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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 ETHICS OF CRITICISM.

Honest criticism is one of the most healthy tonics that can be given to an institution during the period of its development and growth; but criticism that is dishonest may work an unlimited amount of injury. We have always believed that the attack upon the designs of our battleships and upon the responsible Bureaus was prompted, at its inception, by a sincere desire on the part of some of the younger men of our navy to improve conditions in certain particulars where they believed they could be bettered; but we noted with considerable regret, that when the charges were taken up by the Bureaus, and proved to be either absolutely wrong, or true only in a limited degree, the critics and their advocates in the press began to resort to the expedient of throwing dust into the eyes of the public, by quoting those half truths, which frequently convey an impression entirely at variance with the actual facts. One leading daily journal in this city, indeed, seems to have deliberately set itself the task of so manipulating official and semi-official reports of naval proceedings, as to give the public a false impression of what has taken place.

In proof of what we have said, it will be sufficient to mention ne of the most glaring instances of this persistent misleading of the public. We refer to that part of the findings of the Newport Conference (which, it will be remembered, was called by the President for the purpose of thoroughly thrashing out the whole question of battleship defects) in which, by an overwhelming majority, it was decided that in future battleships the lower edge of the armor belt should be placed twelve inches lower than it is on existing ships, and that the top edge of the belt should be placed four inches higher. Now, any schoolboy can see that the *total* effect of adding four inches above the waterline and twelve inches below the waterline is to move the whole body of the plate four inches lower with regard to the waterline than it was before. This means that it was the opinion of the Naval Conference, not that the armor belt in our existing ships was too low (which was the contention of the critics), but that, if anything, it was too high. Had they considered that the armor belt was too low, several feet too low, as the critics contend, the Conference would have added the whole increase in the width of the belt to the upper edge and raised it, not four inches, but sixteen inches higher. Yet, in spite of this obvious intention on the part of the C nference, the daily paper in question came out with a headline announcement to the effect that the Newport Conference indorsed the naval critics by deciding that the upper edge of the belt should be raised four inches higher. This is but one glaring instance out of many, of the way in which our contemporary is endeavoring to mislead the public upon a highly technical subject, in the mazes of which the average layman may only too readily become confused.

The SCIENTIFIC AMERICAN will probably have something more to say on this subject in a later issue; but for the present we beg to assure our readers that the findings of the Newport Conference constitute a strong indorsement of the ships of the United States navy. At the same time, it is only fair to the critics to state that the Conference approved of several valuable suggestions regarding the emplacement and protection of the battery of torpedo guns and the protection of the uptakes to the smokestacks.

SOME EARLY LIGHT-WEIGHT MOTORS.

Langley was told by steam engineers that he could not produce an engine and boiler that would weigh less than 100 pounds to the horse-power. He knew nothing about the subject of steam engineering, and was obliged to study the thing up and work it out for himself. He made many experimental engines, very tiny affairs, and eventually he produced one that, with the boiler, weighed only 7 pounds to the horse-power without water. The engine alone weighed 26 ounces, and developed 1¼ horse-power. The gasoline engines used on the models, and also on the full-sized machine, were made by Charles M. Manly. The model was air-cooled, with five cylinders, developed three horse-power, and weighed 10 pounds. The aeroplane was one-quarter the size of the man-carrying aeroplane. The engine of the latter was identical, except that it had water-cooled cylinders. The engine itself weighed 125 pounds, and with 25 pounds of water, radiator, batteries, spark coils, and all accessories, weighed just under 200 pounds. It developed 52 horse-power for ten hours continuous running at 930 revolutions per minute. The bore was 5 inches, and stroke 5½ inches. This engine was produced in 1901. There are very few motors at the present time that can equal it.

SCHOONERS FOR INTERNATIONAL YACHT RACING.

It begins to look as though future interest in international yachting would be transferred from the large single-stickers of the type of "Reliance" and "Shamrock" to the schooners. The revival of interest in this noble type is due to the success of that splendid yacht "Germania," which our esteemed contemporary, the Yachtsman, of England, designates as "the grandest schooner that ever sailed in British waters." The "Germania" is owned by a German yachtsman, and was built at the Krupp yards from plans of a German designer. During last year's racing season in the Solent, the new yacht made practically a clean sweep of all the schooners opposed to her, among which were included the best of the English yachts and the German Emperor's yacht "Meteor." The success of "Germania" naturally aroused great enthusiasm, and it has led to the placing of an order by the Emperor for the construction of a large schooner to race against the new craft next year. This, in its turn, has stimulated a leading English yachtsman to place an order for a schooner, which is to be built during the coming winter, and be ready in time for the opening gun of the yacht season of 1909. There was a time when schooner racing was the favorite sport of British yachtsmen, and we understand that every effort will be made to regain the supremacy which once was theirs. It now remains for one of our yachtsmen to build a crack racing schooner and send her to the Solent, to insure that the summer of 1909 will see some of the most brilliant and exciting international racing of the present century.

THE GRAND PRIZE AUTOMOBILE ROAD RACE-AND ITS PROBABLE SUCCESSOR.

The Grand Prize race of the Automobile Club of America, which was held upon a specially-prepared 25.13-mile circuit at Savannah, Georgia, on Thanksgiving Day, was the second great international road race to be held in America this y ar. Against the six foreign firms that were represented by one, two, or three cars each, America had but six entries of as many different machines. Three of these machines—the Acme, Chadwick, and National—were fitted with 6-cylinder engines, while the Lozier, Simplex, and Buick had the usual 4-cylinder type of motor used upon all the foreign cars.

Twenty machines started in this 402.8-mile race, which consisted of sixteen circuits of the course. France was represented by a De Dietrich, two Clement, and two Renault cars; Germany by three Benz; and Italy by three Fiat and three Itala machines. From the start the Fiat and Benz cars led, and at the end of the tenth round the first five places were held by these two makes, the former being second and third. During the next lap a tire came off of one of the German machines and struck the driver's head, causing him to lose control and strike a tree. Fortunately neither Erle nor his mechanic was seriously injured. Nazzaro's Fiat, after leading from the twelfth round, was delayed by tire trouble in the last one, and thus lost the race to Wagner's Fiat. Hemery's Benz was second, it being beaten by but 56 seconds, and Henriot's Benz fourth. Eighth and ninth places went to Itala and Fiat cars, while Clement, Renault, and Clement machines were fifth, sixth, and seventh respectively. The French De Dietrich and American Simplex were making their fifteenth rounds and the National and Lozier their twelfth and eleventh, when the race was called off.

The time of the winner was 6 hours, 10 minutes, and 31 seconds, which corresponds to an average speed of 65.11 miles an hour. De Palma's Fiat twice covered the course in 21:36—an average speed of 70½ miles an hour. On a measured mile on one of the 3-mile straightaway stretches, several of the cars made over 100 miles an hour. Considering the number of turns in the course (thirty-seven), the average speed was even more remarkable than that of 70¼ miles an hour averaged two months ago by Nazzaro in the Florio cup race in Italy, which had only four turns per circuit. The road was oiled and in excellent condition, the seven sharp turns being well banked. The course was rigidly policed by soldiers, and there was not the crowding upon it of spectators that took place in the recent Vanderbilt cup race on Long Island. In the latter race, despite the fact that nearly half the course was formed by the cement motor parkway, an average of but 64.39 miles an hour was made by the winning Locomobile.

This recent great road race has again caused the question to be raised whether or not such races are not a thing of the past. They have served a useful purpose in developing and improving the machines; but now there is little chance for improvement in cars for touring purposes, and huge racing machines are not in favor.

In view of the flights made by the Wright brothers with their aeroplanes, and especially of the long-distance flights across country made in France by Farman and Bleriot, we believe that the Automobile Club of America should take up the subject of mechanical flight, as it has done recently in the case of motor boating; and, if possible, that it should organize a long-distance aeroplane race, to be held next summer above Long Island. Prizes of sufficient amount should be offered to attract the foreign aviators and to make it worth the while of the many American inventors now working on the problem to complete machines for the event.

By making such a move, the club would give the cause of aviation in America an impulse that is greatly needed and that it seems impossible to impart in any other way. With the Wrights to show us, we have a great advantage over the foreigners, and there is no reason why we should not at once take the lead in every respect in this new form of locomotion.

As a result of the numerous cash prizes for aeroplane flights abroad—prizes which aggregate now over $250,000—there is a very great amount of experimenting going on there at the present time, and a new industry has been created. Nurtured by the French government and by the new prizes that are constantly being offered, this industry is rapidly growing and assuming a commercial aspect. All that is needed in order to duplicate this new industry in America is the interest and support of those moneyed men who, ten years ago, gave the initial impulse here to the development of the automobile.

That a race such as we suggest would be popular can be seen from the crowds that have traveled by special trains and automobiles from Paris to Le Mans to see Wilbur Wright fly, and also from the crowd that visited Morris Park race track on Election Day to witness the exhibition of the Aeronautic Society. The American public is waiting and eager to see flying machines in action, and no more popular event could be organized than a point-to-point race of aeroplanes.

Lightning striking the earth leaves traces which vary with the character of the soil and rocks. On compact rocks it often leaves a blackish incrustation, in sand hills it produces ful urites. These are nearly vertical channels, usually simple but sometimes branched, which are lined with vitrified silica. The outside of the tube is crumbly and usually blackened. Fulgurites are found in all countries, but most abundantly in regions of frequent thunderstorms. They are particularly abundant in some districts of the Pyrenees. The electrical origin of fulgurites has been put beyond question by the production of artificial fulgurites by the discharge of highly-charged condensers of great capacity through heaps of sand. Artificial fulgurites may also be produced by accident. In December, 1907, one of the wires of a triphase electrical circuit in Catalonia, Spain, broke a few miles from its terminus at Girone. The accident occurred at night and the passengers of a passing diligence were terrified by flames which appeared at many points of the ground. The two parts of the broken section of wire had fallen in a field of lucerne, where each part lay in contact with the ground over a length of about 45 paces. Throughout this distance and to four inches on each side of the wire the lucerne was killed. Scattered along this furrow in the vegetation were found many spongy, black, vitreous objects, resembling scoriæ. Some of these objects ended in polished balls and nearly all were hollowed out lengthwise and crumbled between the fingers. They were found most abundantly near the ends of the broken wire where some of the balls were two inches in diameter. A rough analysis of the soil showed that it was composed chiefly of sand with a little clay and limestone and traces of iron.