

## ARTIFICIAL LIMBS.

MAKING SUBSTITUTES FOR MISSING LEGS AND ARMS.

An Industry That is a Boon to Humanity - Various Processes of Manufacture Described - Cost of Replaced Members.

**A**CCIDENTS will happen and legs and arms be broken or crushed so that amputation becomes necessary, and then the artificial article is truly a blessing. It appears to be a difficult task to determine the date of the first appearance of this great boon to humanity. For centuries the unfortunate cripple was an object of pity, neglected and entirely at the mercy of the unskilled surgeon. Crude and cruel methods were adopted by the ancients in cutting off a limb. It was not until the seventeenth century that any humane means of stopping the hemorrhage was discovered. Previous to that, after a leg or arm had been knocked off by the use of a mallet and a chisel, the stump was seared over with red hot irons to stop the flow of the blood. And even after all this torture, the sufferer was compelled to hobble about as best he could without the slightest hope of ever having his condition ameliorated. And yet some substitute for a missing member was certainly found by the ancients, for Herodotus, who died in 408 B. C., tells us in some of his historical works of a prisoner who amputated his own foot to free himself from the shackle, and was thus enabled to escape and return to his home, where his friends provided him with a wooden foot. An artificial leg was found in 1885 at Capus in a tufa tomb and is now on exhibition in the Academy of Sciences in London. At the feet of the skeleton where this relic was found lay three vases bearing the date of 300 B. C., proving that the art of making artificial limbs is an old one.

The beginning of the present century, however, marks the time when

edge, the workman begins enlarging this hole until he has made it fit the stump so that it touches with precisely the same bearing every portion of it.

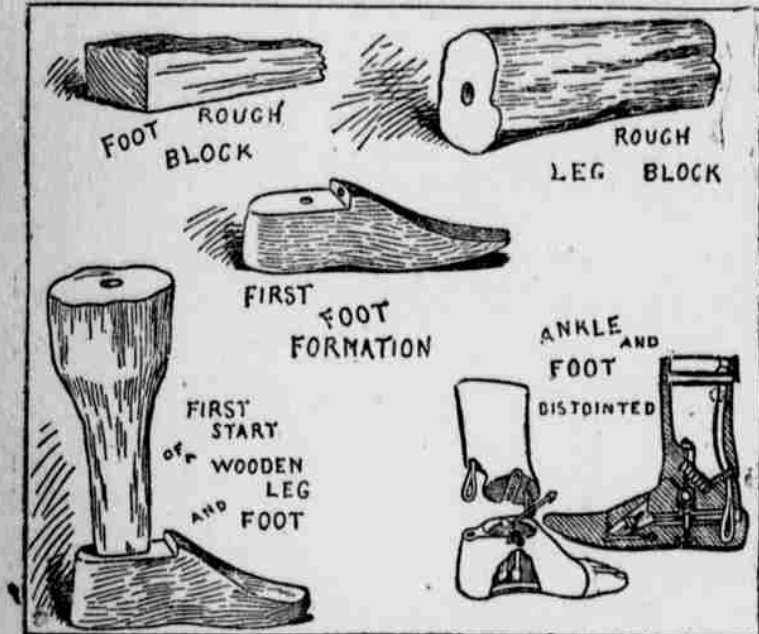


ARTIFICIAL LEG FOR AMPUTATION BELOW THE KNEE.

If the amputation has been below the knee then comes the stout steel knee joint. The making and fitting of this part of the limb requires great skill. The necessity is found for a separate knee piece of wood. This is fashioned into a shapely knee cap, and so adjusted that each end works smoothly and steadily in either the top socket of the lower limb or the bottom part of the upper limb.

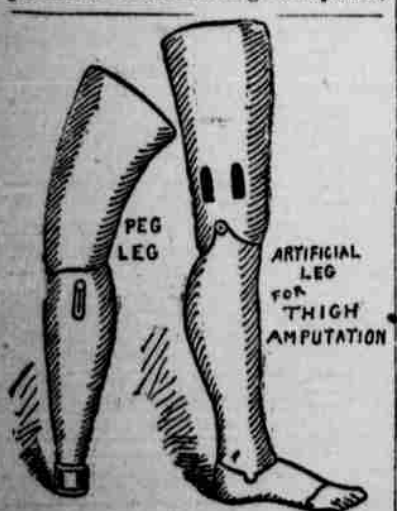
The making of the various hinges which form the joints is an important part of the work. They are made of steel and car-spring rubber, and must be simply perfect in their adjustment to insure satisfactory results.

When the leg has been fitted and all the joints have been made to work



ARTIFICIAL LEG IN VARIOUS STAGES OF MANUFACTURE.

real improvements were made in artificial limbs and shapely legs and arms and hands began to take the place of the crutch and the stiff and immovable wooden peg. Although frequently spoken of as "cork" legs, that very useful material has never been a factor in the making of an artificial limb. Artificial limbs are made generally from red or English willow. This comes to the manufacturer in blocks after a thorough seasoning of two years. For legs, these blocks are long enough to form either the lower or all of the upper or thigh part of the limb. Then there is the foot block. All the work is done by hand. Invention has not yet devised machinery for making artificial limbs. The first thing the operator does is to hew the foot block into some rough semblance of a human foot, and into this is put one part of the ankle hinge. Then the skin is rudely formed and the other portion of the ankle hinge is adjusted.



When these two parts are put together and connected a natural working ankle joint is produced. The ordinary make has only the back and forward motion, though in some cases a joint having a lateral action is found necessary. This, however, is not often.

The next point to which the workman gives his attention is the toe joint. This is a simple contrivance to look at, but it is an ingenious piece of mechanism. It is difficult to get this hinge to exactly suit the step of the wearer. Then comes the socket for the reception of the stump. This is a work of great care, for in the perfect fit here lies all the comfort or discomfort. In one end of the original block as it arrives at the factory is a round spher hole. With a peculiar tool, shaped like a hook, with a sharp

perfectly the wood is smoothed on the outside. It is then covered with a coating of thin rawhide and enameled. But with all the care exercised in the manufacture, the most difficult task, perhaps, falls upon the person who is to wear the contrivance. In many cases it is difficult to learn to use it. According to all accounts people have more trouble learning the use of an artificial arm or hand than they do the leg. If but one arm has been amputated, the remaining member is made to do all the service. People as a usual thing find it much easier to learn to write with the left hand than getting the knack of holding a pen or pencil between a wooden or rubber finger and thumb, but if both hands are missing it becomes necessary.

In regard to artificial arms and hands some great results have been attained. The work on these is much more complicated than on the leg, but still hands are made with fingers that will pick up a pin or handle a sword with wonderful facility. The simplest contrivance for making the fingers work naturally is a strap which goes over the shoulder. By "hunching" or working the shoulder joint this strap is made to act upon a mechanism in the forearm and action is thus communicated to the fingers so that they will open and shut.

While it is advisable for anyone who intends procuring artificial limbs to visit the factory in person to get a perfect fit, it is possible to get fairly good results from a plaster of Paris cast. It is sometimes impossible for people to reach large cities where this work can be done as it should, and in such cases the plaster cast serves a good purpose. So also in regard to the cost of limbs. A perfect leg will cost about \$75, while an arm, owing to the complicated mechanism, will cost from \$40 to \$100.

There are what the makers call peg legs. These are finished legs except that they have no foot. They are made with a peculiar joint at the knee, so that the peg can be either stiff or, by turning a screw, can be made to work on a hinge, as the wearer likes best. The socket receptacle is hollowed out in the complete leg, and they can be made very comfortable.

There is a wide difference of opinion regarding the time that ought to elapse after amputation before the artificial limb should be tried, but a fair average of all judgments on the matter sets the time at three months, and it will then take two weeks to turn out a limb.

White willow, the chosen wood for the cricket bat, is said to be disappearing from England.

## J. J. ASTOR'S OLD DWELLING.

The Fur-Trading Headquarters of the Original Astor.

To live in a house that was once occupied by John Jacob Astor, founder of the greatest fortune in the world, is to have encouraging surroundings. That is the situation of Mr. E. H.



THE ORIGINAL ASTOR HOUSE.

Clerque, of Philadelphia, who is in charge of the Sault pulp and paper plant of Sault St. Marie, Ontario.

The house is situated on the St. Mary's River, the outlet of Lake Superior. It is said to be one of the places which John Jacob Astor made his headquarters while engaged in the fur trade, in which he made his fortune before buying real estate in New York. It was probably the furthest west he reached. The establishment of Astoria, in Oregon, described by Washington Irving, was his enterprise, but he did not go there.

Astor arrived in New York in 1783, and a chance acquaintance with a furrier on the ship decided him to enter the fur trade. At first he exported furs from Canada to England and re-imported them to this country.

Then a treaty with Great Britain enabled him to organize the fur trade in the United States. In 1809 he incorporated the American Fur Company in the State of New York. Afterwards he organized the Southwest Company, with authority from the Government to trade in the Indian Territory along the Canadian border.

This company included the Mackinaw Company, a British corporation, and certain members of the Northwest Company, the greatest trading association in Canada. Many of Astor's hunters and trappers were Canadians. Astor's company was suppressed by the War of 1812.

It is said that he made two million dollars in furs and the China trade before he began his accumulation of real estate.

The old house is built of very heavy logs, evidently with a view to defense against Indians. There are loopholes for muskets. Mr. Clerque has added a story to it and furnished it in a very charming manner.

## The Vanderbilt Arboretum.

All those Americans who are interested in the material welfare of their country will watch with interest what George W. Vanderbilt is doing on his North Carolina estate. Mr. Vanderbilt, as is well known, is making on his estate a sort of model forest, where scientific forestry is to be practiced, and experiments made in acclimating valuable foreign trees, and in the most profitable management of the native species; but every one does not know that his plan includes horticulture and agriculture as well as forestry, and that he wishes and hopes to make his experience valuable to American farmers and land owners everywhere. With this view, he proposes to build on his property a little village, including not only a hotel, but houses and stores, where people interested in agriculture, who come properly introduced, may rent rooms or houses for themselves and their families, for such time as they may desire to study the work going on upon the estate. There can be no doubt that there will be plenty of applicants, for nowhere else in this country can such opportunities for advanced study of the sort be found. Fortunately for his countrymen, Mr. Vanderbilt is not only able, but willing, to expend large sums of money in experiments which may return, for the present, nothing but advances in scientific knowledge; and it is just these experiments which are, perhaps, in the end, most valuable to the country. — American Architect.

## The Limit of Folly.

It seems about the limit of folly to hide money in a stove and leave it to the risk of fire, but even that line was passed by some unknown near Norway, Ga., who stored a lot of cartridges in a stove. A woman started a fire in the stove one day last week and the cartridges exploded, destroying the sight of one eye and otherwise injuring her. — New York Sun.

## A New Factor in Civilization.

The motorcycle, as the horseless carriage is to be named in future, has come to stay. At Tunbridge Wells an exhibition of these vehicles has been



MOTORCYCLE, OR FOUR-WHEELED PETROLEUM GIG.

held, and recently a motorcycle race at Chicago brought the new vehicle still more prominently before the world. The horse has survived steam; will he be able to defy petrolum?

## NEW AND NEAT.

SOME LATE DESIGNS IN GARMENTS FOR WOMEN.

Stylish Combination in a Waist for Misses - Norfolk Basque for General Wear - Picturesque Marie Antoinette Fichus.

**I**N the first large illustration fancy boucle plaid is united with hunter's green velvet and decorated with narrow, dull gilt gimp and small buttons to match. The stylish waist is arranged over linings fitted with single bust darts and other usual seams, and closes in centre back. The full fronts and back are gathered on at yoke depth. A pointed yoke of velvet covers the upper portions of front and back, the front yoke extending to form a stole in centre over the drooping blouse close to the waist line. The neck is finished with a close-fitting standing collar of velvet, and a belt to match encircles the waist. Full gigot sleeves are mounted



HANDSOME WAIST FOR MISSES.

over comfortable linings and completed at the wrists with flaring cuffs of velvet, edged with gimp to match yoke. Handsome combinations of plain and mixed fabrics can be effected by the mode, which is suitable for all styles of material in wool or silk. The waist can be worn with a gored or round full skirt to match, and serge, camel's hair, cashmere, cheviot or tweed will usually be chosen for practical purposes, with or without silk, velvet or other contrasting fabric.

The quantity of 44-inch wide material required to make this waist for a miss of ten years old is 2 yards; for a fourteen-year-old size, 2½ yards; for a sixteen-year-old size, 3 yards.

## NORFOLK BASQUE FOR GENERAL WEAR.

Checked tweed in Scotch heather mixture made the stylish basque pictured in the other two-column illustration. This basque is a popular mode for shopping, walking, driving, cycling or general wear. The adjustment is glove fitting to the waist line, below which it falls with a slight ripple to fashionable length over the hips, the box plaits being graded and applied from the shoulders and the centre of fronts and back to the lower edge of basque. A belt of the material is worn around the waist. The closing

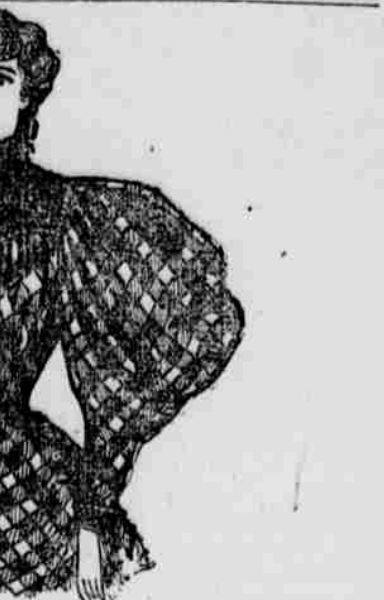
a lady having a 32-inch bust measure is 4½ yards; for a 36-inch size, 4½ yards; for a 40-inch size, 4½ yards; for 42-inch size, 4½ yards.

## ORNAMENTS FOR THE HAIR.

Of late years it has become the fashion to wear some ornament in the hair when in full evening dress. Tiaras, crowns and coronets are, of course, the handsomest ornaments, but, after all, the majority of women do not possess such jewels. Rhinestones, which closely resemble diamonds in their brilliant appearance, are deemed permissible imitations of the precious stones, and come in many quaint and beautiful designs.

Mercury wings are very popular, and are to be had in all sizes. When attached to a band of the same stones they make a becoming and effective headdress, and can be worn with hair arranged either high on the head or low in the neck, or part way between.

Young girls twist a bit of ribbon in their hair and tie the ends of the ribbon into a bow in sort of wing shape, while the rhinestones are universally conceded to be more suitable for older



MARIE ANTOINETTE FICHUS.

women to wear. The wings are often used without the bandeau. In that case they are generally fastened to a long hair pin.

## LADIES' MARIE ANTOINETTE FICHUS.

The picturesque neck draperies of the Marie Antoinette period are found among the dainty accessories to the



MARIE ANTOINETTE FICHUS.

toilette of the fashionable women. The soft, fine mull, chiffon, silk, muslin, crepe-de-chine, or Brussels net, of which they are usually made, draped around the neck in soft folds, with the fluffy, ruffled edging of soft lace or fine embroidery, render them graceful and becoming alike to young



POPULAR NORFOLK BASQUE.

is effected invisibly in centre front under the box plait. Two styles of collar are provided by the pattern, a high rolling collar that is closed to the neck, as shown on the figure, and a low-cut revers collar to wear with a chemisette, as shown in the small drawing. The fashionable full gigot sleeves are gathered at the top over comfortable sleeve linings and are plainly completed at the wrists. This style of basque is simple in construction and dressy in effect, requires no decoration or trimming of any kind, is becoming to all figures, and for these reasons held in general favor, retaining to-day the popularity achieved on its first introduction to the world of fashion. Cheviot, serge, camel's hair, vicuña, covert and ladies' cloth and all varieties of smooth and rough-faced suitings in plaid, striped, mixed or checked designs will develop stylishly by the mode.

The quantity of 44-inch wide material required to make this basque for

and old. No. 1 is here pictured of square-colored chiffon, shaped in button or sailor outline at the back, the edges being finished with frills of the chiffon, edged with butter-colored Valenciennes lace. No. 2 is of white mull with deep frills of handsome lace. It is shaped in round outline in black and lies in soft, natural folds around the neck. The ends can hang loosely or tied in a knot over the bust, as here presented.

The quantity of 44-inch wide material required to make designs No. 1 or No. 2 is 1 yard for either a 32-inch, 36-inch or 40-inch breast measure.

## COATS COME SHORTER.

Coats to tailor-made gowns are made shorter, only twenty-one inches to be exact, with a ripple in the skirt, and they must be lined with silk and not satin. Last month, last week, mayhap, satin was the swagger thing for lining, but to-day it isn't.

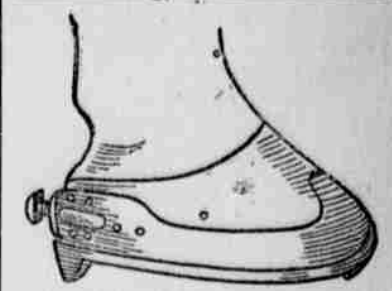
## A NAILLESS HORSESHOE.

An Important Invention That May Prove a Boon for Horses.

In one respect the human race has made very little improvement during the past few thousand years. This is in the matter of horseshoes. Our present method of shoeing horses has not changed materially for centuries, and has always been rude and irrational. One of the chief objections to the system is that the hoof is made to fit the shoe instead of the shoe to fit the hoof. This involves a lot of cutting and scraping, and is the chief cause of lameness and stumbling. The use of nails is also a serious objection, as, no matter how careful the blacksmith may be, there are cases when a tender spot will be penetrated. It is quite obvious that nature never intended nails to be driven into a horse's hoof.

The accompanying illustrations, says the New York World, show a novel horseshoe that has been subjected to a careful and thorough trial on half a dozen horses. In every instance it has worked to perfection. The inventor is G. L. Reynolds, of Auburn, N. Y.

Like a great many works of genius, the one in question is extremely simple. It consists of a band of metal about an inch high, which fits around the lower edge of the hoof. At the base of this band there is a sort of projecting shelf, or flange, which is made to fit into a groove which runs



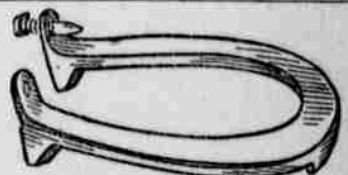
THE HORSESHOE WITHOUT NAILS.

around the inside of the shoe. The latter is made of steel, of the usual shape and style. The only difference between it and the ordinary shoe is the presence of the groove and the absence of nail holes.

When the band is fitted to the hoof (which is done very readily), the shoe in turn is attached by slipping the flange into the groove. It now remains to clasp the arrangement by two screws in the rear. These may be turned to any degree of tightness desired, and a moderate degree is sufficient to prevent the shoe from coming off. The whole arrangement may be put on or taken off in a moment.

As the shoe is not nailed to the hoof, there is a perfect freedom for expansion and contraction. This is a very essential point, as all horsemen know. The growth of the hoof is not prevented, and if there is any growth, instead of splitting the hoof, it serves only to tighten the shoe. All the strain on the band as it is tightened comes over the toe and around the lower edge of the hoof at the point where it is the hardest.

The ease with which the shoe may be put on and taken off permits its fortunate wearer to enjoy a luxury that has been denied him up to the present time, for now the horse may remove his shoes before retiring for the night. We all know what a relief it is to take off our footgear, especially



LOWER PART OF SHOE.

in damp weather. There is no reason why the horse should not feel equally relieved when deprived of his heavy iron clogs.

Another point of advantage, on which the inventor properly lays much stress, is the fact that the shoe is grasped firmly to the hoof at every point. Under the nailing system the last nails towards the rear are driven about half way between the heel and toe. This leaves one-half of the shoe on either side unfastened. There is thus a considerable leverage, and it is for this reason that so many shoes come off. If this shoe is caught, say in a track, at the rear end, it is almost



UPPER PART OF SHOE.

sure to come off. This difficulty is obviated in Mr. Reynolds's shoe. In fact, some persons have objected to this shoe on the ground that it will never pull off in an accident, thus rendering the hoof itself liable to injury.

The fastening in the rear is made by means of a spring clinch, which may be of any strength desired. It has one end fast to the hoof of the rear upright extension of the calf, and the other end has a metallic bearing, attached to the hoof an inch or more further back than where the last nail is usually driven. The point of the screws, as they are turned in, press upon the centre of this spring, and thus, while the screw presses the clinch firmly down to hold the shoe and hoof tightly together, the spring reacts upon the screw with equal pressure. This spring eases the solid, dead blow that is ordinarily given by the hoof when the shoe is fastened by means of nails.

The late M. Stambouloff was a collector of postage stamps. He had about 40,000 of them, some of great value.