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Canals and Railroads.

Measures are now in progress by the Legislature of New York for the purpose of raising means to complete the unfinished canals of the State, embracing the Erie as a grand trunk, and the Oswego, Chenango and some others as branches. For a considerable period of time, the Erie canal was the longest in the world (360 miles), but it has recently been exceeded by the famous Ganges canal in the East Indies, which is about twice as long, and of far greater capacity. By connecting the great inland American lakes with the Atlantic Ocean through the Hudson river, the Erie canal raised New York to a high commercial position, as it was for a number of years the chief avenue of inland communication for passengers and merchandise to and from the Northwest.

Just before the advent of railroads, its business had increased so rapidly that it was found necessary to increase its capacity for boats of greater tonnage. To effect this object, an act was passed about twenty years ago, and arrangements were made to carry it out on a grand scale. Various sections of it were then contracted for, and the work of improvement was commenced and went on for some time; but such an amount of political chicanery was developed in the management of it, and such embarrassments were inflicted upon the State finances that the works were stopped, leaving various sections of the canal, at intermediate points, in their original condition. A vast debt has been thereby contracted for canals, amounting at present to about twenty-five millions of dollars, and as the carrying capacity of the Erie is limited by its old narrow sections, no proportional benefits have been derived from those which were enlarged. To obtain the advantages which should be secured by the latter sections, the whole canal requires to be finished to the same extent throughout; this is stated to be the object of the present movement in the Legislature, and is not the first instance of the kind. It is estimated by friends of the measure that five millions of dollars will completely finish all the State canals, but like all government estimates, this one, in all likelihood, is too low by one half. But why should five millions or one million be expended in enlarging the canals; would it not be a sheer waste of money thus to apply it? It would really appear to be so. Canals seem to have outlived their usefulness; they were good enough in their day, but are not adapted to the present state of commercial progress; they have been superseded by railroads. This is so evident that the man who would propose to build a canal now would be laughed at as one beside himself. Would the proposition be any more wise as applied to enlarging the canals? Twenty-four years ago the whole internal passenger traffic of our country was carried on by canal and river navigation, but at the present day a passenger seldom sets his foot on a canal boat. The passenger packets once so numerous on our canals are now scattered along their banks like the mastodon relics of a past age. In twenty years railroads have engrossed the whole inland passenger traffic of our country, also much of the freight trade, and they are yet destined to absorb the whole of it.

In England canals have become obsolete, railroads having entirely superseded them as a means of internal communication. Those made before the railroad era in that country, as a matter of course, are still used wherever they can be without loss, but no new canals have been commenced in twenty-four years. Some of the beds of the old canals have been filled up and converted into railroads; others have had rail tracks constructed on their banks; many have been closed up, and some undertaken in the beginning of the railroad

era have been abandoned in the course of construction and left in their unfinished state.

In view of these facts, would it not be unwise to expend more money in enlarging any of our canals—would not the money so expended be thrown away? The wisest policy to pursue, apparently, is to utilize the canals, since we have them, as long as they pay their expenses, allowing them to die out gradually.

Coupled with the project of raising means to finish the State canals, it is proposed by the advocates of the project to impose tolls on our railroads, the "Central" especially, for carrying freight. This proposition is as unjust as it is impolitic, and the more especially as it is intended to devote the tolls for the benefit of the canals. The *Tribune* asks that the Central Railroad should be taxed to contribute half a million of dollars per annum to the completion of the canals. The suggestion is as enlightened and honorable as to ask for the imposition of a tax on a young manufacturing company using the most recent and improved machinery, and doing a profitable business, in order to sustain an old losing company, in paying for the repairs of its antediluvian machinery, and the maintenance of its foggy managers. This is a splendid way to encourage new improvements, and help on the car of progress. It would be as unjust to tax our railroads for the benefit of our canals as the latter for the former—each should stand upon its own merits, to live or perish.

Coal-Burning Locomotives.

Early perceiving the great expenses which were incurred, and which would keep increasing, by the use of wood for locomotive fuel, we long ago (when no other kind was used) repeatedly directed attention to the substitution of coal for wood on our railroads. Stubborn at one period in resisting innovations, most of our railroad directors are now encouraging the use of coal-burning locomotives; they are rapidly increasing in numbers, and at some future day no other kind will be employed. The Illinois Central Railroad Company have now twenty-one of this kind of engines in use, as stated in the late report of the directors, and they save thirty per cent in fuel as compared with wood burners; they are somewhat more expensive for repairs, but, on the whole, effect a large saving. On the Boston and Providence Railroad there are five coal-burning locomotives, constructed under the supervision of Geo. S. Griggs, the master mechanic; and on the Providence and Worcester Railroad there are six engines of the same character, all effecting a very large saving. On the Old Colony and Fall River Railroad, there are three coal-burners lately constructed under the direction of the master mechanic, Mr. H. Bullock. Mulholland's coal-burners are exclusively employed on the Reading Railroad, which does an immense business, and on the Baltimore and Ohio Railroad, the majority of the engines are also coal-burners. Two of Dimpfel's (illustrated on page 332, Vol. XII., *SCIENTIFIC AMERICAN*) have been placed on the Wilmington and Baltimore Railroad, and two of Boardman's (illustrated on page 160, Vol. XII., *SCIENTIFIC AMERICAN*) are running on the Jersey City and New Brunswick Railroad.

On a few other railroads, coal-burners have been running successfully for some years, while on others again they have been but recently introduced, and more for the purpose of experiment, apparently, than with a full consciousness that they can ever take the place of wood-burners. But from all we can learn relating to their performances, they effect a saving of from thirty to fifty per cent in fuel expenses. The opinion seems to be gaining ground that this kind of locomotive should be employed on almost all our railroads as a matter of sensible economy. The *Railway Times* states that in Massachusetts alone they would effect an annual saving of five hundred thousand dollars.

On our Western railroads, the locomotives must be constructed to burn bituminous coal, and therefore require a different arrangement

of boiler and furnaces from those on the Eastern roads designed to use anthracite coal, that is, the Western engines must burn their smoke, or they never can be used for passenger trains. At one period it was thought that this was an impossibility, hence in England, where wood could not be obtained, charred coal (coke) was exclusively used for fuel. But science and skill have now triumphed over the smoke difficulty in locomotives, both in England and America.

Hydraulic Cements and Mortars.

The wonderful powers of durance which some mortars possess is to be explained with ease; but before doing so, let us recollect that the mortar and cement found in Herculaneum and Pompeii, now nearly two thousand years old, is as hard and compact as the volcanic rock on which it is found; and there are many specimens of cements in the museums of Europe, that, after having been under water for centuries, are as good, if not better, than when put down. Recollecting also the vast importance of good hydraulic cements in the construction of lighthouses, breakwaters and piers, and all submarine works, perhaps more attention may be given to the subject than otherwise would by non-interested readers. These hydraulic cements are such as set under water, and are not decomposed by its action like ordinary mortars. They are made either from natural or artificial mixtures of carbonate of lime with silica, or silicate of alumina or magnesia. The mineral *dolomite*, when calcined at a moderate heat, exhibits the property of hydraulic lime; and half-burnt lime (containing still a quantity of carbonic acid,) will set under water. From a French engineer—M. Vicat—we learn that the hardening depends much on the amount of carbonic acid left in the lime; thus he informs us that a stone that had thirty per cent of carbonic acid left in it after burning, hardened in fifteen minutes, while another, in which there was twenty-six per cent, hardened in seven minutes, and one containing twenty-three per cent, took nine days to become hard. Two varieties in Europe are known as Trass and Puzzolana; and there is an hydraulic mortar used in England known as "Roman cement," made by burning some nodules found in the tertiary formation.

Neither clay, (silicate of alumina,) nor lime alone, will set under water, but if an intimate mixture of clay and chalk be calcined at a moderate heat, and afterwards mixed with water, a hydrated silicate of alumina and lime is formed as a hard mass, and this is hydraulic cement. If the clay or limestone should contain a little alkali, it seems to aid the solidification. There is an excellent cement made near Paris from one part of clay and four of chalk, which are intimately mixed with water, afterwards allowed to settle, and the deposit thus obtained is molded into bricks, which are then dried and calcined at a gentle heat. This hydraulic lime, like the best from natural sources, is entirely dissolved by acids. All mortars, but especially hydraulic ones, are solidified quicker and better under the influences of pressure and high temperature.

When an hydraulic cement is required, it is advisable to collect specimens of the minerals of the district in which work is to be carried on, and send them to some chemist for analysis. This will, in many instances, save much time and money, for we have known cases where Roman cements and other hydraulic cements, have been brought from a great distance to carry on a work, quite close to which there was plenty only wanting the trouble of burning.

Rarey's Method of Subduing Vicious Horses.

All kinds of theories have been formed in relation to the peculiar method of subduing the wild spirit of horses, so successfully practised in Europe by Mr. Rarey, who is generally known as the "American Horse Tamer." At first many attributed his power to such a system of force as should strike terror into the animal, and thus render him more liable to be influenced by his master; but since the

declaration of Sir Richard Airey that "there is nothing in the treatment but what any horseman would approve of," it is generally conceded that this influence is obtained solely through some mode of appealing directly to the more generous impulses of the horse, and thus conciliating his affection and confidence. It is well known that animals generally have an almost instinctive passion for certain odors, which appear to have a subduing influence over them. The most familiar illustration of this fact is the power in this respect exercised on horses by the rank and musty smell emitted by the goat, which enables the latter animal to enter the stall and pass between the legs of the most vicious of them. The ammoniacal effluvia concentrated in the warts or excrescences formed on the fore and hind legs of horses, appears to have the same attractive and subduing influence. The oils of cummin and rhodium have these peculiar properties in a more marked degree, and as soon as the horse scents the odor of either of these substances he is instinctively drawn towards them. Mr. Rarey has intimated that his power over the horse is obtained solely through herbs or drugs which operate on the senses of smell and taste, and we have no doubt but that the herbs or drugs employed by him, if not the same, are of an analogous nature to those we have mentioned.

The following directions are given for the taming of horses by the system suggested:—

Procure some finely grated horse castor, and oils of cummin and rhodium, and keep the three separate in air-tight vessels. Rub a little of the oil of cummin upon your hand, and approach the horse on the windward side, so that he can smell the odor of the camin. The horse will then suffer you to approach him without any trouble. Immediately rub your hand gently on the horse's nose, getting a little of the oil on it, and you can lead him anywhere. Give him a little of the castor on any substance for which he has a taste, and in the most suitable manner manage to get eight drops of the oil of rhodium upon his tongue, and he will at once become obedient to the most exacting commands with which horses are capable of complying. Be kind and gentle to him, and your permanent supremacy will be established, no matter what may have been his previously wild and vicious character. We understand that Mr. Rarey, has been challenged by D. Sullivan, also a horse tamer, (grandson of the celebrated "Sullivan, the Whisperer,") to a trial of his powers in Cork, Ireland.

A Good Method of Rewarding Merit.

In reading the list of premiums to be awarded by the next annual Agricultural Fair of Howard County, Ind., published in the *Howard Tribune*, we observe that the committee having charge have wisely concluded to present to successful competitors in the exhibition, bound copies of agricultural, scientific and mechanical publications (including the *SCIENTIFIC AMERICAN*) of acknowledged worth. We think this system of rewarding merit far preferable to that heretofore observed. A medal or diploma has no actual worth beyond the expression of the favorable opinion of the judges by whom it is awarded; whereas the presentation of a valuable publication, treating of science, mechanism or agriculture, will not only convey the reward intended, but be of great service in cultivating the mind of the person to whom it is awarded. We commend the example of this remote agricultural society to others of a like character who claim a more exalted position.

How to Improve Soggy Potatoes.

At this season of the year, potatoes are very liable to be moist and soggy after boiling, and many a good dinner will be spoiled on account of the bad potatoes. A simple remedy for this is the following:—After the potatoes are sufficiently boiled, and the skins taken off, place them in a dry cloth, and express the moisture by a slight wringing; they will then appear mealy, and taste as well as the best Hibernians.