

HISTORY OF A COAT.—No. 1v.

[Concluded from No. 546.]

WE have hitherto said nothing concerning the colour of the cloth whose production we are describing; the wool itself has a kind of dirty white tint, and must be dyed before it is fit for use. The dyeing is effected before the wool is spun, for forming cloth of mixed colours; after it is spun into thread, for tapestry-work; but after it is both spun and woven, for the generality of purposes: in the last case, the dyeing is performed after the scouring, by which the oil is removed, but before the milling, which we have yet to describe. The subject of dyeing is too extensive to be here entered upon at much length; but we will briefly speak of the processes by which a piece of cloth is dyed black.

In order that the black dye may be successfully made, it is necessary that the cloth be previously dyed some other dark colour. The finest and deepest black is obtained after a blue dye has been given to the cloth; but a cheaper black results when the cloth has been previously dyed with a brown or root-coloured ground obtained from the root of the walnut-tree or from green walnut-peels; the preparatory blue dye is obtained from indigo and woad; and the nature of the operations will be sufficiently indicated by the following modes of imparting the black dye, these being merely two modes out of many that are adopted. The blue-dyed cloth is boiled for two hours in a solution of galls, and is afterwards kept for a similar length of time in a bath composed of

* 'A Summer in Andalusia,' vol. i., p. 295

logwood and sulphate of iron. Or, a bath is prepared of a pound and a half of yellow-wood, five pounds of logwood, and ten pounds of sumach, which is the proportion of ingredients for every fifteen yards of deep-blue cloth; the cloth having boiled in this bath for three hours, ten pounds of sulphate of iron are added, and the cloth remains for two hours longer. In either case, the blue dye used previous to the black is made to unite to the cloth by means of a *mordant*, or fixing liquid; and the black afterwards unites with the blue; indeed the general processes of dyeing may be characterised thus:— a mordant, which has an affinity for the woolly fibres as well as for the dye-stuff, is first applied to the woven materials, and serves as a link or medium through which the dye is made to adhere to the cloth; for it often happens that the two latter have no tendency to unite without the aid of a third body: the dye-stuffs being principally solutions of vegetable substances, employed at a high temperature. The nice precautions necessary to be taken by the dyer, we, of course, cannot dwell upon here.

After the scouring and dyeing the cloth is milled, by a process very similar to the fulling described in the last paper. A piece of cloth, sixty-two yards in length, is put into a trough, together with about six pounds of soap spread over the surface. The cloth is then beaten for three hours by very heavy stocks or mallets, it being turned occasionally, to present a new surface to the action of the mallets. After three hours' milling, the piece of cloth is taken out of the trough, soaped again, and re-milled in a similar manner; this is done a third and even a fourth time. The enormous amount of beating and pressure which the cloth thus undergoes produces remarkable effects on it: the length is reduced from sixty-two yards to forty yards; and the width from a hundred inches to sixty inches; the fibres are found to be matted and clotted together in a manner which renders it impossible to disunite them; and the threads are wholly concealed by the felting which has been here effected. It is in this process that the serrations in the fibres of wool, of which we spoke in a former paper, cause that peculiar entanglement called felting. The blows of the mallets on the cloth force the small fibres in various directions; and if two neighbouring fibres happen to be so placed that their serrations interlock or catch in one another, this is a miniature instance of the felting or milling which, on the large scale, has so peculiar an effect on the piece of cloth. Not only do both sides of the cloth acquire a nap or pile by the bristling up of the fibres, but a piece of woollen cloth can be safely left with a cut but unhemmed edge, because the fibres of one thread interlace with those of the adjoining one, and thus prevent the thread from ravelling out. We trust the reader will have perceived, from this description, that the pile of a piece of woollen cloth is not a substance laid on the woven material, but consists of some of the fibres of the woven threads, raised up, and entangled one among another.

The nap just described is, however, too irregular and rough to suit our ideas of neatness and elegance; and in order to remove a portion of this roughness, the cloth goes through the processes of *teazling* and *shearing*,—the first of which drags up the fibres so that their points shall, in some degree, be presented uppermost, and the second shaves or cuts off a portion of these fibres from the whole surface of the cloth.

Teazling is a process which differs from almost every other in modern manufacture in this circumstance, that although it is strictly mechanical, no combination of machinery has yet succeeded in effecting it so well as a small vegetable production. The fibres of the cloth have to be raised up by a kind of scratching action, and nothing has yet effected this so well as the sharp hooked points of the common *Teazle* (the *Dipsacus fullonum*). Their excellence for this purpose seems to depend on the

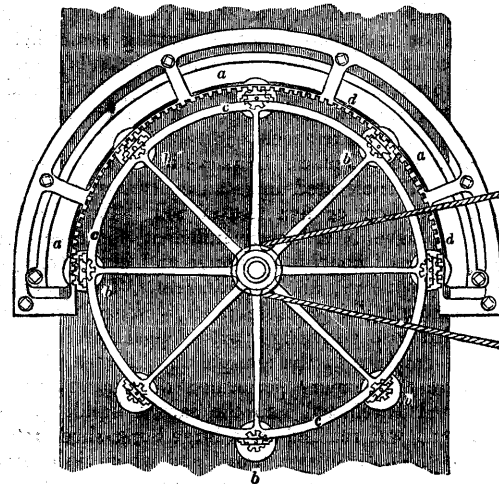
following circumstance, that if the hooked points catch in a knot of the cloth, they break off without tearing a hole in it; whereas steel or iron points, worked by machinery, would almost certainly drag the cloth into holes more readily than they would yield by fracture. It is not improbable that some mode will be hereafter devised which will effect this process by machinery, especially as fifteen or twenty hundred teazle-heads are required for every piece of cloth; but hitherto all such modes have been unsatisfactory. Referring to the last Supplement, p. 384, for a representation of the teazle, and an account of its nature, cultivation, market-price, &c., we will here proceed to describe how it is employed.

Under the old system a number of teazie-heads were set close together in small wooden frames of a convenient shape to be worked by hand. The cloth was drawn over a frame constructed of boards laid in a sloping direction and covered with hair-cloth; and was then scraped or rubbed with the teazles from one end to the other, being kept constantly wetted with water during the whole time. The cloth was then laid on the shearing-boards, which were wooden planks covered with coarse hair-cloth, forming a sort of hard cushion; and the raised fibres of the cloth were cut or sheared off with long heavy shears, which were pressed close to the cloth by means of leaden weights, and which gradually slid forward at every motion or cut, until the cloth was sheared from edge to edge. The cloth was then returned to the teazling-frame,—more fibres were raised, and these fibres were cut off at the shearing-frame. This alternation was repeated three times, finer teazles being employed as the process approached completion.

But in the more modern system the two processes of teazling and of shearing are separated, and each one is performed by steam-power. The hand-teazles are now superseded by the *gig-mill*, consisting principally of a cylinder covered nearly all over its exterior surface with teazles, or, in some few cases, with metallic wires. This cylinder revolves; and the piece of cloth, while passing from one roller to another, is pressed against the points of the teazles so that the fibres are effectually worked up. When the hooks of the teazles become filled with flocks of wool, they are taken out of the cylinder and cleaned by children with a small comb; where the metallic teazles have been employed with any degree of success, their points are cleared by a revolving brush connected with the machine. Different varieties of the gig-mill have been introduced in proportion as the advantages of employing machinery became clearly understood.

The shearing used to be effected by the shears, as we before stated, and was a process requiring much manual dexterity, since the nap had not only to be cut in an even and parallel manner, but the shears had to be shifted after each cut to just such a distance (and that a very small one) as to make another cut in the proper place. As the shears were difficult to hold and manage, machines were contrived, in which the shears were fixed to a carriage which, moving slowly over the cloth, caused their cutting edges to work upon every part of the nap. But still, as the cuttings were made by separate and distinct movements of the shears, the process was not of that continuous nature which we are accustomed to meet with in modern manufactures; and attention was directed to the construction of machines for the more effectual performance of this process. Many such have been recently invented, of which we will briefly describe one, that of Mr. Oldland. The shaded portion of the annexed cut represents a piece of cloth, and the lighter parts show the shearing-machine at work on it. (c, c) is a large working wheel, made to rotate by a band and pulley connected with its axis. Round its circumference are fixed eight little circular cutting discs (b, b), and each disc has a toothed pinion which works in a toothed semicircular rack (d, d); so that when the large wheel is rotating, the small cutters

have a curious motion, not much unlike that of a planet, that is, they all revolve round the centre of the large wheel, and at the same time each one rotates on its own axis. (a, a) is a semicircular cutting blade, on whose edge the circular cutters rest in such a manner as to form a series of scissors or shears: the nap is caught up between the edge of the semicircle and the edge of the disc, and then cut off. The machine is gradually driven from end to end of the piece of cloth, shearing the nap as it goes in semicircular sweeps or curves. We may here remark that the introduction of shearing-machines occasioned much rioting and violent conduct among the hand-shearers some years ago; but the great superiority of the machine method over that by hand has gradually silenced all opposition, so that the latter is probably now scarcely known in England.



When the shearing is completed, the cloth is well brushed, in order to remove the loose particles of wool, and to lay the nap even and smooth. This operation used to be performed by hand, but it is now effected by means of cylinders having hair brushes on their circumference. The piece of cloth is conducted over a system of rollers, to extend it and to draw it forwards: it then passes over one of the brush-cylinders and under the other; and as both cylinders rotate rapidly, the cloth becomes well brushed on both sides.

The cloth is next subjected to the process of pressing, by which a smooth level surface is produced. The piece is folded backwards and forwards in yard lengths, so as to form a thick package, which is placed either in a screw-press, or, in modern establishments, a hydrostatic press. Sheets of glazed paper are placed between the folds of the cloth, in order to prevent the contact of two surfaces of the latter; and at the end of every twenty yards, three hot iron plates are inserted between the folds, laid side by side, so as to cover the whole width of the cloth: thin sheets of cold iron are placed between the cloth and the heated plates to moderate the warmth. When a large package is built up, it is subjected to severe pressure in the press, where it remains till the plates are cold. The cloth is now taken out and refolded, in such a manner that the creases of the former folds may come opposite to the flat surfaces of the paper, and be removed by a second pressure. If the heat of the plates be too great, a satiny lustre and smoothness are given to the cloth, which is liable to unsightly stains if afterwards spotted by rain.

By some modern machines the brushing and pressing are effected in a few minutes by the combined action of brush-cylinders, a steam-cistern, and calendering or pressing rollers. Indeed throughout the manufacture we have contented ourselves with describing the most usual modes of effecting the object in view, without attempting to describe all the various ingenious machines which have

been from time to time introduced for the more speedy performance of the required processes.

Our piece of cloth is now finished; and we have only to say, that the manufacturer usually packs up the cloth in bales containing twenty or twenty-five pieces: the bale is first enclosed in paper, and then in canvas, and is thus transmitted to the purchaser.

The method by which a piece of cloth is measured and cut to the proper dimensions for forming a coat would be difficult to describe in writing, although we can easily enough form a conception of it: our object has been not so much to speak of the means by which the scissors and the needle fashion a coat out of a piece of cloth, as to convey some idea of the process by which the woolly covering of a sheep becomes a smooth and elegant woven material from whence a garment may be made. Although cloths of very different degrees of quality are made, yet

the routine of manufacture is pretty much the same for all; indeed it is probable that in no country in the world does the coat of the nobleman differ less from that of the artisan than in England. Thanks to machinery, our working population is more neatly and comfortably dressed than at any former period: a journeyman in his Sunday attire would not be seen in a coat of worse quality than broad-cloth; and if George Fox, the founder of the Quakers, were again amongst us in his leathern doublet, he would see how neatly labouring mechanics, to which class he belonged, have been enabled to increase their comforts by the cheapening effects of machinery on the prices of clothing. If it be objected that we should not value a man by the quality of his coat, we would remark, on the other hand, that neatness of person and dress is one of the elements of moral advancement by inducing self-respect.
