

the bed where the fallen grain is deposited, presses it against a toothed plate, and both holding firmly the bundle of grain thus collected, swing round behind, and drop their contents in a neat bunch upon the ground. The weight of the raker is 150 lbs., and it is removed by unscrewing two bolts. Whole weight of machine 1,245 lbs.

Machines at the Fair which have been Illustrated in the Scientific American.

The following is a list, with the names attached, of the machines now on exhibition at the Fair of the American Institute, and which have been illustrated in various volumes of the Scientific American. It is evidence and proof of our common assertion, "The Scientific American is the Repertory of American Inventions:—"

1. Mortising Machine, Fay's, Vol. 1, No. 14.
2. Mortising Machine, Otis', Vol. 2, page 41.
3. Mortising Machine, Chandler's, Vol. 3, No. 48.
4. Planing Machine, Woodworth, Vol. 2, page 407.
5. Drawing-board, Chamberlain's, Vol. 3, page 9.
6. Planing Machine, Daniel's, Vol. 4, page 52.
7. Meat Cutter, J. G. Perry, Vol. 4, page 385.
8. Anti-friction Press, Dick's, Vol. 5, page 220.
9. Brick Press, Wagner & Imley's, Vol. 5, page 401.
10. Straw Cutter, Bertholf's, Vol. 5, page 52.
11. Smit Machine, Harris', Vol. 5, page 385.
12. Educational Tables, Allen's, Vol. 5, page 161.
13. Patent Spring Chair, Warren's, Vol. 6, page 76.
14. Sash Balance, H. C. Brown, Vol. 6, page 332.
15. Self-Rocking Cradle, D. Walker, Vol. 6, page 349.
16. Artificial Leech, Thomas', Vol. 6, page 369.
17. Metal Railroad Car, T. Warren, Vol. 6, page 388.
18. Tuyere, Porter's, Vol. 6, page 408.
19. Clothes Dryer, Buckman, Vol. 6, page 362.
20. Lathe, White's, Vol. 7, page 86.
21. Submarine Explorer, Alexander's, Vol. 7, page 81.
22. Sewing Machine, Singer's, Vol. 7, page 49.
23. Drill, Bushnell's, Vol. 7, page 33.
24. Brake, Railroad, Stevens', Vol. 7, page 132.
25. Bridge, Aerial, Houghton's, Vol. 7, page 169.
26. Gold Separator, Buffum's, Vol. 7, page 56.
27. Car Ventilator, Paine's, Vol. 7, page 244.
28. Iron Fence, Wickersham's, Vol. 7, page 233.
29. Spinning Frame, Brundreth's, Vol. 7, page 361.
30. Blind Hinge, Barker's, Vol. 7, page 292.
31. Gas Generator, Gee's, Vol. 7, page 353.
32. Quartz Pulverizer, Cochran's, Vol. 7, page 364.
33. Car Seat, Buel's, Vol. 7, page 356.
34. Straw Cutter, Taylor, Thomas, & Co., Vol. 7, page 372.
35. Gold Separator, Gardner's, Vol. 7, page 393.
36. Gold Separator, Barclay's, Vol. 7, page 401.
37. Punching Machine, Sanford's, Vol. 8, page 20.

The line of travel along the whole lake shore, from Erie to Cleveland, Ohio, will be completed and in full operation by the first of November, so that the obstruction hitherto experienced in the winter season from the closing of the lake will not be felt in the coming winter.

The Canadian Government has given official notice that should it be required, a horse-police force may be established along the line of the Quebec and Richmond Railway, for the preservation of the public peace, and to prevent injury to the works.

British Association for the Advancement of Science.

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OPTICS.—Sir David Brewster delivered a series of three discourses, devoted to an examination of Professor Dove's theory of lustre, a description of a new and simple polariscope, of which Sir David displayed chalk drawings on the board of the lecture-room, and whose great merit, he stated, was its extreme simplicity, and whose chief use was to measure a great degree of polarization of light. On some new phenomena of defraction, Sir David recapitulated the experiments of several scientific observers, among the rest Prof. Stokes, whose theory he canvassed, and in several respects differed from. With regard to the screw-like appearance of rays observed under certain circumstances, Sir David attributed them to the fact of the internal fringes expanding away among the external ones. He observed, with regard to the crossing of rays in some telescopes, it had been observed in some experiments that these telescopes in which this was the case possessed more power than those in which the rays did not cross in the proportion of 10 to 6½—an enormous difference—from which it was reasonable to deduce that there must be some effect produced by the rays of light crossing each other. He had suggested to his friend Lord Rosse the use of concave lenses to determine this, instead of convex lenses, as in concave lenses the rays never come to a focus, but only on the retina. Sir David then referred to other series of effects regarding defraction, communicated in a paper read on the 3d January, 1842, but never published by the author.

SEWED MUSLIN MANUFACTURE IN IRELAND.—The sewed muslin trade was first introduced into Ireland between the years 1800 and 1810, but it generally made little progress until the decennial period 1820 to 1830, the employment being comparatively limited in extent, and the manufacturers confining their productions to a few articles, such as collars, trimmings, robes, and baby linens.

One of the circumstances which first gave a decided impulse to this manufacture was the introduction of machinery for spinning linen yarn, which had formerly been spun exclusively by the hand. This change left the females of Ireland almost without any source of employment. Under these trying circumstances the women and girls of the country anxiously availed themselves of the means of obtaining a livelihood by working at embroidery; and although a partial prejudice existed against it at first, it soon became quite evident that it would ultimately more than compensate for the loss of their former occupation.

Few changes tended to benefit the trade more than the introduction of lithographic printing (about the years 1830 to 1835), instead of the former tedious and expensive system of block printing. Each block cost from 3s. 6d. for the cheapest to £6 and £7 for the more expensive patterns, besides the delay of from one to three weeks for cutting them. Now, any pattern may be designed, drawn, and printed in a few hours, in endless varieties of style, at the cost of as many shillings as they formerly cost pounds. One great disadvantage under which manufacturers in Belfast formerly labored was the difficulty of selling their goods in a finished state at a profit; a prejudice existed, on the part of the buyers, against Irish goods, and so far was this feeling carried out that they were almost excluded from the London market, owing to the very low prices obtained there. From this cause their productions were mostly sold in a grey or unbleached state to the Glasgow manufacturers, who afterwards bleached and resold them in a finished state; but about the year 1840, several additional persons commenced the trade in Belfast, who bleached and finished their goods as done in Glasgow.—This course has at length happily resulted in the removal of all prejudice against Irish goods, and since the fact has become known that about nineteen-twentieths of the goods sold in Glasgow are manufactured in Ireland, and the rapidly improving quality and value of Irish goods have been thoroughly tested, home and foreign buyers visit Belfast, to make purchases, as frequently as they go to Glasgow for that purpose; and the in-

creasing demand for these goods, seconded by the additional skill of the workers, has, at length, opened a fair field for the Belfast manufacturers; and they are now enabled to introduce the once costly articles of their production into almost every market, at such prices, and in such variety, as cannot fail to lead to an enlarged consumption, and, consequently, a still further increase in the trade. No branch of manufacture in this kingdom has made such rapid progress during the last fifteen years, or has afforded more valuable employment. In Ulster, and westwards, the embroidery trade has become almost universal, and is at present giving more or less employment to a quarter of a million of individuals.

The wages paid for working vary in amount, depending in some degree on the prosperity of the trade or otherwise. Young and inexperienced workers cannot earn more than 6d. to 1s. per week, while the more expert and experienced worker will earn 4s. to 5s., and 6s. per week; and a few first-class hands can occasionally earn 10s. per week. The amount annually paid for labor alone, exclusive of materials, may be with safety estimated at £500,000 to £600,000, which is distributed in a shape the most useful and beneficial to the happiness of a people, the females being almost invariably employed in their own homes under the eyes of their parents and friends, and they can thus obtain a livelihood by their own industry without endangering their morals.

A great deal of good has latterly been effected through establishing training schools in the several localities where the work is being newly introduced. Competent teachers are employed to instruct beginners, who retain the pupils under their control until they are able to pronounce them as fit workers of a first or second class rate. These schools have generally been opened under the patronage and support of the landed proprietors in the neighborhood, among whom may be mentioned the Countess of Enniskillen, as one of the foremost in this good work, by whose philanthropy schools were opened on an extensive scale, at Florence Court, under the superintendence of a paid teacher, and several other females whom her Ladyship had previously sent to and maintained at Belfast, where they received instruction and prepared to impart it to others; and it may be mentioned here as an instance of the success attending that lady's praiseworthy endeavors to benefit the condition and increase the comforts of the humbler classes of society by their own industry, that now, after the lapse of three years, the trade is so well established in the district of Enniskillen, that above £400 is weekly paid in that town, for work done by the females of the surrounding neighborhood.

In conclusion (notwithstanding hostile tariffs), the beauty and cheapness of Irish embroidery have become pretty generally known, and it is steadily increasing in sale, even in the most exclusive of continental countries. In France, where by law they are totally inadmissible, they are, nevertheless, daily introduced, and one particular class of work finds extensive favor in the fashionable circles of Paris; so that with a home market, extended foreign relations, and all the other facilities of commerce, the embroidery trade may reasonably expect not only to maintain its position, but look forward to an increase and prosperity hitherto unknown.

The Rev. Dr. Edgar addressed the section at some length on the progress of the trade. The article had been at first one of luxury, yet from the time it was first introduced up to the present it had rapidly increased, for it contained the means of its own support; if it had depended on a single patron it would not have lived a day. He entered at some length into the statistics of its progress in Connaught, stating the means adopted to promote its extension, and the excellent effects in a social sense which attended its development there, adding the beneficial circumstances which arose from its introduction in the west, religiously considered.

An interesting conversation arose, in which the Archbishop of Dublin and other members of the section took part, in the course of which several questions were put to Mr. Holden, who stated, in reply, that they were in-

debted to the Scotch for having introduced the sewed muslin trade in this country, and they were the parties still who gave the greatest amount of employment to the Irish. On principle, he believed that the Copyright of Designs Act of Sir Emerson Tennent was very valuable, but the vast increase of the trade had induced them to look out for more speedy means than before, of supplying a greater variety of patterns to be quickly used, and the consequence was that advantage was not taken of that law. As to the result that had arisen from the great exhibition of 1851, he stated that there were several instances in which he had got orders from Germany and Spain; and not only, in his opinion, had the Exhibition given the trade a favorable position, but it had brought the Irish work into that notice which they wished it to obtain; concluding by quoting the feeling of the Duke of Wellington, that to teach the people of Ireland habits of industry was the best thing that could be done to make them comfortable and happy.

[The above condensed extract we publish as a subject of great interest, and it is one respecting which the great mass of the people are not well informed. They are led astray by the fusilades or partisan editors, who pretend to a knowledge which they, to their shame, do not seem to possess. Many of the fine sewed linen collars and handkerchiefs which are sold in New York for French work are of Irish manufacture.]

STEAMSHIP BUILDING ON THE CLYDE.—Dr. Strang, of Glasgow, read an interesting paper on steamship building on the river Clyde in Scotland. The west of Scotland, during the past 50 years, is much indebted to steamboat and marine engine building for its prosperity. It was there where steam navigation in Europe originated, and where steamboats to navigate the seas were first built and established. When Dr. Strang was reading his paper, he said, it is just 40 years, this moment, since the first successful steamboat, the tiny "Comet," of Henry Bell, made its trial trip on the Clyde. It was only 30 tons burden, and its engine was only of three horse-power.

During the past seven years, there were built on the river Clyde 14 vessels of wooden hulls, and 233 of iron hulls, in all, 247. Of these, 141 were built with paddle wheels, and 106 had screw propellers. The tonnage of the wooden steamers amounted to 18,331 tons and the iron vessels to 129,273 tons. The horse-power of the engines for the wooden vessels was 6,739; the horse-power for the iron vessels was 31,593. There were engines built for vessels not constructed on the Clyde of 9,434 horse-power, making a total of 247 vessels built, of 147,604 tons, and engines of 47,766 horse-power. The average tonnage of these vessels amounted to about 598 tons. Thus, in the course of seven years, on one river, there was built a fleet of no less than 247 steamers, each averaging nearly 600 tons burden. It seems, also, that iron is the principal material used for building the hulls, and the screw is more patronized than the paddle. During the present year, 1852, there have been built, or are building, on the Clyde, 73 steamers, only 4 of which are of wood, the rest iron, and 43 are screws, and only 30 with paddle wheels. On the Clyde there is in daily use 5 large dredging steamboats, capable of dredging 18 feet deep, and these machines have deepened the Clyde from 10 feet average depth to 17 feet. To construct steamboats with wooden hulls costs £14 per ton; iron hulls £12 (\$56 20 cts.) per ton. The first Cunard steamships cost £50,000 each, the new one Arabia will cost £110,000. These statistics will be interesting to engineers.—We had thought that New York stood without an equal for steamship building, we have not the statistics on hand at present, but if they come up anything near those of the river Clyde, we shall be most agreeably surprised.

(To be Continued.)

New Locomotive.

The Camden and Amboy Railroad Company have placed upon their road a fine locomotive, constructed at Bordentown, on a new and somewhat unique principle. The smoke-pipe is formed in such a manner that it can be turned in any way according to the variations of the wind.