THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

VOL. X. NO. 4...[NEW SERIES.].....*Twentieth Year.*

NEW YORK, SATURDAY, JANUARY 23, 1864.

Contents:

(Illustrations are indicated by an Asterisk.)

WIND-MILLS.

A contributor to the Glasgow *Practical Mechanics' Journal* gives an account of the use of wind-mills in several parts of the Old World. He had examined several near Eupatoria, in the Crimea, where there are about 200 employed, chiefly in grinding grain. They are all vertical mills, secured in brick. He also examined one lately erected at Moulin, France. The tower is of brick, 22 feet high, 18 feet in diameter at the base, and 15 feet at the top. The four wings of the mill are of a rectangular shape, 15 feet long and 5 feet broad, and the surface exposed to the wind is increased or diminished by canvas sails. The main shaft upon which the arms are secured is of oak, 15 inches in diameter and square at the front. The two pairs of arms do not intersect the shaft in the same plane, the one pair being in advance of the other and united by bolting with side pieces, so that the strength of the shaft is preserved without mortising. The bearing of the shaft is of hard *lignum-vitæ*, and is lubricated with soft soap and black lead. The rear bearing of the shaft runs in an iron box. On the middle of this shaft is a broad wooden-faced wheel, 4 feet in diameter, upon which there is a friction strap, which constitutes a brake for arresting the speed of the mill. There are also teeth on the rim of this wheel gearing into another on the end of a vertical iron shaft, which is coupled at its lower extremity to the top of the millstone spindle. It drives a pair of millstones 3½ feet in diameter—each, a whole stone of white silicious burr, obtained from the Frenchquarriesat Rouen. These stones are not formed with channels and lands, like English and American mill-stones, but with the millers' pick. The neck of the stone spindle is guided in a bushing of hard wood, having its fiber endways. The wings of this mill are 35 feet in extreme diameter, and they make 29 revolutions per minute when loaded: the extremities of the sail move with a velocity of 3,200 feet per minute.

In France, Holland, several parts of Germany, and the southern counties of England, wind-mills are still employed for grinding grain. In the town of Great Yarmouth, county of Norfolk, there are a number of very large wind-mills. The wings of some of these mills are 100 feet in diameter, and with a moderate breeze each drives six pairs of 4½-feet stones, each rim grinding about 5 bushels of wheat per hour. The main shaft is usually made of oak 3 feet in diameter; its main bearing has thick strips of iron sunk in it, and it revolves in a brass journal box. It has a cast-iron face-wheel, 12 feet in diameter, upon it; its rim has a broad surface for the friction brake, and the teeth gear into a main pinion or wallower, 4 feet in diameter, secured on the vertical shaft which extends down into the tower. On the lower end of this shaft is a great span-wheel, 14 feet in diameter, which drives the spindles of the six pairs of millstones, these being set around in a circle. To turn these mills to the wind, the roof of the tower with the wings is movable, on a turn-table arrangement. In Holland, where there is no coal or waterfalls, wind-mills are common. It is true they are not regular in their motion, being dependent on the fickle breezes; but the power costs nothing, and so far as relates to the working expenses, these are very small.

There are many sections in this country where wind-mills could be employed with advantage. Wind-mills should be built very strong and of the best materials that can be obtained for endurance. They should be capable of withstanding the great and violent pressure that is sometimes occasioned by sudden gales. Many wind-mills have been erected in several sections of this country, and we have seen a number on Long Island; but they were mostly far too frail, and therefore incapable of withstanding sudden gusts of wind.

ENGINEERS AND THEIR DUTIES.

A word in behalf of this trade. We noticed only a day or two since an advertisement in a daily paper calling for an engineer—"one who had some knowledge of the baker's business preferred." This is in keeping with another public inquiry we once noticed in a newspaper, which stated that an engineer was wanted to run a small engine, and—what! why "to look after a horse!" Let any one take up a daily journal, no matter in what part of the country, and see how frequently the notices of steam boiler explosions occur. It seems as though this class of accidents were never more general than at present; and this, notwithstanding that steam boilers are better built than they were twenty years ago. Have the bakers and hostlers obtained their situations, and are they now running engines and boilers? It would certainly appear so. An engineer who understands his business, and wishes to become a proficient, to keep up his standing in his calling, has no spare time to employ in grooming horses, or seeing that bread or sweet cakes are not burned in the oven. Perhaps while the "engineer" is currying the horse or looking after the ginger bread the boiler "goes up," and the enterprising employer who hired a man that understood two callings loses ten times as much as would have obtained a competent engineer for life. If a man owned a powder mill and employed an individual to take a candle and go over it carefully every night, he could not be guilty of a much greater imprudence than the individual who hires a person to take care of a steam boiler and perform other duties besides. His legitimate calling requires all his time and oversight, and if fewer bakers and livery stable-keepers were employed to run steam engines we should not hear of disasters so often.

TILLAGE BY STEAM.

An Association has been formed in England, called the "General Steam Cultivator Company" the objects of which are similar to those of a Loan Company. It proposes to furnish farmers with steam machinery, the price of which is to be paid to the Company in annual rates, extending over periods varying from three to seven years, one-fourth of the machinery being paid by the purchaser within three months of the date of the agreement. This steam machinery includes engines for thrashing, &c., as well as for plowing. A meeting of proprietors of land and farmers took place lately at what is called the "Smithfield Club Show," at which a resolution was unanimously adopted endorsing the advantages that had been derived from steam cultivation. The resolution is as follows:—"That the cultivation of the land by steam is now proved to be an advantageous and highly economical process; and the machinery used for this purpose is of a character sufficiently perfect to be recommended for the use of practical farmers." Fowler's steam-plowing system seems to be the only one that has won success. A steam engine stationed at one side of the field operates a drum or windlass, and the plows are drawn by a tackle of steel wire rope across the field. The power of the engine is thus applied to draw the plows without expending unnecessary labor in moving itself. From experiments made to determine the amount of engine power thus directly applied to turning the furrow with these plows, it was found to be 86 per cent; which shows that only about 14 per cent. was consumed in the friction of the tackle and gearing. Several of these steam plows have lately been introduced in the islands of Barbadoes and Demarara, on sugar plantations; and owing to the greater depth of tillage obtained by them, the sugar crop has been wonderfully increased. We believe that the steam plow would effect a beneficial revolution in the cultivation of the cotton, rice and sugar plantations of the southern states, for which there will certainly be a deficiency of manual labor and mule-power after the war is over. Hitherto the soil of these lands has been merely scratched on the surface, but with the steam plow, furrows twelve inches in depth may be turned over and rich deep undersoil raised to the surface. Of course steam plows can only be employed by persons who have a large capital; but companies may be formed for the purpose of cultivating extensive plantations by steam-power.

ACCIDENTS FROM CARELESSNESS AROUND MACHINERY.

With the introduction of machinery, careless people seem to have enjoyed special facilities for maiming and destroying themselves. Scarcely a day passes that we do not read of lives lost, arms, hands, and legs cut off, through the inattention or carelessness of the sufferer. Here is one instance which we cut from an exchange, where the victim lost his life through his own recklessness.

Jacob Vogle, acting engineer at St. Charles Furnace, was standing on an arm of the fly-wheel, adjusting the pump which had got out of order, when the engine started, crushing him between the connecting rod and arm of the fly-wheel, killing him almost instantly. The Superintendent had just warned him of the danger he was in, in getting upon the wheel.

Here is still another case where a man was killed, from the carelessness of the engineer in not properly securing the air-pump cover on board of a steamer, which was raised to afford access to the interior.

"As the steamer *Europa* was proceeding to Sorel in tow of the *Napoleon*, a fireman named Toussaint Letendre, employed on board, was accidentally killed. It appears that deceased, aided by another man, was in the air-pump adjusting some portion of the machinery. The fastening gave way, and the deceased made an attempt to get out. While so doing the top came down with terrible force upon the middle of his body, literally severing it in two—one part falling outside and the other within the air-pump. Letendre's companion crouched down inside, and managed to escape unhurt."

A shocking death, certainly. Gears are a fruitful source of injury to mankind, and while a man may stand on one side of a set without danger, it is extremely hazardous to venture near "the running side" of heavy wheels.

It appears that an individual who was tending a mill in Pennsylvania lately, fixing something between the two mill stones, had his pantaloons caught in the cog wheel. He was drawn in and both legs and one side of the lower portion of his body mashed. The terrible and irresistible power which drew him to death may be inferred from the fact, that his crushed and mangled limbs raised one of the stones, weighing 1,700 pounds, several inches. The crushed bones clogged on the cog wheels, and stopped the mill. He died shortly after the accident.

So also with thrashing and mowing machines. These are as harmless as cooking-stoves, when proper care is taken by those who attend them. It seems, however, that a young man by the name of William Regan, while attending a threshing machine in the township of Mono, C.W., got his arm fearfully lacerated by being caught in the cylinder of the machine, and his thigh broken by becoming entangled with the shaft. And also in the township of McKillop, C.W., a woman, whilst passing a threshing machine, with a child in her arms, had her dress caught in the tumbling shaft of the machine, and was drawn round the shaft twice before the machine could be stopped. At the moment escape from instant death seemed impossible, but on extricating her, it was found that no fatal injury had been sustained. The escape was truly providential.

Few escape so fortunately, and the examples given above should serve as warning to those who have charge of machines of all kinds, that they cannot be too careful in its presence.

TRAINS are now running on a broad-gage railroad without a change of cars, from New York to Cleveland, Ohio.