

enable them to discriminate so as to confine the proposed changes in the law to the classes that it would really benefit. It is quite out of question that in this matter the views of the School Board teachers should be permitted to materially influence the subject at all. Their achievements, since the foundation of the present system, with the scholars they have had under their control all the day have not been of a very brilliant character, as could and would be testified to by people best qualified to express opinions upon the subject. The teachers, however, are the most prominent advocates of this change, and are making organised efforts to bring it about. The Teachers' Union have recently published a circular upon the subject, which we reproduce here, as offering perhaps the best summary of the arguments that can be adduced in favour of the proposed alteration:—

The Half-time Council, composed of representative teachers of schools containing half-timers in different towns, is unanimously of opinion that—No child should be allowed either partial or total exemption from school who is under 12 years of age. In support of this, the Council offer the following epitome of arguments:—

- (1) Child labour competes with adult labour, to the disadvantage of the latter.
- (2) The Berlin International Labour Conference adopted 12 years as the minimum age at which any child should be allowed to work. The English delegates assented to this.
- (3) In France the minimum age for workers has recently been raised from 10 years to 13 years without any protest from the working classes.
- (4) By raising the age, the children of the working classes would be better prepared to receive technical instruction in evening classes and technical schools.
- (5) Many scholarships intended for the children of the working-classes are at present carried off by middle-class children. Half-timers have no chance in the competition.
- (6) Many manufacturers and overlookers have openly expressed themselves unfavourable to young half-time labour, on account of the trouble of teaching the children to be any use, and of the mischief they do as learners.
- (7) Half-time labour is increasing. The increase was about 2,500 in the year 1890 over 1889.
- (8) Half-time labour is not employed on account of the poverty of the districts where it is in vogue. This is proved by the figures quoted by Mr. R. Waddington, president of the Bolton Teachers' Association:—

County.	No. of children over 10 years.	No. of half-timers.	.. 1 out of every 2
Lancashire ..	195,120	89,234	.. 1
Yorkshire ..	175,953	47,775	.. 1
Cheshire ..	36,504	9,639	.. 1
Staffordshire ..	57,486	4,471	.. 1
Leicestershire ..	18,152	4,228	.. 1
England and Wales ..	1,049,463	33,677	.. 1

(excluding Lancashire and Yorkshire).

If half-time exists on account of poverty, then Lancashire is by far the most poverty-stricken county in England, which the operatives themselves would be the first to deny.

(9) The surroundings of children in a factory are often directly inimical to the moral and physical well-being of the child worker.

(10) It is absurd to say that the boasted commercial supremacy of England depends on infantile labour.

Our available space will only allow us to make the briefest observations upon this remarkable decalogue.

(1st.) Child labour in the textile industries does not compete with adult labour except in very rare circumstances. A very large amount of employment exists in the textile industries suitable for children and quite unsuitable for adults, and it is in this they are employed. They do not begin to compete with adult labour until they pass into the class of young persons. (2nd.) This country cannot be bound to carry into effect the resolutions of the Berlin Conference until Continental countries do so, or, at least, until they bring the regulation of their factory systems abreast of ours of today, from which position a fresh advance might take place. (3rd.) The French Legis-

lature has recently passed several measures and resolutions that are not likely ever to be carried into effect. We must have something more than these before we can make important changes, such as the teachers here propose. (4th.) This statement is incorrect from beginning to end. The most valuable technical education is the practical training they obtain in learning the industry by which they will in future earn their livelihood, which they receive under the present system simultaneously with their elementary education. On the practical training thus received it is easy to build a superstructure of sound scientific theory. The experience already obtained in technical instruction supports these views and disproves those of the teachers. (5th.) It is very rare that half-timers ever enter competitions for scholarships, because the winning of them would involve the devotion of a longer time to education than the circumstances of their parents would admit of. (6th.) The buoyant spirits of children often lead them into mischief, and cause care and trouble to their seniors, who sometimes do not like to give to them the extra attention demanded to keep them right, and, therefore, may have expressed such views as are alleged. Employers are often annoyed and led to express the same opinions by the prosecutions instituted by the factory inspectors upon cases of alleged negligence in keeping the registers correctly—work which is frequently neglected by clerks and overlookers of an establishment. (7th.) Half-time labour will increase *pari passu* with the growth of our textile industries, and the increase of our population. It may also increase owing to the progress of invention so far simplifying some processes as to bring them within the capacity of children. (8th.) This is a disingenuous statement, and is misleading. Who has ever asserted such to be the case? What is maintained is that there is always a considerable percentage of families, as stated in our article a fortnight ago, consisting of man and wife, and three, four, or more young children, whose circumstances compel the children to go into the mill at the earliest age the law permits, in order that they may begin to contribute to the family income. To deprive them of this liberty would be a great hardship. The argument does not apply to the whole working population. (9th.) This is correct only to a very limited extent; mill children's surroundings are certainly not worse than those of others. (10th.) Child labour forms one link in the chain of England's industrial systems, as it does in those of the industry of every country, and to deprive English trades of it, while their foreign competitors continue to use it, would be to inflict a serious blow upon our commercial supremacy. It is safe to conclude that the school teachers of the country have very little knowledge indeed of our industrial requirements or conditions, and until they attain much more than they at present possess, it will be wise on their part to refrain from movements of this kind.

CERTIFYING SURGEONS.—Mr. George Newstead, of Eccleshill, has addressed the following letter on this subject to Sir Walter Foster, M.P. :—

Eccleshill, near Bradford, March 12th, 1891.

DEAR SIR,—I observed in the *British Medical Journal*, a day or two ago, that you had kindly offered to receive communications from certifying surgeons relative to their duties, so seriously threatened by Clause No. 19 of the pending Factory Bill. I think I must be about the oldest (perhaps not as regards actual age, but in respect to official retention of the appointment) of living certifying surgeons. My appointment dates from the 24th October, 1841. The district assigned to me comprises the townships of Eccleshill, Idle, Calverley, and Shipley (inclusive of Saltaire). It is not in my power to afford any exact statistical information regarding the number of rejections during that period, nor the special causes of rejection, as I have

kept no record of either. Broadly speaking, however, I believe I am within the mark when I fix the number at seven or eight per annum. The principal causes have been spinal curvature, defective vision, incurable (and disqualifying) lameness, and cutaneous disease. In my own opinion, the certifying fraternity should endeavour to establish their claims to the continued performance of the functions which Government has entrusted to the medical profession, by insistence upon the indirect rather than on the direct manner in which their utility is conspicuous. The chief contention, apparently, urged against medical surveillance rests on the argument that so very few children and young persons fail to pass the certifying surgeon. At a recent meeting of the Bradford Chamber of Commerce Mr. Arnold-Foster, a large manufacturer (and, perhaps, future M.P.), stated that out of 500 children examined at his works not one certificate was refused. Most surgeons would admit that Mr. Foster's assertion was perfectly true. But, I would ask, how would the matter stand if no check (such as medical examination imposes) were required? I am quite willing to concede that mill occupiers as a rule are careful to select robust children for presentation to the medical ordeal.—I have, etc.,

GEORGE NEWSTEAD,
Sir Walter Foster, M.P., Birmingham.

SPEED OF KNITTING MACHINES.—Considerable difference of opinion exists among knitters in regard to the speed at which the machines can be run so as to obtain the best results. It is pretty generally admitted that good results can be obtained at the rate of from 35 to 80 revolutions per minute, this rate of speed being governed by the diameter and gauge of the cylinders, and to a great extent by the quality of the yarn used. It is, however, laid down by the makers of the different machines that there are proper speeds to run cylinders of certain diameters. In speeding the machine it is necessary to take into consideration that some time is required for the easy and perfect formation of each stitch on the needles, although that time is exceedingly short. A cylinder eighteen inches in diameter should revolve forty to forty-five times per minute, of course this speed being governed by the quality of the yarn. A cylinder of that size, and of twenty gauge, has six hundred needles, and when revolving at a speed of forty turns per minute, knits with one feed 24,000 stitches per minute, or 400 stitches per second, and with four feeds just four times that amount, making quite a rapid rate of production. A cylinder of twenty-two inches in diameter, and of same gauge, has one thousand needles, and when revolving at a rate of forty-five turns per minute, with four feeds, knits 180,000 stitches per minute. The method for computing the required rate of speed for the cylinder used is as follows: Multiply the required number of revolutions of the cylinder per minute by three and one-half, and the result will be the number of revolutions that the main driving shaft must turn per minute. One hundred and forty revolutions of the main driving shaft give forty revolutions to the cylinder.

Designing.

NEW DESIGNS.

DRESS STRIPES, COTTON, SILK, AND LINEN.

No. 1.—Striped materials are becoming fashionable, but they are mostly employed for the skirt only, the bodice being generally of a plain costly material in satin or velvet.—No. 1 dress stripe is a simple inexpensive weave, which will give good effect to proper colour combinations. It is on four shafts, with draft numbered for reference. A good medium cloth can be made with 72 ends per inch, three in a dent, 20's twist, 56 picks per inch of 24's weft. Warp pattern:—48 very dark blue, drawn in as follows: 1, 2, 3, 4, 5, 6, 7, 8, 2, 1, 4, 3, 2, 1, 4, 3, and repeat this from the commencement of the draft until the 48 ends are complete; 9 white, three in a heald, drawn 3 on 3rd shaft; 3 on 1st shaft; 3 on 3rd shaft; 12 blue on 1, 2, 3, 4 shafts; 9 white, 3 on 1st shaft; 3 on 3rd shaft; 3 on 1st shaft; 12 blue on 1, 2, 3, 4 shafts; 9 white, 3 on 3rd shaft; 3 on 1st shaft; 12 blue, 9 white, 3 on 3rd, 3 on 1st, 3 on 3rd shafts; 12 blue on 1, 2, 3, 4 shafts; 9 white, 3 on 1st, 3 on 3rd, 3 on 1st shaft; and repeat with 48 of blue until the width in the reed is filled up. The nines of white cotton would look well in 20's two-fold organ-

details as a basis to work from; heavier cloths for jackets, vests, etc., may be produced by the use of coarser materials, which would also give a bolder diagonal. We may just hint that all drabs and fawns would contrast well with blue, the colder and greener shades with lilac, deep tones of drab with yellow, pink, and grey, scarlet and slate, also shades of salmon and light brown.

FIGURED WOOLLEN MANTLE OR DRESS CLOTH:—

Figure C is for this class of goods, an idea for the development of which is given in Design 24. The first point for consideration is the tone of the leaves. In order to retain the sharpness, which in this case is the characteristic feature, it is necessary to develop on a large jacquard, using as fine a sett as possible. Design 24 is drawn out to scale for a 384 machine, using 512 cards to weave the pattern on the square. Respecting the yarns to use, we recommend

mixture or flaked woollens, which, if for spring wear, should possess light bright characteristics, the following being suitable:—

Warp.
All 30sk. light yellow and grey mixture.
12's reed 4's.

Weft.
All 30sk. light green and grey mixture.
48 picks per inch.

Again, another suitable contrast would be warp of bright yellow and grey mixture, light and pure in tone, and a rich brown and light grey mixture for weft.

Another method of colouring would be to adopt ground colouring similar to the above, but to introduce bands varying in width of another distinct colour, as follows:—

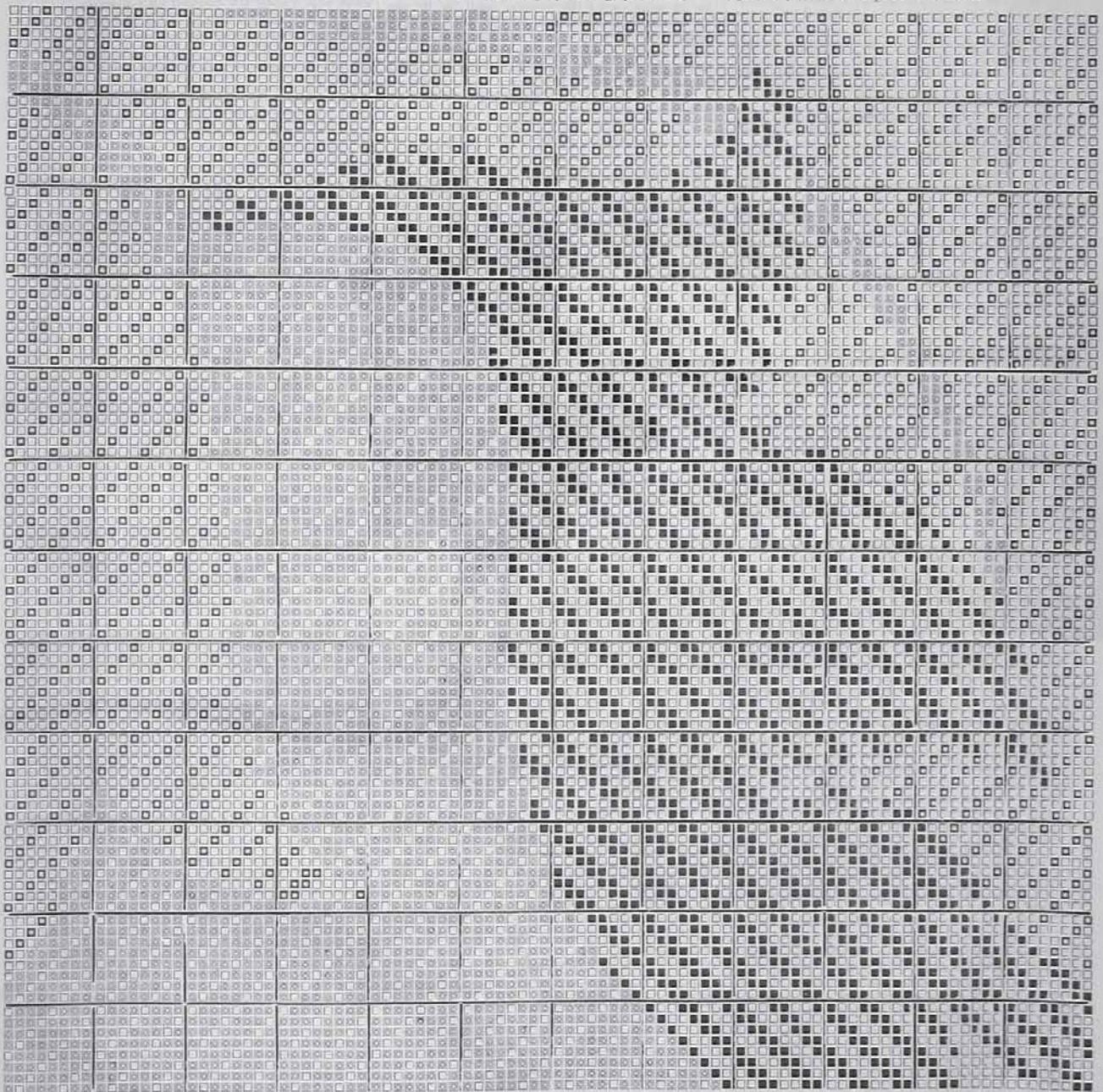
Warp.
8 threads yellow and grey mixture,
8 " neutral purple and grey mixture,
12 " yellow and grey mixture,
6 " neutral purple and grey mixture,

16 threads yellow and grey mixture,
4 " neutral purple and grey mixture,
20 " yellow and grey mixture,
2 " neutral purple and grey mixture.

Weft.
All brown and grey mixture (light) or blue and grey mixture.

Of course, other forms of stripe than the above may be adopted, care being taken in the case of such stripes coming over the figures to retain a sufficient variety in luminosity between the warp and weft in order to retain the figure fairly distinct.

If the above sett be used along with a 384 jacquard, a pattern of 8 inches will be obtained, for $384 \div 48 = 8$ inch pattern. If a 384 is not ready to hand a 300 or even a 200 machine would yield a characteristic effect, but the larger machine gives opportunity for the introduction of more neutral colourings. In the case of lighter cloth being required for dress goods, 40sk. should prove effective.



DESIGN 24.