

### TEXTILE INDUSTRY AT THE VIENNA EXHIBITION.—No. III.

By DR. H. GROTHE.

HAVING completed in our last article a review of the processes and machinery connected with the woollen industry as illustrated at the Vienna Exhibition, we shall next examine how silk manufacture is represented; and we may here note the two methods which we have to distinguish from each other—silk, and waste silk spinning—in the latter of which the process differs widely from the former. We shall also make a few general remarks upon the cotton-spinning exhibits at the Exhibition. So-called silk spinning is limited to the unwinding of the cocoons, and to the twisting of from 2 to 30 of the single and very fine threads which cannot be used alone. The spinning of waste silk is similar to the spinning of other fibres, the object being to clean the raw material, and prepare it in a proper manner, so that strings or fillets may be formed, which may afterwards be twisted into threads. This process of treating waste silk is comparatively a new one.

The mechanical means employed for spinning silk remained unaltered during centuries, and even at the present day they differ very little from the original apparatus, whilst all attempts to construct novel machines for the purpose failed, simply because such machines were not required. Perhaps the most notable so-called improvement for this industry was Lombes' extraordinary machine, which occupied a hundred times the space of the more efficacious and simpler appliances.

At the Vienna Exhibition the silk industry is well represented by Switzerland, France, Italy, Germany, and Austria, and, in a most interesting manner, by Japan and Turkestan.

The Italian apparatus are distinguished by practical ideas very badly carried into execution. Carlo Perinelli, of Piacenza, exhibits a mechanical winding machine, with which he claims that he can obtain, at one operation only, thrown silk with  $1\frac{1}{2}$  revolutions for reeling, and one full twisting; unfortunately, however, there are no means of proving this statement, and the capacity of the machine. The reeling machines of Grossi and of Zanelli Luigi, of Turin, also leave much to be desired in their execution, notwithstanding some interesting details in the arrangement for guiding the threads. We regret that the Italian manufacturers do not produce more carefully executed machines; those for such a simple purpose as we have described, could easily have been properly finished. Excellent, however, is the execution of the French silk-reeling machines, by Touffray Cadet fils, of Vienna (Isere).

Switzerland exhibits several apparatus for silk-spinning. M. A. Frey, of Küttingen, in the Canton of Aargau, shows a spinning mill for thrown and trams silk, with 312 spindles, which are arranged conveniently, and without any waste of space, in a three-high frame, each tier of which is subdivided into three sections. This frame consists of two vertical sides, 16 in. wide, two crosspieces, and four strong horizontal boards, upon which the spindles, with clear spaces of 1 in. between them, are arranged. Above the bearings, the spindles carry friction rollers, and the series of rollers of each horizontal section are arranged in a slightly curved line, so that the belt driving the spindles passes over the friction rollers, following the same curved lines, and putting all the spindles readily into motion. The motion is transferred to four vertical shafts simultaneously from one horizontal main shaft, the positions of which correspond with the three compartments of the machine, and from which the spindles are driven as described above.

The machine is said to work well and quickly, its capacity ranging from 75 to 100 kilogrammes per week, but the general arrangement of driving the spindles horizontally cannot be recommended.

Messrs. Clemmer and Co., of Basel, exhibits a finishing machine for "chape" (a spun-silk fabric),

an automatic silk-washing machine, and a silk ribbon machine. The latter is of some interest, but will have to be examined and described on a future occasion, when we deal with ribbon weaving. Highly interesting is the silk-washing machine exhibited by Messrs. Scheller and Berchtold, of Thalweil, Zurich. We find also in the Swiss department excellent assortments of cards, spindles, reeds, &c., for silk spinning, exhibited by the Spinnerei und Mechanischen Werkstätte Niederuster, near Zurich, also by the Mechanische Kardenfabrik Rütli, Canton Zurich, and by Messrs. Schelling and Co., of Horgen, near Zurich. The Austrian and German exhibits of this class offer little or nothing new or original; we need devote no space to them, but pass on to the waste-silk spinning exhibits. We must not omit to notice, however, an interesting apparatus sent by M. Kaspar Honegger, of Rütli, Zurich, for determining the *titre* of the raw silk, as well as for automatically weighing it. The collection of machines at the Vienna Exhibition for waste-silk spinning has never before been equalled. Since the invention of the mechanical preparation on, and working of waste silk, by Hollenweger, of Kolmar, astonishing progress has been made in this branch of industry, especially in Switzerland, Alsace, and Baden, whilst Thomas Greenwood of the firm of Greenwood and Batley, of Leeds, has taken a prominent place in the improvement of the machinery used in this industry. If we examine the carding machines for waste silk, exhibited by Messrs. Theodore and Frederic Bell, of Kriens, Canton Luzern, Switzerland, we only see Greenwood's system with a few alterations. The firm of Theodore and Frederic Bell is well and favourably known for the construction of silk-combing machines, having built lately perhaps the most extensive silk mills now in existence—those of MM. Torivelli Brothers, of Lugano, and of MM. August Villy and Co., of Amplepuis, near Lyons, whilst the firm itself possesses extensive silk mills. MM. Theodore and Frederic Bell exhibit at Vienna a "mail-batteur," or beater, for the treatment of macerated cocoon and waste silk, an "ouvreuse" or opener, and a combing and hackling machine, for tearing asunder the raw material and clearing it afterwards. We shall before long illustrate and fully describe this set of highly interesting machines, and may mention here that besides the two larger silk mills mentioned above, similar ones have been erected by MM. Bell at Mailand, Turin, Gersan, Chiasso Bene Vagienna, and several places in Switzerland. We are glad to find that at last this branch of industry has been so thoroughly brought before the world, and is so completely illustrated at the Vienna Exhibition.

The exhibition of waste silk of all sorts is also very rich, and well arranged.

Passing on now to a few general observations upon the cotton-spinning machinery, we find it not a little singular that in this department England should be represented at the Exhibition by practically only one firm, that of Platt Brothers, of Oldham, and who exhibit nothing but a cotton gin and a combing machine.

Switzerland, however, shows a complete series of cotton-spinning machinery belonging to Messrs. Jacob Rieter and Co., which does not, however, offer any new arrangement or detail, but it forms an important section of the poorly represented cotton-spinning industry. The execution of this exhibit leaves nothing to be desired. The motor of 472 spindles works very uniformly and exactly, whilst the grinding apparatus for the cotton cards is well arranged. The stripping apparatus for the automatic cleaning of the carders is already well known, and its simplicity recommends itself.

A few machines for cotton spinning, but which have little importance, are exhibited by the Tannwald Works for the construction of spinning machinery. This exhibit practically exhausts the representation at Vienna of this important and universal industry, and we cannot conclude this article without expressing our opinion that at no former Exhibition has this branch of textile industry been so poorly and incompletely represented.