

4.03 *Lehmwickel*

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The German vernacular tradition includes a building component to which we will refer by the German name of *lehmwickel* [earth wrapping], though it has other names in other countries. It consists of a pole, stake, or flat slat of wood with pointed ends, around which is rolled a layer of straw in a clay or mud slurry. When this was dry, or probably nearly dry but still a little soft, it was set in a ceiling with the pointed ends resting in grooves in the sides of the joists, or on top of strips planted onto the sides. A row of these units set close together was a good insulator of sound between floors or of heat below a roof. Occasionally they were also placed vertically in the panels of a wall and plastered over on at least the external face.

a. etymology

It is necessary first of all to justify my use of the name *lehmwickel*. There has been nothing written about this construction in any wider context than its use in a single location, or at most a single country, so there is no internationally accepted term, and indeed no recognition that it is a widespread type. Nor does any one of the terms discussed here appear in Tolhausen's *Technological Dictionary*.¹ *Lehmwickel* is the German name, and obviously derived from this is the Hungarian *vikli*, as distinct from the more formal *szalmapólyas födem*. Dr Zentai Tünde translates *vikli* into English as *wickles*,² but I can find no evidence of the word in English usage elsewhere, and find it convenient to speak still of the individual units as 'biscuits'. The Romanian word was *vălătucs*,³ and in France, where some of the earliest datable examples seem to be found, the units are called *quenouilles*, *fisées* or *torquettes*, or in Germanised Alsace, *wickelbrode*, as will appear below. The term 'Dutch biscuits' has been used in relation to two or three nineteenth century settlements in the United States, but is not universal even in that country.

¹ Alexander Tolhausen (ed, rev Louis Tolhausen), *Technological Dictionary in the English, German & French Languages* (3 vols, Leipzig 1874-1878).

² Zentai Tünde, *A Parastház Története a Dél-Dunántúlon* (Könyvek 1991), p 253.

³ Georgeta Stoica, *Romanian Folk Architecture* (Bucharest 1989), p 36.

b. Germany

Lehmwickel appears to be most typically a German construction, and certainly one associated with German settlement in Hungary, North America and Australia, so the German name seems the appropriate one. In the German tradition lehmwickel is principally associated with half-timbered or *fachwerk* buildings, but it is also found in masonry buildings as a ceiling construction technique. It consists of stakes of timber, wrapped around with earth and straw to form cylindrical batons with protruding timber points, which are placed in parallel within a wall or ceiling panel. In a ceiling the batons may be visible from below, or may be plastered over to a smooth finish. The upper surface may be plastered over to form a floor surface, or overlaid with timber or tiles. In a wall both faces are commonly plastered, but in farm buildings they are sometimes left exposed, especially on the inside.

The age of the technique is difficult to judge. Some of the earliest surviving examples of lehmwickel ceilings in masonry buildings date from the sixteenth century, but timber framed examples are likely to have been far more common and far earlier, even if they have not survived in recognizable form. Even the archaeological record is unhelpful, because early timber-framed ground sills with holes in them are generally assumed to indicate wattle and daub. A day labourer's cottage from Oberwittstadt Neckar-Odenwald-Kreis, dated 1564, and now in the Odenwälder Freilandmuseum Waldürn-Gottersdorf, is said to contain original fabric and it appears (from a drawing) to contain *lehmwickel*. But this could well have been installed later, perhaps after a fire which occurred in 1777.⁴ A wine grower's house from Sachsenflur, Germany, 1562, now in the Hohenlohe Freilandmuseum, contains lehmwickel, but, however accurate it may be, it presumably dates from the moving and reconstruction of the building.⁵

Lehmwickel construction is common elsewhere in the region. An early and datable surviving example is or was in the upper floor of the east wing of the Schloss Höhen-Tübingen, in Germany, where the biscuits appear to be wound with a mixture very high in straw and low in mud. They are set between the joists (apparently into a grooves in the sides) so as to align with the under side and create, when plastered over, a flush ceiling. This part of the building dates from the middle of the sixteenth century.⁶

⁴ Albrecht Bedal [ed], *Alter Bauenhäuser um Kocher und Jagst: zur Konstruktion und Funktion ländlicher Gebäude vor 1650 in Württembergisch-Franken* (Verein Hohenlofer Freilandmuseum e V, Swäbisch Hall 1999), p 87.

⁵ Inspected 2009.

⁶ Prof Dr Hubert Krins, Tübingen, personal communication, 1992. By 2010 the lehmwickel was reportedly not visible, and neither the occupants nor Dr Krins could tell me its location.

c. France

The appearance of Lehmwickel in France is far harder to explain than in those areas where it is associated with identifiable episodes of German migration. Moreover it seems to appear in France at least as early as in Germany itself, for Professor Gwyn Meirion-Jones regards it as a normal medieval technique in Brittany.⁷ So specific a technique is more likely to have been spread by migration than by imitation. It might have been brought by the Normans, which would be consistent with its currency in Normandy and Brittany, and subsequently spread to the Loire Valley and elsewhere. But it is difficult to envisage the Normans bringing a living building tradition based upon timber framing. It is perhaps more likely to be associated with those Germanic tribes, including the Franks, who pressed in upon the declining Roman Empire. They, after all, had been living in the forested areas of Europe, and were moving westwards en masse. And the fact is that the construction appears in the more Frankish areas, rather than the heavily Romanised area in the south of former Gaul.

In Brittany, according to Meirion-Jones, it was surfaced with a layer of clay when used in upper floors of peasant houses, or with tile flooring in seigneurial residences. He refers to houses at Coadélan (Prat, Côtes-d'Amor), of the thirteenth century but burnt out and renewed in recent times, and La Salle (Plurien, Côtes-d'Amor) possibly fourteenth century, as well as the château of Le Bois Orcan (Noyal-sur-Vilaine, Ille-et-Vilaine, about a kilometre north of Châteaugiron, near Rennes) where there are floors of this sort dating from before 1515.⁸ Elsewhere he refers to a loft flooring system called *doubli* or *doublyi* which consists of 'batons of wood and clay' known as *grenouilles* or *baguettes* in the Loire-Atlantique dialect. But the word generally used in the region today is *quenouilles*. A baton of 550 to 650 mm has a mixture of clay and hay wound around it, to a finished diameter of 80 to 100 mm. Before they have fully hardened, these baguettes are laid between beams, touching each other, and when they are dry a layer of *torchis* or *pisé* (in fact two very different things, and *torchis* must be intended) is applied to create a smooth floor.⁹

At the Chateau de Montauban, Brittany, the extensive lehmwickel in the floors probably dates from the work of 1751, and has been restored by the owner, Dr Ontrup. A good surviving example nearby is La Ville-Cotterel, in the town of Montauban (Brittany: not to be confused with Montauban in Tarn-et-Garonne), of 1729. In the first floor there are two layers. The 150 x 200 mm joists, spaced at 450 mm, carry quenouilles on cleats, plastered underneath; above is another layer of quenouilles with their ends resting on top of the joists, filled to a depth of 50 mm above the joist and then tiles, 45 mm thick. In the second floor there is one layer only of quenouilles, with lath and plaster below.¹⁰

⁷ Professor G I Meirion-Jones, letters of 12 February and 10 March 1996.

⁸ Professor G I Meirion-Jones, letters of 12 February and 10 March 1996.

⁹ G I Meirion-Jones, *The Vernacular Architecture of Brittany* (Edinburgh 1982), p 61.

¹⁰ Both inspected 2001.

Allan Willingham has reported an example in the Loire Valley, at the Chateau de Chateaudûn, where the quenouilles are unplastered and exposed from below. The precise location within the building is unclear, but the keep dates from the twelfth century, and the quenouilles could be of almost any date after this. The earliest datable French example known to me is from the sixteenth century. It is the gatehouse of l'Abbaye de la Lucerne in western Normandy. Here the fisées seem to be set with their ends on top of large square joists, rather than in grooves, and the underside is not plastered at all. My informant here, M Yarmola,¹¹ tells me that the core of the fisée is cut from a sapling of chestnut with the bark peeled off. Sometimes oak is used, and if the diameter is too great the sapling is split. The straw is formed into rope and wrapped or twisted around it - hence the name *torquette*, which relates to the winding of rope, and is also used in some parts of Normandy for a twisted mixture of mud and straw used for the coping of a wall, but containing no timber core.¹² The word *fisée*, used by G H Rivière in his description of a farmstead at St Saire, is less ambiguous. This is a much later building, possibly no earlier than 1826, and the *fisées* rest on oak joists, and are covered with a thick layer of clay to create an upper floor.¹³ Dewulf regards lehmwickel as especially characteristic of Normandy, and uses the term *teurques*,¹⁴ which does not seem to be common in France, but appears also in Louisiana, USA.

Of course the east of France, especially Alsace, is heavily Germanised, and when the material is used there it can be assumed to be the result of direct German influence. Indeed it is called by a German name not apparently used elsewhere in either Germany or France, *wickelbrode* [wound loaf].¹⁵ A house at the Ecomuseum of Alsace at Ungersheim, has the *fachwerk* wall panels filled with clay and straw rolled around vertical stakes. An illustration of a house wall shows them exposed to view rather plastered over to create a sheer surface. The mud is not a continuous wrap but a series of rings¹⁶ (a broader version of the same will be described in Hungary, below).

d. eastern Europe

Although information is most readily available for Hungary, lehmwickel seems to be widespread in eastern Europe. But there is a distinction between those countries in which it appears through longstanding German ethnic components or cultural connections, such as Latvia and the Czech Republic,

¹¹ J-C I Yarmola, Architecte en Chef des Monuments Historiques, Paris, personal communication.

¹² Georges-Henri Rivière, 'La Maison Rurale des Pays Normands', in *Chantier 1425* (reports of a survey of vernacular structures, early 1940s, held in the library of the Musée des Arts et Traditions Populaires), p 14.

¹³ Georges-Henri Rivière, 'St Saire 1', in *Chantier 1425*, op cit, pp 109, 113.

¹⁴ Michel Dewulf, *Le Torchis: Mode d'Emploi* (Eyrolles, Paris 2007), p 50..

¹⁵ Dewulf, *Le Torchis*, p 8. Dewulf also reports the word *lahme*, presumably meaning pug or cob: whether this spelling is an error, meaning *lehme*, or it is abenypyuene

¹⁶ Dewulf, *Le Torchis*, p 50.

and those where it is associated with a specific German migration, as in Hungary. Arturs Lapins tells me that there are few fachwerk buildings in Latvia, so he knows of no lehmwickel walls, but he has identified a lehmwickel floor at Cesis Jauna pils, constructed at 1777 as a manor house of the local landlord.. The proportions of the lehmwickel biscuits are rather long, they are formed upon sawn timber stakes of rectangular section, and these are not pointed but have in most cases an angled cut from one side, so that the dimension reduces at the end. The wrapping appears to mud with chopped straw rather than parallel strands.¹⁷ I have also been told that *lehmwickel* is found in Czechoslovakia, though no detail is available to me.

Lehmwickel is fairly common in Hungary and Rumania, and Stoica speaks of houses in the Transylvanian lowlands of Romania which are timber framed with the panels filled either with woven twigs 'or splints alternating with cob called *vălătucs*', then covered with a mixture of loam and chaff.¹⁸ The Hungarian word *vikli* is merely an adaptation of the German *wickel*, but the more formal term is *szalmapólyas födem*, or thatch roll ceiling.¹⁹ Dr András Román has advised me that in Hungary it is common in ceilings and not unknown in walls,²⁰ and Dr Zentai Tünde, in her definitive study of Transdanubian houses, identifies it with the German settlement of Hungary in the eighteenth century.²¹ Barabás and Gilyén see it as a form which attempts to imitate more sophisticated urban architecture. It gave a flush ceiling, for it was always plastered above and below so as to be totally invisible, unlike most of the examples described so far in France and Germany. Barabás and Gilyén identify two versions: in the older one the joist is grooved on either side, towards the bottom, to take the ends of the stakes; in the newer cleat is attached to either side of the joist, and the ends of the stakes rest on top of the cleats. *Vikli* is found in the Great Hungarian Plain, in the east part of Transdanubia, and in some other areas such as Transylvania, Rumania, and in Moldavia only amongst the Csángó ethnic group.²²

Zentai Tünde tells me that the timber core is usually round, but can be flat, while Sabján Tibor²³ has very kindly sketched a range of Hungarian examples, which is most helpful because they embrace all the variations found in France, Germany and elsewhere (but that the underside is plastered in all cases). In a peasant house at Öcsény, of 1872, undressed round sticks are used as the core, with the ends chamfered off like a flat blade. They are made into a roll of about 150 mm diameter, and fitted into grooved joists space apart 840 mm clear. In a house at Sükösd, of 1886, the stakes are of rectangular section, about 30 by 60 or 70 mm, and about 800 to 850 mm long,

¹⁷ Arturs lapuins by email 16 April 2008. 11 February 2010.

¹⁸ Georgeta Stoica, *Romanian Folk Architecture* (Bucharest 1989), p 36.

¹⁹ So I am advised by Sabján Tibor of the Szabadtéri Néprajzi Múzeum (Hungarian Open Air Museum), Szentendre.

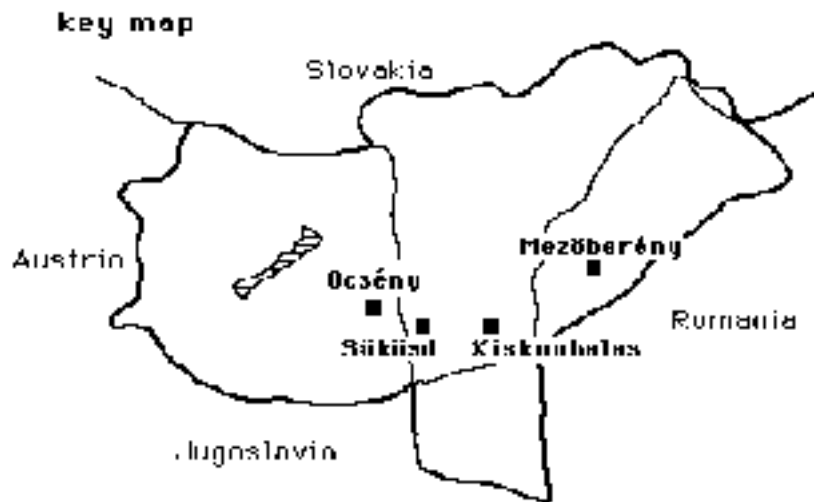
²⁰ My information is from M Jean-Claude Yarmola, conservation architect, of Paris.

²¹ Zentai Tünde, *A Parastház Története a Dél-Dunántúlon* (Könyvek 1991), p 253.

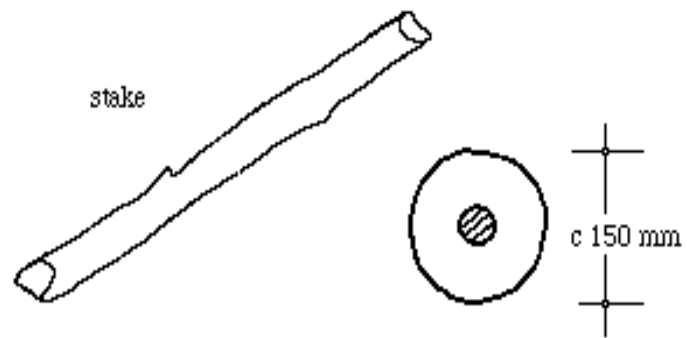
²² J Barabás & N Gilyén, *Magyar Népi Építészet* (Budapest 1987), p 85.

²³ Personal communication, 1991. The buildings at Sükösd and Mezőberény are discussed in relation to their stoves, but not to their *vikli* construction, in Sabján Tibor, *Kívülfűtős Kemencék Bontási Tapasztalatai* (Szentendre 1990).

with the ends again chamfered like a blade. Each is surrounded by a fairly homogeneous straw and mud roll to a diameter of 100-120 mm, and is fitted into grooved joists. In a peasant house at Mezöberény of 1858 the stakes are approximately square with the top two corners chamfered off, and their ends are not tapered. The extraordinary thing here is that the stake is not wrapped in a single roll, but in five narrow ones, strung on like beads. These units, each looking like a wound-up belt, have their ends hanging out loose, and these ends are used to overlap slightly the adjoining biscuit. Clearly, to allow this to be done, they have been placed in the ceiling while still pliable. In an inn at Kiskunhalas, of about 1840, the ends of the *vikli* rest on cleats attached to the sides of the joists using wrought nails, which seems surprisingly extravagant. Finally Sabján cites an example from a modern technical report in which the core rod is simply wound spirally with a rope of straw and mud, and rests on cleats. This then is close to the French *fisée* or *torquette*.

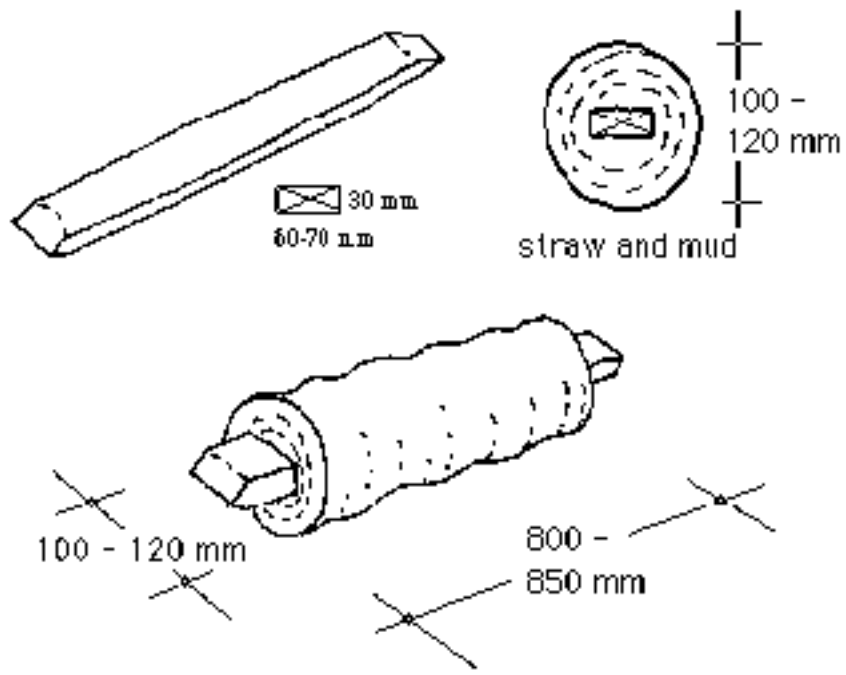


peasant house, Ócsény, 1878

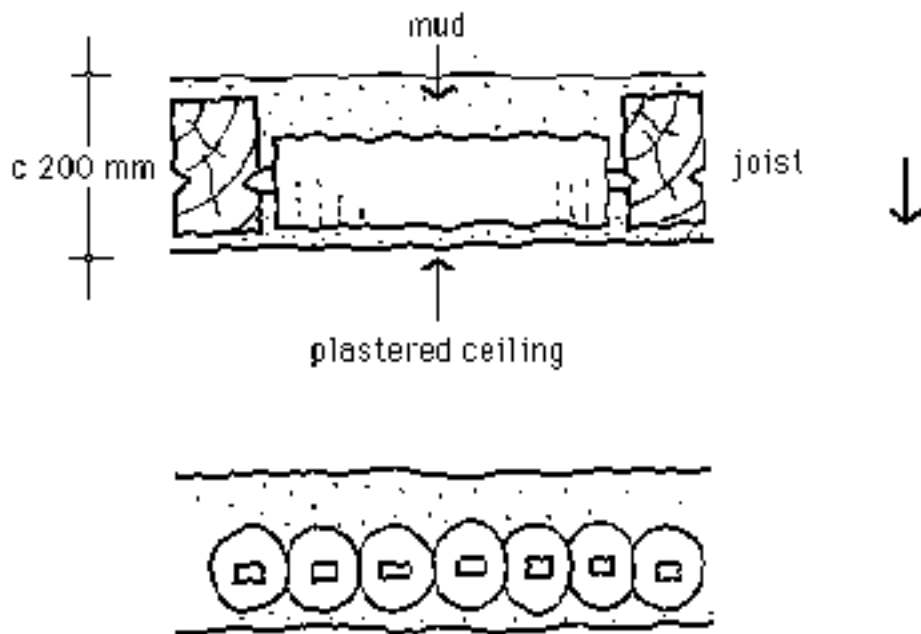


section of ceiling over first kitchen and verandah

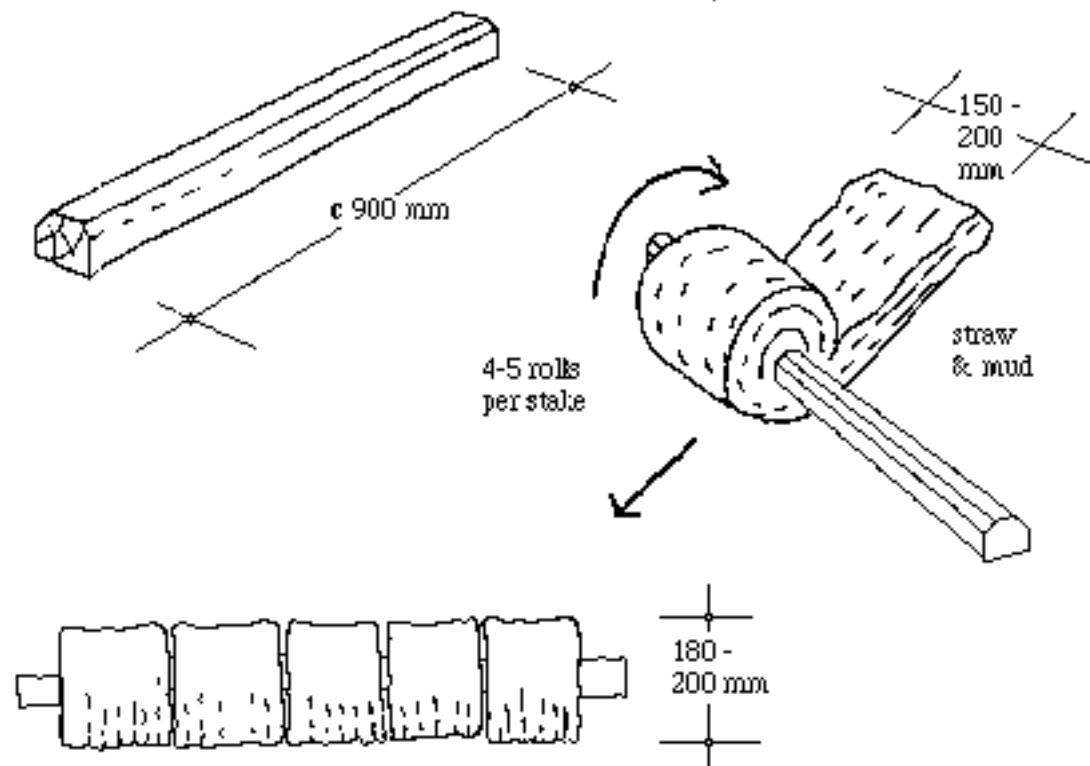
Peasant house, Sükösd, 1886



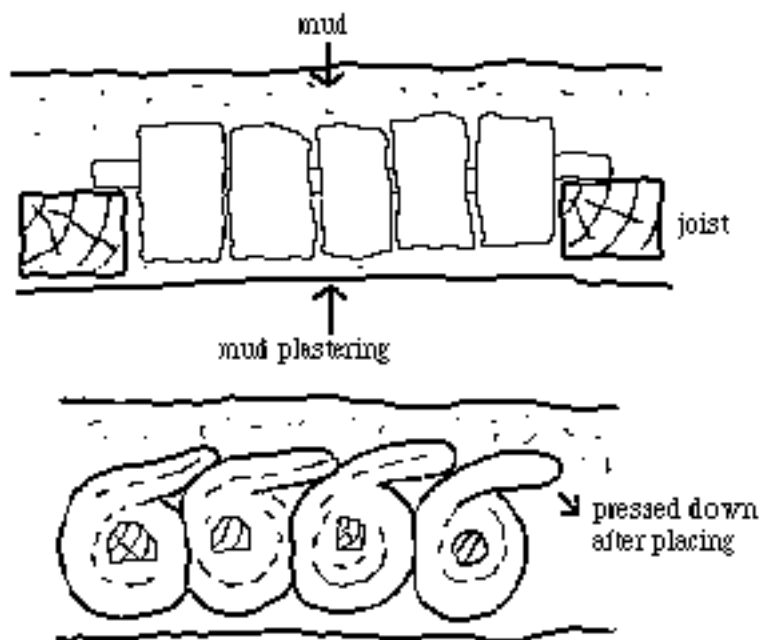
a prepared vikli roll



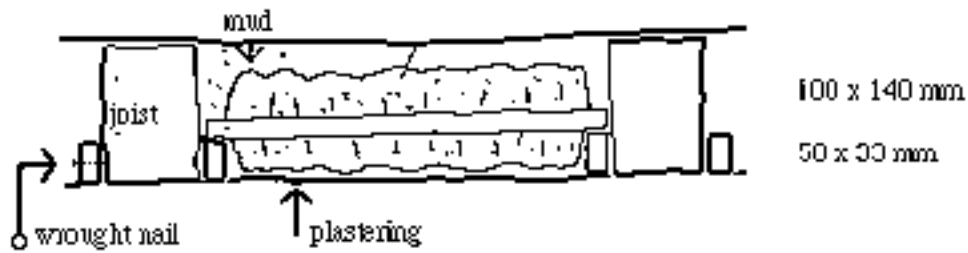
peasant house at Mezöberény, 1858



the prepared vakli with five rolls

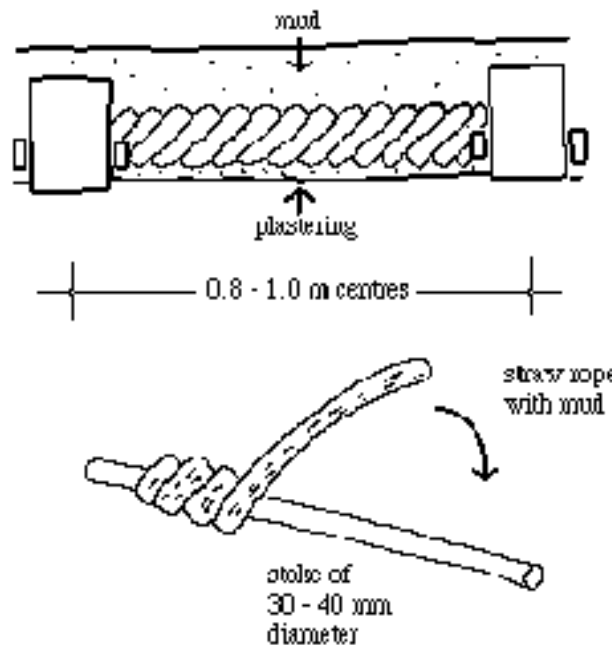


sections of the ceiling over the first room

inn at Kiskunhalas, c 1840

ceiling construction throughout the building

unspecified example
from a publication of 1956



e. North America

John Waite²⁴ tells me that the old Lutheran parsonage at Schoharie, in upstate New York, is a 1730s German building of *fachwerkbau*, though it had to be clad in clapboard at an early date, and has *lehmwickel* with the points fitted into grooves in the sides of the joists. Two subsequent buildings in the area also have or had *lehmwickel* in the construction. According to Frank Matero²⁵ *lehmwickel* is found in cellar partitions in the Dyckman house, New

²⁴ John G Waite of Mesick Cohen Waite, architects, Albany NY, verbally 1992.

²⁵ Frank Matero, University of Pennsylvania, verbally, 1992.

York, of 1783,²⁶ and in German buildings in Pennsylvania. The Dyckman house is Dutch in character, but I am so far unaware of the technique being used in Holland. At Euphrata, an Amish settlement founded in central Pennsylvania in about 1760, lehmwickel was used in wall construction. Here the units run horizontally, rather than vertically in accordance with usual practice, and the ends slot into grooves in the sides of the vertical posts.²⁷

Zoar, Ohio, was founded in 1817 by German separatists who formed themselves into a communal society in 1817, and retained their building traditions for thirty or forty years. J M Gaynor reports that 'Dutch biscuit' construction (as it is known locally) was common there from about 1830 to 1850 (though it seems more likely to have been used from the beginning). The biscuits were of a distinctive form, made from boards split into pieces from 25 to 150 mm wide. One wide piece or a number of narrow ones together were wrapped in mud and straw. The length was typically only about 330 mm to suit the spacing of the hoists, from which they were supported on nailed cleats, and plastered on the underside. The indications are that they were intended for heat rather than sound insulation.²⁸

The technique was also used in Wisconsin. W H Tishler discusses *fachwerk* construction in the German settlements and speaks of the filling of 'bricks or mud daub, made of a loam excavated from the cellar or from nearby low-lying areas, to which chopped rye straw was added as a binder'

To secure the mud in place, a series of vertical pointed staves were inserted into the wall openings. For this purpose shallow holes were chiseled into the bottom of the horizontal timbers, and the staves were slid along a groove cut into the top of the horizontal timber beneath, until they rested wedged upright between the groove and each hole. Frequently the staves were wrapped with twisted strands of rye straw which offered better anchorage for the mud and provided some insulation. In houses, stave-and-mud panels were also used for the interior partitions and between the floor and ceiling joists.²⁹

Tishler refers to this construction rather loosely as 'stave-and-mud-nogged walls', and refers to examples surviving in Dodge, Sheboygan and Shawano counties Wisconsin.³⁰ He has clearly misconstrued the sequence of construction, as observers often do, as being first the installation of the stakes, then the wrapping of straw, and finally plastering with mud. The

²⁶ This is at the corner of Broadway and W 204 St, and is the result of rebuilding by William Dyckman after the destruction of the previous building by the British. It has a gambrel roof and shows strong Dutch influence. Norval White & Elliot Willensky, *AIA Guide to New York City* (New York 1978 [1967]), p 299.

²⁷ Information from Dr Philip Goad, following a visit to the site in 1998.

²⁸ J M Gaynor, 'Nineteenth Century Architectural Insulation: Zoar, Ohio', *APT Bulletin*, VIII, 4 (1976), passim.

²⁹ W H Tishler, 'Fachwerk Construction in the German Settlements of Wisconsin', *Winterthur Portfolio*, XXI, 4 (Winter 1996), pp 279, apparently based upon R W E Perrin, "'Fachwerkbau' Houses in Wisconsin", *Journal of the Society of Architectural Historians*, XVIII, 1 (March 1959), p 31.

³⁰ Tishler, 'Fachwerk Construction' p 287.

principle of first making a mud-wrapped stake and then installing it, is counter-intuitive for most.

Lehmwickel was also used by Rappite settlers from Wurtemberg at Harmonie (which later became the Owenite village of New Harmony), in Indiana.³¹ Although these are called 'Dutch biscuits' - the 'Dutch' in this case is probably a corruption of *Deutsch*, or German. At Harmonie they were used for insulation between the joists of both the upper and the attic floors, and the stakes were shorter and broader than in European examples identified so far, or in most Australian ones, producing something closer to a flat cake than a cylinder, with the ends placed in continuous grooves along the sides of the joists. The wooden stake measured about 25 x 100 x 450 mm, and the finished cross-section was 100 x 175 mm. There is no indication that they were used in the walls (which were brick nogged) or elsewhere in the structure.³² Examples have been reported in other Garrman settlements in Anglaize, Holmes and Wayne counties, Ohio.³³ Professor David Woodcock tells me that fachwerk construction is found in Central Texas, and that in Fredericksburg, outside Austin, there are houses of two rooms plus loft, in which *lehmwickel* is found.³⁴ According to Peter John Stokes³⁵ a house near Kingston, Ontario, built in 1793 by loyalist settlers from the northern United States (not specifically said to be German) also has *lehmwickel* in the fabric.

f. Australia

The only contemporary documentation of this construction in Australia is an account by the Reverend C Eipper of the German mission at Zion's Hill (now Nundah, a suburb of Brisbane), published in 1841: 'the ceilings are formed of plaits of grass and clay wound about sticks and laid across the tie beams'.³⁶ Surviving illustrations do not help much. A view of a farmhouse in the Marburg district shows horizontal stakes running between the studs, and a partially intact covering consisting of some sort of mud and straw, or a similar mixture.³⁷ An illustration of a German house at Bethanie is even less informative, for although it is half-timbered, with dark framing and light infill, there is no way of telling what the infill material is.³⁸ Another house at

³¹ Don Blair, *The New Harmony Story* [no place or date], p 25; T M Slade [ed], *Historic American Buildings Survey in Indiana* (Bloomington [Indiana] 1983), pp 88-9.

³² Don Blair, *Harmonist Construction* (Indianapolis 1964), pp 54-05. Largely derived from this is the account in T H M Prudon, 'Deafening: an early form of sound insulation', *APT Bulletin*, VII, 4 (1975), pp 6, 13.

³³ Gaynor, 'Nineteenth Century Architectural Insulation', p 107, citing Donald Hutslar.

³⁴ Professor David Woodcock of Texas A & M University, verbally 1992.

³⁵ Peter John Stokes, consulting restoration architect, Niagara, Ontario, verbally 1992.

³⁶ Christopher Eipper, *Statement of the Origin, Condition, and Prospects, of the German Mission to the Aborigines at Moreton Bay* (Sydney 1841), quoted by J G Steel, *Brisbane Town in Convict Days 1824-1842* (St Lucia [Qld] 1975), p 290. I am greatly indebted to Ian Evans for drawing this to my attention.

³⁷ John Oxley Library, no 6360.

³⁸ John Oxley Library, no 20134.

Bethanie is half timbered and infilled with brick, which probably replaces the original material.³⁹

The German vernacular tradition which was so strong in South Australia has been studied in detail by Gordon Young and his colleagues,⁴⁰ and provides a good basis for understanding not only the architecture which these Germans took with them to Victoria and the Riverina, but also that of other Germans who emigrated directly to other localities.⁴¹ But the most interesting aspect of this German tradition, *lehmwickel*, not initially recognised in Young's work. Although it was not recognised as such, a *lehmwickel* ceiling appears (judging from the survey drawing) to have been found in the South Australian German settlement of Lobethal.⁴² The nearest description in the work of Young and his associates was that of ceilings 'constructed of wattle and daub panels set in between beams'.⁴³ Young subsequently said that he had come to believe that *lehmwickel* construction was been widely used in the area. A *lehmwickel* ceiling at Paechtown has since been recorded,⁴⁴ and there is another in 'German Cottage', Mount Gambier, a characteristically German-looking building with a jerkinhead roof.⁴⁵

Four photographs of three or four different buildings at Moculta, South Australia, are particularly helpful. One shows the detail of a wall which seems clearly to be of horizontal *lehmwickel* construction. Light saplings have been nailed to the sides of the posts to create grooves. Within these rest the horizontal split stakes with chamfered ends, to which adhere the remains of a coating of mud and straw, apparently round around the timber rather than plastered over it. The other photographs are less clear as to the precise nature of the material, but in at least two of them it can reasonably be interpreted as *lehmwickel*. A detail of the Gottlieb Fechner homestead shows a frame of roughly squared posts, with the surface of which has been chipped to improve bond. The top plate contains drilled holes, into which fit the top points of long vertical stakes, formerly plastered, but now almost entirely exposed. A general view of Samuel Jaeschke's homestead shows a long building with a thatched roof, and a plastered wall surface which is eroding to expose a horizontal member at sill height and vertical timbers in the infill panels. A fourth photograph, of the Martin Groch homestead, shows a thatched roof, and vertical timbers exposed in the gable, but it is impossible to be sure that this is not ordinary palisade construction.⁴⁶

³⁹ John Oxley Library, no 20265.

⁴⁰ Gordon Young et al, *Lobethal, 'Valley of Praise'* (Adelaide 1983).

⁴¹ There were fachwerk houses at Beenleigh and elsewhere in the vicinity of Brisbane, including two illustrated in the William Boag photographs, Oxley Library, one at Bethania, unnumbered, and another, no 1102.

⁴² Cellar, 122 Main Street, Lobethal, illustrated in Gordon Young et al, *Lobethal 'Valley of Praise'* (Adelaide 1983), p 109.

⁴³ Young, *Lobethal*, p 93.

⁴⁴ Robert Moore & Sheridan Bourke, *Australian Cottages* (Port Melbourne 1989), p 45.

⁴⁵ Information from Duncan Ross-Watt, 1991.

⁴⁶ Photographs in the Mortlock Library copied from originals held by a Mr Barritt of Moculta, who was apparently responsible for the annotations: items B41445, B41446, B41448, B41450.

During the 1850s many Germans migrated from South Australia to western Victoria, and it is there that the *lehmwickel* is found in an unequivocal form. In the Peshurst area they occur in a cottage built by the Bürger family in about 1854, a stable building nearby, and formerly in a cottage built by the Murtchen family at about the same time (now demolished), and there were other examples and remains in the neighbourhood. Both the Bürgersa [originally Byrgars] and the Murtchens [Mirtshins] were Sorbs, speaking their own Slavic language in addition to German. Peter Bürger was born in the village of Meschwitz, in Upper Lusatia, Saxon, and in 1851 emigrated with his family on the *Helene* to Adelaide, with the Mirtshins and other mainly Sorbish Wendish passengers. Land being difficult to obtain in South Australia, they travelled to the Mount Rouse area and established the settlement which they called Gnadenthal.⁴⁷

The external appearance of their buildings is more or less that of traditional European half timbering or German *fachwerk*: that is, the squared timber frame and bracing are visible externally, with panels of mud in between, all finished flush. *Lehmwickel* is used in the ceiling of the Bürger cottage, and the internal partitions of the stable. It seems that straw has been laid out flat with the stalks parallel, and a mud slurry poured on to it, or else that the straw has been combed through a container full of slurry, and (in either case) the layer of muddy straw has been rolled up onto the wooden stake like a roller blind. The stakes are of roughly split timber about a metre long, 20 to 30 mm thick and 60 to 80 mm wide, with pointed ends which protrude from the end of the mud cylinder, the overall diameter of which is about 100 mm. The cylinders were then placed horizontally between the ceiling joists, or vertically in a row in the panels of the timber frame, with the pointed ends resting in holes prepared for them. As they were put in place while the mud was still soft, they fit together snugly. In the case of the ceiling there seems to have been a calico lining below them, suggesting that their function was simply that of insulation.

The *lehmwickel* wall construction is visible in internal partitions, but the exterior walls are more problematic. They are flush finished in mud, and though there are similar vertical stakes within, these are so close to the surface that I suspect the mud to have been plastered directly onto the stakes, rather than onto Dutch biscuits. Some of the South Australian buildings appear to be of this simpler construction, but before considering this form it is necessary to mention one other Australian example, apparently quite unconnected with either the South-Australian-Victorian tradition of the Queensland one. This is a semi-detached house pair at 1-3 Vine Street, Ashfield, Sydney, believed to date from the 1850s, and built in a former vineyard. Whether it has any German connection has not been researched, but it is known that six Nassau vigneron had settled in New South Wales.⁴⁸ The building has all the hallmarks of the *fachwerk* tradition, including a jerkin-

⁴⁷ 'The Bürger family emigrants and Gnadenthal, Victoria', www.teachers.ash.org.au/dnuttiung/germanaustralia/e/burger.htm, Victoria and

⁴⁸ *Riverina* (Melbourne 1933), p 58, has the Burgers migrating from Saxony in the 1850s, Brasse, 'The German Contribution', p 39.

head roof. In recent alteration work *lehmwickel* was removed, but although it was used in the internal partitions and in the party wall between the dwellings, it is not clearly established whether it appeared in the exterior walls. Here the units were very long and the straw was short and randomly mixed rather than parallel.

g. postscript

An interesting postscript to the history of *lehmwickel* is the invention of a somewhat similar form of flooring by the Earl of Stanhope, early in the nineteenth century. The resemblance is almost certainly coincidental, and Stanhope's main purpose was to make the floor fireproof. He rendered the sides of the joists with a material consisting of hay cut into three inch [75 mm] lengths and rendered stiff by dragging it through a mixture of lime and sand. He nailed short lengths of lath vertically onto this surface, and arranged closely spaced laths to span between the joists at a level somewhat below their upper surface, then placed onto them more of the hay and lime mixture, levelling it up to the top of the joists. A more elaborate form of 'extra lathing' involved applying a second layer of lathing and hay / lime mixture to the sides of the joists. An example of this latter type was reported to have proved very effective in a building which actually caught fire. In the 1860s R S Burn stated that

The use of a non-conducting material thus introduced years ago by the Earl of Stanhope is still the distinguishing feature of nearly all modern plans, and especially of those extensively practised by the Parisian builders.⁴⁹

In Britain, by contrast, such developments seem to have been almost entirely ignored. In Germany *lehmwickel*, or what Jolly refers to as *lehmwickelstakung*, seems to have been used or revived, or at least to have influenced other construction methods adopted during the building materials shortages following the Great War.⁵⁰

⁴⁹ E S Eyland, Francis Lightbody & R S Burn, *Working Drawings & Designs Architecture and Building* (A Fullarton, Edinburgh, no date [c 1863]); R S Burn, *Modern Building and Architecture* (London, no date [c 1870]), pp 25-6.

⁵⁰ Bridget Jolly, 'Solomit in Australia and its European Context' (PhD submission, University of South Australia, 1998), p 117.