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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.

GAS-DRIVEN LOCOMOTIVES AND SHIPS?

The great advance that has been made during the past ten years in the development of the gas engine, and of its valuable counterpart, the gas producer, is making possible the application of the gas engine in fields of work to which, a few years ago, it was supposed to be quite inapplicable. So long as this type of motor was dependent upon the use of gas that was produced in a large stationary plant, nobody thought of applying it to any uses except those that could be served by a stationary engine. In the early days, when the Otto gas engine was making its plucky and successful fight to establish itself as a useful prime mover, and when only units of small horse-power were needed, if anyone had suggested the application of the gas engine to the locomotive or the steamship, he would have been called an enthusiast and a dreamer; yet to-day, thanks to the broad hint that has been offered by that brilliantly successful invention, the automobile engine, we are unquestionably within measurable reach of the time when we may see the gas engine applied both to the locomotive and the large ship. The automobile proved that the gas engine could be applied successfully to transportation, at least in units where the power was of limited size. But it was early evident to inventors that if trains were to be hauled and steamships driven by gas engines, means, compact and economical, must be found for producing the gas continuously as it was needed in a plant that was carried with, and formed practically a part of, the gas engine. It was realized, moreover, that if this prime mover was to be applied generally to railroad and marine transportation, its gas producer must be capable of handling the common grades of coal, that is to say, of taking the "run of the mine" just as readily as does the steam boiler.

Of course, much yet remains to be done in the perfecting of such gas producers. Some excellent designs have been brought out that show economy superior to that of the best steam engines, *provided they are supplied with fuel of good quality*. But there is much to be accomplished before the producer has been brought to the point at which it will take the cheaper grades of coal, such as are consumed with excellent economy under the steam boiler of to-day. As soon as it has been brought up to the desired point of efficiency when using low-grade fuels, we may look for no little activity in the development of a self-contained producer and engine plant for the operation of locomotives and large steamships. In the current issue of the SUPPLEMENT will be found an interesting study of this problem, as worked out on a United States warship and on the largest of the German transatlantic liners. In the latter case, the saving of space would be very striking. The four big smokestacks would literally "go by the board." One complete battery of boilers would be dispensed with, and the large amount of space between decks, now occupied by the uptakes, would become available for greatly-needed passenger accommodations. If the substitution of gas for steam should become widespread, we would have to make a rather sweeping revision of our glossary of terms. The steam locomotive might be renamed, without offense, "the gas locomotive;" but could the public ever bring itself to the point of calling the magnificent high-speed steamer of to-day a gas-ship?

CAN THE PORT ARTHUR FLEET BE RAISED?

The latest advices from the Far East would seem to indicate that the final surrender of Port Arthur was somewhat precipitate. It is at the conclusion of a war, or of some decisive battle therein, that various side lights, in the way of letters and interviews from the principal actors, are thrown upon important events which hitherto have been subject to the censor's blue pencil. This has occurred in the case of Port Arthur; and it begins to be pretty evident that if the judgment of many of the prominent officers connected with the siege had prevailed, the final capitulation would have been delayed for several weeks longer. If the surrender was precipitate, it may well be that many of the precautions, ordinarily taken before the surrender of a fortress, in the way of the destruction of the war material were, in the hurry of the moment, overlooked, or only partially carried out. In view of this contingency, it becomes quite possible that the Port Arthur fleet, which at the time of surrender was resting half submerged upon the bottom of the harbor, was not so completely wrecked by the Russians as to render its salvage by the Japanese impossible. In a recent interview, one of the paroled officers of the Russian navy has stated that, before the terms of capitulation were signed, the sunken ships were wrecked beyond all hope of recovery. On the other hand, the Japanese claim that some of the battleships can be raised and rendered serviceable, and we are inclined to think that the Japanese version is nearer the truth. According to the Russian account, heavy charges of high explosive were detonated in the boiler rooms, engine rooms and shaft tunnels. If this was done, it is difficult to believe that it was done effectually, since the charges, to properly do this work, must have been placed in carefully-chosen positions and in very large amounts. In view of the fact that the ships were submerged and under fire, this would be a particularly difficult task, and would require an elaborate equipment of divers and mining apparatus, which, in the disorganized condition into which the navy seems to have fallen, can scarcely have been available.

Should it turn out that the ships have suffered no other harm than that produced by the shells that sank them, the task of salvage, though difficult, should not be beyond the powers of the Japanese wrecking crews. The ships were sunk chiefly by the 11-inch projectiles from the mortar batteries. They fell, most of them, almost perpendicularly, and it is likely that, with their usual forethought, the Japanese used armor-piercing projectiles, that were not intended to burst on contact, but passed directly through the various decks and out through the bottom of the ship. Hence it is likely that the water entered through several more or less widely-scattered shell holes, and that the damage at each point of rupture does not extend over an area of more than a few square feet. If this be the case, it would be possible, by temporary patching of the inner bottom, to pump out the vessels and float them, one at a time, into the Port Arthur drydock, or possibly tow them directly to the Japanese yards. The extraordinary vitality betrayed by these very ships, after being struck more than once by torpedoes or floating mines, gives a reasonable expectation that the essential structure of the vessels are still intact, and that a few months in drydock and within reach of a machine shop, may see them added to the Japanese navy and available for the first line of defense. Of the five battleships, one, the "Sevastopol," was sunk outside the harbor in 150 feet of water, and she must be considered as permanently destroyed. The others, including the "Retvizan," "Pobieda," "Peresviet," and "Poltava," were sunk inside the harbor, and are only partially submerged. Wrecking operations, therefore, can be carried on from the decks of the ships themselves, and in no case, probably, under a greater head of water than 40 to 45 feet. The most valuable of these ships is the "Retvizan," which was built in 1900 at the Cramps' shipyard in this country, and may still be reckoned as a thoroughly modern ship. The "Pobieda," built in 1900, and the "Peresviet," built in 1898, are also modern battleships that made, on trial, speeds of 19.1 and 18.5 knots respectively, and carry a numerous battery of long-caliber high-velocity guns. The "Poltava" is an older vessel of doubtful value, launched in 1895; her main armament of four 12-inch guns is somewhat obsolete, and her speed is low. If the three former vessels can be salved, they will form a most powerful addition to the Japanese fighting line, and will give them a decided preponderance over any fleet, or combination of fleets, that Russia can place in the Far East, for at least two or three years to come.

WORLD'S AUTOMOBILE RECORDS IN FLORIDA.

It is gratifying to know that the world's record for the mile, against time, which was brought to this country last January, when W. K. Vanderbilt covered the mile, in a 90-horse-power Mercedes, in 39 seconds, will remain here for the present at least, and probably throughout the whole year. In the meet which was held last week on the famous beach at Ormond, Florida, last year's record for the mile was beaten by no less than three different machines. The fastest run was made by H. L. Bowden on a 120-horse-power Mercedes, weighing 2,650 pounds; his time for the mile being 34 1-5 seconds, and his rate of speed 105.26 miles per hour. The next fastest time was made by an English car, a six-cylinder Napier of 90-horse-power, of less than the regulation weight of 2,204 pounds, driven by A. C. McDonald. This machine ran the mile in 34 2-5 seconds, at the rate of 104.65 miles per hour. The third car to surpass last year's record was a steam car of 20-horse-power driven by L. S. Ross, which covered the mile in 38 seconds. The 120-horse-power machine and the steamer were both constructed specially for racing, the former consisting of a frame lengthened to accommodate two standard 60-horse-power Mercedes engines, placed in tandem on a common shaft, and the Stanley steamer being also a special design, modeled on what has come to be known as the "torpedo" lines, which present as little resistance as possible to the atmosphere. The Napier performance will stand as the official record, on the ground that the machine is a stock machine, coming within the prescribed limit of weight; but it must be admitted that the performance of the steam-driven car is one of the most sensational and altogether surprising events of the meet. It shows how largely the greater power of the gas-driven machines is compensated by the more even torque of the steam engine. Of course, much of the high speed of the steamer is due to its light weight, and to the small sectional area presented to the atmosphere. There can be no question, indeed, that on an ideal track, such as this at Florida, and at the high speed at which the trials were made, the air resistance is by far the most important obstacle to speed.

The record for the kilometer remains in Europe, at least for another year. The Napier machine, with a record of 23 seconds for the distance, being the nearest that any of the racers came to Rigolly's remarkable time of 21 2-5 seconds, made in 1904. In the Florida time trials, the double-engined Mercedes made the distance in 23 3-5 seconds, and the steam-driven car in 24 1-5 seconds.

Unquestionably the most meritorious feat in the time trials was the run of five miles by the Napier car in 3 minutes and 17 seconds, which is 14 1-5 seconds faster than the record made by Vanderbilt in a 90-horse-power Mercedes last year. It works out at an average of 39 2-5 seconds for the mile, or 91.37 miles per hour. For the complete details of the various time trials and races, reference is made to the illustrated article given elsewhere in this issue.

OUR EXPORTS.

Exports of manufactures in the calendar year 1904 exceeded $500,000,000 in value. Details of eleven months' exports just completed by the Department of Commerce and Labor, through its Bureau of Statistics, show for the eleven months of the present year a total of $459,575,023 of manufactures exported, and for the month of November alone $46,608,896; so that, unless the December exports should prove much less than those of November, the total exports of manufactures for the calendar year must exceed 500 million dollars.

In the calendar year 1903 the exports of manufactures were but 421 millions; in 1900, in which year the highest export record in manufactures occurred, the total for the calendar year was 441 millions; in 1898, 308 millions; in 1896, 253 millions; and in 1894, 178 millions. Thus the exports of manufactures in 1904 seem likely to be nearly three times as great as those in 1894. The increase in the exportation of manufactures has been sufficient to nearly offset the phenomenal reduction in exports of agricultural products.

As is well known, the shortage in our own wheat supply, coupled with the unusual demand in the home market and the unusually large surplus in other countries from which our former customers were able to draw freely, have caused the exports of breadstuffs from the United States, and especially those of wheat and flour, to fall off greatly in the last year, so that agricultural products which, in the eleven months ending with November, 1903, amounted to 789 million dollars in value, were but 704 millions in the corresponding months of 1904, a fall of 85 millions; while manufactures show an increase of 77 millions, the figures for the eleven months of 1903 having been 382 millions, and in eleven months of 1904, 459 millions. In addition to this, products of the mines show an increase of about 3 millions, products of the forests 3 millions, and products of the fisheries 1 million dollars; while the miscellaneous group shows a decrease of about 1 million dollars and foreign merchandise exported a decrease of nearly 2 millions, bringing the total exports for the eleven months of 1904 up to $1,306,173,292, against $1,309,933,517 in the corresponding months of 1903.

On the import side the total importations for eleven months are $939,381,659, against $917,725,693 in the corresponding months of last year. The fact that the imports for the single month of November, 1904, were $95,208,172 seems to justify the statement that the total imports for the calendar year will be over one billion dollars. The greatest increase in imports occurs in articles of food, chiefly sugar and coffee, which divide honors about equally in the increase in imports of foodstuffs. The other group showing an increase is "articles in a crude condition for use in manufactur-