476 - Shoes

476.1 IMACS Classification:
(AS) Animal shoes
(SO) Shoes

476.2 Shoe History and Dating: "The old way of doing things in the shoe making business meant using wooden pegs, hand driven, to join soles and uppers. Shoes in the western world were universally made this way until the early 1800s. About 1810, and after Brunel's work with clamping presses, an American developed a similar invention as did two Frenchmen, Gengembre and Joliciere, working in Paris. Their efforts were followed in 1822 by a German shoemaker from Stuttgart, a man named Brecht, who conceived the use of screws for joining soles and uppers. Brecht's idea culminated before 1880 in a process in which a thread was cut upon a brass 'cable screw' wire. The screw thus made was then forced through sole and upper placed on an arm beneath, riveted, and then cut off. This was repeated as the shoe was advanced by the workman until the operation was finished, the whole being effected automatically by a single machine. The ends of the wires were then cut off and filed down, and the heels were nailed to the shoes by machinery (Knight 1882:III: 2158, 2162; Turner 1948:138)" (Fontana et al. 1962:105-106).

"As a rule of thumb, one can safely say that it was about 1812 before shoe nails replaced wooden pegs. Shoe-nailing machines, such as that finally perfected by Nathaniel Leonard of Merrimac, Massachusetts in 1829, did not drive finished nails into shoes. Rather they drove wire which the machines then cut and subsequently, in some instances, headed. In other words, the presence of actual square cut iron nails or square cut brass nails in a shoe dates it post-1812. Metal fasteners of any kind, especially wire, in a shoe date it certainly post-1800 and most likely post-1829" (Fontana et al. 1962:105-106).

"Sometime between the 1800s and the present day brass shoe pegs and nails ceased to be made. We have not been able to establish any dates. Modern shoe nails, both wire and square cut, are iron, coated or otherwise treated to make them resistant to corrosion. There are many kinds, but among the more common varieties are the square cut clinch and soling nails; the wire top-lift and hold-fast nails; and the twisted wire fed into a machine from a spool to be cut at any desired length after it has been driven into the shoe. This machine is a descendant of that invented by Brunel at the onset of the 19th century and perfected by Leonard in 1829" (Fontana et al. 1962:105-106).

The following summary is from Anderson (1968:62-64).

During the industrialization of the nineteenth century a number of important technological innovations took place within the shoe industry. Each development was marked by some distinctive feature which provides the archaeologist with valuable technological data. The twentieth century has been a period of stylistic experimentation and innovation, but today's shoes are manufactured by the same methods used in 1912 and are processed by the same types of machines.

There are two basic types of shoes: turned shoes and shoes whose upper is attached to the insole and reinforced by the outsole and heel. The upper of a turned shoe is sewn inside out to a single, thin sole. Then it is turned right side out. Today turned shoe manufacture has generally been replaced by the cementing process, but archaeologically this form abounds and can be easily recognized. The single sole has a thin, feathered strip of leather on the inside of the sole. The upper is stitched to this strip when inside out.

Any mass-produced shoe can be further placed into one of three groups based on the method of attaching the outsole to the upper. A shoe is nailed (or pegged or screwed), sewn, or cemented. Even fragmentary pieces of sole leather generally betray the method of manufacture. Nails may still be intact, or their corroded remains visible in a nailed shoe. If the nails are gone, the round hole remains. There are no channels, feathered ridges or ribs. Thread from a stitched shoe will probably be gone, but small needle holes will remain. These are generally much smaller than those left in nailed shoes and are slightly oval. There may be indentations in the leather between the holes, indicating tightly pulled thread. Sewn shoes will have an outsole channel where the stitching occurs to keep the thread from being worn. They may also have a feathered edge on the bottom of the outsole with the stitching underneath. Feathering was a method used around the turn of the century for protecting stitches from wear. Often this feathering is worn off at the ball of the outsole, but will still be present on the shank. A McKay shoe will have stitching on the inside of the insole. If the stitching does not include the toe and heel, it may be dated before McKay's 1862 patent. Goodyear Welt shoes are recognized by the unique rib on the underside of the insole. Cemented shoes occur late and are distinguished by the fact that the part of the upper cemented to the insole will be intact. This glued piece may be the only remaining fragment of a cement shoe's upper.

A study of fashions and stylistic changes provides another source of chronological information. However, consideration of styles is outside the scope of this paper. Reports on shoes should utilize the terminology for shoe parts and manufacturing processes that are standard within the shoe industry. Primary sources, including shoe manufacturers' guides, trade catalogues, and patent records should always be consulted. Archaeological and other reports have relied on secondary sources containing factual errors which are perpetuated in the literature.

Footwear can be dated by technology alone. Archaeologists working in post-1850 sites need to be aware of the information that can be derived from old shoes.

"Innovations in the shoe making industry have been cited by Anderson (1968) and include some easily identifiable and datable changes. Foremost in importances, we have discovered, were the developments of the 'Goodyear Welt' technique of shoe manufacture in 1875 and the all rubber heel, an innovation of 1895" (Buckles et al. 1978a:445, 448).

476.3 Shoe Chronologies:

1. Chronological summary from Fontana et al. (1962) and Buckles et al. (1978):

Circa Pre-1812 - Wooden pegs, hand driven, to join sole and uppers.
Circa Post-1812 - Wood pegs replaced by square cut iron or brass nails.
Circa Post-1829 - Metal fasteners of any kind, especially wire.
Post-1875 - Goodyear Welt construction.
Post-1895 - All rubber heel.

2. Shoe Chronology taken from Berge (1980:275-278):

The styles of shoes have changed through time as clothes fashions have changed, but not as drastically as in our own time (Wilson 1969:1).

Anderson (1968) presents an outline of shoe improvements during the nineteenth century. It is further listed with some additions (Wohl Shoe Company) as follows:

until 1750	Shoemakers worked in their own homes, hand crafting footwear.
1800	Shoes were made ready-to-wear. Patent leather was introduced.
1812	Shoe nails were manufactured in New England to replace the wooden peg; also the lathe was developed.
1844	Charles Goodyear discovered and patented the process of vulcanization, which included the manufacture of rubber shoes, soles and fishing boots.
1846	Elias Howe, Jr., patented a sewing machine, making it possible to stitch shoe uppers rapidly.
1850s	The first sport shoes were manufactured with a laced fabric top and a rubber sole, later to be called the 'sneaker'.
1860	Lyman R. Blake, Abington, Massachusetts, patented a sewing machine that sewed the sole to the upper shoe. It "left a loop stitch and ridge of thread on the foot side of the insole, and did not stitch the heel or the toe".
--------	Lasts were developed to distinguish between right and left shoes.

1862	Colonel Gordon McKay patented improvements on Blake's sewing machine, which enabled the seams to be made completely around the shoe. This invention lightened shoe construction, eliminating pegs or nails. This machine left stitching on the foot side of the insole.
--------	Eugene Lemercier formed a screw from a continuous brass wire, forced it into the leather, and cut it off automatically.
1874	The eyelet-setting machine was developed.
1875	Charles Goodyear, Jr., perfected the Goodyear Welt Stitcher, which used a curved needle to stitch the welt to the upper shoe and to the sole at the same time.
1888	Standard shoe sizes were developed.
ca. 1912	Manufacturing techniques were standardized: Goodyear Welt, McKay, turned, standard screw, and nailed.
1915	Saddle shoes were first worn.
1926	Cement shoe production by gluing of the sole to the upper shoe.
1937	Wedged soles were introduced.

476.4 Shoe Illustrations (from Anderson 1968)

See ILLUSTRATIONS section.

476.5 Animal Shoes: The following information is adapted from Berge (1980).

Horseshoes

"The normal horseshoe has the form of a constricted arc with the same three general sections as the foot, ie., toe, quarter, and the heel. The area from the toe to the heel on each side of the shoe is termed the branch or wing (Great Britain 1908:227). These branches can be either inner or outer, depending on the position of the shoe in relation to the body median. The area of the shoe which comes in contact with the ground is the ground surface, and the opposite side is the hoof-surface. That portion of the shoe which comes into direct contact with the hoof is the bearing-surface. The fuller is a groove which usually extends the length of the quarter but may include the entire arc of the shoe, from heel to heel. Nail holes are punched into the fuller, and this groove prevents the wearing away of the nail head, thereby preventing the untimely loss of the shoe. The fuller also prevents slipping and aids the farrier in punching the nail holes more easily and accurately (Fitzwygram 1903:479). Seating is used to take the pressure off the sole in order for the wall to take the entire pressure of the horse's weight. The "web" of the shoe (width of the branch) is "the whole of the substance of the shoe ... and the width of the web, cover, e.g., a wide-webbed shoe, is frequently spoken of as having 'plenty of cover' (Great Britain 1908:227).

Normal front shoes are easily distinguishable from normal hind shoes. The front shoes are more nearly circular at the toe and quarter, and are usually wider at the heels. The hind shoes are more pointed at the toe and quarters, and usually narrower at the heels (Hayes 1960:448).

Mule Shoes

"The structure and characteristics of the hooves of these animals are quite similar to those of the horse, differing chiefly in the narrow and the round at the toe, the sole is well-arched, and the side walls are rather steep. In the ass the narrowness of the hoof is still more pronounced, the wall is relatively wide in the region of the quarters. The horn of both the mule and the ass is tough.

The shoes differ from those of the horse in no other respect than that they should be lighter and narrower. Four nail-holes are sufficient for an ass's shoe, and five to six for a mule."

Oxen Shoes

"The shoeing of oxen is essentially different from that of horses, because the foot of the ox is cloven (split), the long pastern, short pastern, and hoof bone are double so that instead of one hoof or claw, there are two upon each foot, distinguished as outer and inner. Each claw consists of wall, sole, and bulbs; the frog is absent. The wall is considerably thinner than that of the horse's hoof, the sole is thin, and the bulbs are low. For these reasons the shoe designed for a claw must be thin, but wide."

Nails

There are hand-made and machine-made horseshoe nails, both of which have their specific advantages and disadvantages (Lungwitz 1908:109). There are two primary types of nails: (1) rose-headed

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See ILLUSTRATIONS section.

nail and (2) countersunk nails. Rose-headed nails are employed with shoes that have not been fullered; the head does not enter the nail hole. Countersunk nails are embedded into the web, having either a half or full counter (Great Britain 1908:233). There are also frost-nails (edged like a screwdriver) used in the winter to perform the same task as a calk (Lungwitz 1908:119).