

## ROOFING MATERIALS THROUGH THE AGES,

T Eastwood ARCS MIMM FGS

This is part of the Presidential Address to the Geological Association given by T Eastwood ARCS MIMM FGS in 1951. We are grateful to the Association for permission to reproduce it here. The full address, which can be purchased from the Geological Association Library, Burlington House, Piccadilly, London W1B 9AG, covers the use of wood, stone, true slates, clay, metal and a variety of soft materials.

### TILESTONES

Under this heading are included rocks which owe their fissile character not to cleavage but to natural bedding, ie mainly to depositional rather than to induced characters, though occasionally some rocks are suitable for roofing because of close-set jointing, as, for example, the igneous rock of Comdon Hill in Shropshire. On the western faces of that hill the thinly laminated rock appears to dip 350 west (Murchison, 1839, p.277); according to a fifteenth century poet the rock was used in a house at Llandrinis (North, 1946, p.53). Some schists are sufficiently fissile for roofing purposes, as in parts of Norway and in the Scottish Highlands, but, as a rule, tilestones are sandy shales or shaley sandstones or limestones. Parting is facilitated by muddy films or by the presence of mica, but if the parting planes are closer than about half an inch, the tilestone is not likely to be very durable; on the other hand, if more widely spaced than an inch, the slabs will be too heavy for ordinary roofs but will serve for covering outhouses, for flags and the like.

Slabby rocks of all ages have been used locally for tilestones; some have been distributed over fairly wide areas as, for example, those from the Coal Measures of Lancashire and Yorkshire and those from the oolites of Lincolnshire and the Cotswolds.

### ORDOVICIAN AND SILURIAN

Amongst the oldest strata are the hard Ordovician-Silurian shales of the Southern Uplands which provided rather thick and heavy roofing tilestones in the Peebles area and also on the eastern side of Loch Ryan (Scottish Slates, 1940, p.1). Farther south slabby Silurian shales were worked extensively around Corwen in North Wales and a very micaceous Ludlow sandstone at Cilmaenllwyd, about six miles north of Ammanford.

### OLD RED SANDSTONE

The Tilestones at the base of the Old Red Sandstone, as the name indicates, have yielded roofing and flag stones; higher beds have been worked fairly extensively in Orkney, Caithness and Angus, and also in the Eppynt Hills between Builth and Llandovery.

### CARBONIFEROUS

Much greater in importance than any of the above are the fissile sandstones of Carboniferous age, particularly in the north of England; of these the Slate Sills in the upper part of the Limestone Series about Alston may be mentioned, though even more widely used were the sandstones of the Lower Coal Measures especially of north-east Lancashire and west Yorkshire, where for some hundreds of years they were quarried and occasionally mined. In addition to many churches and monastic buildings and the halls of the landed gentry, these Coal Measures 'slates' were used extensively on the houses and barns of yeoman farmers and on general property of all grades. Their use survived well into the industrial era and 'slates' 300 years old are still sound. As roofs to outhouses in the form of thin flags or slabs they were commonly used as late as 1900. Examples of all these uses may be seen in the Burnley area, east of the Pennines and in Derbyshire.

Farther south there are no such rocks until South Wales and neighbouring English territory is reached; here the grey Pennant Sandstone not only provided building stone but also, in some localities, sound roofing material. Examples may be seen on old buildings in the Forest of Dean, but evidence of much earlier use was provided by the Roman villas at Llantwit Major (four miles south-south-west of Cowbridge, Glam.) and at Chedworth (four miles west-south-west of Northleach); in both these cases oolite was used for ridge tiles and at Chedworth some of the 'tiles' were of Old Red Sandstone.

### PERMIAN AND TRIASSIC

In the Permian the name Marl Slate, given to shaly rock beneath the Magnesian Limestone, suggests use as a tilestone, but fissile sandstones in the Trias, good enough for 'slates', are not common, and though the thin beds of limestone in the Rhaetic and Lias have been much used for flags, they seldom provide good roofing stone. Some of the limestone of the Lower Lias at Queen Camel, near Sparkford, and near

Burley Dam, in Shropshire, have furnished tile-stones as have thin flaggy beds in the Marlstone at Chacomb, near Banbury (Woodward, 1893, p.295).

## JURASSIC

On the other hand the fissile portions of the Oolites have been used extensively on all classes of buildings. For example, the basal part of the Lincolnshire Limestone has been quarried and mined for hundreds of years until recently, mainly around the village of Collyweston, near Stamford hence the name Collyweston Slates. Collyweston Slate was used on a large barn built at Peterborough in 1307 and destroyed in 1900 (Innocent, 1916, p.173). Farther south, beyond the range of the Lincolnshire Limestone facies, that portion of the Inferior Oolite above the Northampton Ironstone has been quarried round Duston, near Northampton, for 'slates' (Thompson, 1910, p.471). The Inferior Oolite of the north Cotswolds has yielded thick and heavy 'slates' at Snowhill, Condicote and Lower Swell.

Rivalling those of Collyweston are the 'slates' of the Great Oolite in the Cotswolds. The Stonesfield Slate at the base of that limestone was mined around Stonesfield, near Witney, and as late as 1910 two quarries worked these slates at Througham, near Bisley (Bisley Slates), and at Chalk Hill, near Eyeford. The condition recurs at intervals as far as Minchinhampton, near Stroud, and at one time there were considerable slate workings on Sevenhampton Common, just north of Andoversford. At the present time some slates are quarried at several points in the area Andoversford - Stow-on-the-Wold - Bourton-on-the-Water (Arkell, 1947, pp.142-9). Farther east part of the Taynton Stone of the Great Oolite is occasionally fissile producing the Fulwell Slates which are obtained a mile south of Enstone.

The top part of the Great Oolite, known as the Forest Marble, has furnished great quantities of coarse roofing tiles; these, unlike the Stonesfield Slate, do not require frosting before splitting but peg holes are difficult to make. The chief centres were at Poulton (midway between Cirencester and Fairford) and between Burford and Lechlade (Arkell, 1947, p.147); they were also quarried near Tetbury and Bradford-on-Avon (Woodward, 1893, p.485).

At Buckland warren, twelve miles south-west of Oxford on the Farringdon road, the Corallian is fissile enough to yield the flags and slates known as Pusey Slates.

At a much higher level tilestones have come from the Slatt Beds - thinly bedded limestone in the Lower Purbeck near Weymouth.

## CRETACEOUS

In south-eastern England the best-known tilestones are the Horsham Stone obtained from thin belts of sandstone low in the Wealden Series. They are rather heavy, brownish stones of somewhat irregular shape. Examples may be seen on older buildings in Kent, Surrey, and Sussex.

Tilestones like slates may be nailed to the rafters, as was the case with the small irregular hexagonal ones used at the Roman villa of Chedworth, but more often pegs were used. These were usually of wood - oak, deal or, preferably, elder - but occasionally the bones of sheep were favoured.