

ENGINEERING.

The "Vanguard," the new British "Dreadnought," recently completed an eight-hour trial at the remarkable speed of 22.4 knots, a full knot in excess of the Admiralty's stipulation.

In the endeavor to apply a slow-speed turbine economically to cargo steamers the Parsons Company purchased the cargo steamer "Vespasian," and, after running her with a careful record of steam and coal consumption, they have taken out the engine and put in turbine machinery of the same power. The vessel is now being run under exactly similar conditions as to load and speed, and, before long, valuable particulars of the relative efficiency of the two types of engine will be available.

A number of motor cars for the suburban service of the New Haven Railroad are now being completed at the Westinghouse shops. They are 70 feet long; weigh 86 tons; and seat 72 persons. The cars are equipped with motors of 200 horse-power, and each is guaranteed to haul two 50-ton trailers at a normal acceleration of 0.7 mile per hour per second. They are designed to operate on both the 11,000-volt alternating current of the New Haven, and the 600-volt direct current of the New York Central Railroad.

The Public Service Commission for New York city has published designs for the elevated portions of the new subways, which have been approved by the Municipal Arts Commission. They embody, among other things, a scheme for deadening the noise of the trains, which consists of a concrete floor, 11 to 15 inches in thickness, upon which the wooden ties will be laid. The aesthetic appearance of the structures will be improved by the use of curved steel brackets connecting the columns with the longitudinal and transverse girders.

According to a report from Washington, the officers of our latest and fastest torpedo boats of the "Flusser" and "Reid" type, which have made a speed of over thirty-three knots on trial, are to be furnished with special headgear equipped with a form of automobile goggles to protect them against the fierce rush of wind and spray. Thirty-three knots is equal to about thirty-eight miles an hour, and at this speed, especially when steaming against a strong wind, some form of protection to the eyes becomes a positive necessity.

The New Haven Railroad is constructing a mile of experimental overhead trolley line beyond the Stamford terminus of its present electrical road. The new system is designed to lessen the weight and cost, and eliminate certain undesirable features, of the existing style of construction from Woodlawn to Stamford. Apart from the reduced cost, the new construction will have the great advantage that the trolley wire only will be alive and carried upon the customary insulators, breakages of which have been frequent. The main cables will be strung directly from the supporting columns.

In a series of experiments to determine whether concrete could be conveyed in the plastic condition from the place of mixing to the point where it was to be deposited, Messrs. Buzzell and Larkin recently made some experiments which seem to determine the feasibility of this plan. The experimental plant, as described in *Engineering News*, consisted of a hopper tank maintained under compressed air, in which the concrete was placed, and from which a pipe led to the point of deposit. Half a cubic yard of broken stone concrete was deposited at the end of 400 feet of 4-inch pipe in less than 5 seconds.

The second attempt to raise the United States cruiser "Yankee" to the surface of Buzzard's Bay failed at the very moment when it appeared to be successful. The method adopted, as explained and illustrated in our issue of November 27th, was to exclude the water from certain compartments by forcing in air under pressure, and thereby give the vessel sufficient buoyancy to bring her to the surface. On December 2nd the vessel was raised until the top of the deckhouse aft was three feet above the water. At this stage a certain portion of the hull or deck gave way, allowing the air to escape, and the vessel settled to the bottom. Further details of the mishap will be given in a later issue.

In an exhaustive analysis of the various types of aeroplane, a writer in *Engineering* gives the following particulars: The Wright biplane for each horse-power weighs 41.6 pounds and spreads 21.6 square feet of surface. For the Farman biplane the respective quantities are 24.2 pounds and 8.2 square feet; and for the Curtiss biplane, 18.3 pounds and 9 square feet. Among the monoplanes the Antoinette, per horse-power, weighs 20.8 pounds and spreads 7.3 square feet of surface; the Bleriot weighs 19.2 pounds per horse-power and spreads 6 square feet; while Santos Dumont's little machine, the "Demoiselle," weighs only 8 pounds per horse-power, or one-fifth as much, and spreads 3.8 square feet of surface per horse-power, or less than one-fifth as much as the Wright machine.

ELECTRICITY.

An International Congress of Radiology and Electricity will be held at Brussels next year on September 6th, 7th, and 8th. The subjects to be taken up for discussion are the methods of measuring radioactivity, theories of electricity and radiations, and the effect of radiation on living organisms.

The American Electro-Chemical Society has appointed a committee to devise a method of rating and testing dry cells. The present methods have long been considered unsatisfactory, but have continued in force because of the difficulty of obtaining a rating which would be applicable for the various uses of the cell.

A new safety lamp for miners has been invented, comprising a battery and a metal-filament lamp which are completely incased. The circuit of the lamp is kept closed by means of a spring-pressed rod bearing against a light ring on the glass casing of the lamp. Should the glass be broken, the ring would be sure to break or be displaced, opening the circuit of the lamp, so that there would be no danger of igniting the gases with the incandescent filament.

The city of Chicago is discussing the possibility of utilizing the water power obtainable from the Drainage Canal to extend the street lighting system. A large part of the city is illuminated with gas and gasoline lamps, but by making use of the power from the Drainage Canal these lights could be replaced with electric arcs. There are 13,000 arc lamps now in use, and if the gas and gasoline lamps are done away with, 29,000 arcs will be required.

During one of the automobile endurance tests between San Antonio and Dallas, Texas, one of the entrants, who is president of a telephone company, carried telephone apparatus with him, and by using a long fishing pole could tap the telephone lines along the route without leaving his car. By this means he was able to keep in touch with points in advance of the run, and arrange for relief in case of accident or for hotel accommodations.

The city of Austin, Texas, used to have a large lake, formed by a huge dam built across the Colorado River. This dam was 1,275 feet long and 67 feet high above bedrock. A plant placed just below the dam converted the water power into electricity, which was used for lighting the city and operating the street railways, as well as for a number of industrial plants. In 1900 the dam and power plant were washed away by a flood, and the city was too crippled to replace them. A movement is on foot now to rebuild this dam, making it of reinforced concrete. The power obtainable will probably attract many manufacturing industries, which would undoubtedly contribute materially to the development and growth of the city.

Now that Christmas is here, and amateurs are lighting their trees with electricity, it is well to call attention to the warning issued by the Chicago Board of Underwriters to the general public, and especially to merchants who have holiday window displays. Ordinary Christmas decorations are highly inflammable, and it is even more important to take every precaution with the wiring than if the wiring were to be permanently used in the store or house. Chicago merchants have been warned to have special watchmen keep guard at their windows during the danger season.

A new form of mercury interrupter has recently been invented in which there are no reciprocating parts, but the interruptions are produced by a ripple formed in a stream of mercury. The mercury is contained in a revolving vessel within which a contact piece is fixed. The mercury is thrown by centrifugal force to the inner periphery of the vessel. At one point the stream of mercury is obliged to pass over a deflector, producing a ripple or wave, and the contact piece dips into the mercury stream at this point as it revolves with the vessel. The frequency of the interruptions may be varied by having the deflector revolve slowly in the same direction as the vessel is revolving, or in the opposite direction, or having it remain stationary.

An inventor has recently devised a form of explorer for locating conductors when searching for faults in a high-tension underground cable. It depends for its operation upon the fact that the three conductors of the ordinary cable are spirally wound with a pitch or "lay" of 20 inches. By connecting two of the conductors at the power station, signals which are sent out through the conductors form magnetic lines of force that lie at right angles to those produced by ground currents in the sheath of the cable. Consequently, the magnetic circuit of the instrument is unaffected by these currents. By using a double telephone receiver in connection with the instrument signaling currents sent over the line produce very intense sound when the explorer is on the sheath and the sound is quite noticeable, even when the explorer is placed on the tile duct outside.

SCIENCE.

Dr. Ludwig Mond, the distinguished chemist, died on December 11th in his London residence at the age of sixty years. Dr. Mond was well known as the inventor of many valuable commercial processes, among them the process for the manufacture of ammonia and soda and producer gas.

In view of recent discussion concerning the possibility of adopting an international set of symbols for the principal electrical engineering quantities, Prof. A. E. Kennelly has made a statistical examination of recent textbooks in various countries. The results of his examination are published in the *Electrical World*. It seems that there are twenty-one quantities in the list and fifteen subsidiary fundamental quantities.

In his "Reminiscences of an Astronomer," the late Prof. Simon Newcomb took occasion to pay a tribute to the brilliant work of Dr. George W. Hill of West Nyack, N. Y. That tribute was paid, we suspect, not only because Prof. Newcomb admired Dr. Hill's remarkable mathematical attainments, but also because he wished to drive home to the public some conception of the value of his service as one of the Naval Observatory staff. No doubt Prof. Newcomb would have rejoiced with every American scientific man in the awarding of the Copley Medal to Dr. George W. Hill, the highest distinction conferred by the Royal Society.

An earthquake was recently felt at a mineral spring in Austria. Soon after the shock the water of the spring was found to deposit a brown sediment and to evolve more carbon dioxide than usual. The water soon became clear, but the abnormal evolution of gas continued for several hours. Mineral springs at great distances from the center of disturbance have often been observed to be affected by earthquakes. Prof. Suess explains the phenomenon as follows: Agitation of a supersaturated gas solution causes a rapid evolution of gas, as may be proved by shaking a bottle of soda water. The gas is evolved still more copiously when the solution is thrown into molecular vibration. After an earthquake the rocks surrounding even distant springs are thrown into vibration, which is transmitted to the water, causing rapid evolution of gas, expansion of the mixture of gas and water, and expulsion of solid particles.

The Radium Institute of America was formed at a meeting in the building of the New York Yacht Club recently. The purpose is to study radium, discover any radioferous deposits in the United States, and buy quantities of it in Europe for clinical use in the United States. It is the idea of the founders to establish a clinic in connection with some New York hospital, where radium treatment will be administered free to those needing it. The institute will take steps to protect the public from the false claims of patent medicine manufacturers that certain of their remedies contain radium, and will set a standard that those desiring to deal in radium commercially will have to live up to. Dr. Charles F. Chandler was elected president; Dr. Robert Abbe, vice-president; Prof. William Hallock, secretary; Prof. George B. Betram, assistant secretary, and Dr. Hugo Lieber, treasurer.

Prof. A. Mallock has made a careful study of the utilization of the energy stored in springs for the production of mechanical work, with the object of showing in what way the work stored in stretched India rubber may be most fully utilized so as to supply power at a constant rate. It seems that the most convenient form in which the India rubber can be used is that of a long strip or band wound on a drum or reel under tension, and in order to convert the potential energy into mechanical work Prof. Mallock shows the conversion cannot be effected continuously, but must proceed in cycles, and that the condition of efficiency is that each portion of the elastic band whose contraction is being utilized must be unwound from the drum without change of tension, and that the part so unwound must then be isolated by clamping or otherwise, and allowed to contract without contact with other bodies except at the clamped ends.

The third annual convention of the American Society of Agricultural Engineers will be held at the Iowa State College, Ames, Iowa, on December 28th and 29th. The society was formed at Madison, Wis., in 1908, by a few men, most of whom were then engaged in teaching agricultural engineering in the universities throughout the country. The importance of the work to be accomplished by such an organization was soon realized by prominent manufacturers and others interested in this field both commercially and professionally, the result being that during the last two years the membership of the society was increased fully four hundred per cent. A word explaining the term "agricultural engineering" may be of interest to many who have not become fully acquainted with the work. Within the scope of the term falls a study of farm machinery, farm buildings, farm conveniences, and irrigation and drainage. In short, it deals with the mechanical side of farm life, involving teaching, investigation, and manufacturing activities.