

of the plantations of it, now growing in this country, come from the slips brought over by him. He was at the time residing in Buffalo, N. Y., and thinking the willow might prove a valuable crop for some of the lands in that section of the state, he imported from Germany 2000 slips, which were at last set out by a farmer near Utica. From the growth of these, new plantations were started in various parts of the country. At one time a portion of the embankments of the Ash-labna railroad was planted with slips of this willow, as a defense against the washing of rains and floods, and from these slips sprung quite extensive willow plantations in that part of Ohio. After Colonel Colt had finished the dyke along the Connecticut and Little rivers, Mr. Kunkel was employed to procure a stock of these willow slips and set them along the line of the dyke, in order to render the embankment more secure. This was done in 1855. The first crop of saplings grown on the dyke was sold in a green state for the use of traveling basket makers, but that kind of sale not proving profitable, the succeeding crops were peeled and kept on hand until the manufacture was commenced in this city in 1858. The embankment of the dyke proved a good place for the slips, and they grew very luxuriantly, many of them reaching the height of 10 or 12 feet in a season. Their roots too spread rapidly, and soon took so strong a hold upon the soil as to add greatly to the firmness of the dyke, and to prevent its washing. The value of the plants was so great, in this latter respect, as to suggest this means of protection to the levees along the Mississippi, and a correspondence had been opened with reference to obtaining a supply for that purpose, when the death of Colonel Colt, and the breaking out of the war interrupted it.

COLT'S WILLOW WARE COMPANY.

In 1858 for the purpose of getting a profit out of the willow crop, the manufacture of baskets was commenced under the direction of Mr. Kunkel. The manufacture was at first entirely by hand and was carried on in several private houses, in the "wind-mill house," south of the dyke, and in one tenement in Charter Oak Hill building. In 1859 a large hen and pigeon house, which had been built on Colonel Colt's yard, where the lower one of the conservatories now stands, was moved to the meadows near Wawarman avenue and fitted up for the use of the basket makers. This was a low, wooden building of one story, but it was afterwards raised upon two stories of brick, and now forms the upper portion of the main building of the willow works. This change was completed in the spring of 1860, and the succeeding fall the long addition, fronting on Wawarman avenue was finished, giving the building its present dimensions. The business up to this time had been on a rather small scale, and under individual control, but now a joint stock company was formed, with a capital of \$25,000, Mr. R. W. H. Jarvis being president and treasurer. Mr. Kunkel who had had almost the entire management of the business, relinquished it in 1861, and Mr. Leopold Simon was made superintendent of the works. At first, baskets only were made, but this part of the business, not being found very profitable, the manufacture of furniture, and other bulky work was introduced. Now the company import most of the light, fancy baskets which they sell, and confine their work to the coarser goods, for labor is so much cheaper in Europe that the best goods can be imported cheaper than they can be made here, even though they pay 35 per cent. duty.

THE PROCESS OF MANUFACTURE.

The willows which in the first place are propagated by slips about 14 inches long, placed two-thirds in the ground, are cut either every year or on alternate years according to the size wanted. Those which have grown rather slowly for one year, and are about four or five feet high, are the most valuable. They are cut sometime between November and April, generally in the fall, since if cut when the sap is running, they dry up too much. If not to be peeled at once they are tied in bundles and placed with the ends in water.

In Europe the cuttings are peeled by hand, and without steaming. In the factory here they are first placed in large cylinders, and thoroughly steamed. They are then passed through a peeling machine, which was invented by Mr. George H. Colby of Waterbury, Vermont, and which is used only at these works. The machine consists of two sets of rolls, worked by wheels which give them a rotary and horizontal motion at the same time. In the first set the upper roll is of rubber, and the lower one has a surface of iron, grooved. In the second set this order is inverted. The cuttings in passing through the rolls have their bark crushed and broken, and then by drawing them through the hands, a dozen at a time, they are stripped perfectly clean. If they are peeled without steaming, as they can be when first cut they are much whiter than otherwise, though if not steamed too much they still remain nearly white. The peeling machine in operation at these works cleaned 100 tons of the cuttings in one winter, and is undoubtedly the most useful "peeler" in town.

After peeling, the willows which are not to be used whole are divided into splits or skeins. The implement used in splitting has two blades crossing each other at right angles. This cleaves the rods into four pieces, the intersection of the blades passing down the pith of the rod. The splits are then shaved down by being placed upon the smooth surface of a large wheel, which, in revolving, draws them under knives placed at a suitable distance above its surface.

The forming of baskets and articles of furniture, and the braiding has to be done by hand. In making baskets the twigs or rods, being assorted according to their size and use, and being left considerable longer than the work to be woven, are arranged in pairs parallel to each other, at small intervals apart and in the direction of the longer diameter of the basket. Then two large rods are laid across the parallel ones, with their thick ends toward the workman, who holds them firmly with his foot, and weaves them one at a time alternately over and under those first laid down. This forms the foundation of the basket and is termed the shut or slite. Then the large ends of these two rods are woven over and under the pairs of short ends, quite round the bottom. Additional long rods are then woven in, until the bottom of the basket is of sufficient size. The sides are formed by fastening to the bottom the ends of a sufficient number of stout rods for the ribs, raising them in the direction of the ribs of the basket as to have, and weaving other rods between them until the basket is of the required depth. The rim is formed by bending down and fastening the ends of the ribs, and plaiting or binding them in, according to the fancy of the workman. For smaller or fancy baskets, shaved splits are used instead of the round rods, the plait or braids are varied, and sometimes splits that have been dyed are woven in. For the frames to articles of furniture or sleigh bodies, large rods are first soaked in water. They are then bent between blocks nailed upon a board in such a way as to give the required shape. Two or three of the rods thus bent are nailed together, and a thin piece of board nailed across them at each turn. They are held in shape by the thin board, until dry, and afterwards retain this shape without springing. For the backs of chairs and the sides of baskets, and all the ornamental work, much is left to the taste and skill of good workmen, and great varieties of work are introduced. For some of the plainest braiding machines have been invented, but they do not generally answer the purpose, and none of them are in use here.

THE EXTENT OF THE BUSINESS.

The number of persons employed in the manufactory is not as large as would be inferred from the size of the buildings. The goods are so bulky that a great deal of room is needed for storage, and the braiding is chiefly done on the second story. At one time 150 persons were at work in the factory, forty of whom were girls, but when the manufacture of fancy baskets was given up, the number was reduced more than half. Now there are about sixty at work, most of them Germans. The bradders work entirely by the piece, and earn from \$50 to \$100 a month. Some young boys earn \$40 a month.

This is the only manufactory in the country where willow ware is made to any great extent, and probably the best systematized one in the world. Of the peeling and shaving machines the company has exclusive control. Its business extends from Montreal to Havana and New Orleans. Since the importation of foreign goods was commenced last July, a greater variety has been kept, and the sales have increased. The company now have the whole of the dyke embankments covered with willow plants, and within the past two years they have planted twenty-two acres of them the meadows. They have also eight acres growing in Lansingburg, N. Y., and eight acres in Massachusetts. They send a great many slips for setting, to the South, to California and Mexico, and last year they sent 100,000 to Delaware. These are planted for the use of individuals, and little communities of basket makers.

THE WILLOW VILLAGE.

The little village close by the willow works at-

tracts the attention of every stranger driving through that part of the city. It is in an irregular section of the meadows bounded by Wawarman avenue running at the top of the dyke, Hendrickson avenue, and two short streets. The buildings are light, airy looking structures, rather elaborately ornamented, and having quite a foreign appearance. In one corner of the section stands the manufactory fronting the dyke and one of the short streets. Along the dyke are four large tenement houses of irregular shape. The two lower stories of the houses are of brick, with stripes of wood worked in, by way of ornament. Above the first story a platform of wood extends quite round the building, and upon this the doors of four of the tenements open. Extending from this platform at each end of the building are stairways leading to the outside doors of the third story. This story is built of wood. The platforms, stairways, and cornices are ornamented with slender decorations of wood. Each of the four buildings in this row has ten tenements, four on each of the lower floors, and two on the upper. At the end of this row are the gas works, very prettily covered in, and shaded. They are not used now, as gas is taken from the city pipes. In the corner diagonally opposite the factory is the "big block," containing eighteen tenements. It is a large rectangular building, three stories high above the basement, having six tenements in each floor. Stairways lead up to the outside, at each end of the building, and at the sides.

On the remaining side of the square are nine Swiss cottages, as they are called, resembling the chalets which one sees in Switzerland, on the farms, but not often in villages. The lower story of the cottages is of brick, the upper one of wood, and the decorations are similar to those of the larger houses. Each house contains two tenements, with separate outside entrances. Each tenement in the cottages and on the dyke has three rooms, and those in the big block have two of larger size, and one small room. The rent charged in the cottages is \$7 per month to each family, and in the other tenements about the same rate. The whole village belongs to Colonel Colt's estate, and the tenements are rented only to those who work in the willow works or in the armory. In the center of the square was at first a beer and music garden, that essential to every true German village, but it has now been brought down to the utilitarian purpose of a drying lot for willow goods, a change which the German portion of the population look upon, of course, with regret. The village viewed at a distance has a very pretty and inviting look, and it wants only a few shade trees, properly set up, to make it the most picturesque little nook in the city.

THE MANUFACTURES OF HARTFORD.

FOURTH ARTICLE.

THE WILLOW WORKS--THE ORIGIN OF THE BUSINESS--THE PROCESS OF MANUFACTURE--THE EXTENT AND VARIETY OF THE BUSINESS.

THE USES OF THE WILLOW.

Basket-making is one of the most natural and most ancient of arts. The contrivance of fastening together reeds or grasses by interweaving others transversely, would naturally suggest itself to the most uncultivated and the most uningenious intellect. Accordingly, we find the art in use among nearly all savage nations, and its antiquity is second to few others. It was only a few generations after Jubal, "the father of all such as handle the harp and organ," and of "Tubalcain, an instructor of every artificer in brass and iron," that the mother of young Moses "took for him an ark of bulrushes, and daubed it with slime and with pitch, and put the child therein," thus entrusting to a basket the future deliverer of Israel. In more northern climates than that in which the infant Moses slept among the flags, bulrushes gave place to willows and other woody twigs, in the manufacture of wicker-work. The natives of Britain, before the time of the Roman conquest, were in the habit of putting themselves afloat in wicker-boats, covered with skins; and five centuries before this, boats of a similar material were in use on the Euphrates and Tigris. In India, round boats of wicker-work are still in use, made as large as twelve feet in diameter, and capable of carrying even heavy artillery across or down the rivers. In South America and in Van Diemen's Land, baskets are made from rushes, so closely woven as to hold water. This last could hardly be done with willow twigs; yet very close and nice work can be made from these, and the variety of uses to which the tree can be put is almost endless. A great variety of baskets, props for vines, bridges, ropes, cloth, hats, gates, fences, sledges, sledges, carriages, and boats, and a host of ornamental articles are made from the stalks, twigs, or bark. The timber is also of great value for many purposes, and its charcoal is useful in making gunpowder, and for painters' crayons. The leaves and twigs occasionally serve for food for animals, and in Lapland and Norway the inner bark is ground and mixed with oatmeal in seasons of scarcity. The down of the seeds of some of the larger varieties is employed as a substitute for cotton, in stuffing cushions and mattresses, and a coarse paper has been made from it. And now memory brings us to the mind of the writer another not-to-be-forgotten use of this valuable tree. In the hands of a school-mistress, happily preserved now in matrimony from the necessity of wallowing in miscellaneous urchins not her own, it once proved a valuable auxiliary in the preservation of order and good government. As applied by her vigorous hand, the little and flexible saplings wound themselves gracefully around the legs of the victim, or left their mark across his back, or doubled themselves in lines along his hand and wrist, they imparted a more exquisite tingle than birch or apple-sprout could give, and proved of great disciplinary value; and though this is hardly alluded to the subject in hand, one must be pardoned for thus dwelling a moment upon the *duces* of this valuable tree before passing to a further discussion of its utility.

SALIX PURPUREA MUTABILIS.

The total number of European species of the willow is about 50; the number of American species is 50, of which 13 are identical with those in Europe, and 10 are peculiar to America, the remainder being more or less analogous to the European varieties. Of this whole number only seven are of any very great value in the basket, manufactory. Of these seven the *salix viminalis*, or white osier, is considered by many to be the best for use in Europe, while the *salix purpurea mutabilis*, or the changing purple osier, divides this claim with the white in Europe, and is unquestionably the best in our American soil and climate. It has its name from the peculiarities of its colors in the spring. When the sap first begins to rise the plant is green. It changes then to a purplish tint, then to a yellowish, and finally, when the leaves are fully out, it becomes green again. The saplings of this variety are valuable for wicker work on account of the rapidity and height of their growth, the absence of branches, and the smallness of the pith.

This variety of the willow is believed to have been introduced into this country by Mr. F. W. Kunkel about 25 years ago; at least a majority