

## ELIAS PEDLEY, A CASTLETON LEAD MINER AND HIS CONTRIBUTION TO EARLY GEOLOGICAL THOUGHT

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**Abstract:** A short mine level, driven by Elias Pedley and partners, following a very thin scrin through the 'channel' (now known as the Pindale Tuff), is of interest to students of the history of Geology. The level was visited in 1784 by the noted French geologist Faujas de St. Fond and the presence of a vein of unaltered galena within the 'channel' was sufficient evidence for Faujas de St. Fond to pronounce that the Tuff could not be of igneous origin. The position of Pedley's Level has not previously been accurately located, but a series of Barmaster's entries for Bradwell Liberty has narrowed the position of the site to within about one hundred yards.

The French geologist, Barthelmy Faujas de St. Fond visited Derbyshire during a tour he made through Britain in the year 1784. His observations and geological ideas relating to the county have been discussed by Ford (1965), and his particular involvement in the controversy about the relative merits of the igneous or sedimentary origin of the toadstone (channel, cat dirt, blackstone), has received some previous notice by the writer (Rieuwerts, 1981). Whilst visiting Castleton, Faujas de St. Fond was taken to a lead mine near Bradwell, accompanied by the nominal owner, Elias Pedley. Faujas de St. Fond examined the mine and its contents, including tracing a vein of galena through both limestone and the Pindale Tuff, the latter rock being known locally as channel, or cat-dirt. As a consequence of his investigation he concluded that the presence of unaltered galena within the channel proved that the latter could not be of igneous origin.

It is important to understand that the lead miners, though readily able to distinguish between limestone and other rocks now identified by modern geologists as lavas and tuffs, were not always precise in their identifications. They were interested only in the position of payable ore shoots and the subtleties of rock types and their origins did not normally concern them in their everyday work. Differing degrees of weathering, or variations in texture of the same rock type resulted in that particular rock sometimes being given quite different names, with ensuing confusion. However, toadstone usually meant a hard, relatively unweathered lava and channel was virtually identical, although the latter word was used only in that part of the orefield north of the Lathkill. Toadstone clay referred to the very weathered parts of a toadstone stratum. Cat dirt was either very weathered lava having the consistency of clay containing hard pellets, or more properly it equated to tuff. This term was even more localised and seems to have been used only in the mines around Pindale and Nunlow, between Castleton and Bradwell.

Faujas de St. Fond inevitably gravitated to Castleton and whilst he was there he was introduced to a local lead miner, Elias Pedley, who supplemented his income by selling mineral specimens to visitors. Faujas de St. Fond, seeking proof to substantiate his theory that the toadstones were not of igneous origin, asked Pedley if he was aware of any instances of lead ore being found in toadstone. Pedley replied

*such had uniformly been the fact hereto, and though long employed in the mining business, he had never heard that the slightest trace of lead ore had been discovered in that stone,*

*but that he had just learned to his cost, that the rule was not without exception, if not in respect to toadstone at least as to the cat dirt or channel (Mawe 1802).*

Although by that time ore had been commercially mined from the toadstone or channel in the northern part of the Derbyshire orefield at Tideslow Rake, Moss Rake and Dirlow Rake, Pedley whilst denying any knowledge of such occurrences, shrewdly offered to take him to his own mine where a vein of ore had actually been followed into the cat-dirt or channel.

The exact position of this mine has long been the subject of speculation, however recent examination of the Barmaster's records for the Liberty of Bradwell, when interpreted in conjunction with published geological information (Stevenson and Gaunt, 1971) and information kindly supplied by Dr. D. Jefferson (pers. comm.), imply a location on the lower slopes of Nunlow [originally known as Nunley], south of the Hope Valley cement works. The postulated position of Pedley's Level is discussed later in this paper. The description by Mawe continues:

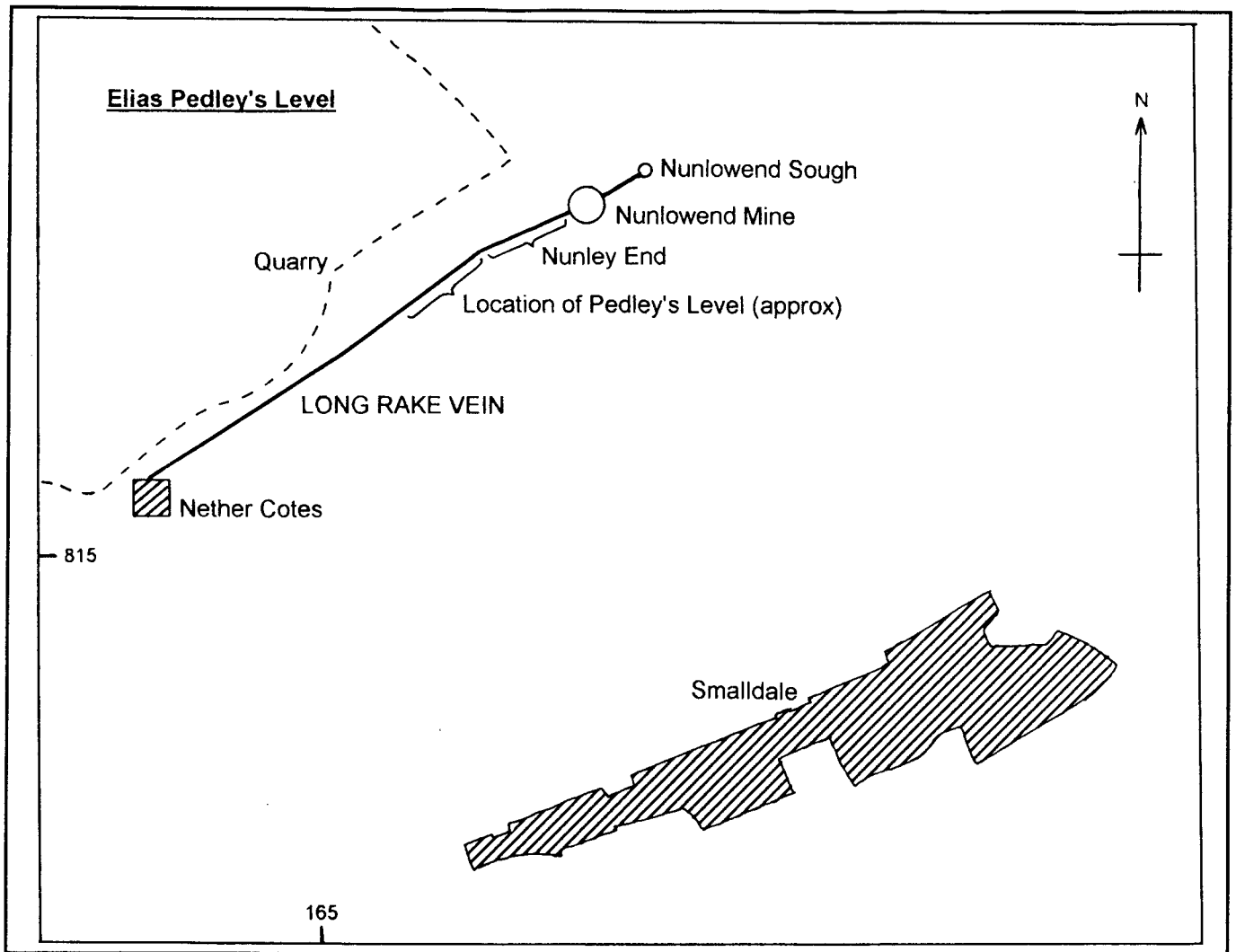
*scarcely had they (Pedley and his partners), reached a depth of twelve feet (actually it was a horizontal level), when the limestone terminated and they had the misfortune to meet with the channel. As till then there had never been any instance of the most slender veins being found in this unproductive stone they would immediately have discontinued their labours, had not the same vein of galena, which they traced through the limestone, continued its course in the channel.*

The level was continued for a distance of ninety feet, the vein being never more than an inch in thickness. The stratum of channel was only seven feet in thickness, so Pedley for some inexplicable reason did not test the vein in either the overlying or underlying limestone, or there too it may have been of very poor quality. Pedley's Level was abandoned at this point, a costly failure to a group of miners without capital resources.

Faujas de St. Fond however was very excited by what he had seen and concluded, quite incorrectly,

*The existence of lead ore in the channel is certain proof that it is not the product of fire*

He also mentions other mineralogists who had previously



visited the mine, so clearly it attracted considerable attention. Perhaps it repaid to Pedley, in the form of visitors fees, a small portion of his financial losses!

Mawe (1802), who printed the above extracts, was not convinced by the arguments put forward by Faujas de St. Fond. He described descending both Dirlow Nine and Siggate Head Mine, taking samples and carrying out a few elementary tests. From his underground observations and the results of the tests, Mawe concluded that the channel and cat dirt occurring in these mines and also at Pindale Mine and Tideslow Rake, was not a different rock type, but merely heavily decomposed limestone containing much iron pyrite. Presumably, he thought that acidic groundwater, derived from the decomposition of pyrite, acting on the limestone, resulted in that rock becoming residually completely disaggregated. Thus, despite their considerable endeavours, both of these pioneer geologists were incorrect in their conclusions. In Derbyshire, Whitehurst (1778), alone appears to have been the main advocate of an igneous origin for toadstone and its varieties. White Watson (1811) followed the Whitehurst line.

The position of Pedley's Level has not previously been satisfactorily proven, but Barmaster's entries for Bradwell Liberty, when related to the geology of the area, strongly suggest a location for the mine on the lower slopes of Nunlow (Nunley).

The first entry in the Barmaster's book dates from

September, 1766, when 15 dishes were measured for Elias Pedley, 'on Nunley'; in June, 1773 he freed Pump Old Scrin, also on Nunley. In 1777, Robert Burrows was given possession of Elias Pedley's 1/12th share in Pump Grove on Nunley, but a little later Pedley recovered his share in the mine, which was described as being at 'Nunley End'. This last entry is very important because it confirms the position of the level as being near the foot of Nunlow, probably somewhat to the south west of Nunley or Nunlowend Sough and at a slightly higher contour than that drainage adit. Geological information from Dr. D. Jefferson suggests that the only location where the Pindale Tuff would be encountered so near the surface, yet adjacent to Nunlow End, is about 250 yards south west of Nunlowend Sough, somewhere very close to the area known in the 18th century as Birdlo Wood.

Pedley and partners also owned title to other mines in the same general area. During April, 1774 he freed Birdlo Old Vein, which was almost certainly part of the complex of veins and scrins associated with Long Rake, the latter extending south west to the Bird Mine and beyond onto Bradwell Moor. Birdlo Wood was situated somewhat further up the hillside, next adjacent to Nunlow; Birdlo Stile was described as being on Nunley. He was also involved in a mine 'in the Thistle Field at Coates' (later Cotes), and also in Wet Rake, this vein ranging from near Nether Cotes Farm, north westwardly over Cotes Green and Bradwell Moor, eventually joining Dirlow Rake.

The last ore measurement in Pedley's name was in October, 1784. Output from all these titles, except Wet Rake, was pathetically small, the total yield being only 13 loads, 1 dish during a period of eighteen years.

Turning now to verification of the position of the level, consideration has to be given to a combination of the information from Barmasters' records and to the known extent and horizon of the Pindale Tuff. The position of all the veins and workings near Nether Cotes Farm are at a too high contour to have intersected the Pindale Tuff, so they can be eliminated as possible sites for Pedley's Level. The position of Nunlowend or Nunley End Mine and Sough is accurately known (see map) and as these workings certainly did not intersect channel/toadstone within 150 feet of the entrance (D. Jefferson), personal communication), they can also be eliminated as a possible site. Farey (1811), in his list of mines, noted that lead ore occurred in the toadstone at Nunleys Mine and thus compounded the problem by apparently confusing Nunlowend Mine with Pedley's Level.

Pedley obtained title to Pump Scrin or Pump Old Grove in 1773. Later entries confirm that he owned a 1/12th share in the mine, which was described as being at Nunley End. Published geological information demonstrates that the Tuff outcrops near the base of Nunlow [see map] and this contour would appear to be the only position where a horizontal level could pass into the Tuff within a few feet of the entrance. Unfortunately no mining has been carried out in the immediate area of the outcrop, so this too must be discounted. The data from Dr. Jefferson, demonstrating the presence of the Tuff beneath a thin veneer of limestone, higher up the hill above Nunlowend Sough, offers the most logical position for this long lost mine level. A 19th century plan showing the surface features at Nunlowend Mine (Chatsworth, Barmasters Collection), notes that slightly higher up the hillside the vein had been proved beneath the toadstone, but whether by shaft sinking, or by driving levels and/or stopes through it, is not stated.

Barmaster's entries prove that Elias Pedley was working lead on Nunley and adjacent to Nether Cotes Farm during the 1760's, 1770's and 1780's, a little before the time of Faujas de St. Fond's visit. His name is not recorded at any other lead mines elsewhere in Bradwell Liberty. Furthermore, Barmaster's entries for Castleton Liberty contain no references to Pedley working any mines situated between Castleton and Bradwell.

The preceding facts strongly suggest, but do not prove, that Elias Pedley's Level was situated on the complex of scrins associated with the north eastern end of Long Rake, where that vein passed through the now forgotten Birdlo Wood and Nunley [now known as Nunlow]. Unfortunately, the whole area has been badly disturbed by quarrying and large portions completely obliterated by huge tips of waste limestone. Nether Cotes Farm and its surrounding fields have been removed by quarrying. Field work is not particularly rewarding and the exact site of this historically important mine will probably never be located.

Elias Pedley died on the 5th of April, 1795, aged 54 years. He is buried in Castleton Church yard.

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