

AERONAUTICS.

Santos Dumont has been making excellent cross-country flights near Paris of late with a new monoplane, fitted with a 30-horse-power double-opposed-cylinder motor. The machine complete weighs only 242 pounds. The Clement company is building a number of these machines, to sell for about \$1,250 each.

The second Aeronautic Show to be held in Paris opened in the Grand Palais on September 25th and lasted three weeks. This exhibition demonstrated how the aeronautic industry has advanced by leaps and bounds within the year. Some thirty different aeroplanes and a score of aeronautic motors were shown, as well as one small dirigible and several plain balloons. A complete description of the show will be given in next week's SCIENTIFIC AMERICAN SUPPLEMENT.

Before starting to teach Lieutenants Lahm and Humphries the operation of the recently acquired government biplane, Wilbur Wright tried the machine out on October 9th and had his pupils time him for a distance of a kilometer in a closed circuit. This distance, including the turn, was covered in 48 3/5 seconds, or at a speed of exactly 46 miles an hour. Allowing 100 meters extra for the turn, the speed was 50 miles an hour. Thus it seems that the new government aeroplane is quite as fast as the Bleriot or Curtiss machines, which made over 47 miles an hour at Rheims.

With the great aviation meet at Rheims as model, almost all the other large cities on the Continent have arranged for a similar event. After Brescia (Italy) and Berlin, Spa, Boulogne, and Dieppe in France; Frankfort in Germany; and Blackpool in England have put up large cash prizes to secure Latham, Bleriot, Farman, and some of the less well-known but fully as daring aviators. The Frankfort authorities even went so far as to pay the traveling and hotel expenses of the "bird men." A big meet was held at the new Juvisy aerodrome near Paris from the 7th to the 21st of this month, no less than 37 machines being entered, of which 13 were Voisin biplanes. On October 10th thousands of people flocked to Juvisy. The train service was inadequate, and there was such a demonstration by the crowd that the troops had to be called out.

On October 13th a course of lectures upon aviation to be given by Wilbur R. Kimball was inaugurated at the rooms of the Young Men's Christian Association, 318 West 47th Street, New York city. Besides Mr. Kimball's lecture, which was illustrated with a number of models, Mr. Hudson Maxim, the inventor of maxinite and an authority upon explosives, spoke upon the dropping of explosives from aeroplanes. He thought the public should be rid of the fallacy that much harm can be done in this way. The aeroplane, he believes, will be used for scouting and raiding, but not as an instrument of destruction in itself. Mr. Winthrop E. Scarritt, an ex-president of the Automobile Club of America, gave an interesting talk on the future of aeronautics.

In connection with the Centennial Celebration at St. Louis, Glenn Curtiss made a number of short but good exhibition flights. There was also a balloon race on the 11th instant, in which 10 balloons competed. The "St. Louis III," piloted by Louis von Phul, won, covering 545 miles in 41 1/2 hours duration, and landing at Lawrence, Minn. The "Indiana," with H. H. McGill pilot and J. M. Schauer aide, landed near Albany, Minn., 500 miles distant. Mr. McGill was taken violently ill, and his aide was finally obliged to bring the balloon to earth to get medical assistance. The "Centennial," H. R. Honeywell pilot, made a flight of 480 miles and landed at Silas, Ala. The "Cleveland," J. Wade, Jr., pilot and A. H. Morgan aide, covered 459 miles and landed near Alexander City, Ala. Baldwin, Knabenshue, and Beachy also made flights at the celebration in their dirigibles. Messrs. Post and Harmon, in the "New York," won the endurance race in 48 hours 26 minutes.

The third international balloon race for the Bennett trophy started from Schlieren (near Zurich), Switzerland, on Sunday, October 3rd. There were 17 starters representing 9 nations and divided as follows: America 1, Austria 1, Belgium 2, England 1, France 3, Germany 3, Italy 2, Spain 1, Switzerland 3. For the second time in four years the cup was won by an American, Mr. E. W. Mix, of Columbus, Ohio—our sole representative—having the good fortune to travel over 648 miles in 35 hours, and, after passing through a drenching rain and having some exciting experiences in the Bavarian Alps, to finally land in the trees in the forest of Gutova, some miles north of Warsaw in Russian Poland. Mr. Mix and his aide were obliged to throw out their life preservers and provisions in order to keep afloat so long. After doing this at Breslau early Monday afternoon, they rose to a height of 9,000 feet, from which elevation they gradually fell until the balloon landed at 3 A. M. October 5th. Second place went to Alfred Leblanc with a record of 631 miles.

ELECTRICITY.

The New York Public Service Commission reports that 3,327 persons were injured last August on the surface traction lines of New York city. This is 12 less than the record for August, 1908. The serious injuries for this August were 204, or 32 less than for the corresponding month of last year.

The Canadian Pacific Railroad has found the telephone so serviceable for train dispatching that the present system of about 500 miles of telephone lines will be extended to 1,000 miles within a year. The company states that about fifty per cent more traffic can be handled now than was possible under the old telegraph system of dispatching.

Every once in a while we hear of wireless telegraphic communication over an enormous range. Recently the army transport "Buford," while nearing Honolulu, succeeded in exchanging messages with the Pacific coast. The distance covered was 3,500 miles. This does not mean that there has been a wonderful advance in wireless telegraphy, but merely that atmospheric conditions were unusually favorable.

The electrification of the street railway line from Woolwich Arsenal to the London County Council free ferry has been brought to a halt owing to possible disturbance of the delicate instruments at Greenwich Observatory. The Astronomer Royal has the power to stop any undertaking within three miles of the observatory that is liable to affect the instruments, and the railroad company must obtain his consent before proceeding with the electrification.

Manufacturers of electrical apparatus have recently awakened to the fact that there is quite a demand for a transformer which will permit of operating electric bells, buzzers, toys, etc., with current taken from line circuits in place of storage or primary batteries. Small direct-current battery apparatus may ordinarily be operated on an alternating current without any change in the windings or connections, provided the voltage is sufficiently reduced. A transformer of this type has recently been put on the market, which will reduce from 110 volts to from 3 to 26 volts.

A very ingenious method of overcoming the friction of intermeshing gears has recently been devised. The gear teeth are electromagnetically held in engagement, without actually contacting. The teeth of the driving gear are magnetized by means of suitable coils, while the teeth of the driven gear serve in pairs as armatures for the magnetized teeth. Of course such an arrangement would hardly be suitable for slow, heavy work, because the cost of current would be greater than that of lubricating oil and the loss due to friction, but for light, high-speed work the electromagnetic engagement would undoubtedly prove very advantageous.

Portable telephone instruments are being made by the Western Electric Company for use on interurban electric railways. The telephone instruments are carried on the cars, and stations are located at various points along the line. The conductor or motorman can connect the instruments to the station by merely inserting a pair of line plugs, and thus can get into direct communication at once with the dispatcher. In case of delay on the road, or an accident, these instruments are invaluable, as they enable the dispatcher to learn the particulars at first hand, and make arrangements to relieve the situation.

An apparatus for sterilizing water has recently been put on the market in France, in which ozone is used to destroy the bacteria. The ozone is generated by means of electric discharges, and the gas is introduced into the water by means of an aspirator. The ozone is led into a mixing tube screwed to the water faucet, and the water is forced by a small pump through several compartments, so that it is divided into a number of fine jets. In this way an intimate mixture of the gas and water is obtained. The device is so arranged that the ozone is generated only when the faucet is opened.

A large electric freight locomotive is being built for the New York, New Haven & Hartford Railroad, with which it will be possible to test thoroughly the advantages of handling freight trains electrically. The locomotive will also be used for hauling heavy passenger trains. Following the present tendency, the motors are placed above the axles, thus raising the center of gravity and reducing the shocks and strains to which the roadbed and track are subjected by locomotives in which the motors are mounted on the axles. The locomotive is mounted on two trucks, one of which is pivoted on a center pin, while the other has a fore-and-aft movement as well as a pivotal movement, permitting it to negotiate curves. Four 350-horse-power single-phase motors are used, which may be operated either with 11,000-volt alternating current or 600-volt direct current. A flexible connection between the power and the wheels is accomplished by gearing the motor to a quill on the axle, which is provided with driving arms that project between the spokes of the wheels. These arms are connected with coil springs, which serve to absorb shocks and strains of transmission and equalize the torque on the gears.

SCIENCE.

The Cook-Pearry controversy will probably be settled by a commission of inquiry appointed by Dr. Ira Remsen. The commission will examine and report on the Arctic records, observations, and data collected by both explorers.

Boomerangs are now made of celluloid and hard rubber. Celluloid is better than cardboard because it is waterproof, light, very hard to break, and can be worked into the peculiar curve and twist so necessary to give the boomerang its peculiar properties.

The owners of a St. Abbs fishing boat have made the important discovery that a net dyed as nearly as possible the hue of the sea, instead of the traditional brown, yields much larger results in the matter of fish caught. The discovery was, says the Western Morning News, put to the test a short time ago, when, out of a fleet of sixty-five boats, the boat with its nets dyed blue made far and away the largest catch. The dye used is bluestone. The discovery has aroused much interest among the fishermen.

Peat, as it comes from the bog, contains from 85 to 95 per cent of water. According to Dr. Ekenberg, it appears that the peat contains a hydrocellulose which is of the nature of a jelly. If the peat is subjected to pressure the hydrocellulose passes through very much as soft soap might, and without separating the water from the peat. If, however, the peat is heated to about 320 deg. F., this jelly is immediately destroyed, and most of the water can be separated by a pressure of about 240 pounds per square inch.

The steamer "Conqueror" at Leith has been chartered by Dr. W. S. Bruce, Edinburgh, the leader of the recent Scottish National Antarctic Expedition, for the purpose of undertaking another expedition to the polar regions. The expedition, it is expected, will be ready to sail in a little more than a fortnight. The present intention is that the expedition will be away for two or three months. Important observations in the neighborhood of Spitzbergen are premeditated, Dr. Bruce being a recognized authority on that region.

A process has recently been patented by two Italian gentlemen for rendering calcium cyanamide inoffensive. At present this product has several serious drawbacks owing principally to its causticity, and the ammonia and hydrocyanic ethers which it gives off. The process in question proposes to add sulphuric acid, diluted with its weight in water, to the cyanamide; after introducing the cyanamide in small quantities to the liquid, the whole should remain slightly acid. After an intimate mixture, the product is dried at 40 to 50 deg. C., and then pulverized.

The following experiment, writes Mr. C. S. Jackson, in Nature, is easily tried, and throws some light on a certain type of illusions. A small cogwheel from an old American clock is the only apparatus required. Holding the axle in the finger and thumb of the right hand, give it a twirling motion, say, counter-clockwise. Let the teeth of the wheel click gently against a small card, or the finger-nail of the left hand. On looking at the wheel the spokes appear to revolve counter-clockwise (as they do) and the teeth to revolve in the reverse direction.

Radium appears to have a marked action on the development of the eggs of the *Philina aperta*. M. Jan Tur, of Paris, made a series of over forty experiments with a very strong radio-active preparation, about 9 milligrammes of radium bromide acting through a thin glass plate upon the eggs in different stages. In the first stages of development, the eggs do not seem to suffer from the effect of the radium, but after a certain period it is found that the organs will no longer be formed. A longer exposure causes the larvæ to shrink up and they become only one-fifth of their normal size. After 6 to 9 days there remains nothing but a shapeless mass of cells and the mass is observed to have a rapid rotary movement inside the shell of the egg. The larvæ are found to die in 9 or 10 days after the laying of the eggs, without being able to leave the shell.

The occurrence of ores of tungsten in Canada is the subject of a report by Dr. T. L. Walker, recently issued by the Canadian Department of Mines. After pointing out that the metal is used not only in the manufacture of metallic filament electric lamps, but also in the production of tungsten steel and of the tungstates which are employed as a mordant in dyeing, in giving weight to silk goods, and in rendering cotton goods fireproof, he goes on to give particulars of the chief tungsten ores, their geological occurrence, and the methods used in treating them, as well as some statistics of the world's production of them, which has been advancing rapidly of late years. He then gives a detailed account of the occurrence of such ores in Canada, and finally remarks that, though no tungsten production has yet been credited to the Dominion, and that she has no well-developed and established tungsten ore mines, still there are many districts where such ores occur.