ENGINEERING.

Reports from Washington regarding the lengthy cruise recently completed by the United States steamer "Cheyenne," in which oil was used as fuel, are to the effect that the vessel was able to steam faster than with coal, and that her steaming radius of 1,500 miles, which was her limit when burning coal, has been increased by the use of oil to 2,300 miles.

The final plans are now being prepared at Twin Falls, Idaho, of what the engineers claim will be, when completed, the highest bridge in the world. It will serve to carry the tracks of an electric road across the Snake River Canyon at a point a short distance below the Great Shoshone Falls of that river. The under side of the bridge will be 700 feet in the clear above the water.

The Ambrose Channel entrance to New York harbor, which, when completed, will be 2,000 feet wide and 40 feet in depth, has now been excavated throughout its whole length for a width of 1,000 feet. It will take about two years and a half to finish the whole work. The completed portion has shown none of that tendency to silt up which was predicted, and it seems likely that the scouring action of the tides will serve to keep the channel permanently clear of shoals.

Atlantic steamship records to the eastward were improved by the "Mauretania" on her last trip, when the distance from Sandy Hook to Daunt's Rock was covered in 4 days, 18 hours, and 11 minutes, at average speed of 25.70 knots. The daily runs were 588, 605, 610, 600, and 532 miles. For three days, from Thursday noon until Sunday noon, the average speed was 26.3 knots, and on the day when 610 miles were covered, the average speed was 26.5 knots.

The Chicago, Rock Island & Pacific Railway is one of several of the leading railroads in the West which have equipped certain sections of their roads with telephones for train dispatching. Last August that road introduced telephone dispatching on its Selina branch, 50 miles in length, and later put the same equipment on 80 miles of road from Herington to Topeka, one of the busiest sections of the Rock Island Railroad. The results were so satisfactory that the company have now equipped the most important division of their road, between Blue Island and Rock Island, consisting of 165 miles of double track, with dispatchers' telephones.

The system of building embankments, by running trains of loaded cars on rails hung from a suspension cable above the line of the embankment, is being used with great success, notably on a long and high embankment on the Lake Hopatcong cut-off of the Delaware, Lackawanna & Western Railway. Two cables are strung from a fixed to a movable tower, and suspenders from the cables are attached to the floor beams of a portable track, which is carried forward ahead of the completed embankment a sufficient distance to allow a train of dump cars to be run upon it and emptied through it. The new method is more speedy and costs less than the old system of building a trestle and burying it in the embankment.

The auxiliary survey yacht "Carnegie," which is being built at the Tebo Yacht Company's yard, South Brooklyn, is making good progress. The hull is in frame, the deck beams in place, and about one-half of the ceiling and planking is done. It is expected that the launching will take place during the last week in May, and that the yacht will be completed about the Fourth of July. Immediately after her trial trip she will start for Hudson's Bay, and commence to make a series of magnetic observations along the proposed route of a new steamship line from Churchill to Liverpool. In the autumn, after her return to this city, her bottom will be sheathed with yellow metal, and she will then be ready for her cruise in southern waters in 1910. The yacht is 155½ feet in length over all, and is built of strictly non-magnetic materials. She was illustrated and described in our issue of February 20th, 1909.

The present condition of work on the Pennsylvania tunnel system in New York is as follows: The excavation and concrete lining of the Bergen Hill tunnels are practically completed. The excavation of the tunnels beneath the Hudson is also nearly finished, and a large part of the concrete lining is in place. The terminal station at 33d Street has received its granite facing on all four façades, and most of the steel structure of the station has been built in place. The four tunnels beneath Manhattan Island have been lined with concrete, and are ready for the laying of tracks. The tunnels below the East River have been completed, and the terminal work in Long Island City is well under way. During the current year the electrification of the system, track laying, signaling and interlocking, etc., is being actively prosecuted; and the indications are that the whole work will be completed during the summer of 1910.

ELECTRICITY.

The Ohio State University is about to start a class in its Engineering Department for the teaching of wireless telegraphy. A complete wireless telegraph equipment is to be installed, and will maintain communication with stations at Cleveland and Detroit.

The Illinois Central Railroad is adopting the telephone for train dispatching. The Superintendent of Telegraphs states that within a year all the main lines will be dispatched by telephone. The Burlington line is operating 1,400 miles in this way, so that it may be said that the telephone for train dispatching has passed the experimental stage.

A new form of arc lamp has just been devised, in which carbon disks are used instead of carbon rods. These disks are constantly rotated, and the arc takes place between the peripheries of the disks. Owing to the continuous rotation, the disks are consumed uniformly. The lamps are small as compared to the ordinary type. The size of a 10-ampere lamp is but 20 inches over all. It is claimed for this lamp that it will burn 50 per cent longer than the rod type.

The first lot of electric locomotives to be used by the Pennsylvania Railroad in its tunnels through New York have just been ordered of the Westinghouse Electric and Manufacturing Company. These locomotives are to be the most powerful ever built. Each will consist of two units, and each unit will be equipped with a 2,000-horse-power motor. The locomotives will be capable of running at a rate of 90 miles per hour. Two of them will be ready for a test this fall.

One of the objectionable features of the ordinary street cars in large cities is the fact that they are provided with leather hand straps, which are liable to accumulate dirt and disease. As a substitute for these unsanitary straps a steel hanger has recently been devised, which is covered with porcelain enamel, so that it may be kept absolutely clean. These straps are being tried by the Interborough Rapid Transit Company of this city.

A new axle train-lighting system has recently been devised, in which the generator is located in the baggage car of the train. The generator is placed in the body of the car, where it is open to inspection at any time, and it is driven by belts from the axle of one of the trucks. The belts are made self-adjusting, so as to take up slack due to the flexing of the springs. A storage battery which is charged by the dynamo serves to furnish current for the lights when the train is standing still.

A novel musical instrument has recently been exhibited, which resembles a piano, but the wires, instead of being struck with hammers, are vibrated by means of electro-magnets. The instrument is also provided with ordinary piano keys and hammers, so that it may be operated by them alone, or at the same time by hand and by the electro-magnets. It is said that the tones of the instrument, which is known as a choralcelo, resemble those of a stringed instrument and organ combined.

A press message was recently sent by the New York Times to the Chicago Tribune by means of wireless telegraphy from the tower of the Waldorf-Astoria Hotel to the Auditorium Annex in Chicago. The difficulties involved in sending the message, owing to the interfering and conflicting waves from other stations, showed that wireless telegraphy, at least in its present state, is not a serious competitor of wire telegraphy for transmission over land. It was only after repeated attempts to get the Chicago station that communication was finally established.

According to a recent press report, a new system of wireless telegraphy has just been completed by the German Telefunken Wireless Telegraph Company. The system goes by the name of "singing sparks," and it is claimed for it that it produces continuous oscillations. How this system differs from the singing arc is not explained. If a system has been evolved by which continuous oscillations may be maintained with perfect regularity, the value of it would be even greater for wireless telephony than for wireless telegraphy, as it would enable one to send spoken messages over a much longer radius than has hitherto been possible.

A new lamp for use in mines has recently been invented. The lamp is placed within a large glass globe, which is air-tight. Between the lamp and the globe pure air is inclosed, and when the lamp is lighted, the air is expanded by the heat. In case the lamp should be so injured as to expose the incandescent filament to the gases in the mine, the compressed air between the two globes is driven into the broken lamp before the air of the mine can enter. The influx of compressed air extinguishes the lamp before the explosive air of the mine is able to reach it. The lamp is fed by a single-cell storage battery, which is inclosed in a celluloid case. It will burn for twelve hours on a single charge, and gives a light of between one and two candle-power.

AERONAUTICS.

On May 6th Lieut. Calderara, the Italian naval officer whom Wilbur Wright taught to operate his machine while in Italy, became dizzy while making a flight, and slipping from his seat, fell a distance of 45 feet to the ground, luckily without sustaining fatal injuries. Deprived of its aviator, the aeroplane crashed to the earth and was badly damaged. This unusual mishap of Lieut. Calderara shows the need of an automatic control, which, should anything happen to the man at the helm, will keep the machine flying on an even keel in the direction in which the rudder is set. With the aviator strapped to his seat, the aeroplane would keep going till the fuel gave out, when it would probably land without damage.

In all probability the Aeronautic Society will be the first American organization to own a Wright aeroplane. Upon their arrival at New York negotiations were at once opened with the Wrights for one of their machines, a few of which are being made by them at Dayton, Ohio, for customers in this country. Though loath to take further contracts at present, both brothers thought they might be able to supply the Society with a machine and to teach a member to operate it within the next two months. The average automobilist can be taught in ten 15-minute lessons, according to the results obtained abroad in this line. The price of the machine is $7,500. With this and the $7,500 Curtiss aeroplane, together with its Morris Park race track aerodrome over which to fly them, the Aeronautic Society offers advantages for those interested in practical as well as experimental aviation to be found nowhere else in the world. The opening flight exhibitions will probably be held May 29th and 31st.

The Wright brothers were entertained at luncheon by the Aero Club of America at noon on May 12th. Several congratulatory speeches were made by the acting president, Mr. A. Holland Forbes, and by Messrs. Colgate Hoyt, Charles J. Edwards, and Gen. Bingham, Police Commissioner of New York. Both the brothers were congratulated on their achievements, and all the speakers mentioned the disgrace put upon our government by the failure of Congress to appropriate the $500,000 which was asked for by Gen. Allen for aeronautic purposes. Upon reaching Dayton, Ohio, their native city, the Wrights were given a preliminary ovation by the citizens, who, on the 16th and 17th proximo, expect to give them a special celebration, at which time they will probably make exhibition flights. On June 10th, at Washington, President Taft will present the gold medals given by the Aero Club of America and also the Smithsonian medal and the medals given by Congress. Orville Wright will probably carry out the completion of the government contract at this time.

The members of the Signal Corps at Washington recently inflated "Dirigible No. 1." The airship was in its shed fully inflated, and the tent had been erected near by to receive it, when a heavy thunder shower suddenly sprang up. The wind blew down the tent, and a bolt of lightning apparently passed through the balloon shed, going in one door and out the other, while several officers were present. Fortunately, the hydrogen gas was not ignited. On account of lack of facilities, it was decided to deflate the dirigible and take it to Fort Omaha, Neb., where there is an excellent large shed and a complete plant for making hydrogen gas electrolytically. The gas has been transferred to the army balloon, and several ascensions have been made. With the taking of the dirigible to Fort Omaha, the army aeronautic work in the balloon line will be removed from Washington, but the tests of the Wright and Herring aeroplanes will be resumed at Fort Myer next month.

Mr. J. A. D. McCurdy, the secretary of the Aerial Experiment Association (which has lately disbanded), was in New York recently. He stated that during the past winter he has flown more than 1,000 miles, having made over 100 trips over a 9-mile course, carefully measured and staked out upon the ice of Lake Bras d'Or. The machine used was the "Silver Dart." Messrs. McCurdy and Baldwin, of the A. E. A., have formed a company to manufacture similar machines in Canada. They have already nearly completed two aeroplanes similar to the "Silver Dart." Among other things, Mr. McCurdy rather upset the theory of wind gusts affecting an aeroplane in flight perceptibly, by stating that in his flights in Canada he had passed over promontories and near hills without having his machine affected in the least. At one time, when flying at Hammondsport, the end of one wing struck a branch of a tree as big as a man's arm, and broke it off, without having the equilibrium disturbed. In view of the above, and also of the practical demonstrations of cross-country flight already made by Farman and Bleriot, it does not seem probable that slight aerial disturbances will stop a machine from following the course of the Hudson River from New York to Albany, and winning the Fulton Flight, in case the motor does not give out.