked open to the surface.

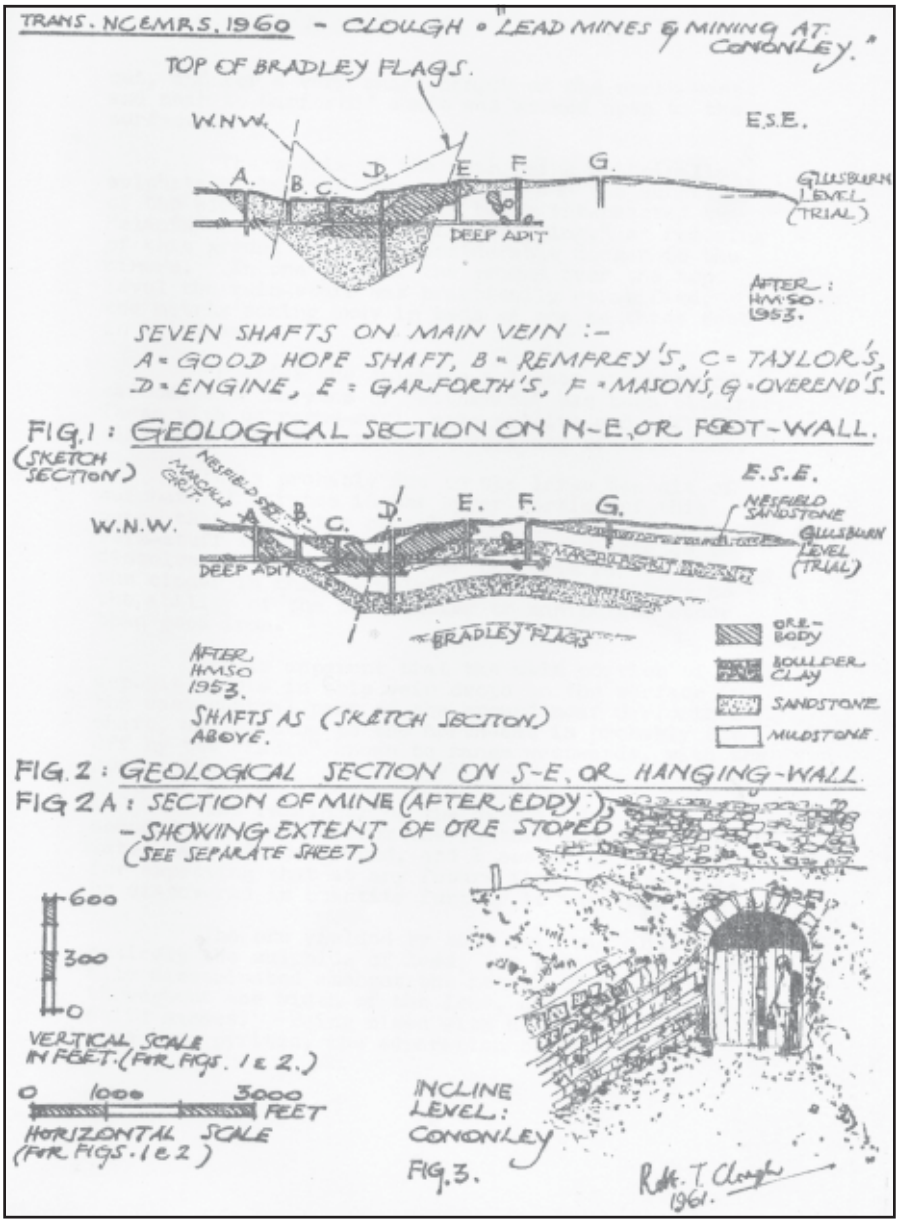
“The matrix of the vein being principally sulphate of barytes (heavy spar), and the substance of the wide part of the vein being intersected by “slants” or clay, joints, the “stopping”, or removing of this ground entailed considerable danger to the miners. In one part of the ground over the top level the vein-stuff was practically stratified, the matrix coming away in beds of one to three feet in thickness.

“Besides the sulphate a lesser quantity of carbonate of barytes or “witherite” has been obtained. These with ochreous-marl, some calcite and much black clay have been the principal contents of this lode.

“It is probably due to the large deposit of sulphate of barytes in the upper portion of this vein, that the water percolating through the mass of vein-stuff is so charged with sulphuric acid as to dissolve the good iron out of the tram rails, leaving the cinder in thin parallel plates as a tribute to the ability of the iron-master to manipulate other than good iron.

“It is apparent that the main portion of the deposit of ore in this vein crops to the surface in the east-central part of the ground near Garforth’s shaft, and dipping to the north-east is probably cut off by the “fault” known to range westwards, with the north side down.

“The remainder of the deposit has been denuded and removed from the eastern and more elevated part of the ground, and I see no good reason for expecting



that at any future time lead ore-will be discovered in quantity further to the south-east.

“The ore yielded by this vein was almost entirely the sulphide of lead, (or galena,) principally disseminated amongst the matrix of the vein throughout the width of the lode, and not often in solid masses. Being mixed with heavy barytes and some iron pyrites, the separation of the ore from [45] the impurities was difficult, and its physical nature when prepared for the furnace made it most refractory in the smelting, very much more so that is usual in ores raised from mines in the same class of rocks.

The south vein – contrary to the characteristics of the main – had very little “throw”, and regular cheeks or sides. It showed a north-east “underlie” of about 6°, and in the bearing part of the lode was of a width varying from a few inches to a foot. Its bearing is about 40° W. of N. Mag., bearing towards the main vein going westwards.

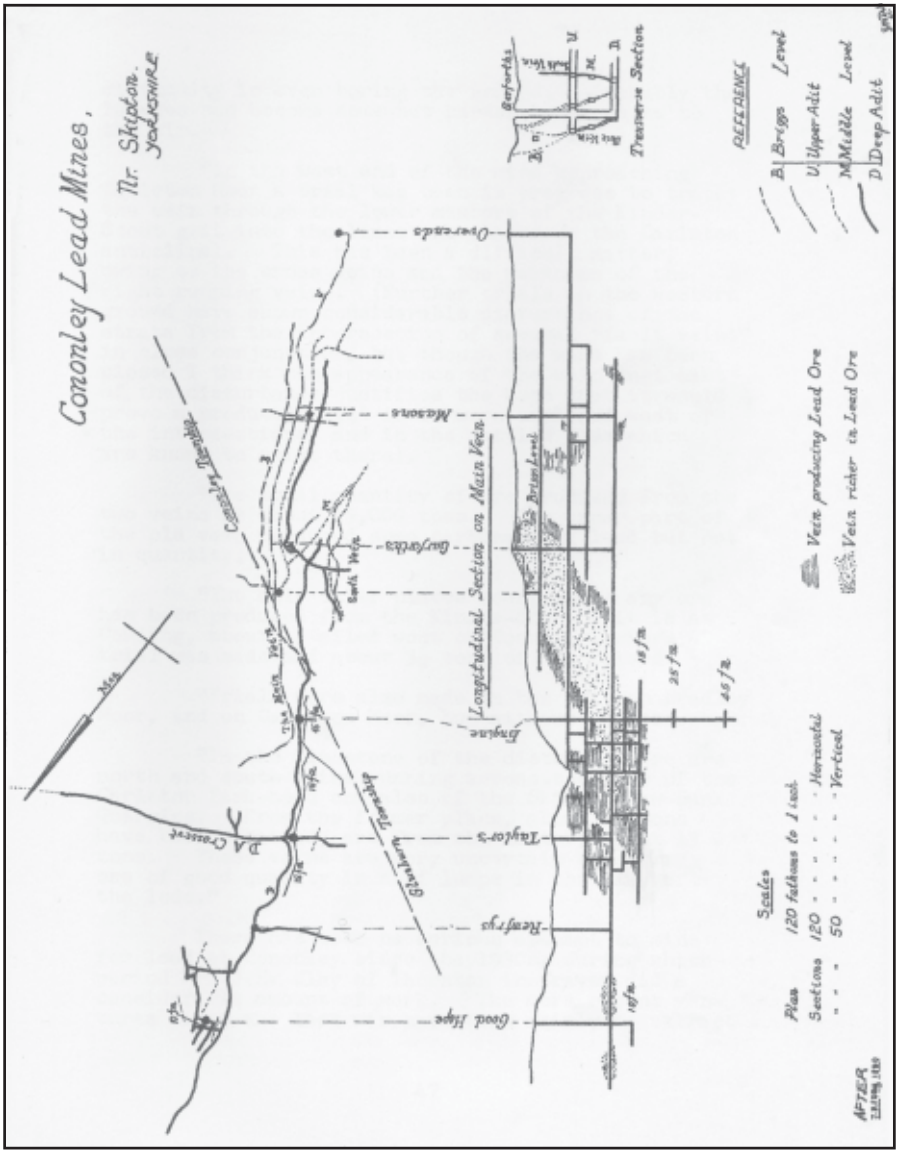
The junction, however, has not been seen in this direction, probably on account of the intervention of the “fault” before alluded to. This “fault” has not been recognised in the mine, for it is difficult and often impossible to see in the size of a level anything further than what appears a “backing” in the rock, whenever the “fault” is a mere joint.

“The ore in the south vein was of a different nature to that from the main lode, being generally found loose in the vein, with little matrix, and that generally of friable carbonate of lime, with loose, dry, earthy mineral. In quality this ore was superior to that from the main vein, but unfortunately it fell far short in quantity.

“The ore bearing zone was limited to a distance of about 18 fathoms, extending from the deep to a little higher than the upper adit, while in length the productive ground was still less than in the main vein.

“In driving the middle level near Mason’s shaft, the lowest part of the earliest works were met with, and in Brigg’s level, east of Garforth’s; a long length of old workings and a short crosscut were opened into. Here our predecessor had cut his ground with picks only, and every shift or day’s work could be accurately told by observation of the side of the level. Only in one place was a bore hole to be seen, and this was probably of a later date. The vein was filled with solid sulphate of barytes, but so hard that the modern miner had [46] difficulty in even boring the ground. Probably the barytes had become somewhat harder by exposure to the air.

“In the west end of the mine approaching Carleton Moor a trial has been in progress to trace the vein through the lower members of the Kinder Scout grit into the limestone shales of the Carleton anticlinal. This has been a difficult matter, owing to the cross veins and the weakness of the right running veins. (Further trials in the western ground have shown considerable disturbance of the strata from the intersection of several “fault veins” in close conjunction, but though the mine has been closed I think the appearance



of the vein just east of the disturbance justifies the hope that it would prove a productive one if it were explored west of the intersections, and in the settled beds which are known to exist there).

“The total quantity of ore produced from the two veins is about 15,000 tons. The upper part of the old vein produced some carbonate of lead but not in quantity.

“The only other places near, where any ore has been produced from the Kinder-Scout grit is at Cowling, about 1½ miles west of Cononley, where a trial was made and about 3½ tons of ore raised.

“Trials were also made in the grit on Bradley Moor, and on Carleton Moor, but without success.

“In the limestone of the district there are north and south veins running across the axis of the Carleton Park-head and also of the Skipton Haw-Bank Quarries. From the former place, about 15 tons have been obtained, and from the latter, about 13 tons. These veins are very uncertain but carry ore of good quality in self lumps in the clay of the lode.”

There has been no serious attempt to mine for lead at Cononley since the 1930s, during which period Mr. J.H. Clay of Thornton in Craven did a considerable amount of work. The more recent ventures since the last war have been mainly to extract [47] barytes from the old tailings; although some underground work has been carried out in the upper and middle adits, where considerable reserves of barytes have been located. The most successful adventurer in recent years has been the mining engineer Gregory, who combined his workings of the tailings, etc. at Cononley with those around Yarnbury on Grassington Moor.