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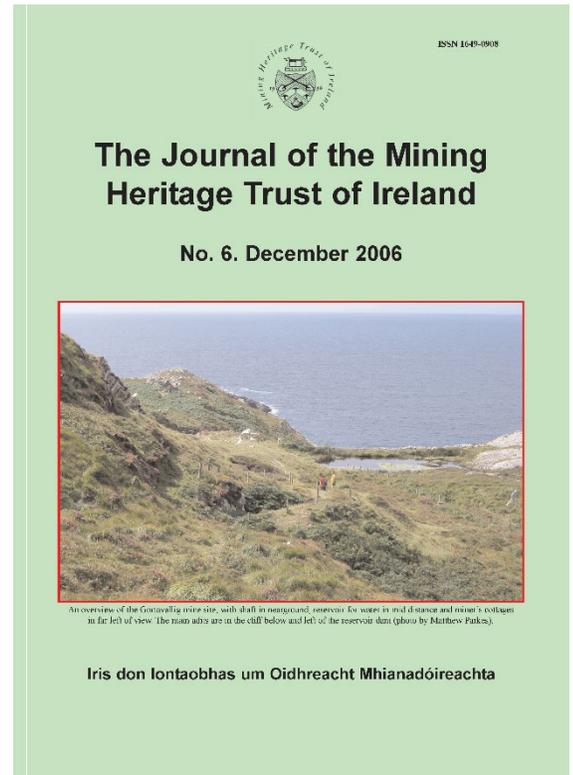
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QUARRIES, MINES AND RAILWAYS OF DALKEY

By John Barnett

Abstract: The settled Dublin suburb of Dalkey seems now an unlikely area of early 19th century extractive activity or of standing steam engine transport experimentation. However, evidence of all of these still survives. *Journal of the Mining Heritage Trust of Ireland*, 6, 2006, 17-21.

QUARRIES

Wherever you go in Dalkey, granite predominates. The hard grey speckled rock that sometimes glints at you is the backbone of Dalkey. It is a distinctive feature of Dalkey Island and Dalkey Hill. Any excavations in Dalkey will hit granite rock, and even in the overlying clays there are large granite boulders. Consequently, Dalkey has a significant history of quarrying. The huge Dalkey quarry is a backdrop to the town, but there were many other smaller quarries.

Much of Dalkey was built of granite excavated from the local quarries. Classic structures such as the Martello tower on the island and the harbours of Bulloch and Coliemore, the Castle of Bulloch and the Martello tower on Harbour Road. Notable fine religious buildings of local granite are St Patrick's Church, Loreto Abbey and the east (initial) building to the Church of the Assumption. On the main street of Dalkey, Castle Street, the Town Hall (formerly Goat Castle) now the Heritage Centre, the adjacent St Begnet's Castle and Archbold's Castle across the street are further evidence of buildings in the local granite. Many private houses and many a wall abounding Dalkey's narrow streets and lanes were built of random granite. Originally, all of Castle Street was laid of granite curbs and included cobblestones from the local granite, as can be seen in some of the sets at the entry into the old tramyard where the tramline into the yard is still preserved.

Granite from the principal quarry, Dalkey Quarry, was used for the building of Dun Laoghaire harbour and infrastructure between 1815 and 1859. Much of it was also used for paving stones in Dublin, and through the Ballast Board (whose job it was to improve the port of Dublin) for the construction of the South Bull Wall at the southern entrance to the River Liffey. The granite that outcropped on the northern side of the hill, was well jointed, accessible and of good quality. The quarry faces advanced into the hill in two benches and gravity assisted the transportation of the quarried and cut stone downhill.

For many years the working was on the face of the hill, at nearly its highest point. The material, which was obtained by blasting, was brought down by inclined planes which consisted of a 0.6 metre gauge double track running down the northern slope of Dalkey Hill along which the stone trucks were guided by an endless rope. One can still see the grooves cut into the stone by the rope. The quarry was opened at the entrance on Ardrubh Road and advanced over the years in a southerly direction. The excavations extended over an area of some 11 hectares (27 acres) and to a depth of about 21 metres (70 feet).

The two massive breakwaters of Dun Laoghaire, were extended out into a water depth approaching 10 metres. Their combined length is about 2.7 kilometres (3,000 yards and about 6 million tonnes of rough stone varying in weight from 8 tonnes to small rubble were utilised. In addition to this, a large portion of the superior ashlar (squared) blocks of which the two circular pier-heads, the Queen's Wharf and the Trader's Wharf, and the Steam packet Pier were constructed, was taken from the Dalkey quarries. In the working of the quarries it was necessary to have some very large blasts. On one occasion when some experiments suggested by Sir John Burgoyne were made, with a view to obtaining the maximum of large blocks fit for ashlar with a minimum of rubble, one mass of sound granite was separated, the volume of which was 51 cubic metres (i.e. almost 3.7m x 3.7m x 3.7m). The drill holes in the quarry for the larger blasts were of 11cm (4½ inches) diameter and 7 metres (22 feet) deep, the charge of powder was 27 kilograms (60 lbs), and the amount of broken rock required three weeks to remove, and was estimated to weigh about 3,000 tonnes.

The granite obtained from the Dalkey quarry is of clear grey colour and quartzose, the felspar being less abundant in it than on the eastern slope of the hill near Sorrento Terrace. The mica is well developed, and the aplite occurring in veins of variable thickness is common throughout the mass. The Sorrento granite, unlike that from Dalkey Hill, frequently contains plumose (feather like) mica. The next most important quarry in Dalkey was adjoining St Patrick's Church, on the northwest side. Not all of the stone for the harbour construction came from Dalkey; a quarry in Dun Laoghaire to the west of Windsor-terrace (now covered over and converted into the Peoples Public Park) was extensively worked for the last additions to the harbour and piers and other works in the neighbourhood.

All the quarries in and near Dalkey and Dun Laoghaire were apparently abandoned around 1890. The granite of Roche's Hill (500 metres southwest of the Dalkey/Killiney Hill complex) as well as that at the Dalkey Hill quarries, has two sets of main joints running through it, which strike for the most part north-east and south-west, one set inclined to the north-west, and the other to the south-east, the maximum inclination being 30°. Roches Hill was also a source of local granite, and the granite that appears on the western slope of the Hill in the townland of Killbegget, is remarkably close grained and quartzose. It is, perhaps the best for building purposes that can be found in the neighbourhood.

In 1900 curbing stone was sold at 1s to 2s (6cents to 13cents) the foot - run, delivered in Dun Laoghaire and Dalkey, window sills 2s 6d to 3s 6d (16cents to 18 cents) the foot, flagging 1s 3d

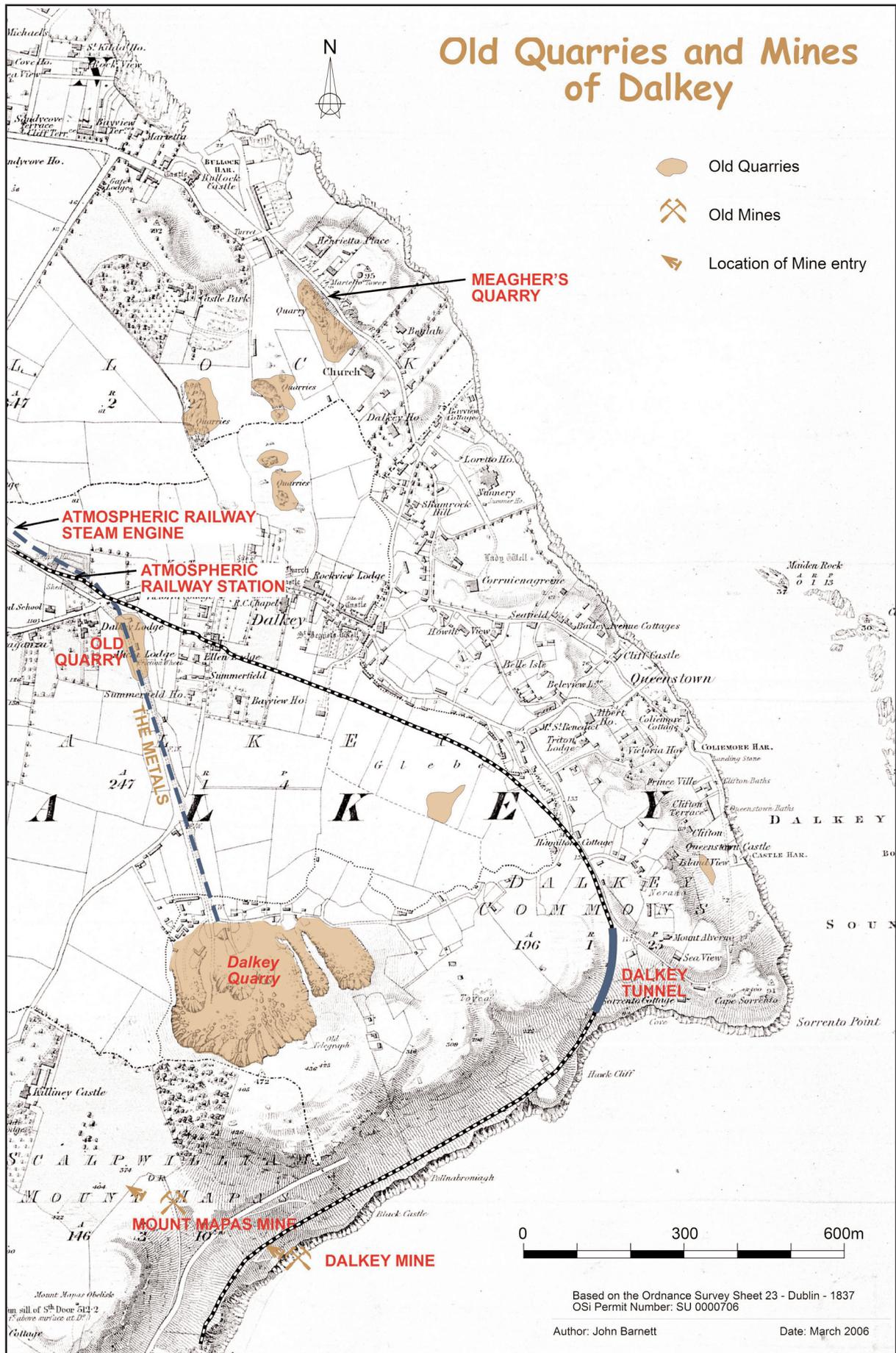


Figure 1. Map of mine, quarry and railway locations in the Dalkey area.

(8cents) per square foot, gate-posts and gate-pierheads. It was considered that the granite in Dalkey and Killiney was a difficult stone to dress, but was a more durable stone when compared to other granites in the Leinster granite mass, such as the granites obtained from Blessington district (Co Wicklow).

The map (Fig. 2) shows along with the main quarry the location of some of the other old quarries of Dalkey. The construction of Coliemore harbour with its two piers was commenced in 1868 and completed a year later in 1869. There are signs along Coliemore Road of old quarries that may have serviced this harbour construction. A number of developments took place on Ardeevin and Knocknacree Roads in the late nineteenth century, including the building of Craiglands House and Ardeevin Terrace on the site of an old quarry.

MINING IN DALKEY

Cole (1922) refers to two mine locations, Dalkey and Mount Mapas, Killiney Hill: "there is an adit running from the sea - shore south of Sorrento Point into the granite mass of Killiney Hill, with a shaft and other traces of mining a little to the south." This mine entrance can still be seen and is 50 metres northwards along the shoreline of Killiney Bay from White Rock. It is referred to locally as Decco's Cave.

The Dalkey mine was within the lands comprising the estate of John Mapas, and was begun in 1751 and is shown on John Roques map of 1756 as "Dalkey Lead Mines". John Wilson in a letter of 1768 states "adjoining the town, on the east side, is a large common, --- Some veins of lead ore have been discovered thereon, and assays made towards working the mines, but hitherto without success; and yet many circumstances induce me to think that a rich vein of ore may, one day or other, be found." John Rutty in 1772 wrote: "near Dalkey is a lead mine, where it is said that some hundreds of tons of ore have been raised. I got 42 grains of lead from 90 grains of ore, fluxed with equal parts of salt". This equates to almost 50% ore grade, not a bad assay.

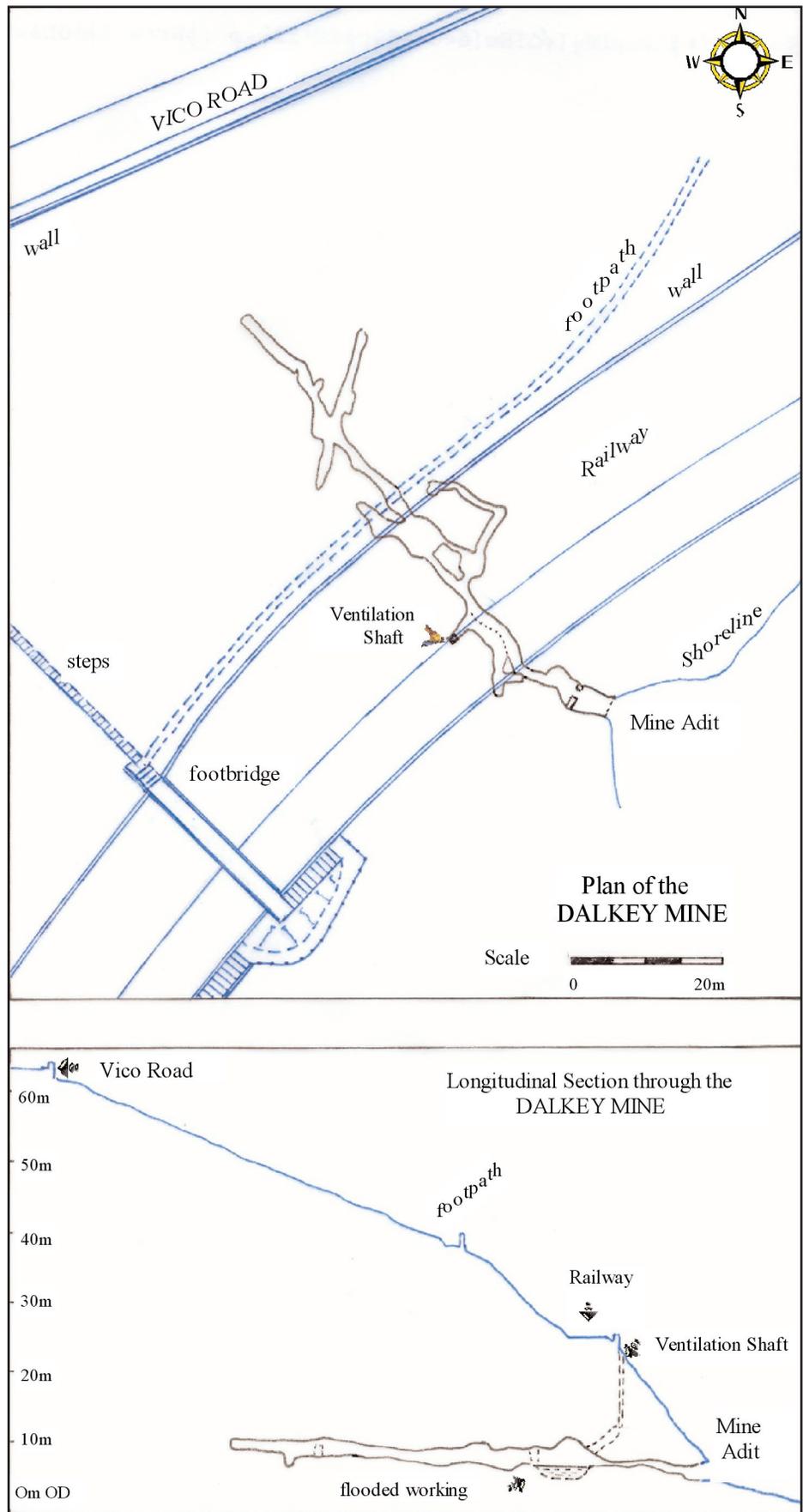


Figure 2. A plan and longitudinal section through Dalkey Mine

By 1790, it had ceased and it was reported that the mine was filled by seawater. It was probably not totally flooded and the reference to being filled by seawater was possibly the flooding of the excavations that extended below sea level in the first stope of the mine. Mining recommenced there about 1825 by the Royal Irish Mining Company, who worked two veins (Griffith, 1828) for a brief period. Griffith marks the site as Mount Mapas on his Map, and gives Killiney Hill as an alternative name (Griffith, 1861). This was the second mine in the area and was worked by shafts. Its location is in the wooded area beyond the Burmah Road public car park on the seaward upper slopes of Dalkey Hill. The minerals associated with these mines were lead, zinc blende and barytes. In the Killiney mine the barytes was apparently a waste mineral (gangue) but a commercial mineral at Dalkey.

The Dalkey Mine has an adit at sea level and a shaft about 15 metres up the cliff face from the sea. The actual adit entrance has the outer appearance of being a cave at the bottom of the cliff. One has to crawl for a few yards and then it opens out to the first stope. The stope has a height of 7 metres and a width of 1 to 2 metres, it also extended downwards, but this is now flooded. When the mine was in use the entrance was probably larger and subsequent debris over the years has caused the narrowing. Beyond the stope there are two branches or headings, the longer one to the left opens to a smaller stope and then to a fast end, so that the total length of the mine is 350 metres.

When the mine was being worked the principal mineral barytes was transported to Dublin port by barge and thence to Liverpool where it was used in the manufacture of paint, as its weight and physical properties added buoyancy. At present barytes is used as a drilling mud, to act as a lubricant and a retarder in oil borehole blowouts, as it is a high density form of clay. There was a jetty serving the mine but no signs of this remain today.

There has been difficulty in fixing the location of the Dalkey lead mines. Some have positioned the mines as being at Sorrento Point, and blocked up passages and tunnels have been reported in this vicinity, particularly near Sorrento Terrace. But as far as my searches go the location was at White Rock; there may have been trial diggings and explorations along the Dalkey coast line but I am not aware of any other commercial mines that operated within the Dalkey parish. There are barytes outcroppings along the shore, and a narrow vein of barytes is exposed on the foreshore in Dillon's Park, Coliemore Road. Barytes also occurs in thin veins in the granite of Rochestown Hill, and also in Victoria Park, Killiney (GSI Dublin Memoir 1903).

THE ATMOSPHERIC RAILWAY

The first railway to Dalkey was an atmospheric railway. It was opened in July 1844, and ran for 2.8 kilometres from Kingstown Railway Station to Barnhill Road, where the present railway bridge is, at the junction with Barnhill Grove. The Barnhill Road terminus of the Kingstown and Dalkey railway was a five minute walk from the village. There was a steam engine at the junction of the metals with Castlepark Road, where there is a small triangular area of undulating and over-

grown land between the metals and the present railway. Alongside the steam engine was a small reservoir to supply the water for the engine on the site of an old gravel pit. There was a chimney that dominated the sparsely populated landscape, and a great flywheel. The steam engine was used to create a vacuum within the 15-inch (38cm) diameter airtight pipe that ran along the centre of the track, a metal arm with flange from underneath the train was located in the pipe through a longitudinal slit. As the air was drawn out of the pipe by the steam engine a vacuum was created and new air entered the pipe to push the flange and the coaches along the pipe.

The steam engine was only used in one direction to bring the train up the gradient from Dun Laoghaire. The return journey was performed by gravity. Control on the downward journey was by brake operated by the brakes man. On one occasion a young rascal got into the van and let off the brake, the train went careering down the line and reached its top recorded speed of 128 kilometres per hour. Normal running speed by air was about 50 to 65 miles an hour, and under the gentler influence of gravity 29kph. The last 500 metres on the up journey to Barnhill was covered by the trains under their own momentum, as the air pipe did not extend all the way into the terminus. If the train stopped short of the station, the third class passengers were asked to push the train whilst the others walked. The alternative of an overshot did happen, and as there were no buffer stops the train would run off the track. In the main all went well with no recorded accidents.

The locomotive line was from Dublin to Kingston with atmospheric connection from Kingston to Barnhill Road: there were no stations at Glenageary or Sandycove & Glasthule at that time. The fares Dalkey to Kingston were; 1d third class and 2d second class. There was no first class. Trains ran every half hour between 6am and 6pm initially and then until 9pm when the Dublin Kingstown service was extended to 11pm.

The line was mainly in a cutting, some 2 to 3 metres below ground level. The excavation was in granite as the solid rock along the section of the line was quite close to the surface. There were ten bridges and one tunnel with only a 7.5cm clearance, so it was folly for a passenger to stick the head out! The track gauge of the atmospheric was 4ft 8½ins (1.43m). This was the mainline gauge adopted in Britain, whereas the Irish standard gauge was increased to the present 5ft 3ins (1.6m).

The section of the metals from Barnhill Road to Castlepark Road was known as the Atmospheric Road at the time of the atmospheric railway. It was not the track of the atmospheric railway but the roadway running alongside: its previous use was as the track for the conveyance of the granite materials from the quarry to the harbour.



Figure 3. The Atmospheric Road sign today.

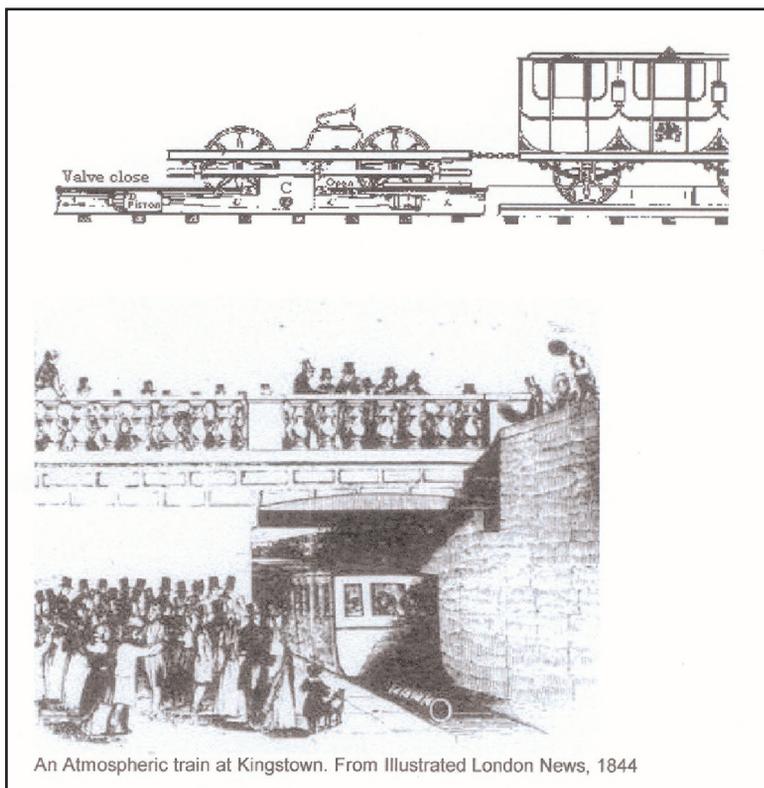


Figure 4. Contemporary illustrations of the Atmospheric railway from the Illustrated London News.

The problem with the atmospheric system of motive power was the maintenance of the air pressure as the slit running the length of the track had to be leak proof with a leather flap sealed with tallow and grease. However, the rats took a liking to eating the grease and in hot weather the tallow ran so that the air seeped out of the pipe. Another problem was ensuring leak proof joints along the track at crossovers and points, so for any extended system of railway it wasn't a success.

However, Dalkey was the first location for any significant commercial running of an atmospheric railway. It was initially seen as a success and described as the "Atmospheric on the little Dublin and Dalkey line in Ireland". It was renowned, and many engineers and others came from Europe to examine and marvel at it. The second opened in 1845 was constructed at Croydon, London to placate the Londoners prejudice against locomotives and a third in Devon built by the distinguished 19th century engineer Brunel.

The atmospheric railway was an environmentally friendly railway in comparison to steam locomotives. Its first benefit was that it could climb gradients, and its second benefit was no emissions of smoke into the surrounds, or sparks from the chimney setting fire to land or property. It was a clean and smooth method of transportation. It operated on the Dun Laoghaire-Dalkey line until 1854 when it was superseded by the extension of the steam locomotion from Kingston to Bray. The present railway station in Dalkey and Railway Road leading to it was built at that time

Much granite had to be excavated in the building of the railway through Dalkey as almost the whole length of the railway is in cutting. A magnificently high granite wall had to be constructed to create the embankment to the railway before it passes under the Vico Road. This 15m high embankment can be seen along Sorrento Road before its junction with Vico Road. After going through the tunnel itself, the rail traveller is greeted with stunning views of Killiney Bay and its backdrop of Bray Head and the Sugar Loafs. There is a further massive retaining wall built of granite to carry the railway line above the cliff at White Rock.

SUMMARY

What is the legacy of this Dalkey industry now that the quarrying and mining has ceased? The main quarry has become a leisure resource for the inhabitants and is a major rock climbing centre for Dublin. The harbour at Dun Laoghaire is a major yachting centre and facility for water pursuits, all enclosed by Dalkey rock. The mine had its use for mine surveying exercises by students attending Bolton Street Technical College, Dublin. The plan and section of the Dalkey mine (Fig. 2) is an extract of their work in 1973/4. The railway has now accommodated the Dart, with commuter trains enabling residents to reach the city centre in 30 minutes.

REFERENCES

- Dublin district memoir of the Geological Survey of Ireland, (HMSO 1903).
- Cole, Memoirs of the Geological Survey of Ireland, Mineral Resources (Stationery Office, Dublin, 1922).
- Griffith, R. *Mines of Leinster* p17, (1828)
- Griffith, R. *Catalogue of Mines* (1861, p 145).
- Wilson, John of Dalkey Lodge letter in 1768 to John Lodge, Esq., Deputy Keeper of the Rolls, entitled "a Topographic Description of Dalkey and Environs"

FURTHER READING

1. *The field description of Igneous Rocks.* Thorpe and Browne, 1990 Open University Press.
2. *Geology and Ireland.* Nevill, 1969 Allen & Figgis, Dublin.
3. *Walk in Dalkey with Harry Latham.* Vol.1 1983.
4. *The Geology of Ireland, an introduction,* by J.K.Charlesworth, Oliver and Boyd. 1953.
5. *Between the Mountains and the Sea. Dun Laoghaire-Rathdown County.* Dublin Peter Pearson. The O'Brien Press, Dublin. 1998.
6. *Bulloch Harbour, Past and Present,* by Donald Smyth, 1999.