

pointed Chief of the Bureau of Construction and Repair in September, 1893, and four years later he was reappointed for his second term, which is now drawing to a close.

It is fitting at this time to refer to the fact that the technical public is greatly indebted to the retiring Chief of the Bureau of Construction for the unvarying courtesy with which he kept the public informed, through the technical press, as to the plans and progress of the vessels of our new navy.

INTERNATIONAL CONGRESS OF RAILWAYS AT PARIS.

Among the most interesting of the papers read at the International Congress of Railways, recently held at Paris, is that relating to the electric railroads now existing in Europe, by Messrs. Auvert and Mazen, two prominent engineers connected with the French railroads. The authors describe in detail the leading railroads of Europe on which electric traction is used. The present abstract includes several of the most important systems.

ZERMATT-GORNERGRATT (SWITZERLAND).

This mountain railway was the first to use three-phase currents. The line, which was opened near the end of 1898, is an extension of the line in the valley of the Viège. It has a total length of five and a half miles, with a maximum grade of 20 per cent. Its construction has presented great difficulties. The track is 39 inch gage, laid upon iron ties. The rack and pinion system is used, with double rack between the rails. The generating station at Findelenbach has three horizontal turbines, fed by a 320 foot fall; each turbine is direct-connected to a dynamo of 250 horse power, one set being used as a reserve. The dynamos, of the Brown-Boveri type, have a fixed armature and revolving field and work at 40 cycles per second. The current generated at 5,400 volts is transmitted to three transforming stations, one of which is in the station itself and the other two at three and five miles along the track. Each of the stations has a transformation capacity of 180 kilowatts, and includes two groups of three transformers of 30 kilowatts. The two trolley wires are supported at intervals of 80 feet by cross-wires; the rail serves as the third conductor. For the traction, locomotives are used having each two motors of 90 horse power, independent of each other. The motors, fixed to the truck, transmit the effort to the main axles by a double gearing, whose ratio is 1 to 12; the motors are of the triphase non-synchronous type and have six poles, making 800 revolutions per minute, and are built to stand a considerable overload. Above are mounted the resistances for the motors and the various apparatus and instruments. The locomotives weigh 11,500 tons; their axles are 80 inches apart. Open and closed passenger cars and freight cars are used. The open cars have five compartments of 10 places and the closed cars contain 60 places.

STANSSTADT-ENGELBERG (SWITZERLAND).

This line is fourteen miles long, and is divided into three sections as to track; the first section, from Stansstadt to Obermatt, being in ordinary track, the second, from Obermatt to Gherst, in rack and pinion, and the Gherst-Engelberg section in ordinary track. In the first and last sections the average grade is 5 per cent, but in the middle section it reaches 25 per cent. The central station of Obermatt has two dynamos of 200 horse power and two exciters of 22 horse power coupled directly to horizontal turbines. The hydraulic power necessary has been obtained by using a number of small streams which flow into a covered reservoir connected with the station by a 10-inch cylindrical conduit of about one mile long. The height of the fall is about 1,000 feet. The triphase currents are produced at 750 volts and 65 cycles. The section next to the station is fed directly, and for the others a system of high tension distribution at 5,000 volts is used, with transformers at the substations to lower the tension to 750 volts. The current is taken to the motors of the locomotives and cars by two trolley lines 3 feet apart and 14 feet above the track. The rolling stock consists at present of two locomotives, five motor cars and four freight cars. The locomotives, which weigh 17 tons, serve to draw the freight trains and push the cars upon a portion of the steep grade. They are mounted upon two axles and carry two motors, which are connected by double reduction gearing to the pinion, which engages in the rack between the rails. The motors, of 75 horse power, give 650 revolutions, and the speed along the rack and pinion system is about three miles per hour; on the ordinary track it reaches seven miles an hour. The current is taken from the overhead line by wire loops. The motor cars are 45 feet long, and have 44 to 48 places; they are carried upon two trucks of two axles each. Upon one of the trucks are mounted two 35 horse power motors, making 480 revolutions, which are connected with the axles by gearing. The circulation on this route is effected as follows: From Stansstadt to Obermatt the distance is about ten miles; this section is traveled over by the motor cars, with a trailer at certain times. At Obermatt the rack and pinion system begins, and the car is pushed up the

grade by the locomotive for a length of one mile to Gherst, after which the car runs upon an ordinary grade to Engelberg by its own motors.

METROPOLITAN UNDERGROUND RAILWAY AT BUDAPEST.

This underground road extends from the center of the city to the exterior limits at Varosliget. It was put in operation in 1896, being intended as the beginning of a metropolitan system. The line, like all the tramway lines of the city, is fed by a central station which supplies continuous current at 300 volts. The road starts from the Danube and reaches by a series of curves of small radius the southern end of Andrassy-Strasse, which the line follows in a straight line under the middle of the street. The total length of this line is about two miles of double track, standard gage. The heaviest grade is 2 per cent, but one curve of 130 feet radius has a grade of 18 per cent. On account of the numerous sewers below the street, the line was laid out so as to pass above these, so that the height between the rail and the iron structure upholding the pavement is about 10 feet. The axes of the tracks are 11 feet apart, and the width of the tunnel is nearly 20 feet. The iron framework is formed of I beams with vaulting between; the structure is consolidated by pillars placed 12 feet apart along the axis of the tunnel. The track is laid upon metal ties. There are ten stations, the platforms being 16 inches above the rail. They are reached from the street by staircases starting from a station erected on the pavement. The current is taken from two conducting rails suspended above the track; these are of steel and are fixed to the overhead beams upon insulators, being 3 feet apart. Each car carries two rubbing contacts which take the current. The central station which supplies this line as well as the other tramways of Budapest, is located in the city about half a mile from the nearest point of the road. It contains three units of 600 horse power (horizontal tandem compound engines coupled to Siemens dynamos giving 1,000 amperes and 300 volts); four units of 300 horse power (horizontal engines coupled to Siemens dynamos of 500 amperes); two units of 80 horse power used as a reserve. This gives a total capacity of 3,160 horse power, or normally 1,600 kilowatts. The rolling stock consists of motor cars of two trucks of a special construction. Two types are in use at present; the first, in which the motors act upon the axles by chain transmission (a type which will probably not be continued), and a second, in which the motors are mounted directly upon the axles. Each truck of two axles has a single motor of 30 horse power, giving a speed of 15 miles an hour. The car has a central space for 42 passengers and a cabin at each end for the motorman; the cars have a total height of 8 feet. The current is taken by horizontal bar contacts supported upon springs. An electric braking system is provided by reversing the current in the motor fields, transforming the motors into generators, and the current set up is sent into a series of resistances, which may be varied at will.

DUSSELDORF-CREFFELD ELECTRIC RAILWAY.

This is one of the most important of the German electric railroads. It unites Düsseldorf on the left bank of the Rhine to Creffeld on the right bank, the distance being about 14 miles. The line is standard gage; at present it is single track for the most part, but is laid out so as to allow double track to be used later. From Düsseldorf the line crosses the river in double track over a wide bridge, and from Oberkassel, the village on the opposite bank, to Creffeld single track is used except at a few stations. The track is laid to take the rolling stock of the Prussian State railroads. This line was begun in the middle of 1897 and commenced operation at the end of 1898. On account of the competition from a neighboring parallel road, the new line was laid out for a speed of 24 miles an hour. The traction is effected by motor cars taking the current at 600 volts from two overhead wires. The generating station, situated at Oberkassel, supplies the road as well as a number of works in the vicinity. It has two engines of 270 horse power driving two direct current dynamos of 330 amperes and 600 volts, one group being used as a reserve. The cars are of the two-truck pattern, each truck having on one axle a 40 horse power motor, mounted directly. The cars are about 40 feet long and contain 50 persons in all. The authors describe the London Underground Systems, Jungfrau Electric Railroad, etc., and also the use of electric locomotives on the Paris-Lyons-Mediterranean road; the latter will be illustrated in a subsequent article.

REGISTRATION OF UNITED STATES PATENTS AND TRADE MARKS IN CUBA.

In our issue of November 24, 1900, we called the attention of American manufacturers and merchants to the necessity for registering trade marks and patents, so far as they have been extended to Cuba, in the Mercantile Register kept in that island. A penalty of \$25 was fixed for failure to register within eight days of the extension of the patent or trade mark right to Cuba, but for patents and trade marks already extended, grace was given up to December 1, 1900.

We take pleasure in informing our readers that this excessively short grace has just been extended to the end of the current year, thus allowing American patentees and trade mark owners sufficient time to comply with the new regulations and to escape being fined.

LETTERS FROM PEARY.

Mr. Herbert L. Bridgman, secretary of the Arctic Club, has given out some extracts of letters to Mrs. Peary. They reached this country after she had started to go to her husband. They contain the first direct news from Lieut. Peary since August 28, 1898.

Mrs. Peary left Sydney, Cape Breton, on July 20, with her daughter, to join her husband at Etah, Greenland, on the "Windward." She was last reported at Disco, Greenland, on August 20. These letters from Peary were carried by natives to the camp of the Stein party at Cape Sabine, and thence conveyed to Cape York by Dr. Kahn, who boarded the steamer "Eclipse" on June 9, and was landed by her at Dundee, Scotland, on November 9.

It is an interesting fact to note that the lieutenant has not the slightest knowledge that his wife and daughter are on their way to meet him, although neither she nor any of his friends know just where he is now.

Neither he nor Mrs. Peary is aware of the death of his mother, which occurred three weeks ago.

The extracts from the letters follow:

FORT CONGER, LADY FRANKLIN BAY,
March 31, 1900.

Just a line to go down to a whaler by returning natives. I arrived here at midnight of the 28th, twenty-four days from Etah. Six and one-half days of this time we were held in camp by heavy windstorms. The doctor and Henson each left Etah with natives before we arrived here. The journey was a tedious one, owing to the storms, but not an uncomfortable one for me. A number of the dogs died on the way, but I had an ample number for the work ahead. Twenty-one musk oxen were killed in sight of the fort the day before I arrived, so we have an abundant supply of fresh meat.

After resting and feeding the dogs a few days longer, I shall go on with Mott and the best Esquimaux up the northeast Greenland coast. The doctor and the other Esquimaux will remain at the fort hunting. I am in good condition, and the journey shows me that I am myself again. If I do my work this spring, I shall come back and hasten down to meet the ship, and turn back with her. I hope to write again by natives whom I shall send back from some point up the Greenland coast. Dr. Diedrick wishes to be remembered.

CAPE D'URVILLE, GRINNELL LAND.

I write this note on the chance of Stein and Dr. Kahn reaching Upernavik by way of Melville Bay. The fall and winter passed comfortably at Etah without even a day's indisposition on my part. I have husbanded myself carefully. My feet have given me very little trouble, and now I feel that I am myself again. I am now at the "Windward's" winter quarters, with the rear division. Mott and the doctor are ahead, with two other divisions, all on the way to Conger. All but a few of the natives will return at once from there, leaving a few with me. I shall push on from Conger without delay, perhaps by way of the Greenland coast. I shall strain every nerve, and, God willing, shall do my work this spring, that I may come back this summer. I send duplicate of this to Cape York for a whaler. (Dated March 12, 1900.)

FAILURE OF THE DISPLAY OF LEONIDS.

The display of Leonids this year has been very disappointing, only a few having been seen. It is probable that their orbit has become changed, taking them farther away from us. Assistant Prof. Wendell, of Harvard University, says that unless during the next thirty-three years there shall be another change in the orbit of the meteors, bringing them back near the earth, we shall see no more of the ancient November shower of Leonids. The few which have been seen this year were stray meteors which had wandered out of the regular path. The principal cause of the change in the orbits of the Leonids is that there has been some disturbance in space which has brought a large body near the path of the Leonids, thus exerting an attraction on them and causing them to change their orbit.

SUGAR INVENTIONS WANTED.

The Hawaiian Planters' Association has offered \$6,500 in prizes to inventors of labor-saving machines to be used in the sugar business. Three machines are wanted, which planters think some one should be able to invent, and they are willing to pay for each. For a machine to cut cane the planters offer a prize of \$2,000 to the man who submits the best plan. This sum will be increased to \$5,000 if the design is accepted and proves efficient. A cane transporter and a machine to load cane into cars are also wanted, and for these planters offer \$1,500.