

CASTLEHILL RESERVOIR EDINBURGH – An historical review



Fig. 1. Castlehill Reservoir/Weaving Mill Edinburgh from Castle Esplanade, 2023

This building, now conserved as 'Edinburgh Tartan Weaving Mill', was built from 1849–51 as a covered reservoir, for supplying the upper end of the Old Town with water. It was more than 100ft (30 m) square and 25ft (7.6m) deep, with a capacity of 1.65 million gallons. Much of the building is below ground, with retaining walls of finely executed ashlar masonry, about 10ft (3m) thick at the base tapering to 6ft (1.8m) at the top, founded on bed rock. The timber-truss roof is supported on the outer walls by 24 slender hollow cast-iron columns 9in (230mm) in diameter. This prime example of mid-Victorian water engineering, was the work of leading Scottish civil engineer James Leslie, Engineer to the Edinburgh Water Company.



Fig. 2. James Leslie , Civil Engineer 1801-89

This reservoir replaced a smaller version operational from the time of Charles II. Bringing in water to the city from a distance by gravity, an ancient concept, was envisaged for Edinburgh in an Act of 1621, but not actioned until 1672. Then a project began that enabled 'a supply of sweet water' to be obtained by 1681 via a 3in (76mm) diameter lead pipe from Tod's Well at Comiston in the Pentland Hills, nearly three miles to the south [Figs 3 ,4, 5]. The engineer for this work, was George Sinclair, a Leith schoolmaster and former professor of philosophy and mathematics at Glasgow University. At that time, or soon after, the water level at Tod's Well was permanently marked near the reservoir at Castle Wynd by a cannon-ball built into the end wall of what became known as 'Cannon-ball House' [Fig 6]. It was placed about 50ft (15m) above the surface of Castlehill Reservoir, more than sufficient head for water to gravitate freely from Comiston well [Fig 7].

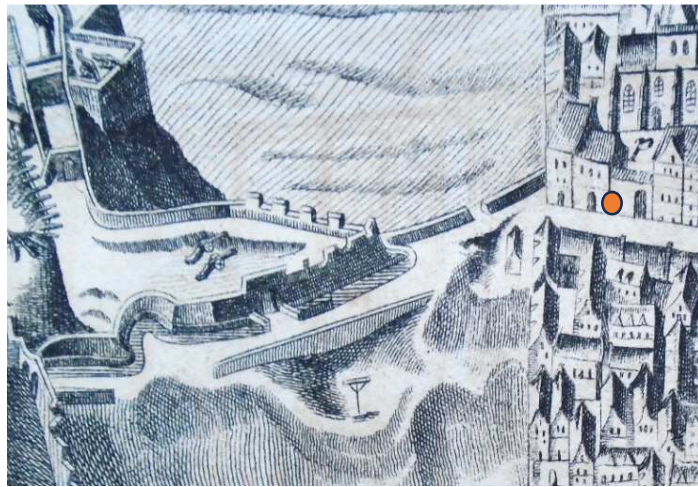


Fig. 3. Gordon of Rothiemay's *Bird's Eye view of Edinburgh* 1647, before site clearance for the reservoir ● c.1676 [Kirkwood 1817]

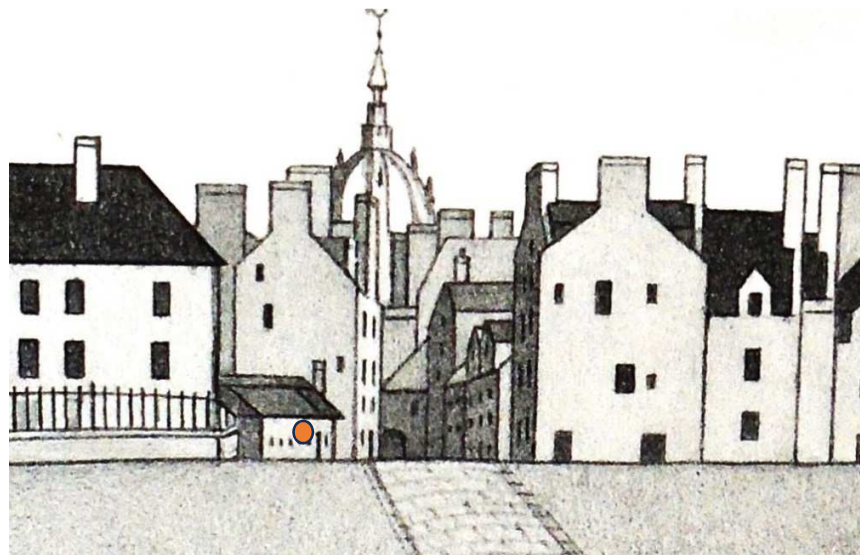


Fig. 4. View in 1816 from Castle to St Giles. Castlehill Reservoir c.1676 ● [T. G. Stevenson]

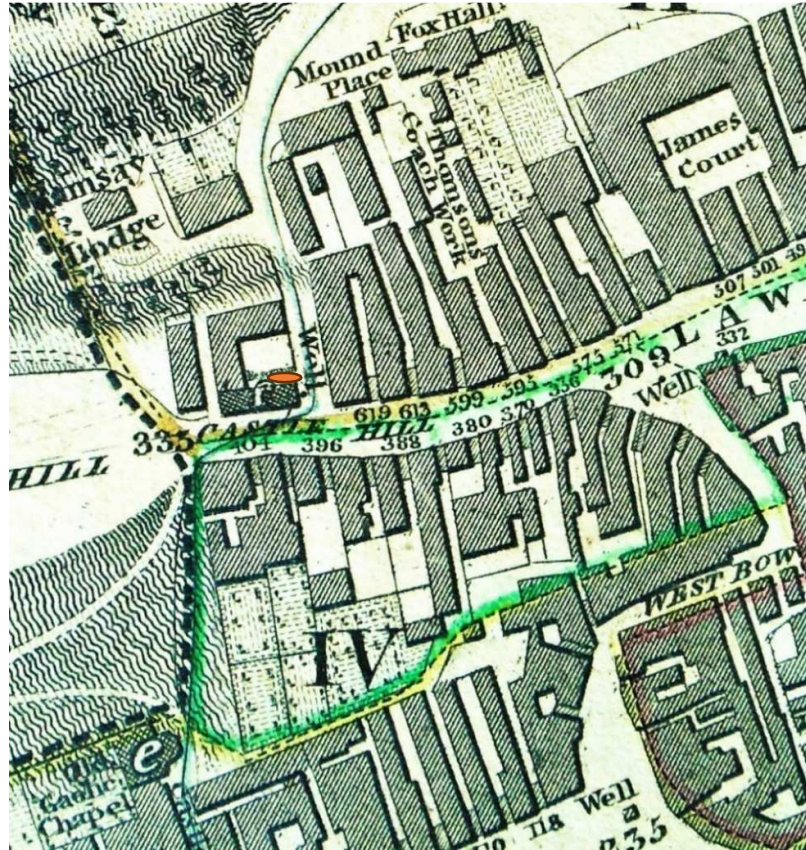



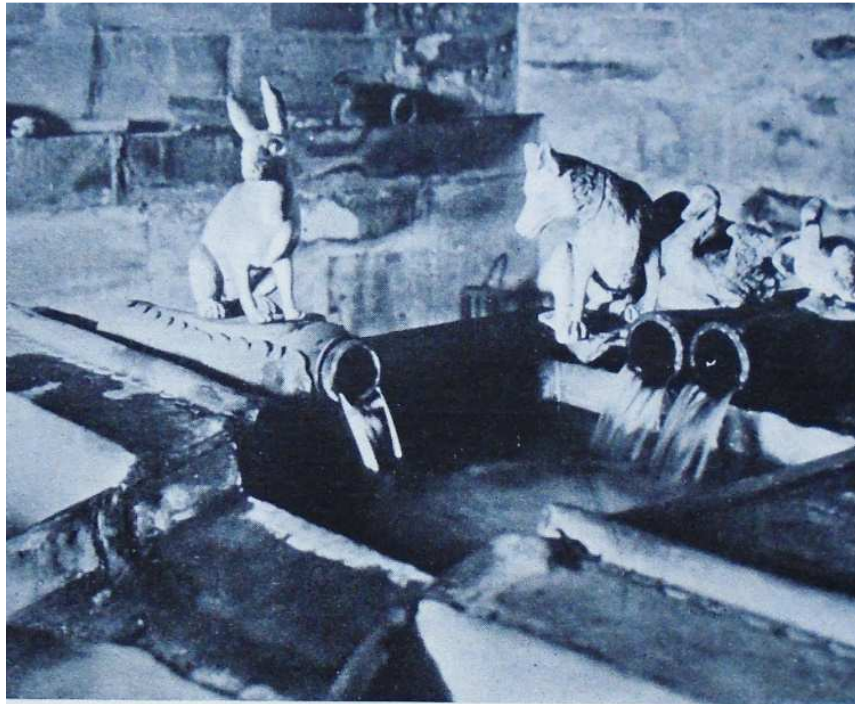
Fig. 5. Former Castlehill 'Reservoir'  and well. Also showing the wells fed from the reservoir at top of West Bow and in the Grassmarket [Kirkwood 1817]



Fig. 6. Cannon-ball at Cannon-ball House, Castle Wynd, opposite Weaving Mill showing water level at Comiston Cistern 14,637ft (4.5km) south [Scots Mag 1760]



Interior of COMISTON WATER HOUSE showing Hare, Fox, Swan, and Peewit Spring Pipes. Constructed 1676.

Fig. 7. Comiston Water House 1676 [Edinburgh Corporation 1939]



Fig. 8. Jardine's 1825 plan with 'old pipe track' from Comiston and Crawley Main increased supply ● to ●

From the Castlehill Reservoir, water flowed by gravity to five stone wells on the High Street in 1681, later also to lower wells, including the one in the Grassmarket. From these wells, for about two centuries, 'caddies', generally women, drew water for nearby households [Fig 8].



Fig. 8. Grassmarket Well c.1829, Shepherd

The 1681 Comiston pipe-line was replaced by one of increased capacity in 1720, under the direction of continental specialists, J. T. Desaguliers and contractor Covay, with a 4.5 in (114mm) diameter pipe. Colston recounts that at the opening ceremony when Covay opened the valve at Castlehill and no water flowed '*he was nonplussed ... and set off on horseback for Comiston to see if the valve there was open. Finding it alright he was quite ashamed to face the authorities in Edinburgh. One of his workmen however speedily found a remedy. Undulations in the pipe caused air to accumulate in it and prevent flow* [Fig 9]. *The workman having driven a nail into the pipe, the air then escaped and the water flowed freely*'. Desaguliers then introduced 13 air valves and four cleansing cocks. His riders and valves provided an effective solution to this problem [Figs 10 - 11].

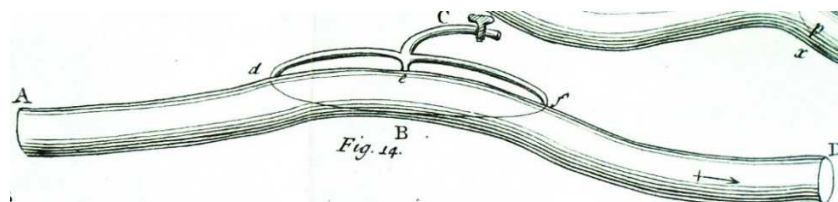


Fig. 9. Desaguliers' valve for dealing with air locks in his 4½ in dia. pipeline.

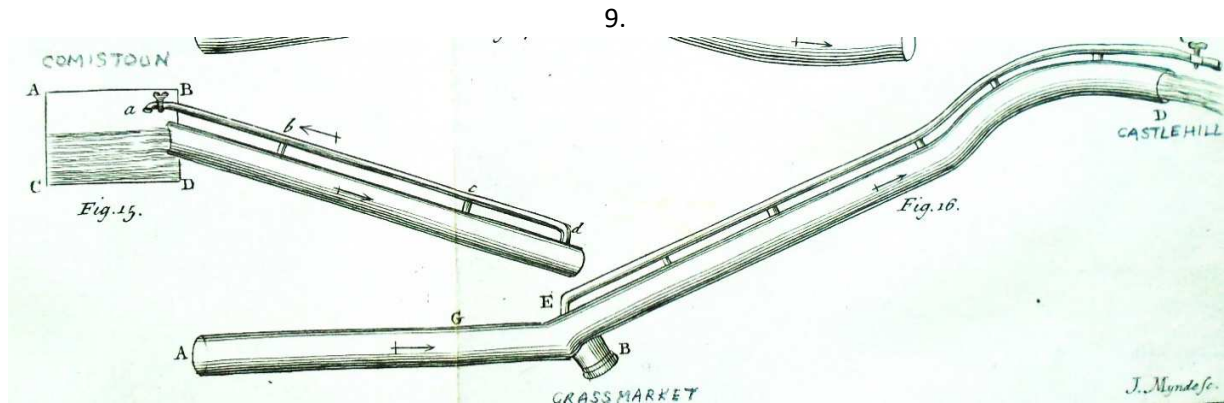


Fig. 10. Desaguliers' improvement 1721, showing pipeline ends + air removal-riders and cleansing cock

FROM the small Reservoirs at *Comestoune*, where the Springs are collected, there is a considerable Declivity at first, and a *Rider* is fix'd over the Pipe of Conduct to discharge the Air at the first going in of the Water. ABCD (*Fig. 15.*) is the little Reservoir, and D is the Mouth of the Pipe into which the Water runs, which is not always wholly cover'd, so that Air often goes in with the Water. But the *Rider* *a, b, c, d,* communicating with the Main at *b, c, d,* &c. brings back the Air in the Direction *d c b B,* contrary to that in which the Water runs down towards *Edinburgh,* as may be sensibly felt when the Cock is open, by holding the Hand at *a.* I do not mention the Air-Cocks between *Comestoune* and *Edinburgh,* having already described the manner of them. But there is a long *Rider* from the lowest Place of the Pipes at the *Grass-Market,* quite up to the Delivery at the *Castle-Hill,* of about 100 Foot in height, and 200 Yards in length, the Use of which appear'd by the Experiment we made, which was in the following manner.

EXPERIMENT *Plate II. Fig. 16.*

WE suppose the *Grass-Market* at AB, the Water running in the Direction A B D, the Delivery at D, the *Rider* to be E C, and a Plug at B to open at any time for emptying and cleansing the Pipes. Having shut the Cock C, we caus'd the Plug B to be open'd; whereupon all the Water in the Pipe B D, reaching from the *Grass-Market* to the *Castle-Hill,* ran down

Fig. 11. Desaguliers' description of his improvement published in 1742

Until well into the 19th century much of Edinburgh's water was conveyed in wooden pipes which was far from what today would be considered acceptable in terms of water-tight joints and accommodating pressure [Paxton, 2019]. From 1822, the much-increased supply from the state-of-the art Jardine/Telford Crawley Springs/Glencorse Reservoir project [Fig. 7; *Scot. Mag* 1825] enabled many more houses in Central Edinburgh to be supplied with water as far north as St Bernard's Crescent by 1831 [Fig. 13]. The Crawley Main consisted of 9ft (2.7m) long cast iron pipes of up to 18in (457mm)

diameter, tested with a pressure equivalent to 500-800ft (152-244m) head of water [Fig.12; Paxton, 1968].



Fig. 12. Butterley Co. 18in dia. Crawley to Hanover St iron main in Castle Hill laid 1822 + reservoir branch

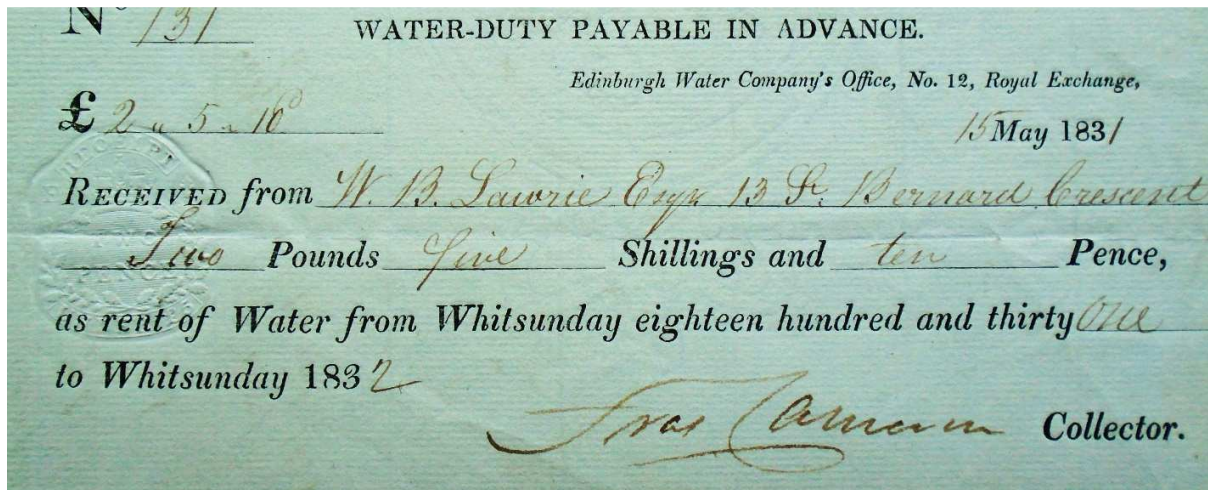


Fig. 13. 1831 water rent receipt for £2.5s.10d to W. K. Lawrie, 13 St Bernard Crescent, Stockbridge.

By 1991, Castlehill Reservoir had become surplus to water supply requirements and embarked on its remarkable change of use which has enabled many thousands of visitors each year to shop in a space that had been under water for about 140 years.

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References.

- Desaguliers J.T. *A Course of Experimental Philosophy*. 1742 pl.XI, 126
- Stevenson, T.G. *Edinburgh in the Olden Time displayed in a series of views between 1717 and 1828*. 1880
- Edinburgh Corporation. *The Water Supply of Edinburgh*. 1939. 3-4
- Shepherd T.H. *Modern Athens*. 1829. 56
- Jardine, J. *Plan of the Proposed Aqueduct 1825*
- Colston, J. *The Edinburgh and District Water Supply*. 1890. 81-86
- Paxton, R. & Shipway, J. *Civil Engineering Heritage Scotland – Lowlands and Borders*. 2007.148-9
- Portrait of James Leslie with holograph signature. Mid 19th century engraving, framed. No imprint visible
- Paxton, R.A. *Three Letters from Thos. Telford*. 1968. Rathalpin Press, Edinburgh.10
- Kirkwood, J. *Plan of Edinburgh [showing 'Reservoir + Gordon of Rothiemay's 'Bird's Eye' 1647 view]*. 1817
- The Scots Magazine*, January 1760. 80, folding section of pipe-track
- The Scots Magazine*. October 19 1825. 'Account of the Water Works for Supplying Edinburgh with Water'
- Ainslie, J. *Plan of the City of Edinburgh to 1st January 1801*. London, Faden 1801
- Paxton R.A. 'Edinburgh Wooden Water Pipes'. Conf. 2019. ICE Scotland Museum website – Lect. 21

The purpose of this review is to encourage production of an illustrated poster or board informing visitors of the fascinating history of this site now serving society as Edinburgh Tartan Weaving Mill.

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