AERONAUTICS.

Those members of the Aeronautic Society who have completed and tried out their machines have not met with good luck of late. A week before the exhibition of June 26th Wilbur R. Kimball damaged his eight-propeller biplane by hitting the banked part of the track at one of the turns, and last week Frederick Schneider demolished his Wright-type aeroplane, which was fitted with the society's motor, when it was shot off the catapult. Both of these members, nothing daunted, intend to build new machines. The Beach-Willard monoplane is nearly completed and will probably be tried by Mr. Willard within a few days, as soon as he has learned how to fly the Society's new biplane.

Senator Henri Deutsch de la Meurthe, who has probably done more than any other one man to encourage the development of aeronautics by offering generous prizes, has recently given $100,000 for the founding of an aero-technical institute in connection with the Paris University. The new institute will be named after M. Deutsch, and will be devoted to study and research for the purpose of perfecting flying machines of all types. M. Deutsch has also given $3,000 and the University $2,000 annually to carry on the work. M. Basil Zakaroff, a wealthy Greek resident of Paris, has given $140,000 for the founding of a chair of aviation by the Faculty of Science at the University. These two gifts show the generosity not only of the native Frenchman, but of the foreigner who has made France his adopted land, when the two meet in the common field of science.

The "Zeppelin I"—the German government's first Zeppelin airship—recently made the trip from Friedrichshafen to Metz. The former place was left at 12:27 A. M., June 29th. There was a light northwest wind blowing. Ravensburg was passed at 1:07, the airship continuing northward at about 18 miles an hour. At 4 P. M. a landing was made in a field at Biberach because of bad weather and trouble with the motors. Despite a heavy rain, the crew of eight men brought the huge craft safely to earth. A battalion of soldiers was required to hold it the next day, when the wind blew a gale. Repairs were finally effected and the airship at length reached its destination on July 4th. After another of the latest-type "Zeppelins" is completed for Metz, the "Zeppelin I" will be sent to Tegel, near Berlin, as a school ship. The official report of the recent long-distance trip of the "Zeppelin II" will be found in the current SUPPLEMENT.

A faint idea was given New Yorkers last week of what a modern dirigible could do in the way of passing over their city, when Frank Goodale sailed his tiny airship from Palisade Park, on the west bank of the Hudson opposite 130th Street, across the river and above Broadway to 42nd Street. The craft, under perfect control and making about 12 miles an hour, circled around the Times Building and returned to its starting point in 40 minutes. A large modern dirigible, with a speed three times as great and a carrying capacity of a score of passengers, could have made this trip in much less time, even with quite a wind blowing. M. Clement, of Paris, is at present constructing just such an airship with the idea of crossing to England. Some patriotic British newspapers are constructing a shed for it at Aldershot with the hope that after this craft has demonstrated its capabilities the government will purchase it and thus acquire a large up-to-date dirigible.

Orville Wright, in attempting to fulfill the government requirements at Fort Myer with his aeroplane, has met with numerous set-backs and a great deal of ill luck. Owing to trouble with the motor and unfavorable winds, the first flight, consisting of one circuit of the field, was not made until June 29th, and then only at the third attempt. The next day the machine flew the length of the field, but scraped one end of the lower plane in making the turn, and in landing broke one runner. On July 2nd two flights were made of 7 and 12 minutes, the second being terminated by the stopping of the motor when the machine was over the shed at the end of the field. In landing one end of the lower plane caught on a small tree, which tore the cloth and whirled the machine around, completely demolishing the runners. Ten days were taken to repair the machine, and it was not until the 12th instant that Orville Wright succeeded in flying again. This flight lasted 5 minutes and 38 seconds. The next day the machine failed to rise properly, and but two straight-line jumps of less than half a minute were made, a runner being broken in alighting the second time. Although a large crowd of prominent people visited the parade ground every afternoon last week, conditions were generally said to be too unfavorable for a flight, and aviation in the vicinity of the national capital received a sharp set-back as a result of the failure of the Wright machine to fly under what could hardly be called really unfavorable conditions, such as a light wind of 6 or 8 miles an hour for example.

ELECTRICITY.

A large Mexican hydro-electric company has just been organized for the purpose of furnishing the power for a vast irrigation scheme. A large plant is to be built near Lake Chapala, and another on the Santiago River near Guadalajara. The territory which is to be reclaimed by this irrigation system covers more than 500,000 acres.

The success of the electrically-illuminated baseball grounds at Cincinnati, Ohio, has been so pronounced, that it is now proposed to have football games, as well, on the illuminated field. Football is too strenuous a game to be played under the summer sun, but no such objection can be raised to it in the cool of the evening or night. It is expected that quite a number of outdoor sports and games will now be possible for evening entertainment.

Last year $56,000,000 was spent by the railroads of the United States for cross ties. The average price of the ties was 50 cents each. Only six per cent of the ties was used by electric railroads. Forty-three per cent of the ties were of oak, and nineteen per cent of yellow pine. Owing to the growing scarcity of suitable timber, other woods are being used after treatment with various preservatives, and it has been found that these treated woods outlast the more expensive untreated oak ties.

In a talk given before the Electric Club of Chicago, Mr. Edward N. Lake pointed to the remarkable growth of street railway systems in the United States. Of the 8,123 miles of single-track railways in 1890, only 15.5 per cent were operated by electricity. At the beginning of last year there were 34,404 miles of street railway, 34,060 miles, or 99 per cent, of which were electrically operated. Mr. Lake also pointed to the rapid strides now being made in the electrification of steam railroads, and predicted great progress within the next ten years.

A new type of electro-magnetic brake is being manufactured in Germany, which operates on the rails rather than on the car wheels. This rail brake comprises a pair of pole shoes, which are parallel with the rails and located close to them. The braking effect may be increased by lengthening the pole shoes. The weight of the brake is but three per cent of the pressure it exerts. The brake is adapted particularly for mountain railroads, and may be used in conjunction with an ordinary wheel brake to increase the adhesion of the car to the rails.

Early in June an outdoor theater conducted by the Boston Suburban Electric Railroad at Auburndale-on-the-Charles was burned to the ground. The fire was discovered at 2 o'clock in the morning, but the general manager was on the scene inside of twenty minutes. A telephone station was immediately established, and within two hours a designing engineer was on the ground planning a new structure. An hour later the carpenters and contractors arrived, ready to estimate the cost of reconstruction. By this time the ruins were cool enough to permit of starting work, which was rushed through with such celerity that within ten days a brand-new theater, complete in every detail and seating three thousand persons, was ready for use. Credit for this rapid construction is due almost entirely to the telephone, which was in constant use during the ten days of construction.

It is well known that Hertzian waves can be transmitted more readily over water than over land. The reason for this was explained quite recently by Prof. J. A. Fleming in a popular lecture. He showed that a current of high frequency could be transmitted over a galvanized-iron wire as readily as by means of a copper wire, but that if the zinc was burned off the wire, so that the current had to traverse an iron path, there was a considerable reluctance. This showed that high-frequency currents, which normally travel over the surface skin of a wire, will penetrate farther into the metal of low conductivity. The Hertzian waves do not penetrate water to a depth of more than a few feet, but when traveling over dry soil there is a much greater penetration, due to the poorer conductivity, which results in a greater loss of energy.

An electric railway running from Trient to Male, Austria, a distance of 38 miles, is soon to be put into operation. The current is to be supplied by a hydro-electric plant. This marks an important step in the utilization of water power in the Tyrol. Another railway line is nearing completion in Austria, known as the Maria Zell road. This line is 57 miles long, and is the longest single-phase railway in Europe. The current is furnished by a hydro-electric plant, and is fed to the trolley wire at a pressure of 6,000 volts. The catenary system is used for supporting the trolley wires. The locomotives will each be equipped with two single-phase 250-horse-power motors. Owing to the narrow gage, the motors cannot be mounted on the car axles, but are situated above the trucks and connected to the wheels by means of connecting rods after the manner of a locomotive.

SCIENCE.

"Orthodentist" is the technical name of a new kind of dentistry. In plain English, "orthodentist" means "tooth-straightener." According to last accounts, there are about 60 of him now in America, as compared with 50,000 ordinary dentists. To the orthodentist's mind, a man who extracts a tooth in regulating foolishly clings to old tradition. He holds that the properly-shaped jaw can hold all the teeth that grow.

Mr. C. E. S. Phillips exhibited at the recent *conversazione* of the Royal Society a permanently luminous watch dial and military night compass. The watch dial is transparent (glass) and the figures are painted upon its upper surface. The dial is backed with a compound containing a minute quantity of $RaBr_2$ (radium bromide), which renders it luminous, so that the time may be easily read in the dark. The compass is arranged upon the same principle. By means of a luminous disk and strip, direction may be determined at night.

A series of ascents of kites and balloons on Lake Victoria was organized by the Prussian Aeronautical Observatory of Lindenberg in July, 1908. A registering balloon, which attained the height of 19.8 kilometers, recorded, at that altitude, a temperature of —84 deg. C., a lower value than has ever been found at equal or even greater altitudes over Europe. The "isothermal layer" was entered on several occasions. On several occasions also an uppermost current from the west was found above the regular easterly current of the equatorial region.

It was shown by the N. S. W. Royal Commission on the Spontaneous Combustion of Coal Cargoes (1897), that ships whose cargoes took fire had mostly been loaded in summer. In view of the high summer temperature of Newcastle, N. S. W., this was only what might have been expected; but it does not seem to have been noticed that a similar relation might obtain for cargoes loaded in the temperate climate of the United Kingdom. Prof. Threlfall has made an analysis of 4,898 long-voyage shipments in the years 1873, 1874, and 1875—presented to the English Royal Commission of 1876—which analysis shows unmistakably that it is only cargoes loaded in summer which are liable to spontaneous combustion.

A new process of keeping eggs consists in placing them first in compressed carbon dioxide, which almost completely sterilizes them, and then in a mixture of carbon dioxide and an inert gas (nitrogen and hydrogen) at a temperature near the freezing point. In these conditions the micro-organisms which have not been destroyed cannot develop. The addition of the inert gas is necessary in order to prevent the liquefaction of the albumen, which would certainly occur in an atmosphere of pure carbon dioxide. Eggs thus treated can be kept ten months without losing any of their qualities. The treatment costs about 38 cents per thousand eggs, while cold storage costs 13 cents per thousand per month; hence if the eggs are kept nine or ten months, the former process will be much cheaper than the other.

A French commission formed for the purpose of making comparative studies of the vertical and inclined styles of handwriting, with regard to the health of school children, has unanimously reported in favor of the inclined style, which is asserted to be far simpler and less fatiguing than the vertical style, and less likely to cause spinal curvature and other evil results. In writing by the vertical system, the right arm is held in an unnatural position, which makes it impossible for the child to maintain a normal and hygienic posture. Vertical writing is performed very slowly and laboriously and may seriously injure children who are predisposed to spinal curvature and other deformities or to writer's cramp. The oculist of the commission denies that vertical writing presents any advantage over inclined writing with respect to the prevention of short-sightedness.

At a meeting of the horticultural society of Algeria, last November, a number of seedless dates of large size and fine flavor were shown, which had been produced without artificial fertilization. The date palm (*Phœnix*) is a dioecious plant, the male and female flowers being borne on separate trees. No seed can be formed unless pollen is conveyed from the male to the female flower by wind, insects, or human agency. In Algeria pollination is usually assisted by placing a few male flowers, with ripe pollen, among the female flowers. Egyptian paintings show that this method was practised in antiquity. Seedless fruits have often been produced by isolated female trees but hitherto these seedless dates have been imperfectly developed. At Nice is cultivated a species of date palm which produces black fruit and bears abundantly every year, whether the flowers are fertilized or not, the seedless dates being equal in size and flavor to the normal fruit. In most species, however, the seedless dates are smaller and are produced less abundantly than the normal fruit.