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(Illustrations are indicated by an asterisk.)

THE COASTING TRADE BEING DONE BY STEAMERS.

On the 7th of September twenty-one ocean steamships cleared the port of New York, and only three of them were for foreign ports—two for Europe and one for Havana—the remaining eighteen being for ports on our coast, distributed from Maine to Texas. This fact marks the progress which has been made in superseding sailing vessels by steamers in our coasting trade. It has been found where the amount of freight is sufficient to keep steamers fully employed, the higher rates that can be obtained in consequence of the quick passages, and the larger quantity that a vessel of given size can carry in a season in consequence of her more numerous trips, more than compensate for the greater expense of running a steamer. On all the principal routes they have been very profitable. The first line for freight between this city and Providence, made the stockholders rich, and when the more recent Neptune line was established, a whole fleet of ships, of 1,300 tuns burden each, were ordered to be constructed. The vessels of this line are provided with fine cabins and state-rooms for passengers, and are a popular line of travel with passengers going east from New York.

Nearly all the coast steamers are driven by screw propellers, compactness of machinery being very desirable in vessels designed mainly for freight. Indeed, it is said that the President of the Cunard line has expressed the opinion that screws will ultimately supersede paddle wheels in all ocean steamers.

Though these coast steamers will, to some extent, drive off sailing vessels from lines on which they run, they will not put the sailing vessels out of employment. There are hundreds of places where steamers cannot be profitably employed, but where sailing vessels can be, and to these routes the displaced sailers will be diverted. When the construction of railroads was commenced, many farmers argued that doing away with the service of so many horses, must lower the price of hay; but, after the construction of 30,000 miles of railroads, it was found that the demand for horses was greater, and the price of hay was higher than ever before. We know several persons who would like to have a good sailing vessel or a good horse, but who do not get one, for the reason that they are not able to pay for it. The desire for capital is boundless, but the commercial demand for any article is limited by the ability to purchase. The community's ability to purchase is increased by whatever augments the product of wealth, hence the demand for horses and sailing vessels is increased by the construction of railroads and steamships.

THE CATTLE PLAGUE.

The disease which has been prevailing among horned cattle in Europe was, at last accounts, unchecked, and so great were its ravages that in some quarters of Germany not an animal is to be seen. The disease spreads rapidly when an infected animal appears in any district, and is liable to be spread by persons carrying the infection in their clothes. It has not yet appeared in this country, and it is to be hoped will not. The symptoms of the malady, as yet unnamed, are a general lassitude of demeanor, a discharge of mucus from the eyes, twitchings of the muscles about the neck and shoulders, trembling of the whole body, and a free discharge of matter from the nostrils. Diarrhea is also present, and in course of time dysentery appears. The average duration of the disease, from its commencement till death supervenes, is three days; and fat animals, or those which have been well cared for, suffer the most. Almost every beast attacked dies—the average deaths being 90 per cent.

As it is by no means impossible that this malady may be introduced into this country by accident, carelessness, or design, the Agricultural Report (official) suggests that the greatest care be exercised with regard to imported cattle, and that a quarantine for such beasts be established at certain points, so that they could remain in confinement until it was positively ascertained that they were not infected.

As this disease is contagious, and affects every part of the animal—hides, hoofs and horns—it will be seen that stringent measures are necessary to prevent the cupidity of some from endangering the interests of many. In Germany the hides are so cut as to be useless, the bones are crushed and buried, and the horns and hoofs burned, or otherwise disposed of, so as to prevent any possible chance of their ever being made use of. In addition to this, a strong military force is drawn about the infected spots, and communication with them entirely cut off, the commissary receiving such supplies as he may need at the end of a long pole. The disease, as we have said, has extended to England from communicating with Russia, and numbers of cattle have already died. Whether the same caution as regards the hoofs, etc., is observed there as in Germany, we do not know, but we hope that our Government is sufficiently alive to its interests to take the most stringent measures to prevent the plague from reaching these shores.

EXPERIMENTS WITH CAST-IRON RIFLED GUNS.

It is not generally known that the Government tried some experiments recently with cast-iron rifled guns of heavy caliber. These guns were of the 15-inch pattern, bored 12 inches, and were fired with a charge of 35 pounds of powder and a projectile of 600 pounds. At the 27th round, unhappily, one of the guns burst; but for this occurrence the experiment would have been continued. Another gun of the same size bore, but cast on the Rodman plan, failed at the 16th round.

After a few rounds had been fired from these immense rifles, the grooves became so filled with the residuum that it was extremely difficult to get the shot home. The Rodman gun did not burst, but failed; that is to say, it would have burst if the firing had been continued longer. It is believed, from these experiments, that cast-iron *rifles*, 12 inches in the bore, are not desirable additions to our ordnance.

A CURIOUS SLOTTING MACHINE.

The last number of the London *Artizan* contains an engraving and description of a new slotting machine for working out wrought-iron locomotive wheels on the inside of the rim. This tool produces very beautiful work, and is as novel as it is simple in design.

A right-angled lever vibrating on a center is the principal part. One arm of this lever is vertical and the other horizontal. From the vertical arm depends the tool, and vibration is imparted by a crank pin working in a slot of the horizontal arm. It will thus be seen that the path of the tool point will be a curved line, precisely the shape of a section of the wheel rim inside. The tool point or cutting edge and the center of the main lever are both in line, and the cutter works equidistant from the center, rising and falling vertically, so that the inside of the rim will be a true curve.

If the reader will take a pair of scissors, hold one blade vertical and move the other up and down, he will have a clear illustration of the way the tool works. It should be remembered that the tool depends vertically from the vertical blade of the scissors, being slightly offset therefrom to reach over the rim.

The rest of the machine is not peculiar. The wheel is simply bolted to a platen constructed with rotary feed, as all slotting machines are, and has a roller set under the rim to catch the down thrust of the tool and relieve the friction of working round. When the operator comes to an arm in the wheel, he lifts the tool, and runs it over the arm by the hand screw, as usual. It is stated that this machine accomplishes a great saving in time, to say nothing of the superior quality of the work and the advantages arising from having the wheels truly balanced.

The machine was devised by Mr. Webb, chief assistant at the railway shops, Crewe, England, and is a valuable aid to machinists.

UTILIZING STEAM IN EVAPORATING.

MESSRS. EDITORS:—A year since I spent some time at the salt works of Saganaw, Michigan, and was pleased to observe that many of the companies were combining the sawing of lumber with making salt advantageously, using the exhaust steam for evaporating the water. I asked one of the superintendents to inform me how much difference he had observed in the evaporating power of the steam direct from the boilers over that which had passed through the cylinders and propelled the saw-mill. To my surprise, he stated that he thought the same steam would evaporate more water after propelling the mill than it would if passed to the evaporating vats direct from the boilers. I cannot doubt his answer resulted from a want of careful observation. I did suppose that every pound of force exerted by the steam was at the expense of a given definite amount of caloric. Am I right? It is certainly an interesting subject there, where this combination of the use of steam is growing in favor, and many are actually making steam for the sole purpose of evaporating the water. J. D. CATON.

Ottawa, Ill., Sept. 30, 1865.

Careless observation is so general that we are prepared to encounter it to almost any extent, but it may not be responsible for the apparent anomaly in this instance. If the passages under the salt-water pans were large and short, perhaps the high-pressure steam might sweep through, while that of lower pressure, moving with less velocity, might be condensed to water, giving up its 966° heat of evaporation, and thus imparting more heat to the water than high-pressure steam. But if the arrangements were so made as to condense the steam in both cases, then steam of high pressure would be slightly more efficient in evaporating the salt water than steam of low pressure, though only slightly, for the sum of the latent and sensible heat of steam is nearly the same at all pressures. The temperature of saturated steam at 15 pounds pressure to the square inch is 212°, while that of steam at 101 pounds is 339°; but in converting water into steam at 15 pounds pressure 966·6° of heat are absorbed, while in converting it into steam at 101 pounds pressure only 877·3° of heat are absorbed. Therefore, in reducing steam of 15 pounds pressure to boiling water 1,178·6° of heat would be given up, while in reducing that of 101 pounds pressure 1,216·8° of heat would be evolved. Regnault announces as the most probable conclusion of his long series of observations and experiments that the power exerted by expanding steam is in direct proportion to its loss of heat. It is, therefore, impossible to employ steam in driving a steam engine without impairing its efficiency for the purpose of evaporation, provided that the conditions are such as to utilize all its evaporating power in either case.

Most furnaces are so constructed as to waste a very large proportion of the heat, but the furnaces on which most effort has been bestowed are those of steam boilers. In some of these the arrangements for burning the fuel and economizing the heat may possibly be so good that they may be employed profitably for generating steam to be used in evaporating water in procuring salt. It is manifest that even if the steam is all condensed, the heat required to raise the temperature of the water in the steam boiler to the boiling point must be lost, and the superiority of the steam boiler furnace over the furnace that would be constructed under the salt pans must be sufficient to compensate for this loss in order to make the arrangement economical.