

RECENT ERUPTION OF MOUNT HECLA.

Our engraving is from a sketch taken by Capt. Ambrosen, of the Danish mail steamship *Valdemar*, for the *London Graphic*, and exhibits a singular phase of the recent eruption. On the morning of March 24, about five o'clock, while steaming along the coast from Reykjavik, on the way to the Faroë Isles, those on board the *Valdemar* witnessed a great volcanic eruption. It appeared to be in a valley about five miles from Hecla, at a point about 1,500 feet above the level of the sea, or 3,500 feet below the summit of Hecla. The flames mounted to an immense distance into the air, apparently about twice the height of the mountain itself. The wind was blowing freshly from the north, and driving the flames and ashes in a southerly direction. The illustration shows the appearance it presented from the sea. About fourteen days previously sharp shocks of earthquake had been felt all over the island, and eruptions had continued more or less since that time. According to the *London Echo*, there are twenty-five more or less active volcanoes, some being mere *solfataras*, in Iceland, the most turbulent of which is Hecla. After the great eruption of 1845, the most terrible on record in Iceland, the augitic ashes cast up so covered the grass and other fodder that nearly all the cattle on the island died.

AMERICAN STEAM FIRE ENGINES.

There are few departments of American manufacture in which more praise is really deserved and less actually given than that of steam fire engines, in which the exacting demands of the purchaser, ever increasing and becoming more varied, have been met by the fiercely competing builders with a skill and promptness hardly less than marvelous.

It must be remembered that in this country of combustible buildings and bad roads the demand must imperatively be for fire engines that shall combine the maxima of lightness,

In the engines there is perhaps marked room for improvement. The advocates of the rotary and of the rotatory (commonly called reciprocating) systems are here in fierce rivalry; there being two builders of rotaries on the Holly system (two pistons working together as true spur wheels), one of these employing adjustable packing plates on the ends of the revolvers. Of the reciprocating engines but two types are horizontal; one of these employing a rock valve, the other a plain slide valve moved by a complication of bell cranks.

As regards the transmission of motion from the steam piston to that of the pump, in the reciprocating types, the usage is about equally divided between the "yoke and block" and the crank, the former giving the greatest compactness and stiffness, but the most friction.

With pumps the usage is, while generally excellent, most remarkably various, there being about as many styles as makers. The general division into rotary and reciprocating here obtains; those of the latter class being either vertical or horizontal, and in the most marked variety as regards disposition, material, number, and proportions of valves (all, however, being double acting). At present there are but two builders using horizontal pumps, the vertical being given the preference from their greater compactness and stiffness, freedom from rocking the machine, more even wear of cylinder and piston, greater regularity of suction distribution, etc. The horizontal types have, in all sizes, but one steam and one pump cylinder; the vertical are built both single and duplex (generally the latter), and in some cases having a device for running either half independently in case of damage to the other. Both cast iron and brass are used for the pump barrels, the latter metal being required when salt or foul water is to be used. In all makes (except one of the two horizontal types alluded to) the valves are brass or rubber faced poppets, many in number, interchangeable, and having short lift and springs to cause quick seating. In

pumping up to feed the boiler without supplying the hose. With but few exceptions the wheels are of American hickory, with patent hubs. One builder puts in strong steel fellics, with spokes set staggering from a very long gun metal hub, making a light and strong wheel. At present nearly all the frames are made "crane necked," which gives ease and quickness of turning and of ranging into position.

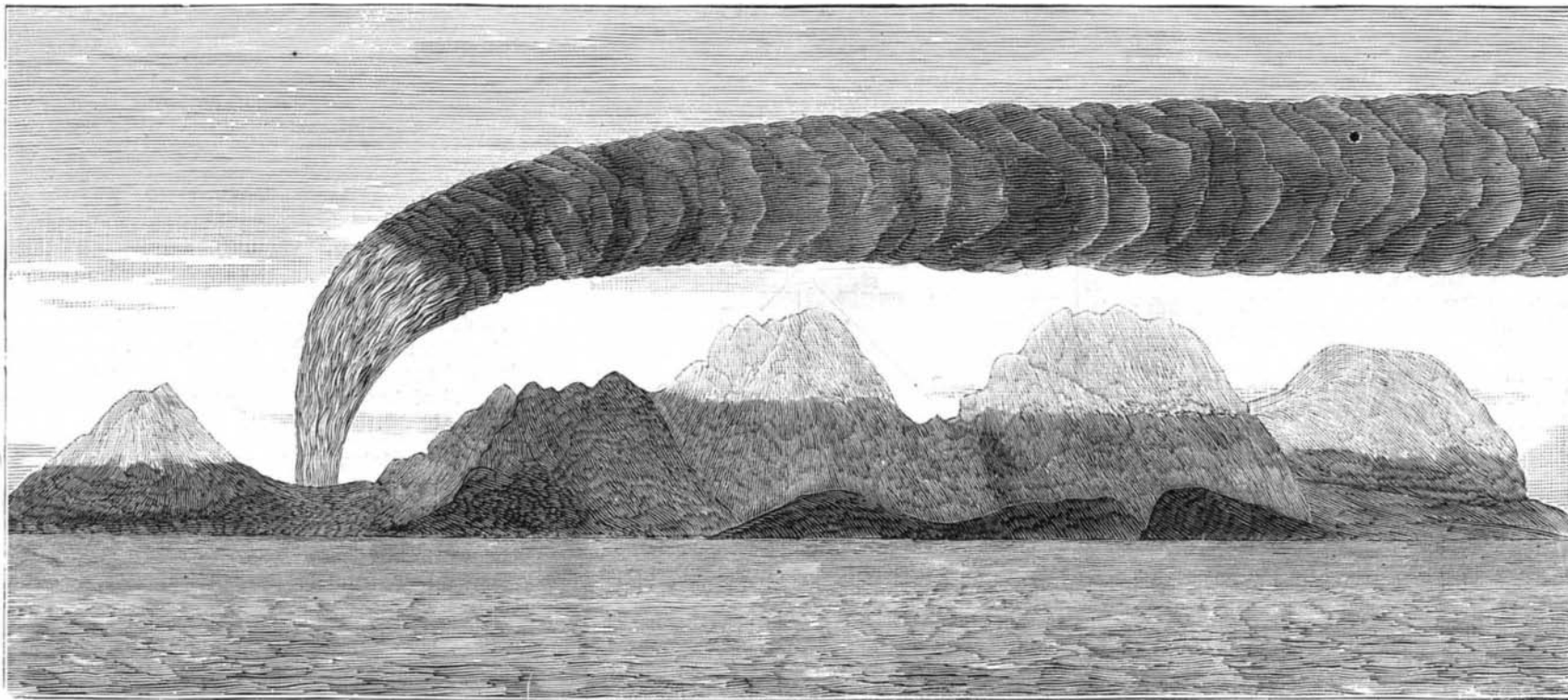
We may say that in general the American steam fire engine is distinguished for remarkable rapidity and capacity of steam generation, lightness and strength of frame and running gear, the greatest force of volume of discharge known in its field, and elaboration of ornamental detail.

The principal faults to be mentioned are the very general low efficiency of the steam cylinders; the great quantity of coal ejected bodily from the stack by the exhaust of the reciprocating styles; necessity of running the engine in order to feed the boiler in most makes; inadequate area of suction inlet and valves in many of the vertical reciprocating pumps; the danger to the driver, perched high up on the engine instead of riding the horses.

We would suggest the use of steel boilers, double riveted "staggering," with steel rivets of oval section, in drilled or in punched and annealed holes; the use of the injector, at least as an auxiliary to the pump; and a feed heater when the latter is used; the coning of the fire box walls; more general introduction of the Perkins or Field suspended water tubes; blowing with live instead of with exhaust steam; shorter cut off and more cushion; larger suction inlets and valve area than are now general. G.

How British Commerce helps British Manufactures.

In an able review of the condition and prospects of the British Empire in the *Nineteenth Century*, Sir Julius Vogel incidentally points out one secret of England's command of the carrying trade of the world, and the importance of that



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strength, and pumping power, together with great simplicity of construction, quick steaming capacity, and freedom from injury by impure water and from reckless driving to fires.

As regards the boilers, American steam fire engines have but little of which to be ashamed. Without exception they are all vertical, most of them multitubular, having waterleg and submerged smoke dome. Two makers build boilers both multitubular and tubulous—a number of short dependent water tubes extending from the lower flue sheet into the combustion chamber. In one of these types an inner tube causes circulation in each water tube. In the other, this is substituted by three partition slips of sheet iron. In another boiler the fire box has tapering walls. In all the employment of "variable exhaust nozzles" is a marked feature. One make, different from all others in the world, and popular in our Western States, has a coil boiler, in which the water is pumped, in small quantity at a time, and vaporized rapidly. Generally there are automatically coupling heater attachments, by which a low steam pressure is constantly maintained while in the house, while steam from cold water in three minutes is by no means an unusual performance. Steel is as yet but little used for boilers. One or two makers are supplied with fresh water tanks for boiler supply. Few heat the feed water. Some can feed both from a donkey pump driven while the main engine and pump are working, and from the main pump. The "rotaries" have independent rotary donkeys, and also independent reciprocating feeders. The forced generation supplies steam so wet that the use of the ordinary locomotive injector is not feasible and not attempted—a fact greatly to be regretted. It is possible that the duplex injector, or "inspirator," might fill the bill. Nearly all the reciprocating engines work with from 100 to 160 pounds boiler pressure; the rotaries, at 60 to 80 pounds.

scarcely any two makes are the valves grouped alike or placed similarly as regards the axis of the pump barrel. In most instances the provision for removing a valve in very short time is praiseworthy.

With one exception the pistons are solid plungers. In one of the horizontals the plunger consists of a smoothly turned solid center attached to the piston rod, and having around it a sleeve bored true inside and turned outside to fit the barrel proper. This sleeve may be made to act as a part of the piston or a bushing to the barrel at will, thus varying the piston area and giving, as desired, either volume or pressure of discharge. With two makers in one Eastern city the usage prevails of putting one of the pumps and engines parallel before the other, giving a stiff trussed frame, permitting the engineer to have one side of the machine as the "working side," and thus not requiring him to go from one side to the other.

The air chambers are large and well proportioned, save perhaps in the neck, where they are too narrow. One Western builder has an air pump to counteract absorption and keep the chamber properly cushioned. There is always a vacuum chamber to aid steady suction supply. In one case this is contained within the discharge air chamber. There are generally two suction and three discharge connections, so as to make the engines "right or left handed." The discharge gates have tight and quick acting valves. The rotary and the horizontal makes have the suction hose permanently attached, and carried "squirrel tail" fashion; and draught from the center of the front of the machine. This saves the time required to attach the heavy suction hose, and that ordinarily wasted by the others in "backing and filling" before a hydrant to get the right distance.

Nearly all the reciprocating machines have "relief valves," opening communication between both ends of the pump (or else between the discharge side and the suction) to permit of

trade to the prosperity of her mechanical industries. The groove into which the conduct of England's shipping has fallen supplies one of the largest systems of trade protection and bounty that has ever been in operation. The whole principle on which the English shipping trade with other countries is conducted is to make the homeward freight supply the profits. On the outward route a bare return to cover expenses, and sometimes not even that, is submitted to, the homeward voyage to make the whole trip a profitable one. For instance, a ship carrying out a \$100,000 cargo, makes for her outward freight \$12,500. She will under ordinary circumstances make at least \$25,000 on the way home, or \$37,500 on the entire trip.

If this were equally divided there would be a return of \$18,750 each way; the difference between that amount and the sum actually received on the outward route is \$6,250, and that is so much bounty to the cargo carried out, or 6¼ per cent. And the same amount may be added as an impost on the homeward freight. This system has arisen accidentally; nevertheless it greatly helps England's exterior trade, the prosperity of which has been largely due to her control of the merchant marine. It will be readily seen how critical would be England's position in case a foreign war should seriously interfere with her commercial supremacy. England is now one vast industrial concern. Deprive her of the means of making that industry profitable, and the loss of wealth would be as rapid as the previous gain.

THE *Kansas City Price Current* says that the drive of Texas cattle this season will reach fully three hundred thousand head in good condition, and they will reach their destination much earlier than last year. Eighty-five thousand head of cattle in Southern Kansas will be ready to go to market by the middle of June.