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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 BALLOON IN FOGGY WEATHER.

The many disasters attending the third international balloon race, which started from a suburb of Berlin, Germany, on October 11, merely emphasized the fact already well understood, that of all forms of locomotion, ballooning is the most uncertain, helpless, and full of peril. Of the 23 competitors that started, four came down in the North Sea, as did two others in the endurance contest of the following day, one of which has not been recovered. The uncertainties of a balloon race were accentuated in the present case by the fact that the prevalence of fog and the shifting character of the wind rendered it difficult, and often impossible, to determine when the balloons were being carried beyond the land. Ordinarily, unless he felt satisfied that the direction, strength, and permanence of the wind and his reserve of gas and ballast were sufficient to carry him across a stretch of water and enable him to make a landing on *terra firma*, a balloonist would be compelled to descend before the limits of the coast line had been reached. In clear weather this can be done with considerable certainty; but in foggy weather, as the sequel of this race has shown, the risks of a disastrous descent into the sea are greatly increased. Humanitarian considerations alone should prevent the repetition of races under such perilous conditions as that held last week; and future races with spherical balloons should be started from some central point, sufficiently far from the seaboard to insure for the contestants a stretch of at least 700 to 1,000 miles before they reach the coast. The city of St. Louis, at which the race of last year was started, was an ideal location. It should be possible to find, say within Central Russia, some city equally well placed as a starting point for such future races as may be held in Europe.

In addition to the risk from thick weather, the race has emphasized another grave peril—that of the bursting of the balloon. Two of the contesting aerostats, one American and one Spanish, ripped open at a high altitude; and had it not been for the fortunate fact that the envelope, in each case, spread out and acted as a parachute, the list of fatalities would have been a large one.

Is it not about time to recognize that the day of the spherical balloon is over? Zeppelin and the Wright brothers have opened a new era in the navigation of the air—an era in which the clumsy spherical balloon has no place.

OUR MACADAMIZED ROAD FIASCO.

The magnificent macadamized roads of Europe are the admiration of all Americans who have had an opportunity to make use of them. Scientifically constructed and most diligently repaired and maintained, they provide to-day, as they have provided in many cases for centuries, a smooth, hard, and well-drained surface, which never varies in its excellence from season to season, or from year to year.

Here in the United States the art of macadamized roadbuilding, at least on a scale of any magnitude, is of comparatively recent date. Such roads as we have constructed have been built, as a rule, under experienced engineers and according to those principles which have been so thoroughly tested in Europe. Generally, our new roads, on their completion, are of excellent quality. The work is so well done that there is no reason why, with proper maintenance, they should not show the same wearing qualities as similar roads abroad.

As a matter of fact, in the majority of cases, our roads, after a single season's wear, begin to show serious signs of going to pieces, and frequently, after two or three seasons' wear, have lapsed into a condition that is little better than that of a common country dirt road. If the top dressing has not disappeared entirely, it will be found in the shape of a deep layer of dust and fine stone at each side of the roadway; the stripped surface will be worn more or less deeply into ruts, or hammered into hollows; and not infrequently the underlying courses of large broken stone and rock will be clearly discernible.

Why do American macadam roads go to pieces so swiftly, while those in Europe maintain their fine surface indefinitely? The answer is to be found in the fact that in Europe they have a careful system of road maintenance, and in the United States we have none, or practically none. European roadbuilders and supervisors, or whatever they may be called, clearly understand that there is no engineering work that depends more absolutely for its integrity and permanence upon careful attention and upkeep than does a macadamized highway. They understand, moreover, that there is no work of the kind in which the old adage, "a stitch in time saves nine," is more true than in this; and, consequently, their system of road maintenance involves a constant and careful inspection, and the immediate repair of any spot in the road, however small, that shows incipient signs of breaking down. Hence the work of keeping up the European roads is being done all the time; in many places; and by a large army of individual laborers. The solitary road repairer, with his wheelbarrow, pick and shovel, and little pile of broken stone and top dressing, is a familiar sight. It is his duty to inspect daily his own section. On detecting a low spot where water might collect (the genesis of the American "chuckhole"), he makes immediate repairs.

Here, in the United States, we know little or nothing of such road maintenance as this. No sooner is a stretch of new road accepted and paid for, than it is left to the tender mercies of the traffic and the weather. Incipient ruts and hollows, instead of receiving the immediate care of the road mender, are allowed to remain full of the standing water of the last rainstorm, and are quickly deepened and widened by the wear of the passing traffic. When the work of destruction has proceeded unhindered to a certain stage of ruin, the road is given a wholesale repair (*sic*) by dumping upon it a few hundred tons of top dressing, which is left to be crushed down into the irregular and ragged surface beneath by such haphazard rolling as may be given by passing traffic.

In the present campaign of "good roads" education, more attention should be paid to the vital function of road maintenance. Our present practice of building a first-class road and then letting it go to ruin as fast as wind, weather, and traffic can wreck it, is the height of folly and extravagance.

FLAREBACKS IN THE FRENCH NAVY.

The "flareback" peril is not, by any means, confined to our own navy. The recent disaster on the French ship "Couronne," due to this cause, when twenty-seven lives were lost, has been followed by a similar accident on the "Latouche-Treville," in which nine men were killed. In discussing the accident, Le Figaro of Paris says that the committee of investigation ordered to look into the explosion on the "Couronne" attribute the accident to a "retarded inflammation of the gases developed by previous charges." Two hypotheses were offered in explanation of the explosion. First, the ignition of the powder in the bore of the gun, either spontaneously or through the heat of the bore or of the residues at a high temperature; and second, the blow of the breech block against the cartridge case in closing the breech. In either case, the projectile, offering a certain resistance to expulsion, remained in its seat, while the breech block—closed but not yet locked, and consequently offering no resistance—was thrown back and broken, leaving a free exit to the gases escaping from the cartridge case. These gases set off two other cartridges that the gun's crew held in readiness, and thus burned the personnel. These are the facts as found.

The artillery officers, standing on experiments made at the Servan-Livvy laboratory and the Gavres firing ground, maintained that the primer had been exploded by the shock of the breech block against the head of the cartridge case. They based their conviction on the fact that such an explosion had been brought about by tests that had been most carefully supervised. The naval officers did not deny this; but they maintained that such an explosion was only produced by repeated blows of the breech block against the cartridge case, and never on a first blow. In addition, they maintained that, on the evidence of the survivors, this had not been the case in the accident of August 12. Furthermore, the reports on the incidents of the target firing on the "Gueydon" in 1904, with her 6½-inch guns, model 93-96, that is to say, the same model as those of the "Couronne," show that the phenomena occurring at that target exercise were identical with those marking the accident on the "Couronne"; and the cause as reported on investigation was attributed to a retarded reinflammation of gases developed by previous firing, the flame being communicated to the powder exposed bare in the cartridge case, as the latter is left entirely open in front.

This proof, sustaining the contention of the naval officers, was singularly confirmed very shortly afterward by other incidents equally significant which occurred on board the "Justice." In one of the 12-inch turrets of this battleship, just as the last part of the cartridge had been inserted in the chamber, a sheet of flame burst back; fortunately, the web of the cloth of which the cartridge bag is made resisted the flame, but it was only thanks to this that no accident happened. Again, and a few days afterward, on one of the armored cruisers, just at the moment when the breech block of a 6½-inch gun—identical with that of the "Couronne"—was closed *and locked*, the gun went off; one second sooner, and the accident of the "Couronne" would have been exactly repeated. In face of this assemblage of concurring facts, it was considered to be no longer possible to deny the existence of the flareback, that is to say, the retarded reinflammation of gases engendered by prior discharge, as the cause of the accident on the "Couronne." There is more doubt as to the cause of the "Latouche-Treville" accident; although the balance of evidence seems to point to the detonator having been struck prematurely as the cause of explosion.

MANUFACTURING PAPER FROM CORNSTALKS.

The chemists of the United States Department of Agriculture have at last solved the problem of how to turn into paper the millions of tons of cornstalks wasted annually. After years of experiment, the department now reports that the vast quantity of material heretofore considered valueless and destroyed every year by the farmers of the country can be utilized, thus saving much of the remaining wood reserve of the United States, and bringing about the manufacture of paper from an annual crop.

The first practical samples of this new paper were manufactured in Washington, and consist of five grades in five colors. One grade is dark gray, thick and heavy, resembling parchment. There is a lighter grade of the same character, two shades of yellow and one of white. The latter are manufactured from the hard outside part of the cornstalk, and the former from the interior or the pith. The yellow grades have much longer fiber, and resemble paper made from cotton rags or linen, being soft to the touch and pliable, and appearing to have been made from material of entirely different character from that used in the gray product.

In the process of the experiments which resulted so successfully, the "soda-cooked" method was employed. This process many manufacturers of paper have found to be the best treatment for the finer grades of wood-pulp paper. The cornstalk pulp can be cooked in from two to two and one-half hours, as against twelve to fourteen hours needed in treating wood. It is claimed that even at the present primitive stage of experimentation, cornstalk paper can be made almost as cheaply as wood-pulp paper, though the latter industry has been developing for the past half century. The belief is freely expressed by the scientists who have been conducting these experiments, that when proper machinery is brought out, and the farmers grow cornstalks in localities where they can be moved cheaply to the mill, the cost will be fully fifty per cent less than paper now manufactured from wood. At the present period, with wood at $8 a cord, it costs $13 to manufacture a ton of wood pulp. With cornstalks at $5 a ton, and adding the cost of bringing the stalks from nearby farms to the laboratory of the Department of Agriculture at Washington, pulp can be manufactured at $14 a ton. These figures are looked upon as prophetic of the future, no new product ever having been produced in the past at anything near the price reached subsequently with commercial development.

No special growth of corn is required, as the experiments have shown that any kind will answer the purpose of manufacture. The kind used, however, was the common Virginia and Maryland field corn, but that grown anywhere will do as well. The discovery is undoubtedly one of the most important of its kind made in recent years, as it will add millions of dollars to the income of the farmers, and partially reduce the drain on the forests of the country, besides furnishing an equally good and a much cheaper paper than can now be manufactured from wood pulp.

The French automobile export business continues to decline. The exports for the first five months of 1908 amount to $10,738,200, compared with $14,219,800 in 1907. The only countries showing an increase are Russia, from $121,200 to $340,000; Turkey, from $10,800 to $78,800; Algeria, from $292,200 to $428,200. All the others show decreases, America falling from $912,600 to $903,000.