These were found in a filled-in well excavated at
17th-century farmhouse. The well though
a 500 years older farm house (Goubitz 1997b). It
use of a few Pingsdorf-style potsherds that the
ıoes could be dated to around 1200. Otherwise,
:ive shoes (Fig. 1) would have been dated eight to
's earlier!
ımple is provided by a pair of shoes from Haarlem.
typically 15th-century design (Fig. 2), fastened
buckles, and come from an early 15th-century con-
dating seems quite straightforward, but they have
ury welted sole construction (pers. comm. P.
Groeneveld, Archeologisch Museum, Haarlem). The problem is that the welted sole construction is believed to have evolved around 1500 at the very earliest! Whereas the primitive shoes from Hoogland may be explained as simple, home-made products, the Haarlem find continues to be a mystery. Given the associated finds, the dating of this curious pair is beyond doubt.
Fortunately, archaeology is a pleasant combination of fact, imagination and science and we should keep in mind that it is always full of surprises.
Still, the matter will continue to be intriguing .

*'he 'primitive' shoe found
' in Hoogland. Ca. 1200.*

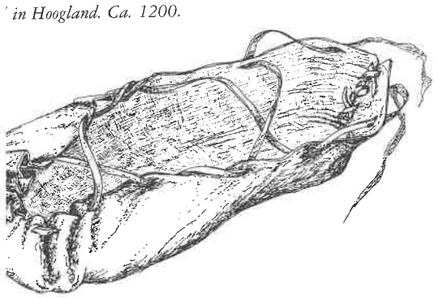
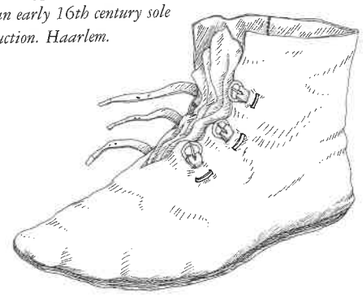


Fig. 2. A typical 15th century shoe with an early 16th century sole construction. Haarlem.



Material

From the Late Iron Age onward and well into the 19th century, footwear was made from vegetable-tanned leather. From then on, also other tanning agents and methods were applied in the increasingly industrialised production of shoes. These tanning agents worked much faster and made for a much more standardised product, which is a prerequisite for industrial processing. Nowadays vegetable-tanned leathers are used almost exclusively for the linings of luxury shoes and in orthopaedic footwear.
Cowhide, from young and mature animals, is a first-rate material for shoes. It is strong, supple and - if properly greased - watertight, and it can be used either in its full or in a reduced thickness. From prehistory up till the present, cowhide has been the most popular shoe leather. For somewhat more pliable, generally more luxurious footwear, goatskin was used as well. Leathers such as those of chamois, reindeer, red deer, roe deer and even horse would also have been used, but for more specific purposes. Because pigskin is difficult to tan with vegetable agents because of its high fat content, this was rarely used. Only once did pigskin turn up at the R.O.B.'s leather unit: as a midsole in a 16th-century shoe. Vegetable-tanned leather when excavated tends still to be fairly pliable, mostly because it is saturated with groundwater. If allowed to dry without being impregnated with a conserving agent, it will become rigid like cardboard. If reimmersed in water, it will usually regain its suppleness.
Archaeological leather takes on the colour of the soil: dark brown to black. Iron, naturally present in the soil or coming from buried iron artefacts, is particularly apt to react with the tanning agents to produce a dark colour. Interestingly, the leather made before 1500 often is lighter in colour than that of later centuries. Economic and technological developments around 1500 made it necessary and possible to speed up the tanning process by new methods. After 1500, shoes were also constructed in a different way and thicker leather was used. What was the cause and what the effect, is still unclear.
Political and economic developments brought greater prosperity to some towns and regions than to others. The excavated footwear often presents a fair reflection of local prosperity or the lack of it. This is evident from the range of types, the proportion of decorated footwear, the degree of wear and the extent to which shoes have been repaired.
The kind of leather may be identified by examining its grain pattern. Leather has a grain and a flesh side. The grain pattern is caused by the cavities of the hair follicles. Every animal species has its characteristic pattern of hair or wool growth (Hegenauer 1977), and the graining and tanning of the skin makes the follicles visible. Not every piece of archaeological leather can be identified to species: the method of skin preparation, the use of the leather and its burial in the soil may severely affect the recognisability of the grain pattern. Moreover, the grain pattern on a skin will differ markedly from one part of the body to another. The grain pattern on the belly and flank of a cow may look so untypical that one may believe it to be goatskin. The difference between flesh and grain side is very clear, unless the grain side is badly abraded. The grain side is dense and smooth and may be somewhat shiny. Leather that was used for strong casings, knife sheaths and book bindings will be smooth and is easily made glossy again. This leather often has been deliberately hardened by beating, pressing or forced drying. Leather of casings and book bindings will be flattened on the flesh side as well and will rarely show traces of wear on this side. Shoes often have areas of wear which are easily observed on the smooth grain side.
Wear is of great use in establishing what was the inside and outside, or top and bottom of a piece of leather. It helps to identify the insole, midsole and treadsole of a shoe. The treadsole always has its grain side towards the outside, the street surface. The insole usually has its grain side towards the foot. In mules the flesh side sometimes faces upward, but this is rarely the case in shoes.
In some cases, the upper of a shoe was made with the flesh side facing outward. In medieval times, this was mostly reserved for luxury footwear, the velvety texture of the carefully scraped flesh side lending the shoe extra distinction. When the flesh side was turned to the inside, it is variably scraped, and in some cases not at all, with fibres still dangling. The flesh sides of the leather envelopes and soles were on the whole left untreated, because these were not going to be visible. Cuts caused by skinning and tanning are often clear to see here.
The author investigated the direction in which medieval shoemakers tended to cut parts out of a skin. There was a distinct preference: in ca. 50% of the investigated uppers, the leather was found to have been cut in such a way that the hairs would have pointed to the rear or obliquely to the side as they had done on the animal itself. Leather cut sideways to the direction of the hair implant accounted for 20 % of the parts, and leather with the hairs pointing forward or obliquely forward, for another 20%. In the other cases the leather had been cut out of a part of the skin where the grain was a mixture of various directions, as on the belly and flank. Shoemakers avoided leather from these parts as much as possible, because of its excessive elasticity. Yet occasionally a teat may be found on some part of an upper.
The thread with which shoes were stitched together was flax, hemp or a combination of the two. In favourable conditions,

remains of thread may survive in the stitch-holes. These remains can often be microscopically identified at a 50- or 100-fold magnification with transmitted light. Flax is particularly distinctive in polarised light.

Wood and cork are both used as sole fillings in certain mules. The soles of leather pattens always contain layers of cork, 7 to 12 mm thick. In mules and shoes wood is mostly used for the higher heels, whereas wooden pattens obviously have entirely wooden soles, with a leather strap across the foot.

Metals were used for buckles: pewter, brass or iron. Iron nails joined the footstraps of wooden pattens to the soles. In sole constructions, it was not until the late 18th century that iron nails were used as well as wooden pegs. Previously, iron nails had now and then occurred on soles, but these served mainly as a precaution against slipping. This implies a gap of over twelve centuries since the Romans used nails as a constructive element in their footwear. The purpose of the "barrelfuls of shoe nails" that are mentioned in some Dutch 16th-century tariff lists, is a mystery. Maybe these were made for shoeing horses or for strengthening the hulls of ships. No special shoe nails were needed for wooden pattens; here ordinary carpenter's nails would do the trick.

On rare occasions, if a shoe is so well preserved in the soil that its sole parts have remained pressed together, it is possible to find remains of pitch along the sole seams of well-made shoes. For making the seam entirely watertight, the shoemaker used a natural bitumen. Maybe this was a fairly regular feature of 16th-century and later footwear, but the bitumen may have decayed through the action of soil acids.

Some shoes may have a layer or area where some product seems to have been spread onto it. This usually is a somewhat sticky, bituminous or oily material. Most probably these are remains of substances that were spilt onto the shoes by their wearers. In the same way spots of paint may occur on shoes; one should investigate whether these are accidental stains or deliberately made spots of decorative colour (See Decoration). Such traces of use must never be unthinkingly removed, and should at any rate be properly documented.

Within the toe part of a shoe there may be a filling of hair, moss or other fibrous material. This is found mostly in late-medieval shoes with long piked toes; it served to keep the pikes in shape. Hair, wool and other insulating shoe fillings were used, though we find barely any trace of these in the shoes. Moreover, it is rarely clear whether such materials belonged in the shoe or ended up there at a later stage. In the 16th century, woollen fabrics began to be used for lining or covering footwear (Goubitz 1998c). Mostly only the sole was textile-covered, but even then it is not always clear whether this fabric was part of the shoe or belonged to a stocking or a legging that for some reason remained inside the shoe.