Calico Printing.

[Concluded from page 198.]

Another method of calico printing remains to be described, namely, press printing, by which several colors can be printed at once. The cloth to be printed is wound upon a roller at one end of a machine, and the design, which is formed in a block of mixed metal about two and a half feet square, is supported with its face downwards in an iron frame, and can be raised or lowered at pleasure. The face of the block is divided into as many stripes, ranging cross-ways with the table, as there are colors to be printed. If, for example, the pattern be made up of five stripes of different colors, and each stripe to be six inches broad, and as long as the breadth of the cloth, the colors have to be applied without mingling or interfering with each other. This is accomplished in the following manner:—The side edges of the table are furnished with a couple of rails similar to a railway, and upon this is a shallow tray or frame, capable of mo ing backwards and forwards upon wheels. Within this frame is a cushion of about the same size as the printing block, and by its side are four small troughs containing the thickened colors. By means of a long piece of wood, formed so as to dip into all the troughs at once, the tearer applies a small portion of each color to the surface of the cushion, and spreads them evenly into five portions or stripes, taking care not to mix them; but making their breadth equal to that of the stereotype rows on the block. The cushion being prepared, the frame is rolled along the railway until it is immediately under the printing block, which the pressman then lowers upon the cushion, by which means the five stripes of the block become charged, each with its proper color. The block is then raised, the frame rolled away, and the block brought down upon the cloth, which it prints with five rows of different colors. On raising the block, the cloth is drawn forward about six inches in the direction of its length, or exactly the width of one stripe on the block; the tearer again pushes forward the cushion with the colors renewed and the block is again charged and applied to the cloth. Now, as a length of the cloth equal to the width of a stripe is drawn from under the block at each impression, every part of the cloth is brought into contact with all the stripes on the block. Great care is required so to adjust all the moving parts of the press, that the colors may not mingle, and distort the pattern.

We have said nothing about the chemical nature of the art of Calico Printing, than which no one displays a more extensive or finer field for chemical research, and the application of chemical knowledge. Indeed, it is exceedingly exciting to the mind, and has tended to the development of very high mental qualities in some of England's greatest statesmen, and especially in her great Commoner, Robert Peel.

As an art it is divided into a number of branches, such as the *resist*, *discharge*, and *topical* styles, each one being quite different from the other.

Resist Style—Blue.—By printing any pattern on white cloth, with a certain paste, and then dyeing the cloth in a blue vat, the parts printed with the paste will come out white, and the parts not so printed will be blue. The following is the way to do this. A vat containing 150 gallons of water is charged with 30 lbs., of good indigo ground together finer than wheat flour, 40 lbs. of the sulphate of iron and 60 lbs. of flour quick-lime. These ingredients must be well stirred every two hours with a flat iron rake, for three days, before the vat is fit to be worked. The copperas and lime deprive the indigo of its oxygen, and it then gives out its color. This vat must be allowed to settle well before it is worked. The cloth to be dyed is printed with a paste made by dissolving 1½ lbs., of the sulphate of copper in one gallon of water with 8 lbs. of fine ground pipe-clay, to which is added some dissolved gum-tragacanth, arabic, or British. This paste having been printed by blocks, or rollers on the goods, and dried, they are taken and placed on a frame, and cautiously let down into the blue vat, then made to move carefully on rollers up and down, so as to expose them to the air; they may also get dips in several vats—always ending with the strongest. When they are of the proper shade of color, they are taken out and run through a very weak solution of sulphuric acid, and well washed in cold water afterwards. The figures printed with the paste will be white, and the rest will be blue.

Another variety of the style may be produced by mixing some acetate, or subnitrate of lead with the above paste, and after the goods are dyed, and well washed, they are passed slowly through a hot solution, at 24 degs. strength, of the bi-chromate of potash, then through a weak solution of acetate of lead, and afterwards washed. The figures printed with the paste will then be yellow, and the ground blue, or if instead of running the goods lastly through a solution of the acetate of lead, they are passed through hot lime water, they (the yellow figures) will become an orange color. We have thus described the methods of producing white and blue, yellow and blue, and orange and blue calicoes. By printing different pastes, on the cloth, a great number of colors can afterwards be dyed in them, and still there may be white flowers in the pattern.

The madder resist style it another branch of the art, but we will proceed to that of the "discharge style." This consists in discharging the color by figured blocks, from plain pieces of goods. This is all done by presses. The cloth to be discharged is pressed very firmly between large leaden blocks, which have the pattern so cut in them that the parts not to be discharged are so firmly squeezed that none of the discharge liquor (which is strong chloride of lime, the chlorine being set free by sulphuric acid) will touch them, while the parts to be discharged of color are allowed to come in contact with the liquor. Turkey-red goods are the kind on which this branch of the art is practiced. It has been carried to the greatest perfection at the Works of Sir Henry Monteath, near the City of Glasgow. Many men have lost their lives working at this unhealthy business.

Topical Style—This style consists in printing the colors at once on the cloth, like paint, but still the colors are very different from paint, as many of them, when printed on the cloth, have to be submitted to a steam bath, in order to fix them, and in this manner calico printing differs entirely from that of oil-cloth printing, the colors of the latter lie on the surface, those of the former must combine with the fibre of the cloth, and become something like a part of the cloth itself. The difference between a fast and a fugitive color in calicoes, simply consists in the quality of the color as related to the cloth. The color which is the most insoluble in water and soap, and withstands sunlight best, is the fastest; that which is the easiest affected with washing or sunlight is the most fugitive.

Tapestry carpets are calico prints, in a certain sense; their warps are printed by rollers on large drums, and the yarn so printed, according to a registered pattern, is afterwards spooled, warped out and beamed in such a manner, that the pattern is formed in the warp, the weft being merely woven in like plain work; the warp which is raised by the wires, shows the pattern which was printed by rollers. The colors are all steamed (like some of those on calicoes) after they are printed.

We do not see why carpets may not be printed to look as well as those which are woven. Two patents have been taken out for printing them on both sides, and it may be that they will yet be printed, by rollers, on both sides at one continuous operation. We think this possible—it is at least worthy of an effort. A press might be made with a succession of pattern cylinders, to print the pattern on one side, and a succession of pattern rollers may print a different pattern on the other side, and then the whole piece may be run into a steam room to raise and set the colors. This may yet be accomplished. Such an invention would revolutionize the whole art of carpet manufacturing.

We have no statistics at hand to give full and correct information respecting the number of calico printworks in the United States, and their history, but there are quite a number of them, and some not a little famous for their styles of goods. The Printworks at Lowell, Mass., Fall River, Conn., Providence, R. I., Lodi, N. J., and Frankfort, Pa., are known far and near. Massachusetts is the great calico State, however. In 1845 there were 14 printworks in it (6 being in Middlesex Co.,) employing 2,053 persons, with a capital invested, of $1,401,500, and producing 40,855,818 yards, valued at $4,779,817. There are some styles of printing which have not yet been introduced into our country, such as the fine muslin and turkey red styles. Our calicoes are principally of the coarser qualities; the finer are all imported mostly from France, at least they are all sold under French titles, a very good evidence of the character of French calicoes. It was attempted, we believe, to establish Turkey-red dyeing by Joseph Marshall, at Hudson, N. Y., some years before he died, but the effort failed of success. At the present moment there are colors sold for Turkey reds, which are just as like that beautiful color as a brown is to a clear bright scarlet, and indeed at the present prices of goods, it is not possible to produce such fabrics in our country, as they can be bought for 18 cents per yard by the piece, while the dusky red barwoods cost 12 cents. The calicoes manufactured at Merrimac have long been famous for their permanent colors; they are mostly produced from madder; but as a general thing they do not exhibit that beauty of pattern and design peculiar to the French calicoes, or even those of Switzerland and Britain, and it is even admitted that the designs of the British calicoes of the present day are not equal to those which were produced 50 years ago, because the calico printers find it to their profit to copy from the French. The person who conducts a calico printfield, should be a man of great chemical information, have a fine taste for the harmony of colors, and the grouping of forms, and have his head well filled with a knowledge of machinery.

American Coal Statistics.

The following statistics from the Pottsville "Mining Journal" are of deep interest to all those who use coal as fuel for manufacturing purposes, or domestic use:—

The Journal says:—"The consumption of coal does not increase as rapidly as was supposed. In 1852, the increase was less than 13 per cent., and left a surplus in the market.—In 1853, the increased supply was less than 9 per cent., from all sources. To this of course is to be attributed the high price of coal during the latter part of the year—but taking the average over 12 per cent., it will reach it. We see no good reason to believe that this average per centage in the demand is likely to be exceeded the present year, which would require an increase in the supply of about 623,000 tons, in 1854, from all sources, to keep the market healthy.

This increased supply can easily be furnished by the different regions, provided dealers and customers will come forward and take coal early in the spring.

The same paper gives the following summary of operations in Schuylkill county:

Total number of collieries	113
Red Ash, do.	58
White Ash, do.	55
Number of operators, ...	82
Employed at collieries, ...	9,792
Miners' houses out of towns, . . .	2,756
Whole capital invested in these collieries	$3,462,000
By individual operators, about .	2,600,000
Thickest vein, worked at Heckscherville, (feet)	80
Smallest, ...	2

All the coal lands now worked in Schuylkill county are owned by six corporations and about sixty individuals. About twenty-five of the owners reside in Schuylkill county, and the balance abroad. The coal rent will average about 30 cts. a ton. The product of 1853, in Schuylkill county, was 2,551,603 tons. This would give an income of $765,480 to the landholders, in the shape of rents, for the year."

American Wool.

The British Commissioners of the great exhibition of 1851, have determined to form, in London, a grand universal trade museum. Mr. Solby, their agent, has applied to Mr. P. A. Browne, of Philadelphia, to ascertain how they will be able to procure for it all the leading varieties of the best American fleece; and Mr. Browne has recommended this direct appeal in their behalf, to the sheep-breeders and wool-growers of the United States.

Any one disposed to countenance this laudable design will be pleased, with as little delay as possible, to forward specimens to Mr. Browne post-paid.

Each sample ought to be accompanied with the name and address of the donor, and also of the breeder, where he is not the owner; the name of the species, variety, or breed of both parents or ancestors of the animal from which the specimen is taken; the age, sex, probable weight, and amount and date of the last clip; and the number of the flock to which he belongs, &c. All specimens, when practicable, should be drawn out, (not cut,) and be taken from the back, six inches in the rear of the neck.

[The above is from the Philadelphia Ledger; we heartily recommend the subject to the attention of our farmers who have sheep, many of whom are readers of the "Scientific American.

American Steamboats on the Amazon River.

A letter addressed to the Boston "Traveller," dated Para, South America, December 22, 1853, gives an account of the trial trip of Dr. Whitmore's new steamers, designed to navigate the river Amazon. Some time ago he took a contract from the Peruvian government, to furnish two or more steamboats suitable for the navigation of the Amazon, a treaty having been made with Brazil with this end in view. Dr. Whitmore came to New York, contracted for the boats and machinery, superintended their construction, had them taken to pieces and packed in a sailing vessel and shipped for the mouth of the Amazon; all at his own hazard. He then secured a sufficient number of competent mechanics to go out with him, to put the steamers together, and set up their machinery, and on the day of the date of the letter, the enterprise had been so far crowned with success, that the first of these little river boats had made its trip, and appeared off Para, some seventy miles from the mouth of the Amazon.

It was a gala day. The city was astir with joyful anticipations; and the little steamer was received with every demonstration of satisfaction. She was decked with flags, among which the stars and stripes were conspicuous, and bore a gladsome company, some two hundred persons.

Scientific Darkness.

"A very remarkable discovery was announced to the Academy of Sciences by M. Dumas in its last sitting. He stated that M. Saint-Clair Deville had succeeded in obtaining from clay a metal as white and brilliant as silver, as malleable as gold, and as light as glass. It is fusible at a moderate temperature. Air and damp do not affect this metal, which is called alumini_um; it retains its brilliancy, and is not affected by nitric or sulphuric acid, either strong or diluted, if the temperature be not raised. Several specimens of this metal were exhibited to the Academy, and, on the proposition of Baron Thenard, it was voted unanimously that a sufficient sum should be placed at the disposal of M. Saint-Clair Deville to enable him to make experiments on a large scale."

[The above is from the Paris correspondent of the "New York Daily Times" of the 27th ult., and really exhibits an amount of ignorance quite surprising in this age of light and intelligence. The basis of all clays have been long known to be a metal named aluminum, and although it has some qualities different from those ascribed to it above, still the metal itself is no new discovery. It was suspected to be a metal by Sir H. Davy, and proved to be one by Wohler. The above-named French chemist may have discovered some new properties of this metal, and the correspondent being ignorant of what these were, jumbled up the whole mess as above. Such news from Paris may be very edifying to some kinds of readers, but would not be to those of the Scientific American.

The Province of Nova Scotia appears to be in a very prosperous state. Only six States in the Union surpass it for ship-building.

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