proper differs from the shoe in reaching up to the knee, as exemplified by such forms as jack-boots, top-boots, Hessian boots and Wellington boots, but the term is in England now commonly applied to “ half-boots ” or “ ankle-boots ” which reach only above the ankle. A collection illustrating the numerous forms and varieties of foot-covering, formed by Jules Jacquemart, is in the Cluny Museum in Paris.

*Wooden Shoes.—*The simplest foot-covering, largely used through­out Europe, is the wooden shoe *(sabot)* made from a single piece of wood roughly cut into shoe form. Analogous to this is the clog of the midland counties of England. Clogs, known also as pattens, are wooden soles to which shoe or boot uppers arc attached. Sole and heel are made of one piece from a block of maple or ash 2 in. thick, and a little longer and broader than the desired size of shoe. The outer side of the sole and heel is fashioned with a long chisel-edged implement, called the dogger’s knife or stock; a second implement, called the groover, makes a groove about one-eighth of an inch deep and wide round the side of the sole; and by means of a hollower the contour of the inner face of the sole is adapted to the shape of the foot. The uppers of heavy leather, machine sewed or riveted, are fitted closely to the groove around the sole, and a thin piece of leather-binding is nailed on all round the edges, the nails being placed very close, so as to give a firm durable fastening. These clogs are of great advantage to all who work in damp sloppy places, keeping the feet dry and comfortable in a manner impossible with either leather or india-rubber. They are consequently largely used on the continent of Europe by agricultural and forest labourers, and in England and the United States by dyers, bleachers, tanners, workers in su gar-factories, chemical works, provision packing ware- houses, &c. There is also a considerable demand for expensive clogs, with finely trimmed soles and fancy uppers, for use by clog- dancers on the stage.

*Manufacture of Leather Shoes.—*There are two main divisions of work comprised in ordinary shoemaking. The minor division— the making of “turn shoes ”—embraces all work in which there is only one thin flexible sole, which is sewed to the upper while outside in and turned over when completed. Slippers and ladies’ thin house boots are examples of this class of work. In the other division the upper is united to an insole and at least one outsole, with a raised heel. In this are comprised all classes, shapes and qualities of goods, from shoes up to long-top or riding boots which reach to the knee, with all their variations of lacing, buttoning, elastic-web side gussets, &c. The accompanying cuts (figs. 1 and 2) show the parts and trade names of a boot.

Shoemaking was formerly a pure handicraft ; but now machinery effects almost every operation in the art. On the factory system all human feet are treated alike; in the handicraft, the shoemaker deals with the individual foot, and he should produce a boot which for fit, comfort, flexibility and strength cannot be approached by the product of machinery.

The shoemaker after measuring the feet, cuts out upper leather according to the size and pattern. These parts are fitted and stitched together by the “ boot-closers,” but little of this closing is now done by hand. The sole “ stuff ” is next cut out and assembled, consisting of a pair of inner soles of soft leather, a pair of outer soles of firmer texture, a pair of welts or bands about I in. broad, of flexible leather, and lifts and top-pieces for the heels. These the “maker" mellows by steep- ing in water. He attaches the insoles to the bottom of a pair of wooden lasts, which are blocks the form and size of the boots to be made, fastens the leather down with lasting tacks, and, when it is dried, draws it out with pincers till it takes the exact form of the last bottom. Then he “ rounds the soles,” by paring down the edges close to the last, and forms round these edges a small channel or feather cut about one-eighth of an inch in the leather. Next he pierces the in- soles all round with a bent awl, which bites into, but not through, the leather, and comes out at the channel or feather. The boots are then “ lasted," by placing the uppers on the lasts, drawing their edges tightly round the edge of the insoles, and fastening them in position with lasting tacks. Lasting is a crucial opera­tion, for, unless the upper is drawn smoothly and equally over the last, leaving neither crease nor wrinkle, the form of the boot will be bad. The welt, having one edge pared or chamfered, is put in position round the sides, up to the heel or “ seat,” and the maker proceeds to “inseam,” by passing his awl through the holes already made in the insole, catching with it the edge of the upper and the thin edge of the welt, and sewing all three together in one flat seam, with a waxed thread. He then pares off inequalities and “ levels the bottoms,” by filling up the depressed part in the centre with a piece of tarred felt; and, that done, the boots are ready for the outsoles. After the leather for them has been tho­roughly compressed by hammering on the “ lap-stone,” they arc fastened through the insole with steel tacks, their sides are pared, and a narrow channel is cut round their edges; and through this channel they are stitched to the welt, about twelve stitches of strong waxed thread being made to the inch. The soles are now hammered into shape; the. heel lifts are put on and attached with wooden pegs, then sewed through the stitches of the insole ; and the top-pieces, similar to the out­soles, are put on and nailed down to the lifts. The finishing operations embrace pinning up the edge of the hed, paring, rasping, scraping, smoothing, blacking and burnishing the edges of soles and heels, scraping, sand- papering and burnishing the soles, withdrawing the lasts, and cleaning out any pegs which may have pierced through the inner sole. Of course, there are numerous minor operations connected with forwarding and finish­ing in various materials, such as punching lace-holes, inserting eyelets, applying heel and toe irons, hob-nailing, &c. To make a pair of common stout lacing boots occupies an expert workman from fourteen to eighteen hours.

The principal difficulties to be overcome in applying machinery to shoemaking were encountered in the operation of fastening together the soles and uppers. The first success in this important operation was effected when means other than sewing were devised. In 1809 David Meade Randolph obtained a patent for fastening the soles and heels to the inner soles by means of little nails, brads, sprigs or tacks. The lasts he used were covered at the bottom with plates of metab and the nails, when driven through the inner soles, were turned and clinched by coming against the metal plates. To fix the soles to the lasts during the operation the metal plates were each perforated with three holes, in which wooden plugs were inserted, and to these the insoles were nailed. This invention may be said to have laid the foundation of machine boot-making. In 1810 Μ. I. Brunel patented a range of machinery for fastening soles to uppers by means of metallic pins or nails, and the use of screws and staples was patented by Richard Woodman in the same year.

Apart from sewing by machine or hand, three principal methods of attaching soles to uppers have been used. The first is “ pegging ” with small wooden pins or pegs driven through outsole and insole, catching between them the edges of the upper. The points of the pegs which project through the insole arc cut away and smoothed level with the leather either by hand or by a machine pegging rasp. The second is the system of “ riveting or clinching ” with iron or brass nails, the points of the nails being turned or clinched by coming in contact with the iron last used. The third method, screwing, has come into extensive use since the standard screwing machine was introduced in America by the McKay Sewing-Machine Association, of Boston, Massachusetts, and in Europe by the Blake and Goodyear Company, of London. The standard screw machine, which is an American invention, though the idea was anticipated by a Frenchman named Blanchon in 1856, is provided with a reel of stout screw-threaded brass wire, which by the revolution of the reel is inserted into and screwed through outsole, upper edge and insole. Within the upper a head presses against the insole directly opposite the point of the screw, and the instant screw and head touch the wire is cut level with the outsole. The screw, making its own hole, fits tightly in the leather, and the two soles, being both compressed and screwed firmly together, make a perfectly water-tight and solid shoe. The surface of the insole is quite level and even, and as the work is really screwed, the screws are steady in their position, and they add materially to the durability of the soles. The principal disadvantage in the use of standard screwed soles is the great difficulty met with in removing and levelling down the remains of an old sole when repairs are necessary.

The various forms of sewing-machine by which uppers are closed, and their important modifications for uniting soles and uppers, are also principally of American origin. But the first suggestion of machine sewing was an English idea. The patent secured by Thomas Saint in the English Patent Office in 1790, while it fore- shadowed the most important features of the modern sewing-machine, indicated more particularly the devices now adopted in the sewing of leather. After the introduction of the sewing-machine for cloth work its adaptation to stitching leather both with plain