

middle than on the sides of the cloth; while if caused in the other departments, the wide and narrow places will show equally all across the cloth, the changes being abrupt from wide to narrow, and often in spaces indicating one or more hobbins of weft, or at uniform intervals, corresponding with the revolutions of the warp beams. In the matter of the oil used upon the material in carding, the manufacturer cannot be too careful to secure a good oil and avoid frequent changes. The manufacturer is sometimes too ready to try experiments, and by getting into the works two or three kinds of wool oil, each of which requires a different strength of soap, gives the finisher the impossible task of producing uniform results with a soap only adapted for one of the oils in question. By a proper adaptation of the soap, and a careful application of the same, together with a prompt report when it is discovered that cockles are caused by faults in the other departments, the finisher will have done his duty regarding them.

Another trouble which the finisher has sometimes to contend with is mill wrinkles, or wrinkles made in the fulling mills, which become felted, so that they cause an imperfection in the finished fabric. As a rule, these wrinkles occur near the ends of the cloth, usually being most pronounced on the end that enters the mill first. Careless sewing of the ends, by which the seam is irregular, or the stitches too long, will produce wrinkles; and often their extent into the cloth is in proportion to the irregularity or length of the stitches. Fine and uniform sewing, or, what is better, the use of a mill sewing machine, will remove this cause.

The weaving of headings in the ends of the cloth, of yarn that fulls faster than the body of the piece, will cause the cloth to wrinkle, on the same principle that narrow places in cockled goods will produce them; and where the wrinkles remain in the cloth during the fulling they produce felted streaks. It is best to have no heading woven in the cloth, unless it be of yarn of less fulling quality than the regular weft. Should the mill wrinkles occur in the body of the piece, without reference to the ends, the only remedy is a frequent overhauling or opening of the cloth to change the folds in it before they become set or felted. If the cloth is not intelligently designed or "laid out" in the loom and the warp threads are crowded or out of proportion to the weft mill wrinkles will result, in spite of the finisher's best efforts, especially upon goods requiring several hours' fulling. Anything that tends to open the cloth on its passage from the rolls to their entrance again, or otherwise to change folds, will obviate the trouble, and in this matter there is an opportunity for an improvement in the modern fulling mill.

Rolling selvages are usually due to something not under the control of the finisher. Frequent opening and shaking of them out or sewing the edges of the cloth together, with the side toward which they roll outward, so that in their tendency to roll they are holding each other from it, are the only remedies for the finisher. Further corrections must be made in the yarn or weaving. Cloth with a predominance of weft on one side will tend to roll toward that side; and the trouble is intensified by the open or loose character of the weave. If the selvages are made in the loom tighter, or of stock that will shrink faster, and in consequence become tighter than the cloth, they will at once begin to roll, and the only remedy is a change either in the yarn or the weave of the selvege, to make it slacker or less inclined to shrink.

Sometimes, when the selvages are all right, the leaving out of a broken warp thread in them, or a wrong draw, will expose the weft, causing the shrinkage at that point that will turn the edge of the cloth and produce the trouble. It is too often the case that the weaver fails to understand the import-

ance of perfect selvages, and they go to the finishing-room in all kinds of conditions, giving the finisher trouble in fulling, gigning, shearing, and pressing, often resulting in their destruction, despite his best efforts to save them. The result of rolling selvages is a more compact and heavier felt on the sides of the cloth, owing to the increased warmth at that point in fulling; so that it is quite impossible to produce a uniform finish, even if the finisher succeeds in opening out the cloth in the last processes of this work.

Dirty goods mean a serious difficulty. One important thing which is too often overlooked is the fact that the fulling is, or should be, considered a part of the scouring process, and serves as such when it is correctly done. As a rule, where goods are not properly cleansed, the fault is as likely to be in the fulling as in the scouring. If the saponification is imperfect or incomplete in fulling, the heat produced in the process tends to set the grease, making it harder to remove in scouring. If the saponification is perfect it converts all the grease into soap, and though in dirty state, if of sufficient body, it holds all the foreign matter until the scouring follows to complete the work. There are many difficulties in the dry finishing that are the direct result of a failure to properly clean the goods, hence the battle is largely won by thorough work in the wet department. Crooked plaids or checks are sometimes made worse by uneven or very slack selvages; but good results can only be assured by care to keep them as nearly straight as possible in drying and on the press.

FABRIC OF THE ROCHDALE WEAVERS.

It is not known to everybody that to the weavers of Rochdale, Eng., belongs the credit of being the pioneers of the co-operative system of supply, and that the co-operative association which they founded in 1843 is to-day perhaps the largest institution of its kind in the world. They wove better than they knew, and the fabric they completed then is a model of its kind. The Montreal Witness thus summarizes its last annual report:

Inaugurated in the year 1843 by a small gathering of poor weavers in Rochdale, the last annual report of its operations shows an expansion truly marvellous. The first co-operators agreed to pay twenty pence a week into a common fund, but so great was their poverty that few of them were able to meet their payments. Their number increased, however, and at the end of the first year they had a capital of £12, but realized no profits. In the second year the membership had risen to 74, and the profits amounted to £22. The spirit that animated these poor associates was admirably shown by the meeting at which this result was declared by the setting apart of two and a half per cent. of their surplus as an education fund. Thenceforward the association developed its resources till, in 1876, its membership numbered 8,890, in which year its business amounted to £305,000, and its profits to £50,000. The gigantic expansion of the movement since that date is seen in the account of its operations for the year 1901, which gives a total of £81,782,900, or more than four hundred million dollars, with dividends to shareholders of over forty-five million dollars! Capitalistic combination, which is known in every instance to be largely based on the hypothetical value of monopolies in assumed control of markets, can show nothing more wonderful than this. From an economical viewpoint it demonstrates the stupendous values in the business of supplying the people with the necessities of life. This is further proved by the simple statement that the association has reduced the cost of conveying goods from the producer to the consumer from 33 1-6 per cent. to 6 1/2 per