solution, sulphurous acid is conducted into the lower part of a coke tower, in which water drops down. The aqueous sulphurous acid is best used at 77° to 100° F, and since the gas is more soluble in cold than in warm water, it is necessary to dilute the saturated solution sufficiently so that no gas escapes in heating. A solution of bisulphite of soda is also employed. The wool treated with sulphurous acid is entered into a weak soda solution and afterwards washed thoroughly, and, if necessary, the bleaching process is repeated.

For bleaching with peroxide of hydrogen, the peroxide is mixed with water and ammonia, in which the bath wool is left immersed for ten hours. It is then taken out, and without being washed taken to a well-ventilated drying chamber, heated to 70° F, or, what is still better, dried in the sunshine in open air. To obtain a purer white, the wool must be blued feebly with indigo carmine, or, better still, with methyl violet

Raw silk is first degummed by treatment with soda, soap or carbonate of ammonia, after which it is well washed and passed through an acid bath. It loses thereby more than 25 per cent, and to avoid this great loss, it is frequently washed in a diluted and heated mixture of hydrochloric and nitric acids, until it has become grey, when it is quickly and carefully washed. The loss in this process is at most 18 per cent, but the product, the suppled silk, is proportionally more inferior. In both cases the cleansed silk is bleached with gaseous, more frequently with a solution of sulphurous acid, and then washed, and a reddish or bluish tone is generally finally imparted to it with annatto, indigo carmine, or aniline blue.

Vegetable fibres, wool and silk, can also be bleached with permanganate of soda. The cleansed material is entered into a solution of manganate of soda, after which sulphate of magnesia or chloride of magnesium is poured in. The generated permanganate of soda has a bleaching effect by surrendering oxygen, while brown manganese oxides precipitate upon the fibre. For removing these oxides the material is entered into a bath of sulphurous acid, which forms a protosulphate of manganese and is easily washed out.

Horse, cow and calf hair are bleached in the same manner as wool. Wood, also, can be bleached, but only with sulphurous acid. Ivory is bleached in a mixture of oil of turpentine and alcohol, which has been exposed in a bottle at most one-half full to the rays of the sun for several days.

The work of bleaching is exposed to but few dangers, for the workmen soon become accustomed to the vapors, and the diluted chloride-of-lime baths can hardly be taken into account, although they are more disagreeable in their effect in the vicinity. Dirty waste water must be thoroughly cleansed with lime, and it is, therefore, well to locate bleaching establishments below settlements on the same stream. Odors must be drawn off by good ventilation, although in establishments recently built their immediate removal has been provided for.

The grass bleach is an ancient method which attained perfection in the eighteenth century, and it was used with such great skill in Holland, Bohemia, Silesia, etc., that nearly all the linen woven in Scotland was sent to Haarlem to be bleached. Berthollet taught the factory bleaching with chlorine water in 1785, and James Watt, Henry, and Boneuil introduced the method into England, but found great opposition, as was the case everywhere else. It was observed that the fabric entered into chlorine water frequently became yellow, and in order to prevent this the cloth was boiled with alkaline lyes. In 1792, Berthollet discovered the chloride of potash, which can be handled with much less trouble than chlorine water; but his discovery was eclipsed by the discovery of the chloride of lime by Tennant, in Glasgow, in 1798. At first Tennant employed the milk of lime treated with chlorine, but as early as 1799 he received a patent for a bleaching powder. The chlorine bleach was on the point of being abandoned by being carelessly used, and only when the processes were performed with more care did the new bleaching process take a renewed hold, first by being employed for cotton fabric, and much later for linen. The bleaching process, however, was promoted most largely by the introduction of machinery. The bleaching with permanganate of potash was discovered by Tessié du Motay and Maréchal, in 1866. —*Industrial Record.*

STRIPPING COLOR FROM DARK RAGS.

What is the method for reducing dark rags or dark shoddy yarn to a medium light-yellow olive by boiling with chromate of potash and acid? In what proportion are these agents employed, and what acid is best to use? How long is boiling to be continued? These questions are answered by a German contemporary as follows: When the wool material is treated with bichromate of potash, the latter surrenders a portion of its oxygen to the former, and reddish to greenish-yellow chrome combinations are precipitated upon the fibre. The organic dyes already upon the material are in large part changed or destroyed, although not all to the same degree, which shows that the question as to what kind of dyestuffs preponderate on the material must be considered. Wood colors can be destroyed much more readily by the oxidation with chromic acid than alizarin dyes, and many anilines are also less fast than the alizarins. Indigo is most thoroughly destroyed by the following mordant: For 100 lb. wool 5 lb. sodium bichromate (which is generally used at present for this purpose, in place of the much dearer potash salt), 3½ lb. blue vitriol (sulphate of copper), and 3 lb. of sulphuric acid, 66° B.; boil in this from 1½ to 2 hours. If the quantity of dye upon the fibre, which will be considered as unknown, is large, the following decoction may be used, but anything stronger cannot be employed: 5 per cent. sodium bichromate and 4½ per cent. sulphuric acid, 66° B.; boil for 2 hours. This quantity of acid, which is theoretically too high, practically ensures the best success, as it liberates the entire quantity of the chromic acid, and forces it to act with energy upon the material, while, on the other hand, the bisulphate of sodium is generated. At a subsequent boiling the quantity of the chromate, as well as that of the acid, must be diminished.

To use an organic acid, such as oxalic acid or tartaric acid, for the present purpose, would be a mistake, for two reasons: (1) The cost would be increased unnecessarily; and (2), in the presence of one of the acids named, the chromate does not act so energetically upon the wool material, or rather upon the dyes upon it, since a part of the oxygen surrendered by the chromate oxidizes these acids in place of the dyestuffs, which it is intended to destroy. In stripping colors it is not advisable in all cases to use more than 5 per cent. sodium bichromate, as the fibres become harsh in feel, in consequence of the large quantity of chrome combinations which they absorb, and perhaps also by reason of their oxidation.

The plates should not be put on any harder than necessary to take out wrinkles, or else they will have to be stretched out again on the stretcher to make them wide enough. This may be unnecessary on goods requiring an excessive amount of felt; but as a usual thing it is better to run goods natural and have as little stretching as possible. Next morning the goods are unwound, and they are then in prime condition for the gig. On the gig commence with old work, and go into the felt as easily as possible When about half gigged, take the goods to the cropping shear and give them a good cropping. The better and evener this work is performed, the better the goods will look. While it is of great detriment to the goods if they are cropped too low, it is equally bad not to go low enough for if they are not sheared low enough the benefit is not obtained, and the labor spent is practically wasted. They should be cropped to within three or four notches of where they are to finish. After returning them to the gig, employ somewhat sharper work, and try and raise the remainder of the fibres; after about half-an-hour's work thus put in (the sharpest work you have, or breakers), finish up one way for about twenty or twenty-five minutes.

The next process depends entirely on the stock used, for if the stock contains many burrs, burr or speck dyeing becomes necessary, and this must be done now. After speck dyeing the goods go to the wet gig, where they receive four runs and are then wound