And then there was Clipsham

Quarry company Goldholme is seeking permission to extend its Hooby Lane quarry northwards into Clipsham stone reserves. At the same time, owner Phil Kerry has been researching the stones that built Oxford, one of which is Clipsham.

It is not often that a new site is opened as a dimensional stone quarry, but Goldholme did it at Hooby Lane at Stretton, near Oakham in Rutland in 2004. Now the company is seeking permission to extend the quarry to the north of the lane into new Clipsham beds of Jurassic oolitic limestone.

The original Hooby Lane quarry is eight acres and the proposed extension covers 24 acres. The original eight will be restored to agricultural land.

The new site has bed depths of up to 1.1m and typically 700-900mm. Density is up to 2.57 tonnes per cubic metre, which indicates it is a particularly strong limestone.

Researching the market for the stone gave Goldholme's majority shareholder, Phil Kerry, the opportunity to look into the use of stone in Oxford, a major market for Clipsham stone.

Phil has been developing his writing of late, authoring a thriller and a biography of Kev Madden, who was a tenant of a gold mine on land Phil owned in Wales. The book is called *The Man From the Last Field*. It tells the story of Kev Madden's journey from India, where he was born, back to Liverpool, where his family hired a hand cart that they pushed as far west as they could for the next six years. Their journey ended in Wales, in the last field before the Irish Sea.

Phil has also researched and written a number of reports on various stones and histories resulting from projects he has been involved in and artefacts he has found in the quarries his company operates. These have been posted on the goldholme.com website. The latest is *The Stone that Built Oxford*, an abridged version of which follows. Contributing to Phil's research for the piece was a book called *Oxford Stone*, written by W J Arkell and published in 1947.

Stones that built Oxford

Oxford lies on the Great (Jurassic) Limestone belt of central southern England. The city is of Saxon origin (its name means 'Ford of the Oxon') and these days has a population of about 155,000.

In a poem written in 1861, Matthew Arnold described Oxford as seen from his bedroom window as 'the city of dreaming spires'. It is an epithet it has never lost.

A Norman castle was built from local stone in the 11th Century and Oxford earned its status as a city in 1546, elevating it from a medieval town. The first university had been built there 400 years earlier, at Rewley Abbey. Today the Saïd Business School stands on the site, its construction carefully avoiding damage to the Abbey remains below it. It is faced with 80m^3 of Bath stone, a granite plinth, stall riser and steps, and has 30m^3 of York stone paving.

The Saïd Business School has been described as Europe's answer to Harvard in America and has been awarded an Oxford Preservation Trust Award for its contribution to the city's built environment.

During the year 1209, a student murdered his local mistress. A mob started hanging students in retaliation, causing some to flee the town. They didn't stop running until they reached Cambridge, where they established a new university to accommodate them.

The relationship between the scholars, who came from far and wide, and the local people remained tense. A further incident, known as the St Scholastic Day Riot, in 1355 resulted in the deaths of 93 people.

The stones that built Oxford have varied, although one thing was certain: any stone used in Oxford would have to be oolitic limestone from the Jurassic period.

The stones mentioned below are in more or less date order and consist of those used for building architectural work, with a brief mention of those used for roofing slates.

What is not widely known about Oxford architecture is that virtually all the stones used were, in the early years of the 20th century, in a state of physical and chemical decay as the result of a combination of the materials used, deficient design and/or craftsmanship and acid rain.

Although acid rain tends to be thought of as a 20th century affliction, it was first identified in the 17th century by John Evelyn. It acquired the description of acid rain from Robert Angus Smith in 1852, when it was realised sulphur dioxide and nitrogen oxides present in the atmosphere as the result of coal burning were being dissolved in rain, fog, sleet, snow and dew. The acid reacted with calcium in the limestones (limestone is calcium carbonate) to create gypsum, which simply flakes off. In the 20th century vehicle exhausts added to the pollution.

The earliest stones used to build Oxford are described as 'local stones', as all stones used for building tended to be until first the canals and then the railways and roads made it feasible to transport stone longer distances. 'Local stones' were extracted

Barry Hunt, geologist and Director of IBIS specialist building materials consultancy based in London, was asked by Goldholme to analyse core drill samples taken from an area of land it is being proposed to extend Hooby Lane quarry into. This is what he says:

The work on the Hooby Lane cores was interesting. I looked at five samples from different locations and depths in the sequence at Hooby Lane and while clearly Jurassic oolitic limestone, typical of the geology of the location, there were some interesting variations between all five samples based on the type and amount of matrix present and some subtle variations in the size of the grains.

One quality of the stone had a completely sparry matrix so it could be almost polished. It would be interesting to determine how large and extensive this bed is, as sculptors and stone carvers could be interested in this material, which is an unusual representation of an oolitic limestone of this age (up to 200million years ago). Under normal circumstances it is difficult to get really smooth faces and sharp arrises with coarser-grained oolitic limestones, but with some of the qualities demonstrated here this should be possible.

The Hooby Lane samples varied but were typical of Clipsham, indicating that there should be plenty of material available that will perform as we would expect of Clipsham, some beds better than others, as we would expect from any quarry. The main thing is matching the quality to the use, as it has always been with natural stone resources. Even the lowest quality material should have no issue being used for plain walling, for example, while the best qualities could most likely can be used for copings, say, but not plinths – which is true for just about every limestone that has not been recrystallised.

The stones that built Oxford

wherever they were found.

However, as the town expanded, the local stone became harder to find and stone for building had to be transported. A variety of Cotswold stones were brought into the city from around the year 1100 up until the early 1400s. Some Cotswold stone continues to be used to the present day.

Wheatley Quarry, approximately 9km to the west of Oxford, supplied Merton College as early as 1307. This supply, however, gave way to the much closer Headington Stone, discovered in the late 14th century four kilometres to the west of Oxford town centre. Headington was made up of several individual quarries that would continue to supply the stones to build Oxford for hundreds of years.

The Headington Quarries supplied the stone for the new Bell Tower at New College in 1396. The extensive city walls also came from Headington. During the years 1438 to 1443, All Souls College bought 6,140 cart loads of it at between 4d (1.6p) and 6d (2.5p) per cart load. In 1468 it was used for the divinity school at Magdalen College. It went into Brasenose College (1509) and Christ Church College (1520s). By the 17th century Headington was being used for every building project in Oxford.

Balliol, Brasenose, Christ Church, Corpus Christi, Lincoln, Oriel, Magdalen and Queens colleges even purchased their own land for quarrying at Headington.

Interestingly, in 1840 one of the workers died at a Headington quarry. His name was George Snow. He was eight years old.

During the mid-1700s it was apparent that the Headington Stone was corroding. It is said that a slight tap with a walking stick could reduce to dust the stone in any wall been built of it.

While the Headington stone was a fine freestone (it could be worked in any direction), over successive years of extraction the quality possibly deteriorated. At the same time the atmosphere became ever more corrosive as Oxford expanded and more coal was burnt.

An alternative stone would have to be found. Builders turned to Bath Stone, which became easier to transport to Oxford thanks to the building of the canal network.

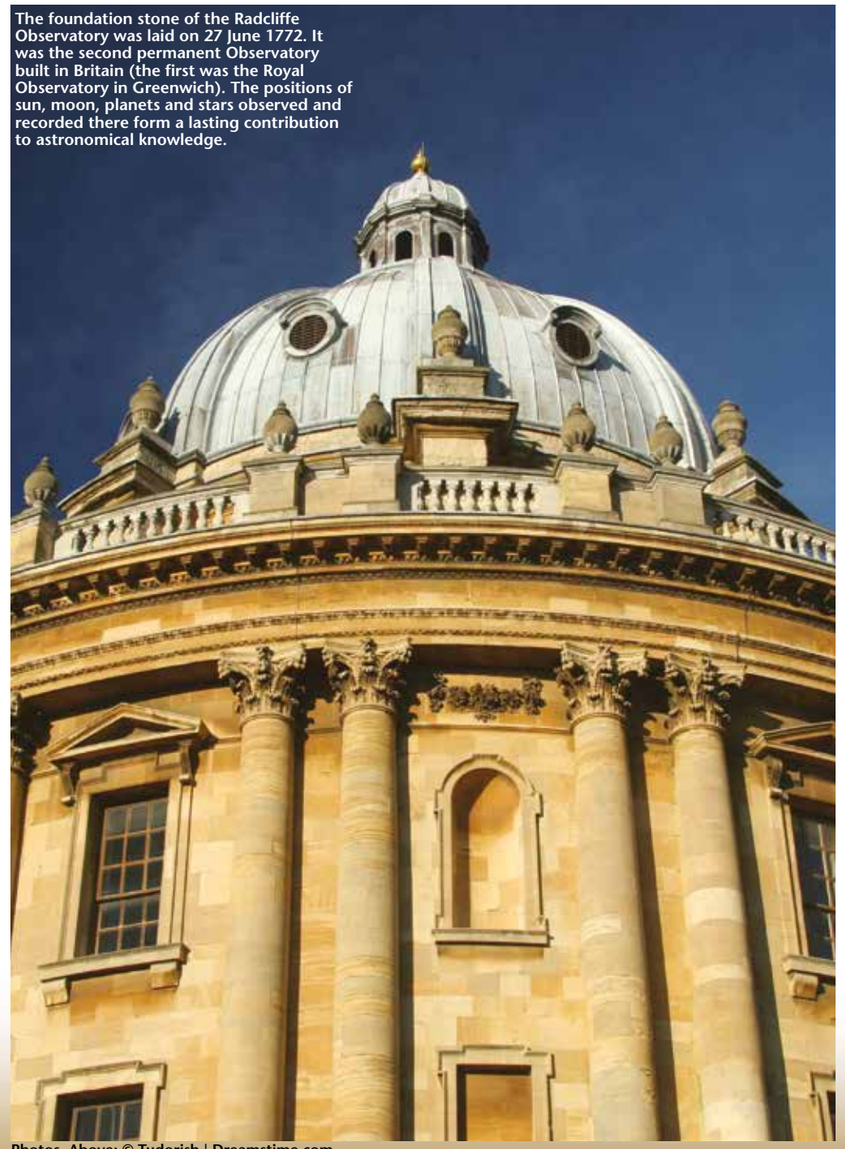
The Bath area consisted of scores of quarries (generally underground as what we would call mines) and in its hey day is said to have employed 1,025 quarrymen and 350 masons. Bath Stone came in a variety of qualities, the finest of which was reputed to be Box Ground.

At its peak in the 19th century, Bath Stone was used in so many projects in Oxford, including re-cladding existing buildings, that it is said to be easier to name the streets in which it was used rather than individual buildings. The principle use was in Beaumont, Broad and Turi Streets. The expanse of Bath ashlar is only broken on Beaumont St by the Clipsham built Play House. Bath was once considered the saviour of Oxford's architecture.

Next came Milton Stone. Two miles from Burford Bridge, Milton quarry rode on the back of the reputation of neighbouring Taynton Stone, which appeared to be geologically identical but was in fact superior. Milton would be passed off as Taynton, an act that would eventually see the demise of both quarries. Although they were both in operation from the early 14th century there is no evidence of the stone being used in Oxford until 1875, when Sir George Gilbert Scott used Milton Stone for The New Building at New College. Then Sir Thomas Jackson used it for The Examination School and many more projects after that.

Portland Stone was generally considered too white for Oxford but it was used for small projects between 1820 and the late 1940s. Since then it has been used to build the Beehive Building in the North Quad at St John's College in 1958 using the shelly Roach bed and the enlargement of the Ashmolean Museum in 2009 by architect Rick Mather.

Doulton Stone was used in 1877 to build the University College and the new Quadrangle at Trinity in 1883-7. It was also used for the registry of non-collegiate students on High St in 1887 and the Corpus



The foundation stone of the Radcliffe Observatory was laid on 27 June 1772. It was the second permanent Observatory built in Britain (the first was the Royal Observatory in Greenwich). The positions of sun, moon, planets and stars observed and recorded there form a lasting contribution to astronomical knowledge.

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Below: © Chris Doyle | Dreamstime.com

new building in 1885, but was found to suffer badly in frost when the temperature dropped below -5ºC. In 1906 The Warren Building used Guiting stone, production of which has recently resumed.

Towards the end of the 19th century Clipsham started to be used. There were by then many examples of the earlier stones showing signs of weathering and deterioration in the smoky, acidic atmosphere of the busy city. But T G Jackson wrote in 1893: "Clipsham may be trusted." He said: "There is no stone but Portland in which I have more faith."

Clipsham has been used on the Bodleian Library; The Robinsons Building Oriel; The new Examinations Schools; Robinsons Tower, Pandys of New College; The Chapel of Somerville; The Playhouse in Beaumont St…

There are many, many more Clipsham buildings right up to the present day and the award-winning Sultan Nazrin Shah Centre in 2017. After well over 100 years of extensive use in Oxford, there is probably more Clipsham to be seen in Oxford today than any other stone.

But the list of stones used is not yet complete. Weldon Stone is another. Quarried in the village of the same name near Corby, Northamptonshire, this stone was used by Basil Champneys for the ashlar walls of his St Albans Quadrangle (1904-7) and The Wardens House (1908) at Merton College. He also used it for his Rhodes building at Oriel fronting High Street (1911). Weldon was used for Somerville Library in 1903 and in 1931 on the Balliol extension at Holywell manor.

Weldon Stone is softer than some of the Lincolnshire limestones and so has sometimes been used with Clipsham quoins.

There is Ancaster Stone to be seen in Oxford. Ancaster quarries are still in production in Lincolnshire, between Grantham and Sleaford. Not far from Ancaster is the Ketton quarry, and Ketton stone has also made its way to Oxford.

Ancaster Stone can be seen on the north range of the Rawlinson buildings at St Johns, some of the carved work on St Swithuns buildings at Magdalen and in the columns on the corner of Broad Street and Cornmarket. Ketton was used at Trinity College, Christs College and Magdalen College in 1969, Emmanuel College in 1995 and the Oxford Centre for Islamic studies along with Clipsham in 2016.

On the roofs of Oxford are stones from Stow on the Wolds, The Slaughters, the mines of Stonefield, Rissington, Eyford Hill, Huntsmans Quarries Naunton, Holwell, Westwell, Broadwell Grove and Filkins Bradwell, Fullwell Estates, Slat Pit Pusey, The Thames Vale and Collyweston in Northamptonshire. Forest Marble might also have been used in the Middle Ages.

What's left

What happened to the Quarries that built Oxford? Bladon has been built on. Two of the Headington Quarries are now Sites of Special Scientific Interest (SSSIs) and the rest have been built upon.

Portland Stone is still available and used for many prestigious new builds and conservation work, much of it in London. It is generally considered too white for Oxford.

Ancaster stone is still being extracted, Bath Stone is available from various underground quarries (mines), Weldon stone is long worked out and has become an Industrial Estate. Barnack seams appear from time to time, Clipsham is available from two neighbouring quarries in Rutland and, as we have seen, Goldholm says petrological examination shows stone from Hooby Lane is also Clipsham. Clipsham stone originally came from seven quarries, one as far north as Corby Glen in Lincolnshire, which is further from Clipsham than Hooby Lane.

Ketton is still produced in block form from a quarry operated primarily for cement production by Hanson, part of HeidelbergCement.

World War II ended what was left of roofing slate production, although it has started again recently in Collyweston and the slates being produced are being supplied to a major conservation project in Oxford. ■