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NEW YORK, SATURDAY, SEPTEMBER 19, 1903.

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.

GREAT ECONOMY OF THE MOTOR CYCLE.

Extremely satisfactory to the friends of the motor cycle was the result of the tests of speed and economy which were carried out recently at one of the bicycle tracks in this city. The management very wisely determined to try out the qualities of normal motor cycles of standard make and reasonable horse power under conditions that would approximate those that obtain when any private citizen takes out his machine for a day's run over fairly good roads. There was a four-hour race, in which only machines that were of five horse power or under were allowed to compete, and it was required that they should be ridden in every case by amateurs. The winning machine covered 150 miles at the average rate of 37½ miles an hour, while the half dozen other riders that finished covered from 115 to 142 miles in the four hours. The endurance of the motor cycle was shown in the case of one rider who covered 131.3 miles without a stop, while another contestant who set out to establish the endurance of his machine remained in the saddle for the whole four hours. Perhaps the most remarkable result of all was that achieved by a 1¾-horsepower machine, which was driven for 19 miles, 1348 yards, at a speed of 30 miles an hour on a consumption of only one pint of gasoline that cost about three cents. If any one had foretold two years ago that a motor-driven machine would be produced to carry a rider six and a half miles for the expenditure of one cent for fuel, he would have been written down as a visionary of the most extreme type. It is true that this result was achieved on a smooth track that was free from grades, and on a day when there was only a light wind blowing; but even with these admissions the feat must be regarded as highly meritorious and extremely promising for the future of the motor cycle industry.

EYE-BAR CABLES.

The continued opposition of the Board of Aldermen to the adoption of eye-bar cables for the new Manhattan Bridge has led the Bridge Department to seriously consider the advisability of using the unexpended remainder of the sum of money voted for the construction of this bridge in building the towers and other substructural work according to the proposed plans. This, it is claimed, would necessitate the completion of the superstructure also in conformity with the proposed plans. We doubt the wisdom of such a course, for the reason that the Board might maintain its opposition to the eye-bar cables and precipitate a deadlock, of which no one could foretell the end. We have already pointed out in this journal that the objections to the eye-bar are either sentimental or fanciful. Not only is there no valid engineering objection that can be raised against them, but they have, in this particular design, certain merits, both of appearance and economy of material and time, which should lead to their immediate adoption. Because we have been building long-span suspension bridges of wire for so many years is no reason whatever why we should continue to build them on this system indefinitely. Indeed, judged from the purely American standpoint, its long-continued use furnishes a good reason why we should investigate the system to see if it cannot be improved upon. The eye-bar method of construction is distinctively an American creation. We have developed it until the eyebar bridge has come to be regarded as the distinctively national type. No one has heard a word of objection against the Blackwell's Island Bridge, in which the eye-bar figures just as extensively as it does in the proposed Manhattan Bridge. The functions, the shape, and the stresses to which they will be subjected, are broadly similar in both bridges, and the opponents of the type have yet to present an objection to their use in the new Manhattan Bridge either from the standpoint of architectural effect or engineering utility which will stand the test of impartial investigation.

INTERMEDIATE BATTERIES ON BATTLESHIPS.

The latest announcement of the designs of the new Russian battleships is that they are to carry four 12-inch and twelve 8-inch guns as their principal armament. The 12-inch gun appears to be thoroughly well established as the proper piece to mount in the main battery of the modern battleship; but for the secondary battery there has been, and still is, a wide diversity of opinion as to the best type of gun. In all navies there is a growing tendency to increase the weight of the secondary pieces and provide guns that are armor-piercers at ordinary battle ranges. Until lately the 6-inch gun was the popular secondary-battery weapon. Then Great Britain brought out her 7.5-inch gun, and the United States her 7-inch gun, to be followed a little later by Italy, which, in the "Vittorio Emanuele," boldly adopted a secondary battery made up exclusively of long-caliber, 8-inch rapid-fire guns. How great has been the change of ideas on this subject is seen, when we remember that in our own navy we have two battleships, the "Kearsarge" and "Kentucky," whose secondary battery is made up of 5-inch guns, while the "Iowa" carries a mere popgun battery of 4-inch rapid-fire guns. We have no doubt that the Russian government, following the lead of the Italians, has taken a step in the right direction. The modern 8-inch piece, with its improved breech mechanism, can fire with a rapidity equal to if not greater than that of many existing 6-inch guns in the rapid-fire batteries of the older ships, and its striking energy at the more distant ranges is so much greater than that of the 6-inch piece as to render it an incomparably more effective gun, weight for weight. In giving credit to the Italian government for being the first to adopt a secondary battery made up entirely of heavy armor-piercing guns, it must not be forgotten, however, that the 8-inch piece has always been carried in our warships in considerable numbers, and that it has formed what might be called an intermediate battery midway between the 12-inch and the 5 or 4-inch battery, as the case might be; so that in using an 8-inch gun exclusively the Italians have merely developed an idea, the germ of which has existed for more than a decade in our own navy. We think it is probable that our future battleships will carry in their secondary battery only one caliber of armor-piercing guns, and that the piece selected will be either the 8-inch or some new gun of 8½ or 9-inch caliber. The 6-inch gun will disappear altogether, and the 14-pounder will be used exclusively for the third or rapid-fire battery. This would result in a simplification of the arrangement of ammunition rooms and hoists, and as there would be only three calibers of gun, the chances of confusion of ammunition during the stress of battle would be proportionately reduced.

DISTRIBUTION OF TRADE AT THE PORTS OF THE UNITED STATES.

In connection with the steady increase in the export trade of this country, it is interesting to know that there is a more rapid growth of trade at the ports located on the Gulf of Mexico, the northern lake border and the Pacific coast than at the Atlantic coast ports. Although by far the larger portion of both the export and import trade passes through ports on the Atlantic coast, it is noticeable that in recent years the export trade is finding its way, in an increasing proportion, to the ports at the North, South and West, although about eighty per cent of the total import trade still enters this country through the Atlantic seaboard. As compared with the year 1901, the figures for the fiscal year just ended show a reduction of exports for Boston of 55 millions; for New York, of 24 millions; for Philadelphia, 6 millions; Baltimore, 25 millions; Newport News, of 7 millions, and for Norfolk a reduction of nearly 2 millions. As we continue southward down the coast, we find that there is an increase in exportations at Savannah of about 8 millions; at Wilmington, N. C., of over 2 millions; and at Galveston, an increase of 3 millions. Combining all of the Atlantic ports, the total exports of 1903, compared with those of 1901, show a falling off of 98 millions; while the figures for the Gulf ports are about the same in 1903 as in 1901. The exports of the Mexican border ports have increased nearly 5 millions, and of the Pacific ports about 10 millions; while the northern border and lake ports show an increase of 18 millions. In imports, however, the Atlantic seaboard is increasing its commanding lead. In the year 1903, out of the total imports into the United States of 1,025 millions, eighty per cent came in through the Atlantic ports. A comparison of the figures for 1903 with those of 1901 shows that there has been an increase of 151 million dollars at the Atlantic ports, 12 million dollars at the northern ports, 8 million dollars at the Pacific ports, and 25 million dollars at the northern border and lake ports. A comparison of the growth of the past ten years shows that whereas in 1893 the total of exports of New York amounted to 347 millions, in 1903 they had grown to 505 millions, an increase of 158 millions; while the imports had grown in the same period from 548 millions to 618 millions. A truly remarkable story of commercial development, and one without a parallel in the history of the world.

THE CAUSE AND CURE OF HAY FEVER.

Hay fever is a catarrhal affection of the eyes, nose, and throat, accompanied by violent sneezing and asthmatic symptoms, to which very many persons are subject in the summer while others are entirely immune. The attack commonly begins in the latter part of May and continues six or eight weeks.

Medical treatment has hitherto been of little use. The best palliative is a trip to the seashore.

Until recently there has been great uncertainty as to the cause of the disease, which has been variously attributed to the heat of early summer, exhalations from grass and new-mown hay, mechanical irritation by pollen from grasses and other plants and, recently, to bacteria.

Prof. Dunbar, of Hamburg, who has been studying the subject for seven years, now publishes, in the Deutsche Medizinische Wochenschrift, experiments which seem to disprove all these theories and also to hold out the hope of curing hay fever by a rational treatment.

According to Dr. Dunbar, the disease is caused by the pollen of grasses, but not by mechanical irritation. He has extracted from the pollen a poison, or toxin, which is insoluble in ether and alcohol, but soluble in water and weak saline solutions, tears, the mucus of the nose and the serum of blood. A solution of this toxin dropped into the eye or nose at once produces the characteristic symptoms of hay fever. The same symptoms in an aggravated form occur when the solution is injected hypodermically.

This discovery suggested treatment by the serum method and Dr. Dunbar set to work to produce a curative serum by inoculating animals with pollen toxin. For several months these animals yielded a blood-serum which aggravated instead of relieved the sufferings of hay fever patients, but in time counter-poisons were formed in the blood of the inoculated animals and a serum was obtained which, when dropped into the eye or nose together with pollen toxin, completely prevented the attack which the latter alone would have caused.

Experiments looking to the cure of the disease began in the latter part of January of the present year. A drop of very active pollen toxin was applied to the eye, and, as soon as the first inflammation appeared, a drop of the serum was applied. The burning sensation ceased instantly, but soon returned. Then a second drop of serum was applied, with similar results. After four drops had been thus given at intervals of five minutes the burning did not return and the redness and inflammation ceased.

When the applications were made to the nose the curative effect was even more strongly marked, because larger quantities of the antitoxin serum could be used.

There is therefore good reason to believe that the disease can be checked in its earliest stage by applying the serum to the external mucous surfaces. Hypodermic injection of the serum would probably be necessary if considerable quantities of pollen toxin had already passed into the blood.

Probably a more powerful serum can be obtained than was used in these experiments. It is not yet certain whether there is a single pollen toxin, a single variety of hay fever, and a single curative serum, or a different toxin, disease, and serum for each kind of grass and grain. Dr. Dunbar has proved, however, that serum from animals inoculated with maize pollen is efficacious against hay fever caused by rye pollen.

It is noteworthy that rye, barley, wheat, rice, maize, and every kind of grain and grass which Dr. Dunbar has investigated yield a toxin which causes hay fever, while, on the other hand, he has not succeeded in obtaining such a toxin from any plant not of the grass family (Graminiæ).

The toxin is permanent and, as the above-mentioned experiments show, is as virulent in winter as in summer.

ALCOHOL AS AN ILLUMINANT.

L. Denayrouze gives some statistics as to the use of alcohol as an illuminant, which has recently been rendered practicable by an increase in the efficiency of the Denayrouze lamp. Taking 1.08 gramme of pure alcohol or 0.64 gramme of carbureted alcohol (*alcohol carburé*) per candle hour as the consumption of this lamp, the cost is estimated at 0.00478 and 0.00298 of a penny per candle hour for these two alcohols, as against 0.01428 of a penny for petroleum. The lamp consists essentially of a wick, conducting the liquid by capillarity into a chamber where it is vaporized, the necessary heat being produced by a copper bar which derives its heat from the lamp itself. The vapor passes through a small channel into a kind of Bunsen burner, above which the mantle is fixed. The series of operations is entirely automatic.—Bull. French Phys. Soc.