For the Scientific American.

The Carpet Manufacture.

(Continued from our last)

The succession of colors must be determined by means of a design paper, which represents the design or figured pattern intended to be produced by plain weaving of the party-colored yarns. Design paper used by weavers for figured weaving, being ruled with squares, which are numbered across the top and down the length, and it must contain the entire figure of the pattern which it is intended to produce in the fabric, and which pattern is to be repeated thereon at regular intervals along the piece; and, supposing that the ground whereon the pattern is to be represented, is to be all of one uniform tint, the whole of the threads may be dyed with that color previous to applying the party-colors,—the dye being chosen of such a nature that it will readily give place to the stronger party-colors which are to be applied. The size of the cylinder must be so chosen that its circumference will be equal to the length of yarn which the warp willtake up for weaving, from the commencement to the end of the pattern, where it will join to the preceding, and to the succeeding repetition of the pattern, taking into consideration the contraction of the length of the warp which will result from the gathering up of the yarn in weaving, and which contraction varies very greatly in different kinds of fabrics. Whatever number of squares the length of the design paper occupies, the circumference of the cylinder must be divided into a like number, or the double or the treble that number, if the cylinder is large in proportion to the pattern; which is easily done by applying a tape painted with suitable divisions upon it around the circumference of the cylinder, and fastening it with pins to the blanket cover. The design paper should be laid out in large squares, as the printer has to distinguish readily the succession and order of the different colors. It may either represent a figure to fill the breadth of the intended fabric, or one which is to be repeated several times side by side in the breadth, and each square may either represent a single thread or a number of threads according as the texture is to be fine or coarse. Repetitions of the *same* figure in the breadth will admit of several threads being colored alike at one operation, and the trouble of separating threads may be avoided by keeping the coils of the different threads distinct from each other upon the cylinder. In applying the colors to each set of yarns, either the first or the last of these impressions, which is made when the cylinder stands at its division 1, must be of such a decided character, that its place on every thread can always be distinguished with certainty; or a narrow black impression may be made across every set of the threads when the cylinder stands at its division 1, as a common starting place for all the threads, and for all the sets of threads; which decided impressions, or narrow black impression, in consequence of the circumconvulsions which the threads make around the cylinder, will be repeated at every place along the length of each thread, when the repetitions of the pattern are intended to begin and to end. In short, when the party colored threads are afterwards formed into a warp, the marks will indicate the junctions of the successive repetitions of the pattern: and if the threads are all so adjusted that those marks on each thread will range in a straight line, square across the breadth of the warp, then a correct pattern will be formed by the party colors of the threads; and all the precaution that is required during the progress of the weaving is to keep all the threads so adjusted in length that all others of the marks at every succeeding repetition of the pattern, shall continue to range in straight lines and square across. To ensure this condition, a clamp is used, which is composed of two straight rulers, united by screws, which draw the edges of the two rulers together, and their adjacent edges are covered with cloth. This clamp is applied across the warp, with one of its rulers above the yarns and the other below them, near to the place where the marks must range in a straight line, square across the warp, and there the clamp is fastened by its screws, so as to hold all the threads fast between the edges of its two rulers, in order to confine them to their relative positions end-ways, in respect to each other. As the weaving proceeds, the clamp advances along with the yarn; and when the length of the pattern has been woven, the weaving must be suspended, while the screws of the clamp are loosened, to set it free on the yarns, and it is then taken back along with them, to the next succeeding marks; and, if those marks do not range in a straight line, and square across the warp as they ought to do, those yarns which are forward must be pulled back or stretched until the marks are made to range and then the clamp is to be again screwed fast on the yarns to confine them in their true relative positions, whilst another length of pattern is woven; after which the clamp is again shifted to the next succeeding set of marks and so on until the weaving of the whole piece is completed. This method of working with the clamp during the progress of the weaving is only requisite in case the yarns are drawn off at once from the bobbins to form the warp in the loom as the weaving goes on without using a yarn-beam:—but, if the warp is formed and gathered on a yarn-beam by a previous operation to the weaving, then the clamp must be used in the manner above described during the operation of beaming, but will not be afterwards required during the weaving.—GILROY.

(To be Continued.)

Starch.

Starch is a white pulverulent substance, composed of microscopic spheroids. Ordinary starch may be extracted from the following grains:—wheat, rye, barley, oats, backwheat, rice, maize, millet, spelt; from the silioquose seeds, as beans, peas, lentiles, &c.: from tuberous and tap roots, as those of the potato, the manioc, arrowroot, bastata, &c. Different kinds of corn yield very variable quantities of starch. Wheat differs in this respect, according to the varieties of the plant, as well as the soil, manure, season and climate. Wheat partly damaged by long keeping in granaries, may be employed for the manutacture of starch, as this constituent suffers less injury than the gluten, and it may be used either in the ground or unground state.

STARCH WITH UNGROUND WHEAT.—The wheat being sifted clean, is to be put into cisterns, covered with soft water, and left to steep till it becomes swollen and so soft as to be easily crushed between the fingers. It is now to be taken out and immersed in clear water of a temperature equal to that of malting barley, whence it is to be transferred into bags which are placed in a wooden chest containing some water, and exposed to strong pressure. The water being rendered milky by the starch being drawn off by a tap, fresh water is poured in, and the pressure is repeated. Instead of putting the swollen grain into bags, some prefer to grind it under vertical edge-stones, or between a pair of horizontal rollers and then to lay it in a cistern, and then separate the starchy liquor by elutriation with successive quantities of water well stirred up with it. The residuary matters in the sacks or cisterns contains much vegetable albumen, and gluten, along with the husks, when exposed to fermentation, it affords a small quantity of starch of rather inferior quality.

The above milky liquor, obtained by expression or elutriation is run into large cisterns, where it deposites its starch in layers successively less and less dense; the uppermost containing a considerable proportion of gluten. The supernatant liquor being drawn off, and fresh water poured on it, the whole must be well stirred up, allowed again to settle, and the surface liquor again withdrawn. This washing should be repeated as long as the water takes any perceptible color. As the first turbid liquor contains a mixture of gluten, sugar, gum, albumen, &c., it ferments readily, and produces a certain portion of vinegar, which helps to dissolve out the rest of the mingled gluten, and thus to bleach the starch It is, in fact, by the action of this fermented or soured water, and repeated washing that it is purified. After the last deposition and decantation, there appears on the starch a thin layer of a slimy mixture of gluten and albumen, which, being scraped off, serves for feeding pigs or oxen; underneath will be found a starch of good quality. The layers of different sorts should be then taken up with a wooden shovel, transferred into separate cisterns, where they are agitated with water, and passed through fine sieves. After this pap is once more well settled, the clear water is drawn off, the starchy mass is taken out, and laid on cotton cloths in wicker baskets, to drain and become partially dry. When sufficiently firm, it is cut into pieces, which are spread upon other cloths, and thoroughly dessiccated in a proper drying room, which in winter is heated by stoves. The upper surface of the starch is generally scraped, to remove any dusty matter, and the resulting powder is sold in that state. Wheat yields upon an average, only from 35 to forty per cent of good starch. It should afford more by skilful management.

Another plan is to crush wheat between iron rollers, and then laid to steep in as much water as will wet it thoroughly, in four or five days tho mixture ferments, soon afterwards settles, and is ready to be washed out with a quantity of water in the proper fermenting vats. The proper time allowed for the steep. is from 14 to 20 days. The next process consists in removing the stuff from the vats, into a stout round basket set across a back below a pump. One or two men keep going round the basket, stirring up the stuff with strong wooden shovels, while another keeps pumping water, till all the *farina* is washed from the bran. Whenever the subjacent back is filled, the liquor is taken out and strained through hair sieves into square frames or cisterns, where it is allowed to settle for 24 hours: after which the water is run off from the deposited starch by plug taps at different levels in the side. The thin stuff called *slimes*, upon the surface of the starch, is removed by a tray of a peculiar form. Fresh water is now introduced, and the whole being well mixed by proper agitation, is then poured upon fine silk sieves. What passes through is allowed to settle for 24 hours, the liquor being withdrawn, and then the slimes, as before, more water is again poured in, with agitation, when the mixture is again thrown upon the silk sieve. The milky liquor is now suffered to rest for several days, 4 or 5, till the starch becomes settled pretty firmly at the bottom of the square cistern. If the starch is to have the blue tint, called Poland, fine salt must be mixed in the liquor of the last seive, in the proportion of two or three pounds to the cwt. A considerable portion of these slimes may, by good engagement be worked up into starch by elutriation and straining.

The starch is now fit for boxing, by shovelling the cleansed deposite into wooden chests, about 4 feet long, 12 inches broad, and 6 inches deep, perforated throughout, and lined with thin canvass. When it is drained and dried into a compact mass, it is turned out by inverting the chests upon a clean table where it is broken into pieces four or five inches square, but laying a ruler under the cake, and giving its surface a cut with a knife, after which the slightest pressure with the hand will make the fracture. These pieces are set upon half burned bricks, which by their porous capilliary imbibe the moisture of the starch, so that its under surface may not become hard and horny. When sufficiently dried upon the bricks, it is put into a stove, (which resembles that of a sugar refinery,) and left there till tolerably dry. It is now removed to a table, when all the sides are carefully scraped with a knite; it is next packed up in the papers, in which it is sold; these packages are returned back into the stove, and subjected to a gentle heat during soms days, a point which requires to be skilfully regulated.

A patent was obtained for bleaching starch by chloride of lime in 1821. Chlorine water would probably be preferable, and might prove useful in operating on damaged wheat. During the drying, starch splits into small prismatic columns of considerable regularity. When kept dry it remains unaltered for a very long period.

Mr. Ames, an American artist, has been commissioned to take a portrait of Pope Pius IX. and has commenced the work.

More about Staite's Electric Light.

At a recent lecture at New Castle upon Tyne, Mr. Staite observed that the experiment of the charcoal points, and the phenomena of the voltaic arc, with powerful batteries were well known. The difficulties hitherto experienced had been—1. The economical production and application of the electric currents.—2. The discovery of a suitable material for the developement of the light.—3. The rendering of the light permanent (the greatest difficulty of all.) By what means, and to what extent, he had overcome these difficulties, Mr. Staite informed his audience. He produced, under a glass receiver, a brilliant light before which the gas jets of the lecture-room turned, not pale, but yellow. The peculiar characteristics of the electric light were its purity and volume. The most delicate shades of color might be detected, while the eye was not distressed by its effects. The same quantity of light, developed by gas, or any other known means, would be absolutely unendurable. That the light was not the result of combustion, strictly speaking, was evident.—There could be no combustion without the presence of oxygen; and, as the light was developed to the best advantage under a closed glass, from which supplies of atmospheric air were excluded, it was quite certain that combustion had nothing to do with the matter.—The light in fact, the lecturer remarked, could be produced as readily in water as out of it.—He showed its peculiar applicability to coal-mining, for it could not explode the foulest atmosphere. He then came to the comparative cost of the electric and other lights.—With a battery consisting of four small cells, a light was developed equal to 380 mould candles (sixes,) or 64 cubic feet of the best gas burnt in the standard burner.

This was effected by a consumption of zinc equal to 77-100ths of a pound, being little more than 3-4lb. of zinc per hour. When the light, however, was brought to it maximum, by increasing the distance of the electroids to their limit, the light was increased nearly threefold, while the current itself was reduced to about three-fifths in quantity. This curious fact (continued Mr. Staite) I have frequently observed before. So that the light, when developed under the best circumstances consistent with its permanence, was produced by a consumption of a seventh part only of a pound of zinc per hour—and the light equal to 380 tallow candles. Assuming that the zinc so consumed was worth one half penny, and that the cost of the working solution, deducting the value of the products (sulphate of zinc, &c.,) was as much more, we have the following comparative result:—Electric light, 1d per hour; gas light, equal thereto, 6d to 8d; tallow candles, 7s 6d. In conclusion, M. S observed, "By a careful comparison of all modes of effecting artificial illumination, I think I am justified in saying that there is no light so cheap as that evolved by voltaic currents of electricity; and there is certainly none which exhibits such pure and brilliant results. The absence of all smoke and flame, and noxious gases—the non-consumption of oxygen—the impossibility of its igniting surrounding substances,—and the simplicity of the apparatus are powertul recommendations for the adoption of the light in all places where purity, and brilliance, and safety, and economy are sought for."

Leather.

In consequence of the unfavorable accounts from the tanners respecting the scarcity of bark to tan the stock of hides now out, and the consequent delay which is likely to occur in bringing the spring stock of leather to market, and also the great reduction of the stock on hand, caused by the heavy auction sales, through the summer, months. Prices have improved and may now be quoted at one cent higher than the last year's sales.

Diamonds in North Carolina.

The Raleigh Register, says:—"We have been presented by Beaumont, the intelligent correspondent of the Southerner, printed at Richmond, Va., with a piece of flexible sand stone, found at the Linville mountain, in Burke county, the presence of which is said to be an unerring test that there are diamonds about."