

THE CHALK TUNNELS OF NORWICH

by Malcolm Atkin, B.A.

SUMMARY

The extensive systems of chalk tunnels that occur on the outskirts of medieval Norwich have virtually no contemporary documentation, though an inscription of 1571 is recorded. They are in fact the mines from which the chalk needed for lime used in building (and possibly also agriculture and tanning) and the associated flint, also used extensively in the local building industry, were derived. Chalk and flint seem to have been mined at Norwich from the 11th or 12th to the 20th centuries, though the emphasis in the early period was on open-cast working.

Considerable local interest surrounds the existence of a number of systems of chalk tunnels that are known to underlie large areas of modern Norwich. A wealth of legend has grown up around their supposed date and function, and yet little has been written to try to assess their correct place in the history of the city (Atkin 1978). This is, perhaps, less surprising than might appear at first sight as there is virtually no contemporary record of their use. Many of the suggestions contained in this present short note must, therefore, remain as 'working hypotheses' until any firmer evidence emerges. Grateful thanks are due to John Goldsmith, John Jones, Norman Peake and the late Helen Sutermeister for help and advice at various times, and to Phillip Judge for preparing the illustrations. The City Engineer's Department, Norwich City Council, kindly allowed access to their files and to parts of the tunnels themselves, and also gave permission for information on the Rosary Road workings to be reproduced as Fig. 3. Thanks are also owed to the Society of Antiquaries of London for permission to copy the 19th-century plan of the Earlam Road workings (Fig. 2).

Evidence of mining activity has been found on all sides of Norwich, cut into the chalk hillsides above the widely meandering valleys of the rivers Yare and Wensum. Fig. 1 shows the areas in which tunnel systems have been located. As many of these have been discovered only accidentally during the course of building work, there may be others awaiting detection, and few of the existing systems have been fully mapped. The tunnels are mainly found around the outskirts of the medieval city (but within the city boundary), but extend within the walled area along King Street/Ber Street and in the Pottergate/Westwick Street area. There is a close correlation between the tunnels and the 50ft (15.24m) contour, the main exception being the steep scarp to the north of Earlam Road. The depth of the tunnels below ground varies widely from a mere 12ft (3.65m) on Churchill Road to 90ft (27.43m) on Rosary Road and largely depends on the height of the valley side above them. The tunnels vary from 2m to 4m in height and from 2m to 4m in width (Fig. 3), and were cut horizontally into the hillside in a rough grid pattern (Figs. 2 and 3). An exception are the Eaton chalk caves of the 19th/20th century which are 5.5m high and up to 5m wide. These were worked in a series of steps and some were reputedly large enough to take a double-decker bus! (Hornby *et al* 1973, 11-12).

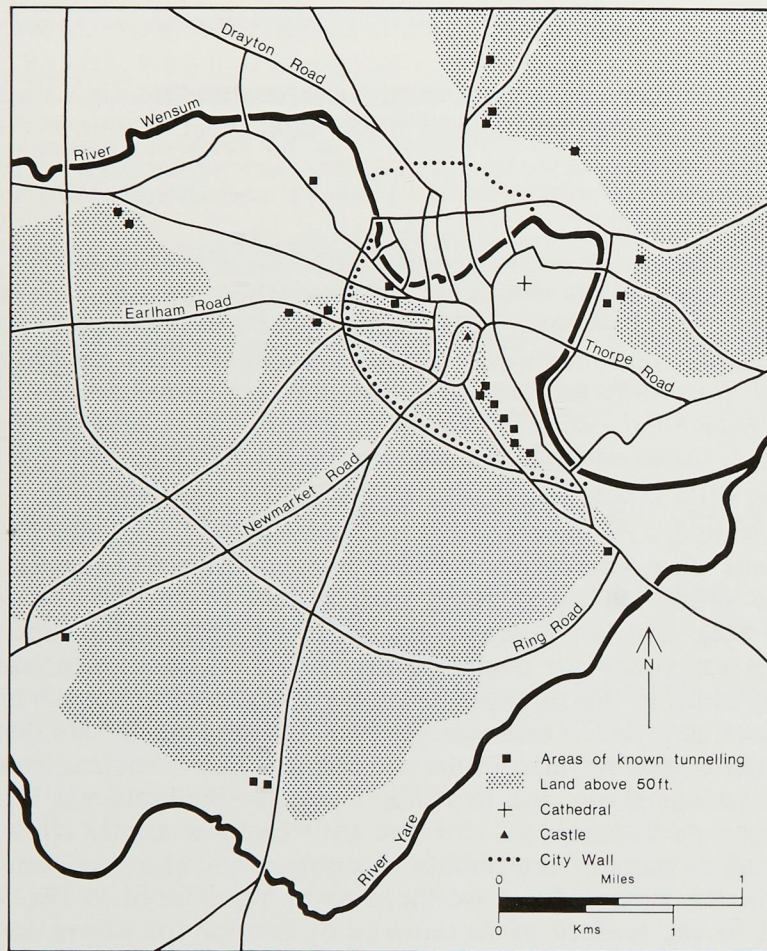


Fig. 1
Plan of Norwich showing known tunnel systems

Two of the best known systems are those beneath the south end of Earlham Road (adjacent to St. John's Roman Catholic Cathedral) shown on Fig. 2 and those off Rosary Road (Fig. 3). Those tunnels beneath Earlham Road were re-discovered in 1823 during the excavation of a well-shaft and quickly became a tourist attraction. Coloured lights were installed and the chambers were given fanciful names such as 'Bacchus Street', 'Royal Arch' and 'Temple Cross'. The plan drawn up around this time does, however, show a piece of graffiti on the wall of one of the tunnels to 'John Bond 1571' (Fig. 2). This is not accessible now, but the style of writing on the reproduction would suggest that this was, in fact, a genuine 16th-century inscription. In all, this system was recorded as being 1,600ft (487.68m) long, but unfortunately all except the 19th-century brick-lined entrance tunnel and a small section of original tunnel are now blocked.

The workings off Rosary Road (behind Lollard's Pit) were explored by the Reverend J. W. Hayes in the 19th century. These extended 133ft (40.53m) into the cliff beneath St. Leonard's Hill and Hayes estimated that 20,000 cubic yards (15,292 cu. m) of material had been removed from them. Walter Rye published a photograph of them in 1904 (Rye 1904, 195) which showed the 19th-century trolley rails still in place. Of particular interest is the suggestion (Goreham 1964) that a tunnel led from Rosary Road to a landing stage on the river, with a similar tunnel leading from the tunnels in 'Kett's Cave' off Mousehold Lane. A tunnel certainly has been located towards the river beneath Lollards Road (information via City Engineer's Department) but whether this led to an actual landing-stage must remain an open question. The siting of extensive chalk workings so close to the site of the Cathedral might suggest that some of these workings were used to supply material for building the Cathedral. There is no direct evidence however, and it seems more likely that it was the open-cast pits (as Lollard's Pit) that were exploited first. This system of tunnels was accessible up to 1978 but has since been bricked-up to prevent trespass.

Popular speculation has abounded around the purpose of these tunnels. One suggestion has been that the Earlham Road tunnels were the site of a battle between Boudicca and the Romans, but the more usual rumour is that they were part of a vast system of secret passages. These were thought variously to connect local churches to the Cathedral, the Cathedral to St. Benet's Abbey (10 miles), the Castle to Guildhall or Guildhall to Gaol on Earlham Road. Such 'passages' are often found not to have an origin in the tunnels themselves, but from speculation arising out of the discovery of back-filled cellars or undercrofts, especially those cellars that appear to link one property to another (following the alteration of above-ground tenement boundaries), or even sewage workings and disused water courses. Subsidence on the corner of Golden Ball Street and along Cattle Market Street, once thought to be as a result of tunnelling (information via Norwich City Engineers), is more likely to have been occasioned by slumpage into the medieval castle defence ditch. There is, of course, also the possibility of natural subsidence. Following the spreading of sewage from Norwich at Whitlingham in the 19th century, the land upon which it was discharged was soon covered with circular holes, usually from three to five feet in diameter, and of various depths; and on one occasion the ground suddenly subsided for a space of twenty-one feet in diameter, and to a depth of twelve feet. These were thought at the time to be due to 'sand-galls' in the chalk, and to the washing in of material by the excess of water (Woodward 1884, 642). The discovery of waste flint flakes from the site in the 1960s does, however, raise the possibility that the subsidence was into old flint workings. There are, indeed, supposed to be tunnels associated with the pit not far away in Whitlingham Lane (pers. comm. J. G. Goldsmith).

In fact, the tunnels that do exist were mines for building materials – both the chalk needed to burn lime for mortar, and for the flint contained within the chalk which was the principal local building stone. From the mid-16th century lime had also begun to be used in agriculture (Jones and Jones 1977, 21). An undocumented, but possibly periodic, use may have been for the production of quicklime to deal with the large numbers of corpses resulting from the frequent occurrence of

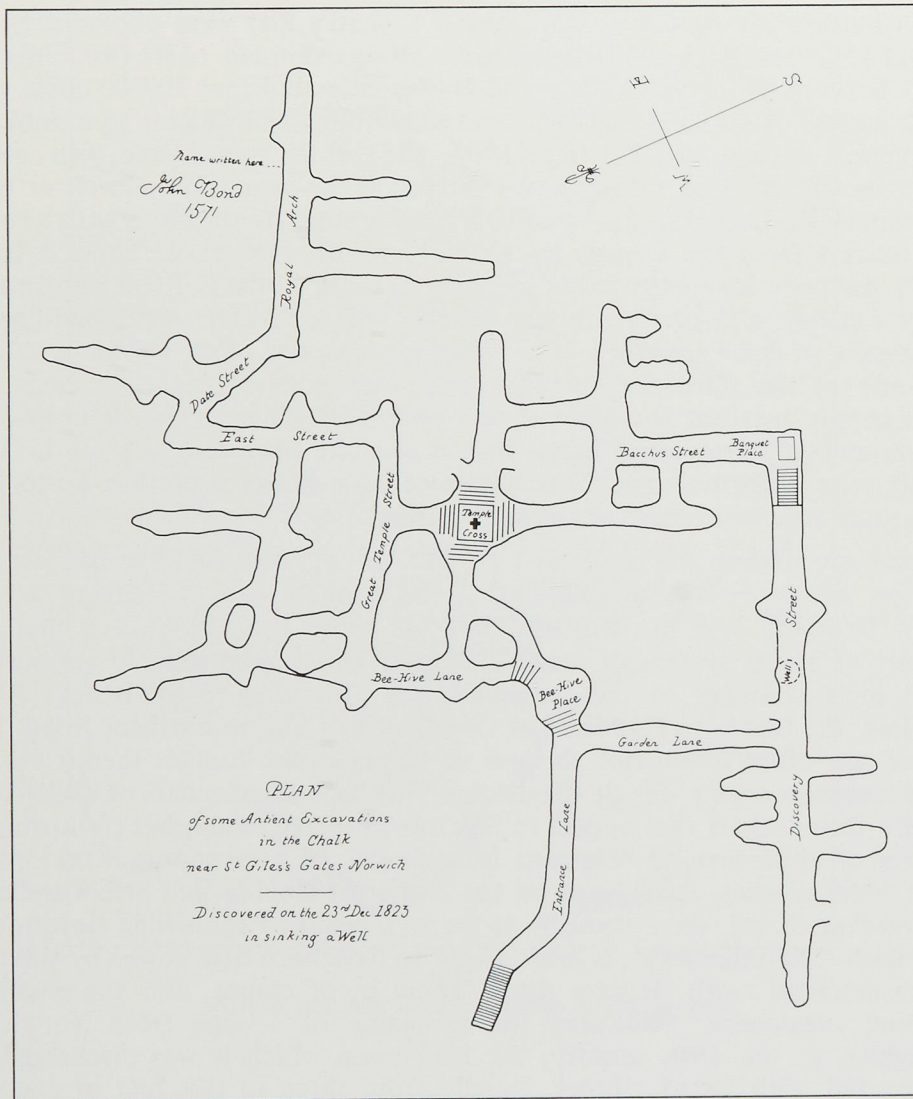


Fig. 2

Copy of 19th century plan of the tunnels beneath Earlham Road. Original in library of Antiquaries of London.

plagues in Norwich from the 14th to 17th centuries. Quicklime was also an important ingredient in the tanning industry, known to be present in medieval and later Norwich. The particular advantage of mining by tunnels rather than by open-cast working was that the former avoided the problem of the disposal of overlying topsoil, sand and gravel.

The close association of the mines with the known sites of medieval and later lime kilns suggests that the production of lime was an important function (although

the 19th-century kilns at Eaton made whiting as well as lime (Jones and Jones 1978, 25-28). In 1433/4, 461 trays of lime were exported to Caister Castle from Norwich (Barnes and Simpson 1952, 183). References to lime kilns occur in the Norwich deeds from the 14th century. A kiln belonging to the City 'in the ditch' on King Street was leased to Thomas de Byntre and William de Wittone in 1321/3 (Ninham 1861, 2); John Pettus leased the 'Lymekills without Bishopgates' in 1601 (Williams and Cozens-Hardy 1953, 40). Blomefield records kilns between Skeygate and Sandgate Lanes (present Argyle Street) and between Skeygate and Lime Kiln Lanes (ex-Burleigh Street) in 1746 (Blomefield 1806, Plan). Faden's map of Norwich shows a lime kiln at Eaton in the 1790s. Nineteenth-century kilns are also known from West Pottergate, Lollard's Pit, St. James' Hill, Mousehold Lane, Newmarket Road, Sprowston Road and Eaton, the latter in use until 1936). In addition, large dumps of waste from lime working were found in excavations on King Street in 1975, including an undercroft completely packed with chalk (Atkin *et al* 1976, 194). Despite this close association, however, the importance of a local supply of flint should not be disregarded – the Earlham Road and Rosary Road workings could clearly be seen to be following the wide bands of flint. Much of the flint used in the medieval and post-medieval buildings of Norwich can, where the evidence remains, be seen to have derived from freshly-worked flint which has a characteristic white patina rather than the iron-stained flints from the surface gravels as frequently seen in the county. As much of the flint has been completely knapped it is difficult, however, to be precise on this point.

The original date of the workings is very problematical and is made more difficult by the evident long-continued use of the mines. The tunnels off Rosary Road were worked into the 19th century – and still contain the trolley rails of that period. There is no obvious typological sequence except that the 19th century Eaton mines are on a much larger scale. A reputed antler pick (not preserved) from a tunnel discovered by Post Office engineers beneath Westwick Street (possibly the same find as reported near Earlham Road), and further finds of antler from Eaton, *may* suggest a prehistoric origin, but the evidence is uncertain and certainly not proof in itself. The only other recorded find has been an iron pick, probably medieval, from a tunnel beneath St Bartholomew's Street (NCM 86.963). A *terminus ante quem* is provided for the Earlham Road tunnels by the inscription to 1571. Samuel Woodward suggested (Woodward 1831, 412) that these tunnels were then closed in 1578 as a consequence of preparations for a visit by Elizabeth I in that year, when 'the narrow way at St Giles Gate (was directed to be) enlarged, by casting down the hills' (Blomefield 1806, 318). This can, however, be only speculative. The tunnels beneath St Michael's Mount were probably those described as being destroyed 'by the shaking of the earth during a thunderstorm, June 12, 1748' (Woodward 1831, 411). Further documentary evidence for the existence of the mines may lie in the medieval name of Upper Goat Lane – *Stonegate* – first recorded in 1267 (Kirkpatrick 1889, 49) which may refer to mines known to exist in that area (as revealed by pile-driving on 31-55 Pottergate in 1973), as a paved street would be highly unlikely at this date. If so, the mines most probably pre-date the 12th century when domestic settlement first spread along that part of Pottergate,

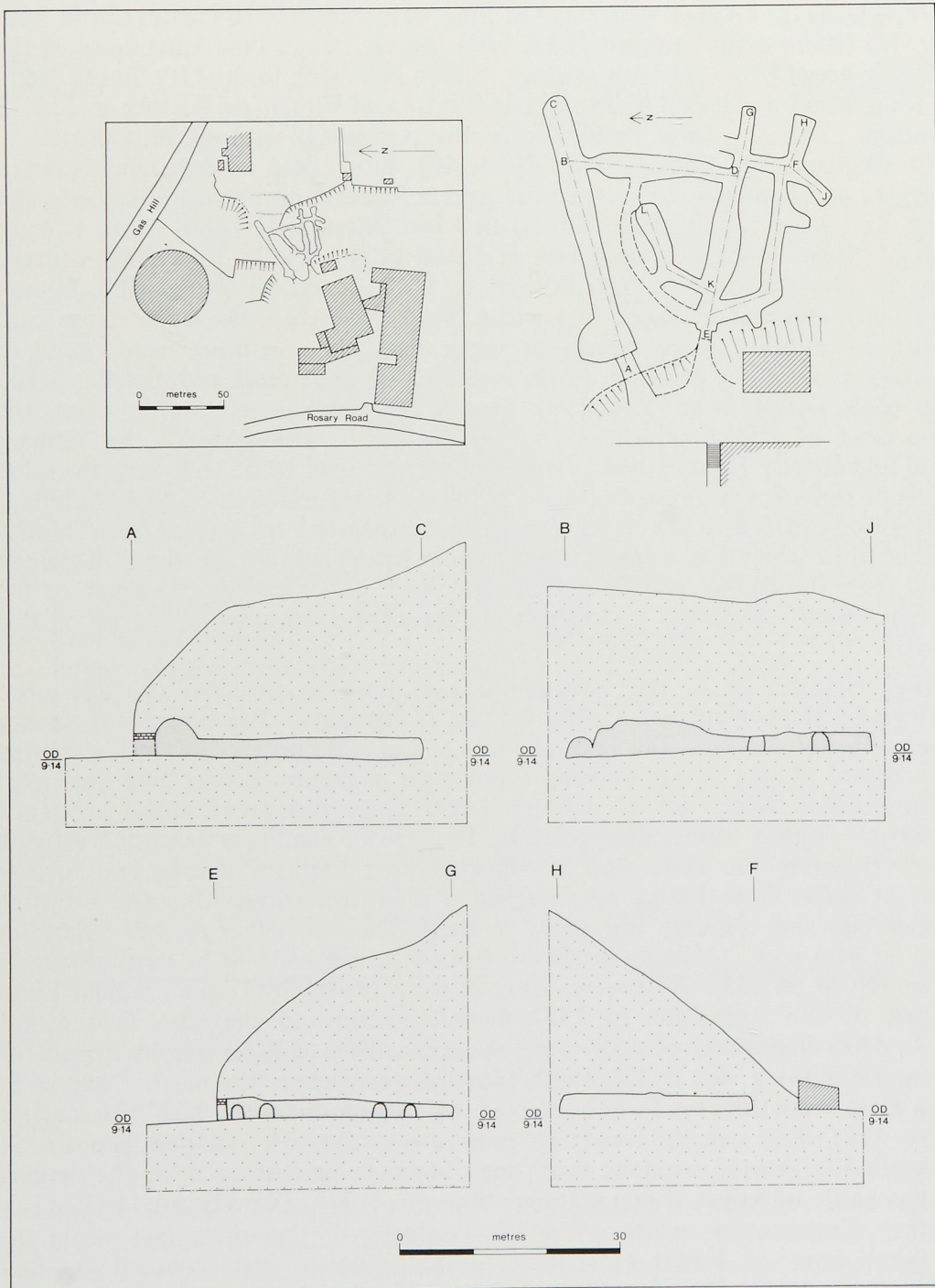


Fig. 3
 Location plan, plan and sections of Rosary Road chalk tunnels (after Norwich City Engineers Dept.). Scale and Heights in metres.

making operation of the mine-head less practical. There is no evidence of open-cast workings in this area.

It is, however, possible to construct a broad framework for the likely date of the operation of the mines and chalk pits from what has been discovered about the wider pattern of the building history of Norwich. The large number of Late Saxon churches in Norwich and surrounding district provide a possible Saxon context for the exploitation, particularly of the flints (though not necessarily by mining). Reference has already been made (above p. 315) to the possible use of the Lollard's Pit working (tunnels or open-cast pits) for the production of lime, to be used in mortar, needed for the Cathedral in the late 11th century. Most domestic buildings continued to be built in timber or clay until the late 15th century, but the rebuilding of churches, and the construction of the city walls (with a circuit of 2½ miles) from 1297, would provide a steady and important demand for both flints and mortar. Many of the floors of medieval domestic buildings also had floors of rammed chalk.

From the 16th century there would have been a significant rise in demand for the products of such mines. Flint rubble mortared walls became standard in domestic housing from the 16th to late 17th centuries – increasing the need both for the flints and lime for the mortar. Reference has already been made above to the known introduction of liming in agriculture from the mid-16th century. Thus, although the survival of the only direct fragment of evidence for the use of the tunnels (inscription to 'John Bond 1571' in the Earlham Road tunnels) may be quite fortuitous, it seems very likely that this was the period marking the maximum exploitation of the mines. Previous to this, open-cast pits may have been thought sufficient to supply the needs of the city – with the probable exception of the Pottergate mines which were out of use by the 12th century but still remembered in 1267.

The later history of the chalk tunnels is of considerable interest in itself. The tunnels off Rosary Road continued to be used as mines into the 19th century, but were then used as a wine store in 1894 by Coleman's Brewery, and latterly as a metal store. During World War Two they were used as air raid shelters and, when seen in 1978, still contained bunk beds from the 1940s. The Earlham Road system, after its popularity as a tourist attraction waned, was also probably used as a wine store and then for mushroom beds. The Eaton lime workings were operated until 1936. Reputedly the only break in their mining during the 19th/20th century came when the tunnels were flooded in the floods of 1911.

None of the chalk workings are now publicly accessible. Much of their history is forever lost – and the rest relies heavily on necessarily untried hypotheses. It is hoped, nevertheless, that this paper will have shed some light on one part of the history of Norwich that will remain, very firmly, under our feet.

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Under the 'bat section' of the Wildlife and Countryside Act, which became law in September 1982 any deliberate disturbance of bats (especially when hibernating) is an offence. It should be noted that all underground sites are

potential, if not actual, bat roosts (pers. comm. John Goldsmith, Natural History Department, Norfolk Museums Service).

The Norfolk Record Office has recently acquired, in a collection of plans and drawings relating to the estate of Sir Robert John Harvey, a plan with sections, dated 1850, of the Rosary Road chalk workings (MC91/2/2).

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