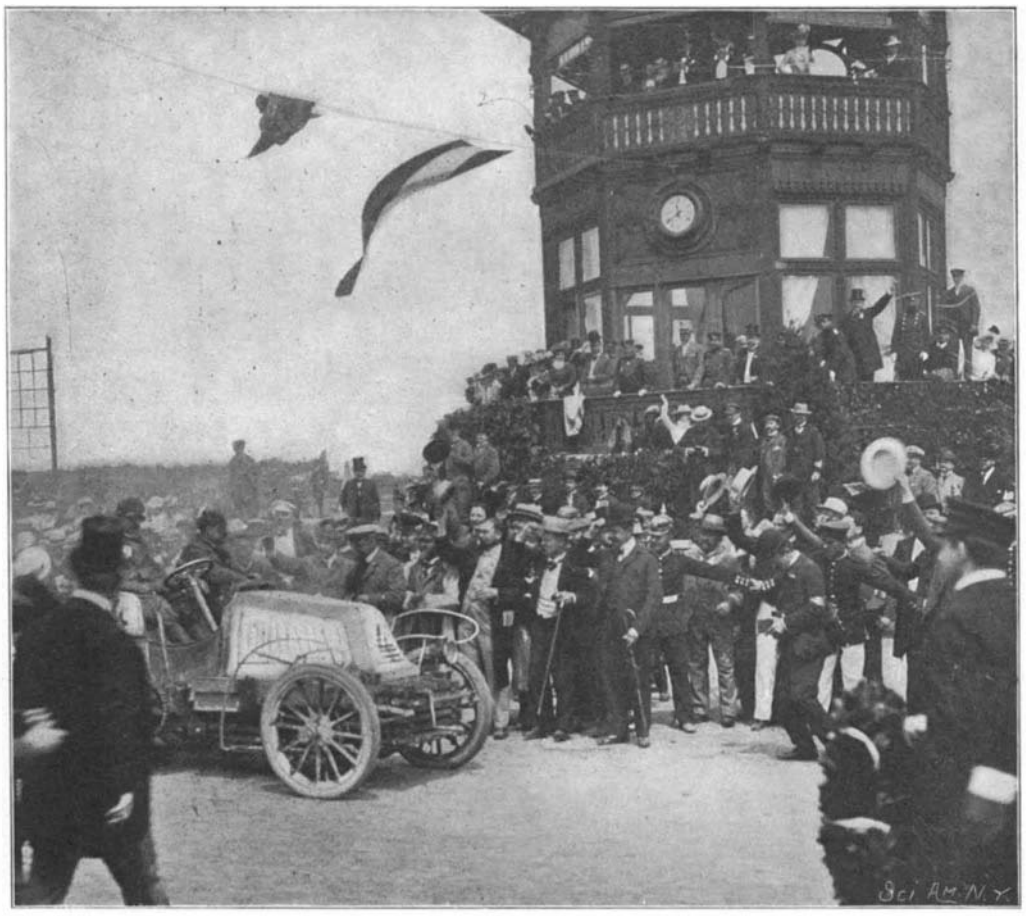
THE PARIS-BERLIN MOTOR CARRIAGE RACE.

The Paris-Berlin motor carriage race was the most interesting ever held, although it cannot be said it was the most important for the industry, as the vehicles used in the race were not of a type which it is particularly desirable to advance. Both the French and German press have been anxious to prevent a repetition of races of this kind by legislative enactment. The precautions adopted to protect the lives of spectators were most elaborate. For weeks the course was placarded with notices of the coming race. Soldiers and mounted police were picketed at short intervals throughout the whole distance, and all the towns and many of the villages were "neutralized," every competitor being piloted by cyclist marshals at slow speed until the outer limit was reached. For a couple of weeks before the race, Paris was made almost unendurable from the odor of petroleum, and day and night were made hideous by the puffing of cars and the tooting of horns. The automobile has never been popular with many of the inhabitants of Paris, and the peasants detest it, for these wild races from one end of France to the other are almost sure to mean maiming or death to some one, and the Paris-Berlin race was no exception to the rule, a man and child having been killed and a number of spectators and automobile drivers hurt and seriously injured. The expense of organizing this race must have been enormous, and it is impossible to say whether the immediate results will be at all proportionate to the outlay. At first contests of this nature enabled manufacturers to discover the weak parts of their mechanisms, but now with their machines of the highest speed, it seems as though all parts were vulnerable and the number of extra pieces which must be carried is very large. The racing vehicle is built purely for speed, and is a distinctive type, but is dangerous, unreliable and expensive, and makers object supplying them, except to customers who are known to be expert chauffeurs.

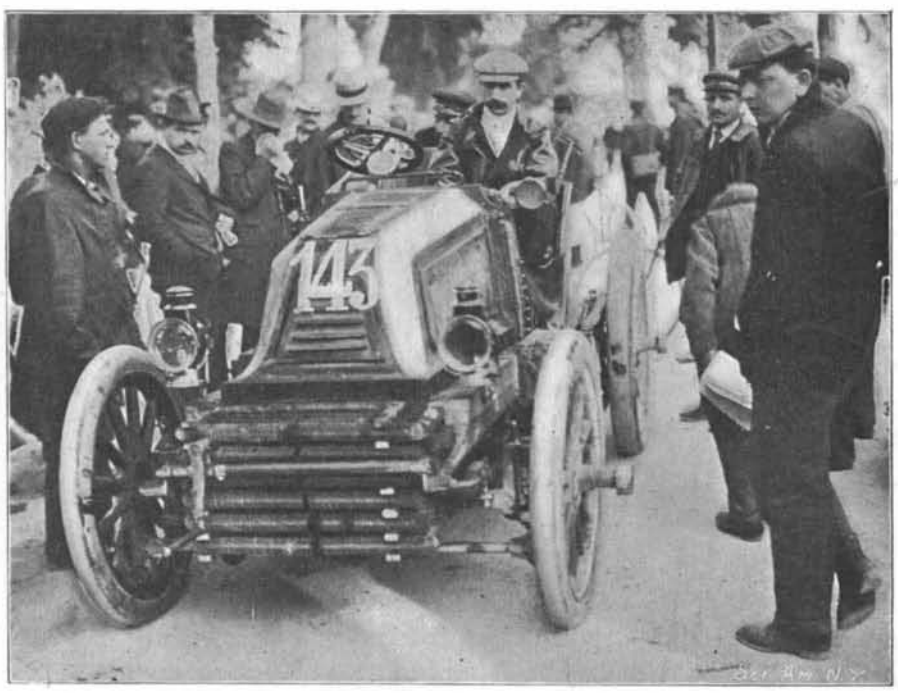
There were 170 vehicles entered for the race, and 110 made the start and 30 finished. Some of the carriages had motors of 50 and 60 horse power, and on the straight and level roads some of them made from 70 to 75 miles an hour; Fournier's the winner's net time from Paris to Berlin (744 miles) being 16 hours 6 minutes, or about 47 miles an hour. In the Paris-Bordeaux race Fournier covered the distance at an average speed of 53¼ miles, but the length of the present route, the condition of the roads and the number of towns to be passed through all served to decrease his speed.

The distance was divided into three sections, the first day's trip being from Paris to Aix-la-Chapelle, 282 miles; the second day from Aix-la-Chapelle to Hanover, 276 miles, and the third day from Hanover to Berlin, 184 miles. The start took place in the early morning of June 27, and an enormous throng gathered to witness the event. The carriages were dispatched two minutes apart until 7 o'clock in the morning, when the last of the horseless vehicles was started. The crowd was very enthusiastic over Mme. Du Gast, the only woman racer, whose portrait appears in one of the pho-

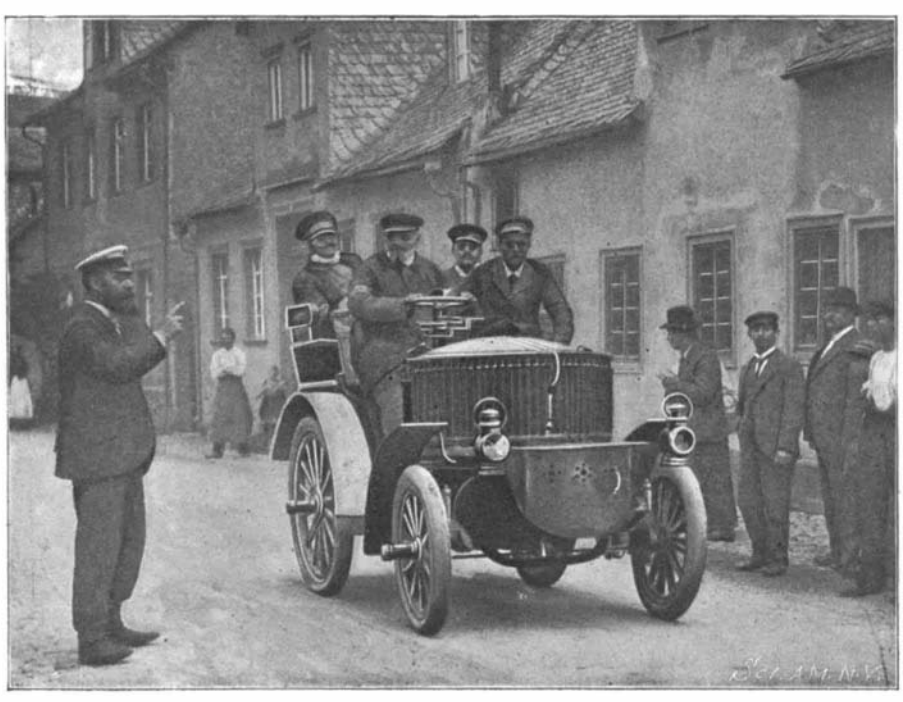


Welcoming Fournier, the Winner, as He Crosses the Line.

Mme. Du Gast, the Only Lady Entry and One of the Few to Finish.



Mr. Foxhall Keene, the Only American in the Race, Just Before the Start



Receiving Instruction About the Route.

Anthony, One of the Cracks, 100 Yards From the Start.

THE PARIS-BERLIN MOTOR CARRIAGE RACE.

tographs. M. Fournier arrived at Aix-la-Chapelle at two minutes past 12 o'clock, his time being 8 hours, 28 minutes and 3 seconds.

The day was marked by many accidents. On the way a child ran in front of one of the carriages and was instantly killed. The carriage of Foxhall Keene, the only American competitor, was overturned, but fortunately he was not injured. The next day the start was made from Hanover at 5 o'clock in the morning. Eighty carriages took part, starting in the same order that they arrived at Aix-la-Chapelle. M. Fournier arrived at Hanover at 2.13 P. M. in clouds of dust, having covered 276 miles in 9 hours, 7 minutes and 39 seconds. The correspondents who saw M. Fournier start from Hanover at 5.15 the next morning took a special train to Berlin, and when they arrived there they found the country roads lined with people. The enthusiasm at the West End race course, Berlin, at 11.46 A. M., when Fournier arrived, was almost beyond bounds. His friends broke through the line of troops, surrounded the car and cheered him loudly. The band played the "Marseillaise," and the Germans carried him on their shoulders to the judges' stand and thence to the prize platform, which, like the winning post, was decorated with both French and German flags. The other racers came in soon after, M. Girardot arriving second. Mme. du Gast came in at 4 o'clock. M. Fournier had eleven punctures in the tires of his vehicle, which prevented him from making a better record.

It may well be asked if the limit of speed in racing vehicles has been reached. It is not likely that it has, but the safe limit has been attained, and the higher the speed the more liable are the tires to destruction through excessive side strains in taking corners, in addition to the liability of puncture. Speed does not, therefore, depend entirely upon the motors; the tire is a factor of equal importance. It is almost impossible for even a trained chauffeur to carry on such sustained high speeds for days without physical collapse, the nervous strain being intense. Many of the French drivers in the recent race are still suffering from the results of the sport. The race, however, is intended to further the automobile movement all over the world by creating a great interest in it among the public, so that even though the technical lessons of the recent contest may not be very great, the net result must be gratifying.

THE CONQUEST OF THE AIR.

The navigation of the air has at last been achieved by a young Brazilian, M. Santos-Dumont, who has succeeded in driving his aerial ship a distance of ten miles in forty-one minutes, and performed evolutions which showed that he had the vessel under complete control during the trial, which was of course under favorable atmospheric conditions. His machine is by no means perfect, and there are some weak points to be strengthened, but within a month it is thought these defects will, to a great extent, be overcome. A number of inventors have been working along somewhat similar lines, so that M. Santos-Dumont has been very active, especially in view of the prize offered by M. Deutsch of 100,000 francs for a successful balloon trip from St. Cloud around the Eiffel Tower and return.

M. Santos-Dumont was born in Brazil in 1873 and early became interested in aeronautics. He soon abandoned spherical for cylindrical balloons, and the present is the fifth he has constructed. The balloon

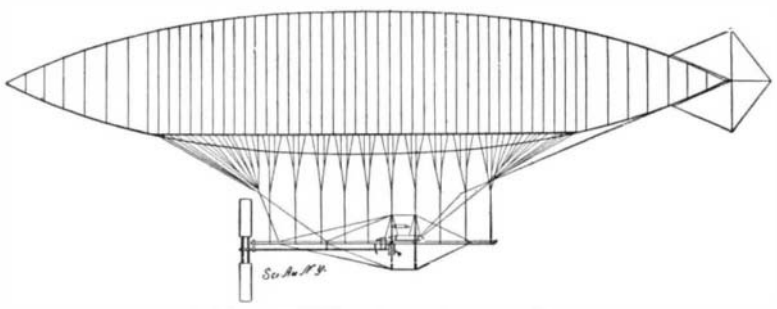
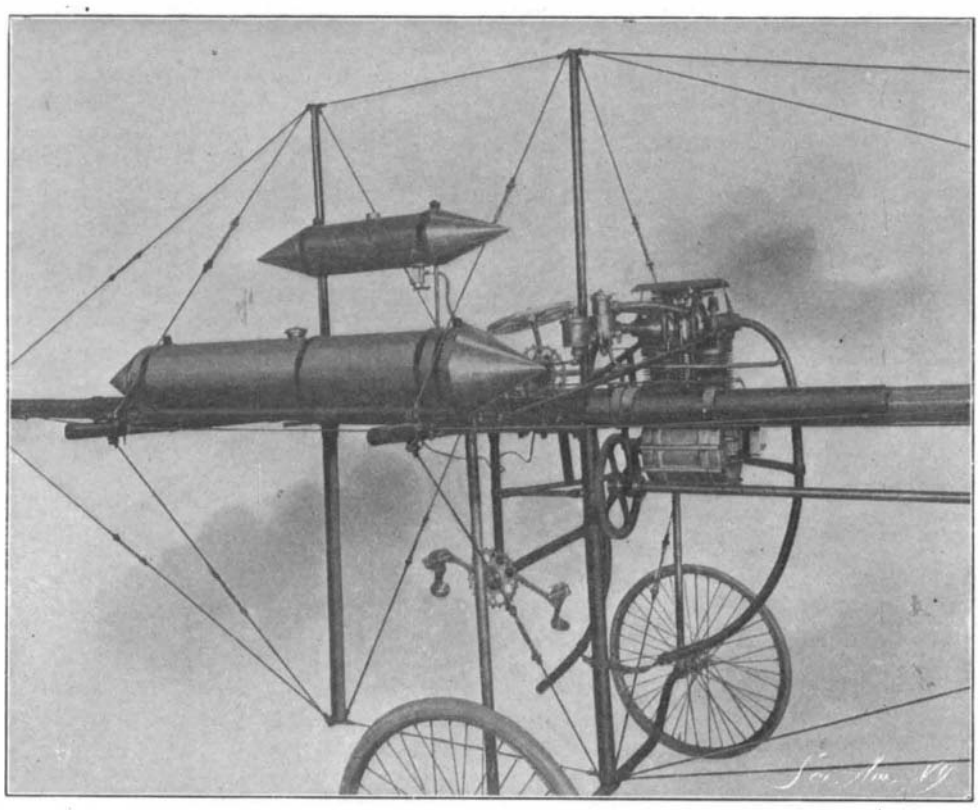


Diagram of the Santos-Dumont Air Ship.

proper is 111 feet long and 20 feet in diameter. Beneath the balloon, suspended by steel wires, is a cradle 59 feet long, composed of pine poles secured together at the ends. This cradle contains a four-cylinder motor of 16 horse power. Suspended from the center section is a triangular cradle, which carries the screw. The aeronaut sits in a small basket at the opposite end and controls the valves and rudder. Our engravings show the method of propulsion used in a previous

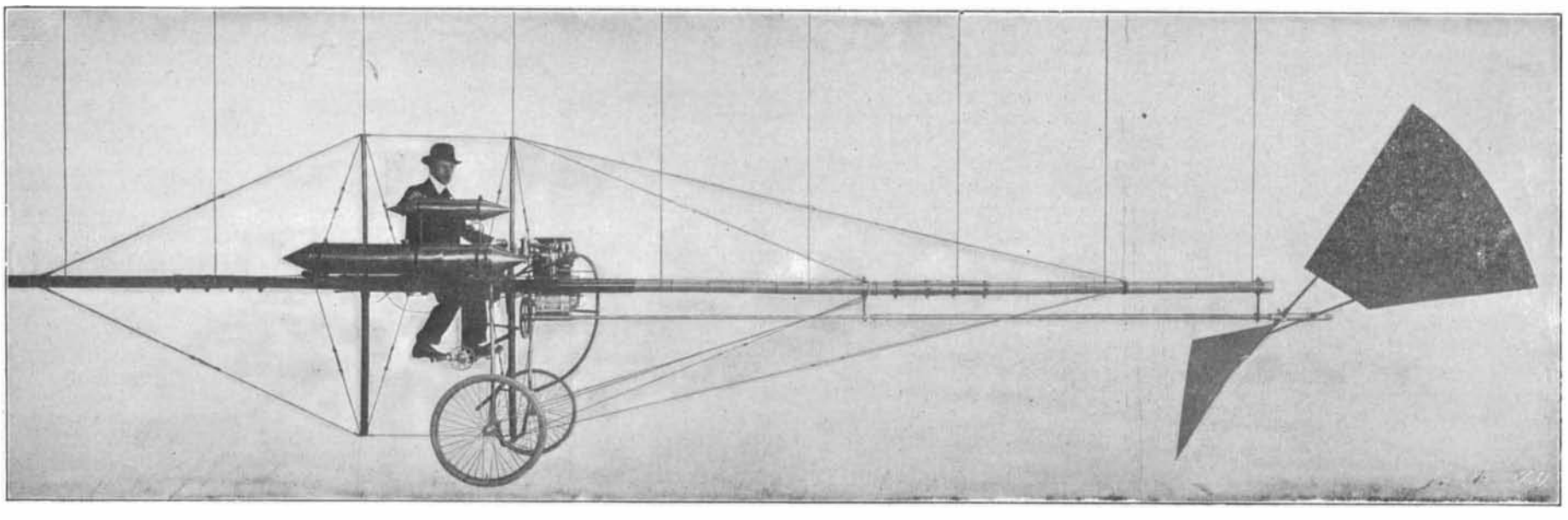


Detail View of Engines, Tanks and Controlling Gear.

experimental air ship. The start was made from the huge shed at St. Cloud, near Paris. At five o'clock in the morning the sliding doors were opened and the huge aerostat with its strange appendages was wheeled out and the motor was given a turn; the ropes were cast off and the balloon began to rise. M. Santos-Dumont threw out handful after handful of sand and the balloon slowly rose higher and higher. It swung around and made directly for the Eiffel Tower. It had no difficulty in rounding the Tower within three hundred feet and the return was then begun. It could not, however, make the balloon-house, the motors not working well, and the entrance to the Parc d'Aerostation being obstructed by some other balloon-sheds where M. Deutsch, the donor of the prize, is having a balloon built. The attempt would probably have been successful if it had not been for the fact that the supply of liquid fuel gave out so that the balloon was left at the mercy of the wind. A quick descent was arranged for and the machine became entangled in a tree. Fortunately it was not injured and M. Santos-Dumont escaped unharmed. In a short time he will make another ascent, and there is little question that he can make the trip in the time required to gain the much-coveted prize—the blue ribbon of aerial navigation.

Experiments Upon the Liquid of the Internal Ear.

In a paper recently read before the Académie des Sciences, M. Marage describes a series of experiments made upon the crystals which are found in the liquid of the internal ear. This liquid contains more or less voluminous crystals which have been called "otoliths." The different hypotheses which have been advanced to explain the acoustic action of these solid bodies seem to be scarcely probable, and in any case are not founded upon experience. The author has undertaken a series of experiments using the liquid obtained from the frog's ear and draws some conclusions as to the character and composition of these crystals. In the case of the frog, the contents of the internal ear have a milky appearance, and it is possible to secure as much as one or two hundredths of a grain. He finds the density to be 2.18, which is a very high figure. As to its composition, it is a solution of carbonate of lime and of magnesia in a liquid charged with carbonic acid. In contact with the air the carbonic acid gas disengages very rapidly, and it is easy to detect its presence. The liquid itself is very volatile; under the microscope it is seen as an oily substance which condenses in drops. It has been impossible to collect a sufficient quantity to determine its composition. The crystals which remain are formed of carbonate of lime and very small quantities of carbonate of magnesia. The most voluminous of these crystals are about the same size as a blood corpuscle (32 μ); the others, representing about 98 per cent, are much smaller and there are a great number which are scarcely visible with a magnifying power of 450 diameters. These otoliths are soluble in water charged with carbonic acid gas and can be made to reappear upon evaporation. The contents of the internal ear are thus seen to be formed of a solution of bicarbonate of lime and of magnesia with crystals in excess of insoluble carbonates. The great density of this mixture makes it an admirable conductor of sound. The existence of the crystals may also be made manifest in the living animal; the author has made radiographs of a frog under suitable conditions, and the presence of the otoliths has been revealed by a small round spot on each side of the head. To sum up, M. Marage comes



General View of the Suspended Truss, Showing the Aluminium Propeller.

THE EXPERIMENTAL MACHINE OF M. SANTOS-DUMONT, WHO APPEARS TO HAVE SOLVED THE PROBLEM OF AERIAL NAVIGATION.