## SALTING STREETS—THE SCIENCE OF THE QUESTION.

The practice of salting the tracks of city railroads, whereby they have been kept in a state of cold slush during winter, has called forth the wisdom of various city magistrates and others in exposing the evils, or supposed evils, arising therefrom. The Common Council of Philadelphia, having referred this subject to a committee, they have called in scientific experts to give testimony, a course altogether beneath the wisdom of the wise men who rule in our Gotham.

Professor Rand, of the Franklin Institute and of the Philadelphia High School, when called upon to give testimony in the case, stated that he had practiced medicine for twelve years and he did not believe that salting streets was prejudicial to public health, or productive of epidemics, as some persons had alleged. He said :—

The greater prevalence of certain epidemics in winter is easily accounted for by deficient ventilation and comparative inattention to cleanliness during the cold season. The cause of colds from wet feet is due partly to conduction through the leather of the heat of the foot, and evaporation kept up from the surface of the foot. It is a common belief among seafaring men that wetting with salt water is less injurious than with fresh water. Its effects upon leather may be retarded, if not averted, by applying grease. The fogs on the sea shore are fresh. Salt will not volatilize at a temperature less than red heat.

The Doctor did not believe there was any increase of mortality among children from catarrhal diseases since the use of salt upon the railroads. He could not be certain, as the statistics of the last two years had not been kept as they now are. Snow without salt may alternately melt and freeze for days together. The smallest quantity of salt will continue to melt the snow until itself is infinitesimally diluted. The difference between salt and no salt is, that with salt you may have one day's slush where the slush would last a week without it.

Sea water will freeze at a temperature a little lower than the freezing point of ordinary water. But the slush from salt would keep on melting much longer. Diphtheria is an inflammation of the throat, very analogous to croup, except that instead of attacking the breathing apparatus it affects the tonsils and swallowing apparatus. True diphtheria is rare and very fatal. It is accompanied with an exudation of lymph matter. A large number of cases of sore throat, quinsy, &c., are called diphtheria, when nothing like it exists. Chlorate of potash is largely used as a remedy.

Professor Rogers, being called upon to give his opinion on the subject said he had experimented upon the respective strengths of snow water with salt and sea water. Salt slush was a brine considerably weaker than sea water. You can boil salt water as easily as fresh. Salt water containing about one or two per cent of salt does not freeze, though the night is cold, but continues to run off. The city is thus drained. Salt and water wets the feet less rapidly than fresh water, and with a saturated solution of salt and water you can scarcely wet a piece of leather at all. The amount of salt in the snow after its conversion into slush is a very homeopathic quantity. The small per centage of salt used, the very moderate reduction of temperature, and the brief continuance of that reduction, as caused by the use of salt taken in connection with the advantage of draining the city in a short time, were reasons why the Professor advocated instead of reprehended the use of salt in the streets.

Julius Esenwein, farrier, pronounced the feet of horses to be uninjured, if not benefited, by the salt slush. The animals take no more colds than before salt was used. The number of sick horses has been less, though why this was so the farrier could not state.

The committee have publicly advertised for people to come forward and show the objections to salt, but no counter data to the above have been given. Meanwhile the verdict stands for the salt. Thus far science has rather sanctioned than condemned it.

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THE Cold Spring Foundry at West Point has up to this time, furnished upward of 600 Parrott rifled guns to the government, which is a substantial proof of its value.

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Large quantities of cotton have lately arrived at this port from Liverpool. The steamer *John Bell* arrived a few days since with 2,000 bales.

## Priming in Steam Boilers—Its Causes and Remedies.

In answer to several inquiries lately made of us on this subject, we quote the following sound information from Bourne on the steam engine.

Priming is a violent agitation of the water within the boiler, in consequence of which a large quantity of water passes off with the steam in the shape of froth or spray. Such a result is injurious, both as regards the efficacy of the engine, and the safety of the engine and boiler; for the large volume of hot water carried by the steam into the condenser impairs the vacuum, and throws a great load upon the air pump, which diminishes the speed and available power of the engine; and the existence of water within the cylinder, unless there be safety valves upon the cylinder to permit its escape, will very probably cause some part of the machinery to break, by suddenly arresting the motion of the piston when it meets the surface of the water—the slide valve being closed to the condenser before the termination of the stroke, in all engines with lap upon the valves, so that the water within the cylinder is prevented from escaping in that direction. At the same time the boiler is emptied of its water too rapidly for the feed pump to be able to maintain the supply, and the flues are in danger of being burnt from a deficiency of water above them. The causes of priming are an insufficient amount of steam room, an inadequate area of water level, an insufficient width between the flues or tubes for the ascent of the steam and the descent of water to supply the vacuity the steam occasions, and the use of dirty water in the boiler. New boilers prime more than old boilers, and steamers entering rivers from the sea are more addicted to priming than if sea or river water had alone been used in the boilers—probably from the boiling point of salt water being higher than that of fresh, whereby the salt water acts like so much molten metal in raising the fresh water into steam. Opening the safety valve suddenly may make a boiler prime, and if the safety valve be situated near the mouth of the steam pipe, the spray or foam thus created may be mingled with the steam passing into the engine, and materially diminish its effective power; but if the safety valve be situated at a distance from the mouth of the steam pipe, the quantity of foam or spray passing into the engine may be diminished by opening the safety valve, and in locomotives, therefore, it is found beneficial to have a safety valve on the barrel of the boiler at a point remote from the steam chest, by partially opening which any priming in that part of the boiler adjacent to the steam chest is checked, and a purer steam than before passes to the engine. When a boiler primes, the engineer generally closes the throttle valve partially, turns off the injection water, and opens the furnace doors, whereby the generation of steam is checked, and a less violent ebullition in the boiler suffices. Where the priming arises from an insufficient amount of steam room, it may be mitigated by putting a higher pressure upon the boiler and working more expansively, or by the interposition of a perforated plate between the boiler and the steam chest, which breaks the ascending water and liberates the steam. In some cases, however, it may be necessary to set a second steam chest on the top of the existing one, and it will be preferable to establish a communication with this new chamber by means of a number of small holes, bored through the iron plate of the boiler, rather than by a single large orifice. Where priming arises from the existence of dirty water in the boiler, the evil may be remedied by the use of collecting vessels, or by blowing off largely from the surface; and where it arises from an insufficient area of water level, or an insufficient width between the flues for the free ascent of the steam and the descent of the superincumbent water, the evil may be abated by the addition of circulating pipes in some part of the boiler which will allow the water to descend freely to the place from whence the steam rises, the width of the water spaces being virtually increased by restricting their function to the transmission of a current of steam and water to the surface. It is desirable, however, to arrange the heating surface in such a way that the feed water entering the boiler at its lowest point is heated gradually as it ascends, until towards the superior part of the flues it is raised gradually into steam; and in boilers designed upon this principle, there will be less need for any special provision to enable currents to rise or descend. The steam pipe proceeding to the engine should obviously be attached to the highest point of the steam chest, in boilers of every construction.

## The Queen Bee.

In connection with the improved beehive, illustrated in our last number, we publish the following curious facts, which have long since been ascertained, but which we extract in this form from the admirable article on the bee in "Appleton's New American Cyclopedia":—

The queen bee is the largest, being 8½ lines in length, the males being 7, and the workers 6; her abdomen is longer in proportion, and has 2 ovaria of considerable size; her wings are so short as hardly to reach beyond the third ring, and her color is of a deeper yellow. She is easily recognized by the slowness of her march, by her size, and by the respect and attentions paid to her; she lives in the interior of the hive, and seldom departs from it unless for the purpose of being impregnated or to lead out a new swarm; if she be removed from the hive the whole swarm will follow her. The queen governs the whole colony, and is in fact its mother, she being the only breeder out of 20,000 or 30,000 bees; on this account she is loved, respected and obeyed with all the external marks of affection and devotion which human subjects could give to a beloved monarch.

The eggs and larva of the royal family do not differ in appearance from those of the workers; but the young are more carefully nursed, and fed to repletion with a more stimulating kind of food, which causes them to grow so rapidly that in 5 days the larva is prepared to spin its web, and on the 16th day becomes a perfect queen. But, as only one queen can reign in the hive, the young ones are kept close prisoners, and carefully guarded against the attacks of the queen mother, as long as there is any prospect of her leading another swarm from the hive; if a new swarm is not to be sent off, the workers allow the approach of the old queen to the royal cells, and she immediately commences the destruction of the royal brood by stinging them, one after the other, while they remain in the cells. Huber obseves that the cocoons of the royal larvæ are open behind and he believes this to be a provision of nature to enable the queen to destroy the young, which, in the ordinary cocoon, would be safe against her sting. When the old queen departs with a swarm, a young one is liberated, who immediately seeks the destruction of her sisters, but is prevented by the guards; if she departs with another swarm, a second queen is liberated, and so on, until further swarming is impossible from the diminution of the numbers or the coldness of the weather; then the reigning queen is allowed to kill all her sisters. If two queens should happen to come out at the same time, they instantly commence a mortal combat, and the survivor is recognized as the sovereign; the other bees favor the battle, form a ring, and excite the combatants, exactly as in a human prize fight.

Experiments amply prove that on the loss of the queen the hive is thrown into the greatest confusion; the inquietude which commences in one part is speedily communicated to the whole; the bees rush from the hive, and seek the queen in all directions; after some hours all becomes quiet again, and the labors are resumed. If there be no eggs nor brood in the combs the bees seem to lose their faculties; they cease to labor and to collect food, and the whole community soon dies. But if there be brood in the combs the labors continue as follows:—having selected a grub, not more than 3 days old, the workers sacrifice 3 contiguous cells that the cell of the grub may be made into a royal cell; they supply it with the peculiar stimulating jelly reserved for the queens, and at the end of the usual 16 days the larva of a worker is metamorphosed into a queen. This fact, which rests on indisputable authority, is certainly a most remarkable natural provision for the preservation of the lives of the colony. While a hive remains without a queen swarming can never take place, however crowded it may be. The possibility of changing the worker into a queen is taken advantage of in the formation of artificial swarms, by which the amount of honey may be indefinitely increased. In a well-proportioned hive, containing 20,000 bees, there would be 19,499 workers, 500 males and 1 queen.

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THE Ericsson steam battery has been successfully launched.

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