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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.

EDUCATIONAL VALUE OF THE HUDSON-FULTON CELEBRATION.

In view of the considerable cost, exceeding $1,000,000, of the Hudson-Fulton Celebration, the question has been raised as to whether any results have been realized, or could possibly be realized, that justify so great an outlay. If by results we are to understand any tangible commercial returns, it might be difficult to give a satisfactory answer; although it cannot be doubted that mine host of the inn and that innumerable army which caters to the physical well-being of a holiday crowd are more than satisfied.

To those of us who are in the habit of looking below the surface of things, and who ever bear in mind the transcendent importance of the spiritual and moral over the merely material, it will be evident that the mere outlay upon the recent festival is of minor importance compared with the valuable gain to New York city, the Hudson River district, and to the country at large, due to the close attention which that festival has directed to certain important events in the history of the United States, and the correcting of certain serious historical errors concerning them.

Thus, in view of the far-reaching importance of his discovery, it was well worth the cost and trouble of the celebration to abolish once and for all the mythical "Hendrik" Hudson, and have restored to the page of history the actual "Henry Hudson, Englishman," who sailed in a Dutch ship and under the Dutch flag after signing the recently discovered contract in which he is so named and thus designated. And it may be as well just here to explain that the total absence of the English flag from the elaborate scheme of decoration was perfectly proper, even in spite of the fact that it celebrated the feat of a British citizen. For the discovery of the river was made under the auspices of a Dutch company and by a ship which flew the blue, white, and orange, just as that other great event commemorated by the celebration, the inauguration of steamship travel, was achieved by a vessel which flew the American flag. Technically considered, the exclusive use of the old Netherland colors and of our national emblem was correct; and had the scheme of decorations been thrown open to include the flags of all nations, it would certainly have lost much of that distinctive character which was one of its successful features. Now that the historical facts as to the real name and nationality of Hudson have been presented in such convincing form to the world at large, it is to be hoped that the mistaken spelling of the name will be carefully avoided in the interests of historical accuracy.

The other important truth brought out by the recent festival is the true relation of Verrazzano and Henry Hudson to the discovery of the Hudson River. The name of Hudson has been given to the river by practically universal consent, because he was the first navigator to make a complete exploration of the river throughout its navigable length, and to leave behind him a careful record of what he saw and did. He did not himself claim, nor as far as we know has anyone claimed, that he was the discoverer of New York Bay, an honor which we think should rightly belong to Verrazzano. The document which gives the account of Verrazzano's visit to New York Bay leaves the impression that his time was spent in the bay, and that the river he mentioned may have been the Narrows. Certain it is that the fact that the water at the mouth of the Hudson, if he ever entered that stream, was completely salt, and that the tidal currents were as strong in one direction as the other, must have given Verrazzano every reason to believe that he was at the mouth, not of a river, but of an arm of the sea. Verrazzano was a bold navigator, and his letter to Francis the First, describing his voyage, proves him to have been a close observer and capable of giving an entertaining description of what he saw. The genuineness of the letter, it is true, has been attacked; but the latest consensus of opinion among the historical authorities agrees to consider it as genuine.

For these reasons it is rather timely that the Italians of this city should have recently erected a monument to their fellow countryman, which will serve to connect his name with the famous harbor into which he sailed in 1524.

EVOLUTION NOT REVOLUTION.

We have received so many requests for information about the widely discussed Melville-MacAlpine improvement in the marine steam turbine, and so many exaggerated statements have appeared in the public press as to the "revolutionary" character of this device, that we hasten to say the improvement is in no sense revolutionary, but is rather one important step in the evolution of the ideal marine turbine drive. Hitherto, the propeller has been placed on the same shaft as the rotor or rotating portion of the turbine. In the device which Westinghouse has built for Melville and MacAlpine, the propeller would be placed on a separate shaft from the turbine, and a reduction gear of five to one interposed between the shafts, thereby reducing the speed of the propeller to one-fifth that of the turbine.

Why is this improvement, supposing that in actual test at sea it proves to be as efficient as in the experimental tests, of such great importance? Why should not the turbine and propeller be upon the same shaft? Why should it be desirable to run one at a much higher speed than the other? The answer is that the steam turbine shows its best economy, consumes the least coal per horse-power, when it is run at high speed, whereas the propeller shows its best economy when it is run at a relatively low speed of revolution. This is true both of high-speed transatlantic steamships and slow-speed cargo boats. The propellers of the "Kaiser Wilhelm II," running at a speed of 85 to 90 revolutions per minute, show a propeller efficiency of from 60 to 65 per cent. The propellers of the "Lusitania," running on her trial trip at 180 revolutions per minute, showed a propeller efficiency of only 48 per cent. Had the "Lusitania" used larger propellers running at lower speed, the speed of the turbine would have been too low for efficiency, and results at the turbine end of the shaft would have been disastrous. On the other hand, had turbines been used on the "Lusitania" running at the high speed which gives a maximum turbine efficiency, the propeller efficiency would have been even less than the low figure of 48 per cent. The only way out of the dilemma was to use the present speed of 180 revolutions, which is too low for the best turbine results and too high for the best propeller results.

Now, what Melville and his coadjutors have done is to design a gear which is strong enough and runs with sufficient sweetness to transmit the great horsepower of a modern steam turbine without causing excessive loss by friction. When De Laval introduced the first practical steam turbine some fifteen years ago, he solved the problem by introducing a long helical gear, which reduced the speed from the several thousand revolutions per minute of the turbine to the working speed which was required on the power shaft. Apparently, what has been done in the new device is to master the difficult problem of providing a helical gear with a certain power of automatic self-adjustment, which will enable it to transmit several thousand horse-power without serious wear or heavy loss through friction.

Henceforth, if the gear shows good results in service at sea, it will be possible to secure the same horsepower with smaller turbines running at high speed, and to design the propeller with strict reference to the size and speed of the ship and the securing of a maximum effective thrust. Economy will thus be effected at both ends of the shaft; the engine room will become smaller, engine weights less, and the space and weight thus saved can be put into cargo and passenger space, or, in a warship, into heavier armament and better protection.

THE MOST POWERFUL NAVAL GUN.

In a certain respect big guns are like big battleships. At the time they are being built, it would seem that the limit of size and range had been reached; as indeed they have, for the time being. The progress toward improvement is so rapid, however, in these days, that hardly has one construction reached its supposed limit, before work is begun on another, bigger and better. A good illustration of this fact is had in the making of the largest and most powerful naval weapon in the world, namely, our new naval 14-inch breech-loading gun. This powerful weapon is nearing completion, and will be delivered to the Navy Department by the middle of October, for official tests at the Indian Head proving grounds.

The penetration of the new 50-caliber 12-inch guns to be installed on the new 26,000-ton battleships of the "Arkansas" class is given, at 11 inches of Krupp steel at an extreme battle range of 9,000 yards. The thickness of the armor plate on the British battleship "Dreadnought" and her successors in the British navy is 11 inches at the maximum. This thickness of armor is being used on the new American warships now under construction. Up to the time of the construction of the 14-inch gun, the new American 12-inch gun, with its penetration of 11 inches of Krupp armor at 9,000 yards, was our most powerful gun. But that it has been greatly surpassed by the new piece is shown by the following figures:

The new 14-inch gun weighs nearly 64 tons, or 10 tons more than the 12-inch rifles built for the battleships "North Dakota" and "Delaware." Its total length is 53½ feet. The capacity of the powder chamber is 15,848 cubic inches, and it will require 365 pounds of smokeless powder to hurl the projectile of 1,400 pounds. After this huge shell is fired, it will travel a distance of 542 inches within the bore of the gun, and after leaving the muzzle it is good for a 25-mile flight. The range at which it would be fired in actual battle, however, would be about 9,000 yards, or five miles. The range of naval battles has trebled since the Spanish-American war, at which time 3,000 yards was the estimated range for a naval conflict, the guns being built accordingly. But now to outrange the "enemy" it has become necessary to build all American naval guns with a range of five miles.

The shell will leave the muzzle of the 14-inch gun at the rate of 2,600 feet per second, and its muzzle energy will be 65,606 foot-tons. This is 13,000 more foot-tons energy than that designed for the latest 12-inch weapon. So great is the penetrative power of this rifle that, when fired with a full charge, the projectile will penetrate 22.7 inches of the best Krupp steel armor plate at the muzzle, and at the range of 9,000 yards would pass right through a piece of armor 13 inches in thickness.

THE RECORD FLIGHTS OF ORVILLE AND WILBUR WRIGHT.

Almost simultaneously in Germany and in America Messrs. Orville and Wilbur Wright made two new records of an entirely different kind on the second and fourth instant. The first record was made by Orville Wright at Potsdam, Germany, on October 2nd. He first took Crown Prince Frederick William on a flight of 10 minutes' duration at about 4:30 in the afternoon. During this flight the machine was driven to an altitude of about sixty feet. The Crown Prince was greatly pleased, and he urged Mr. Wright to go higher. Soon after alighting, Orville Wright started out again by himself, and for fifteen minutes he kept steadily mounting in circles until the areoplane was a tiny speck in the sky. After reaching the maximum height, which he estimated was about 500 meters (1,637 feet), he started in a swift descent. The machine came down at a terrific rate, and finally alighted safely about five minutes after it started the descent. Orville Wright said that the view he obtained was very similar to that he had when on board the Zeppelin airship, except that objects seemed smaller on account of his greater height. The height reached was not accurately measured, but from Wilbur Wright's statement to our editor that his aeroplane, if sent upward at its best speed, would probably ascend at the rate of three feet a second, it seems probable that Orville attained even a greater height than he believes himself to have reached.

The second record is that of Wilbur Wright, which was made about 10 A. M. on the morning of October 4th, when he started from Governor's Island and flew over the waters of New York Bay and above the North River to a point opposite Grant's Tomb. Circling around the British cruiser "Inflexible," he made the return trip close to the Jersey shore, at an elevation of only about seventy-five feet. On the upward journey he flew at a height of some two hundred feet, where he experienced considerable difficulty from the eddies and gusts of wind produced by the skyscrapers in the lower part of the city. A northeast wind of about twelve miles an hour velocity was blowing. On the return trip, the daring aviator kept on the other side of the river, and at a low elevation in order to avoid these gusts. The entire journey was made in 33 minutes and 33 seconds, the distance being about 19½ miles. This flight was not official, and Mr. Wright expected to repeat it in the afternoon. The weather conditions were ideal at 4 P. M., but just as he was about to start a cylinder blew off the motor, and effectively put the machine out of commission. As Mr. Curtiss had left the city the evening before after having made a short circular flight of a quarter of a mile, there was no more flying in connection with the Hudson-Fulton Celebration. Mr. Wright has already begun to teach two lieutenants to fly the government aeroplane.