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THE NIAGARA AERIAL TRAMWAY.

While the harnessing of Niagara may rank as one of the engineering triumphs of the age, it certainly cannot rank as one of its æsthetic triumphs; but now a new scheme for attacking poor Niagara has been evolved, this time not in the interests of commerce or of manufacturing industry, but simply as a money-making scheme based on the curiosity of the public.

The Aerial Tramway Company proposes to erect towers on each side of the Falls, one in the Canadian and the other in the American park, and to carry from tower to tower a double set of steel cables, which are to be traversed by cars suspended therefrom and operated by electricity from the American side of the Falls.

The cars, which are to be open, cage-like structures, will traverse the Falls about 30 feet above the edge, so as to give the sightseers a close inspection of the water where it takes the mighty plunge. The line will follow closely the brink of the American Falls to Goat Island, the prolongation of which direction will carry it as a chord to the Canadian or Horseshoe Falls.

The State of New York and the Canadian government have both established parks for the preservation of the natural beauty of the Falls, which were fast becoming impaired by vandalism. When the necessary powers were obtained for the establishment of these reservations, every lover of the beautiful in nature felt relieved to think that Niagara was saved, but it is questionable if in the worst of its days a greater act of vandalism was contemplated than the construction of the aerial tramway. The natural conformation of the ground about the Falls enables the visitor to approach close to the edge of the Falls and to see to an unusual advantage the great cataract. A nearer approach to its brink than that afforded by nature is not desirable, and the stretching of cables across the chasm in full view, to be traversed by cars, will be the greatest defacement to which the scenery has ever yet been subjected. Those who advocated the parks, and perhaps worked for their establishment, will regret to see them surrendered to such uses as the location for towers of the tramway.

ACETYLENE.

No recent chemical discovery has excited more interest than the direct production of acetylene. The calcium carbide process may properly be termed direct, for in it the carbon is first united to calcium and secondly to hydrogen, the calcium being supplied by lime and the hydrogen by water. We have given a number of papers on the subject, and the new process is now being presented in various exhibits, lectures and papers to the public. One private residence in this city has a small acetylene plant with which the house can be illuminated or which can be used to enrich the ordinary gas. If the calcium carbide can be produced commercially—and its promoters state most positively that it can be so produced—it will have a great effect upon the production of artificial light.

Political economists, who have devoted some thought to the influence of modern scientific progress upon the condition of the world, recognize in the modern development of artificial illumination one of the most powerful instruments for the civilization of mankind. In old times the dark streets of cities were dangerous, because they were haunted by robbers, who only lacked subjects because the people were afraid to go abroad after dark. When Argand invented his cylindrical lamp burner with central draught, he made one of the great steps forward in artificial lighting. The invention of plaited candle wicks, chemically treated, which, as the candle burned, would bend over and burn away, was considered a great discovery and achievement in its day, as doing away with snuffers. Then gas was introduced and proved to be the greatest civilizing agent for cities. When the streets were adequately lighted, crime at once diminished.

In recent years the electric arc light has proved the best street illuminant, but gas or the incandescent electric light remains the favorite indoor illuminant. In the co-development of gas and electricity some interesting cycles or transformations of energies have resulted or have been worked out. Gas is primarily made for the purpose of giving light. When burned in the explosion gas engine it gives, from the physicist's standpoint, a far more economical result than is attainable with the steam engine. In the commercial sense the economy, owing to the high cost of gas, disappears.

The gas engine burns some twenty feet of gas per horse power hour, which gas represents an illuminating power of sixty to one hundred or more candles. For the production of such gas four pounds of bituminous coal suffice, which give also as side products a material amount of coke and a quantity of coal tar. If a gas engine drives a dynamo, we may get from it in incandescent lights as much or more candle power than from the original gas burned as such, while if we use arc lamps the production would be vastly increased. In the new acetylene process, a similar but more complicated cycle exists. Power is expended in producing an electric current. The current is led to an electric furnace, where it heats to an almost immeasurably high temperature a mixture of lime and carbon. The lime is reduced and gives calcium carbide. This substance is treated with water, and every pound evolves five cubic feet of acetylene, enough to give 250 to 300 candle power of light for one hour.

Thus if we know how much horse power is expended per hour in producing a definite yield of the calcium carbide, we can compare the economy of the different cycles. As a matter of figures it is enough to say that they come out about the same. But the new product effects other results. It diminishes the minimum size of gas holder required for the usual exigencies of gas supply. A one-foot burner gives perhaps forty candle power, or as much as ten feet of ordinary gas would give. Hence a gas holder of one-tenth the ordinary size could be used. The new gas is made without heat, and without any dangerous agent such as gasoline. Finally, when the gas is made it is a permanent one. The utter simplicity of the apparatus and process is also striking.

One of the curiosities of the carbide is that it will not burn. It can be drawn out white hot from the electric furnace and cast in moulds. A piece can be held in a Bunsen burner without the least effect. But if a drop of water is put upon the stony substance it effervesces, and the gas can be lighted and will burn like a piece of wood for a few seconds until the water is exhausted. Then it goes out.

Merely as a matter of scientific interest it is to be hoped that the commercial production will soon be accomplished. The merciless judgment of the balance sheet has wrecked many a most ingenious scientific triumph. It is to be hoped that acetylene will fare better.

The Craig Colony for Epileptics.

The managers of the Craig Colony for Epileptics, at Sonyea, N. Y., have recently published an interesting report of the work so far accomplished in fitting out the home. During the year considerable progress has been made. In 1894, the Legislature of New York appropriated $140,000 for the establishment of the colony, and of this amount $12,000 has been expended in purchasing the farm which is to form the site of the colony, and in protecting and improving the property. A general design for the colony has been adopted to which all buildings and improvements will be obliged to conform, and architects and engineers, surveyors and others have been employed to carry out these plans. It is proposed to construct first an administration group of fine buildings. These are to be plain two-story structures, entirely disconnected and devoid of all "institutional" features, the whole resembling a cluster of private dwellings. The chief buildings of this group will contain the offices of the superintendent and members of his staff, and it will be here that the patients will be first received. Two of the buildings will be hospitals, one for each sex, and two will be used to accommodate patients before they are distributed in the colony. The idea is to provide the most homelike conditions. The minor offices and wants of the colony will be provided for by the patients themselves.

The designs of the respective buildings will vary from each other in detail and in outline. Everything will be done to prevent the colony from having the appearance of an institution. The home life will be further maintained by providing a dining room for each respective building. The patients from the several buildings will not, in any case, be massed together. There will also be separate buildings, to be known as sewing cottages, laundry cottages, etc. The farm at Sonyea comprises nearly 1,000 acres of excellent land, and much of this will be cultivated. The place will also be beautified by a tasteful arrangement of driveways, lawns, trees, and shrubbery.

Such an institution as is being here provided has for a long time been very badly needed. The State now makes provision in separate institutions for the insane, the blind, the deaf and dumb, and others suffering from chronic maladies. It is no less important that provision should also be made for epileptics. It is estimated that there are 12,000 epileptics in the State of New York. Of this number some 400 are confined in insane asylums and 600 in poor houses. The colony at Sonyea will doubtless correct this abuse. Its surroundings will, besides, be unusually healthful, and its atmosphere as far as possible homelike, and, therefore, restful and beneficial. The plan of providing an epileptic colony is already in successful operation in England, France, and Germany, where much good has been accomplished.

New Torpedo Catchers.

The Banshee, one of the three torpedo-boat destroyers built by Messrs. Laird Brothers, Birkenhead, recently made a successful trial, attaining a mean speed on six miles of 27·97 knots, and for the three hours' running 27·6 knots, being more than half a knot in excess of the contract speed. Exhaustive trials of steering, both ahead and astern, at full speed were also carried out with satisfactory results.

Annual Report of the Factory Inspector.

The ninth annual report of the Factory Inspector of New York State, which has recently been submitted to the Legislature, contains much important information. The inspections of the past year have been very thorough, and much good work has been accomplished. During the year some 13,866 separate workshops have been visited, which employ in all 465,926 persons. Of these it was found that 150,662 were women and 12,536 were children under sixteen years of age. The inspection has led to the correction of many abuses of the laws governing the ages of children employed and the proper protection of the lives and morals of employes. In all, 10,425 notifications requiring changes and improvements were issued, many of which were of great importance.

It was found that the number of children in the factories, under sixteen years of age, was less than in previous years. About 2·6 per cent, or less than 27 children in each 1,000 of factory workers, were under age, and it is claimed that this is a better record than that of any manufacturing State or country in the world. Many improvements have also been brought about relating to the guarding of machinery and the proper protection of operatives. The inspector has, as far as possible, exercised supervision over the sweating or tenement house system of manufacturing. In this work eight deputy inspectors were at work for ten months on the east side of New York City alone. As a result of these inspections a great many notifications were served and enforced to better the conditions of these places. Notifications were also served relating to the guarding of elevators and hoistways, the erection of fire escapes, the renovation of factories, the provision of proper toilet rooms, to better ventilation, and similar improvements. The report states that in most cases the notifications were promptly and cheerfully obeyed.

Electric Road Between Niagara Falls and Buffalo.

Everybody in Niagara Falls is rejoicing, says the Buffalo Express, over the letting of the contract for the building of the electric road between the Falls and Buffalo. The contract, as W. Caryl Ely announced, was formally signed recently in Buffalo, and it was mainly through Mr. Ely's tireless efforts that this road was secured. According to plans, the road is to be built of 94 pound steel girder rails, with side trolley poles. It is to be double-tracked except for a distance of 2½ miles, where the highway commissioners of the town of Wheatfield refused to grant more than a single-track line franchise. The best feature of all is that is will give Buffalo and Niagara Falls cheap fares, the rate to be but 50 cents for the round trip at all times. Quick time is to be made, and in order to do this the road is to be made so that heavy cars can be used. The running of late cars will keep hundreds of Buffalo people in Niagara Falls until late in the evening, who now are obliged to go home before the really enjoyable part of the day about the Falls comes. The power for operating the road will be furnished by the Niagara Falls Power Company, and according to the contract, the cars will be running by July 1 of this year.

In Niagara Falls the road will be run on the tracks of the local street railway company from Echota, and this line, which is now a single track, will be double-tracked this spring and rebuilt entirely.

All the capital for the building of this road has been secured and the moment the weather permits, work on its construction will begin. The first section between Buffalo and Tonawanda will, it is said, cost about $500,000, complete.

The "Experimental Farms" of Canada.

For several years the provinces and the federal government of Canada have been taking an active interest in the improvement of agricultural methods throughout the provinces, and at present the equipments of their so-called "experimental farms" are very complete and efficient. The central experimental farm, situated near Ottawa, comprises some 500 acres of land and a complete outfit of buildings and the necessary machinery. The buildings are especially fitted up for cattle, horses, pigs and poultry, and all of these are well stocked. There is also a dairy equipped with the modern appliances for carrying on experimental work. The farm also includes a seed testing and propagating house and a conservatory. Besides this central station, there are eleven experimental farms situated in other parts of Canada, and these carry on experiments in agriculture, horticulture and arboriculture with much profit. The several farms are situated so as to render them as helpful as possible to the most thickly populated districts, and in their equipments and general methods they resemble closely the central station. The staff of workers at the central experimental farm includes a director, an agriculturist, a horticulturist, a botanist, an entomologist and a chemist. There is also a poultry manager, a "foreman of forestry" and several assistants to assist the members of the staff. The work is varied in nature and has to do with practically everything which relates to farming in Canada. The adaptability and merits of various varieties of wheat are, for example, the subject of careful inquiry.

Experiments are also carried on to determine the vitality and purity of various agricultural seeds, and to investigate the nature of the diseases of plants and trees, and the cure for the ravages of insects. Various varieties of fertilizers are tested to determine their comparative value with different soils and crops. The study of the care of animals is also a very important interest, and the value of different breeds of stock and their adaptability to various climates and other conditions are carefully investigated.

These stations also examine the scientific and economic sides of butter and cheese making. Experiments are also carried on to determine the best methods of planting and pruning trees for fruit raising or for shelter or timber. The information gained in all this work is carefully recorded and published for general distribution.

First Aid to the Electrically Shocked.

The French Minister of Public Works, under expert advice, has prepared the following rules in case of shock: The victim is to be, first of all, taken into an airy place; three or four persons should be taken there to assist and no one else allowed to enter. The clothing is to be loosened and efforts made to re-establish respiration and circulation as soon as possible. To re-establish respiration, recourse can be had to the following two methods, viz., drawing of the tongue and artificial respiration. In the former case, the mouth of the victim is opened with the fingers, or, if there be resistance, with a piece of wood, the handle of a knife, spoon or fork, or end of a walking stick. The front part of the tongue should then be taken between the thumb and index finger of the right hand, bare or covered with, say, a pocket handkerchief to prevent slipping. The tongue is then strongly pulled, and allowed to relax, in rhythmical imitation of respiration, at least twenty times a minute. These movements must be continued without a break for half an hour or more. For artificial respiration the subject should be laid upon his back, the shoulders slightly raised, the mouth open and the tongue free. The arms are taken at the height of the elbows, supporting them strongly on the walls of the chest, next bringing them above the head, describing the arc of a circle. These movements are to be continued at least twenty times a minute until the re-establishment of natural respiration. It is suitable to commence with the movement of the tongue as described, simultaneously, if possible, with the adopting of artificial respiration. At the same time, it is desirable to try and restore circulation by rubbing the surface of the body, by beating the body with the hands or with wet towels, throwing cold water on the subject from time to time, and applying ammonia or vinegar to the nose.—Boston Transcript.

Iced Bar Base Apparatus.

The United States Coast and Geodetic Survey employ an interesting and ingenious apparatus for determining the exact measurement of base lines. Considerable difficulty is experienced usually in this work from the variation of the measuring bars due to changes of temperature. A measuring bar will even be so affected by the heat of the hand holding it as to become more or less inaccurate. The length of a rod of brass or copper a foot long will vary from the heat of the hand from 0·007 inch to 0·01 inch. In order to secure perfect accuracy this expansion must be considered. In outdoor work such as surveying it is of course impossible to keep the measuring rod at a constant temperature.

The apparatus used by the survey for avoiding this danger is known as the "Iced Bar Base Apparatus." By this device a single rigid bar is used as the element of length. The bar is carried in a Y-shaped trough and when in use it is surrounded by melting ice, which, it will be seen, serves to preserve a uniform temperature for the rod. The trough is very rigidly constructed and especially adapted to resist vertical strains. The trough is completely filled with pulverized ice, and the slanting sides of the trough serve to keep the ice constantly in contact with the bar. The particles of crushed ice used for this purpose vary in size from the smallest flakes up to the size of a cubic centimeter. This is found to suit the purpose better than snow or pulverized ice, since it does not pack.

The bar is rectangular in shape and is formed of rolled tire steel. The upper part of the bar is cut away at either end to receive the graduation plugs, which are of platinum-iridium. The trough carrying the iced bar, as described, is attached to two cars, which may be moved along a horizontal track. The measuring may be moved in this way to the positions required in measuring the base lines. Micrometer microscopes are used to mark its successive positions. The trough is covered with a close fitting jacket or blanket of heavy white cotton felt, which serves to protect the ice in a measure from the heat. In actual practice the apparatus is found to work very successfully.

Ordnance Notes.

Lieutenant E. F. Qualtrough, U. S. N., has contributed some interesting notes on the progress of ordnance in the thirteenth number of the General Information Series issued by the Office of Navy Intelligence of the Navy Department. The leading authorities seem now agreed that the naval artillery of the future will be of more moderate dimensions. There are several objections to guns of large size. The endurance of a gun diminishes as the caliber increases. The machinery required for the manipulation of heavy guns is easily disabled by a projectile from a comparatively small gun, and large guns can only be fired at intervals of several minutes, so that often much smaller rapid-fire guns will do more execution. The employment of guns of moderate size paves the way for improvements in reduction of displacement and increase in the coal endurance. For a given outlay the reduction of caliber means an increase of ships and guns, and where a large battery of guns of moderate dimensions are provided, there is less danger of the vessel being crippled by the dismounting of a gun or two. The projectile fired by the latest 12 inch gun is capable of perforating any armor afloat at fighting ranges, so that if the penetrating power is sufficient to sucessfully attack the defensive armor which is liable to be encountered, it is advisable to increase the number of guns and not their size. The manufacturers of rapid-firing guns have been increasing the caliber of their weapons and have recently made important improvements in mounts and ammunition.

An efficient gun mount has such important duties to perform that the new devices in the way of disappearing carriages and means of absorbing the energy of the recoiling gun that the progress made in the last few years is fully as great as that made in the gun itself. By arranging for the recoil to take place in the line of fire the "jump" is much reduced, and sudden blows to the deck are obviated, although a severe strain is necessarily brought upon it. Springs have been generally introduced for returning guns to the firing position. They were first used with the mounts for rapid-firing guns, and the experience thus obtained has led to their more extended employment. Gun shields have increased in thickness, and nickel steel is being introduced for use in constructing them. Sights are now usually fitted on the mount, so that the pointing of the gun is in no way interfered with by the loading or firing.

Food Fish of Alaskan Waters.

A careful study of the many varieties of food fish of Alaska has recently been made by one of the government ichthyologists in the interests of the Smithsonian Institution, and the observations made are very valuable and interesting. In Alaska every native is a fisherman, and the fish of these waters are so abundant and of such variety that the entire native population is able to support itself by this means. The report, it is to be hoped, will lead to some arrangement by which these quantities of food fish may be brought to the markets of the United States.

The great wealth of Alaskan waters lies in their abundance of salmon. The natives catch the salmon by the aid of spears, nets and traps, and dry them at present for their own use exclusively. The large variety known as king salmon often weigh from sixty to ninety pounds apiece, and these are very abundant. The waters also swarm with codfish equal, it is reported, to those of New England. In the northern rivers several varieties of whitefish take the place of salmon. They grow to a weight of about thirty pounds and have a delicious flavor. The rapid streams are well supplied with grayling; and Dolly Varden trout are very plentiful, and frequently exceed fifteen pounds in weight. Quantities of pike, dogfish and redfish also abound. Probably the most abundant of all fish, however, are the common herring. These are very fat and of an excellent flavor. It is said that vessels often sail for hours at a time through shoals of these herring.

Weather and the Mind.

The psychology of the weather is considered by Dr. T. D. Crothers as a promising subject for study. He says, in Science:

"Very few persons recognize the sources of error that come directly from atmospheric conditions on experimenters and observers and others. In my own case, I have been amazed at the faulty deductions and misconceptions which were made in damp, foggy weather, or on days in which the air was charged with electricity and thunderstorms were impending. What seemed clear to me at these times appeared later to be filled with error. An actuary in a large insurance company is obliged to stop work at such times, finding that he makes so many mistakes which he is only conscious of later that his work is useless. In a large factory from 10 to 20 per cent less work is brought out on damp days and days of threatening storm. The superintendent, in receiving orders to be delivered at a certain time, takes this factor into calculation"