

The Wright Brothers and Their First American Pupils.

On November 4th Orville Wright arrived at New York fresh from his exhibition flights at Berlin and at Potsdam before the Emperor and Empress. During his stay he taught several army officers how to operate his biplane. These machines are now being manufactured in Germany, England, France, and Italy, and a large company is about to be organized to make them in the United States.

Wilbur Wright has finished teaching Lieuts. Lahm and Humphreys the operation of the new government biplane at College Park, Md. The aerodrome is located beside the tracks of the B. & O. Railroad, some eight miles from Washington, and in the course of the lessons the aeroplane had several brushes with the express trains, all of which it is reported to have won easily. An important modification was made a month ago by Wilbur Wright. This consisted in removing the upper surface of the front horizontal rudder and rigging it just in front of the rear vertical rudders as a tail. It is said to make the machine much easier to control, and also that it does away to a large extent with pitching. Orville Wright changed in a similar manner the machine that he used in Germany.

After being taught for a fortnight how to operate the government biplane, Lieuts. Lahm and Humphreys, on October 26th, made their first flights in it alone. Lieut. Humphreys made the first flight, which consisted of two circuits of the field, in 3 minutes. Lieut. Lahm next flew six times around, and described some small circles as well, his time being 13 minutes. Lieut. Humphreys then made another flight of 8 minutes. On October 30th both officers had been flying for 10 minutes when the gear that drives the magneto dropped off, causing the engine to stop. The machine glided safely to earth. On November 1st, after making an excellent 16-minute flight, Lieut. Lahm remained aloft 58½ minutes. Two days later Lieut. Humphreys, with Lieut. Foulois as passenger, flew 61¼ minutes, and came within 10¼ minutes of equaling Orville Wright's record flight with a passenger. Lieut. Lahm, after one false start, succeeded in making an 8¾-minute flight with Lieut. Sweet, who weighs 185 pounds and whom Wilbur Wright had twice tried to take up in a calm without accomplishing it. Lieuts. Humphreys and Foulois made another flight of 25 minutes. On November 5th, when Lieuts. Lahm and Humphreys were making a flight early in the morning, the motor began missing, and the machine got dangerously near the ground. The end of the lower plane struck in making a turn, and the machine was rather badly smashed, although neither of its occupants was hurt.

An Electrolytic Scrap Tin Process.

The electrolytic method for extracting tin from scrap is quite extensively used in Italy at the present time. An alkaline bath is used in most of the factories. For the anode tin scrap is used, while the cathode is made up of plates of iron. The bath is a soda lye which is kept at a high temperature. Oxidation of the tin at the positive pole produces stannic acid, which is transformed to stannate of soda by combination with the soda of the bath. This stannate of soda is reduced at the negative pole, and here the tin is deposited. Soda is re-formed in this way.

Considered theoretically, the electrolysis should have the effect only of depositing the tin at the negative pole, while leaving iron at the positive pole, the liquid of the bath not changing in composition, and no gas being given off at the electrodes. It was found, however, that a heating of the bath gave a much better result, which is explained by the lowering of the electrical resistance when the temperature rises and by the greater solubility of the stannic acid in the caustic soda at high temperatures. Thus in order to facilitate the chemical and electrolytic phenomena the liquid is heated and given a rapid circulation in the direction of the current. The reactions are easily produced at the positive pole, owing to the great surface of contact of the anode and the bath, but such reactions are less easily produced at the cathode, whose surface is much smaller. Therefore at the beginning of the operation there is formed an excess of stannate of soda and its quantity keeps on increasing. When the percentage of stannate exceeds a certain value determined by experience, the bath is not sufficiently alkaline to allow of the good progress of the actions. Some of the liquid is then removed and replaced by soda lye. When the operation is well carried out, there is but little hydrogen set free at the negative pole and nearly all the oxygen enters into reaction at the positive pole. The amount of gas given off shows an indication as to the working of the process, and the end of the extraction of the tin coincides with the greatest disengagement of gas.

In Italy the tanks generally used are made of iron and have about 100 cubic feet capacity. The liquid is made to circulate rapidly between the re-heater and the tanks by a pump. The six anodes which are used are formed by perforated iron holders containing the tin scrap, while the seven cathodes are made of plates of

iron. The tin is thrown down on the cathodes in a spongy state which adheres but slightly and can be collected by scraping off. The powder thus secured is washed and then compressed in cylindrical cakes, which are kept under water in order to prevent oxidation. The cakes are melted in a furnace of the kind which is used for bismuth. A part of the tin is oxidized during the operation. The metal is then recuperated by a reducing treatment of this oxide in a reverberatory furnace.

The iron obtained at the cathode does not contain more than 0.1 per cent of tin when the process is well carried out, and this iron is of a very good quality and is sought for by iron works. It is this part of the process which makes the present method of tin extracting economical, for unless the iron can be used in metallurgy the case would be otherwise, as is true for other tin extraction methods. The stannate of soda taken from the bath is then transformed to bioxide of tin, and to carry this out we filter the liquid taken from the tanks and a current of carbonic-acid gas is passed through it. There is formed thus carbonate of soda and stannic acid, and this latter is roasted so as to give bioxide of tin, this product being used in ceramics and also in the chemical industry for manufacture of tin salts. At present there is used in Italy from 50,000 to 60,000 tons of tin, the greater part of which goes to the manufacture of tin cans. The scrap is estimated at 11,000 tons. As soon as the new works are completed, the whole of this amount of scrap can be treated in Italy.

THE RECORD FLIGHTS OF COUNT DE LAMBERT AND HENRY FARMAN

Mention has already been made in these columns of the magnificent flight of Count de Lambert on a



COUNT DE LAMBERT FLYING NEAR THE EIFFEL TOWER.

Wright biplane from the Juvisy aerodrome to Paris and above the Eiffel Tower. In the present issue we reproduce a photograph showing the aeroplane flying near the tower at a high elevation. After circling about the aerodrome a couple of times in order to reach a height of some 450 feet, Count de Lambert left it at 4:37 P. M. on October 18th and flew straight for Paris, passing over Chevilly and Villejuif and entering the city by passing over bastion 81, about 180 feet to the left of the Arcueil gate. From this point he curved to the left and kept steadily ascending, so that when he reached the Eiffel Tower he was at a height of some 400 meters (1,312 feet), or 100 meters (328 feet) above the top of this lofty edifice. After passing over it he described a wide semi-circle, and returned to Juvisy along the same route. He alighted at 5:30 P. M. less than a score of feet from his shed, and was heartily cheered by the crowd of spectators who had witnessed his departure and return. The total length of the flight was 49 minutes 39 seconds, and the distance covered close to 30 miles. The air-line distance from the aerodrome to the tower is about 12½ miles, but the course followed by Count de Lambert was a couple of miles longer, to which must be added the circuits of the aerodrome at the start and upon the return. When congratulated upon his magnificent performance by Orville Wright (who had just arrived from Berlin), Count de Lambert was very modest and had but little to say. The chief impression was the slow speed at which he seemed to be traveling when flying at a great height, and the well-nigh interminable time before he finally reached again his starting point. Although his flight was one

of the most daring that has thus far been made, the Count did not treat it as such, and he seems to have made it without any great trepidation. As a spectacular feat in aviation it stands unsurpassed up to the present, although Farman's new endurance record, made at Mourmelon November 3rd, was probably of more importance from a practical point of view.

While competing for the Michelin trophy last week Wednesday, Farman flew continuously for 4 hours, 6 minutes, and 25 seconds, during which time he covered 232 kilometers (144 miles) at an average speed of 35.06 miles an hour. Thus he has actually covered in a single flight a distance as great as that from New York to Albany, which we stated some time ago we believed him capable of covering if he had seen fit to revisit America and participate in the contest held during the Hudson-Fulton Celebration. This contest, which is for a prize of \$10,000 for the first aeroplane or dirigible that flies from New York to Albany, is to be held open until October 9th, 1910.

The motor used by Farman in his latest record-breaking flight is the same one that he used in winning the long-distance contest at Rheims. It is a Gnome revolving-cylinder motor of 50 horse-power, having 7 cylinders that revolve in a vertical plane around a stationary crankshaft. In a brake test made by the Aero Club of France, this motor developed only 34 horse-power and ran for 2½ hours; Farman has had, however, greater success with it, as evidenced by his excellent flight. Both Paulhan and Sommer, as well as Farman, have also made excellent flights recently upon Farman biplanes at the recent aviation meetings at Blackpool and Doncaster in England. The revolving-cylinder motor seems to have worked well in every instance, and to have demonstrated its reliability.

The Michelin trophy was brought to America last week by the president of the Aero Club of America as a result of Wilbur Wright's flight of 2 hours 20 minutes on December 31st last at Le Mans. When asked whether he thought it would remain here, Wilbur Wright is said to have replied that the winner for this year must be prepared to fly from dawn till dark; so in all probability Farman's record will be considerably beaten before the year is out.

As the trophy can only be competed for between 10 A. M. and sunset, however, if the flight for it is not made until the last day of the year, it cannot be of more than of six or seven hours' duration.

Disinfectants in Water Purification.

At the annual meeting of the New England Water Works Association one paper dealt with the extensive studies which have been in progress for some years at the Laurence Experimental Station, and another recorded some interesting results obtained at the Poughkeepsie water works. At the Laurence establishment many disinfectants have been tested, including copper salts, permanganate of potash, and calcium chloride. Unlike copper salts, both of the latter reagents are rapidly decomposed; they effect a considerable reduction in the number of bacteria present; and the resulting compounds are of harmless character from the physiological standpoint. Recent experience at Poughkeepsie relates chiefly to the employment of calcium chloride, which has been found beneficial in preparing the water for filtration. The general tendency to-day in water purification is toward reduction of the work to be performed in filters. British endeavors of this class are mainly confined to the provision of storage reservoirs where partial purification occurs by natural agencies, while American engineers more generally attempt to hasten the process by means of coagulants and disinfectants, alone or in combination. The papers mentioned are worthy of consideration, but we think the British method of preliminary treatment generally preferable, especially for waters already characterized by a fairly large proportion of mineral salts.

The Russian Secret Service and Aeronautics.

The Russian government views with alarm the advent of the airship or aeroplane. Evidently the fear that some aeronautic nihilist may possibly drop a bomb upon the Czar's palace has wrought up the government to a pitch of nervous fear. The Minister of the Interior has given the following instructions to his subordinates:

1. All ascents of flying machines and airships are to be carefully watched by the police.
2. All the aero clubs of Russia must be registered, and their members are subject to supervision by the secret police.

A good example of the economy often accomplished by chemical investigation and discovery is furnished in the case of ultramarine. Many years ago when this was made by powdering the mineral lapis lazuli, it sold for more than its weight in gold. Now that the chemist has discovered how to make the same material from such cheap substances as kaolin, sodium sulphate and carbonate, charcoal, sulphur and rosin, the price is only a few cents per pound.—American Machinist.