



This document is with a copy of the following article published by the Mining Heritage Trust of Ireland. It is provided for non-commercial research and educational use.

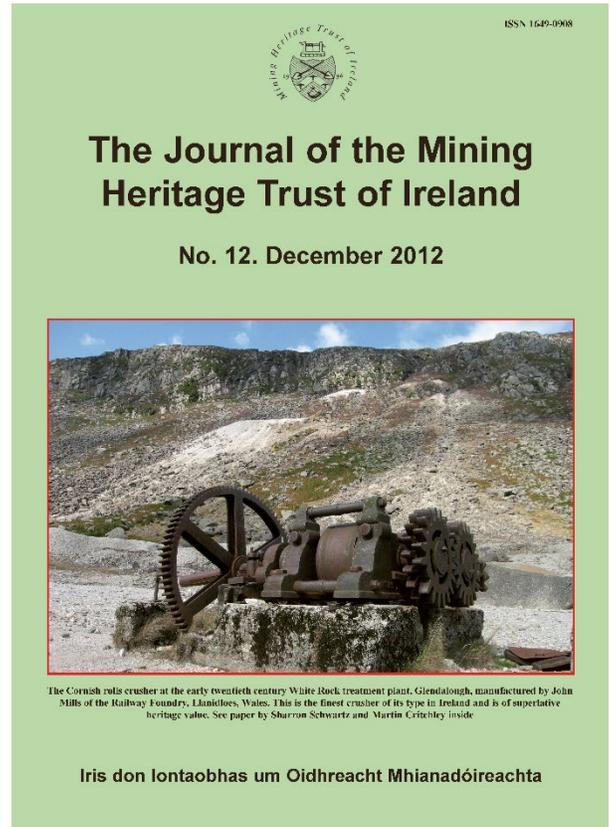
The Mining Heritage Trust of Ireland formally ceased its existence in 2019 but has provided a continuing website of resources with free access for those interested in the activities of the organisation in its various formats from 1996-2019, and in Irish mining heritage in a broader sense.

Schwartz, S. P., Critchley, M. F. 'Creggan and the History of the Silver-Lead Mines of the Marches of Armagh and Monaghan' *Journal of the Mining Heritage Trust of Ireland*, **12**, pp. 57-86

Copyright of this article remains with the Mining Heritage Trust of Ireland whose archives, intellectual assets and library have been transferred to the Natural History Division of the National Museum of Ireland. Please contact naturalhistory@museum.ie for any enquiries relating to the MHTI.

This cover page must be included as an integral part of any copies of this document.

Please visit www.mhti.com for more information.





CREGGAN AND THE HISTORY OF THE SILVER-LEAD MINES OF THE MARCHES OF ARMAGH AND MONAGHAN

Sharron P. Schwartz and Martin F. Critchley

Abstract: Numerous small lead mines are known to have existed in counties Armagh and Monaghan, but apart from detailed geological surveys (see Morris 1984, 1985), and with the exception of the Tassan Mine (see Morris 2010, 56-61) their histories remain largely unrecorded. Creggan in County Armagh is one of them. The mine was unmentioned by Kinahan (1889) and the main source of information about it is contained within the Mineral Statistics which are, however, unclear and muddled due to Creggan being recorded under the name 'Dundalk' for both counties Armagh and Louth. Additionally, 'Hope Dundalk, Louth', has been incorrectly entered under the Hope Mine in neighbouring County Monaghan, while the *Mining Journal* of 1859 even erroneously notes Dundalk in its 'progressive mines list' as being in Scotland, further complicating the picture. Creggan's history might, like most of its neighbouring mines, have remained confused and largely unknown had it not been for the advent of various online databases including Access to Archives and the digitisation of various nineteenth century newspapers and rites of life registers in recent years. This has been a tremendous boon to researchers in Ireland, given that a significant collection of records housed at the Irish Public Records Office, Four Courts, Dublin, were destroyed in a fire in June 1922 during the Civil War (IT 1922). An enormous amount of online data has become readily available to the historian, yielding information which can be nominally linked to surviving records both within and outside Ireland, an approach adopted for this article. This has helped to build up a picture, not only of the rise and demise of Creggan mine, but of the people who worked there and enabled us to offer the first comparative history of lead mining throughout Armagh and neighbouring County Monaghan. *Journal of the Mining Heritage Trust of Ireland*, 12, 2012, 57-86.

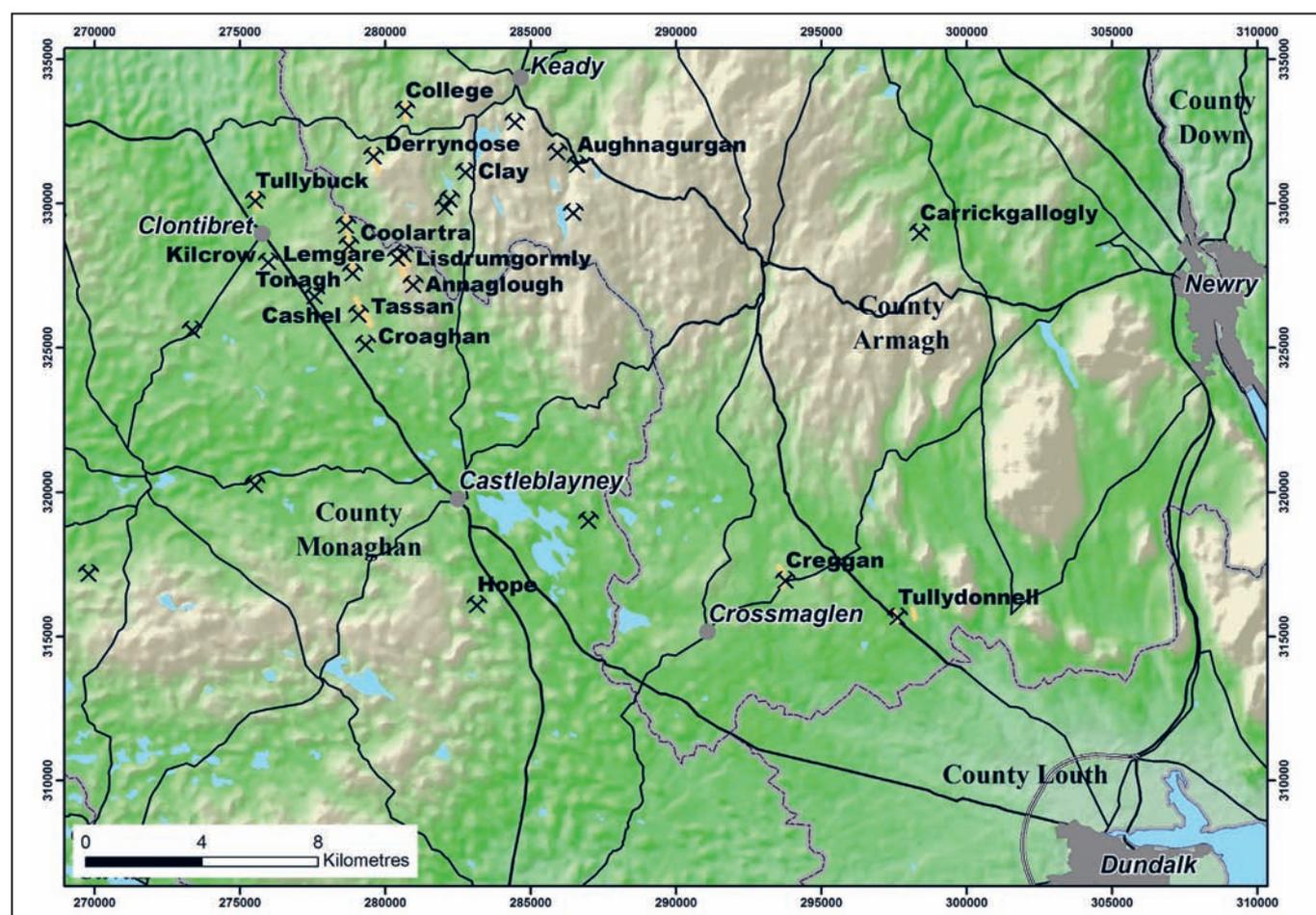
LOCATION AND GEOLOGY

Cregganduff or Creggan Mine is situated in the Barony of Upper Fews, Parish of Creggan in the Townland of Cregganduff (from the Irish, 'black rocky place'), just under a kilometre north east of Crossmaglen on the road leading to Silverbridge on a small hillside above the Creggan River in County Armagh (293762 316992) (Map 1). Creggan and the historic mines of the wider Armagh-Monaghan district are located within the Longford-Down Inlier, composed of Ordovician (500-440 Ma) and Silurian (440-400 Ma) rocks, which extends along strike to the NE into the Southern Uplands of Scotland. The Ordovician rocks comprise the northern part of the inlier whilst Silurian rocks form the central and southern parts of the inlier. A major shear zone, the Orlock Bridge Fault, marks the boundary between the northern Ordovician belt and the central/southern Silurian belts. The Orlock Bridge Fault is a major, probably crustal seated structure, which is thought to have a sinistral offset of 400km (Anderson and Oliver 1986) and is represented by a mylonitic crush zone up to 200m wide in places. Within each belt there are a number of strike parallel SW-NE faults which truncate the stratigraphic sequences and break them up into a number of tracts or belts. The whole sequence had been interpreted by Legget *et al* (1979) as representing an accretionary prism formed by the NW subduction of oceanic crust beneath the Laurentian continent during the closure of the Iapetus Ocean. The

Creggan mine is situated within the central zone in the Magoney Bridge Formation which consists of a sequence of medium to thick turbidites (greywackes), sandstones and shales of Silurian age.

Four styles of mineralisation are recognised by Morris (1990) in the Longford-Down Inlier. These are syn-sedimentary manganiferous iron ores, porphyry copper deposits (associated with granodiorite intrusions), gold-arsenic and lead-zinc epigenetic deposits. The gold-arsenic mineralisation is presently being actively explored and a major 1m+ ounce of gold reserves has been delimited by Conroy Minerals near Clontibret in County Monaghan. The gold-arsenic (often with antimony) deposits appear to be intimately associated with the Orlock Bridge Fault and occur as stringers within the shear zone or infillings in NNW trending veins (Conroy 2012). Morris (1990) suggests a late Caledonian age for the gold-arsenic mineralisation (440 Ma) and that it is contemporaneous with mafic/intermediate magmatism and the sinistral movement on the Orlock Bridge Fault. The lead-zinc style of mineralisation is the most widely distributed type of deposit in the Longford-Down Inlier and typically forms veins striking NNW, although at Creggan the vein appears to strike NNE. The lead deposits at Newtownards in County Down are also part of the same suite of mineralisation.

Lead-zinc mineralisation forms the dominant style of



Map 1. The location of the main metalliferous mines of counties Armagh and Monaghan

mineralisation not just in the Longford-Down Inlier but throughout the orogenic belt as it extends eastwards into the Southern Uplands of Scotland where there was extensive lead mining at many mines during the nineteenth century including Wanlockhead, Leadhills, Woodhead, Pibble and Silver Rig. It is perhaps no coincidence to discover that many of the nineteenth century shareholders connected to Creggan and other mines in the region were from Scotland and had interests and investments in mining companies working what they believed to be similar ore deposits there. Morris (1984) notes that all the lead veins in the Armagh-Monaghan orefield occupy steep dipping brittle fractures trending NW to NNE which cut across and post-date the ductile deformation and metamorphism of the host rocks (which are associated with the 'Caledonian' Orogeny and the closing of the Iapetus Ocean). These brittle structures generally show normal fault movements but wrench movements have also been observed (Cameron, 1981). Ineson and Mitchell (1974) have dated the lead-zinc mineralisation at Leadhills in Scotland to be of a Lower Carboniferous age. At Clontibret in County Monaghan the mineralisation has also been dated as Lower Carboniferous (329-298Ma) by Halliday and Mitchell (1983).

Creggan witnessed at least three phases of development in the nineteenth century and another in the pre-WWI period, but was associated for the majority of its lifetime with companies containing 'Dundalk' in their title. However, Creggan was just over eleven miles (around eighteen and a half kilometres)

from Dundalk, a port well connected by road and rail at the mouth of the Castletown River in County Louth, with which name it has become inextricably linked in the Mineral Statistics. Creggan's ore was carted by road to Dundalk from which regular shipping services to Liverpool were provided from 1837 by the Dundalk Steam Packet Company. From here, the ore was shipped across the Irish Sea to the River Dee where a number of important lead smelters were established in the Chester area (Burt 1984, 251-252). As Creggan Parish, in which the mine is situated, straddles two counties, Louth and Armagh, this possibly also accounts for the confusion encountered in the Mineral Statistics which note returns for 'Dundalk' under both Armagh and Louth.

EARLY MINING IN ARMAGH AND MONAGHAN

In County Armagh around fifty seven adits and shafts have been recorded (County Armagh Mineral Resource Map), while the Geological Survey of Northern Ireland (GSNI) records 83 'workings' associated with lead mining (Warke 2012). The locations, geological characteristics and extant remains of numerous historic lead mines in Counties Monaghan and Armagh have been recorded by Morris (1984, 1985) and he hints at the antiquity of mining in these useful works of reference. But indisputable proof of early mining activity, at least in Armagh, is found on a remarkable eighteenth century map. Armagh, then one of the most populous counties in Ireland, was surveyed and mapped by

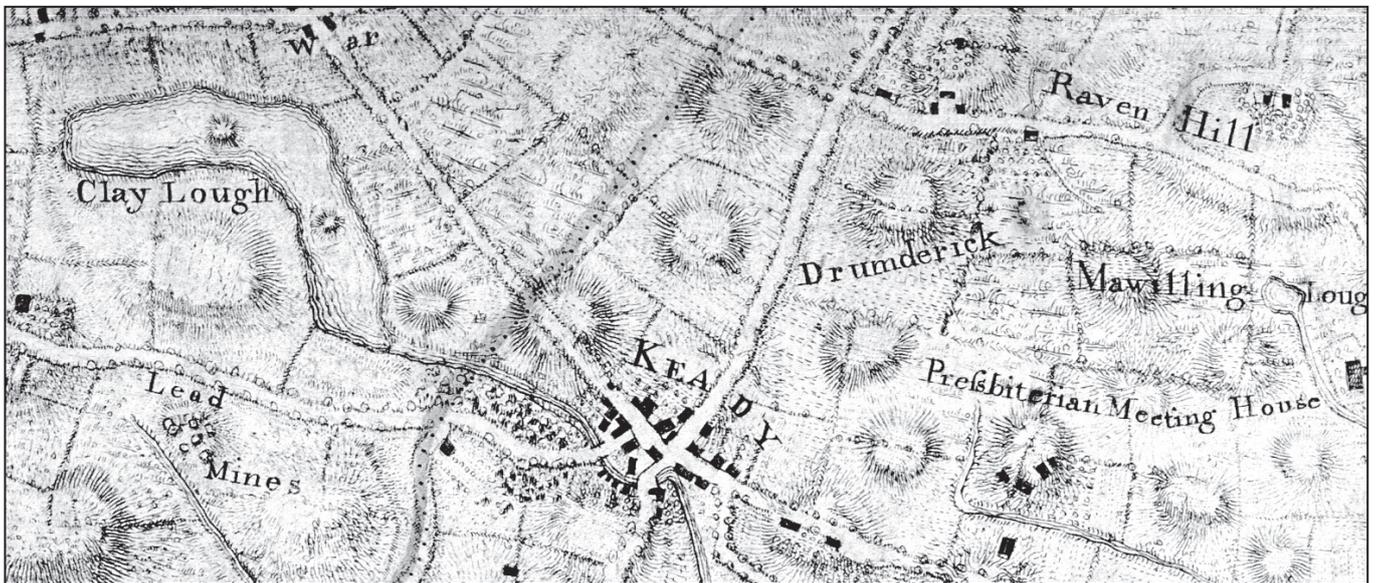


Figure 1 (top). An extract from Rocque's map of 1760 depicting the mines of Derrynoose. Figure 2 (centre) shows the Clay Mines near Keady and Figure 3 (bottom), the location of the Carrickgallogly Mines near Belleek. The Rocque Map is undoubtedly the earliest to depict Irish mines within their landscape context in such detail. Map extracts reproduced from a black and white master copy, by kind permission of the Public Record Office of Northern Ireland

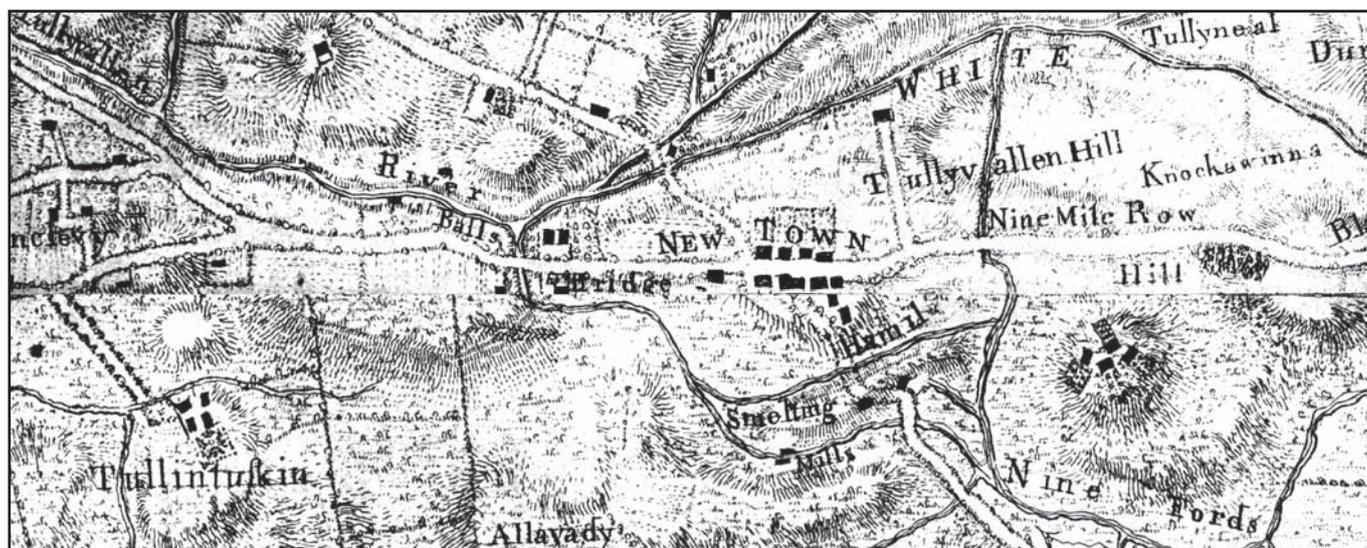


Figure 4. The smelt mills south of Newtownhamilton, as depicted on the Rocque Map of 1760. Map extracts reproduced from a black and white master copy, by kind permission of the Public Record Office of Northern Ireland

Huguenot cartographer, John Rocque (1709–1762), who is best known for his production of a map of London published in twenty four printed sheets in 1747, that earned him an appointment as cartographer to the Prince of Wales in 1751. In 1756 he produced a much acclaimed map of Dublin; that for Armagh was completed in 1760.

This incredibly detailed map provides an unparalleled snapshot of the industrial resources of contemporary Armagh. Lead mines are depicted at Derrynoose (also spelt Derrynoo/Derrynews) (Figure 1) and to the east of Clay Lake (also spelt Clea), to the west of the town of Keady (Figure 2). Interestingly, the position of the latter group of mines on Rocque’s map do not correspond with the site of the Clay mines on nineteenth century mapping and Egan (1877) does not note the presence of mineralisation in this area that is part of the townland of Crossdened. Rocque’s map did come in for some criticism by Coote (1801, 284) as to its accuracy, which begs the question as to whether the group of mines to the east of Clay Lake are erroneously positioned?¹ Rocque also shows lead mines at Carrickgallogy ENE of Newtownhamilton (Figure 3) and two smelting mills south of this town (Figure 4). Half a century later, the *Belfast Monthly Magazine* mentions the existence of a smelt mill near Newtownhamilton, ‘the gigantic bellows of which were wrought by a waterwheel; but this is in ruins long since’. The source of the lead ore was said to have been ‘from the mountains towards Keady’ (BMM 1810), although Coote notes that some of the lead formerly smelted there came from the townlands of Curraghbrack belonging to Messrs. Sloane and Bellingham in neighbouring County Monaghan, a short lived mid-eighteenth century enterprise that was apparently wrecked by the wanton inebriation of the six miners concerned (Coote 1801, 26). Lewis notes that the smelt mills near Newtownhamilton continued in operation as long as wood

(manufactured into charcoal) for fuel lasted (Lewis 1837, 409).

No smelt mills are indicated on the Rocque map in the vicinity of Keady, but modern maps show ‘Smelt Mill Bridge’, 1.3 km northeast of Derrynoose on a river at Carryhugh, indicating the site of a former water powered smelter. The Derrynoose mines are not as clearly depicted on Rocque’s map as are the others, indicated by numerous circular pits or shafts, suggesting that the mines there were possibly less developed at this time. Therefore, the smelt mill might have been erected after the map was surveyed (1759). Coote (1804) describes lead mines at Keady, one of which had been wrought on the estate of Trinity College Dublin which owned land in numerous townlands in both Keady and Derrynoose parishes.² A mine was developed in the ‘wild and rude’ countryside of one or more of these townlands by Barry Maxwell (Figure 5), 3rd Lord Farnham and 1st Earl of Farnham of the second creation (1723-1800), one of the largest landowners in County Cavan (BMM 1809). The Earl expended considerable sums in sinking and working it, but made no profit due to the want of skilful superintendence and after his death his son and successor, John James Maxwell, discontinued the works (Coote 1804, 286-7).

That a lead smelter owned by Lord Farnham to smelt his Derrynoose ores definitely existed near Keady, is betrayed by a late eighteenth century newspaper report which describes how the exterior and interior doors of the smelt mill were broken on the 31st March 1784, allowing thieves to make off with 159 triangular bars of lead ore weighing seven pounds each and roughly fourteen inches in length. This audacious theft ‘by some evil-minded person or persons’ led to twenty two gentlemen offering a reward for the capture and prosecution of those responsible (BNL 1784). Faulkner’s *Dublin Journal* of 1784 notes that ‘lead and silver mines of fair promise’ also existed on the estate of Henry Bond in the

¹ Rocque did not do all of the surveying. It states at the bottom of the map that, ‘The Impossibility of finding the true Mearings of the Baronys has Obliged us to have Recourse to S.r William Petty’s Surveys. The mines could be those that were actually in the townland of Clay (on the 1836 First Edition OS Map).

² Trinity College, Dublin, acquired the land in the late sixteenth century. The later workings were thus known as the College Mines.



Figure 5. Barry Maxwell 3rd Lord Farnham and 1st Earl of Farnham of the second creation (1723-1800), who operated the Derrynoose Mines in the eighteenth century without realising any profit. Portrait by renowned English artist, George Romney

parish of Derrynoose (FJ 1849), while Stewart notes a vein of lead in the townland of Corclea, in the same parish and opined that it was worth sinking a mine on this vein (Transactions 1800, 18-20).

Crieve Mountain to the SW of Castleblaney in County Monaghan was also described as being rich in lead ore. Mines had been opened in the parish of Aughnamullen, Barony of Cremorne, on the church lands of Tamlaght belonging to Hugh Johnson Esq. in the 1750s/60s (Coote 1801, 25-26; Morris 1984, 28). Furthermore, a lead smelter was erected by Mr Pepper [Peppard/Pippard] near Ballybay, in the Parish of Ballybay, Barony of Cremorne, perhaps to process ores from the lead mines of Cornamucklagh South, after whose death it was discontinued.³ We also learn of other mining development in the area, as around the mid-eighteenth century the Lord Bishop of Clogher had granted permission for mining on his estate in the parishes of Aughnamullen and Clontibret for a term of 31 years, subject to a dish, or due, of one ninth of the ore. William Deane (a lawyer who was also noted for having developed various scientific and technical innovations, including the establishment of glass and bottle works in Dublin), Joseph Bayly, gentleman, and Rupert Barber (a

³ John Jackson jnr, grandson of Hugh Johnson, married Elizabeth Tatlow of Cavan in 1816; her father, John Tatlow Esq. was described as a 'grover', an obsolete term meaning 'miner'. Tatlow was one of the chief landed proprietors in Co. Cavan and possibly the lessee of lead mines in Monaghan (Coote, 1802, 280).

wealthy woollen merchant)⁴ all of Dublin, and Thomas Butler of Ballinavally County Wicklow, were stated to have opened and carried on at 'great expense' a lead mine in Aughnamullen.

The land being mined by these men 'nearly adjoined the lands of Drumfaldra', part of the estate of William Kerr of Newcastle, County Meath, who had granted permission to mine for lead on 20 April 1761 to Thomas Verner of Dublin (1717-1788) and John Kerr for a term of 31 years, also subject to a due of one ninth.⁵ As the working of the mine at Aughnamullen might have made it 'necessary to open the grounds and seek and search for mines in the lands of Drumfaldra', a draft indenture between Deane, Bayly, Barber and Butler and Thomas Verner was drawn up setting out the terms and conditions of a partnership (PRONI MSS). The inclusion of Thomas Butler of Wicklow as a partner in this enterprise is of particular interest, as Ballinavally is a townland in the parish of Castlemacadam which contains the mines of Ovoca. Butler is highly likely to have been the former mine manager of the Cronebane Mine, having arrived in Newbridge (Ovoca) from Redruth, Cornwall, with a party of Cornish miners sometime between 1721 and 1730 (Schwartz and Critchley, forthcoming). His experience of hard rock mining in Cornwall and Wicklow would have been essential to the success of operations in Aughnamullen, hence his involvement in the partnership. Mining appears to have ceased sometime after this, possibly due to the high dues demanded by the landowners, and were again 'dabbled with' in the mid-1790s but development was stymied by a lack of capital (Coote 1801, 26).

Donald Stewart, an itinerant mineralogist who explored the Armagh-Monaghan region, among others, for the Royal Dublin Society in 1799, describes the lands around Castleblaney as containing several poorly worked mines yielding good 'potter's ore' (Stewart 1800, 102). This was utilised to give a green glaze to ceramic ware and Coote goes into some detail about how the lead (and manganese used to give a black glaze) was prepared and applied to coarse-ware at the pottery of Lisgoa near Glaslough in Monaghan (Coote 1801, 150-151). Lewis also records another probable eighteenth century working of a lead mine rich in silver at Laragh just outside Ballybay, noting that silver from it was manufactured into plate possessed by Col. Leslie of Glaslough, but it had not worked since 1826 (Lewis 1837, 103). In neighbouring Armagh, Stewart mentions a lead mine that was poorly worked for many years at Aughnagurgan to the west of Tullynowood Lake and describes a mine in the townland of Clay (Clea), rich in lead but poor in silver, that provided a good potter's ore. Lead mines were also wrought on the estate of Sir Walter Synnot (1742-1821) who settled in the parish of Ballymoyer in 1778 and leased eight townlands from the See of Armagh. The family made its money from linen manufacture and lead mining and Griffith's reference in 1854 (Morris 2001,

⁴ He was married to the poet and protégée of Swift, Mary Barber (c.1685-1755), and was the father of Rupert Barber (1719-72), miniaturist and enamel painter.

⁵ Thomas Verner married Margaret Kerr in 1749, the couple were childless. William Kerr was the grandson of John Kerr, a Scotsman who had settled in Aughnamullen in 1688.

29) to 'Ballymore Mines' might relate to the mines wrought on Synott's demesne, the ore of which Lewis later states was very pure and lay conveniently for working (Lewis 1837).

The numerous references presented here point to the antiquity of lead mining in this region and there is every reason to suspect that mining predates the eighteenth century. The mining industry was probably instigated by plantation settlers in the late seventeenth-early-eighteenth century, who were primarily seeking rich argentiferous lead deposits, although much of the poorer quality ore that was wrought found a ready market in the thriving local potteries.

THE 1820'S MINING BOOM AND THE 'MODERN' MINING ERA

The first 'modern' mining company to work the lead deposits of Armagh was the Mining Company of Ireland (MCI), set up as a joint stock company of £200,000 divided into 20,000 shares of £10 each, that received Royal Assent in July 1824 during the London stock market boom of 1824-25.⁶ The consequent mining 'boom' generated a frenetic scramble amongst several rival Irish companies for the rights to mining leases, as Britain's industrial revolution swept Irish shores in the form of heavily capitalised and hierarchically organised companies employing hundreds of people and headed by experienced men from various parts of the British Isles. Progressive companies such as the MCI deployed the very latest technology in the shape of steam engines (where practical) and other innovative machinery, used to unwater deep workings and to efficiently raise and process ores.

The MCI succeeded in obtaining the leases to work mines in the parish of Derrynoose and twenty eight townlands adjoining the townland of Clea (Gorton 1833, 453).⁷ Both Clea and Derrynoose were stated in 1826 to have been in need of the aid of machinery to work them, but it seems attention was primarily focused on the Clea (Clay) deposit probably where numerous 'old men's workings' were evident. In 1826 the shaft at Clea Mine had been sunk to a depth of 12 fathoms (about 22 metres) and a cross section was expected to cut the lode at that depth. The ore that had been sold to the local potteries and that remaining to be sold, represented a quarter of the cost of erecting machinery to trial the lode. Later that year the MCI decided to suspend operations there as the lode proved to be poor. Quite possibly, the richer and/or easier to exploit ore outcrop had already been worked out. In the last half of 1826, their income from Clea represented less than a fifth of their expenditure on the mine so the decision was a wise one (MCI Reports 1824-1855). Four shafts are depicted at Clea on the Ordnance Survey map of 1835 after which time

it appears no more significant work was done. The GNSI database records at least ten shafts along the strike of the lode and the name 'engine field' corresponds to the site of two shafts depicted on the 1873 OS map (GNSI Archive).

Lewis, writing about Keady Parish, notes that a lead mine had been opened and wrought there, 'a few years since, by the Mining Company of Ireland, but has been discontinued: it is, however, about to be re-opened, preparations for working it having been made at a great expense, and are nearly completed' (Lewis 1837)⁸. Griffith (1861, 140), however, identifies this MCI mine with Farnham's earlier endeavour. According to MCI reports, they had held Derrynoose in 1825 and Lewis' description actually relates to the re-opening of this mine in Derrynoose parish (very close to Keady parish) in the townland of Drumeland in 1837 on the church lands of Armagh. Previous, older workings certainly existed on the lode that traversed the southern part of townland of Drumeland as the MCI reported how progress had been retarded and expenditure increased, due to the state of the 'old workings'. These were discovered to have been very badly organised following the mine's unwatering in 1837 by a 30-inch 8-foot stroke steam engine manufactured at the Cornish engineering works, Harveys of Hayle (CRO Harvey In-letters; Cundick 2002, 18).⁹

The Derrynoose district was very unfavourably circumstanced as to fuel, with coal, whether from Coalisland (Tyrone) or Newry, subject to land carriage that cost in the region of 10s a ton that had to be added onto the basic purchase price per ton (the average price for Tyrone coal being then about 8s per ton). The Cornish-built engine at Derrynoose was therefore subjected to an interesting MCI experiment to compare its duty¹⁰ under two different types of fuel: black mountain turf (procured at 6s 10½d per ton) and large and small coals, the usual fuel for such high pressure steam engines (costing in total, about 18s per ton). Under precisely the same conditions, Kane notes that the effect of the peat (which also created a lot of ash) was around one third that of average coals. However, it was noted that the fireplaces of the boilers were not built for burning turf, which would also have proven more efficient if it had been sufficiently desiccated beforehand (Kane 1844, 56-57). Overall, the experiment proved that three times as much turf needed to be burned to raise the mine water by one foot and even given the higher price of coal per ton, there was no great benefit to be derived by burning inferior local black turf.

Interestingly, William Petherick (born in Gwennap, Cornwall, in 1803), a mining engineer, was noted as resident at 'Derrynoose, County Armagh' when his wife Mary (née

6 The Royal Irish Mining Company also unsuccessfully explored a small lead showing near Cootehill in Monaghan in the 1820s. In neighbouring County Louth, the Hibernian Mining Company worked a mine at Salterstown on the coast at Castlebellingham, sinking a shaft near the old church in search of lead close to another of their trials for copper, both of which were unsuccessful (Cole 1922, 101).

7 This probably included Lemgare, explored by MCI in the very 1840s, the workings of which were visible and recorded by Morris in the townland adjacent to Coolartragh (Morris 1984; Morris and Parkes 2001).

8 He seems to have conflated the Clay mine working of the 1820s with Derrynoose, both of which were held by the MCI. The MCI mines in Derrynoose parish lay primarily in the townland of Drumeland; the Clay mines were in the townland of Clay in neighbouring Keady parish.

9 Noted as a 30-inch engine costing £1,580. Cross referencing the original Harvey papers with the MCI published reports, confirms that this was the engine for the 'Derrynoose lead mine'.

10 Duty was expressed as the number of pounds weight of water lifted one foot high by burning one bushel (94 lbs) of coals.



Figure 6. Cornish engineer William West (1801-1879) who worked with William Petherick and designed the Derrynoose steam engine built by Harveys of Hayle that was subjected to a typical Cornish trial by the MCI to judge its fuel efficiency

Hitchens) died at St Blazey, Cornwall, in 1839 (RCG, 1839). Formerly the superintendant of Redmoor Consolidated Mines (RCG 1835), Petherick was also one of the key figures at Fowey Consols and Lanescot Mines (Lewis 1997), scene of an important public trial of the duty of the most famous pumping engine in Cornwall: Austen's 80-inch, that began work in 1834 (RCG, 1835; Lean 1839, 98). This had been erected by Petherick and the rising star of the Cornish engineering world, William West (Figure 6), with whom he entered a brief partnership, collaborating on the design of a new type of boiler. Both men worked closely with Harveys of Hayle. Petherick left Fowey Consols in 1837 for Ireland where he was the engineer charged with the erection and maintenance of the Harvey-built Derrynoose engine that was designed by none other than William West (ICS 1973, 25).¹¹ Its aforementioned 'trial' (DD 1850) certainly echoes the type of activities with which Petherick was closely involved in contemporary Cornwall where coal was expensive. His brother, John, was of course a MCI Agent, based at the Knockmahon copper mines in County Waterford (Cowman 2006) and William became the Captain of the Derrynoose

¹¹ West designed and superintended the erection of several steam engines for the MCI in 1836 and 37, which probably included ones for Knockmahon, Waterford and Caime, Wexford.

Mines. The involvement of Petherick and West clearly demonstrates the MCI's willingness to engage the finest minds in the contemporary engineering world for their works and illustrates the specificity of many nineteenth century mining and engineering networks, based on professional and familial ties.

That the MCI was attempting to save money at Derrynoose was evident, as the vein was found to be small, no more than 1-2 feet wide, yielding 1-1½ tons of ore per fathom and the company appealed to His Grace, the Lord Primate, for an abatement of rent in 1839 in order to prove the lode more thoroughly. In 1840 they reported driving the deep level and although it yielded 300 tons of dressed lead in 1839 and a further 258 tons the following year, expenditure regularly outweighed profit. In 1840 the lower levels were found to be unproductive and consequently, the engine was stopped and the pumps withdrawn. The MCI turned their attention to another lode that was discovered in the College Lands adjoining the Derrynoose Royalty in Derrynoose parish and that also crossed into it. This mine was started in August 1840 and was situated 'by a brook that divides the townlands of Curryhughs and Cargalissgarron [Carryhugh and Cargalisgarran] and that runs onto the Blackwater river that falls into Lough Neagh' (BPP 1968, 883).¹² A section of the withdrawn pumps had been placed in this new working and, with the availability of water power, it was hoped to make favourable progress as the new mine had already yielded 108 tons of lead ore.

Thomas Martin Esq. visited this mine on 29 April 1841 as part of the *Children's Employment Commission* and interviewed Captain Petherick, finding three boys, brothers James and William McCan aged 16 and 17 respectively and John Dowrich aged 17, employed at the surface. The brothers were engaged as ore dressers earning from 9-10 pence per day, Dowrich as a carpenter earning 15 pence, all working 69 hours a week in summer and 42 hours in winter, the wages remaining the same in all seasons to compensate for exposure to the winter weather. In common with many early nineteenth century mines, there were no facilities for washing or changing their clothes, but there was a medical club for accidents or ordinary sickness into which the men paid 6 pence each month and the boys less according to their wage rate. Petherick paid them their wages and stated, 'if they don't like the wages I give them, they leave'. Negligent workers were 'spalled' (fined) a day's work or were discharged, but good conduct and diligence was rewarded with a pay rise. Petherick stated that the previous year there were eight boys and eight girls employed at the company's former mine at Derrynoose, but that the services of most were dispensed with when it stopped working. The boys' duties underground included wheeling ore and rubbish to the mouth of the pit, working the windlass and very occasionally to operate large bellows (known as 'duck pumps' that were certainly in use at Fowey Consols Mine where Petherick formerly worked) to force pure air into the workings when bad air accumulated. The mine was worked on tribute, with one 'taker' entering into

¹² This was in the area that was later to be worked by College Mines Ltd.

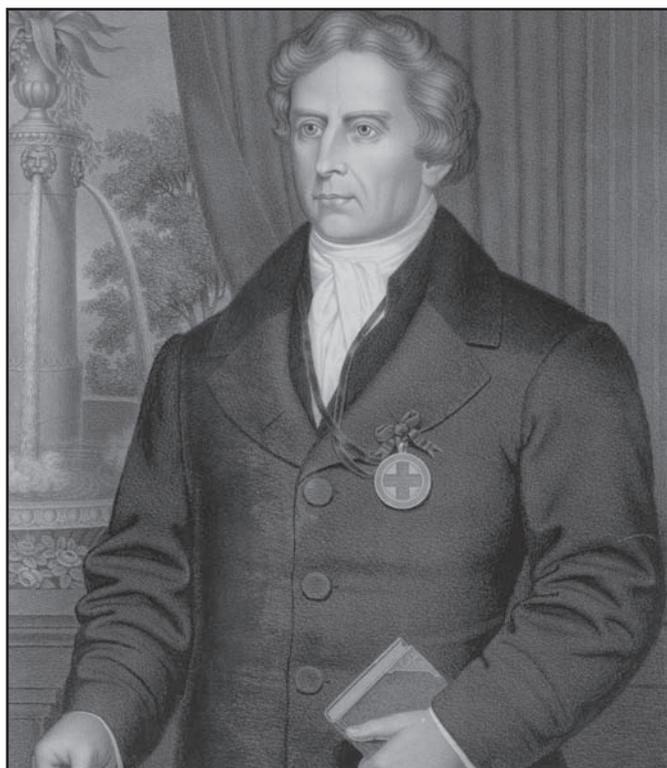


Figure 7. Charismatic Temperance Priest, Father Theobald Mathew (1790-1856), who preached abstinence to the miners at Derrynoose whom Captain Petherick described as 'desperate drunkards'. Image with permission of the Library of Congress Prints and Photographs Division

a bargain with the mine to work a certain pitch underground for an agreed amount per ton on behalf of his tribute 'pare' (group of miners). He then split the monthly earnings with them. There were three shifts each day, with the usual high holidays and all the Catholic days of devotional obligation observed (BPP 1968, 883).

A reference in the *Belfast News-Letter* to a lead mine 'conducted by William Cairns' in 1839 in Mullyard (the townland adjoining Drumeland through which the Derrynoose lode passes), and a court case relating to a violent disagreement, is likely to be a reference to a MCI tribute 'pare' headed by Cairns, splitting its earnings. A dispute at Wood's public house where Cairns had given the miners their wages and where they had all been imbibing rather too freely in spirits, resulted in Patrick McShane allegedly assaulting him after he had left the pub in company with John Twigg causing a riot to break out (BNL 1839). Such incidents were commonplace according to Petherick who remarked that, 'the people were desperate drunkards when I first came, but they are less so than they were'. Two men had been killed in the mine under his captaincy: one from 'sportive playing as he was descending the ladders' the other 'by going underground in a state of intoxication'. Temperance priest, Father Theobald Mathew (1790-1856) (Figure 7), who was touring the country in the early-1840s encouraging people to turn away from alcohol and take the Total Abstinence Pledge, visited Derrynoose and tried to instil some morals into the community. But Petherick wondered how long the impression he had caused would last as he believed the barely literate children of the district were,

'ill off from want of being properly taught and brought up'.¹³ He noted that he had been unable to keep several of the young men at the mine, for as soon as they were about 22 years of age they 'emigrated to America: there is scarcely any money in the country' (BPP 1968, 883).¹⁴

Not long after Thomas Martin's visit to the Carryhugh Mine, prospecting and development was retarded by the 'lawless conduct on part of the occupiers of the land' who were judged to have been ignorant of the MCI's rights and court proceedings were ordered. However, it appears that the prospect of protracted litigation acted as the catalyst for the company's withdrawal from the district in 1842. The Derrynoose lease was surrendered to the landlord, His Grace, the Lord Primate, the company's interests advertised for sale and the steam engine, machinery and mining materials removed to their Knockmahon copper mines in Waterford (MCI Reports 1847-1852; FJ 1842). According to the GSNI, around a dozen shafts and an adit were developed on the NNW-SSE Derrynoose lode, while another shaft in a field at the eastern edge of the townland was reported to have yielded rich lead in abundance in the eighteenth century. One of the shafts is reported to be 150 feet (46 metres) deep (GNSI Archive).

The modern period of mining with its sizeable, capitalised companies backed by an army of ready speculators, facilitated a wave of prospecting for minerals across the island, as entrepreneurs from all over Ireland and Britain sought out known and new deposits to exploit. One of these was the Coolartra (also spelt Coolartragh and variants). A mine in this townland had for some years yielded considerable quantities of rich lead ore and is shown on the First Edition 6-Inch OS Map of 1836. However, the Second Edition (published in 1860) depicts two separate 'old lead mines' some distance apart. One of these mines was that worked by Thomas Boothman, a large shareholder in several Derbyshire lead mines including Alport and Magpie (Willies 1977). Indeed, the *Armagh Guardian* of 1845 records the activities of this Englishman's company:

... The indications of metallic wealth have recently become so conspicuous as to induce the enterprising proprietor to erect a steam engine for the more effectual drainage of the works. The engine is now in full operation, and the results, we have been assured, are such as to afford the most cheering prospects of successful enterprise, and of ample remuneration for the investment of capital—rich veins of ore having been discovered, the products of which are in course of being brought to market. On visiting

¹³ At its height, just before the Great Famine of 1845-49, Father Mathew's temperance movement enrolled some three million people, or more than half of the adult population of Ireland.

¹⁴ Petherick himself migrated to the USA in about 1847 with his daughter, Ellen. His elder brother, Thomas, a mining engineer and inventor of a hydraulic jigger, had migrated there in 1843 settling at Pottsville, Pennsylvania. William became a naturalised US citizen in 1860 and although he made return trips to Cornwall related to mining, he died in San Francisco in 1865 where he was a mining investor.

the works, the attention of the spectator is at once arrested by a scene of bustling animation and active industry, well calculated to elevate the hopes and gratify the heart of every lover of his country. To the tenants on the estate and the surrounding neighbourhood the amount of benefit derived from increased employment, with all its concomitant blessing, is, even at the present moment, considerable, whilst the prospective advantages can hardly be over-rated. At present we are informed the average payment of wages is about £200 per annum. The works are placed under the management of Mr. Skimming, an active and intelligent person, who has had much experience in some of the largest English mines, and his opinion, we are happy to learn, is, that the district in question abounds in mineral wealth. Under such superintendence [sic] we doubt not that ample success will reward the efforts of the company, and a stimulus be thus given to the future investment of English capital in the country. *Incuriosa suorum* has long been the reproach of Ireland, in regard to her literary relics, and the same may be applied to the still undeveloped resources with which her soil is teeming. But a new race of improvement has begun, and the industrial capabilities of our land are at once encouraging to the capitalist and cheering to the patriot. We therefore wish all prosperity to the undertaking of which we have given an outline, confident that it will prove alike beneficial to the district at large, and to the spirited lord of the soil, Mr. Bond (AG 1845).

The manager, James Skimming (born c.1817), was the former Agent of the Longstone Edge lead mine in Derbyshire, one of four mines operated by mining magnate, John Taylor. He was also a protégée of a local mining entrepreneur and engineer, William Wyatt, who had installed a 70-inch cylinder Cornish steam engine at Watergrove Mine and a 36/70-inch compound engine designed by Cornish engineer, James Sims, at High Rake in the late 1830s-early 1840s (Barnatt 2011). Wyatt was, however, a protagonist of the formidable John Taylor. By taking sides with Wyatt and Boothman, key shareholders in Taylor's mines, the young Skimming fell foul of Taylor and his Cornish supporters and was, unsurprisingly, replaced at Longstone Edge by a Cornish mine captain (Willies 1977). Fortunately Boothman gave him the mine manager's job at Coolartra and, coming from the Peak District, a mining region that had embraced the latest steam technology, it is not surprising to learn that the men erected a steam engine in County Monaghan.

An ambitious, well-connected man through his links with Freemasonry (he was a member of Dundalk Lodge 384) (BNL 1852), Skimming quickly made his mark in County Monaghan, discovering significant lead deposits at Annaglough in 1851 (see below) and at Hope in 1859 which he had leased and where he had been working a lode of much promise. The new discovery came about after a caunter lode was found by

costeaning ground he believed to be mineralised. The caunter lode fell into the main lode at an angle of 40 degrees and at the point of intersection and for 50 fathoms south on the caunter, 'rich stones of lead ore embedded in soft sugary barytes' were found. The discovery of this deposit, that caused great excitement in the area, was believed to be the chimney or outcrop of a vast deposit (BNL 1859; MJ 1859). Skimming was also the lessee of the Lisdrumgormly lead mine close to the Armagh border (as enlisted in the Griffiths' Valuation) and was called upon to inspect and manage other mines in Ireland, including concerns in Cork, Kerry, Galway, Mayo and Wicklow.¹⁵ The above description of the Coolartra mine, which made returns to the Mineral Statistics under 'Bond and Newry' between 1845 and 1847, is confirmed by Egan who describes a period of working followed by a discontinuation and subsequent revival when an engine house and dressing floors were constructed (Egan 1877).

CREGGAN AND THE LEAD MINES OF THE 1850'S POST-FAMINE BOOM

The discovery and opening of the Creggan Mine along with numerous other mines, occurred amid the post-famine attempt to stimulate and raise the profile of Irish industrial enterprises, epitomised by the 1853 Industrial Exhibition held in Dublin. Indeed, prospecting activity was magnified, and a raft of mining companies both private and public were set up across Ireland in the early-1850s, taking advantage of rising mineral prices, although many of these proved to be unsuccessful 'bubble' companies. The interest in Irish mineral resources is strongly reflected in the contemporary press, with *Mining Journal* editor, Henry English, making several visits to the 'Sister Isle' in 1852, publishing extensive reports on the mines he had visited.

We have Bell Williams of Liverpool, 'Mine Agent and Viewer', to thank for his description of the 'little known mineralogical district of Armagh' north and east of Castleblaney (near Keady) which he visited at the end of 1851. In his report, he describes a visit to a mine 'sunk in the bog' which he observed being drained by an 'old fashioned 20-inch cylinder steam engine' fuelled by turf.¹⁶ He noted that wages were from six to ten shillings a week, the dues were set at a royalty of one twentieth and about 60-70 tons of lead were being raised each month, primarily to supply the neighbouring potteries. Williams recorded his concern that the bulk of the

¹⁵ He inspected the Coosheen Mine west Cork in 1854 and the same year took on the management of the Kenmare Mine in County Kerry (MJ 1854). In 1859 he inspected the mines of the Galway and Mayo United Mining Company with George Henwood (IT 1859). In 1860 he was the Manager and Engineer of the short-lived Baravore Mining Company, working lead mines in Glenmalure, County Wicklow (IT 1860). His wife, Elizabeth, died aged 54 in 1872 and he passed away at Castleblaney in 1881 aged 64.

¹⁶ Infuriatingly, Williams omits to name the mine concerned, which was not on lands owned by Trinity College. Moreover, the Mineral Statistics do not throw any light on a mine producing 60-70 tons of lead ore monthly in 1851 in Co. Armagh. We therefore believe this to be a reference to the Annalough Mines that had recently begun operations just across the border in Monaghan. The 'old fashioned engine' possibly refers to a Newcomen atmospheric engine and we know that this company was working with the aid of a steam engine fuelled by turf, which would not have been a common item of machinery in this part of Ireland.

surrounding rich mineral district was placed under the 'incubus of 1-10 dues'. This he saw as a bar to development, evidenced by the fact that the lands owned by Trinity College had then not a working mine upon them, for they, as the owners, were constrained by Acts of Parliament and unable to set them for less. The paucity of water courses on their lands and the necessity of machinery simply conspired to make capitalists run shy of investment. However, he concluded that he knew of 'no other mineral district in England or Wales presenting less speculative prospects; for much of the country seems to offer success to the humblest of efforts' (MJ 1852).

Indeed, the *Newry Telegraph* reports the discovery of a 'valuable lead mine' in the spring of 1852 in the townland of Kilcrow, parish of Clontibret, on land belonging to the late Joseph McClelland Esq. of Newry and that application for working it had been made to his son in law, T.H. Fletcher, the acting trustee (BNL 1852).¹⁷ In 1859, the case of Denny v Denny was heard at the High Court of Chancery in London relating to a lead mine that had been previously discovered and opened 'in and under the townlands of Derrylusk and Lisguigney in the parish of Tullycorbet' about three miles north of Ballybay. A very superior quality of argentiferous lead ore had been extracted from three shafts and a driveage; these workings and lodes of lead were advertised in the press to be let by tender for a term not less than 21 nor greater than 41 years from the 29th June 1859 (DN 1859).

The district around Creggan was overwhelmingly agricultural. People coaxed a living from small, rock strewn plots containing poorly drained, cold, wet soils above a substratum of slaty rock (MacMillan 1930). They had suffered enormously from the effects of the Great Hunger, reflected in the fact that the local population had declined by thirty five percent in the decade 1841-1851 due to famine and emigration, a Dundalk newspaper comparing those who fled the region to 'an army retreating before the enemy' (NSNTJ 1851). Unsurprisingly, the area, and indeed much of the wider region, was affected by subsequent agrarian unrest caused by the campaign to have the 'Ulster Custom' legalised.¹⁸ The Tenant Right League, established in 1850 with its battle cry, Land is Life! campaigning for the three F's (fair rent; fixity of tenure; free sale), gained much local support. The *Newry Telegraph*, a newspaper with a reputation for prejudicial and biased reporting where Catholic affairs were concerned (BMM 1814), had little sympathy for the plight of the desperate and destitute that fuelled agrarian discontent. It reported that around Crossmaglen, Ribbonism (a secret society whose members were rural Catholics) was rife, bailiffs subject to beatings, while some landed proprietors had been reduced to extreme poverty due to their tenants' refusal to pay rent.

The brutal murder near Crossmaglen of Robert Lindsay Mauleverer, an Armagh land agent and magistrate, shocked



Figure 8. Violence was reported to have been endemic in the famine ravaged district of Crossmaglen where several brutal murders occurred. The mining industry was seen as a way of bringing greater prosperity and calm to this disturbed region

the nation and was widely reported in the Irish and British press (MP 1850). MP Joseph Napier suggested in the House of Commons that agrarian violence was endemic in Crossmaglen (BNL 1850) which elicited a furious rebuttal from local inhabitants, both Catholic and Protestant, who claimed that people from all classes and religions had always lived peaceably together (FJ 1850). However, the violence worsened (Figure 8). The following May, farmer, Samuel Coulter, whose evidence at the Ballybot quarter sessions resulted in the procurement of a number of ejection decrees, was murdered on the road only half a mile from where Mauleverer met his end (LWN 1851); a land agent called Moorhead was shot dead 'at the too famous scene of blood, Crossmaglen' (LM 1851) and a poor labourer named Maginnis was beaten with bludgeons and left for dead over intimidation thought to be related to land issues (CM 1851). The attempted murder of landowner, James Eastwood of Castletown House near Dundalk, resulted in two companies of the 71st Highlanders being stationed at Newtownhamilton and Crossmaglen to maintain order (FJ 1851) and the local constabularies were beefed up.

The development of local mineral resources was doubtless viewed as an opportunity to create better paid employment in an area stricken by agrarian problems and to detract attention from 'the poisonous seed of the Leaguers' (S 1852). Indeed, the *Mining Journal* commented on the 'conspicuous effect' of labour on the local population when the Annaglough Mines near Castleblaney just across the border in County Monaghan, commenced in late-1851: '... from 50-80 persons are employed... the locality is within a very short distance of the scene of the murder of Mr Bateson (BNL 1854), the agent of Lord Templemore, in Dec. last, and previous to operations being commenced, nightly meetings of idle and disorderly persons took place, where now, from employment and

¹⁷ This mine is probably indicated by two pits on the Geological Survey 6-inch field sheet (about 1870); an annotation states that these were sunk in about 1856 on a lead lode.

¹⁸ The Ulster Custom contained three main tenets: that a man should not be evicted by his landlord except for non-payment of rent; that he should be compensated for improvements; and that he should be able to sell his tenancy.

remuneration, all is peace and happiness' (MJ 1852). This is a record of the early activities of the North-Eastern Mining Company of Ireland under the 'efficient management of James Skimming', who had made 'good miners, pitmen and engineers' of the sons of the neighbouring peasantry who 'performed their work with entire satisfaction' (BNL 1851). The company, utilising a powerful steam engine fuelled by local turf, was reported in 1851 to have struck a rich vein of lead ore about 10 fathoms down.¹⁹ One mass of ore weighing 16 cwt was reported to have yielded 85 per cent lead and to have been worth at least £100 per fathom of the mine. From 15-20 tons of ore were being raised weekly and due to its quality, a high price was being obtained at the local potteries (BNL 1851). The company was also noted to have been sending the ore overseas, as 60 tons were ready for shipment at Dundalk (FJ 1851).²⁰

A few years later the College Mines Company Ltd., an English enterprise, obtained permission to work a sett comprising about 21,000 acres owned by Trinity College at Carryhugh Glen near Keady, at dues of 1-16th, far more conducive to development than those described by Bell Williams just five years previously. This would have been the area where the MCI was working in 1840-42. Worked on the Cornish system of tribute and tutwork, operations commenced on two productive lodes (the Blue Lode and the Red Lode) in January 1856 with just three men, on a portion of the sett called the Glen Mine, worked entirely by water power. Almost twelve months later the mine had started dressing ore (MC 1856). Twenty men were then employed, supervised by Cornishman, Captain Benjamin Tucker, described as a Mine Agent, Surveyor and Chemist and formerly of the Wheal Duchy silver-lead mine near Callington, Cornwall; the company was paying in the region of eighty pounds a month in wages (RCG 1856). The *Belfast News-Letter* in July of that year noted that a consignment of machinery had been sent from Kent to Dundalk via Holyhead for a new lead mine at Keady which probably refers to this company (BNL 1856). College Mines Ltd., later managed by Captain Alfred Braithwaite, enjoyed moderate success producing regular tonnages of lead that were forwarded by rail to the Mining Company of Ireland's Ringwood store (for smelting at Ballycorus) or delivered to Armagh to supply Joseph Kilpatrick or Enoch Fowler, pottery manufacturers at Coalisland; small tonnages were even sold locally. In 1857-58, none of their ore appears to have been shipped outside Ireland for smelting.²¹

19 We speculate that this is the same engine, formerly at work at the Coolarra mine, which had ceased sometime around 1850.

20 Annaglough seems to have been incorrectly entered in the Mineral Statistics as being in Co. Clare during this period and to have produced a staggering 400 tons of lead ore in 1852.

21 However, the company secretary was forced to write to the Bursar of Trinity College in the autumn of 1858 to request a temporary suspension of the mines for a period of six months in order to raise an additional working capital of £2,000 by the issue of new shares (TCD MSS). The company went into voluntary liquidation on account of a lack of capital to progress development of their sett which, on an original capital of £3,000, had realised £1,200 of lead ore from workings not much deeper than 15 fathoms. The leasehold with 28 years remaining was advertised for sale at auction in May 1859, along with the machinery, stores and materials on the mines. The mines were sold at this auction to some of the principal shareholders in the original venture who expressed their intention of 'renewing operations in a

David Brewster's *Edinburgh Encyclopaedia* of 1830 had noted the presence of galena in County Louth, and indeed the *Freeman's Journal* reported on the chance discovery of lead by workmen digging a drain at a farm at Fairhill near Dundrum on the estate of the Earl of Roden in 1848 (FJ 1848). Moreover, Brewster's encyclopaedia had clearly stated that in the Parish of Creggan 'lead was supposed to exist' (Brewster 1830, 204). It was only a matter of time before the Creggan lead deposit would be discovered as the area in the immediate vicinity was being poured over by prospectors. This is evidenced in the report concerning the lands of Lough Ross in the vicinity of Cullaville belonging to William Charles Quinn, advertised for sale under the Encumbered Estates Act which noted a 'recent discovery of lead ore' following successful searches by 'an experienced Cornish miner', whose report was available for viewing at the solicitors handling the sale (BNL 1856).

A much later article in the *Dundalk Democrat* (DD 1901) provides some crucial information about the opening and early years of the Creggan mine, contained in an interview with local man, Terence McParland (his surname is variously spelt McPartland, McParling and McPartling).²² He recalled beginning work at Creggan under Captain Conn and his son who commenced operations around 1852. McParland stated, 'who he was or where he came from, I don't know'. He related the story of how Conn had been alerted to the Creggan deposit by a local roadman named Murphy who, drinking in a public house kept by a man by the name of McShane at a nearby copper mine, happened to mention to the miners there the presence of lead at Creggan. This copper mine was the Tullydonnell, located on the north western side of the village of that name, six kilometres east of Crossmaglen on the Newtownhamilton - Monaghan road. It lay on the estate of Mr O'Callaghan (FJ 1853) and was, at this time, being explored by the Mining Company of Ireland who had taken the royalty (Reports 1855). They inspected two showings of copper in the area and consequently abandoned both in 1854 after expending the sum of £59 14s 3d (FJ, 1854).

CAPTAIN CONN AND SON OF CORNWALL

Captain Conn was one Henry Conn (1793-1860), a former lieutenant in the Royal Navy. The son of Captain John Conn (1764-1810) and his wife, Margaret Nelson, a vicar's daughter from Northumberland (Age of Nelson),²³ he was born in Stoke Damerall, north Cornwall, and stationed at the Port of Falmouth, a stone's throw from the Duchy's busy mining

spirited manner' and the mine continued in operation until the mid-1860s (MJ 1859).

22 Terence McParland, the man who was interviewed in the 1901 for the *Dundalk Democrat*, is enumerated on the 1901 Census returns for the County of Armagh (NA Census) as a 60 year old Roman Catholic farmer born in Armagh and resident at Cregganduff with his wife Anne (50), daughter Sarah Anne (19) and son Bernard (17). The Census is often not particularly accurate with ages and we can surmise that McParland commenced work at Creggan under Captain Conn when he was around 11-13 years old, by no means unusual in the nineteenth century.

23 Captain John Conn served under Nelson, commanding the *Dreadnought* at the Battle of Trafalgar.

hinterland.²⁴ After a fairly adventurous naval career that saw him captured and imprisoned by the French from 1809-12, in midlife he turned his attention to the manufacture of arsenic in response to the demand for the compound required by the burgeoning dyestuffs and allied chemical industries, setting up a works above Bissoe in the Carnon Valley in about 1833. Conn had led a somewhat chequered career, becoming entangled in financial difficulties and was declared bankrupt in 1843 (CRO; LM 1843), although he later gained a discharge (RCG 1843). With his arsenic works thriving, he perhaps sought diversification into other fields. The rapidly rising price of lead ore in the early 1850s, 'the trade had never been in a more healthy state... the advance has been occasioned by real export demand' (MJ 1852) and the demand for paints, pigments and acetates derived from lead oxides, were probably factors in his decision to move into silver-lead mining (see Burt 1984, 244, for lead prices).

Conn had familial connections with Ireland as his grandfather, John Conn, a gunner on the *HMS Weazle*, was from Kill St. Nicholas, Waterford, a parish five miles (eight kilometres) east of the city and on Waterford Harbour (The Conn Families of Devon and Cornwall). However, his surname is widespread in the Province of Ulster and so might also indicate a family association with the northern part of the country. Besides his interest in the Creggan mine, Henry Conn and Captain John Williams of Truro took a 24 year lease of the Coolartra lead and silver mine in neighbouring County Monaghan from Edward Wellington Bond of Bondville, Esq. in 1851 (possibly the mine that had been worked by Boothman and Skimming). Conn and Williams found that the only lode which had really been proven at Coolartra averaged fifteen inches in width (RCG 1851) and proposed to drive an adit level to unwater the workings to a depth of at least 40 fathoms to obviate the necessity of erecting costly steam engines. The mine was raising ten tons daily which was being readily disposed of at £13 per ton (of which no record appears in the Mineral Statistics) and was considered to be an enterprising concern (DN 1851). The *Belfast News-Letter* commented on the fact that Coolartra had been let to an 'eminent and enterprising mining company from Cornwall', at a royalty of one fifteenth. The newspaper, quoting the *Ulster Gazette*, saw it as a 'step in the right direction' as the residence of 'intelligent and enterprising strangers would give impetus to industrial pursuits' providing employment in a district blighted by unemployment and emigration and amongst 'a people of inoffensive, industrious and primitive habits' (BNL 1851).

In May 1852, Edward Bond's estates in Armagh and Monaghan, consisting of two lots, Bondville and Coolartra, were sold under the provision of the Encumbered Estates Act 1848/9 (TT 1852). This included the 'valuable lead mine' in Coolartra, and both lots were purchased by Mr W.W. Bond. The fact that the Second Series OS map clearly shows two separate workings in the townland of Coolartra might account for the fact that two English companies were noted to have started work there in 1851, one under Captain Williams, Conn's partner, and another under Mr Backhouse (BNL 1851). Joseph Backhouse Esq. of Consethall [Consett Hall], County

Durham in England, an ambitious mining entrepreneur who had snapped up many leases to potential mines across the region, was also noted to have been working a valuable silver and lead mine in the Barony of Upper Fews, on lands belonging to William Armstrong Esq. (1794-1872) (LWN 1851). He is credited with the discovery of the Tassan Mine in the late 1840s (Morris *et al* 2002, 42 *et seq.*) and was elected to the first committee of shareholders after the setting up in 1853 of a cost book company in 20,000 paid up shares of 10s each named the Tassan Lead Mines to work this deposit (DN 1853) with the aid of a 25-inch pumping, winding and crushing engine.²⁵

Griffith notes Backhouse's involvement with the above mines in a list he compiled in 1854 (Morris 2002). That Backhouse had been busy exploring the region's mineral potential is evidenced by the fact that he communicated to Griffith various showings of lead at Dorsy, which he was stated to have discovered; Ballintemple in Armagh; Watersek in Down and Dromore in Monaghan. Perhaps Backhouse later relinquished his lease at Coolartra, as on 26 July 1854, Captain Conn took out a lease of lead and copper mines at Coolartra, Cremorne Barony, County Monaghan, from Wadham Windham Bond (PRO Dublin). Conn and his son, William (born at St Clements, Truro, in 1825), like Backhouse, were also busy prospecting for lead in the region and Griffith notes William Conn's communication of lead ore at Crossreagh (Doohat) in Armagh and Avalbane, Cornamucklough North and Latnakelly in Monaghan (Morris 2001). However, it appears the Conns' mining activities were abruptly halted, with Cole noting that Coolartra was not working at the end of 1854 (Cole 1922, 97). Indeed, McParland claims that Captain Conn and his son did not remain long at Creggan either and sold the mine to an English company.

In order to understand why, we have to turn our attention to events occurring back in Cornwall, where, in the early-1850s, Conn and his son William found themselves being cajoled into joining a 'ring' of competing arsenic producers, that included many of the most powerful Cornish industrialists of the time. Henry Conn staunchly refused and the cut throat competition that ensued led to an attempt by them to cut off Conn's supply of the raw material in order to destroy him. Conn found himself gradually starved of capital that undoubtedly affected his business interests, including those in Ireland, which he seems to have increasingly entrusted to his son and was eventually forced, in the mid-1850s, to admit his opponents as partners in his Bissoe works (Barton 1970, 104-113). He retired from the company leaving his son William to battle the underhanded actions of the arsenic ring through the courts. Henry Conn died in Pimlico, London, on 4th March 1860, aged 66 (TEFP 1860).

THE DUNDALK SILVER-LEAD MINING COMPANY

This English company that took over the Creggan mine from Henry Conn was the Dundalk Silver-Lead Mining Company, which secured the mines on a lease from John James Bigger

²⁴ Conn was made a retired Commander in 1848 (MP 1848).

²⁵ The mining sett was held direct from the freeholder, Lord Templetown, for 21 years from the 25th May 1852, without rent and at 1-15th dues or royalties.

Esq., a JP who owned most of the Townland of Cregganduff and was resident at Falmore Hall, Parish of Roche, four miles north west of Dundalk. Initially, this seems to have been a private company, as its shares were not traded on the open stock market and this, presumably, accounts for the general paucity of information about the mine until it became a limited liability concern in 1859. In 1852, only ten persons were noted as working at the mine, in contrast to the lead mines at Annaglough that had 100 and Newtownards in County Down that employed 400 (Sproule 1854, 51).

The head Mining Captain, or Agent, was a Cornishman named Samuel Bailey, born in 1834 to miner John Bailey and his wife Mary Daniel. Bailey grew up in Baldhu, high on the moorland above the Carnon Valley, one of the many mining settlements that sprang up during the height of Cornwall's industrial revolution. He and two younger brothers are noted as tin miners in the 1851 Census and it seems Bailey worked as a tributer in the nearby Wheal Jane.²⁶ He then migrated to Devon where, on 13 June 1853 at Newton St Cyres, he married Elizabeth, the daughter of fellow Cornishman, Captain William Phillips Nicholls, the Agent of the Newton St Cyres lead/manganese mine near Exeter and where Bailey was presumably employed (WB 1853).²⁷ The couple settled in Baldhu where his son, William John, was born in April 1854.²⁸ Bailey seems to have arrived at Creggan in the early years of the Dundalk Silver-Lead Mining Company, that perhaps required the services of a man well-versed in mining. Creggan was likely to have been his first captaincy and he remained associated with the mine throughout its lifetime. He settled at Cregganbane with his wife and infant son; his eldest daughter, Florence, was born there in the summer of 1856.²⁹

According to the published returns in the Mineral Statistics, an annual list that provides the main source of information about the production of nineteenth century mines, production from Creggan was sporadic. The Mineral Statistics grew out of a concern among leading mining industrialists, including John Taylor and Sir Charles Lemon, MP, who formed the British Association, to campaign for detailed annual figures of mineral production in the United Kingdom. In 1840, the Treasury accepted the recommendation of the British Society and set up the Mining Record Office. From then onwards, Mineral Statistics were compiled on an annual basis and were thoroughly correlated and published from 1845 by Robert

26 1851 Census, Kea, 1910/711/0 Baldhu. Samuel Bailey and a friend, Josiah Stephen Bailey, were involved in a fracas after leaving a pub in Truro with two tributers from Wheal Jane who beat them up and robbed Josiah of his tribute pay (WB 1852).

27 1851 Census, Christow, Devon, 1867/436/48. Nicholls was a visitor to a place named Waterwell and is noted as formerly of Chacewater.

28 The return to Baldhu might have been caused by the sudden death of his father in law, Captain Nicholls, who died instantly after falling out of a kibble at the Newton St Cyres Mine that August (WB 1853).

29 Her baptism is recorded on 9th June in the Creggan Parish Church of Ireland records. He is noted as Samuel Bailie of Cregganbane, Mining Captain (Silver Bowl). Florence, named after her paternal grandmother, was married to Stephen Joseph Biddington at Isipingo, South Africa in 1881. Both bride and groom were stated to have been from Falmouth (RCG 1881). Florence's mother, Elizabeth, died in 1887 aged 55 at Durban, South Africa, at the residence of her son in law, W. Harpur (WB 1887).

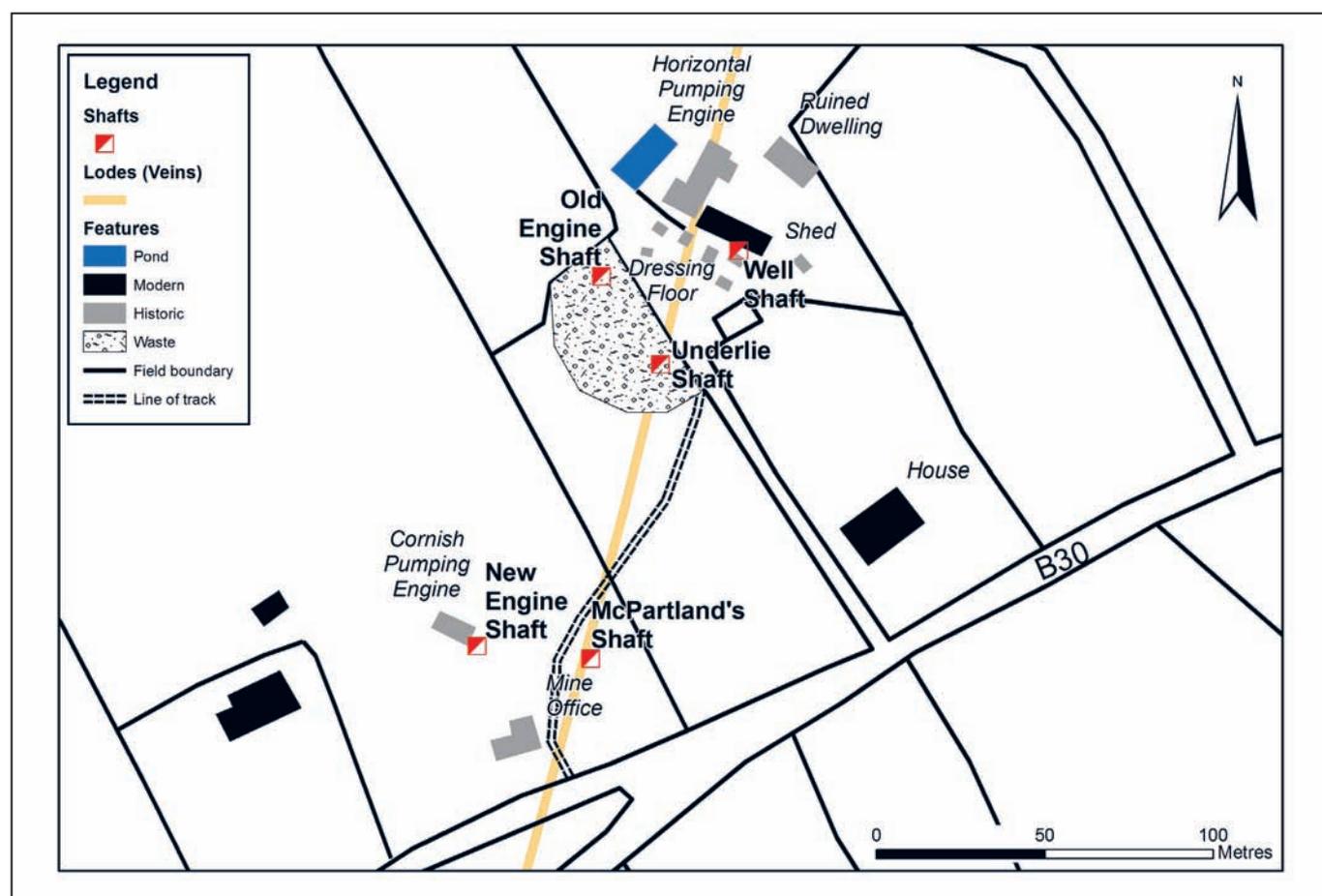
Hunt in his capacity as Keeper of the Mining Records. Accurate returns were not always easy to obtain in the early years, particularly for lead producers where production was not concentrated as it was for the tin and copper industries. Hunt states that the annual returns were 'obtained by scrutiny of the lead sales in [Holywell] Flintshire, that were obtained by favour, as well as by communication with every lead producing district in the United Kingdom and with each individual mine of any consequence' (Hunt 1853, 414). Burt *et al* (1985) claim that the lead mining interest was generally co-operative, enabling a long, complete and reliable run of production figures down to the twentieth century.

However, the data for the Irish lead mines relate largely to ores that were exported and sold at ticketings in Holywell and not to those sold privately in Britain (after samples of ore were sent to smelters and bids received back by post) or directly to smelters within Ireland. Additionally, given that these returns were purely voluntary and relied on the diligence and/or honesty of individual mine captains and smelting houses and as it only became a legal requirement to provide accurate annual returns after the Metalliferous Mines Act of 1872 (by which time Creggan had closed), many small, private concerns might not have provided regular or accurate figures. Creggan listed under 'Dundalk, Louth', produced 38.80 tons of lead in 1852 which the *Mining Journal* states realised £651 3s 6d (MJ 1852; RCG 1852) but Hunt records the total as 52.50 (Hunt 1853, 472). However, published details of lead ore sales in 1853 record that Dundalk sold 20 tons of lead ore to Newton, Keates and Co. at £13 1s; a further 4 tons to Walker, Parker and Co. at £15 5s and 2 tons to J.P. Eyton at £13 12s 6d, the sales of which are not recorded in the Mineral Statistics (see RCG 1853). A further 29.00 tons was produced in 1854, 21 tons of which was sold at Holywell to Walker, Parker and Co. for £12 15 s per ton realising £267 15s (DN 1854; WDWA 1854) (see Appendix One for more detail).

The presence of silver in the Creggan ore undoubtedly incentivised the shareholders, as the invention of the Pattison Process in 1833 made it possible to economically recover silver from argentiferous lead ores and indeed, McParland notes that the silver was extracted from the ore only after it had been shipped (DD 1901). Indeed, in 1856 the *Dundalk Democrat* reported on an immense silver nugget that had been discovered in what it termed 'the very valuable silver-lead mine' at Cregganduff near Crossmaglen. This was being run by the 'intelligent mine manager' Samuel Bailey and worked by Charles Henry Stedman Esq. of 'Gilford' [Guildford], Surrey, who had arranged for Bailey to ship the nugget on board one of the Dundalk Steam Packet Company's boats where it was afterwards forwarded to a London exhibition. 'It weighed no less than 15 cwt', reported the paper, '... and was the largest ever raised from an Irish mine' (FJ, 1856). Stedman was presumably the mine owner or principal shareholder/adventurer at this time.

YEARS OF DEVELOPMENT, STALLED PROGRESS AND STRIFE

In 1859 the company was reorganised into a Limited Liability enterprise of 4,000 shares of 15 shillings each, of which 1,000



Map 2. Historic and modern buildings and features at the Creggan Mine site

were given on account of the purchase of the mine and machinery (to whom is not detailed, possibly Stedman) that amounted to £1,000. Hereafter, reports appear sporadically in the *Mining Journal* under 'Dundalk' (MJ 1859). It was reported at the first board meeting that 2,187 shares had been taken up (the company was still owed £5 by one shareholder). We learn from these reports that mine had been but little developed prior to this, with workings not exceeding 15 fathoms from the surface and the newly capitalised company sought to give the lode a more general trial. McPartland's Shaft was probably the first shaft sunk on the property during Conn's time, but was superseded by a new vertical engine shaft developed further up the hill by Bailey (see Map 2). In order to impress prospective shareholders, the mine had apparently been favourably reported on by two of the most highly respected and prominent mining men in contemporary Britain: Mr [John] Darlington, manager and engineer of the Minera lead mine near Wrexham in Wales and Josiah Hitchens, Mine Agent of Devon Great Consols near Tavistock. Twelve tons of ore had been raised prompting the *Mining Journal* to report that 'sanguine expectations are that this will become a remunerative undertaking'.

In March 1859 Bailey reported driving on the 15 fm level driven on a lode from the engine shaft and reached by a cross cut to the south. This lode was thin to the north (1¼ ft) comprised of quartz, blende and silver-lead ore and reported to be too poor to work. However, it was thicker to the south (4 ft) and richer (1 ton per fathom). Bailey reports 14 tons of ore

at the surface in April and that he had found a branch of the lode northwards. However, later that month he had discovered the northward extension of the lode to be pinched against a cross lode or fault on the 10 fathom level (this level was being developed from an underlie or inclined shaft). Bailey decided to suspend works northwards on the lode but at the same time to deepen the engine shaft. In May, he reported that the stopes in the 15 looked 'remarkably well'. By mid-1859 the lode to the south had also pinched to 2 feet wide and the ore grade had declined to just 5 cwt. per fathom.

However, the lode soon widened to 4 feet and improved in grade as the 15 was driven southwards towards the old McPartland's Shaft which was unwatered and cleared. Slow progress was being made on sinking the engine shaft below the 15 due to the hardness of the ground and extra miners were employed at this task, resulting in a stoppage of all work on the 15 north. By late 1859 the engine shaft had reached the 23 and a cross cut to the south had met the lode. An unexpected influx of water during a particularly wet period in November 1859 had necessitated the introduction of a new set of pumps in the engine shaft that had increased expenditure, while more ore would have been dressed had it not been for frost and bad weather. A small outlay was made on dressing machinery enabling ten tons of ore to be sold for £130 in October and a further 10 tons were dressed and prepared for market (this was sold on the mine that December for £13 5s per ton) which figures are corroborated in the Mineral Statistics (see Appendix One). In the period March to December 1859 the mine showed

a credit balance of £33 14s 9d, and the balance of assets over liabilities was £1,628 (S 1860), suggesting that it had some machinery of value at the surface.

In March of 1860 Bailey expressed his delight at recent progress: 'On the whole I never saw the mine looking so well'. The lode in the 23 south was reported to have been 2½ feet wide and estimated to produce 12 cwts. of ore per fathom. A winze being sunk on the lode at the bottom of the 15 was expected to give 8 cwts. of ore per fathom and 10 cwts. per fathom in the rise at the back of the 23. There were about six tons of ore in the store-house and Bailey expected to augment this to ten tons which he stated would be offered for sale (MJ 1860). By July the Underlie Shaft was down nearly five fathoms below the 23 and in order to speed up the sinking of this shaft to the 33, Bailey had set the task to nine instead of six men. He noted that the lode had very much improved and he was hopeful of being able to confirm in the near future whether this was a new shoot of ore, which, if so, would have doubled the intrinsic value of the mine. A cross cut was being driven toward the caunter lode at the 23 and Bailey estimated that with another five fathoms of driving this would be reached. He expected to find it productive, as it would be intersected opposite to the run of good ground in the main lode. In the 15 south the lode was 2 ft wide, yielding good stones of ore, but not sufficient to value and he shortly afterwards suspended work there, removing the miners to the piece of ground standing in the Underlie Shaft (MJ 1860).

Progress at sinking the Underlie Shaft was impeded by harder ground towards the end of July causing Bailey to revise the time estimated to meet the 33, now pegged back to the end of September. The general appearance of the lode in the north end of the shaft appeared to strongly indicate the proximity of another shoot of ore in that direction, and, with the exception of a short drivage in the 10, the ground was untried. Bailey therefore suggested that once the 33 was reached, drives be made both north and south: 'by doing so we shall not only command the bunch of ore gone down in the bottom of the 23, south of the shaft, but most probably open out a new shoot of ore northward, standing in whole ground to the surface'. By mid-October 1860 it was reported that the lode on the 15 fathom level south had pinched to 1½ feet with poor ore. A month later he reported that the 33 had been extended south of the Underlie shaft about three fathoms and the lode was described as the size of the end: '... 4ft wide composed of 'flookan, barytes and lead, worth of the latter 5 cwts. per fathom'. Bailey was shortly expecting to bring this end under the shoot of ore that was evident in the upper level, making 'a good bunch of ore'. However, the cross cut in the 23 had been 'idle owing to want of hands', but he had managed to obtain a fresh party for the bargain. Another party of men were driving north in easy ground from the bottom of the underlie shaft (the 33) in order to prove the junction of the two lodes some 11 or 12 fathoms north of the Underlie Shaft. A parcel of ore was shortly to be prepared for market (MJ 1860).

By the end of November the lode in the 15 south was 3 ft wide and had been driven south of Mc Partling's Shaft 16 fathoms and was within 2 fathoms of being under the mine office. However, it was yielding just 6 cwts. of ore per fathom. Yet

Bailey saw reasons to be optimistic: 'I am of the opinion that this is the commencement of a new shoot of ore as the lode in this level has never looked so well for the last 50 fathoms of drivage'. Time would tell, but he also reports that the lode in the 33 was little better, worth 8 cwts. of ore per fathom but that this was also improving. Work was continuing in the 23 through hard ground to cut the lode (MJ 1860). December's report noted how the end in the 15 south had been driven south of McPartling's Shaft 17 fathoms. A dyke of soft clay had been intersected which was discernible at the surface which Bailey had costeamed, encountering this clay in pits close to the mine office: 'I consider the change of strata in this end a very important feature in this part of the mine, seeing that the lode has not been so productive since we last passed through the same kind of ground at the Underlie Shaft...'. Work driving the cross cut to cut the caunter lode in the 23 was progressing and the lode in the winze in the bottom of the 23 south was notably richer at 2 feet wide and worth from 15 cwts. to one ton of ore per fathom. However, progress there was being impeded by abundant water which necessitated the adequate draining of the 33 after which Bailey anticipated having a large piece of valuable ground 10 fathoms high open for stoping. The 33 was also looking promising as a 2 ft wide 'orey lode' was fast approaching ore ground. Bailey ended his report by stating that '... the present appearance and prospects of the mine are highly encouraging; in fact I never saw the mine looking so well since its commencement'. Enigmatically, this is the last report from the mine to be published in the *Mining Journal* for six years, the next not appearing until the autumn of 1866.

We seldom know much about the composition or characteristics of the workforce employed at Irish mines during the nineteenth century, so we can be grateful to the *Belfast News-Letter* that provides an account of the demise of one of Creggan's employees, Terence Hughes. He was found dead in a field by a man named Caherty after being missing for three or four days just after Christmas 1859 whilst on a period of leave. As a Captain, Hughes was seldom without a good deal of money about his person and was known to have been carrying seven pounds, as a witness, Mrs. Murphy, had seen him dry the notes at her fireplace after they had become wet in the mine. Given the history of violence in the area and the fact that his body was found with one of his pockets partially turned out and the seven pounds was missing, suspicions of murder inevitably circulated. At the inquest into his death, one of his colleagues at the mine stated that Hughes had been complaining of a headache of late but had continued to work as usual. In his evidence, Dr Donaldson stated that the body bore no marks of violence, but that Hughes had some time before received a fracture of the skull and was of the opinion that death was caused by an effusion of blood on the brain, assisted by the cold causing insensibility. The jury returned a verdict of accidental death accordingly (BNL, 1859); the theft of the money was *post mortem* and opportunistic. Importantly, Hughes seems to have been a subordinate Captain, so there were clearly enough employees at Creggan to warrant hiring a man to work underneath the Agent, Bailey.

It is noticeable that Dundalk had fallen out of the *Mining Journal's* Progressive Mines' list by the beginning of

November 1860. Despite Bailey's positive final report of that year, progress thereafter appears to have stalled as no production figures are listed for the early- to mid-1860s and operations were noted in the Mineral Statistics as suspended from 1862-5. However, Dundalk clearly remained operational as it is listed in *Saunders News-Letter* in April 1861 as trading shares on the Dublin stock market (MP 1861). We have the *Freeman's Journal* and *The Times* to thank for two reports in 1864 which throw more light on this period and which indicate that Creggan was indeed still operational, but that all was not well.

We learn that James Hearty was indicted for having caused a disturbance by unlawfully assembling at Cregganduff on 15th February and breaking the door of Thomas Comasky's [Cumisky] house at night to assault George Gordon. *The Times* reports that there had been discontent among the workforce over the level of wages at the Creggan mine and that the miners had 'struck'; the manager had consequently brought in some 'English' miners to break the strike. Gordon was one of the strike breakers, the *Freeman's Journal* stating that he had formerly been employed in one of the Wicklow mines. Hearty, one of a gang of about sixteen men (and the only one in this gang to have been identified), dragged him naked from his bed and beat him most unmercifully, warning they would kill him if he did not stop working and that the same fate would befall the other English miners.³⁰

However, following Hearty's arrest, the local community appears to have closed ranks and provided him with several alibis to prove that he was asleep in his father's house the night that the outrage took place. The judge at the hearing in Armagh expressed his disgust at the actions of the gang, stating that through their blindness and ignorance they were trying to dictate their own terms and thus prevent free trade in the labour market which would only serve to damage themselves and might have a deleterious effect on the future of the mining industry in the county (TT 1864). It appears that the strike arose due to disputes concerning the rates Bailey was offering for tutwork and tribute bargains, which customarily varied according to the nature of the ground and the value of the ore being extracted (for example, rich ore would result in a lower tribute rate per fathom), which was common practice on all Cornish-run mines.

No mine captain could afford to permit a 'combination of men' to dictate prices, hence Bailey's drafting in miners from elsewhere to break the strike. He was obviously finding it difficult to implement the Cornish system of mining in an area that was overwhelmingly rural and with men who had not been brought up in the hard rock mining industry, where

30 A James Hearty is listed in Griffith's Valuation as leasing a house, office and land and two cottiers' houses to the north of Creggan Mine from John James Bigger. *The Times* gives the manager's name as Mr Bell, but this is likely to be a transcription error for 'Baillie' as the Crossmaglen baptism registers clearly show that Bailey was resident throughout this period; his wife gave birth to a daughter on 1 April 1864. She had returned from Baldhu where she and her children were enumerated in 1861 (Kea 1562/78/9, resident near the school. Elizabeth Bailey, Head, Married, 28; William John, son, 6; Florence, daughter, 4; Adelaide L, daughter, 2. The last two children are noted as born in Ireland).

miners bargained with the Mine Agent on setting day for tribute pitches and tutwork bargains that were always let to the lowest bidder. Some months tribute pases could end up indebted to the mine and thereby forced to request 'subsist' from the management until the next payday, which undoubtedly caused resentment. Despite the judge's best efforts to ensure the jury's impartiality, they returned a verdict of acquittal (FJ 1864).

THE 'CORNWALL OF ERIN'

The early 1860s appeared to have witnessed something of a revival of lead mining in the Armagh-Monaghan area, perhaps as a result of the American Civil War (1861-1865). Although this caused an initial temporary depression in the mineral market, it led to a rise in British lead exports from 27,551 tons in the period 1858-1860, to 43,002 tons between 1862-1864 while the price per ton also rose in 1862-3 (Burt 1984, 239-244)³¹. Indeed, Cornishman, George Henwood (1809-1883), a native of Penryn and the former Cornish correspondent to the *Mining Journal* then resident in Scotland (where he had previously managed the Marquis of Breadalbane's mining property), reported favourably on some of the Monaghan lead mines in 1862. Although he acknowledged that Irish mines had not yet recovered from the shock of the mid-1850s post-famine 'bubble', he saw reasons to be optimistic:

If he [the Dublin Shareholder] will take the trouble to visit or inquire into the recent discoveries at Coolartra and Bond Mines, he will witness the truth in his remarks that Ireland possesses abundant minerals. He will also find that gentlemen of the sister island are becoming alive to the value of those treasures. He, by a visit, will be further gratified by the interesting fact that the bugbear of Irish mining (the belief that the ore only exists in surface bunches) is dispelled at the Tassan Mine, adjoining the Coolartra, where, by the indomitable perseverance of Captain Skimming, the mine has been sunk to the 70-fathom level, and found at that depth to be more productive than at any previous point. These facts, the sales of ore, and the spirit excited thereby, tend to foster and encourage mining in Ireland than all the words of a thousand theorists.

With such successes as Tassan and Coolartra, the motto will be 'Erin-go Bragh!', predicted Henwood (BNL 1862). And he had good reason to talk up the mineral potential of the immediate area, for he was about to open a small silver-lead mine named Cashel near the Tassan Mine (see Lings 2009 for details of this enterprise).³²

31 The overall price per ton was still less than that received a decade before, when for example, in 1855 it was reported that lead was at an unusually high price.

32 The 'engine opening' to which Lings refers in his paper, taken from an *Irish Times* report (1863), is in fact a reference to the opening of the Coolartra 50-inch Cornish pumping engine. Henwood was deeply involved in this concern.

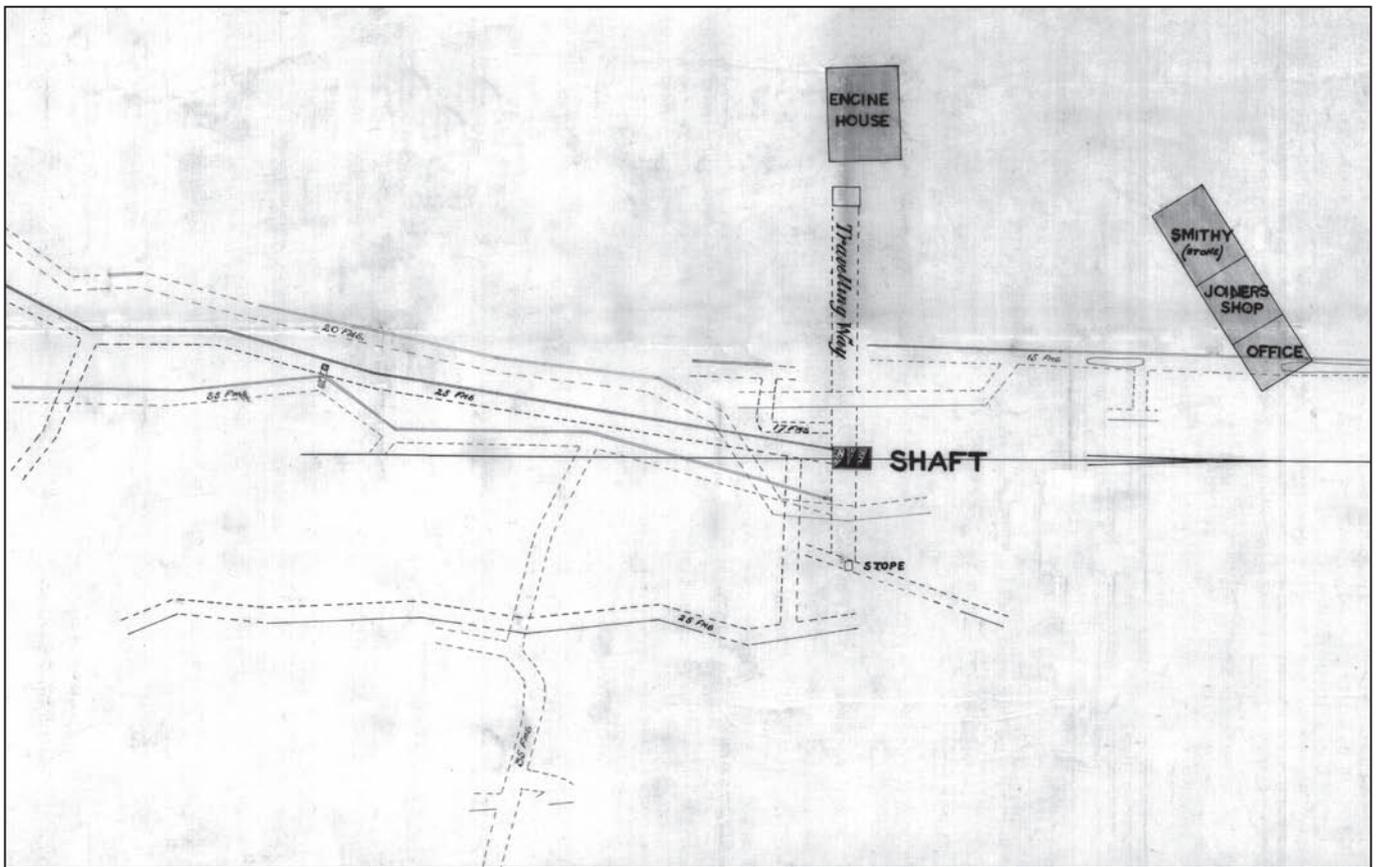


Figure 9. Extract from a surface plan dated 1892 of the then abandoned Coolartra Mine, County Monaghan, showing the extant remains of some of the buildings, including the Cornish engine house, that were erected to great fanfare in 1863. A projection of the underground workings is also depicted

The following year, the *Dublin Builder* noted the installation of the huge 15 ton beam of a Cornish pumping engine at the Coolartra and Bond Mines which had not been worked for about twelve years. This was lifted 50 feet into place and the cylinder and castings were noted to have weighed 9 tons (DB 1863). The Coolartra and Bond Silver Lead Mining Company Ltd., based initially in Glasgow, then in Manchester, was formed in the summer of 1862 with a capital of £16,000 divided into 16,000 shares of £1 each (NAS; GH 1862) and had obviously obtained the second hand engine ‘not less than a 40-inch cylinder, to be delivered at Dundalk quay or railway station’, that its Cornish mine manager, Captain J. Jones, was seeking in an advertisement placed in the *Glasgow Herald* in the autumn of 1862 (GH 1862). The company had negotiated very liberal terms with the landowner (Bond)³³, to rework the mines that were said to have returned upwards of 1,700 tons of ore and were abandoned for want of capital and adequate machinery. The mine’s ‘stupendous plant’ was laid out by George Henwood and was being rapidly completed by four fitters towards the end of 1863. The iconic 76 feet high engine house accommodating a 50-inch Cornish steam engine, the towering capstan and shears and the 20 ton boiler with two flues measuring 30 feet long and 8 feet in diameter, drew much praise from curious visitors and other local mine Captains.

³³ Obviously a reasonable man, Bond had turned a blind eye to the poor picking over the mine dumps during ‘bad times’ when Coolartra was closed.

Moreover, the management looked after their workers, who were provided with a miners’ dry, heated with warm air from the pipes of the adjacent boiler and a room for them to cook and eat their food. There were numerous other buildings on site, including an account house (of modest dimensions), a store room, smithy, coal store, cart shed and stable and also a two horse whim (Figure 9). Following the completion of the plant, over 60 men sat down to a roast beef supper washed down with ‘Cornish Miners’ Punch’ as a mark of the company’s recognition of their services (IT 1863). The ceremonial ‘starting of the engine’ (a Cornish custom) which had been supplied by Mr. Fox of St Ann’s Square, Manchester and said to have been ‘one of the largest, if not the largest ever erected in Ireland for mining purposes’ (MJ 1863), was a cause for great celebration in the area, where the mine was ploughing £400 monthly into the local labour market.³⁴ ‘We trust that the County of Monaghan will be found sufficiently productive to warrant the title applied to it by experienced miners – “The Cornwall of Erin”’ sounded the *Irish Times* (IT 1863).

In April of 1865 the newspaper continued to capture the

³⁴ The duty of the engine was as follows: At fourth pressure, working 8 feet stroke, lifting by 17 strokes per minute 850 gallons. The quantity of coals consumed did not exceed 6 cwt in 24 hours (MJ 1863). The largest steam engine in Ireland was, in fact, the 60-inch vertical pumping engine at Tigrooney Mine, Avoca, County Wicklow, manufactured at the Perran Foundry, Cornwall.

buoyant mood of the time, commenting on the large amounts of silver lead ore at the Port of Dundalk awaiting shipment for the 'Chester River' and mention was also made to the highly profitable Hope Mine under the charge of Cornishman, Captain Richard Trevantant [Trevarthan], just one of a number of mines to be tested by the Hope Silver and Lead Mine Company (NAS) at Castleblaney (which might account for the reference in the Mineral Statistics to 19.00 tons of lead (from 25.00 tons of dressed ore) and 215 ozs of silver from 'Hope Dundalk' in 1864). The Great Northern Mining Company of Ireland Ltd., (NAS) working the Tassan Mine under the management of Captain James Skimming and its auxiliary, the Trinity Mine at Keady,³⁵ managed by Captain Alfred Braithwaite, were also noted as doing a flourishing business.³⁶ Additionally, the Croaghan Mining Company was set up in 1863 to work lead mines on the Arnyallow lands of Lord Templetown in County Monaghan on a lease agreed between Templetown's agent, Basil Brooke, and Utrick Vipont [Utrick Vipond]³⁷ on behalf of the Croaghan Mining Company for an agreed 1/15th of the nett produce that would be realised from the sale of ore raised. Over £2,000 was expended by the company in the construction of works, including a steam engine (FJ 1866). 'As the resources of Ireland in minerals are beginning to attract the attention of English and Scotch capitalists, I trust soon to see the country covered with shafts and steam engines', exclaimed the *Irish Times* editor (IT 1865). The *Monaghan Standard* reported on the cargo of ore from Tassan valued at nearly a thousand pounds that had been shipped out of Dundalk for 'Chester River', and noted that the Tassan and Hope mines were employing at least 400 men at a high rate of wages (IT 1865).

Like those mining enterprises across the border in County Monaghan, the Creggan mine appeared to have witnessed something of a renaissance in the mid-60s. It appears that the Dundalk Silver-Lead Mining Company Ltd. was voluntarily dissolved and a new company, the Dundalk Silver Lead and Copper Mining Company (NAS), an enterprise in 25,000 shares, was capitalised in 1863. A new 21 year lease was negotiated on 1st May 1863 with a fixed rent of £50 per annum, merging into a royalty of one-fifteenth and the mine entered on its third phase of working. As we have seen, Bailey encountered problems getting men to work at the wages he was offering at the beginning of 1864, but by July things had returned to normality as several Scottish gentlemen (presumably investors) connected with the Hope and Dundalk silver, copper and lead mines had visited their property, collected numerous specimens and were stated to have been well pleased with their visit (IT 1864).

35 The mine was dubbed the 'Trinity', as the sett was on land owned by Trinity College Dublin, and was presumably part of the land worked by the College Mines Ltd.

36 If the Mineral Statistics are to be believed, the College Mines were actually in decline by this time, having seen a significant falling off in the produce of the mines from a height of 60 tons of ore in 1859 and 1860 to a mere 5 tons in 1864.

37 Possibly from Alston, Cumbria, where a master miller (a native of Yorkshire) turned rate collector of the same name, had a financial interest in the Greenhurther lead mine in 1872.

Indeed, it appears that Scottish and English investment capital was obtained to enable the purchase of new equipment and machinery, undoubtedly a direct consequence of the arrival in the region of the cutting edge machinery erected at the Coolattra Mine that Bailey would surely have visited. And Creggan was not alone in this respect, for a Cornish pumping engine was also installed at the Hope Mine. The new machinery duly arrived at Dundalk in 1865 'to open a new mine at Creggan under the management of Captain Bailie' (IT 1865). The workshop, offices and land of Dundalk Silver Lead and Copper Mining Company are recorded in Griffith's Valuation (completed in June 1865) and the mine is depicted on the 1862 Second Edition OS 6-inch map comprising of a building (the office) and shaft close to the road and another shaft, engine house, buildings and a dressing floor above a large heap of spoil, slightly to the north east.

Two steam engines were erected at Creggan during its lifetime: a 36-inch cylinder Cornish pumping engine, 8.5 feet stroke with two 8 ton boilers, and a 16-inch cylinder rotary condensing horizontal steam engine, 5 feet stroke with two 5 ton boilers, fitted with a winding cage. The Cornish pumping engine was not shown on the Second Edition OS map of 1862, but it is on the later 1907 edition, so we might conclude that this was at least a part of the 'machinery' that arrived at Dundalk in 1865 (see Figure 9). The other engine erected on the vertical shaft was therefore the winding engine which would also have worked pumps before the Cornish engine arrived and it is odd that Bailey never mentioned it in his reports. In addition, the company invested in a Cornish rolls crusher with 20-inch cylinders, presumably run by a crank from the winding engine, to crush hand sorted lead ore that would then have been jigged and buddled (indicated by a series of squares on the Second Edition OS map). The pumping engine seemed to have originated in Britain, although it is unknown what foundry manufactured it, or even if it was purchased new. The Dundalk Silver Lead and Copper Mining Company also appear to have taken the royalty of Tullydonnell (that had previously been trialled and abandoned by the Mining Company of Ireland), hence the inclusion of 'Copper' in their new title, erecting a 14-inch cylinder rotary condensing steam engine, 5-foot stroke with one 5 ton boiler fitted with winding cage and pumps on a shaft that attained a depth of 360 feet (110 metres, see Appendix Two).

In October 1866, under the heading, 'Dundalk Mines', the *Mining Journal* noted that for those interested in these mines it was cheering to learn on good authority that the lead mine was steadily improving. A marked improvement had been made on the 60 where a good lode of lead had been driven some distance where overhead in the 40 it had been barren. However, new discoveries had also been made on the 40 that was being driven south. The shaft was then down to a depth of 72 fathoms (132 metres) and a level was about to be driven from it. A parcel of ore was stated to have been ready for the market and could have been at once increased, but the economical working of the mine prevented this as the 72 had to be driven first. Judging by the nature of the lode in the 60, it was fully expected that the 72 would prove to be very productive, allowing regular ore sales to be made.



Figure 9. View of the southern wing wall and the bob wall of the abandoned Creggan Cornish pumping engine house, built to accommodate a 36-inch vertical steam engine. This image is dated 1926, five years before it was demolished. Not even the footprint of the house is visible today. Reproduced by kind permission of the Armagh County Museum

Indeed, the recapitalisation of the company and improved mechanisation seemed to herald a new dawn, for Creggan once more recorded entries in the Mineral Statistics under Dundalk, Armagh (see Appendix One). However, the 1866 report informs us that in the six years since Bailey last gave details of the mine's progress, the engine shaft had been sunk 39 fathoms (71 metres) and at least two new levels had been driven. This possibly relates to the new engine shaft on which the Cornish pumping engine was erected that was reputedly driven to a depth of about 500 feet (152 metres). But there are no records in the Mineral Statistics of any ore sales from this period, not even from the promising piece of ground that Bailey was enthusing about on the 33 in 1860, which seems very odd indeed.

LIQUIDATION

Anecdotal reports tell of the mines being the site of 'ceaseless labour' for almost two decades.

Day and night the stroke of the pick echoed in the depths of the rocky hillside, or the muffled report of a blast told of new workings to be explored; day and night the great pumping engine on the top of the stone building kept up its ceaseless motion; and the roads between Creggan and Dundalk saw pass and repass, the loads of ore for shipment and the supplies of coal and timber for the mines (DD 1901).

Mr Williamson was one of the suppliers of coal (for the steam engines), steel, iron and timber to the mining company and he was noted to have made a fortune out of it (DD 1901). However, the published returns in the Mineral Statistics do not corroborate the above description, quite the contrary.

We learn that the company started making calls not long after its third and final incarnation. At the third annual meeting held in Glasgow in February of 1867, the accounts showed just £423 in hand and it was agreed to make a call of 2s 6d per share (MP 1867). This call on the shareholders was stated to have been 'required to carry on the works efficiently, consequent on the great improvement in the mine'. Company representatives present at the meeting, including G.W. Clarke, one of the Directors, who had recently visited the mine at Creggan with fellow Director, Mr Dick, put a positive spin on things and the report from the engineer, T.C. Gregory, and Captain Bailey was very satisfactory. Twenty tons of lead had just been sold and twenty tons more were in the course of being dressed; shareholders were assured that future returns were expected to be 'regular and increasing' (MJ 1867). The Directors had even engaged the services of another Cornish mine captain, William Bishop of the Connorree Mine in Ovoca, Wicklow, to inspect the mine and submit a report for the shareholders, which gave a positive verdict.

Interestingly, we learn that Bailey returned the favour not long afterwards, having been 'highly recommended' to the Board of Directors of the Connorree Mining Company, who required

an impartial opinion of their enterprise; indeed, they even felt it necessary to emphasise to their shareholders that they had kept themselves 'entirely aloof from him' during his inspection of their mine and ore stocks in the spring of 1867. But Connorree was hardly an unblemished operation and shortly afterwards collapsed in fraudulent disarray (Cowman 2010, 11). Unsurprisingly, Bailey's report stated that, on the whole, the prospects of Connorree looked 'exceedingly cheering' and concluded that with a fair price for the produce and 'additional capital expenditure', it was capable of yielding good profits (FJ 1867).

'It is pleasant during these dull times to be able to refer to success,' trumpeted the *Mining Journal* that August. '... Dundalk Mine has been for some six months improving steadily and now a good course of ore is opened up: 50 tons are just sold and 20 more are in the course of dressing. If the 72 fm level finds the lode as in the 60 above, the sales will be much increased' (MJ 1867). It might not have seemed evident then, but the company's days were numbered. Ore sales for 1869 were down considerably from the previous year (see Appendix One) suggesting that the 72 might not have been as productive as predicted and the company went into liquidation. The decision to wind up voluntarily was made by members of the board at a special meeting of 17th November 1869, and confirmed at a Special General Meeting of the company held on the 1st December 1869 in the Religious Institution Rooms, 75, St George's Place, Glasgow (EG 1870). By January of 1870, the *Belfast News-Letter* carried an advertisement for the sale of the leasehold and equipment at a public auction to be held at the Faculty Hall, St George's Place, Glasgow, on 8th February. Besides the two Creggan engines, their appurtenances and the Cornish-rolls crusher, the 14-inch rotary condensing engine at Tullydonnell valued at £60 was also placed under the hammer. The buildings at Creggan were listed as two engine and boiler houses, an office, smiths' and carpenters' shops, a storehouse and a powder house. These buildings, the engines and machinery and the goods at the mine consisting of iron, timber, powder, nails and other items were valued at the 'very low upset price of £600' (BNL 1870). A report on the mines by civil and mining engineer, Thomas Currie Gregory (c1827-1909), a native of Edinburgh resident in Glasgow who had spent several years in Western Canada in the mid-1850s, was available for inspection.

Following the closure of Creggan, Captain Bailey returned to Cornwall with his wife and family where he took up residence at Falmouth. He became the representative of a Glasgow based company, Creegbrowse and Penkevil United, formed to work a mine in Cornwall, the company secretary of which was Thomas Currie Gregory, former engineer to the Dundalk Silver-Lead and Copper Mining Company. Gregory also served in this capacity for a number of other Glasgow based mining companies operating in Scotland and elsewhere.³⁸ Creegbrowse was a tin and copper mine situated close to his childhood home and Bailey was the manager there from 1874-

38 These included the South of Scotland Mining Company (with which G.W. Clarke, a former Director at the Dundalk Silver-Lead and Copper Mining Company, was also involved) and the Glasgow Caradon Consols Copper Mining Company, also in Cornwall.



Figure 11. The extant chimney of the Cornish engine house erected by the Hope Silver Lead Mining Company Ltd., at the Hope Mine, County Monaghan, is the only visible reminder of a number of engine houses that were constructed in the 'Cornwall of Erin' in the early-1860s

1877 (RCG 1874). In 1877 he purchased the old West Huel Anna silver-lead mine at Perranzabuloe, setting up the New Chiverton Mining Company Ltd., which lasted less than twelve months. The old West Huel Anna is shown as in liquidation in the Mineral Statistics of 1878 and 1879.³⁹ Bailey died at Falmouth in the summer of 1879 aged just 46.

Creggan was by no means the only mining casualty in Counties Armagh and Monaghan in the late 1860s. The much lauded Coolattra and Bond Silver Lead Mining Company was voluntarily wound up in January of 1867 after a lifespan of just five years (LG 1867). The Croaghan Mining Company collapsed in litigious disarray in 1866 following a dispute between Lord Templetown and the company over the validity of the lease allegedly granted by his agent in 1863 (FJ 1866).⁴⁰ Egan notes the ruinous engine house of this hapless

39 Bailey's wife and four children are enumerated on the 1881 Census for Budock Parish (near Falmouth). 1881 Census 2317/0/76/0. Elizabeth, 48, is noted as an annuitant; Adelaide, 22, Alexandrina 16 and Emily, 12, are noted as born in Armagh. Janie, 19, was born in Kea and James L, 7, at Falmouth.

40 The Croaghan Mining Company brought a suit against Lord Templetown to compel him to specifically perform the terms of a lease agreement entered into in 1863. They alleged that Templetown's refusal to grant this lease was so he could avail of the valuable lead mines that had been discovered himself. Templetown filed an injunction to prevent the Croaghan Mining Company from raising lead or any other ore in his lands, searching for

venture in 1877 (Egan 1877). The Hope Silver Lead Mining Company Ltd, likewise advertised for sale the leases of its mines in part of the town and lands of Carrickagarvan and Cornalough, parish of Clontibret, along with the 'machinery, pitwork and other materials on the mine' (betrayed today only by the chimney and footprint of its Cornish engine house, see Figure 11) at public auction in Glasgow on 4th April 1866 after a period of just four year's working (BNL 1866). The company experienced problems selling these assets, indicated by the fact that the upset price was reduced to £1,000 in May of that year and the property had still not been disposed off the following year, when the upset price was again reduced to £600. They were finally sold at auction in September 1867 (BNL 1866, 1867).⁴¹

Additionally, the leaseholds of the Annaglough, Glen (College Mines), Tootra and Tassan mines and their machinery, operated by the Great Northern Mining Company of Ireland (set up in 1863), were also advertised for sale in 1870 (GH 1870) and the company was liquidated in 1871 (MP 1871). This begs the question of why Creggan and many of the mines in the region closed at a time when the price of lead had not gone down significantly and moreover, the end of the American Civil War had not resulted in an immediate reduction in the market for British lead. This is a point we will return to below. The Dundalk Silver Lead and Copper Mining Company was still listed in the *London Gazette* and the *Edinburgh Gazette* in the autumn of 1881 (LG, EG 1881) and according to the Board of Trade Companies Registration Office, the company was struck off in 1882 (NAK).

A DISHONEST CAPTAIN?

The 1901 description of the mines in the *Dundalk Democrat* (DD 1901) states that the mines formerly employed hundreds of miners and labourers, some of whom came from as far away as Castleblayney and beyond and who had worked in the lead mines there. It correctly states that the men were paid so much per fathom (on the Cornish system) and adds that the miners worked three eight hour shifts with boys employed on the dressing floors cleaning and preparing the ore for shipment. The fact that Captain Hughes was clearly a subordinate captain at the mine suggests that it was not a small labour force, but conversely, Bailey's reports do not suggest a mine with hundreds of employees and there are indications contained in his reports of 1859-60 that he was sometimes short of hands for both development work and 'pares' for tribute pitches. McParland, however, remembers seeing a table covered with gold sovereigns on pay nights and recalls there being no shortage of good ore in the Creggan workings: '...I saw places where you could throw a hack into the solid ore, it runs in

minerals or cutting drains, or diverting water from a river flowing through his lands. An injunction brought by Templetown had already been granted by the Master of the Rolls concerning the diversion of water and cutting of drains, and the Lord Chancellor also granted Templetown's petition for an injunction. The mines appear not to have been worked thereafter and the Croaghan Mining Company was finally dissolved in 1882.

⁴¹ The local landowner recalls being told that the abandoned boilers to the pumping engine were still visible close to the engine house in the interwar period of the twentieth century. Pers. comm. 2012.

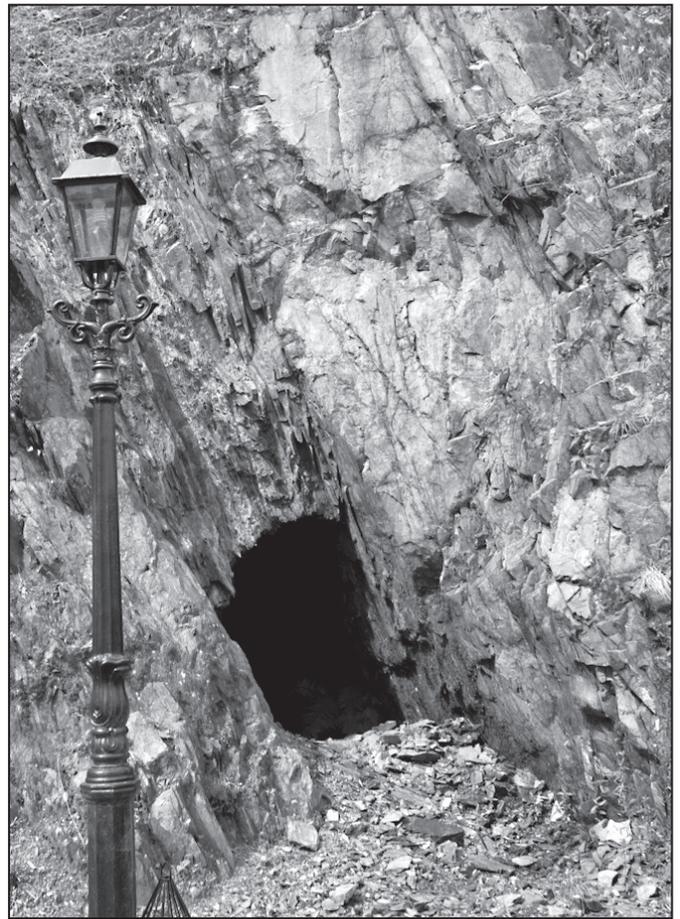


Figure 12. Nineteenth century experimental drive at the Tullydonnell Mine which produced very little copper

veins, sometimes dipping and sometimes widening out – here plenty of solid ore and again perhaps the rock pushing it out of the way...’ This is in contrast to the description given of the older Tullydonnell copper mine, about which nothing is mentioned in any of the company reports. The general consensus of opinion among the locals was that there was little copper there, with the mine never giving more than a hundredweight of the mineral despite long exploration (see Figure 12). The MCI wisely abandoned this mine and it begs the question of why the Dundalk Company even bothered to try and rework it.

Local people were unanimous in pointing the finger of blame for the mine's failure firmly at the Agent, Captain Samuel Bailey. They bitterly recalled how 'the busy throng of miners drifted away, many of them to other lands' when the mine closed, Mrs McKeown who kept the inn at Creggan Bridge remembering 'the plenty that once flowed from the mine down the hill' to her public house.⁴² Indeed, the closure of most of the lead mines in the wider region in the late 1860s would have had a pronounced economic impact. Captain Bailey was universally detested in the area and rumours abounded about his anxiety to get out of the country thus

⁴² This is a reference to 'Mary Jane McKeone' shown on the 1901 Census returns as a 58 year old resident at Cregganduff and the wife of Arthur McKeone, a 64 year old farmer and spirit merchant. The couple had a 19 year old daughter, Bridget. All were noted as Roman Catholic and literate.

precipitating the mine's closure. In Dundalk, that anxiety was ascribed to a 'nervous dread of political societies in his neighbourhood'. Bailey would have been fully aware of the troubled and violent past of the area and, after the strike incident in 1864, more than cognisant of the fact that local people were not beyond taking the law into their own hands. As a much loathed outsider, he might have felt haunted by the spectre of agrarian unrest and the return of Ribbonism that resulted in numerous police raids and arrests in the search for arms and perpetrators of suspected plots in the years leading up to the Fenian Uprising of 1867 (BNL 1866).

Others, however, played down the political and religious dimension and believed that he was anxious 'to flee to England' as he had good reason to fear somebody due solely to his dishonesty in working the mine. Indeed, it was alleged that he could have defrauded the 'English company' that employed him 'with perfect ease' and was accused of concealing the true richness of the lode with mud, so that whenever a company inspector or owner went down through the workings 'the existence of these rich veins might pass unnoticed'. The woman who lived above McParland in a farmhouse situated close to the walls of the second engine house and old spoil heaps, corroborated the locals' general ill feeling against Captain Bailey. She described how badly he got on with the miners and that wage disputes frequently occurred, which is confirmed by the reported strike in 1864.

Terence McParland, who claimed that he had worked at the mine 'from the day the first sod was cut', was involved in sinking the shafts and helped to take down the engines when the mine was closed, recalls the main shaft (new engine shaft) being 82 fathoms (150m or about 500 feet) deep, 11 foot by 9 foot, and lined with 9-inch square timbers to the bottom. Levels were driven from it mostly to the south where the best ore was found. Old engine shaft was further up the hill to the north.⁴³ That he was closely involved with the mine's development appears to be borne out by the naming of the earliest shaft after him. Bailey's decision to sink the old engine shaft atop the hill was questioned by McParland who, by his own admission stated that he was no engineer, yet wondered why he had sunk a shaft where it had to be driven deeper and water thus pumped from greater depths. He was aware of the accusations of Bailey's dishonestly, that he deliberately 'picked the eyes out of the mine' keeping the best ore for himself to send away independently of the company, but was rather more reserved in his judgement of the man: 'Of course I often saw him make up the stuff in little bags to send it away. They say he shipped lots of the richest of it for himself. Of course, who can say now?' One thing is certain, Bailey certainly had sufficient money to purchase a silver-lead mine in Cornwall in 1877.

⁴³ The *Dundalk Democrat* quotes McParland as stating that the levels driven on what we have termed new engine shaft were the 13, 28, 33, 45, 60, 73 and 82 fathoms, where Bailey's reports refer to old engine shaft of which the upper levels were the 15 and 23, and that the lower levels were the 60 and 72. As shafts were normally measured from adit level (and there is no main adit at Creggan) the difference in fathom level could arise from the measurements being taken from the shaft collar.

Even some 80 years after the cessation of the mine under the Dundalk Company, Bailey was still being maligned by the local people, with Hugh Murphy of Cregganbane writing to the Geological Survey of Northern Ireland (GSNI Archive) that when the mines were first in operation, 'they were doing rightly for some time':

But whoever was in charge seems to have been rather too fond of liquor and was not returning official records to the company concerned; this, allied to the fact that the workmen got into the same way of carrying on, with the result that there was a general "devil may care" attitude about the place.

TWENTIETH CENTURY ATTEMPTS TO RE-OPEN CREGGAN

Considerable excitement was occasioned in the area in 1901 when it was reported that negotiations were afoot for the re-opening of the mine. The *Dundalk Democrat* waxed lyrical about how 'the gaunt wreck of the old engine-house' (Figure 9) formed a prominent feature of the landscape, 'towering against the western sky as one crosses the bridge that spans the river gorge beside the pretty grounds of the Parsonage' and was a constant reminder of 'better days in times past':

Among the white washed cottages of the peasantry, the whisper of the possible reopening of the mines awakened hopeful echoes, for to them it would mean work for all the men and boys at home, good wages and a return of old-time prosperity.

However, it seemed that this potential reopening came to nothing and it was not until 1910-11 that attempts were made to rework the mine for lead and barites by Hume and Frame under the agency of Robert Murray of Beauparc Copper Mining Company, County Meath. The re-working came about after another lead lode was discovered in a well that was being deepened on a farm (the site of the former dressing floors near the old engine shaft). The well was widened to about 8 feet by 6 feet and developed into a shaft 25-30 feet deep, from which two small NE-SW adits were driven from its base. A 3.5 feet lode of galena trending E-W was met with and was said to have been worked for a short distance. It apparently increased in size at depth. Presumably, to intercept this lode, a 130 feet shaft was sunk ENE of the well and drifts driven to the north and the west of this shaft 'to the width of the field' (GSNI Archive).

Between 3-10 people were employed underground and 4-10 at the surface during this re-working. One of the miners was 24 year old Bernard McParland, the son of Terence McParland (NA Census 1911). Three Loy brothers, John (24) Thomas (23) and Felix (21), the sons of farmer, Thomas Loy, resident at Creggan Bane Glebe, were also enumerated as lead miners on the 1911 Census returns, as were Owen Hearty (35) and Arthur Mulligan (22) from nearby Drumbally, Crossmaglen. According to Hugh Murphy of Cregganbane, this company had no plans of the old workings to guide their endeavours and

blasting into a chamber of water was a constant worry. The only method of pumping deployed by the company was use of a hand windlass and bucket, hence most of the time was spent keeping the workings unwatered. No ore was met with in the new shaft and operations soon ceased (GSNI Archive). A geophysical analysis of all of the 'disused' lead mines of Armagh was undertaken in the autumn of 1957, which concluded that lead ore in commercial quantities does not exist at any of the abandoned mine sites in the county (GSNI Archive).

WHAT CAUSED THE DEMISE OF CREGGAN AND RELATED SILVER-LEAD MINES?

If the Mineral Statistics are to be believed, Creggan, one of the last survivors of a number of mid-nineteenth century silver-lead mines that were wrought in Armagh and Monaghan, was a totally unsuccessful operation recording during its seventeen years of life, in total, 293.5 tons of ore from which 209.4 tons of lead was obtained and just 300 ozs of silver. For a mining company allegedly employing hundreds of people for almost two decades which invested in costly machinery, including three steam engines and that sank several shafts, at least one of which was 150 metres deep with seven levels off it, the published returns from Creggan are surprisingly and disappointingly small.

However, some of the information contained within the Mineral Statistics is clearly questionable and must therefore be treated with considerable caution. Entries for Creggan mine have been confused with other mines in the vicinity (most notably, Hope Dundalk) and empirical evidence from the contemporary press show that it was working in 1864 when the Mineral Statistics state it was suspended. Moreover, production figures were clearly not collected every year for Creggan, as those for 1853 have been completely omitted and furthermore, the amounts published in the Mineral Statistics do not reflect the reports filed by Bailey that appeared in the *Mining Journal*. Where, for example, is the record of the six tons of ore that Bailey states were 'in the storehouse' and that he expected to augment to ten tons in March 1860? That incomplete returns might have been made to the Mineral Statistics by mines in the region is substantiated by the Coolartra Mine operated by Conn and Williams. This was reported in the local press to have been raising sizeable quantities of ore each month that never appeared in the Mineral Statistics for 1851. Additionally, details of the quantities of lead ore sold by College Mines Ltd. that were sent to the Bursar of Trinity College in 1857-8 do not tally with the published Mineral Statistics.⁴⁴ With some of the small tonnage sales from College Mines being made to potteries and even local shopkeepers, it is reasonable to suggest that many of these probably went unrecorded and the same might well be true for lead mines elsewhere in the region, including Creggan. The deficiencies highlighted by this paper regarding the Mineral Statistics point to the fact that

it proved difficult to acquire accurate and regular annual returns from smaller, mid-nineteenth century companies in certain parts of Ireland, especially when there was no legal requirement to submit these.

And what of the Dundalk company in its various incarnations, which never recorded paying a dividend: was it an elaborate scam? There are examples aplenty of nineteenth century mines set up to beguile and defraud a gullible public (see Cowman 2003 and 2010, for some Irish examples). While this cannot be ruled out for Dundalk there is, however, no evidence in the *Mining Journal* or the contemporary press to suggest that any doubts were cast by shareholders on the integrity of the company or its management, in contrast to many other nineteenth century Irish mining companies, such as the infamous Connorree. So therefore, was its long term Agent, Captain Bailey, as dishonest and dissolute as alleged, responsible for poor book keeping and for failing to supply accurate annual reports of the mine's output to the Mineral Statistics, while secretly selling the ore to enrich himself? Or was he disliked for being an outsider, an intractable Cornishman who rubbed the local population up the wrong way? A report by Nolan (1877, 34) offers a more prosaic view explaining the mine's demise and leads us to believe that some of the comments made in the 1901 newspaper report should perhaps be taken with a pinch of salt: 'Parts of the lode are very good, and have produced fine bunches of lead; in other parts, however, the yield was poor, so that the work was abandoned'. Indeed, McParland stated as much himself when discussing the lode.

There is a lack of detailed geological data for Creggan Mine and only surface samples of quartz and barite gangue have been collected during the field investigations for this paper. Contemporary reports by Bailey in the *Mining Journal* describe a mineral lode running between the (old) Engine Shaft and McPartland's shaft which would give a SW-NE strike to the lode (it dips 70° WNW). The lode was of variable width, being generally 3-4 ft wide (90-120 cm) on the 15 fathom level between the two shafts but thinning to 1½ ft (45 cm) wide south of McPartland's shaft and also thinning or even terminating against a cross fault to the north of the Engine shaft. The lode appeared to hold its width at depth and the geometry would suggest that the ore shoot had a restricted lateral extent but a good vertical extent. The vertical nature of the oreshoots in the lead deposits of the Longford-Down terrane was also reported by Krol (1952) who described how the ore shoots are controlled by stratigraphy (as well as the fault which forms the vein). Krol notes that lead-zinc mineralisation is confined to those portions of the lode which cut through arenaceous beds ('grit' as he calls them - but more correctly Greywackes). In the more argillaceous beds (slate and schist) Krol observed little mineralisation.

The steep vertical plunge of the oreshoots can be explained by the nature of the intersection of the lode fault structures with the bedrocks. The host bedrocks in the middle tract of the Longford-Down Inlier are typically tightly folded with steep limbs (70 degrees to vertical) and strike almost perpendicular to the lode. Thus, in cross section along a vein, it would be seen that the 'grit' beds dip steeply downwards whilst their

44 In 1857 Mineral Statistics note 30 tons of ore were sold, while the College Mines letters to Trinity College record sales of 41 tons, and the following year the totals are 69 tons in the Mineral Statistics as opposed to 57.5 tons of ore in the company's letters to Trinity.

horizontal extents in the line of the lode is restricted. The fact that the economic lead-zinc mineralisation is confined to the 'grit' beds and their steep dip gives oreshoots which have a small horizontal extent but a great vertical extent (Krol likens them to pipes). Strike-slip movements coupled with inflections along strike of the lodes may also have limited the lateral extent of the oreshoots. It is highly likely that the form of the oreshoots resulted in the short working periods of many of the mines in the nineteenth century when it was realised by the operators that the oreshoots plunged steeply downwards and this meant deeper workings which required expensive pumping equipment that ate up capital, meaning the mines thus became uneconomic to operate. Krol also states that much of the mineralisation was not true infill of a single fault structure but usually took the form of veinlets within the 'grit' beds and Morris (1984) also notes the presence of mineralised breccias ascribed to hydraulic fracturing. Investigation of the 'Well' Shaft at Creggan mine by the Geological Survey of Northern Ireland in 1958 (Murray and Bramwych) also noted that the lode near to the surface consisted of brecciated greywacke in a matrix of galena and barytes. The lack of a 'true' lode structure may also have been a constraint on the economic working of the deposits in the nineteenth century. By comparison, the lead deposits at Wanlockhead-Leadhills in Scotland were more successfully mined (yielding at least 270,000 tons of ore in period 1842 to 1958) because the high density of closely spaced and intersecting lodes meant that mining was not just reliant on the vagaries of small oreshoots on a single lode.

The vein mineralogy is described in Bailey's reports as being comprised of silver-lead [galena], blende [sphalerite], baryte and quartz, often accompanied by 'prian' a soft grey clay [fault gouge]. The ore grade was given in the form of tons or cwt of ore per [square] fathom.⁴⁵ The maximum quoted grade was one ton per fathom (over 4 foot width - equivalent to about 3.5% metallic lead) declining to 5 cwt per fathom as the lode thinned to 1-2 ft wide. In comparison, the Lunganure mines in County Wicklow averaged two tons per fathom (London Encyclopaedia 1827, 167). Krol (1952) also records low lead values in the Monaghan deposits (1.7% to 2.7%) but locally high zinc values (7%). The silver content of the Armagh-Monaghan deposits also appear to be low, despite many of the mines being called silver-lead mines. The Mineral Statistics for 1867 for Creggan records 80 tons of ore which yielded 300 ounces of silver; a grade of 3.75oz Ag/Ton (105 ppm). This compares to 7oz/ton at Lunganure (Wicklow) in 1868 and 25oz/ton at Shallee (Silvermines, Tipperary) in

1866.

In 1859 it was noted that expenditure at Creggan amounted to £145 per month and this would require raising 12 tons per month to cover costs, but production figures published in the Mineral Statistics never matched this figure. In fact the Mineral Statistics record little overall production at the mine and there appears to be a discrepancy between the quoted depth of the final workings (500 feet or 150m), the volume of the ore body exposed to this depth and the very low ore returns in the mineral statistics. If all the lode had been stoped out to the 150m level, then taking the distance between Old Engine Shaft and McPartland's shaft of 200m (100 fm), an average grade of 10 cwt per fathom would give a theoretical maximum ore production of 7,500 tons. The total recorded production in the Mineral Statistics for the period 1852 to 1869 is just 267.5 tons. The discrepancy between the theoretical and actual tonnages could be due the geological nature of the oreshoots (as already described), the limited stoping/extraction on the lower levels, or, more likely, incomplete returns made to the Mineral Statistics.

It seems that a combination of geology and economics were ultimately to blame for the demise of mining in the region. The mainly Scottish management and investors, after considerable expenditure in the 1860s on state of the art pumping equipment to enable thorough deep lode working of the ore deposits, realised after a few years that Creggan and related lead mines in Armagh and Monaghan were never going to yield commercially viable amounts of lead ore like the mines at Wanlockhead and geologically related areas of Scotland. They were therefore unwilling to sink endless capital into fruitless ventures which explains the sudden withdrawal from the area of a number of companies after a relatively short life in the late-1860s.

⁴⁵ The mine quoted ore values in tons per a square fathom (a common measurement for British and Irish mines in the C19th) as this would give an idea of yield/value for a one fathom long by one fathom high (6x6 ft) stope across the full width of a vein. It would probably also be easy to evaluate when driving a level and makes it relatively easy to calculate tonnage of blocks between levels and shafts from just measuring the area on a longitudinal section of a mine. The measurement does not give an estimate of grade unless you know the width of the vein. For most veins of say 4 foot width or less then the width does not affect the economics of mining too much as there is a certain minimum width which has to be mined. At Creggan 1 [square] fathom would be 4 about 4 cubic metres for a 4 foot wide vein. One ton of galena is about 0.14 cubic metres in volume taking a specific gravity of 7.5. Thus one ton per fathom of lead ore for a 4 foot wide vein = 0.14/4 which is approximately 3.5% lead ore.

**APPENDIX ONE:
PUBLISHED PRODUCTION FIGURES FOR THE CREGGAN SILVER-LEAD MINE, CO. ARMAGH**

*Source: annual Mineral Statistics unless **

Year	Ore (Tons)	Pb (Tons)	Ag (Ozs)	Value of Ore (£)	Min Stats Comments	Company Details
1852	62.50	38.80		£651 3s 6d*	Under Dundalk, Louth	*Dundalk Silver Lead Mining Company
1853	26.00*			£348 5s*		
1854	39.00	29.00 (21 tons of this total)*		Sold in June £267 15s*	Under Dundalk, Louth	
1855						
1856						
1857						
1858						
1859	20.00	14.30		£262 5s*	Under Dundalk, Louth	
1860					Under Dundalk, Louth, listed, no production figures recorded	
1861						
1862					Under Dundalk, Louth, listed as suspended	
1863						*Dundalk Silver Lead and Copper Mining Company Ltd.
1864						
1865						
1866						
1867	80.00	6.00	300		Dundalk Silver Lead Mining Co., under Armagh. Samuel Bailey Manager	
1868	70.00	53.00			Under Dundalk, Louth	
1869	22.00	14.30			Under Dundalk, Louth	
TOTAL	293.50	209.40	300	£1529 8s 6d		

APPENDIX TWO: INDUSTRIAL ARCHAEOLOGY OF CREGGAN AND TULLYDONNELL

Tullydonnell

Two separate copper lodes exist in the area and both were the subject of a geophysical survey prior to a shaft capping programme on health and safety grounds in 1995.

In 1901 the 'deserted engine-house and tall chimney stack, crumbling to decay on the banks of the rocky burn alongside the high road' (DD 1901) at Tullydonnell, were familiar sights. The buildings are long gone and the site is now residential. The owner of the modern property built on the former mine site fell into the flooded main shaft some 15 metres deep located between his bungalow and workshop which suddenly opened up after heavy rain in May 1994. It was flooded to within 2.4 metres of the surface and the diameter of the hole was some 5 metres. This was the old engine shaft that was driven/deepened by the Dundalk Mining Company to about 360 feet (110 metres) and which was consequently excavated to bedrock and capped (Kirk McClure Morton 1995). The metal manhole cover was lifted during our field visit to reveal a flooded concrete chamber leading to the capped shaft. Clinker that is likely to have come from the former engine's boiler house forms a mound adjacent to the stream where a greenhouse is now situated (UK habitats citation).

Above the burn, an adit or level was driven that intersects the engine shaft which is sited about 30 metres away. The entrance to this level is extant but it has been backfilled to within 3 metres of the opening (Figure 13) and the front has been landscaped by the owner. Presumably, the engine shaft was sunk on this adit to test the lode at depth at a later date. The landowner notes before the engine shaft was capped, he explored a drive (that terminated in a collapse) to the NW that presumably follows the strike of the lode. A former spillway (for the water raised by the engine) discharged into the burn



Figure 13. Mick Carragher at the entrance of the level above the burn that leads into the Tullydonnell Engine Shaft. The level has been backfilled to within 3 metres of the now landscaped entrance

and was discovered a few metres to the right of the level entrance by the landowner when he was landscaping the area. He described it as a wooden lined culvert which is now not observable (pers. comm. 2012).

About 225 metres to the south of the engine shaft behind a modern residence is what appears to be a trial drive on a fault running in a NE-SW direction that extends around 32 metres into the hillside (Figure 12). Pick marks may be seen at the forehead but no signs of copper mineralisation were observed in this working that is noted on the 1873 field slip as 'level in search of copper'. It is driven in extremely friable ground and was once much longer in extent, the owner having cut away the entrance and part of the level with a digger. About 600 metres NE of the engine shaft is a former trial shaft sunk on a NNW trending lode, betrayed by a circular depression about 2-3 metres in diameter and about 1.5 metres deep. This was driven by the MCI in the early 1850s to a depth of about 9 fathoms (16.5 metres) and has been backfilled or capped; there is no obvious sign of subsidence (Kirk McClure Morton 1995). To the north and south of the trial shaft, there are several indentations along the strike of this lode that might relate to ancient lode back workings or nineteenth century costean pits to prove the lode.

Creggan

The mine site at Creggan was the subject of a geophysical survey prior to a shaft capping programme on health and safety grounds in 1995.

Egan describes the tall chimney stack of Creggan's Cornish pumping engine not long after the mine's closure as being a 'conspicuous object for many miles around' (1877, 34). It was not integral to the engine house and appears to have vanished by 1901 as it is not mentioned in the newspaper report which describes the extant remains of the Cornish pumping engine house, which was in a parlous condition back then. Terence McParland who occupied 'a neat cottage at the road side' was reported as planting cabbage 'in the very ruins themselves' while 'above his head towered a pile of masonry that must have cost hundreds of pounds to put up, roofless, its thick walls cracked already, possibly by some subsidence of the mined ground...' (DD 1901). The environmental damage inflicted by lead mining on the landscape is hinted at, with the 1901 report noting how fowls (poultry) were unable to thrive there, as there was something in the soil that poisoned them (DD 1901). A fine photograph of the Cornish pumping engine house dating to 1926 (Figure 9) has survived showing the bob wall and southern wing wall of the structure. However, in the summer of 1931 the local landowner apparently stripped it of its quoins which were offered for sale and a local contractor took the remaining stone for road dressing (Carragher, 1999).

A site visit in 2012 confirmed the extant remains of Terence McParland's house which was formerly the mine office, situated at the entrance to the mine site, the old gateway of which leading into a courtyard is extant but no longer in use. The building is inset from the road, immediately below the

gently rising ground where the pumping engine house once stood on a distinctive, well vegetated flat topped mound. There is no evidence of spoil from the shaft suggesting that it has been largely removed and the site forms part of a field utilised for pasture. Not even the footprints of the engine or boiler houses are visible, but amazingly, several sections of pump rod, eight inches square and manufactured from pitch pine, were located close to the manhole cover that marks the site of the capped shaft and were probably hauled out of the shaft during capping (see Figure 14). These have since been removed for conservation. The site of McPartland's Shaft in the eastern corner of the field was not evident, but fragments of barite were observed in the old courtyard in front of the former mine office that might have come from the dump of this shaft.

The remainder of the site to the north, where the old engine shaft and related engine and boiler house, Cornish rolls crusher, blacksmith's and carpenter's shop, storehouse, powder house, dressing floors and twentieth century Well Shaft were located, has been considerably altered. Following the mine's closure in 1869, the site became a farm and the engine house and related buildings were probably robbed for stone to build a two storey slated house with a lean too (added on at a later date), the extant remains of which may be seen at 293769 317022. The OS map of 1862 shows a rectangular feature parallel to the engine house on the NW side and this

appears to be an engine pool with a possible launder leading to the dressing floor. We observed no trace of this in the field. There are no obvious remains of the extensive spoil heap shown on nineteenth century maps, but some fragments of barite were observed in the vicinity of the old dressing floors, now partially covered by a rectangular shed and cut across by an access track to the farm yard. The site of Well Shaft, which was capped during 1995, was observed close to the rectangular shed and is betrayed by a metal manhole cover identical to those at Tullydonnell and Creggan (New) Engine Shaft. We could find no obvious trace of the site of Old Engine Shaft and Underlie Shaft. The name 'Mine Hill' provides the only obvious clue that Creggan was once a site of industry.

ACKNOWLEDGEMENTS

The authors would like to thank Geoff Warke of the Geological Survey of Northern Ireland for his kind assistance with documents pertaining to the mines of Armagh and for his comments and suggestions on the final draft of this paper; staff at the Armagh County Museum for permission to reproduce the 1926 photograph of the Creggan Cornish pumping engine house and the archivist and staff of the Maps and Archives Research Library of Trinity College Dublin for their kind assistance. To the Public Record Office of Northern Ireland, we are grateful for permission to publish parts of the Rocque Map. Thanks also to Alastair Lings, for information on Irish companies held in the National Archives of Scotland. Mick Carragher, a native of Armagh, was kind enough to facilitate access with local landowners to mining remains on their properties at Creggan and Tullydonnell and attended our second field trip in July 2012. We especially thank Dennis Summers and Tom and Siobhan Garvey of Tullydonnell and Pat Largey and Michael Hearty at Creggan for their time and interest. Local historian, Michael McShane of the Creggan Historical Society, also accompanied us on our second field trip and we are most grateful to him for providing a much appreciated and fascinating contextual history of the area.



Figure 14. Sections of pump rod lie close to the manhole cover (just visible far left) of Creggan New Engine Shaft and were probably removed when the shaft was capped in 1995

PRIMARY SOURCES

- BPP- British Parliamentary Papers, 1842 (380.) XV.1, *Report of Commissioners for inquiring into the Employment and Condition of Children in Mines and Manufactories*, Appendix 1 to the first report (otherwise known as the 1842 Children's Commission). Reprinted as *Industrial Revolution Children's Employment* Volume 7, Irish University Press, 1968.
- CRO - Cornwall Record Office, Truro, BRA 833/406, *Summons to bankruptcy court against Henry Conn, St. Clement and Gwennap, arsenic manufacturer and dealer*, 31 Mar. 1843; H/1/1-179, *In-letters to Harvey's Foundry, Hayle, 1829-1904*.
- GSNI – Geological Survey of Northern Ireland Archives, Belfast, *Undated letter from Hugh Murphy of Cregganbane to the Geological Survey of Northern Ireland*.
- NAK – National Archives Kew, BT 31/386/1445, *Company No: 1445; Dundalk Lead Mining Company Ltd. Incorporated in 1859. Dissolved before 1916*.
- NAS - National Archives of Scotland, BT2/106: Hope Silver Lead Mining Co Ltd; BT2/119: Coolartra and Bond Silver and Lead Mining Co Ltd; BT2/152: Dundalk Silver Lead and Copper Mining Co Ltd; BT2/326: Armagh Lead Mining Co Ltd; BT2/134: Great Northern Mining Co of Ireland Ltd.
- PRO Public Record Office, Dublin, D 20,156, *Lease of lead and copper mines at Coolartra, Cremore Barony, Co. Monaghan, by Wadham Windham to Capt. Henry Conn*, 26 July 1854.
- PRONI – Public Record Office of Northern Ireland, Belfast, D3053/5/14/2, *Indentured Articles of Agreement...* D1594/291 and 129212, *A Topographical Map of the County of Armagh, to which is Anex'd the Plans of Newry and Armagh, 1760*.
- TCD – Trinity College Dublin Maps and Archives Research Library, Dublin, MUN/P/24/452 *Correspondence between the College Mines Company Ltd. Keady, with the Bursar of Trinity College, Dublin*.
- 1999, pp. 10-11.
- Cole, G.A.J., *Memoir of the Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland*, Mining Heritage Society of Ireland edition, Dublin, 1998.
- Coote, C., *Statistical Survey of the County of Monaghan, With Observations on Means of Improvement Drawn up in the Years 1801, For the Consideration and Under the Direction of, the Dublin Society*, Dublin, 1801.
- Coote, C., *Statistical Survey of the County of Cavan, With Observations on Means of Improvement Drawn up in the Years 1801, For the Consideration and Under the Direction of, the Dublin Society*, Dublin, 1802.
- Coote, C., *Statistical Survey of the County of Armagh, With Observations on Means of Improvement Drawn up in the Years 1802, and 1803, For the Consideration and Under the Direction of, the Dublin Society*, Dublin, 1804.
- Cowman, D., *The Making and Breaking of a Mining Community: The Copper Coast, County Waterford 1825-1875+*, Waterford 2006.
- Cowman, D., 'Mining Scams? Three examples from Wicklow', *Journal of the Mining Heritage Trust of Ireland*, 2003, pp. 9-14.
- Cowman, D., 'Re-assessing a "scam": Connaree Mining Company 1859-1872', *Journal of the Mining Heritage Trust of Ireland*, 2010, pp. 11-12.
- Egan, F.W., *Explanatory Memoir to Accompany Sheet 59 of the Maps of the Geological Survey of Ireland, Including the Districts of Newtownhamilton, Keady and Castleblaney*, Dublin, 1877.
- Gorton, J., *A Topographical Dictionary of Great Britain and Ireland*, (in 3 Vols.) Vol. 1, London, 1833.
- Griffith, R.J., 'Catalogue of the several localities in Ireland where mines or metalliferous indications have hitherto been discovered', *Journal of the Geological Society of Dublin*, 9, 1861, pp. 140-155.
- Halliday, A.N., and Mitchell J.G., 'K-Ar ages of clay concentrates from Irish orebodies and their bearing on the timing of mineralization', *Transactions of the Royal Society of Edinburgh: Earth Sciences*, 74, 1983, pp. 1-14.
- Hunt, R., *Records of the School of Mines and of Science Applied to the Arts*, Vol. 1, Part IV, London 1853.
- ICS – Institute of Cornish Studies, Minor Classics, No. 1, *Sketch of the Life of William West, C.E., of Tredenham, Redruth*, 1973.
- Ineson, P. R., and Mitchell, J. G., 'K-Ar isotopic age determinations from some Scottish mineral localities', *Transactions of the Institution Minerals and Metallurgy (B)*, 83, 1974, pp. B13–18.
- Kane, R., *The Industrial Resources in Ireland*, Dublin, 1844.
- Kinahan, G.H., 'Economic Geology of Ireland', *Journal of the Royal Geological Society of Ireland*, Vol. 8, 1889.
- Kirk McClure Morton, *Mineshaft Stabilisation Project: Cregganduff Lead Mine (Disused) Final Report*, Unpublished Report to Geological Survey Northern Ireland, 1995.
- Krol, G.L., *The Lead-Mine Deposits North of Castleblaney, Ireland*, unpublished report, Billiton N.V., 1952.
- Lean, T., *Historical Statement of the Improvements made in*

- the Duty Performed by the Steam Engines in Cornwall*, London, 1839.
- Leggett, J. K., McKerrow, W. S. and Eales, M. H., 'The Southern Uplands of Scotland a Lower Palaeozoic accretionary prism', *Journal of the Geological Society*, 136, London, 1979, pp. 755–70.
- Lewis, J., *A Richly Yielding Piece of Ground: A History of Fowey Consols Mine 1813 to 1867*, St Austell, 1997.
- Lewis, S., *A Topographical Dictionary of Ireland*, 2 Vols. London, 1837.
- Lings, A., 'The Cashel Silver Lead Mine, County Monaghan', *Journal of the Mining Heritage Trust of Ireland*, 2009, pp. 33-35.
- Tegg, T., *The London Encyclopaedia or Universal Dictionary of Science, Art, Literature, and Practical Mechanics Comprising a Popular View of the Present State of Knowledge*, Vol. XII, London, 1829.
- MacKay, R.A., 'The Leadhills Wanlockhead Mining District', Symposium of Non Ferrous Mining in Scotland, Institute of Mining and Metallurgy, 1959.
- Mining Company of Ireland, *Reports of the Mining Company of Ireland From April 1824 to December 1855*, Dublin, 1855.
- Mining Heritage Society of Ireland, *Reports of the Board of Directors to the Mining Company of Ireland 1847-1852*, transcript, n/d.
- Morris, J.H., *The Metallic Mineral Deposits of the Lower Palaeozoic Longford-Down Inlier, in the Republic of Ireland*, Geological Survey of Ireland, Dublin, 1984.
- Morris, J.H., *Lead Deposits in the Vicinity of Keady, County Armagh*, 1985.
- Morris, J.H., 'A Catalogue of Mines and Mineral Occurrences in Ireland', *Journal of the Mining Heritage Trust of Ireland*, 2001, pp. 25-37.
- Morris, J.H., *Gold and base metal mineralisation in the Clontibret region of County Monaghan*, Unpublished notes for field excursion of the Irish Geological Association, 18th April 1990 (copy in GSI archive item 90/9).
- Morris, J.H. and Parkes, M., 'Survey of the Historic Mine Workings Exposed in McQuaid's Quarry, Lemgare, Clontibret, Co. Monaghan', *Journal of the Mining Heritage Trust of Ireland*, 2001, pp. 57-60.
- Morris J.H., Lally, P., and Cowman, D., 'A History and Survey of Mine Buildings at the Tassan Mine, Co. Monaghan', *Journal of the Mining Heritage Trust of Ireland*, 2002, pp. 41-49.
- Murphy, C.G and Bramwych, M., *Report of the geophysical investigations at the sites of the principal 'disused' lead and copper mines of southern Armagh*, Unpublished Report to Geological Survey Northern Ireland, 1958.
- Nolan, J., *Explanatory Memoir to Accompany Sheet 70 of the Maps of the Geological Survey of Ireland, Including the Country Around Dundalk and Carrickmacross*, Dublin, 1877.
- Schwartz S.P, and Critchey M.F., *Mining 'the Garden of Ireland': Wicklow's Metal Mines and Mining Communities*, Dublin, forthcoming.
- Sproule, J. (ed.), *The Irish Industrial Exhibition of 1853: A Detailed Catalogue of its Contents with Critical Dissertations, Statistical Information and Accounts of Manufacturing Processes in the Different Departments*, Dublin, 1854.
- The Dublin Society, *Transactions of the Dublin Society*, Vol. 1, Part II, Dublin, 1800.
- MacMillan, J., 'Rev. Daniel Gunn Brown' (1930), reproduced in the *Journal of the Creggan Historical Society*, 1990.
- Warke, G., Personal Communication, June 2012.
- Willies, L., 'John Taylor in Derbyshire 1839-1851: Part II', *Bulletin of the Peak District Mines Historical Society*, Vol. 6, No. 5, 1977, pp. 218-132.
- Newspapers and Periodicals**
- AG – *Armagh Guardian*, 20 May 1845.
- BMM – *Belfast Monthly Magazine*, 28 February 1809; 30 April 1810; 13 June 1814.
- BNL – *Belfast News-Letter*, 9 April 1784; 26 March 1839; 7 June 1850; 8 October and 10 November 1851; 5 January and 7 May 1852; 12 April 1854; 16 July and 18 September 1856; 5 October and 30 December 1859; 22 December 1862; 18 January, 17 March and 12 May 1866; 14 and 26 September 1867; 20 January 1870.
- CM – *Caledonian Mercury*, 8 May 1851.
- DB – *Dublin Builder*, Vol. V. No. 89, September 1863.
- DD – *Dundalk Democrat*, 25 May 1850; 4 May 1901; 18 May 1901.
- DN – *Daily News*, 30 October 1851; 25 April 1853; 10 June 1854; 6 April 1859.
- EG – *Edinburgh Gazette*, 4 February 1870; 25 November 1881.
- FJ – *Freeman's Journal*, 7 January 1842; 24 October 1848; 8 June 1849; 24 June 1850; 27 November and 29 December 1851; 30 May 1853; 6 January 1854; 8 July 1856; 9 March 1864; 30 Jan 1866; 7 October 1867.
- GH – *Glasgow Herald*, 5 September 1862; 8 September 1862; 18 July 1870.
- IT – *Irish Times*, 14 October 1859; 10 January 1860; 17 September and 4 December 1863; 16 July 1864; 13 March 1865; 18 April 1865; 3 July 1922.
- LG – *London Gazette*, 11 January 1867; 22 November 1881.
- LM – *Liverpool Mercury*, 10 March 1843; 6 May 1851.
- LWN – *Lloyd's Weekly Newspaper*, 11 May and 27 July 1851.
- MC – *Morning Chronicle*, 24 November 1856.
- MJ – *Mining Journal*, 24 January, 12 June and 26 June 1852; 8 April and November 25 1854; 26 March, 2 April, 16 April, 23 April, 30 April, 14 May, 21 May, June 11, 18 June, July 9, 13 August, 1 October; 29 October, 5 November, 12 November, 19 November, 26 November, and 17 December, 1859; 17 March, 7 July, 21 July, 28 July 6 October, 10 November, 24 November and 16 December 1860; 21 March 1863; 13 October 1866; 9 February and 10 August 1867.
- MP – *Morning Post*, 17 April 1848; 24 April 1861; 11 February 1867; 25 July 1871.
- NSNTJ – *Northern Star and National Trades' Journal*, 26 April 1851.
- RCG – *Royal Cornwall Gazette*, 4 September 1835; 30 October 1835; 12 July 1839; 7 July 1843; 31 October

1851; 15 October 1852; 5 December 1856; 10
October 1874; 21 October 1881.

S – *Standard*, 26 January 1852; 13 February 1860.

TEFP – *Trewman's Exeter Flying Post*, 14 March 1860.

TT – *The Times*, 21 May 1852; 8 March 1864.

WB – *West Briton*, 3 December 1852; 24 June 1853; 26
August 1853; 26 September 1887.

WDWA – *Wrexham and Denbigh Weekly Advertiser*, 17 June
1854.

Internet sites

Age of Nelson, <http://www.ageofnelson.org/index.html>
accessed 21 May 2012.

Conroy Minerals, [http://conroydiamondsandgold.com/
projects/ireland/armagh-monaghan/clontibret/
mineralisation.php](http://conroydiamondsandgold.com/projects/ireland/armagh-monaghan/clontibret/mineralisation.php) accessed on 6 July 2012.

County Armagh Mineral Resource Map, Northern Ireland:
[ftp://ftp.bgs.ac.uk/pubload/jmank/NI_MinMap/
Armagh_Mineral_Final.pdf](ftp://ftp.bgs.ac.uk/pubload/jmank/NI_MinMap/Armagh_Mineral_Final.pdf) accessed 25 May 2012.

National Archives Census for 1901 and 1911 [http://www.
census.nationalarchives.ie/](http://www.census.nationalarchives.ie/)

Silver Bowl, [http://www.thesilverbowl.com/documents/
TABLES/CregganBaptisms.html](http://www.thesilverbowl.com/documents/TABLES/CregganBaptisms.html) accessed 21 May
2012

The Conn Families of Devon and Cornwall, [http://freepages.
genealogy.rootsweb.ancestry.com/~aldo75da/devon.
html](http://freepages.genealogy.rootsweb.ancestry.com/~aldo75da/devon.html) accessed 21 May 2012.

UK Habitats [http://www.habitas.org.uk/escr/site.
asp?Item=567](http://www.habitas.org.uk/escr/site.asp?Item=567) accessed 21 May 2012.