



Clay Biggings

OF THE TAY
LANDSCAPE **1**

*our landscape
our buildings
our people*



Volume 1: Landscape, Buildings, People

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This report was written as part of the **Tay Landscape Partnership's** project to understand, conserve and celebrate our vernacular clay buildings. The Tay Landscape stretches from west of Dundee to Perth and then south of the Tay as far as Newburgh. More information about the project can be found at www.tlp.org



our landscape

Our Place, Our Story

What does it mean to live in a particular place at a particular time?

How have we made our buildings from what nature provided here?

What from our past survives in our relationship with our landscape today?

We have lived at the confluence of our two rivers, the Tay and Earn, for ten thousand years. Our ancestors gradually gave up moving between temporary shelters to make permanent homes, clustering into small groups, then farm towns, villages and a city.

We built our buildings from the natural materials that we found close at hand, and we developed skills in using them to create beautiful, durable and comfortable buildings.

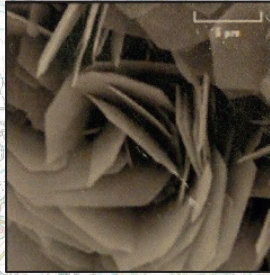
Queen among these materials was clay earth, which lies in vast quantities just below the surface across much of our land, and can be easily wrought into buildings in a great variety of ways using the laws of natural science.

Across the world, earth has always been one of humanity's great construction materials and a third of our species still live in earthen buildings. But in our area, this great tradition ended more than a century ago, as industrially-produced synthetic materials became cheaply available, land use was re-organised, traditional communities became dispersed and traditional skills were forgotten.

As part of the Tay Landscape Partnership, a team of local enthusiasts and national experts came together in 2017 to look for these lost traditions, searching through dusty records, trawling the internet, tramping over fields and poking in old walls. We found some amazing stories and astonishing relics that shine light on how one material has linked our people to our place through a hundred centuries.

The key thing we found out is that our tradition of earth building is much more widespread than we thought. We identified **147 surviving earth buildings** and there are lots more still to be discovered and many things that could be better understood.

We know that our clay soil gives us a particularly rich heritage of earth building, and that this is also true for other communities across Scotland who have not yet studied them. We've also seen that earth building has the potential to be renewed as a living tradition and to continue to contribute to our future, as it has in our past.



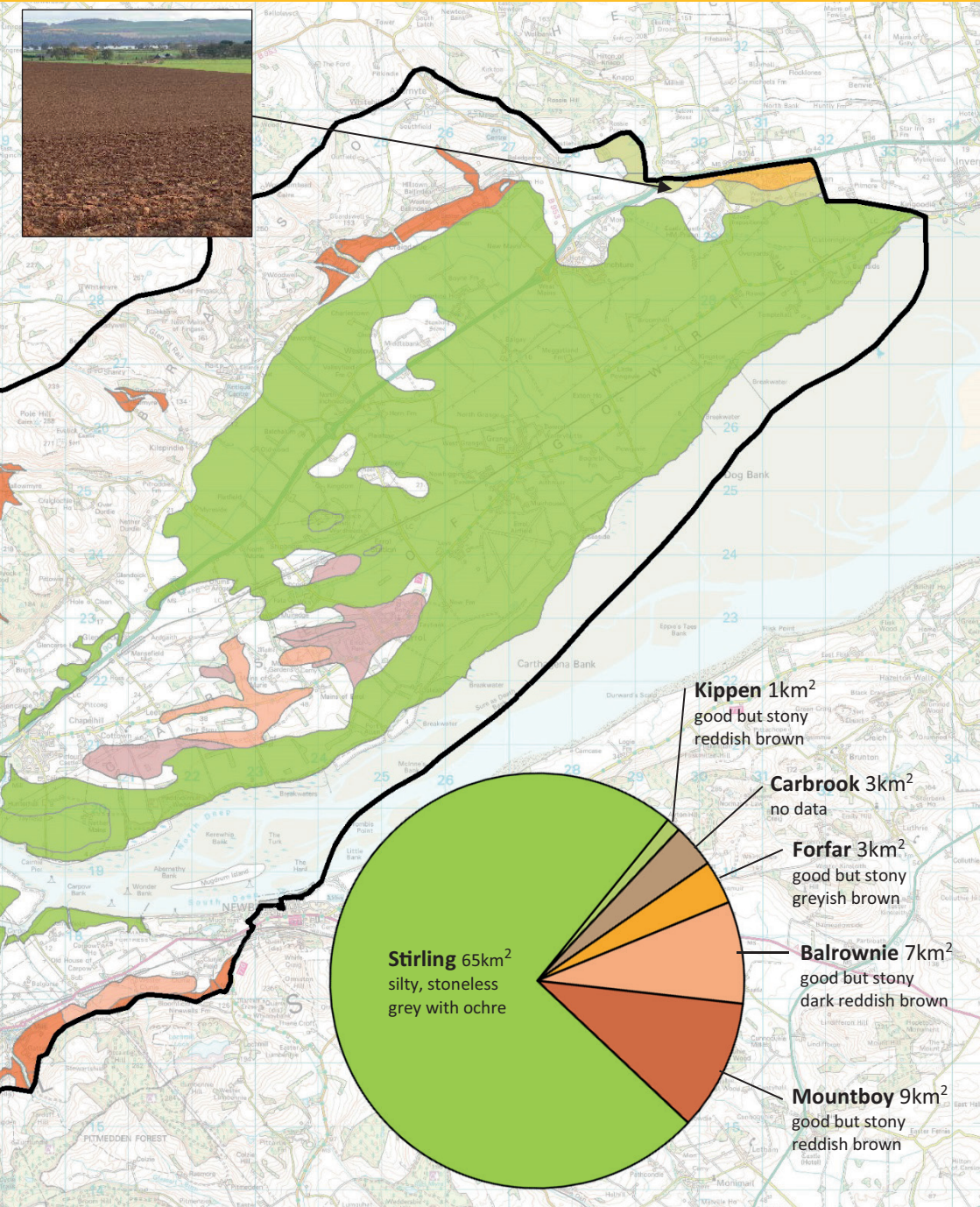
Clay is made up of tiny platelets, about 1000 times thinner than a human hair. When wet, these platelets easily slide past each other, making clay malleable and slippery, but when it dries they bind larger grains of silt and sand together to form a solid and tough earth material.



Most of the clay in the Carse of Gowrie is good for building with. It can be very silty, but it can also be tough.

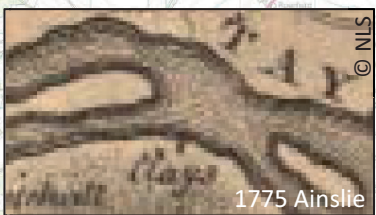
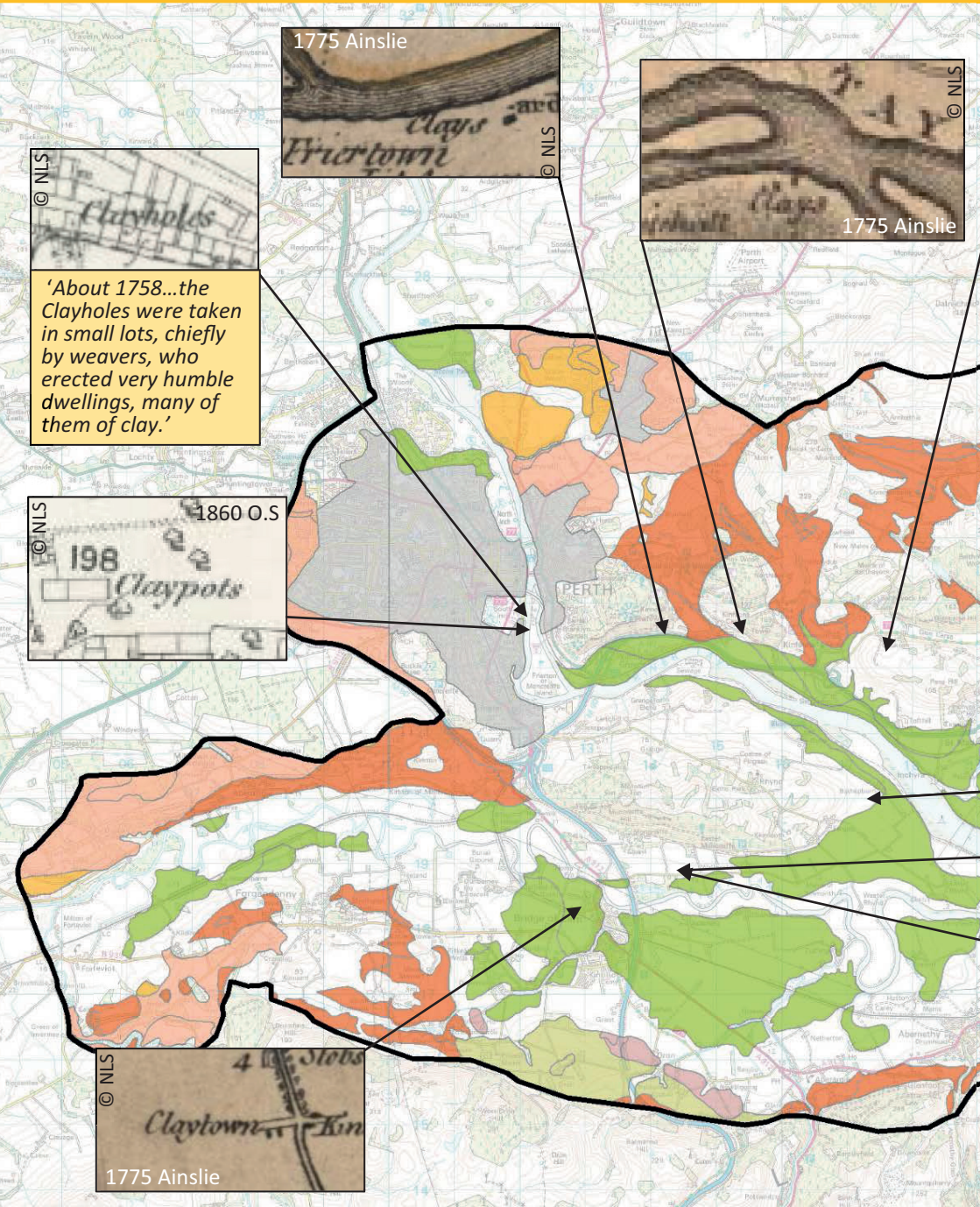
urban area soils are not defined

The Tay and Earn rivers are held between hills on a broad expanse of land where vast deposits of clay settled beneath glaciers during the Pleistocene era, **2,600,000 to 11,700 years ago**, and were shaped by changing sea and river levels, which settled 5,000 years ago. **44%** of the subsoils in the area contain enough clay to be useful for building and they are divided into six types, each with slightly different colours and qualities. These are shown in the pie chart below.

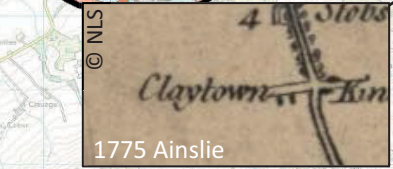
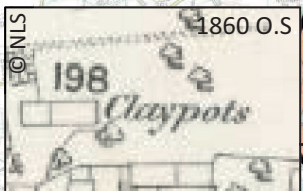


our landscape

Placenames



'About 1758...the Clayholes were taken in small lots, chiefly by weavers, who erected very humble dwellings, many of them of clay.'



The names we gave to our places offer insight into past relationships of people to place. We searched old maps and records for names connected to earth building and found **nine**. All are in **Scots**, indicating very roughly a date between 1400 - 1750. We also found earth buildings in places like Pitmiddle (Petmeodhel), whose names suggests settlement in **Gaelic** times, from around 900. The absence of clay place-names in the Carse may be because their clay is everywhere.

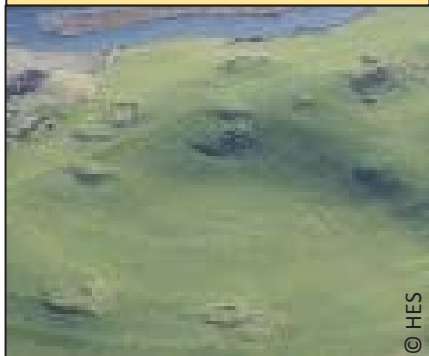


our landscape

Places that Vanished

Many **hut circles** survive as crop marks that can be seen from above and as mounds in areas that have not been heavily ploughed.

These are the surviving bases of the circular daub and thatch homes of our early ancestors. The ones below are near Kilspindie.



Many individual homes or clusters of buildings are recorded on old maps but have now completely disappeared or only remain as crumbling ruins.

Where such buildings are made of biodegradable materials, such as earth or turf, they readily **melt** back into the landscape. This is what happened to all the early buildings before maps, where all that can be seen now are vague lumps in the landscape or the stone sockets for timber posts.

Later buildings were demolished to increase field sizes, to make way for railways or new roads. Others were mills or smithys whose rural purpose became **obsolete**, or were homes in **isolated** locations which never gained the convenience of public roads, water and electricity.



Leetown Victory Hall is thought to have been built to mark the end of World War 1. It had brick-faced mudwall walls standing in the 1990's, but they have now almost completely disappeared.



The patterns of where we live have varied dramatically over time. Early hillforts and scattered clusters gave way to extensive occupation as land was cleared and drained. Agricultural improvements in the 18th and 19th centuries consolidated settlement in rural areas, a pattern that continued in the modern era as towns and the city of Perth grew. But forgotten and isolated, the ghosts of abandoned places still haunt our countryside.



Map of Pitmiddle village from around 1865.



Photograph from around 1900.

Pitmiddle is an ancient **abandoned village** near Kinnaird, whose name suggests it was a settlement from perhaps around 900. It is documented as being continuously occupied from before 1172 until 1938, and was a substantial village in the Medieval era with perhaps around 200 people in 1691, falling to 99 in 26 households in 1861.

This community kept cattle, grew oats, barley and wheat, and wove linen. The early earth and timber dwellings are thought to have been replaced by earth mortared masonry in the early 19th century, with stone from a small quarry opened nearby.

The village struggled to survive in the 20th century without public roads, electricity and mains water, and the last resident left in 1938. Slowly disappearing, the ruins of nine buildings can still be seen and the site is protected as a Scheduled Ancient Monument.

our landscape

Places that Changed



© HES

The city of **Perth** has gone through several transformations as it grew to its current size.

The medieval city was largely made of timber, wattle & daub and thatch, with high status masonry buildings, and the city walls, using clay mortar.

Remnants of these medieval structures survive below later buildings, some of which used mudwall alongside clay mortared masonry.

Only one remnant survives of these buildings at **Carrs Croft**, and it shows clear remains of mudwall gables and substantial areas of clay mortar.



The town of **Abernethy** was an early capital of Scotland, with an extensive Culdee monastery. Nothing now remains of the medieval town, save the Round Tower, dating from 1140, which has clay mortar, at least at its base.

Clay mortar was widely used in **garden walls** in the 18th and 19th century, but we weren't able to determine how much clay mortar was used in buildings from that era.



Huge changes in agriculture and employment, as well as population migration during the 18th and 19th centuries led to some settlements being abandoned, and new ones being created. However, many of our old settlements experienced a wide-scale replacement of buildings within the same townscape pattern. Later, change during the 20th century tended to erode traditional character and individuality of place, through the use of standardised modern construction processes.

The village of **Longforgan** had 'not a spot of lime' before 1777. Soon after, the old buildings made of earth, stone and turf were replaced with smarter buildings, built of earth mortared masonry pointed in lime, and with clay floors. During the 20th century many of these were changed again, given new floors and cement harling.



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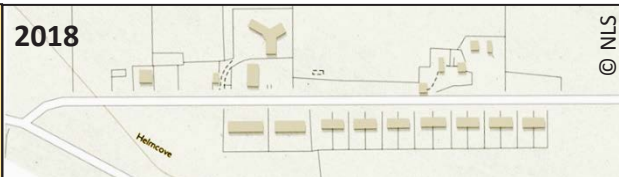


Cottown was home to cottars, living in mudwall and earth mortared masonry dwellings until the 20th century, when all but the Schoolhouse were replaced by modern buildings.

With its thatched roof, this is the best surviving example of a traditional mudwall house left in the area.

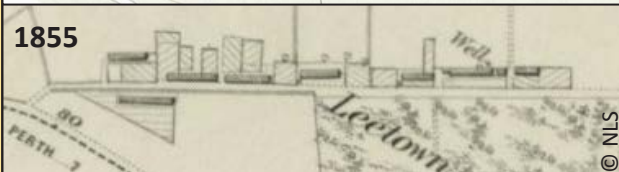
The village of **Leetown** used to be a row of mudwall homes on the north side of the road until they were replaced by houses which were built on the south side. The old buildings were used as outbuildings, gradually being replaced or removed.

2018

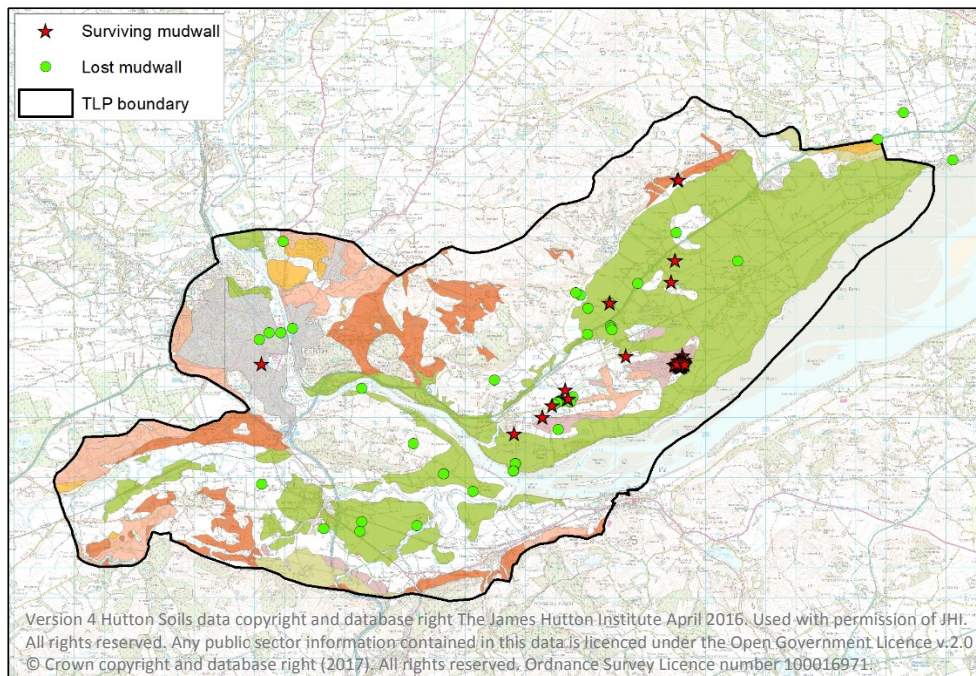


© NLS

1855



© NLS

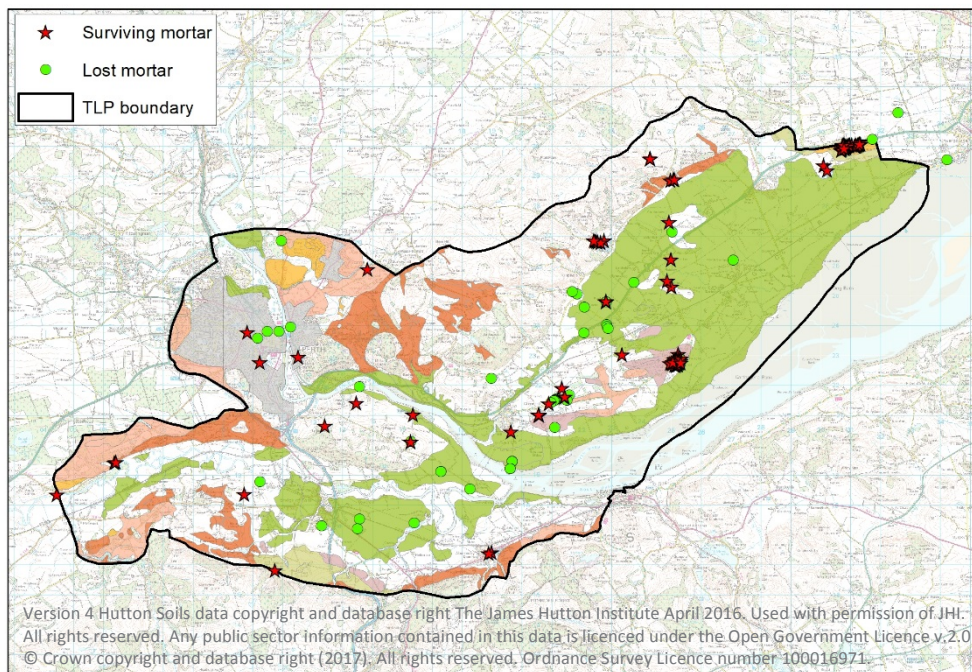


The map above shows the **69 surviving and 21 lost mudwall buildings** we recorded. They are clearly concentrated in areas of clay subsoil, which is heavy to transport. A few are located a short distance away from clay soil, suggesting their soil was transported. Traditional house foundations are very shallow and wouldn't have provided enough earth, so clay would always have been obtained from elsewhere to build a mudwall building.

Some Errol residents still have title deeds granted by the proprietors of Errol giving permission for the extraction of clay from a specific strip of land reserved for the purpose of repairing existing houses and any future builds. *"The soil and clay were to be taken from the Little Muir which stretched towards the River Tay from the south end of Scots Bridge for the distance of 800 feet"*. (Melville, 1935, p.40).

Surviving mudwall is predominantly in the Carse of Gowrie, where there was not easy access to building stone, but examples in Perth and Scone show that mudwall was used in places where other materials were easily available. The absence of any surviving examples south of the Tay reflects a more diverse construction tradition. Individual mudwall buildings are known to have existed but did not survive the era of improvement.

Earth building was widely practiced across the Tay Landscape area. Mudwall was focused in areas with clay soils, but our survey showed that clay was also used to build in places that do not have naturally clayey soils. These buildings mainly used earth mortar and were built in the 18th and 19th centuries. This shows that the benefits of clay materials were sufficiently widely recognised by professional builders to merit transporting them some distance.



This map shows the **141 surviving and 22 lost buildings** recorded with clay masonry, making clay mortar the most common earth material, and found throughout the area. These include 72 and 1 where earth mortar was the main construction and the 69 and 21 mudwall buildings where clay mortar formed the masonry plinth, protecting the mudwall from damp, requiring only a small amount of stone to be sourced.

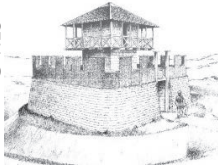
The sites include the 2 high status medieval buildings that survive to show the use of clay mortar alongside lime in that period. Elsewhere, most of the buildings date from the 18th and 19th centuries, when many improved houses were built using mostly clay mortar, sometimes with added lime, and usually with lime pointing. Blank locations tend to reflect the difficulty in obtaining survey data, rather than a local absence of examples.

This distribution shows that the benefits of clay materials were sufficiently widely recognised by professional builders to merit sourcing and transport materials some distance, and that their material properties were well enough understood to combine with other materials in designed, commercial construction projects. However, where clay soil was abundant and stone scarce, mudwall was preferred and masonry used sparingly.

our buildings

Timeline

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Carpow Roman Fortress
180 - 220 CE



© PKHT

Hillforts
2000 BCE – 800 CE



Roundhouses
4000 BCE – 500 CE



© PKHT

Longhouses
500 CE – 800 CE

EARTH

turf & daub

LIME

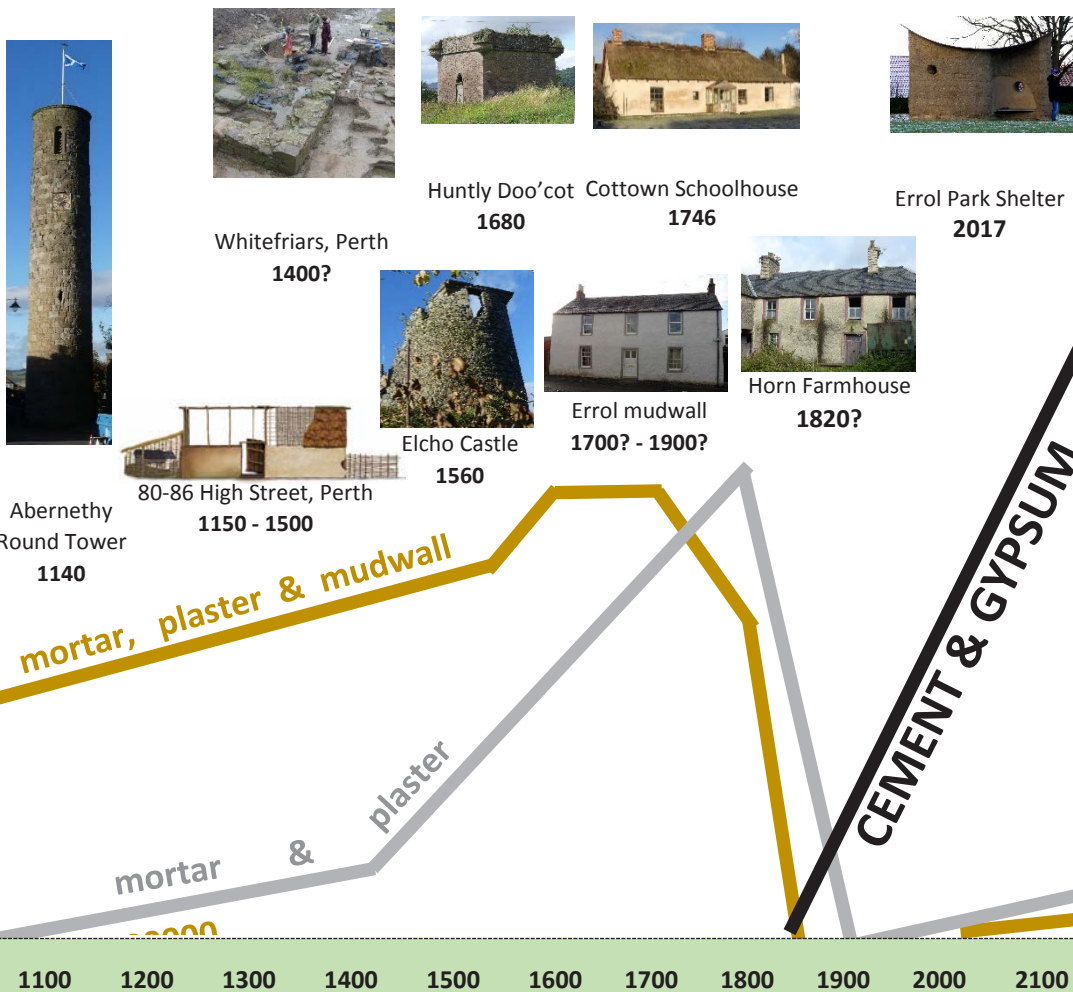
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For the **first 5,000 years** people lived in buildings with turf, clay and daub walls, and clay floors. This is the bulk of our built heritage, but traces are rare.

The **Romans** built a massive Fortress and signal towers using daub & turf.

The **Medieval** era saw an increasing number, size and diversity of types of buildings, very commonly using wattle & daub for walls, clay mortared stonework, clay plasters and clay floors.

For most of the last **6,000 years** people built with natural materials that they could find close at hand and which could be easily wrought into comfortable dwellings. Our use of clay earth increased in sophistication as our population grew, but its peak coincided with the widespread introduction of industrially produced materials and mobile labour enabled by the railways, which killed off vernacular building. The 21st century has brought a renewal of interest in earth building.



Perth grew as an urban centre different from rural areas where settlements remained small and dispersed.

Wealthy people started to use **lime** for pointing, mortar and plaster in higher status buildings such as castles and churches, but often clay was still used, hidden behind other finishes.

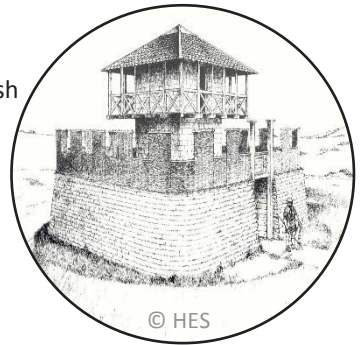
Draining the Carse was a key agricultural improvement in an age of change. A **building boom** swept away old buildings and saw the peak of mudwall in the Carse, followed by decline as lime and then cement became dominant.

The 21st Century sees the glimmer of a **revival**.



Homes Earth walls are warmer than ones built of stone and people could build them themselves from the ground under their feet. In our survey we recorded **121 surviving earth-built homes** in our area, with many more unconfirmed. The challenges homeowners now face are about insurance, mortgages and finding people with the skills and knowledge to repair their earth built homes.

Castles Early fortifications, such as the 15 Pictish **hillforts** and the Roman **Carpow Fortress** and Signal Stations used turf and clay, alongside wood and stone. Later, as lime was introduced in the medieval period, clay was still used in Perth's 14th C. **city walls** and in barmkin tower walls at **Elcho Castle** around 1560.



Churches Two mudwall churches are recorded at **Dunbarney** in 1685 and **Pitroddie** in 1786, while early ones were probably built of turf and daub. The ruined medieval churches at Westown and Rait have clay and later clay/lime mortars with stone.

Bridges & Walls Clay mortar was used as the bulk mortar to build bridges, such as the **Forteviot Bridge** over the river Earn, as well as field and garden walls, like at **Abernethy**. Lime was used for pointing and sometimes clay mortar would have quicklime added. Mudwall was used for some garden walls in Errol.



Earth was used to make **every kind of building** in our area. Cheap, flexible, and easy to source, it was used for bulk building, with more expensive and complicated lime materials used for finishes and high strength. As time went on, the structures we built became increasingly varied and clay adapted to these needs until it was replaced by lime, cement and gypsum in the 19th century. Our buildings of the last 1000 years show the dominance and diversity of earth building in our area.



Doo'cots & Icehouses

Clay and clay/lime mortars were used to build doo'cots in the 17th and 18th century, like this one at **Bonhard** from 1709. Clay mortar was also used for underground masonry ice-houses built in the cold period during 19th century. An example survives at **Castle Huntly**.

Farms Ferm Touns were largely replaced in the 19th century when agriculture was booming, but earth was still used in some of the new buildings. A mudwall byre and barn survive at **Flatfield** and the fine mudwall **Horn Farmhouse** was Architect designed around 1820.



Friaries & Monasteries

The lost buildings of the early Culdee monastery at Abernethy may have been daub or turf, but all that now remains is the 12th century Round Tower, which has clay mortar. The surviving foundations of the later Carmelite Friary in Perth are also clay mortared.

Windmills & Smiddys

Working buildings that were subjected to heat and vibration still used earth. Smiddys were once very common and several are converted or derelict, as at **Burnside**. Windmills, used to pump water and grind grain, were rare, but the clay mortared windmill at **Dunbarney** is one old survivor.



our buildings

Mudwall



Mudwall is made by digging up clay soil and **mixing it with straw**. In the past clay might be left over winter to be broken up by frost and then mixed by animals feet, whose dung would enhance the mixture.

Nowadays, mixing is done quickly by machines and sand is often added to temper the clay.

This mudwall mixture forms heavy but malleable clumps, which are **built up in layers** or *lifts* about 200mm high, on top of a stone and clay mortared base that keeps the clay above wet ground and rain splash.



The clay layers are **beaten into shape** with garden forks and **trimmed with spades**. After a couple of months the mudwall is dry, giving a very solid wall that can be finished with limewash, harl or plaster.

During the 19th century, mudwall buildings began to be faced with brick or stone *'to keep out the wind and the rain'*. Examples of this can be seen in Errol.



Mudwall was used for all sorts of single and 2-storey buildings, including, we think, a church at Dunbarney, near Forgandenny, which was in use until 1684.

Mudwall was also used to construct free-standing garden walls in Errol.

We know of **69 surviving mudwall buildings**, mostly people's homes, though there are probably more. We also know of 21 lost mudwall buildings, but many more will have disappeared without record.



Mudwall buildings are tough and last well, as long as they are maintained and the roof doesn't let water into the walls. Modern cement render and synthetic paints are damaging, as they encourage moisture to build up in the walls.

Mudwall is a way of building thick, solid walls from a heavy mixture of clay earth and straw. Mudwall dominated the extensive building that occurred in the Carse of Gowrie after land was drained for agriculture, as this area has an abundance of clay soil. But it can also be found further afield, including in Perth, where there were many alternatives. Mudwall is a regional technique, that is also found in other clay-rich areas such as Angus and Ayrshire.

Cottown Schoolhouse, near St. Madoes, is the best surviving example of a traditional mudwall building, and the only one that still has its thatched roof, shedding rainwater clear of the walls.

Dating from 1746, the building was lived in until the 1980's when the last resident died. It has had many alterations over the years, a common thing for old mudwall buildings. The mudwall is finished with a traditional lime harl outside and clay and lime plaster inside.



Errol has the best concentration of surviving mudwall buildings in the area and Scotland, covering much of the historic town centre. However, they can be hard to spot, as they are generally harled or faced with stone or brick.

This building looks like it is made of stone, but that is just a facing on the front elevation. Behind this, the walls are made of mudwall.



Errol Park Shelter was built in 2017 of mudwall and is the first modern building in the local area using the traditional technique. The earth was sourced from West Leys farm, a mile to the east and built by a mudmason and 120 local volunteers through the summer.

our buildings

Earth Mortar



Earth mortars are found throughout our area, as they are across Scotland, and they were very popular until the late 19th century when lime mortar came to dominate.

In the Carse, where mudwall was the main way of building walls, earth mortar was used to build stone bases for the mudwall. Everywhere else, earth mortar was transported to build stone masonry walls, with the outer face sometimes pointed with lime.



Many earth mortared buildings survive, but are often hidden behind plaster, harl and paint. We found **140 earth mortared structures**, mostly people homes, but there are bound to be many more not yet recorded.

Walls are built with two faces of stone and a core packed with smaller stones.



Earth mortars are robust if protected, but decay with the action of rain and frost when an exposed building becomes roofless. This softens and breaks up the mortar.

This medieval church in Rait shows a clay mortar core, with remnants of lime plaster on the inside face.



People added quicklime to earth mortars to boost their performance, mainly in the 19th century. However, results were variable and this remains an area of ongoing research.

This clay mortar at Castle Huntly Doo'cot contains small specks of lime, which has reacted with the clay to increase its durability.

Earth mortars use clay subsoil to bed and fill gaps between stones to build traditional masonry structures. The outside face was sometimes pointed with a thin layer of lime mortar. Earth mortar was extremely common until the late 19th century. In later times, quicklime was sometimes added to earth mortars to enhance their performance and sometimes lime harl coated the whole wall. Many earth mortared buildings survive, but often now hidden behind modern cement and paint.

The **Round Tower at Abernethy** is the oldest earth masonry structure we found in the area, built around a thousand years ago by Culdee monks. It is also the tallest structure, standing 22m high. Its round shape gives it strength, while lime mortar pointing protects the joints. This is a good example of a surviving high status building from the medieval era.



Many earth masonry houses dating from the 18th and 19th centuries survive, such as this thatched cottage in **Rait**.



This earth mortared and lime pointed cottage in **Longforgan** is typical of the many houses built there around 1800 to replace older turf buildings.



This late 17th century baronial **doo'cot** at **Castle Huntly** is a great early example of clay mortar enhanced by the addition of a little quicklime. A complex and roofless structure, it has survived in much better condition than the other ones in the area that were built of lime mortar, and later clay/lime mortars.



Earth and earth/lime mortars were used for complex masonry structures into the 19th century, such as this bridge over the Earn near **Forteviot**.



our buildings

Turf

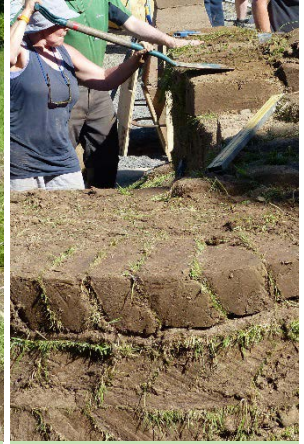
Turf was one of our **key** building materials from pre-history up until around 1800. Old turf buildings **melt** into the landscape and the technique is now all but forgotten.

A common way of using turf was to cut **shaped blocks** from clay-rich ground with a spade, and lay them **in courses** to form a thick wall. The plant roots bind the earth blocks together and a wall can be erected quite quickly.

Turf was also laid in courses between stones to form masonry walls without mortar, and as a thin layer **on roofs beneath thatch**.



Cutting turf blocks.



Building a turf wall.

Blocks of turf were excavated at the ramparts at the **Roman Fortress** at Carpow and turf is very likely to have been used in their smaller Signal Forts.

Old turf buildings were found in **Perth** from 1790.

A roofing turf discovered in an old byre at Flatfield Farm



The village of **Longforgan** is a typical later example. In 1777 all the buildings in the village were recorded as being *'built with turf and stone, or with clay for mortar, and all thatched with turf or straw.'* So much turf was used there that in 1660 the Earl complained about the buildings on his estate *'for whose yearly repair a great deal of good pasture ground was continually wasted.'*

All these turf buildings were taken down and replaced around 1800.

This photo from 1992 shows what looks like a rough turf and stone wall in the roof of a house in Rait. © HES.

our buildings

Daub

Daub is a **thick wet mixture** of earth and straw, which is applied to a wooden frame to create a thin wall. This is **perhaps our oldest walling** technique, with most buildings well into the medieval era built with walls of willow woven between hazel rods, known as *stake & rice*, covered with daub, some with animal hair.

Daub was used everywhere, with examples from all periods up to the early 19th century. **Roman Carpow** contained huge amounts of daub, fragments of which were ceramicised when the fortress was burned, and are now kept in Dundee Museum.



*This willow and daub lum at **Cottown** Schoolhouse sits in the attic against a mudwall wall, and was made in 1818.*



This daub onto a stake and rice frame is typical of early wall construction.

When later buildings started to use more solid outer walls, we still used daub internally, for **partitions** and **chimney lums**. Some of these walls used more substantial timbers, known as *kebbler & mott*.



Ruined daub structures readily decompose, while many internal walls are reported to have been removed from buildings in Errol in the 1970's. Of all the thousands we once had, there is now **only 1 known surviving** daub structure.

*This 200-year old kebbler & mott partition at **Cottown** Schoolhouse, made of clay infill between closely-spaced upright timbers.*



our buildings

Clay Plaster

Much of the clay soil in the area is rich and fine, and therefore well suited to making plaster for **walls and ceilings**.

To make plaster, clay is broken up and soaked, and any stones removed. The wet clay is then mixed with **chopped straw** or animal **hair** to create a smooth sticky mix, which is applied in layers with trowels and floats to create a smooth surface.

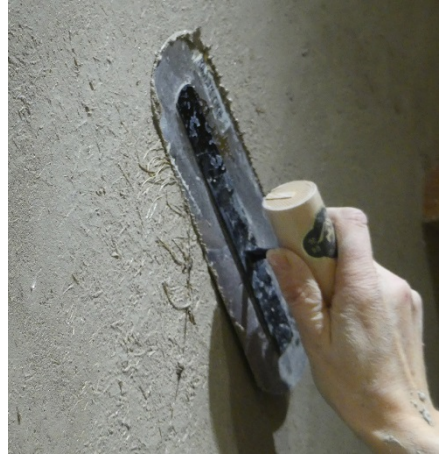
Clay plaster was frequently used as an internal finish, often with a top coat of limewash or lime plaster skim.

Most buildings up to the early 19th century would have used clay plaster. As techniques moved from using plaster **on solid walls** to lath and plaster linings, clay plaster fell out of fashion and lime plaster mixed with hair came to dominate in the 19th century.

Today a lot of clay plaster still survives behind modern finishes, but it is rare to find good examples apart from in neglected buildings where the roof still protects the plaster from washing away.

We found **3 examples** of clay plaster in our area, with the vast majority lost or unrecorded. This limited sample makes it difficult to estimate the true extent to which it was used and how much survives.

Modern clay plasters are increasingly popular, as an eco-friendly alternative to gypsum, and there is one example in Errol.



*Earth plaster base coat below a lime top coat at **Craigdallie**.*

our buildings

Earth Floors

Earth floors are laid in several **layers** of increasing fineness, **beaten or polished** to a fine finish.

This formed the ground floors in most of our homes for thousands of years until timber boards and stone slabs became increasingly affordable in the 18th and 19th centuries. They were also used in farm buildings and at least one church, the Old Church of Rhynd.

Surviving earth floors are **rare**, as they were often replaced with timber or concrete floors, but we found 3 examples:

- A medieval earth floor was excavated at Skinnergate in **Perth**.
- An early 19th century floor was uncovered recently in **Longforgan** High Street. Other ones are recorded in **Errol**.
- A clay floor still exists in a working stables at **Flatfield** Farm and is praised by the owner for its resilience.

Clay mixed with straw was also used in upper floors, as deafening infill between timber joists, over lath & plaster ceilings.

Examples have been found at Horn Farmhouse, as well as in nearby Newburgh and Dundee. Many more of these will survive in our older homes, undisturbed since they were built.



Clay floor in Longforgan from about 1800.



Earth deafening infill at Horn Farmhouse.



When we settled down and built permanent homes, around 6,000 years ago, we used earth, stone and timber to make them.

Round houses were made with low turf and stone walls around a timber structure that supported a **turf** roof. Inside the walls were frames of woven hazel, willow and birch covered with **daub** made of clay and straw. Earthen floors surrounded a central fireplace.

These were our homes for thousands of years and a great many were built in our area, but practically nothing remains of them, apart from circular shadows that appear as **crop marks** in dry summers and the bases and post holes uncovered by archaeologists.

We also built large **hillforts**, using earth, timber and stone ramparts to enclose buildings of turf and daub, which were inhabited for perhaps a thousand years. There are about **15** of these forts in our area - on all the prominent hilltops.

*Artist's image of the hillfort on **Abernethy Law**, looking out to the Tay and Earn rivers.*



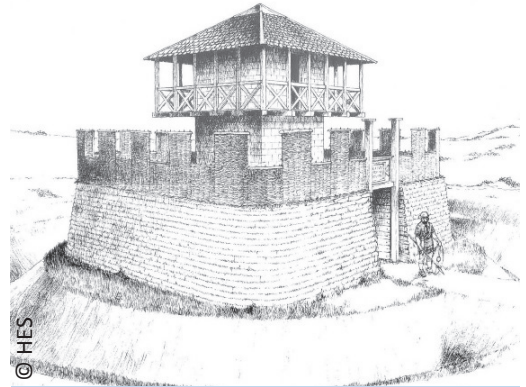
*This photo shows the remains of an iron age round house at **Carpow**.*

The Romans

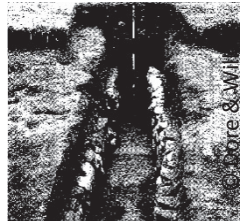
The Romans visited us and built a huge **fortress at Carpow** near Abernethy, where it could be supplied by sea. This base was home to up to **3,000 men** between around 180 and 220 AD, as part of the campaign against Caledonian and Maetae tribes by Emperor Septimius Severus. Alongside the Legionary Fortress, there were a number of smaller forts and **signal stations**.

The **11 hectare site** was enclosed by a ditch and large protective walls, and contained **numerous buildings** including barracks, headquarters, granary and a bathhouse.

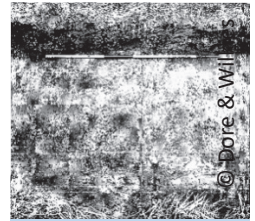
The site was **demolished** by the Romans when they left after the death of Severus in 211 and it has been investigated several times by archaeologists.



A typical small Roman fort with turf block walls, cut from the ditch around.



Clay lined pipes



Turf wall blocks



The Romans made frequent use of earth as a construction material and the Carpow site has unearthed:

- Turf blocks from the battlements of the enclosure wall.
- A large amount of daub used for walls.
- Clay linings to waterproof water pipes.
- Clay as a base for cobbled floors.

*Several hundred fragments of Roman daub, which were ceramicised by fire, are held in **Dundee Museum**, still showing the impressions of willow framework.*

our people

the Middle Ages



A reconstruction of one of the excavated buildings at **75-95 High Street, Perth**, dating from the late 13th century, with daubed walls and thatched roof. Very typical of its time, it would have been a simple but comfortable dwelling. One that needed regular maintenance, but which could easily be done by the people themselves with local, natural materials.

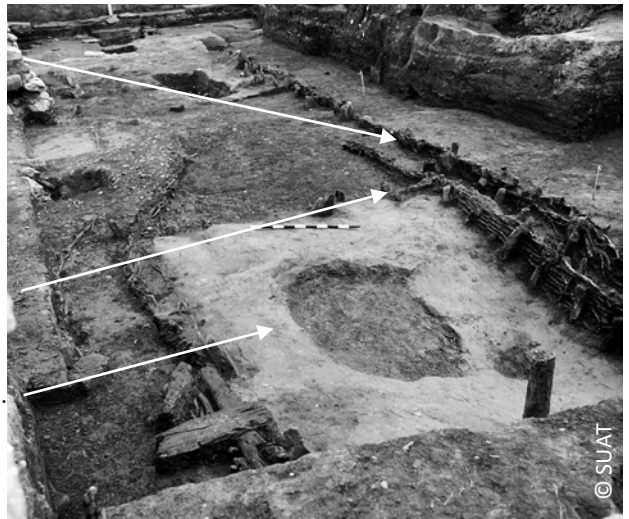
© SUAT



Some buildings had thick insulating external walls made of **two layers** of undaubed stake & rice framing with earth infill between.

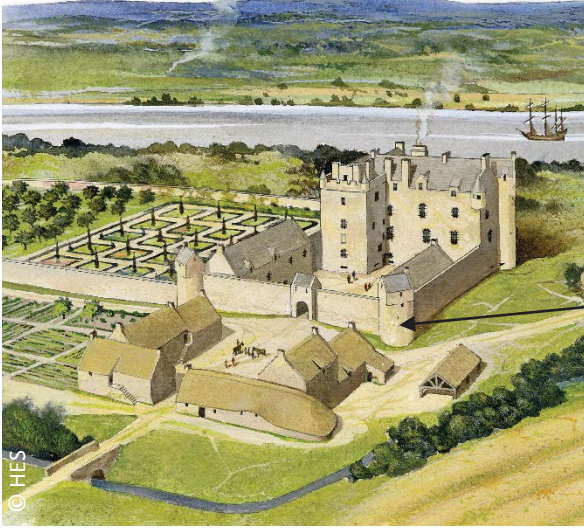
A typical single daubed stake & rice wall.

Clay floor with a central hearth.



© SUAT

Increasing population and prosperity during the medieval era led to an increasing number of buildings and a **greater variety** of elite structures. Most people still had simple single storey daub and thatched buildings with earth floors, even in urban areas. Turf walls would also have been popular among rural residents. The elite built larger, more complex and expensive buildings. Often these used earth alongside lime - as mortar in walls, as daub for partitions, and for plaster.



Elcho Castle is a good example of a high status building, where clay was used in the walls and floor of a corner tower around 1560.



The 15th century Carmelite Friary on **Whitefriars Street** in Perth was located just outside the medieval city walls. The excavated walls are clay bonded, probably to create a damp-proof foundation for lime mortared walls above.

The Improvers

During these 200 years the majority of our buildings were replaced, either on an individual basis or as part of wholesale renewal instigated by landowners.

The villages of **Pitmiddle** and **Longforgan** are recorded as having earth and turf buildings replaced by masonry ones around 1800. In this organised programme of improvement, old ways of building were associated with **poverty** and poor quality dwellings, while new materials were associated with social **progress**.

'The earlier houses in Longforgan were very lowly. They were narrow, low-roofed and inconvenient. ... each had its own door, and one or two windows, or rather holes, small enough, but sufficient to let plenty of air and some light. The houses were built of clay, mixed with land boulders for stones, thatched with straw and floored with mud....the crevices in the walls rather invited, than prevented the wind from entering.'



Typical clay mortared and thatched house, Longforgan, built around 1800.



Typical clay mortared & slate roofed house, Longforgan, built around 1800.

Nonetheless, both villages still used clay as mortar and for floors in the new improved houses, showing that **earth was still valued** as a construction material and could be adapted to create the new improved homes.

'By 1797 in the parish of Longforgan there were 50-60 new houses measuring 28 to 30ft (8.5-9.1m) long by 15ft (4.6m) wide internally, with floors of earth or clay, two good rooms and a smaller one in the middle, garrets above laid with deal, and a thatch of sewn wheat straw, or tiles or slates, with skylights.'

The 18th and 19th centuries saw huge changes in where and how we lived and this was reflected in our buildings. Land was drained and new bigger farms and estates created. Populations moved, industry sprung up, old places were abandoned and new villages were built. Gradually our long-established craft traditions and natural materials declined as new mass-produced building materials were distributed by the railways, which reached here in the 1860's.



View of peasant homes outside Scone in 1693 by Slezer.

Scone recorded a similar valuing of clay through this period of change in the building stock. *"The road leading to Scone ran through a dirty narrow lane, sunk about eight feet below the upper bank on the side which was lined with **very mean clay huts.**"* From Perry, George (1836) *Traditions of Perth...*

However *"According to a letter of 1817 relating to the Scone Estate, clay was actually dearer to use as a building material than stone, so that an improved house in clay was **by no means a sign of poverty.**"* (Bruce Walker).

In **Errol**, traditional mudwall declined. In 1792, *"clay...all the old buildings in the parish are of that substance, which...is reckoned to be the warmest and most durable of any... They are however adopting a plan of building much more agreeable to the eye, and certainly no less useful for accommodation, moulding the mortar into bricks, and with these forming their dwellings."* *Statistical Account of Errol 1792.*

"Those who can remember Errol in the late seventies [1870's] will recall what a change for the better took place in the outward appearance of the village...the old ruinous houses were replaced by up-to-date and comfortable houses.....Where then one could see about 50% of the buildings constructed of clay with thatched roofs, it is doubtful if one could now find more than half a dozen." (Melville, 1935).



Errol around 1900, with old thatched biggin on the left and new brick building on the right.

our people

Vanished Lives



Leetown: 'A small pendicle village situated on the lands of Clashbenny, inhabited by farm labourers. The houses are of an inferior description being chiefly built of mud.'

"Nelly lived in the middle of the three, the door of which was rather low, there was one window to the south with a small curved tunnel at the side through which the cat went in and out at its pleasure, and another window to the north. These two with a big low vent, served to admit all the light there was in that lowly dwelling of one apartment, with its **clay floor** and small fireplace. That one room contained the machinery by which she earned her frugal livelihood as well as her furniture. The machinery was a spinning wheel and reel, a pirn-wheel and swifts." 1895, Parish of **Longforgan**.



Vernacular buildings were a product of a traditional way of life that developed through a close relationship between people and landscape, a character that was localised and slow to change. This relationship declined in the 18th and 19th centuries, which saw dramatic change in people's ways of life, as well as in their buildings. A few **written descriptions** and **early photographs** survive to illustrate the people who built and lived in these local earth buildings.

A detailed description is recorded of a rural home in **Rhynd around 1775**, by a woman who had visited as a child.

*'She describes the cottages as having each a kailyard, containing also some apple-trees and bountree bushes (elder), the green underbark of which, when scraped down and mixed with suet, acted as a sovereign remedy for cuts and bruises. The cottages were all alike — **walls of stone and clay cemented together with chopped straw**; roofs thatched with the reeds which grow in great abundance close by at the Junction of the Tay and Earn; the inside, divided by box-beds into a but and ben, and the **hallan, a clay partition** at the entrance door to exclude the blast. The lady goes on to tell of a visit to an old nurse who lived in one of those cottages with a bachelor brother, a weaver.*

'To pay a visit to our nurse was a chief indulgence and sure of a hearty welcome. On entrance the sound of a weaver's shuttle was heard. The fireplace was at one end of the cottage, and consisted of some neat stones placed near the wall that the smoke might escape through the lum or hole in the roof. A few seats of wood or stone surrounded the fireplace. In one corner stood a milch cow (for all the cottars had cows), in the other sat a hen with a brood of five chickens nestling under her; yet all so clean and inoffensive, it had all quite a look of comfort. Soon a stool covered with a napkin white as snow was set before us, with a cog of nice milk covered with cream, a trencher (or wooden plate) with barley bannocks. A large print of butter, and at times a honeycomb, with large horn cuttys, or spoons, completed the repast, attended only by our dear old nurse, for Johnny, the brother, remained at his loom, not wishing to interrupt the young ladies.' Ballingal, James (1905) *The Rhynd and Elcho A Parish History*. Edinburgh.



A cottage at **Muiredge**, Errol around 1900.

our people

21st Century Clay

The 1990's saw a **renewed interest** in the heritage of vernacular building in Scotland. The mudwall buildings of the Carse of Gowrie began to be recognised as something special, in work led by **Dr. Bruce Walker**.

The Old Schoolhouse at Cottown was bought by the National Trust for Scotland. Through its repair, a **better understanding** was gained of traditional techniques and how to repair and maintain earth buildings.

In the early 21st century, interest developed in how clay could be used in **modern construction**. The Errol Brick Company, one of Scotland's last small independent brickworks developed unfired clay bricks and mortar products as **new sustainable** construction materials. A wall in Errol Primary School was built with them.

Very sadly, the Errol Brickworks closed in 2008, following a steep decline in demand for bricks due to an economic downturn.

In 2015, Earth Building UK held **Clayfest!** - a week-long festival of earth building in Errol. As part of this a new clay stove was built in a local house by Swedish and German earth builders.

Clayfest sparked interest among the local community in new earth building and in 2017 a **new park shelter** was built in Errol. This contemporary design of exposed mudwall was made from clay earth dug just outside town and built by **120 local volunteers**, under the supervision of Becky Little from Rebearth.



Conservation at Cottown in 2007.



Errol Brick Company in 2003

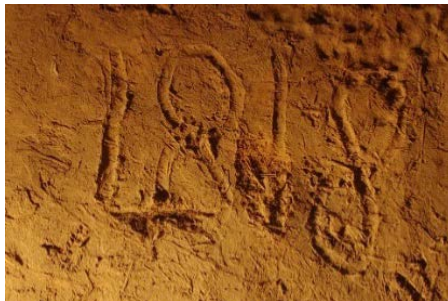


Errol Park Shelter in 2017

our people a Living Tradition?

Who were the **mudmasons** who built these buildings and what happened to their skills and knowledge of working with clay?

The Old Statistical Account for the parish of Errol in 1792 makes it clear that *'In forming such edifices, every man is his own mason, raising them by times and putting on one layer as the other is compacted, and to this cause it is certainly owing that there are so few professional masons in the parish.*



Date of the **Cottown lum** drawn by finger.



Child's footprint in a clay floor, Newburgh.

In ancient times people built their own homes using the simple techniques of turf and daub, but a professional class of builder developed in the Middle Ages. They flourished in the era of improvement, as wide-scale organised construction took to industrially produced materials. But it is clear that some people still built their own homes and that mudwall was suited to this.

In 1792, parishioners including Session Clerk John Roger, came together to **communally build a mudwall church** at Pitroddie. Hints of the involvement of women and children can sometimes be found in impressions of hands or feet captured in dried clay.

During this project, two professional masons were trained to repair mudwall buildings by Scotland's only living mudmason. **Becky Little** also gave experience to more than 120 community volunteers who helped build the new Errol Park Shelter.

Equally important was maintenance training given to **building owners**. All these activities leave a legacy of skills and knowledge to support our heritage in the future.



our people

Celebrating Our Culture

This survey has shed light on the extent of earth building in our past and identified some of the buildings that have survived to the present. But it has also found that our heritage, of buildings knowledge and skills, is threatened in part by a lack of recognition and valuing.

The Tay Landscape Partnership addressed this legacy of cultural neglect through a series of initiatives.

*Songs were composed
by Ewan McVicar &
Christine Kydd.*



*Buildings at risk
were repaired.*



*Local children learned
about their heritage.*



*Poems were written
by Kathleen Jamie*

Schule

Whit did ye learn i' this schule

Wi its wa's o carse cley, its roof o tree?

Tae take tent o the Yird.

an did ye?

*Local people built the
first new mudwall
building in the area
for a hundred years.*



*A landscape art project
created 4 installations around Errol.
see <http://theredfield.co.uk/un-melting>*



Building with earth was a fundamental part of the way we have lived by the Tay river for 6,000 years and its absence for the hundred years of the 20th century broke a connection that was key to our cultural landscape and to our knowledge of the past and to our understanding of our relationship to the place where we live.

Only recently has the tradition of building with earth risen above the association with poverty that was applied to it during the 19th century, and the extent and richness of its contribution to our national architectural heritage been recognised.

Local people have always known that there were clay buildings in Errol and that this was something special, but nobody realised this was just the tip of the iceberg, and that a much larger and longer tradition of building with earth lay neglected.

Our recognition of the importance of the cultural heritage of building with earth in the Tay Landscape strengthens a wider recognition of vernacular building in the conservation community across Scotland, and among the global community of people concerned with heritage and sustainable development.

The fundamental qualities of using clay as a binder that made earth such a strong vernacular material – low energy, non-polluting and zero waste – are also the basis of its emergence in contemporary eco-construction, and we see signs of this here.

Whether new earth building takes hold among us as a living tradition remains to be seen. In part this will depend on challenging the cultural association of synthetic materials with progress and of natural ones with backwardness, which we have inherited from the Age of Improvements 200 years ago.

The recognition of our earth building traditions here in this part of Scotland therefore gives hope not only for a richer cultural life locally, but also for a sustainable future for all. Breathing life into our past to revive a living tradition of earth building, acknowledges the ghosts of the past that walk among us, brings richness to our lives today and is a statement of hope for our future.

We thank all of the many people who have made this project possible
special thanks to Linda, Jim, Rob, Sophie, Sharon, Becky and Heather.

And thanks to our funders – the Heritage Lottery Fund, Historic Environment
Scotland and Perth & Kinross Heritage Trust



“ Wow! What an experience - fun days with friends, tramping around fields, exploring ruins and doing computer research.

LINDA DUNWELL
local volunteer ”




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