

## DAMASK WEAVING.

By the ordinary method of jacquard weaving, in which one mail eye or heddle is used for each warp-thread, the width of the pattern is in proportion to the number of hooks in the jacquard machine. Each hook controls as many cords as there are repeats of patterns in the width of the warp. On a four-hundred hook machine a warp pattern with four hundred threads can be woven. This is exclusive of selvages, for which an extra number of cords are provided. If there are 1200 threads in the warp, this will give three 400-thread patterns in the whole width of the cloth; each hook will thus control three cords, each cord one mail, and each mail one warp-thread. Within the limits of these four hundred threads, the designer has free scope. He can give each one of the four hundred threads a different movement in the texture, if desired, and the contour of the figure can be varied by the movement of single threads.

If two mails, each holding a warp-thread, are attached to each jacquard harness cord operated from each hook of the jacquard, it follows that the pattern can then be made to include 800 threads, which work in pairs instead of singly, as before.

If four mails are controlled by each cord, the capacity of the pattern in our example will be increased to 1600 threads, and the pattern can be made four times as wide as with the single tie-up. Single threads, however, cannot by either of the last-named arrangements be moved independently. By the raising of a hook, two or four consecutive warp-threads respectively will be raised in each pattern. The contour of the figure in this instance cannot be varied by single threads, but the changes must be made by degrees of two or four threads, as the case may be. This is a distinct feature of damask weaving.

When a damask fabric is constructed with the same density of warp and filling threads per inch, it follows that the change by degrees of two or four threads (which is compulsory in the warp) must be also adopted for the filling, otherwise the pattern will be distorted, having the right width but only one-quarter of the required length. If the density of the filling is only one-half that of the warp, two threads of filling will occupy the same space as four of the warp. To preserve the correct proportion in the design of such a texture, the changes in the filling must be made by degrees of two threads, corresponding to the four thread degrees in the warp.

In an ordinary jacquard design made with one thread in each mail, each point in the design is, as it were, a single element. These consist of single points in the design, each corresponding either to the raising or lowering of one thread in the warp.

In the damask fabric the case is different. The design on the point paper is made by using single points or squares, the same as in ordinary designing, but said squares on the point paper design in this instance indicate not one, but a group of warp-threads. Each point in the design corresponds to the raising or lowering of as many consecutive warp-threads as are controlled by single cords. It thus follows that the design paper must be adjusted, not to the number of warp-threads and picks, but to the number of groups of warp-threads and picks. A single thread in this instance cannot be tied down or raised independently, since each point in the design corresponds to an entire group of warp-threads drawn through each mail of the set.

A twill or plain weave in a damask pattern is used, not to form the figure, but to make the effect of a particular part of the figure more or less prominent.

In the weaving of a damask fabric, a large or small part of the warp-threads adjacent to each other may be raised or lowered. In the former case a certain number of warp-threads must be lowered, and in the latter case a certain number must be raised to form a texture with the filling.

It is not possible to do this with the ordinary jacquard attachment, so a supplementary device is employed, which consists of harness placed between the jacquard and the reed. These front harnesses, as they are called, raise a certain number of warp-threads (corresponding to the weave desired) which have been lowered by the jacquard, and in turn lowers others which have been raised by the jacquard. It is evident that in order to preserve the figure formed by the jacquard, only a small portion of the raised threads can be lowered, or of the lowered threads raised.

These front harnesses are worked by means independently of the jacquard, consequently the buildings of the shed consist of two distinct operations: (1) the movement of the jacquard harness, and (2) the movement of the front harnesses. To permit of these operations being carried out, it is necessary that the formation of the shed by the jacquard be not interfered with by the front harnesses. The object is obtained by a specially-constructed jacquard harness. In the construction of this harness, on each of the hooks of the jacquard are connected four, or more or less cords, which pass through the comberboard. One of the warp-threads is then drawn through each mail, so that each hook controls a group of four, or more or less, consecutive threads. These threads are drawn, not only through the jacquard mails, but also singly through the heddle-eyes of the set of the front harnesses. The eyes are long loops, in place of the regular heddle-eyes. When in their central position, they do not interfere with the movement of the thread by the jacquard. Raising or lowering them, raises or lowers the warp-threads which they control, if they are not already raised or lowered respectively.

The stitching or tying of this figure shed is done by the front harnesses. This double action of forming the shed gives rise to the greatest objection to damask weaving, *viz.*, the so-called cross shed. By a cross shed the warp yarn is subject to a double deflection, and owing to the increased strain, must be correspondingly strong. It is, therefore, absolutely necessary in damask weaving that the best material only be used for warp. To relieve the strain caused by the cross shed, various devices are employed.

In place of using 4, or more or less heddle cords, to each harness cord of the leash, only one heddle is attached, the same containing four, or more or less, eye holes in the mail, accomplishing the same as the four single eye heddles tied to one jacquard harness cord.

Another device for relieving the tension of the cross shed is called the half-harness. In this case two cross bars are placed under the warp between the harness and the yarn beam. Half harnesses, supported by strips of rods, are placed between these bars, and the threads are drawn through the eyes. By this arrangement, the warp-threads are depressed below the horizontal. When the cross shed is formed, the strain on the warp is relieved by these light weights

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being lifted up. The objection to this method is that the space behind the jacquard must be greater, and that the work of drawing-in is greatly increased. It results, however, in the yarn being relieved of much of the strain, so that finer warps can be used.

## Price Level Will be Higher than Pre-War.

There is every reason to believe that the price level will be higher than before the war. The quantity theory of money and credit is now pretty generally accepted. According to this idea, prices increase as the volume of money and credit increases unless there is a corresponding increase in production. During and since the war, the expansion of money and credit has been out of all proportion to the growth of production.

### Chart Shows Expansion.

The accompanying tables compare the expansion of currency and credit in the United States with the growth of production since 1900. The production figures are based on 1899 instead of 1900. While in 1919 the output of manufacture, mining and agriculture had increased respectively 95 per cent., 128 per cent. and 37 per cent. over 1899, currency and credit had expanded 367 per cent. in 1920 over 1900.

**MONEY AND CREDIT GROWTH IN THE U. S., 1919-1920.**

(Statistical Abstract of the United States.)

Currency. (Million Dollars)	Individual Bank Deposits. (Million Dollars)	Total of Both. (Million Dollars)	Per Cent. of Increase Year 1900=100
1900....2,055	7,238	9,293	100
1905....2,587	11,350	13,937	149
1910....3,102	15,283	18,385	197
1915....3,569	19,225	22,794	245
1920....6,087	37,370	43,457	467

There has been a slackening in the use of money and

credit which has the same effect as a decline in their volume. This has probably been entirely offset by diminished production. There has also been a slight recession of bank deposits from the high point of 1920, but if the experience of the last one hundred years can be taken as a basis of prediction, the trend will continue upward and in advance of production.

### Raw Material Prices Favorable.

The prices of more than half of the raw materials are now believed favorable to manufacturers. They are lower in price than in comparison with other products and lower than can be expected later.

**GROWTH OF PRODUCTION IN THE UNITED STATES.**  
 (Professor Edmund E. Day in the Quarterly Publication of the American Statistical Association, March, 1921.)

1899 = 100

	Manufacture.	Mining.	Agriculture.
1899.....	100	100	100
1904.....	123	136	116
1909.....	163	189	118
1914.....	171	202	135
1919.....	195	228	137

### WAGES AND WHOLESALE PRICES.

Civil War Period 1856-1860 = 100*			World War Period 1910-1914 = 100†		
Year.	Wholesale Prices All Commodities.	Wages.	Year.	Wholesale Prices All Commodities.	Wages.
1860.....	95	101	1914.....	102	105
1861.....	95	102	1915.....	102	106
1862.....	112	104	1916.....	126	104
1863.....	141	111	1917.....	178	131
1864.....	181	126	1918.....	200	166
1865.....	205	144	1919.....	219	189
1866.....	181	153	1920.....	250	240
1867.....	163	159			
1868.....	152	160			
1869.....	145	163			
1870.....	135	163			
1871.....	129	165			
1872.....	132	167			
1873.....	130	168			
1874.....	126	163			
1875.....	121	160			
1876.....	112	154			
1877.....	105	146			
1878.....	96	144			

\* Senate Report No. 1394, Fifty-second Congress, second session, Part I, pp. 13 and 91.

† Monthly Labor Review, Vol. XII, No. 2, pp. 73-74, February, 1921.

Wages rise in the wake of prices and fall more slowly. The table above compares the Civil War and World War periods in this respect.

One reason for the success of wage earners in resisting the decline after the Civil War was the public land which absorbed the surplus workers. That influence is now practically terminated; two new factors may, however, be considered; one is trade unionism and the other is a new consciousness that the standard of living must continuously be improved in the interest of national welfare. Some wages, as some commodities, are too high and some too low, and readjustment is necessary. If the price level is to be permanently higher than before the war, can a guess be hazarded concerning the readjusted price equilibrium? The best basis for such an estimate is the Bureau of Labor Statistics Wholesale Price Index which calculates present prices in terms of an assumed 1913 equilibrium. Nine groups of commodities are compared. In August 1921, the weighted average of the nine groups showed prices 52 per cent. higher than in 1913. This can be taken as the August equilibrium. If all the groups stood at that point, the exchange relationship between them would be practically the same as in 1913. A dis-