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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE MOTORMAN.

It was only by a fraction of a second of time that the President of the United States escaped being killed, as the result of the recklessness or stupidity of a trolley-car motorman, who, on being reproved by the Chief Magistrate of the land, proceeded to give a display of that brutal indifference and brazen-faced impertinence with which the public is only too familiar. The fact that it was the President himself who was imperiled has served to draw public attention to the general incompetency of the men who run our modern trolley cars; and the public horror of the accident, with its actual and possible consequences, is, of course, accentuated by the fact that we have been within an ace of losing a President by violence for the second time within a year. Yet, as a matter of fact, the peril of instant death which overtook the President is one which confronts hundreds, and indeed thousands, of the citizens of this country every day of the year. There is no question, and there has been no question in the public mind for several months, that the time is ripe for stringent legislation affecting the selection and appointment of men to the most important position of motorman. The companies will have to make a more careful choice; they will have to give a rate of wage for this work which will attract to it only the best and most skilled men.

It is far from our intention to cast a slight on the large and rapidly-increasing body of motormen as such; for we believe that the majority of them are careful and conscientious men who realize the dangers of their work and its enormous responsibilities, and endeavor to put their cars through on schedule time without riding rough-shod over such rights of the road as are possessed by other traffic, whether vehicular or pedestrian. At the same time, it is a fact that there are many men handling the controller who are in every way unqualified for the task. They are often ignorant, callous, and domineering, and only too ready to assert the brute force which is exemplified in the size, speed and momentum of the cars they run.

Considerations of public safety demand a thorough investigation of the whole subject of the selection and training of motormen; and in considering this question it is necessary to realize at the very outset that the responsibilities of the task assigned to the motorman have been greatly underrated. We venture to assert without fear of contradiction that the driving of a motor car at a moderate speed in a crowded city, or at the higher speeds that obtain in suburban service, calls for closer watchfulness and quicker judgment than the driving of a fast passenger locomotive on a steam railroad. A few considerations will show this. In the first place, the steam locomotive runs on a fenced-in right of way, and has the exclusive use of its own pair of steel rails; its movements are controlled by an elaborate system of signals, which is so arranged that the engineer, except in cases of extraordinary emergency, finds every provision made to assist him in controlling his train and maintaining it in its proper position relative to other trains; there are no cross streets at every 200 to 300 feet, through which other trains may come unheralded to cross his track; nor is there a mass of vehicular or pedestrian traffic that may quickly gather and surge over the track in front of him, necessitating exquisite judgment as to pace and distance if he would avoid continual arrest on the charge of culpable homicide.

The motorman, on the other hand, runs his car on a public thoroughfare; he has no signals to warn him of obstructions; no carefully marked-off distances; no home and distance signals; no clearly-painted signboards giving him the pitch of the hills, or even in some cases the curvature of the line; he has to depend on his own judgment as to speed and distance; and at any time, when he is speeding his car in the effort to keep up with the company's schedule, he is liable to find the track ahead of him obstructed by a

lumbering wagon or some unsuspecting or bewildered pedestrian. We venture to repeat that of the two men the motorman holds the more difficult and responsible position; and yet we find that while in the case of the steam railroad, engineers are subjected to an apprenticeship of many years before they graduate to the throttle, and by that time are a highly intelligent and well-paid body of men, the average trolley-car motorman, on the other hand, is rushed into his job with absurdly inadequate preparation; that his pay is barely half as much as that of the locomotive engineer; and that in point of intelligence, training, and reliability, he does not compare with the men who, as a matter of fact, have the less difficult and exacting work to do.

This is all wrong, and we are paying the penalty for it in the ghastly list of tragedies which, during the last summer months, has been growing frightfully in length and in the shocking nature of its fatalities. The fact of the matter is that while the motorman had a comparatively easy task when electric trolleys were first introduced, when cars were small and speeds were low, the motorman of to-day is in a vastly different position, handling as he does a car which is two or three times as heavy and travels at nearly two or three times the speed of the car of fifteen years ago. The great peril through which our President has recently passed will not have been without its due effect, if it leads to a thorough investigation and some stringent laws on the selection and training of trolley-car motormen.

"AMERICA" CUP RACES IN 1903

The announcement that a challenge has been dispatched from the other side for a series of races for the "America" cup in the year 1903 will be welcomed by that large section of the American people that has followed with interest the history of this great aquatic contest. It has been understood for some time that a challenge would be forthcoming, so that the actual announcement has not caused any measure of surprise. At the close of the 1901 races, Mr. Watson, the designer of "Shamrock II.," absolutely refused to undergo again the anxiety and labor attendant upon the designing and tuning up of a challenging yacht. At the same time, he expressed his perfect willingness to render to Mr. Fife, or whatever designer should be chosen for the new boat, all the assistance at his command, and to place at his disposal the valuable data acquired during the preliminary investigation and subsequent construction and sailing of "Shamrock II." The designing of "Shamrock III." has been intrusted to Mr. Fife, who also designed the first "Shamrock"; and it is now announced that the plans have been completed for many months, and that a start on the actual construction of the yacht has been made by the Denny Brothers, the builders of "Shamrock II." Sir Thomas Lipton seems to have learned one of the most important lessons of his previous failures, namely, that a challenger to have any reasonable chance of success must be put into the water many months earlier than previous challengers have been, so as to give ample time to tune her into racing condition. It is expected that the new boat will be launched by the end of the year and tuned up on the Clyde against "Shamrock I." From the Clyde, if the programme is followed out, she is to be taken to the Mediterranean for the spring season, after which she will make an early start for this country, where "Shamrock II." will have been launched and put in racing trim to meet her in a series of tuning-up trials off Sandy Hook. If the plans for the challenger, as thus outlined, can be put through, the new yacht will not enter the races as an untried boat. She will have had an opportunity to measure herself against two previous challengers, and will also have had the advantage of sailing a series of races over the Sandy Hook course, under conditions identical to those which obtain in the actual cup contests. We welcome the announcement that there is to be another series of races; for in the whole field of sport there is none so dignified, none with so clean a record, and none that is marked by more friendly characteristics than that of international cup racing. While the construction of the yachts themselves has come to be a question of science and good mechanics, the handling of the yachts allows to-day, just as much as it did half a century ago in the days of the good old "America," a broad field for the exercise of the sailing skill of the skipper, and the smartness and agility of the yacht crews.

THE DEFENSES OF LONG ISLAND SOUND.

Much cheap satire has been leveled at our army and navy during the past two weeks in connection with the game of war which has been played off our North Atlantic coast—satire which has merely served to measure the ignorance of the would-be humorist of the true meaning, scope and usefulness of these maneuvers. In the first place, it is a fact which the layman too little understands, that even when guns are not shotted and mines and torpedoes are harmless dummies, it is possible to simulate the conditions of actual warfare

with a close approach to actual conditions. Naval experts who have given a lifetime to the theoretical study and actual practice of war have been able to draw up a scale of points by which in mimic warfare they can assign to a battleship or a fort a close approximation to the amount of damage inflicted or received. Of course, when it is laid down that if a warship carrying 6 inches of side armor comes within 2,000 or 3,000 yards of a fort armed with 12-inch guns, and is discovered and fired upon, the vessel is put out of action—it is assumed that at such a close range a 12-inch gun will find its mark. In an actual fight, it might do so, or might not. Again, if a fleet of half a dozen torpedo boats can creep up in a fog within striking range of a battleship, and discharge their torpedoes, it is reasonably assumed that such a vessel is sent to the bottom; and so, throughout the whole range of operations involved in an attack such as has recently been made on our Long Island defenses, it is possible, by using a system of points, to reach in the total, a pretty fair estimate of what would happen were the ships those of the enemy, and the guns and torpedoes loaded to destroy.

Of the value of these maneuvers to the ships and forts themselves there can be no question. Everything is present during a sham fight except the destruction wrought in the ship or fort itself by the enemy's gun fire; and surely that is worth much in training both to officers and crews. So also, to judge from the standpoint of defense, most valuable experience must necessarily be gained, say, by the Signal Corps, when they know that a hostile fleet is endeavoring to force a passage and that on their eternal vigilance and early finding of the enemy will the result of the operations greatly depend. Similar maneuvers are carried out every year by the great navies of Europe, and for a quarter of a century or more have formed a regular and important part of the year's routine. Evidently they have proved to be of practical value, else, on account of the great expense involved, they would surely have been long ago discontinued. Of the result of the maneuvers themselves, it is impossible to offer any opinion for the very good reason that they are a matter of secret official record, and known to no one outside of government circles. The publication of these results, which will take place in due course, will be made probably through the official journals of the army and navy, and they cannot fail to prove most instructive reading. For the present it is sufficient to say that the ordinary press comment on the maneuvers is necessarily as futile, as much of it is foolish and misleading.

ELECTRICAL TREATMENT FOR LEAD POISONING.

An installation of electric baths for the treatment of lead-poisoning in the pottery industries of England has been carried out at Stoke-on-Trent. One of the most prevalent maladies contracted in the pottery factories is lead poisoning, and paralysis, and the complaint has become so great during late years that it was resolved to establish electric baths, since electro-therapeutics is conceded to be the only efficacious means of combating the disease. The installation provides for continuous and alternating-current baths. The necessary current is taken from the street mains to charge a large accumulator, which is capable, when fully charged, of working the baths for fifteen hours. The accumulator is controlled by a switch which completely isolates it from the bath apparatus when charging, and so avoids any possible connection between the high potential of the current from the street mains, which is utilized for the tram-car service, and the baths. A pair of wires are run from this switch to a board, where they are divided up into six pairs. One pair is for the machine that converts the continuous current from the accumulator into an alternating current; one pair goes to the controlling board for the large bath; two other pairs go to two arm baths, and the remaining two pairs are in reserve. The machine consists of a motor and a dynamo coupled together, and running at 3,000 revolutions per minute, this high speed being necessary in order to obtain the requisite number of alternations per second of the current. The alternating current is carried by a pair of wires from this dynamo to a board, where they are divided into five pairs, one pair being for the large bath, two other pairs for the two arm baths, and the remaining pairs are held in reserve. Thus there are four wires going to each controlling board, two carrying continuous and two alternating current. By means of a switch on these boards either the alternating or the continuous current can be turned on to the bath as required. A regulator is mounted on the boards for adjusting the current to the proper potential, and on the controlling board for the large bath a voltmeter and an ammeter are attached. The current is passed through the water in the bath from two tin plates, one at the head and one at the foot, a third plate like a paddle being provided to concentrate the current on any particular portion of the patient's body. The Roentgen rays are worked from an induction coil, capable of giving a 10-inch spark, the current being