

Zeitschrift: Swiss textiles [English edition]
Herausgeber: Swiss office for the development of trade
Band: - (1945)
Heft: 2

Artikel: A modern industry : textile finishing
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DOI: <https://doi.org/10.5169/seals-799080>

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A MODERN INDUSTRY: TEXTILE FINISHING

I. From empirical to scientific methods.

There are many records extant testifying that, even in the most remote past, primitive man, moved by some vague esthetic impulse, sought to beautify the clumsy objects he produced by the work of his hands, particularly those he manufactured with textile fibres to protect himself against inclement weather. Very early in the history of man, the need was felt to clean and make more pleasant to the eye both yarns and raw fabrics, to render these commodities as white as snow by bleaching. Colour has always exercised a great power of attraction over man, as Goethe excellently summed up when he wrote : "Colour generally gives man great joy ; the eye has as much need of colour as of light." Man saw colour everywhere in Nature and strove to reproduce it both on his own person and in the products of his industry ; it is most certainly to this that the origin of the art of dyeing must be attributed. Later, with the more refined needs of a civilized society, greater importance was attached to the special preparation, or "dressing", of textiles. According to the use to which they were to be put, men sought to give fabrics various qualities of appearance and handle, such as softness, lustre, smoothness or weight, for instance. All the processes to which fabrics are submitted after manufacture form part of what we call to-day *the finishing or "smartening" of textiles*. This branch of industry

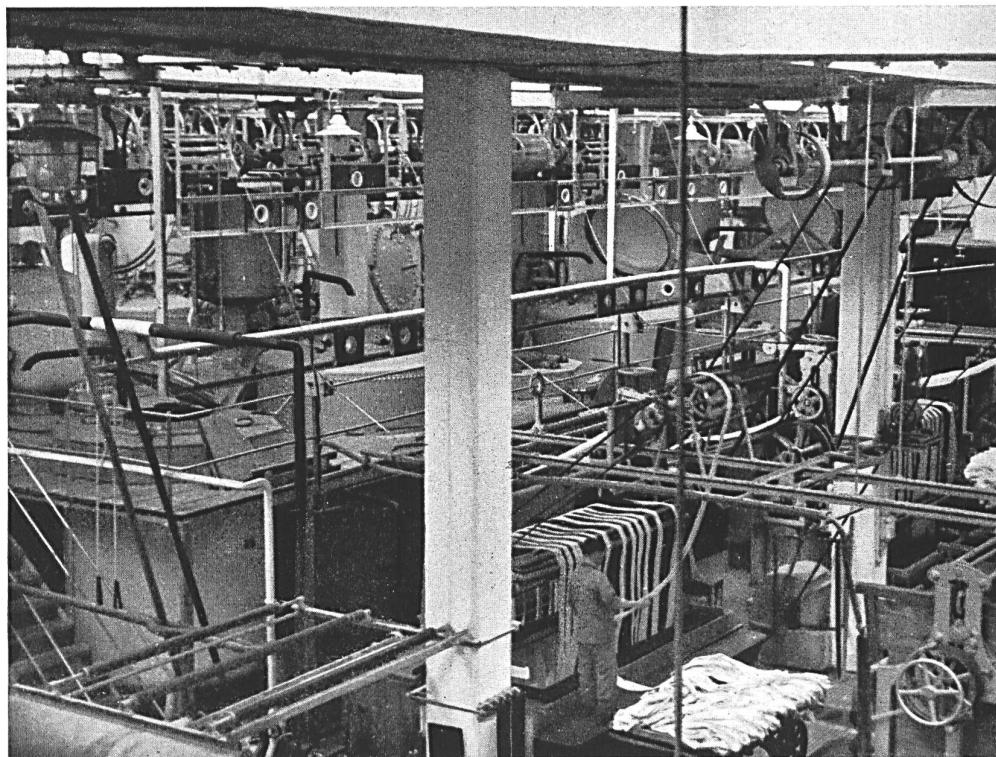
therefore ranks among the oldest discoveries of man's inventive spirit.

The accompanying illustration is a reproduction of a XVIth century stained glass window in St. Gall, showing that even then this ancient craft was highly considered. Here we see two dyers, one of whom is wringing a dyed skein, while the other is plunging a length of cloth in the dye vat. The upper frieze depicts the equipment of a finisher's workshop, consisting of a mangle worked by a horse-driven swivel and of a table on which two workmen are stretching and smoothing a fabric by means of a wooden roller or bowl. For centuries, even until the industrial age was well under way, generations of craftsmen handed down one to the other, the arts of bleaching and dyeing. As a result of technical progress this craft became an indispensable branch of the spinning and weaving industries and sprang up wherever these two industries were established. Finally, it too was conquered by the machine age and, when chemical bleaching processes and synthetic dyes came into being, the art of finishing, formerly a craft, became an important auxiliary industry. In Eastern Switzer-



On left-hand page :

Stained glass window of the Dyers's Guild. Executed in 1565 by Hör.



Right :

A characteristic view of a great modern factory of the textile finishing industry. This scene may give some idea of the autonomous development of the industry which was formerly merely an auxiliary craft.

land especially, when the ancient manufacture of linen cloth was replaced by cotton weaving and the embroidery industry, specialized finishing firms widely contributed, by their high standard of workmanship, to the establishment of the excellent repute enjoyed by Swiss textile products. The muslins, coloured fabrics and St. Gall embroideries found easy markets all over the world owing to the quality of their finish. This development was marked by the establishment of large factories. Over a century ago there were already finishing factories in St. Gall, Herisau and even in the Toggenburg, which employed, even then, 300 or 400 workmen. Meanwhile, the old natural dyes, whereby only a limited number of colours could be obtained, were supplanted by synthetic dyestuffs and, after a trial period during which inferior products were placed on the market, the industry made great headway and began to supply more and more perfected dyes. It proved possible to obtain both light and laundry resistant coloured fabrics, which led to the universally accepted standard of "fast" colours. However, other branches of the finishing trade lagged somewhat behind. It seemed sufficient merely to give products of inferior quality the appearance of expensive goods, and people were quite resigned to the inevitable when a single laundering caused the lustre, weight and handle of a fabric to vanish completely, indeed all the proprieties which gave only seeming splendour to the material. It is a curious fact that, apart from the development of bleaching processes, the improvement of mechanical and technical operations and the development of dyeing, no fundamental innovation was found during the last decades of the XIXth century. Finishers had of course learned to modify the appearance of the fibres, that is to say, to produce an apparent improvement in quality; but the processes then adopted, which consisted in stiffening or "filling" the cloth with starch or other preparations, in pressing, calendering and raising it, had the disadvantage of producing only an outward change in the fabrics, giving them mere artificial qualities which soon disappeared when the material was in use.

The introduction of cotton *mercerizing* towards the end of last century proved to be the starting point of the development of modern finishing processes. By this invention,

it first proved possible to modify the structure of the fibres by means of chemical products — in this case sodium hydrate or caustic soda ; the change is permanent and laundry resistant, and cotton thus acquires the lustre of silk. This fine discovery, the foundations of which had been laid 50 years earlier by the patient research of John Mercer, revolutionized the cotton industry and its importance has not diminished even to-day. We cannot now visualize the textile industry deprived of mercerized cotton yarns and fabrics so greatly in demand just now, owing to the textile shortage. The experiments made in the application of this new technique gave rise to the idea of seeking other possibilities of modifying textile fibres by means of chemical products. "Permanent organdies" were the fruit of research along these lines ; this type of muslin organdie, gauzy and transparent as its name suggests, and, at the same time laundry resistant, has become an indispensable fashion auxiliary. The new achievement proved that nothing further could be obtained by improving old empirical methods, but that the future lay in scientific and technical research ; indeed, a whole series of most diverse, new and original effects were later obtained in this way. After having succeeded in giving cotton the appearance of silk, treatments were discovered to make it look like wool or linen. On the other hand, the development of new chemical and mechanical processes made it possible, not only to make the fibres resemble those of other raw materials, usually considered more valuable, but also to create entirely new qualities. By applying the new treatments in combination with printing processes, other possibilities were found whereby fine new fabrics, answering to all the requirements of fashion, can be produced from quite ordinary textiles. When one considers the numerous effects that can be obtained with a plain weave cotton muslin by means of the "Imago" ¹ or other processes, one can understand how greatly the finishing operations enhance the value of the raw product. Thanks to the progress it has achieved, the finishing industry now stands foremost among the fashion novelty trades and industries. Within a few decades it has risen from a mere auxiliary to a great, independent industry which plays no inconsiderable part in the manufacture and export of textiles. The accompanying illustration shows a characteristic view of a modern finishing factory (see also one of the next numbers).

The creation and development of so-called artificial textile fibres has not exhausted the possibilities of the modern finisher's craft ; on the contrary, rayon and staple fibre lend themselves to after-treatment extremely well. For the last few years, this industry has been working along new lines : the question is no longer merely to satisfy the requirements of fashion, but also to make textile products as utilitarian as possible. Thanks to after-treatment, the resistance of certain materials when wet has been increased ; others have been rendered unstretchable, unshrinkable or crease-proof.

There is no doubt but that the finishing industry which, in the past, has more than once provided new impulses to revive a stricken branch of the textile industry, will fulfil its task in the post-war period we are awaiting ; already an important factor in the export trade, it will without doubt further the placing of Swiss textiles on world markets. The industry's best weapon is its untiring spirit of scientific research, animated by the determination constantly to find new possibilities whatever the obstacles which may have to be faced, and to achieve and maintain the highest possible standard of production and workmanship.

¹ Proprietary name.