BUILDINGS AT RISK

Use of quicklime – for good and bad reasons

Buildings at Risk looks at our built heritage – buildings and structures, how they have evolved, and their place and role in the landscape. In this instalment, Dave Martin of the Isle of Man Natural History and Antiquarian Society looks at the multitude of uses for quicklime.

ast time, we looked at why 'lime' is used on the land, how limestone is converted into quicklime by heating, and how those kilns evolved.

This week we will look at some of the myriad uses for that quicklime.

When quicklime is taken from the kiln, after the carbon dioxide has been driven off from the limestone it is usually described as 'lump lime'.

The lumps would be of varying sizes, hopefully all converted but if some lumps were too big or didn't receive enough heat, a stony core may be left, like the 'stone' unexpectedly encountered in allegedly pitted fruit.

For agricultural use, that didn't matter; but for many uses it was milled, rolled and graded to get finer powder.

Quicklime, because of its alkalinity and chemical reactivity, is extremely caustic.

There are uses for lime in the form of quicklime before it is 'slaked' or hydrated by adding water, which exploit either the reactivity or its corrosiveness.

Many readers will recall use of quicklime to reduce health risks, probably most recently when livestock were culled to try and contain the spread of Foot and Mouth disease.

The aggressive power of quicklime has long been recognised, and it may well have been the first chemical warfare weapon.

It is reported that 'At the great sea-fight off Dover in 1217, when Hubert de Burgh, Earl of Kent, met and defeated a French fleet under Eustace the Monk, the English used large quanti-



Action between HMS Shannon and USS Chesapeake off Boston; is one of those white clouds on Chesapeake's deck the bursting quicklime barrel?

ties of quicklime; and for its most effectual employment De Burgh was careful to get and keep the weather gage, so that his enemy being to leeward his men could with greater accuracy fling the lime in their eyes; and these tactics won him the first great battle fought in the Channel.'

It is possible that Richard de Burgh, Earl of Ulster, when he held the Isle of Man, as well as using lime for construction, may have had barrels of quicklime ready to fling at any enemies, just as his great-grandfather Hubert had used in 1217. This wasn't just a medieval practice. During the American War of 1812, on June 1 1813 USS Chesapeake sailed out from Boston harbour to face the blockading HMS Shannon.

It was an action wellfought by both frigates, which slightly surprisingly ended with the Royal Navy capturing the Chesapeake.

Shannon's victory was initially attributed to the Royal Navy's superior gunnery, shiphandling and pluck.

However it was later revealed in the British and indeed the Manx press, with some schadenfreude, that

A DANGEROUS CARGO.—On Wednesday morning a Castletown smack with a quantity of lime on board, was discovered to be on fire in Douglas harbour. The fire was occasioned by some water getting by some means or other amongst the lime and slaking it. The master of the vessel was obliged to have the decks torn up in order to have the fire extinguished.

From the Manx Sun, 6 July 1867 (iMuseum)

one of the reasons for the Chesapeake's surrender was that a significant number of her crew had been rendered unable to sail/fight by their own quicklime. Apparently the Americans had a barrel of quick-

cans had a barrel of quicklime on deck, ready to throw in the faces of British sailors should the Chesapeake be boarded.

In the event, a lucky shot from HMS Shannon unwittingly smashed the barrel of quicklime open and incapacitated many of the Chesapeake's deck crew.

Quicklime was well known as both an irritant and desiccant, and when spreading it in the fields, horses suffered 'dry mouth' from the lime dust; but it wasn't just the horses that apparently 'got a thirst' from the lime.

In the Manx Folk Life Survey, Mr and Miss Christian from Northop recalled that when Mat Hampton kept a pub in Glen Helen (later Brew's Tea Rooms) it was one of the places where carters carrying lime from Ballasalla kilns to the Northern parishes stopped for 'ale, griddle cakes and cheese'.

Up to 20 wagons were seen stopped at Glen Helen at a time; the other favoured 'truck stop' was apparently the 'North Star' on the Balbarodhe Staright

lamodlha Straight. Quicklime has long been used as an alkali, industrially and on a smaller scale. Again in the Manx Folk Life Survey, the late George Quayle from Close-ny-Mona recalls one of their sheep-keeping neighbours, 'Cashen the Glebe', putting fleeces in a barrel with quicklime to clean and bleach them, before sending them to southward's woollen mill for weaving.

Quicklime combines quite violently and aggressively with water.

This is one of the reasons for the proliferation of on-

National Maritime Museum

farm limekilns on the Isle of Man and elsewhere – it meant lime could be used quickly without the risk of exposing it to atmospheric humidity before it was time to use it.

This is also the reason that, whilst limestone could be conveyed in, say, an open cart, quicklime was conveyed in barrels, with sealed lids.

This is also why, whilst agricultural applications of marl, wrack etc were specified as so many cartloads per acre, the likes of Thomas Quayle's 1812 report on Manx Agriculture reports production of lime from the Derbyhaven kiln at averaging 15,000 barrels per annum, and application rates are quoted in barrels per acre.

When quicklime is mixed with water – slaked or hydrated – it is an exothermic reaction, liberating copious heat.

Whilst it was never really economical to export



Castle Rushen – traces of Whitewash still on the face of the curtain wall - originally inside now-demolished storehouse? Frank Cowin via Manx Museum Librar



Interior wall of a farm outbuilding – left-hand section, rendered and whitewashed, might have been a dairy?

limestone off-island for lime-making, the higher value-per-ton quicklime was exported, although carriage by water brought obvious risks.

There is a record of a serious conflagration in Liverpool docks when a ship from the Isle of Man sprang a leak and water reached the cargo of quicklime barrels; and in 1867 a similar fire started in a quicklime cargo in Douglas harbour.

Nowadays, that same exothermic reaction is used when closely controlled small amounts of quicklime and water are mixed, for example in the outer can of selfheating cans of food or soup.

SLAKED LIME

When quicklime is mixed with water, if there is just enough water, the result is 'lime putty'; adding various fillers to make lime mortar or render, or more water to make whitewash or limewash.

That slaked or hydrated lime is the penultimate stage of the lime cycle. Once it absorbs carbon dioxide from the air, it sheds water and solidifies back into limestone again.

Lime putty is more usually thought of as an ingredient in lime mortar or lime render, whose use in construction we will consider next time; but lime putty had other uses too, such as combined with Canada balsam to make early dental fillings!

Whilst the greatest volume of lime was used for mortar and render, the most visible may have been the whitewash responsible for the archetype Manx white cottage.

Most paints have three key components - the (coloured) filler: the solvent that helps them spread; and a binder that keeps the filler on the wall once the solvent has evaporated; the binder can also help form a waterproof 'skin'.

So, for example early chalk-based white distemper paints used chalk, gelatinous size, and water; but were prone to becoming dry and dusty surfaces as time

elapsed. Whitewash is both simple and powerful.

As the lime cycle completes, the slaked lime turns back to limestone. All whitewash needs is sufficient



Whitewashed interior of Ann Christian's cottage, West Craig-even the scraa (turf under the thatch) have been whitewashed iMuseum



Castle Rushen – interior wall with copious traces of Whitewash, and coral-pink limewash showing remains lower down Frank Cowin via Manx Museum Library

water to spread a coat over a wall, and after the water has evaporated, the whitewash absorbs carbon dioxide turning back to a very thin sheet of limestone covering the wall.

That coating is pretty waterproof, but can breathe to a

It is though somewhat mechanically fragile – it is after all a sheet of limestone maybe a lot less than a millimetre thick. It will bond to a clean underlying whitewash, but if there is a poor bond, whitewash will characteristically flake off.

Outer walls would be whitewashed to help deflect rain; whereas internal walls would be whitewashed to help make the most of light from small windows or candles, and this can give rise to the apparent incongruity of whitewash on walls just made of earth!

Whilst agricultural outbuildings were rarely whitewashed, when milk hygiene regulations were introduced it became mandatory for outbuildings used as dairies to have whitewashed internal walls, so this can sometimes leave a clue as to a farm outbuilding's former use.

Whilst much of the lime used for construction was burned in Manx limekilns, in the 20th century the lime used for whitewash was increasingly imported from manufacturers who produced fine milled or rolled lime; those who, like the author, grew up on farms may well recall the clouds of fine dust when bags of 'Limbux' whitewash were opened. 'Limbux' isn't a Latin geological name - it is just a trade name for Lime from Buxton in Derbyshire!

hicker whitewash could also be used for marking purposes - many will have seen school groundsmen pushing a roller around sportsfields, that roller laid down a coat of thick whitewash.

Whitewash can carry other ingredients.

For example, the Surgeon to the prison at Castle Rushen instructed that whenever a prisoner had died of disease or pestilence, before housing a new inmate the cell was to be scrubbed and then re-whitewashed with carbolic acid mixed in with the whitewash.

Pure whitewash is (near) white, but limewash can also carry other colours. Castle Rushen's walls bear traces of early coloured limewash; some may have been tinted with ochre or umber mined nearby.

Later, limewash could be tinted by mixing 'dolly blue', more usually used to brighten the washtub, with the water before adding to the quicklime; farmers also used the powered raddle paint to colour limewash. As late as the 1970s, 'bluestone' (Copper Sulphate), was used as an additive when 'whitewashing' dairies.

Frescos aren't pained on or using – whitewash – but they are lime based. 'Fresco' is the Italian for 'fresh', and that refers to painting on fresh lime plaster, so the paint is taken into and retained by the matrix as the plaster dries and hardens.

 Next time we will look at the use of lime in construction: lime mortar, lime render and lime plaster – its ecological credentials and importance, and the damage that can be done by inappropriate use of cement instead of lime.

limited extent.