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(Illustrated articles are marked with an asterisk.)

THE ERIE CANAL.

When, in 1816, DeWitt Clinton presented his celebrated memorial, with one hundred thousand names appended, to the New York Legislature, asking for an act authorizing the construction of the Erie Canal, it is doubtful whether he foresaw the storm of opposition his proposition would raise; and when, at last, by his untiring energy, he secured an appropriation of $5,752,738, and saw the first shovelful of earth raised, at Rome, on the succeeding 4th of July, it is probable that he realized still less the brilliant future of that—at the time—stupendous project. Still less did he foresee that scarcely would the work be completed ere a new system of transportation and traffic, exceeding in rapidity anything the world had ever dreamed of, would spring up, and, stretching its "steel-shod grooves" parallel with this world-famous canal, rival the latter in carrying power for freights, and totally extinguish its passenger traffic.

Many are still living who have been huddled in the closely crowded cabins of the old-time packets, whose sharp prows no longer cut the waters of the Erie Canal. And some have, perchance, had the experience of a trip in a lazy line-boat from Albany to Buffalo.

The writer well recollects such an experience, and can call to mind the table supplied with steaks of fresh pork, flanked with boiled potatoes, tea and coffee, bread and butter, and apple sauce, which formed the standard dinner; the cabin which, the tables being removed, was crowded with sleeping berths, the males being separated from the females by a rude curtain, and mingling their snores in anything but harmonious concert; the long drawn cry of "Lock red—d—a—a!" easily heard half a mile away, in the still night air; the shrill cries and screams of impudent boy drivers, receiving castigation at the hands of irate captains; the startling crash of pike poles, thrown down upon deck immediately over the heads of the passengers, causing those in the up per berths to jump up, half awake, and bump their heads against the deck timbers; the curious sensation of sinking down unfathomable depths, in going through locks; the early rising in the moist, foggy air; the ablutions, performed in ways and by means indescribable, or, in many cases, left unperformed; the rush to breakfast; the broiling through the long summer day on the deck, the monotony only varied by occasional cries of "Bridge—Low Bridge "from the "steersman," and the general scramble and ducking of heads which followed, or by stale stories and feeble jokes, from the more humorous of the passengers, or perhaps by, what was then frequent, a fight between boatmen. These were the charms of travel over the Erie Canal, "but all these charms are fled."

The writer well recollects standing in the village of Canastota, filled with wonder at his first sight of a locomotive and train, coming on at a speed of perhaps fifteen miles an hour, over the Central Railroad, and it was not long after that the waters of the Erie practically ceased to carry passengers. From that time, destined to be only an artery for the circulation of freight, it has been sought to improve its carrying capacity. All these movements have been opposed by the railroad interest, yet the people at large have seen too clearly how much the prosperity of the State has depended, and still depends, upon this great work, to allow the defeat of such measures. Its capacity has been greatly increased by enlargement of its cross section and its locks; and many attempts have been made to give it still greater carrying power, by the substitution of steam for horse and mule power in the propulsion of boats, culminating in the bill we published last week, offering a prize of $100,000 for the best system of propulsion.

This prize will have the effect of bringing to bear upon the problem a vast deal of inventive talent, and if fairly awarded, will be quite as likely to be secured by some ingenious farmer's boy in the backwoods, as by a skilled engineer, versed in the mysteries of steam engineering. For it must be remembered that the solution of this problem does not depend upon any novel construction of steam engines, but upon means not hitherto employed for applying the power of motors to the propulsion of these boats, under the conditions specified in the law, or upon some radical modification in means already used, but as yet found defective. It is a new path that must be struck out, in which old devices will be of little use, except as elements of new combinations; and, we venture to say, there are many undeveloped Watts and Ericssons, who to-day are masters only of few tools and rude appliances, huddled together in their fathers' horse-sheds, who would be even more likely to hit upon something new, than men whose minds have become accustomed to run in grooves, and who recognize, in the screw and paddle wheel, the only practical means of steam propulsion.

The effect of the prize will be, however, broader than was intended by the framers of the bill. Those who attempt the solution of the problem will stumble upon many inventions capable of useful application to other purposes. The construction of the canal banks and locks may even undergo material change, ere the anticipated system of propulsion can be applied. It may even prove that in such a modification, of the construction of the canal, lies the solution of the entire question. But these are things that time only can develop.

In our next issue we propose to resume this subject, perhaps giving more particulars, historical and statistical, of the origin and progress of the canal, and following with some account of patents issued on means of canal boat propulsion in the United States.

We shall also be glad to receive contributions from our correspondents upon this, now more than ever, important subject.

PIPES FOR DOMESTIC WATER SERVICE.

There is nothing about which we receive more numerous inquiries than water pipes. Most people are getting suspicious of lead for this purpose, it having been shown that this metal often contaminates the potable waters conveyed through pipes made of it. For a time, quite a popular impression prevailed that in zinced, or, as commonly called, galvanized iron pipes, the cheap and safe water conduit for for domestic purposes had been found. This is still maintained by some, and it is with a view to throw additional light upon the subject that the present article is written.

There is no doubt, as we have shown in previous articles, that iron pipes, thoroughly coated with zinc, and conveying perfectly pure water, will not contaminate the water to any appreciable or hurtful degree. Waters containing acids or free alkalies will, however. speedily become charged with the oxide or salts of zinc, to a greater or less extent, depending upon the character of the water. In some cases, where there does not appear to be a notable amount of alkalies, acids, or salts, the solutions of which dissolve or combine with zinc oxide, there is still rapid attack upon the metal. We have a specimen of such a pipe that is nearly filled with a deposit of metallic origin, resembling mixed metallic zinc and red oxide of iron. An analysis of this deposit would be interesting. Pure water acts more powerfully upon lead than upon zinc. While the oxide of lead is readily soluble in water free from carbonic acid, it is converted into a comparatively insoluble, or difficultly soluble, carbonate, whenever it is exposed to water containing carbonic acid. In experiments made by the Government commissions appointed to examine into the chemical quality of the water supply of London, the extraordinary effect produced by a small quantity of carbonic acid in the way described was most particularly noted. Pure distilled water placed in contact with lead became highly poisonous, while that containing three per cent of its volume of carbonic acid remained safe. They decided that sufficient carbonic acid is usually found in well, river, and spring waters, to render lead pipes a safe means for conducting them.

Notwithstanding this, they admit that, from causes little understood, water will at times act with unusual energy upon lead; and we have no doubt that imperfectly understood conditions will often render it powerfully energetic in its action upon zinc coated iron pipes. The specimen of this kind of pipe, above referred to, which has almost become stopped by its deposit of mixed oxide, metallic granules, and salts, would seem to indicate this, as the water which flowed through it has always been regarded as being of ordinary purity for drinking and culinary purposes.

A prominent leader in the Shaker family at New Lebanon, N. Y., assures us that they have not succeeded in the use of zinc coated pipes; and regarding lead with disfavor, they are meditating a return to the old pump log service, once so much used in this country.

We are cognizant of another example, in a town near Boston, Mass., where a new house was piped with galvanized iron pipes. Sickness soon overtook the family, one of its young members died, and a *post mortem* examination revealed the presence of salts of zinc in the stomach and other organs. Death was directly attributed to the use of these pipes.

Mr. Robert Rawlinson testified, before the commission referred to, that galvanizing iron pipes is a delusion. He said: "If the pipes are laid in subsoils which will act upon iron, the galvanizing affords no protection against that action, and there are soils which will rapidly eat away either iron or lead. If you examine a galvanized iron pipe under a microscope, you will find that it is not an even coating; it is freckled, and there are interstices, oxidation sets up, and then the galvanizing is blistered off; it does not improve, and, even so far as it does cover it, I doubt very much whether it preserves it; it is not stronger in its texture, and it certainly does not last longer; that is my experience."

Mr. Thomas Duncan, engineer of the Liverpool Water Works, stated that "the effect of soft water upon iron pipes was to produce an infinite number of small tubercles; those have grown up, and they project, in many instances, for about three quarters of an inch, reducing the diameter of the pipe between point and point, one and a half inches, thereby increasing the friction. They form an infinite number of little eddies, and it is not only the space they occupy in the pipe, but, from my observation, I believe the effects extend much further into the interior of the pipe, and disturb the current."

A method has been recently patented for coating pipes internally by silver electroplating therein. Water containing sulphur would, of course, in time convert such a coating into the sulphide of silver; but this, being insoluble in water, would protect the pipes as well as the metallic silver. Should the water contain any alkaline hyposulphites, and also free chloride, the silver may be gradually converted into a chloride, which, being dissolved by ammonia, would, after a time, result in the denudation of the lead. Of course, the time required for this action, if it should take place, can only be determined by experiment; but in such waters as contain traces of the substances named, such action would seem likely to result ultimately. It is known that silver exposed to an atmosphere containing chlorine will gradually blacken from the formation of chloride; and it is probable that this would occur, to some extent, in water pipes coated with silver. The cost of the metal will stand in the way of using a very thick coating; and, therefore, any chemical action will be more apt to interfere with the economical application of silver to this purpose.

In Boston the lined copper pipes are coming into vogue, and are pronounced perfectly safe in all respects. The copper is tinned before being made into tubes, and the interior of the pipe is again tinned when made up. The expense of these pipes is about the same as lead pipes of equal strength.

THE BLOWPIPE AS AN AID TO THE DRILL IN OPENING SAFES.

The blowpipe, in an attack upon a *well constructed* safe, is a powerful auxiliary to the drill, but it cannot be used alone with success.

Some experiments with most skillfully constructed apparatus, performed at the Herring safe manufactory, in this city, which we witnessed last week, show that the temper may be drawn, in time, from a steel plate an inch thick, by the use of the blowpipe, so that the plate may be drilled. It may also be burned quite through when operated upon singly; but it is difficult to do this with iron plates, which burn less easily, and also conduct heat away from the point against which the flame is directed, as rapidly as the steel. Spiegeleisen burns with even less facility than ordinary iron. The flame directed against the corner of a fragment of speigeleisen fused it, but, after continued action, only produced a comparatively small amount of the oxide of iron, which coated the bead formed. The fused metal, on cooling, was as hard as before. This material, in fact, depends for its hardness upon its natural composition, and not upon any process of tempering, so that mere melting does not change its character.

It would, however, require apparatus not available to burglars to melt a hole in the center of a speigleisen plate. It follows, therefore, that while iron plates and steel plates may be successively penetrated by the use of the blowpipe, as practically capable of use in the hands of burglars, the speigeleisen plate, which practically resists drilling, defeats the use of the instrument as an adjunct to the drill.

We have recently held a conversation with Mr. John Dickinson, of 65 Nassau street, New York, manufacturer of carbon points for drills, etc., who assures us that these points will not drill speigeleisen, except by the use of appliances for obtaining speed, which cannot be used by burglars, and that to drill it at all would be a work of so much time as to prevent its adoption for safe-breaking.

The rate at which, by the ultimate use of the blowpipe and drill, a hard steel plate can be penetrated, is, we are told by Mr. Farrell, about one inch per hour; the drawing of the temper in advance of the drill occupying about two fifths as