

AERONAUTICS.

The Opel firm of Russelheim, Germany, has recently offered a prize of \$4,000 for a cross-country aeroplane flight from Frankfort to a point about 15 miles distant. This flight must be made during the coming summer, while the Frankfort Aeronautical Exposition is open. The machine must be constructed in Germany, and the aviator must be of that nationality.

The first German military airship, "Zeppelin I," recently made a night flight, and remained in the air 13 hours and 20 minutes. It was intended to make a 24-hour trip, but the weather conditions were not favorable. The airship started out at 10 P. M. on April 6th, and returned the next morning at 11, after making an excellent flight. The flight was 11 minutes longer than that made by the Gross airship in Germany September 12th last.

Wilbur Wright, after making a considerable number of excellent exhibition flights at Rome, has gone with his brother to England, where the brothers will be presented with the gold medal of the Aero Club of Great Britain before they return to America to finish the government aeroplane contract. Wilbur Wright, during his Italian flights, is said to have started his machine by sliding it on its runners over the grass under its own power, thus dispensing with the dropping weight and starting rail. If he actually accomplished this feat, he has made a big stride in advance in making his machine thoroughly practical.

The West Hudson Aero Club, Arlington, N. J., will give a grand aeronautic demonstration during the week from May 26th to 31st. Capt. Baldwin has been engaged to make flights with his new 90-foot dirigible, and Mr. Perkins will conduct kite-flying contests for amateurs, besides flying a large number of kites himself. The chief attraction for aviators will be a prize of \$1,000, offered for a flight of a mile, and \$500 for the aeroplane having the best points, although it may not fly. The contest will be conducted under the auspices of the Aero Club of America.

The Aeronautic Society expects to have its first exhibition on the 22d instant at Morris Park. Besides a large number of cups and small prizes for gliders and model aeroplanes, a prize of \$2,000 is offered for one circuit of the race track, a distance of about 1¾ miles; for a 1,500-foot flight, \$1,000 will be given, or \$500 for a flight of 1,000 feet by any new machine which has not been flown publicly heretofore. It is also hoped to have a flight by some competent aviator, such as Mr. Curtiss or Mr. McCurdy, either of whom is probably capable of making a 25-mile flight. The SCIENTIFIC AMERICAN trophy can be competed for upon both occasions.

The Douai section of the National Aerial League of France will hold an aviation meeting from June 28th to July 18th. \$8,000 in prizes are available. One-half of this amount was donated by the municipality. Three contests have been arranged for: (1) A speed contest around a 2½-kilometer (1½-mile) circuit. (2) A distance race to be known as the Grand Prix of Douai, to take place between July 4th and 18th. (3) A cross-country flight from Arras to Douai, 25 kilometers (15 miles).

The London Daily Mail has recently offered a prize of \$5,000 for the first aeroplane flight of one mile in a closed circuit, by an English-built machine flown by an Englishman. The flight must be made in Great Britain, within a year from April 7th last, but the machine can be constructed in any part of the British empire. This newspaper, it will be remembered, offered a prize of \$50,000 two years ago for a flight of 180 miles from London to Manchester. Only recently, the same paper put up \$5,000 for a flight across the English Channel. This latest prize has been offered for the purpose of stimulating British industry, and there is little doubt that it will be won within a year. Mr. J. Norton Griffiths has lately offered a trophy for the longest flight in any one year, in England.

The Technical Committee of the Automobile Club of France has undertaken tests of the leading light-weight French aeronautic motors. The R. E. P. (Robert Esnault-Pelterie), Gnome revolving-cylinder, Farcot, and Renault motors are to be given thorough tests this month, so that the public will soon know just what these various motors are capable of doing. All but the Renault are of the air-cooled type, and this latter is furnished either air or water cooled. They have all been described recently in the SCIENTIFIC AMERICAN SUPPLEMENT.

The new German Aerial Fleet Company expects to open at Friedrichshafen about October 1st a school for aeronauts in which a three years' course will be followed for the practical and scientific instruction of aerial pilots. After having graduated from the primary upper school and studied mechanics for a year, a young man can begin at Friedrichshafen, where he will spend a year in studying the theoretical side of the subject. The second year he may enter the workshops; and finally, the third year, he can undertake to make ascensions in dirigibles and aeroplanes.

ELECTRICITY.

The Burlington Railroad has decided to light its suburban trains running out of Chicago with electricity. The current will be generated by turbo-generators mounted on the locomotive boiler and driven by steam taken from the boiler. The generators will also supply current for the searchlights of the engines.

Heretofore direct-current generators have been designed for operation by high-speed engines, but recently a French company has designed a dynamo generating direct current at 2,500 kilowatts, which is driven by a slow-speed prime motor. The armature of this dynamo is 17 feet in diameter, and serves as a fly wheel. The dynamo runs at 85 revolutions per minute, and generates current at a tension of 250 volts.

The city of Los Angeles has solved the pole nuisance to a large extent by providing a joint pole committee, whose object is to eliminate unnecessary poles and cause the various companies to run their lines on the same poles. The committee has been at work for two years, and 10,000 poles are now being used jointly by the different companies, thus doing away with a like or even larger number that would otherwise be necessary.

A report from Consul General A. M. Thackara of Berlin describes a trackless trolley line in the suburbs of Vienna which is a little over a mile in length. The cars pass through narrow streets with many sharp turns and steep grades. In several places the grade is 1 to 10. A double line is provided so that cars can pass each other without interruption. The line cost \$44,153 and the running expenses are under \$10,000 per annum.

An interesting example of the value of a small stream for light and power purposes may be found near Sacramento, Cal. A trout stream has been dammed up and the power in the form of electricity has been used for doing such light work as washing and ironing, also for cooking and lighting in the home of the owner. As the stream is very small during the dry months, an old miner's ditch has been dammed to form a reservoir of 100,000 cubic feet capacity. The plant cost \$1,500 and in a single year has done \$700 worth of work.

A new method of transmitting photographs to a distance has recently been devised. A gelatine negative is used, in which the picture is formed in relief. A style travels over the uneven surface of the negative and operates a rheostat in the main line. At the receiving station a luminous ray plays over a sensitized plate, and the intensity of its light is varied by the rheostat. The reliefs and hollows of the original are thus reproduced in light and shadow on the sensitized medium, and form the picture. This method of transmitting pictures was recently tried with success on the line between Paris and Lyons.

In a discussion of the American and Canadian transmission systems, recently published in Cassier's Magazine, it was pointed out that the largest transmission line in the world is that of the Niagara-Syracuse-Auburn line, which transmits 30,000 horse-power over a distance of 163 miles. The line in parts is designed to carry 60,000 horse-power. The Colgate plant, Yuba River, Cal., connects via Oakland and Mission San José to a line 222 miles in length. This plant has a capacity of 11,250 kilowatts and there are over 100 sub-stations on 1,375 miles of circuit on the system.

The use of candles in dining rooms of hotels and restaurants makes a very pleasing decoration. However, the ordinary paraffine candle is entirely unsuited for the purpose, owing to its unsteady light and the drip of the paraffine wax. The ideal candle would be an electric one, but the objection to the use of electricity heretofore has been that it required connecting wires running to the source of power. Recently an electric table lamp has been devised which carries its own storage battery. This little lighting device is rather more ambitious than a candle, being set in a vase in which cut flowers may be placed. The light passing through the flowers and water contained in the vase gives a very soft, pleasing effect.

The intensity of light is measured in candles, both here and abroad, but there is considerable difference in the value of the standard candle in the different countries. Germany uses the Hefner candle—an amyacetate flame; in France the standard is the Carcel—a colza-oil flame; while in England the original sperm candle flame has given way to a flame of pentane gas. In this country we use the pentane flame for the gas industry, but for electric lighting incandescent lamps are used which are only approximately equal to the value of the pentane flame. An effort is now being made to adopt an international candle, which will be 1.6 per cent below the candle we use now. This international candle would be equivalent to the English candle and to a French candle known as the *bougie decimile* and to 10/9 of a Hefner candle.

SCIENCE.

A curious defect in color sense is recorded by Mr. C. R. Gibson in the Transactions of the Royal Philosophical Society of Glasgow. The case in question is that of Mr. Gibson himself. His color vision is perfectly normal, with the exception that at times his sensitivity to red is suppressed. As soon as his attention is called to a red object, his eye immediately responds and he sees the object as it really is. In other words, the temporary "red blindness" disappears immediately when he is informed that red rays are present in the light which strikes his eye.

The United States Weather Bureau has established snow gaging stations in the Rocky Mountains. The amount of snowfall in the Rocky Mountains determines the amount of water in many of the principal rivers of the West, and therefore bears a direct relation on the floods that devastate the Middle West at times. Moreover, many vast irrigation enterprises depend for their success upon the amount of snowfall in the mountains. In order to keep accurate and dependable records of the amount of snowfall, and therefore to forecast in a measure the amount of water that may be expected from the mountains, these stations have been established.

From experiments made in France in the employment of artificial refrigeration in wine making, the following conclusions have been drawn: Grapes may be kept at a temperature of 29 deg. F. for a year, but it is not advisable to keep them longer than a few months because of the inevitable softening of the seeds. In the clarification of liqueurs and their preparation for exportation to cold climates, very good results are obtained by cooling to 29 deg. F. for 72 hours. Cold affects wine by precipitating excess of tartar and, with this, the oxy-tannins, albuminoids, pectates and certain alumina and iron compounds which the wine holds in suspension. Pathogenic microbes are rendered inert and carried down with the lees. Applied to sparkling wines, cold increases the quantity of carbonic acid dissolved, without injuring the quality.

A chemist has analyzed fatty matter extracted from Coptic mummies dating from 500 B. C., and found it to consist chiefly of oleic acid, with some other higher fatty acids, but without a trace of any volatile acid. From Egyptian mummies of the 21st dynasty, dating from 1500 B. C., the same chemist obtained large quantities of volatile acids of the fatty series, in the form of soda salts, which were found chiefly among the "natron" which filled the internal cavities of the mummies. Natron is a mineral which is found native in Egypt and which consists of sodium carbonate, mixed with sodium sulphate, sodium chloride, and calcium carbonate. The volatile acids could not have been derived from the butter and other grease used by the embalmers, but must have been produced by the decomposition of the tissues of the body, and then fixed by combination with the natron.

The comparatively high temperature produced within a greenhouse covered with glass and exposed to solar radiation is usually held to result from a transformation of wave-length; that is, that the heat waves from the sun, which are able to penetrate the glass, fall upon the walls of the inclosure and raise its temperature; the heat energy is re-emitted by the walls in the form of much longer waves, which are unable to penetrate the glass, the greenhouse acting as a radiation trap. Prof. R. W. Wood of Johns Hopkins University thinks it more probable that the part played by the glass is the prevention of the escape of the warm air heated by the ground within the inclosure. In some experiments which he conducted it was found that the loss of temperature of the ground by radiation is very small in comparison with the loss by convection, so that little is gained from the trapped radiation. From this it seems doubtful if the atmosphere is warmed to any great extent by absorbing the radiation from the ground.

The unpleasant discovery that telegraph poles impregnated with copper sulphate by the Boucherie process are so readily attacked by fungi that in some districts they last only eight or ten years has led the Austrian government telegraph bureau to institute experiments in the preservative action of fluorides. In the preliminary experiments air-dried poles were saturated with solutions of acid zinc fluoride containing a little free hydrofluoric acid. After two years' service from 80 to 100 per cent of these poles showed a surface absolutely intact, while of the poles treated with copper sulphate, after two years' service, only 50 per cent remained free from fungi and 10 per cent were badly rotted. In subsequent experiments on a larger scale the poles were impregnated with acid zinc fluoride both by steeping and by hydrostatic pressure. Analysis of the water which drained from the poles showed that all of the free acid and a large part of the loosely combined acid had been absorbed by the wood. The durability of this second set of poles has not yet been made known.