REPORT ON TEXTILE FABRICS, RAW MATERIALS, AND MACHINERY.

By HORATIO G. KNIGHT.

His Excellency the governor, in his address to the two branches of the legislature, expressed a doubt whether the representation of the Commonwealth at the Vienna Exhibition would result in the great benefit that was predicted by many.

He alluded to the chief causes of failure, and gave the Massachusetts Commission credit for having labored faithfully and intelligently to secure the best attainable results.

It may well be questioned whether it was expedient for *any* State to send out a paid commission, charged with duties that should have been well performed by United States commissioners.

The Massachusetts Commissioner on behalf of industrial interests, explains the hindrances to his own success, points out many defects in the arrangement and organization of the Exhibition, and makes suggestions in his report which may be of much value to the State in its preparation for *future* exhibitions.

It is therefore more than possible that such advantages will accrue to the Commonwealth, from its representation at Vienna, as to justify the appropriation that was made for the industrial, as well as for the educational branch of the Commission.

If a new impulse shall be given to any one of our great industrial interests, or if our people shall be more impressed with the importance of industrial and scientific education, the labors of the Commission will not have been in vain.

The undersigned would gladly have given more time to his duties as an Associate, but for the reasons that are stated in the Commissioner's report it seemed to be useless to go to Vienna while the Exhibition was in a state of disorder.

After making a hurried survey of the whole Exhibition, which required more than one week, the time that remained—about three weeks—was mostly devoted to textile industry as there represented in various ways, upon which a brief report will now be given.

Writers for the press, and others, have described the general plan and arrangement of the Exhibition, which was in twenty-six groups, with numerous additional exhibitions.

Group V. was Textile Industry and Clothing.

It is said by those who had the best opportunities for observing, and it is an unquestioned fact, that never at any previous Exhibition was textile industry so prominently represented, or its importance so well shown, as at the Vienna Universal Exhibition. Never before was there brought together a series of exhibits so complete, or so significant of progress in the various branches of this industry. Its almost numberless branches were clearly shown, and the relation between textile and other industries was distinctly expressed.

Although, in our modern civilization, it is understood that coal, iron and textile fibres range in importance in the order here mentioned, the textile industry claimed much space, and was more prominent than any other at Vienna.

It was no easy task to obtain a general view of this department, as the various exhibits belonging to it were widely separated, and in several buildings. The Agricultural Halls contained a variety of raw materials, and machines for cultivating the same; there were many things in the Machinery Halls belonging to textile industry; and the great Industry Palace contained an immense and somewhat confusing collection of textile fabrics from all parts of the world, including articles of utility, of ornament, and of luxury.

A careful examination of all these exhibits, and the preparation of an elaborate report thereon, would have been a labor of several months for more than one man. It would have necessitated a thorough investigation of a great variety of raw materials, to ascertain the new channels they open for manufacturing operations; the examination of numberless textile fabrics, to obtain from them evidence of mechanical progress and chemical development in this branch of man-

ufacture; and the inspection of a great variety of machinery that was exhibited for preparation, spinning, weaving, braiding, dyeing, printing, ornamenting and finishing.

This work has been done with more or less thoroughness, and reports of much interest and value have been or will be made by commissioners and others. A series of valuable articles on the textile industry at Vienna, have already been published in an English journal that is seen by many artisans, manufacturers and scientists in this country. The official catalogues of several countries contain important information relative to their various industries.

It is believed that textile industry alone was represented at Vienna by nearly ten thousand exhibitors, if we include the exhibits of fibres, apparatus and machinery; but without including these, the number, as shown by the catalogues, was—

For Austria and Hungary,	about	2,500
Germany,	"	1,100
France,	"	750
Switzerland,	"	400
England,	"	300
Italy,	"	300
Turkey,	"	300
Greece,	"	225
Russia,	"	200
Tunis,	"	175
Belgium,	"	150
Sweden,	"	50
Denmark,	"	75

Exhibits from various other countries, including the United States, would make up a total of at least 8,000 exhibitors of textile fabrics and clothing.

These figures indicate the extent of this branch of the Vienna Exhibition; but its magnitude will be better appreciated when it is stated that, in many instances, a single exhibitor displayed a great variety, as well as a large quantity of goods. This was especially noticeable in the Austrian sections. The exhibits of that country alone, in eleven sections, constituted an immense exhibition.

The exhibits of France were also in eleven sections, illustrating in their arrangement, the skill and taste for which the people of that country are distinguished.

The German exhibits were well displayed in eight sections. From those countries, as well as from Switzerland, Belgium and England, there were collective exhibits of great beauty and interest, consisting of fabrics in silk, wool, cotton, flax, hemp and jute; and clothing of all descriptions, for both sexes.

No collective exhibit was more interesting than that by the silk manufacturers of Crefeld, Germany. The history of the silk industry of Crefeld is very instructive, and may well be studies by any one about to engage in that branch of manufacture.

The silk manufacturers of Lyons also united in a magnificent display of their fabrics, occupying an entire court of the Palace.

The Macclesfield Chamber of Commerce exhibited a beautiful "Trophy of Silk," comprising articles peculiar to that place, furnished by nine of its manufacturers.

The most celebrated manufacturers of silk, woollen, linen and dress goods, in France, Germany, Belgium and Great Britain—whose names are well known in this country—exhibited some of their choicest productions.

From Oriental countries there were numerous collections of webs and tissues, chiefly the productions of manual labor according to old usages and methods, distinguished in design and coloring by native taste. These attracted much attention.

There were several exhibits illustrating the processes of manufacture, the silk industry being thus most completely illustrated.

In the United States department there were less than forty exhibits in Group V., and but few of these were from Massachusetts, whose manufacturers could have furnished five times forty contributions to that branch of the Exhibition. It certainly was remarkable that a State which leads all the others in the manufacture of woollen, cotton and worsted goods, as well as the manufacture of boots and shoes, contributed so little to this last and greatest Universal Exhibition. There

was, however, but little inducement to participate in an exhibition that promised no immediate substantial returns.

This branch of the United States department was too meagre, and too mean, to reflect any credit upon the country, and could only tend to convey a false impression concerning its advancement in textile industry.

The exhibits of the raw textile materials were numerous, including some that are little known in this country, and but little used elsewhere.

Much interest was expressed in the fibres of certain plants exhibited by Dr. Collyer in the United States department, which are said to have been cultivated with success in various countries during the last few years. In the Brazilian department there was a long fibrous textile product, extracted from the stems of a bulbous plant, resembling mohair; also fibres from Tucum, in various degrees of treatment, some of which were similar to sheep's wool.

The United States exhibited a large collection of cotton, including beautiful samples of the Sea Island, and there was cotton from China, Egypt, Syria, Southern Russia, Algeria, Central America, and several other countries.

It was thought that the exhibits of cotton from Egypt, Russia and Algeria, furnished evidence of progress in the cotton-culture of those countries.

The flax culture was largely represented by Germany, Austria and Great Britain.

The culture of hemp was best represented by Russia,—a country that is endeavoring to produce all raw textile materials for weaving.

Jute was prominently represented, and has become an important material for yarns, being extensively used in carpet-weaving as a substitute for hemp. It is being applied to new purposes, as was shown in the Austrian, German, Dutch, Belgian, French and English departments.

There were exhibitions of wool of every description, from all countries; also goat's hair from various countries.

There were collections of silk, in all its varieties, from all silk-growing countries, making a very instructive exhibition. So well was this material represented, that one could there learn more about its quality and treatment than could be

learned in a short time from any treatise or book. It is understood that Italy is making rapid progress in this and many other branches of industry.

Our Massachusetts manufacturers are generally well acquainted with all machinery and raw materials adapted to their wants, are promptly informed of all inventions and improvements, and are not slow to adopt whatever is valuable.

Some of the numerous exhibits of textile fabric machinery and apparatus will now be referred to, full descriptions and illustrations of which are easily attainable by any one desiring the same.

Machinery for the cotton branch of textile industry was poorly represented. Switzerland alone showed a complete series of cotton-spinning machines, without any noteworthy improvements, by Jacob Reiter & Co., of Winterthur.

Wool-washing was chemically represented by German houses, and the mechanical process by McNaught & Co., of England, who exhibited machines of improved construction.

A wool-opening machine was exhibited by M. Celestin Martin, of Verviers, Belgium, capable of working 400 pounds of wool per hour; also a self-acting oiling-machine of simple construction, with which, it is said, a single workman can oil 3,000 pounds of wool in twelve hours. Other machines were shown by the same well-known engineer. Excellent wool-combing machines were shown by Platt Brothers, of Oldham, England.

Wool-carding was largely represented by well-known German, Belgian and English houses, some of whom claimed important improvements. The machines of M. Martin, who exhibited two systems of carding, attracted much attention.

Wool-spinning was well represented; and here again the machines of M. Celestin Martin were conspicuous. The self-actor for carded wool, by M. Bede, of Verviers, contains interesting and original features of probable value.

Much interest was manifested in the patent continuous wool-spinner, by John G. Avery, of Worcester County, Mass., which, it is claimed in his circular, "will do more and better work with one-half the number of spindles at less than half

the expense, occupying less than one-quarter the space than the most improved process now in use in Europe."

Flax, hemp and jute-spinning were probably best represented by Great Britain, though there were interesting exhibits from other countries. Flax-breaking machines were largely represented in the Austrian, German, and other departments. Dr. Collyer exhibited a flax-breaking and scutching machine in the American department.

Machinery and apparatus belonging to the silk industry were represented by Switzerland, France, Italy, Germany and Austria; also in an interesting manner by Turkestan and Japan. There was a remarkable exhibition of machinery for working silk waste, by Theodor and Fredric Bell, engineers, at Kriens, near Lucerne; all of which is worthy of description and illustration. Great progress is being made in this comparatively new branch of industry.

Caspar Honegger, of Rüti, Canton Zurich, showed the most numerous exhibits for silk-weaving. There was also interesting silk machinery from another Swiss house, that of Scheller & Berchtold, of Thalweil, near Zurich. Looms for weaving silk ribbons, with six shuttles, by F. Wahl, of Basle; and a series of looms for various purposes and materials, by M. Kuffmaul & Son, of the same place, were deserving of notice. Among the latter was one for taffeta ribbons, with revolver-slay, and a new motion for the leaves, actuated by means of eccentrics; and one for velvet ribbons, with a crochet-slay, and a jacquard apparatus at its side.

In the German department there were looms for silk-weaving, by Felix Tonar, of Dülken, including one for weaving glazed silk-stuff. It is said that the works of Mr. Tonar have been started for the purpose of making the Rhenish silk industry independent of foreign manufacturers of machinery.

Looms for mixed stuffs and for heavy goods were prominently represented. The new and novel apparatus for weaving, by George Hodgson, of Bradford, England, is believed to be worthy the attention of all interested in textile industry. He exhibited other looms, including one of the best construction, with the circular box and six shuttles. There was also a collection of looms, apparatus, etc., for the weaving process,

all of excellent workmanship, by Henry Livesey, of Greenbank, Blackburn.

Escher, Wyss & Co., of Zurich, exhibited looms for weaving colored stuffs, arranged for different mountings, and to work with three, with four, and with five shuttles.

Kuffmaul and Sons, of Basle, exhibited a loom for tapestry, with high warp, with a jacquard machine of 1,500 lifting wires.

Conspicuous in the German department, were the looms and the tools connected with weaving, exhibited by the Sächsisehe Webstuhlfabrik (formerly Louis Schœnherr), of Chemnitz. These looms are said to be adapted for the lightest as well as for the heaviest stuffs; for the closest and for the widest arrangement of warp; with change of weft; with or without the jacquard machine. This company was formed in 1851, and now employs about 700 workmen.

The Crompton loom, in a lighter and more simple form than heretofore made, was exhibited by the Sächsische Maschinen Fabrik (formerly Richard Hartmann).

In the Austrian department several looms were in operation, including those of the Tannenwald Cotton Works, which appeared to be composed of all possible elements of other looms, but good, both in combination and workmanship. There was one loom in the American department, constructed and exhibited by the Star Tool Company of Providence, which has two or three interesting details, and makes 300 picks per minute.

Reference will be made to only a few more machines, all of which, it was claimed, contained new and interesting details, namely: A warping-frame and a warp-dressing machine, by the Erste Brünner Maschinen Fabriks Gesellschaft, Brünn. A mechanical knitting-loom, by Ernst Supe, of Limbach (and here it may be mentioned, that the well-known Lamb knitting-machine, and several others, were exhibited). A covering and twisting machine, and a cord-making machine, by G. Stein, of Berlin. A singeing machine, and other machines for finishing, by the Zittauer Maschinen Fabrik und Eisengiesserei, Zittau: also a drying machine by the same company. Stretching machines, by William Birch, of Manchester, and by J. Ducommun & Co., of Mulhouse. A craping machine, by A. Kiessler, of Zittau; and a calendering

machine for woollen fabrics, by the same engineer. An eight-color perrotine printing-machine, constructed and exhibited by C. Bialon, of Berlin. Finally, what appeared to be a remarkable machine for embroidery, by Reitmann, of St. Gall, Switzerland.

Other textile fabric machinery and apparatus, of equal, or even greater importance, may have escaped the notice of the writer of this paper: whose knowledge of machinery is limited, and whose time for its examination was short.

A single remark concerning the Philadelphia Exhibition. If Massachusetts is to be well represented there, she must make wise and timely preparation. The countries that made such preparation, of which England was one and Belgium another, were most successful at Vienna.

While Massachusetts is greatly in advance of all the other States in respect to several important industries, reliable statistics show that she is behind four others in the silk industry, and especially in the matter of weaving.

The undersigned will conclude this brief and necessarily imperfect Report on the branch of the Exhibition in which he was most interested and spent most time, by expressing the hope that the attention of our capitalists, and others, may be so directed to the silk manufacture, that we may at no distant day, occupy in this the same enviable position that we hold in other branches of the textile industry.

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