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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 SCIENTIFIC AMERICAN FLYING MACHINE TROPHY FOR 1909.

In another column will be found the rules governing the contest for the SCIENTIFIC AMERICAN Trophy for the year 1909, and it will be timely to explain in the present issue the object of offering this prize.

It has long been recognized that one of the most effective means of stimulating the development of a new science is the offering of prizes or trophies, and the SCIENTIFIC AMERICAN Trophy was offered with the object of encouraging inventors to build and try out heavier-than-air machines, and also with the hope of stimulating competition in this new field of development.

When the prize was first offered in 1907, it was recognized that the era of aerial flight had only just dawned, and it was felt that the prize should be awarded to the *first* machine which succeeded in sustaining itself in its equilibrium in flight over a distance which should exceed a mere jump or leap in the air. This minimum distance was arbitrarily fixed at one kilometer. In spite of these very moderate conditions, the trophy was not won until the following year, when the "June Bug," in charge of Glenn H. Curtiss, succeeded in covering the required distance at Hammondsport, N. Y., on July 4th, 1908.

Under the deed of gift the Trophy was presented to the Aero Club of America, and the rules governing each contest are to be arranged by the Contest Committee of that organization.

After the performance made by the "June Bug" it was decided to arrange for competitive trials, to take place at a point near Washington, D. C., where Orville Wright was making his experiments for government trials. Unfortunately, there were no entries for this competition; and inasmuch as it has been found that even in France, where the art of aerial navigation has been carried further than it has in this country, it is extremely difficult to induce experimenters to arrange for competitive trials at any given point and date, it was decided that for the competition for 1909 some other form of trial should be arranged. After a thorough consideration of all the circumstances of the case, it was determined that the most attractive and satisfactory form of competition for the year 1909 would be, not to fix a given place and time for an aerial tournament, but to allow the experimenters to make trial flights at or near their own homes, and allow such records, if made under the auspices of the Contest Committee of the Aero Club, to stand as record trials, and that the cup should be awarded to the competitor making the longest and best flight during the year 1909, provided such flight should exceed twenty-five kilometers. It was believed that such an arrangement would sustain an interest in the sport during the entire season.

In our last issue we made announcement that Dr. Alexander Graham Bell had made entry for the SCIENTIFIC AMERICAN cup. While that issue was on the press, however, Mr. Bishop, president of the Aero Club, received a telegram from Dr. Bell, stating that the rules for the year were not satisfactory to him, and that he wished to withdraw his entry unless the cup should be awarded to the first machine making the flight. In conclusion he states: "We are purely an experimental association, and do not care to enter into competition or attempt to make the longest possible flight."

It is difficult to understand the object of making an entry for a trophy and eliminating, at the same time, the idea of competition. Such a principle is entirely antagonistic to the ideas of the donors, and also of the Contest Committee of the Aero Club, as the main object of the trophy is to stimulate competition in every possible way; to measure, if possible, the progress that is being made in the art of aerial navigation, and to award the trophy to the inventor or experimenter who has shown the greatest development in the art.

It may be said in explanation of Dr. Bell's telegram that he arrived at his determination to withdraw his entry before having seen the complete rules for 1909, and it is hoped that when the conditions are fully understood, he will decide to compete for the trophy at some later date.

It may be said in explanation of the action of the Aero Club in this connection, that it was stretching a point in favor of Dr. Bell, in allowing the test to be made outside of the borders of the United States.

The rules for the trophy will be changed from year to year, as occasion requires, the contest each year being made more severe than the previous year.

It has been found, even in France, that aerial tournaments, where a number of competitive machines may be tried and tested at one time and at one place, are not now practicable, and the rules governing the SCIENTIFIC AMERICAN Trophy are framed upon the same general principles as those governing the principal trophies offered in Europe. It is interesting to note that both Farman and Wright made successive attempts under official supervision to win the Michelin trophy last year; and it was in his last and crowning effort, made on the last day of the year, near sundown, that Wilbur Wright broke the world's record for flight and succeeded in winning this prize.

It is hoped that before long the science will be so far developed, that it will be possible to arrange for an aerial tournament, where a number of competitive machines may be tried and tested at one time and at one place. There seems to be little doubt that such a consummation will be reached in the near future.

THE HIGHWAY AND THE AUTOMOBILE.

A serious problem which grows in importance every year is that of the relation of the automobile to the public highways. That the automobile is the most active of all agents in the breaking down of macadamized roads is a fact that has been long recognized by our State Engineers, and of late years it has become so evident, that not even the most enthusiastic automobilist can deny that great damage is done. When a new stretch of macadamized roadway is thrown open to the public, it offers such strong attraction to automobile owners that, even in cases where its use involves a considerable detour as compared with shorter routes over roads of inferior quality, it is certain to become so popular with the rubber-tired vehicles that they will frequently constitute the majority of the traffic. The initial breaking down of the carefully-prepared surface is almost immediate. The so-called "suction" of the swiftly-revolving rubber tires picks up the finely-crushed binding material of the surface, and throws it to the rear, exposing the broken edges of the top course of macadam. These in their turn are broken down, ground into dust, picked up by the passing wheels, and carried by the wind into the adjoining fields, or sifted upon the lawns and buildings of adjacent property. The process of disintegration goes on at a speed proportionate to the density of the traffic, until finally the heavy underlying foundation rock of the macadam is exposed. When this condition has been reached, there is nothing for it but to practically rebuild the roadway, or at least the upper half of it. The destructive action of automobile traffic has been greatly intensified in recent years by the introduction of chains and other non-skidding devices, which are undoubtedly active agents in breaking down and pulverizing the surface dressing and the upper, broken-stone layers of a macadamized road.

There are but two courses open in dealing with this perplexing and very serious problem. Either the automobile traffic must be restricted, or new and improved methods of road construction must be used. No one who seriously considers the matter believes, for a moment, that fines, heavy licenses, and restrictions as to speed, travel, or the use of non-skidding devices will fully meet the problem. Legislative restrictions may modify the evil, but they cannot possibly eradicate it; and this for the reason that, as we have shown above, the destructive effects of the automobile are inherent in that very feature of its construction—the pneumatic tire—which has made the automobile a possibility. A vehicle weighing from 1,200 to 3,000 pounds, running at speeds of from 20 to 30 miles an hour on pneumatic tires, will break down, and very quickly break down, the type of macadamized road of which we are building thousands of miles throughout this country. This is an indisputable fact; and no amount of legislative control can get rid of it.

Evidently, then, the only solution of the problem lies in constructing our highways with a view to meeting the exacting conditions of traffic which have arisen within the past ten years. We must build automobile highways; and since the automobile is by far the most frequent user of the State roads, this will be a perfectly logical thing to do. It is pretty well agreed that if some binding material can be found, which will shed the surface water of the winter, and prevent the surface dressing from grinding up into an impalpable dust in the summer, a long step will have been taken in securing a perfect road. The solution of the problem will be found, probably, in the use of some form of tar; although our experience in this country has shown that the mere coating of the surface with this material, unless the road itself has the proper strength and consistency, is not sufficient. In many cases the disintegration of the road still goes on, and because of the soiling effects of the tar, the dust and mud become even more objectionable than before.

The material for the upper layers of the macadam road should be selected for its strength and binding qualities; should be carefully broken to size, and thoroughly rolled in. Too often the finished surface is not given sufficient crown to insure a quick shedding of the surface water. This is a feature that should be most carefully attended to. In tarring the finished road, care should be taken to give the tar sufficient time to get thoroughly set before the road is thrown open to traffic. This may be hastened by giving the tarred surface a thin coating of sand.

Finally, as we have frequently pointed out in this journal, our whole system of maintenance needs to be thoroughly revised. Our present methods of allowing a road to go to ruin, and then spreading a layer of so-called top dressing upon it, and calling this procedure a repair job, is simply barbarous. Eternal vigilance is as necessary in the upkeep of a modern highway as it is in that of a steam railroad track. Local indications of subsidence or wear should be immediately repaired. The constant day-by-day attention of a repair gang, scattered at wide intervals over a stretch of State highway, will keep the surface in first-class condition for many years. They will do successfully, and for far less cost, what the periodic and spasmodic repairs under our present systems of maintenance fail utterly to accomplish.

CLOSE OF THE FOURTH DIMENSION CONTEST.

On April 1st the contest inaugurated by a friend of the SCIENTIFIC AMERICAN'S for the purpose of awarding $500 to the best popular essay of two thousand five hundred words on the Fourth Dimension will be definitely closed. We take this opportunity of expressing our gratification at the relatively large number of competitive offerings that have been received, not only from American readers of the SCIENTIFIC AMERICAN, but from foreign sources as well. In the last fortnight the mails have brought to us essays from Turkey, Austria, India, Australia, France, and Germany. Almost every civilized country is represented.

Naturally some time must elapse before the essays can be read and passed upon by the judges. In all probability, the prize will be awarded in the latter part of June or the beginning of July. The winning essay will be published in the SCIENTIFIC AMERICAN, and a few of the meritorious contributions in the SCIENTIFIC AMERICAN SUPPLEMENT. It is not impossible that a collection of the better essays will be made and published in book form.

RAINMAKING BY DYNAMITE.

Many attempts have been made, notably by Dyrenforth in Texas a number of years ago, to produce rain by the explosion of dynamite or gunpowder. Despite the failure of these experiments, a fresh attempt was made in 1907 in southern New Zealand, in a district frequently exposed to severe droughts. Bates, the meteorologist detailed by the government to furnish hygrometric data for the rainmakers, has recently published a report of the experiments. The results were purely negative, but as rain happened to fall soon afterward, the explosions were popularly credited with its production. Bates himself, like all other intelligent men, rejects this belief. It is impossible to conceive the process by which the explosion of a few pounds of dynamite could produce rainfall.

The compression of the air caused by the explosion would develop heat, which would raise the temperature still farther above the dew point and thus diminish the chance of precipitation. The shock caused by the explosion is infinitesimal. Bates compares its effect with the effect produced on the air of a room by striking a match. The natural forces opposed to any artificial change of atmospheric conditions are enormous beyond our power of imagination. Bates points out that a rainfall of one inch means a precipitation of 64,640 tons of water on each square mile. The heat set free by the condensation of this quantity of water is mechanically equivalent to fifty million horse-power hours. What is the most powerful explosion that man can produce in comparison with such an outburst of energy? Bates concludes that reforestation is the only method by which the dryness of this district can be remedied.