(For the Scientific American.)

Flax Industry.—No. 11.

The average annual exportation of linens from Great Britain, during the years 1833 to 1838, inclusive, was as follows:—

To the United States,	25,377,000 yards.	
" British West Indies,	12,437,000	do.
" Other W. I. Islands,	5,820,000	do.
" Spain,	5,000,000	do.
" Brazil,	6,509,000	do.
" Portugal,	1,495,000	do.
" France,	6,100,000	do.

In 1800, according to Eden, the value of the annual production of linens in Great Britain was $10,000,000. McCulloch, in 1837, gave as his opinion that the vallue of the annual production of linens did not exceed $40,000,000, of which three-eighths were sold in foreign markets. Colquhon, writing about the same time, raises the estimate as high as $60,000,000, which last is believed to have been nearer the truth than the value given by McCulloch.

In 1820, 28,238,000 lbs. of flax, tow, and hemp were imported into Great Britain, in 1839 no less than 122,374,000 lbs. were imported, being an increase of 94,136,000 lbs.

In 1840, there were imported into Great Britain 127,830,480 lbs. of flax, and 69,774,936 lbs. of hemp. In 1849, the amount had risen to 184,292,000 lbs. of flax, and 108,250,000 lbs. of hemp; the average import, during these ten years, being 139,279,848 lbs. of flax and 82,665,556 lbs. of hemp.

The following table gives the amount of flax, the production of different countries, imported into Great Britain during the years 1840 and 1847, inclusive:

	1840. lbs.	1847. lbs.
Russia,	88,780,902	75,479,000
Prussia,	13,850,000	14,468,000
British E. Indies,	——	183,600
Holland,	11,536,000	6,507,000
Austria and Italy	76,082	774,588
Egypt,	1,224	4,850,000
United States,	——	5,500,210
Belgium,	8,456,000	3,518,000
Hanse Towns	826,000	3,518,000
France,	4,416,000	528,000
Denmark,	110,000	——
China,	——	111,184

Table showing the amount of hemp, the production of different countries, imported into Great Britain during the years 1840 and 1847:

	1840. lbs.	1847. lbs.
Russia,	61,080,000	55,000,000
Prussia,	——	——
British E. Indies,	5,669,000	18,950,000
Holland,	——	——
Austria and Italy,	675,400	3,285,208
Egypt,	——	——
United States,	——	127,806
Belgium,	42,000	——
Hanse Towns	——	——
France,	——	——
Denmark,	——	1,788,000
Phillippine Isl'ds,	1,573,900	202,698
China,	224,000	——

It appears that the average annual importation of foreign flax has been as follows:—

From 1820 to 1830,	72,000,000 lbs.
1830 to 1840,	109,000,000 lbs.
1840 to 1850,	139,000,000 lbs.

In eddition to the above quantities consumed in manufacturing operations, must be added the amount of flax and hemp grown at home, an amount by no means inconsiderable.

The proportionate percentage of the foreign importations may also be shown by the following table, calculated on the average imports of the years 1840 and 1849:

Russia	1840,	69	1849,	74
Prussia,	"	11	"	10
Holland,	"	9	"	6·5
Belgium,	"	6·5	"	4
France,	"	3·5	"	1·5
Other countries,	"	1	"	4·5

Besides the large amount of flax and hemp yearly drawn from foreign countries by England, to supply her manufacturers, she requires annually a supply of 650,000 quarters of linseed, to be used as seed, or for crushing purposes. This requires an outlay of about $6,000,000, which goes principally to Russia and the northern ports. Oil cake, the residuum of the pressed seed, so valuable as a feeding substance for cattle, is also imported into England in large quantities, the annual average being about 75,000 tuns, valued at $2,500,000.

From returns recently published respecting the English linen trade, the following curious statistics respecting the consumption of linen in different countries appears. It has been ascertained that 39,000,000 of persons in America cansume annually more than 2 yards of her linen per head—equal to 1s. 6½d. sterling; in Canada, the proportion is 1s. 6½d.. or nearly 20 per cent. more than in the United States; while 228,000,000 in Europe take but 1-38th part of a yard per head. This remarkable difference does not arise so much from the consumption being proportionally less in the countries of the Old World, as from the comparatively high duties which most of them maintain on the import of linen goods, and from the small disposition to use them in Asia and Africa, where cotton fabrics are almost exclusively used.

Before concluding our notice of the flax industry of Great Britain, a brief notice should be given to the manufacture of lace, which yearly requires an immense supply of linen thread. In Ireland this business, although dating its origin but few years back, is so extensive as to employ women to the number of a quarter of a million, and in England, in the town of Nottingham alone, the great center of the business of lace-making, 143,000 persons—men, women, and children,—find employment at this work. The greater portion of the work is done by machinery, and the products, in imitation of the Valenciennes and Mechlin, are fast rivaling the real article. The invention of machines for the making of lace was a work of years and of many trials and improvements. The stocking frame formed the original foundation, which, since the year 1800, has received improvement after improvement until it now stands capable of making laces of beautiful designs and all widths. Every improvement has lessened the cost of manufacture so much that lace that cost 30 shillings per square yard in 1815 can now be purchased for 3d. It is sent to every quarter of the world, and even smuggled into France—that country prohibiting the sale of all English laces and embroidery.

Recent Foreign Inventions.

TEMPERING AND GRINDING STEEL, ETC.—Mr. Chesterman, of Sheffield, England, has lately invented and patented several valuable improvements in hardening and tempering steel, and in grinding, glazing, buffing, and brushing steel and other metallic articles. The process of hardening and tempering apply principally to thin steel, such as is used for saw-blades, for example. The hardening is effected in the following manner:—The inventor takes a strip, say from ten to thirty feet long, and winds it into a circular cast-iron case of about the same depth as the width of the steel. In the side of the case is a grate or aperture, through which a small portion of the outer coil of the steel is made to protrude. He then puts a cast metal lid on the top of the case, so as to cover the whole of the steel, and places the case in a furnace, and allows it to get red-hot, when it is removed by one workman, while another seizes hold of the protruding end of the steel, and draws it through a pair of cold steel, metal, or stone dies or plates, by which the steel will be hardened, coming out flat.—The dies or plates are to be kept cold by having cold water applied to them, or they may be made hollow, and a stream of water be caused to flow through them. Shorter and stronger lengths, such as steel saw-blades, &c. are hardened by placing them in a furnace and allowing them to get red-hot, and then quickly introducing them and subjecting them to pressure between two dies or plates, mounted in a frame so as to form a press, by which means they are both hardened and prevented from warping or buckling—care being again taken to keep the dies or plates, whether of metal or stone, cold by the application of water. He tempers these articles in the ordinary manner, and the tapes or strips as follows:—After the strip or length of steel has passed through the dies or plates, it is removed to a stretching-table, where one end is made fast between screw-clamps or otherwise, while the other end is clipped between another pair of screw-clamps attached to a leather strap, which is fastened to a drum or roller turning in bearings, and furnished with a lever or arm, which is weighted so as to produce a gentle strain on the steel. The steel is then oiled or greased, and heat is applied to it from a portable furnace or gas-light attached to a flexible tube, or from any other source, so as to blaze off the oil or grease, whereby a fine spring temper will be imparted to the article operated on, and it will be left flat and straight. Or a fixed gas-furnace is employed, and the steel drawn from the hardening dies or plates direct through the gas-furnace, thus becoming hardened and tempered at one continuous operation.

For the purpose of grinding both sides of a flat article, or the entire periphery of a circular or similarly-shaped article, the inventor fixes upon a central tube or axis a grindstone in the form of a roller or cylinder, and makes this stone plain or indented with semi-circular or other grooves, according to the shape of the article to be ground; and over this grindstone roller he mounts another similar to it.—Upon rotary motion being imparted to the rollers, and the end of the article to be ground being inserted between them, they will draw it through, but without grinding it; the article is then to be drawn or pushed by the workman in a contrary direction to the rotation of the rollers, and the grinding will then take place in its passage between them. The sides of one of the rollers, when the articles to be ground are flat, are also provided with collars formed of grindstone, and of a larger diameter than that of the rollers, whereby the edges, as well as the sides of the metal article, may be ground, when requisite, at the same operation. Means are provided for adjusting these rollers to suit the thickness of the articles to be ground, and also for adjusting the stones on the central tube or axis. For the purpose of grinding one side only of a steel or metal article at a time, a plain wooden roller is substituted for one of the grindstone rollers; and combined with this arrangement are guide-rollers for cross grinding.

These improvements in grinding will be found of especial advantage in the case of saw-grinders, who, as a body, are subject to severe diseases of the chest and lungs, called the "Grinder's Complaint," caused by their standing or sitting over the stone. To such an extent is this complaint prevalent, that it is no uncommon thing for persons thus employed to become incapacitated from following their occupation at a comparatively early age. By the present improvements this evil will be in a great measure obviated, as the men will be enabled to grind articles at a considerable distance from the stone, and in front of it instead of leaning over it, as is the common practice. Another important consideration is, that in the event of a grindstone flying to pieces—by no means an uncommon occurrence—the men will be much less likely to be injured, or perhaps killed, while standing at a distance from the stone, than if they were over it, as they would be under the ordinary system.

LITHOGRAPHIC PRINTING.—Andrew McClure, of London, patentee.—This invention consists of a damping apparatus composed of a roller sponge and water trough combined with the inking rollers, in an inking trough. After every impression in a lithographic press, the stone has to be damped with a sponge and then inked, before a new impression can be given. This is usually done by hand, and the above plan is to substitute machine for hand labor. To effect these two operations, it is our opinion that a wider field is at present open for improvements in lithographic than any other kind of printing.

POWER LOOM IMPROVEMENTS.—Peter Hindle, of Ramsbottom, Lancashire, England, patentee. —This improvement consists of a double interrupted or variable take-up motion, that is having a slow and quick take-up motion, at any required intervals of space, theeffect of which is to produce thick and thin transverse strips of cloth alternately, by the operation of a single shuttle, and of one and the same quality of weft thread throughout. This is a very simple method of producing a variable kind of fabric in power looms.—[London Mech. Mag.

Savannah Water Works.

The following is condensed from the Savannah "Republican:"

The Works for supplying the city with water were not turned over to the Public Authorities last week, as was expected. It was found that it would require a longer time to put all the engines in operation, and test the quality and capability of the machinery. Accordingly, Mr. Craven, consulting engineer for the city, and Mr. Worthington, the constructor of the machinery and one of the contractors, have returned to New York, leaving the Works, for the present, under the care of Mr. F. W. Jenkins, temporary chief engineer, and an assistant of Mr. Worthington. As soon as Mr. Jenkins shall have put the other two engines in operation, and got everything in train for the engineer and officers who are to succeed him, the Works will be delivered over to the City Authorities. In the meantime, one of the pumping engines will be at work, and will keep the city supplied with water.

The water, taken from the river at the most favorable time of tide, is received into four capacious basins, each capable of holding from three to four days supply. This allows ample time for the subsidence of sediment, and as has been proved under unusually unfavorable circumstances, leaves the water in a condition of equal clearness and purity with that found in Philadelphia, and other places where the supply is taken from a river. By an admirable arrangement of stop gates, any one of these basins can be at any time drawn off and the sedimentary deposit thoroughly washed out.

The high service reservoir in Franklin Square is a tower of the most massive and durable character, supporting an iron tank with a capacity adequate to the supply of about 8 gallons to each inhabitant, and of an elevation sufficient to afford an efficient pressure to all parts of the city.

No less than three pumping engines are provided, disconnected from each other, either one of which is capable of furnishing at least twice the requisite quantity of water. The boilers also, being entirely independent, and the two large forcing mains running separately to the reservoir, it is fairly claimed that no city can boast of such immunity from the troubles likely to follow an interruption of the supply.

For simplicity and beauty, the engines speak well for themselves, and on the score of economy, the engineers are collecting statistics, which, when made public, will, it is asserted, compare favorably with those of any pumping engine of which we have accounts.

To the associate contractors and engineers, Messrs. Morse & Worthington, belongs the credit of a system of Water Works for which there is no precedent. The attention of the latter named gentlemen having been exclusively directed to the construction of the engines which bear his name as patentee, the citizens are indebted to Mr. Morse for the beautiful structures belonging to the Works, as also for the entire plan and arrangement of the receiving and distributing reservoirs.

[The pumping engines spoken of are simply what is generally known as "Worthington and Baker's Steam Pump," which has been illustrated in the Sci. Am. This is the first time that such pumps have been used on such a grand scale as that for which they are employed in Savannah, namely, supplying a city with water. As the pumps made for this purpose are of a very large size, we hope they will prove to be very economical; this, however, can only be determined by a good deal of experience.

Expansion from Heat.

We noticed on Tuesday, says the Newberry, S. C., "Sentinel," that the rails on the Greenville and Columbia railroad had expanded very much from the excessive heat. The vacant spaces between them were closed up, and the rail drawn up in the form of an arch, five inches at the highest point from the stringer, at the same time drawing out two spikes. The rails were so hot that it was like handling hot coals to touch them. We noticed two other rails slightly arched.