

AERONAUTICS.

The Automobile Club of America has granted the Aeronautic Society the use of a room at its sumptuous club house in West 54th Street, for the weekly meetings of the Society. This will be found a much more convenient place of meeting than the club house at Morris Park. It is probable that the Automobile Club itself will take up the subject of aeronautics in the near future.

Columbia University students have recently organized an Aero Club, and at a lecture given recently by Mr. Wilbur R. Kimball, the members were given an insight into the state of aeronautics at the present time. Dr. Bell has presented the Club with the manuscript of Lieut. Selfridge's last paper on "The Progress in the Art of Aerial Navigation." Jay Gould, the son of George Gould, is an enthusiastic member, and he expects to experiment with a dirigible and with an aeroplane next spring. The club will also probably hold a competition of models made by its members.

Laurence J. Lesh the boy aviator, who broke his ankle while being towed in a glider by an automobile at the Aeronautic Society's exhibition at Morris Park, is slowly recovering. His ankle was improperly set the first time, and an operation had to be performed upon it afterward. Mr. Lesh is busying himself while recovering with inventing a new aeroplane. He expects to try a model shortly in the basement of the hospital.

Dr. George A. Spratt, who is one of the pioneers in aeroplane experimentation in this country, and who is at present said to be associated with Mr. Octave Chanute in carrying out some experiments, recently tested a glider at his farm at West Brandywine, Pa. The aeroplane was towed by an automobile, but after making a glide of about 150 feet, it was dashed to the ground and demolished. Fortunately, Dr. Spratt sustained no serious injuries.

The syndicate which has purchased the patent rights of the Wright aeroplane in France, has arranged for a 225-acre ground at Hyeres for a school of aviation. As soon as some of the fifty machines which are being built by the Société Navale de Chantiers de France are completed, instruction will be given to the purchasers at these new grounds. In this connection, it is interesting to note that M. Delagrangé will teach anyone how to operate a Voisin aeroplane for \$200.

Wilbur Wright, since the breaking of the driving chain of one of his propellers while in flight, has arranged another chain which connects together the two propellers, so that if either of the driving chains should break, both propellers will continue to revolve, and there will be no danger of accident from the gyroscopic action.

In a letter to Engineering, analyzing the relative performance of the Farman and the Wright brothers' aeroplanes, Sir Hiram Maxim, whose pioneer work in aeronautics of twenty years ago attracted wide attention, attributes the superiority of the Wright brothers' machine to the fact that they use two propellers, turning in opposite directions, and thereby get rid of troublesome gyroscopic action. French machines, as used by Farman and Delagrangé, are equipped with a single propeller, which is run at a very high speed. When the machine is turned to the right or the left, the gyroscopic action tends to make the machine turn over about a transverse axis, and this accounts for the difficulties which the Frenchmen have had in making evolutions.

Russia has a dirigible, and negotiations are being carried on with the Wright brothers for the purchase of some of their aeroplanes. The price proposed is \$100,000, with royalties on machines built in Russia. The government requires a three-hour flight, but Wilbur Wright thinks a one-hour flight a sufficient demonstration provided he can carry fuel enough to remain aloft three hours. The Russian War Department has recently granted \$25,000 for the construction of a flying machine invented by H. Tatarinoff, who claims to have an apparatus that operates on neither the balloon nor the aeroplane principle. A small cigar-shaped model weighing about 30 pounds is said to have made successful tests recently.

During the past week there were several attempts by Messrs. Curtiss and McCurdy, of the Aerial Experiment Association, to make flights with the "Silver Dart," the new aeroplane described in our last issue. The first attempt was made on December 6, when three short flights were accomplished. On the 11th instant another attempt was made, with McCurdy acting as aviator and Mr. Curtis as passenger. The machine rose slightly, but tipped to one side until the end of one of the wings touched the ground and swung the aeroplane around sharply, breaking the wheels. The lack of control is thought to have been due to the new 50-horse-power motor, which is, if anything, too powerful, and which, with the single propeller, produces too much gyroscopic effect. The experiments on Lake Keuka with the "Loon" have been checked, owing to the freezing over of the lake.

ELECTRICITY.

A test of the Strang motor car is being made by the Chicago & Alton Railroad, to determine its efficiency for service on branch lines. The car is propelled by electricity generated by a dynamo coupled to a gasoline engine. Surplus electricity is stored in a battery, which is used as an auxiliary to drive the wheel motors when excessive loads are encountered.

The use of the telephone for train dispatching on electric roads is becoming very common. The various systems employed were discussed in a recent paper by Frank W. Fowle. The relative advantage of stationary and portable telephone sets was considered, with the arguments favoring the former. The objection to the latter being that at night it is difficult to make the connection with the wires by means of the so-called "fishpole," without coming in contact with line wires.

The largest induction motor in the world was started recently at Gary, Ind., where it is installed in a large rolling mill. The motor is rated to develop 6,000 horse-power. It is of the three-phase 25-cycle type, and two 2,000-kilowatt Curtis turbines generate the current necessary to operate it. The motor receives the current at 6,600 volts. By using a step-by-step controller starting at 1,350 volts, the motor was successfully started in the proper direction, coming to full speed in 45 seconds.

The enormous energy developed by a flat spot in a wheel has been estimated by Prof. Hancock of Purdue University. He finds that a flat spot $2\frac{1}{4}$ inches long on a 33-inch wheel, carrying a load of 6,000 pounds at 30 miles per hour, will deliver a blow to the rail of more than a 1,000 foot pounds. The same flat wheel supporting a 55-ton interurban car running at 60 miles per hour, would deliver a blow with an energy of 9,500 foot pounds. Such a flat spot would be produced by wearing off less than 0.05 inch of metal.

A bill has been introduced in the German Reichstag which is to establish a tax on electricity and gas. The bill is causing much agitation among the German engineers, as it will undoubtedly hinder the development of electrical projects, if passed. The tax proposed is five per cent on the selling price of the current, with a maximum of 0.4 pfennig (one mill) per kilowatt hour. In addition to this, there will be a tax on illuminating apparatus as well. It is expected that this will net the government a revenue of about \$12,000,000 per year.

The Health Department of Chicago is making experiments with one of the new "pay-as-you-enter" cars, with a view to installing a better ventilating system than is now to be had. This experimental car, as described in the Electric Railway Journal, is provided with a duplicate ventilating and heating apparatus. The apparatus is located under the longitudinal end seats. Two fans are used, one of which sucks the foul air from the upper part of the car and discharges it under the car floor, while the other takes in fresh air through a screened opening five feet above the platform, draws it through the coils of a heater, and distributes it close to the floor under the seats.

Some experiments have recently been made by M. Jagou, as reported before the French Academy of Sciences, on the use of a number of electrolytic detectors connected in series and in parallel. He finds that the detectors when connected in series are less sensitive than the most sensitive one of their number. When connected in parallel, however, the sensitivity of the series depended upon the most sensitive of the individual detectors. He suggests that several electrolytic receivers might thus be connected in practice, so that if one of the detectors should lose some of its sensitiveness, it would not affect the series. The phenomenon is explained by the fact that the Hertzian waves act only on the most sensitive one of the detectors when the waves are weak; but when they are strong, the others are acted upon at the same time.

It has often been suggested that a dynamo be used as a telephone relay by placing the field winding in the primary circuit and the armature winding in the secondary circuit, so as to reproduce in the latter the fluctuating current of the former. The principal objection to this system seems to lie in the design of a suitable collecting device, which will not produce any disturbing effects. The Electrical Review and Western Electrician describes an invention which is adapted to overcome this difficulty. It consists in the use of a dynamo with the field winding and the armature winding stationary, while the only moving part is an inductor, which is magnetized by the field winding. This inductor has a natural frequency which is much higher than that of the telephone currents, so that each pulsation of the telephone current will correspond to a large number of alternations induced by the inductor. The variation of current in the primary circuit of the field winding does not change the frequency, but does change the amplitude of the armature currents.

SCIENCE NOTES.

The War Department has considered the advisability of immunizing soldiers against typhoid fever by vaccination. It has decided that inoculation as a preventive against typhoid has been so thoroughly demonstrated in foreign countries and its efficacy so well established that the vaccination method is to be adopted in the United States army.

A prize offered by a German society of manufacturing chemists for a method of removing arseniureted hydrogen from crude hydrogen gas has been awarded to O. Wentzki for the following process: The impure hydrogen is caused to flow through a cylinder filled with a mixture of two parts of dry chloride of lime and one part of moist sand or any similar inert material. The cylinder should be vertical and the gas should be admitted at the bottom, immediately above which it is advisable to place a piece of fine wire netting. The cylinder should have about one-third the capacity of the hydrogen generator.

Many farmers believe that dandelions increase the yield of milk and, consequently, that the presence of dandelions in pastures and meadows is rather desirable than otherwise. A Belgian investigator, J. P. Wagner, has shown the incorrectness of this opinion which, he says, is founded wholly on a false analogy, suggested by the milky juice of the dandelion. According to Wagner, the presence of dandelions in large numbers in pastures exerts a very deleterious effect on the quality of the butter and is one of the numerous causes of the difficulty of making butter of fine flavor and good keeping qualities in spring and early summer. The presence of large quantities of dandelions in hay has a similar effect. Hence Wagner advises farmers to weed their pastures, whenever it is practicable to do so.

One of the most interesting and picturesque trees in the world, as well as one of the most ancient, is the *Cupressus macrocarpa*, or Monterey cypress. Its native habitat is extremely restricted, for it is found in its wild state in only two spots in the whole wide world—on the edge of a grove of conifers stretching for a few miles between the Bay of Monterey and the Bay of Carmel (the latter of which bears a striking resemblance in outline and color to its prototype in the Holy Land) and in a similar spot near Pescadero, a little town lying on the coast between Monterey and San Francisco. The Monterey grove consists of only a dozen or two cypresses of large size and most striking appearance. Their trunks are massive and wrinkled with hoary age, while their boughs, gnarled and twisted, grow chiefly on one side, away from the stormy winds that have buffeted them for thousands of years. The noble trees are limited to the rocky, wind-beaten shore, on which some of them have but a precarious hold. Hemmed between the slowly encroaching ocean on one hand and a pine forest on the other, their future is exposed to great hazard. It is, therefore, gratifying to observe that a fair number of thrifty young cypresses are holding their own against the pines for a short distance inland.

Teisserenc de Bort has been making a study, as interesting in its methods as in its results, of the constitution of the upper atmosphere, and especially of its richness in helium, argon, and the other gases. His investigations were confined to the permanent isothermal stratum which extends from the height of 26,000 feet to that of 46,000 feet above sea level, and the origin of which is yet unexplained. If the upper atmosphere differs essentially in composition from the air near the ground, the specific differences ought to show most clearly in this elevated isothermal stratum, which is not contaminated by the ascending and descending currents caused by cyclones and barometric depressions. The specimens of air were collected by a very ingenious method. A glass tube, which had been exhausted of air and sealed by fusing its pointed ends, was attached to a sounding balloon in such a manner as to avoid the possibility of absorbing hydrogen leaking from the gas bag. When the balloon attained a certain altitude the closing of an electric circuit by the barometer or by the clockwork of the meteorograph caused a little hammer to fall and break one end of the tube. Air entered and filled the tube, which was then sealed by the automatic action of an accumulator, the current of which heated to redness a platinum wire coiled round the broken end of the tube and fused the glass by the heat thus produced. The quantity of air that can be collected in this way is too small for quantitative chemical analysis and can only be analyzed qualitatively with the spectroscopic. Two methods have been employed. In one, all the constituents of the air, except helium and neon, are absorbed by charcoal. In the other method, the argon is separated first. Argon and neon were detected in all specimens collected at elevations between 26,000 and 46,000 feet. The yellow line of helium appeared in the spectra of all the specimens except one which was collected at the greatest height attained, about 46,000 feet. The presence of krypton could not be determined with certainty.