high, narrow chamber of brick, through which the cloth passes continuously in the form of long loops suspended from rods resting upon, and carried forward by travelling chains, situated at the top, and close to the sides, of the chamber. Steam is admitted to this chamber through a series of pipes at the bottom, and the cloth enters and emerges through slots at the top of its opposite ends. On entering, the cloth falls over one of the slowly travelling rods and continues to run downwards until a sufficient length to form the loop has run in. By this time the first rod has moved forward and a second taken its place, with the result that the cloth now falls over the second rod and commences to form the second loop. At this point—the commencement of a second loop—the second rod comes in contact with a brass bar carried by arms pivotted above. The object of this bar, which clips the continuously entering cloth firmly between itself and the rod until the second loop is complete, is twofold, namely (1) to prevent too much cloth being fed into the first loop, and (2) to prevent the weight of the first loop from pulling the cloth over the second rod during the formation of the second loop. By the time this latter is complete the second rod has moved sufficiently far forward to escape contact with the pivotted brass bar, which thereupon swings back and takes up a similar position on the third rod. In this way each rod is supplied with cloth, which it carries forward continuously until the other end of the steamer is reached, where both cloth and rods emerge—the former through the top of the chamber and the latter through a slotted opening at the top of the end wall. Through a similar slot, at the beginning end of the steamer, the rods are fed in automatically as long as any cloth remains to be steamed.

The usual time occupied in passing the goods through a “ steamer ” of this description is one hour, but it may be shortened or prolonged at will, and, if desirable, the goods may be allowed to remain in it for any length of time.

The room used for *ageing* is lofty and is furnished near the top with suspending rods of wood, and at the bottom with a series of steam inlet pipes through which thin streams of free steam may be introduced into the chamber, as required. Its temperature is generally kept about 36° C. on the dry-bulb thermometer and 32°-33° on the wet-bulb thermometer.

*"Dunging* ” is carried out in a series of becks provided with rollers at the top and bottom, and heated by steam pipes. . It may also be performed in becks through which the cloth passes in rope form.

Many attempts have been made from time to time to replace cow-dung by sodium silicate, phosphate, arsenite and carbonate of ammonia, but none of them yield results quite so good as cow­dung.

*The tartar emetic treatment* is only used for the fixation of tannin mordants, and of basic aniline colours printed with tannic acid. It is performed by passing the cloth in the open width over and under a series of wooden rollers arranged in a water-tight box— a beck—containing the following solution :—

2 lb tartar emetic.

2 lb chalk.

16 gals. water at 60°-70° C.

The chalk is added simply to neutralize the acid salt produced in the bath—a salt which exerts a solvent action on the basic colour tannin lakes and utterly spoils any ultramarine blues that may have been printed in combination with them.

*Chroming* is only applied to a few styles, such as aniline black, catechu brown, and colours containing salts of lead which have to be converted into chrome yellow. “ Chroming” is carried out in a beck similar to that used for tartar emetic. The cloth runs continuously through a 3 to 4 per cent. solution of bichromate of potash at 60° C.; the excess is squeezed out in a mangle, and the cloth then passes directly into a washing machine to clear it completely of the chrome. When alizarine reds, and other colours susceptible to chrome, are present, the chroming must be either omitted altogether or the operation conducted cold with a very weak solution.

*Washing* is a very important process, and upon its proper per­formance depends a good deal of the final success of the work. It may be carried out in several different ways according to the different styles of work to be treated. Alizarine reds and pink, both printed and dyed, dyed chocolates, purples, &c., aniline black, indigo blue, &c. &c., all very fast colours, are usually washed and soaped in the rope form in machines like that described for madder­dyeing. Other colours, especially pigments, must be washed, in the open width, through a series of wash-boxes furnished with rollers over which the cloth passes. In these boxes the water usually enters where the cloth leaves, thus ensuring that the cleanest cloth gets the cleanest water. Some of the boxes are occasionally fitted with heaters and others again with “ spirt pipes ” through which the water is forced at a high pressure for the purpose of causing it to pass straight through the cloth. Other types of machine are also used, for details of which some technical work must be consulted.

*Soaping* is also an important factor in the production of the best work. It clears the white parts of the goods, brightens the colours and generally improves the whole appearance of the cloth. The strength and temperature of the soap solution, the duration of the soaping and the type of machine used are all varied according to the fastness of the colours to be soaped. As in washing, the alizarine dyed colours, alizarine “steam" reds and pinks, aniline black and the ice-colours, will not only withstand a long, hot and strong soaping, but arc greatly brightened and enhanced in beauty thereby. On the other hand, direct dyeing colours, basic colours, pigments and a few others require only a moderate soaping and that in the open width. Colours which will stand a drastic soaping are usually soaped, in spiral becks, in the rope state, and pass from one to another of these becks, going through as many as half a dozen times before being washed off in water. Goods requiring to be soaped in the open width are treated in a special soaping machine known as the “ open soaper.” In principle this is simply a range of watertight boxes each fitted with rollers at the top and bottom. The first two or three boxes contain hot soap solution and the rest hot or cold water or a series of “ spirt pipes" to better wash out the soap. Very frequently open soapers are supplied with “ tartar emetic ” and "chroming ” boxes, so that the goods can go through two or more processes directly and without any intermediate handling. ,

*“ Chemicking."—*In this process all traces of colour still remaining after soaping are removed from the white parts of the printed cloth, by a weak solution of bleaching powder. Two methods are used in applying the “ chemick,” or bleaching powder solution, to the cloth. In the first the cloth is passed between a pair of squeezing bowls the lower of which is of wood, and revolves partly immersed in a solution of bleaching powder or “ chemick ” vary­ing in strength from ⅛° Tw. to ½° Tw. This lower bowl carries the chemick to the cloth, the excess is then squeezed by passing between the two, and the cloth goes forward over a set of steam- heated drying cylinders, during its passage over which the bleaching properties of the chemick effectually remove the last traces of colour on the white parts of the cloth and leave it perfectly clean and bright.

The. second method of “ chemicking ” is employed when the cloth is too deeply stained to be successfully “ cleared ” by the first. All madder-dyed goods, and goods printed in strong heavy dark-coloured patterns, are liable to attract, to their white parts, a considerable amount of colour during the dyeing, washing and soaping operations. They therefore require a stronger “ chemick­ing ” to clear them, and this the second method supplies. The goods are passed successively through (1) a trough . containing “chemick” at about ¼° Tw. ; (2) a pair of squeezing rollers; (3) a small steam chest fitted with half a dozen guide rollers top and bottom, and a steam admission pipe; (4) a series of “ spirt pipes ” to wash out the bulk of the lime salts; and (5) through a washing-box and squeezing rollers, whence they go directly to a drying machine.

In both methods the strength of the “chemick ” depends upon the power of the resistance to its action of the colours printed, and great care must therefore be taken to keep it weak enough.

Occasionally a little ultramarine blue is added to the chemick for the purpose of correcting the yellowish tinge usually possessed by bleached cotton.

From the. fact that two or more styles can be combined in one pattern it is obviously impossible to formulate any general rule for the practical application of any of the foregoing after treatments.

For example, in aniline black resists the black ground will stand any amount of soaping, but the basic colours which constitute the pattern are only moderately fast to soaping, and, consequently, this process must be so regulated as to yield the best possible results. The same may be said of alizarine reds and pinks printed in combination with basic or pigment colours, and of paranitraniline red and other ice-colours associated with basic colours.

*Finishing.—*In this process the cloth undergoes various opera­tions of softening, stiffening, embossing and polishing or smoothing, according to the requirements of the customer. The following substances are chiefly employed for the above purposes:—

*Softening Agents.*—Turkey red oil, tallow, paraffin, stearine, wax and certain soaps.

*Stiffening Agents.—*Starch of all sorts, dextrine, gum tragacanth, vegetable gelatine or Blandola, glue size, various preparations of soluble starch, lichens, &c. &c., all of which are applied on special finishing mangles, and either to one or both sides of the cloth.

*Hygroscopic substances,* such as zinc chloride, glycerin and glucose are added to the stiffening pastes for the purpose of softening the feel of the cloth without detracting from its “ body.”

The smoothing, polishing and embossing of the fabric are all performed on various types of calenders. Smoothing and polishing calenders have highly polished steel “ bowls ” which may be heated by steam or gas, embossing calenders have an engraved steel or brass bowl working against one of compressed paper, or one in which depressions are engraved to exactly correspond with the projections on its fellow. The cloth is run between these various kinds of bowls according to the effect desired. In the finishing process all creases are smoothed out of the cloth, and it is stretched to its proper width (and its weft straightened if awry) on special