

### PARIS METROPOLITAN RAILROAD—NEW SYSTEMS.

BY PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The Paris Metropolitan system, of which the first branch has been so successful, is to be greatly extended and completed within the next few years, so that eventually the whole city will be covered with a network of underground lines, and will be one of

of the system will permit an easy and rapid circulation through the city. The Right Bank has a greater number of lines than the Left, but the former has also a greater circulation. Besides, a project for a number of additional lines is now in preparation. The construction of such an extensive underground system throughout a city



PARIS ELEVATED LINE AND STATION PLATFORM.

The best provided in Europe in this regard. There will be eight different lines. No. I. is the present Metropolitan, which crosses the city from west to east from the Maillot Gate to that of Vincennes. It has two branches at the Place de l'Etoile which pass to the Dauphine Gate and the Trocadero. At the latter point will commence the new line No. III., while the Dauphine branch forms the commencement for line No. II. The latter, which is now nearly finished, starts from the Etoile and makes a semicircular tour through the northern part of the city by the exterior boulevards, ending at the Place de la Nation on the east. This line is partly underground and part on an elevated structure passing along the center of the Boulevard. The tunnel is now almost ready for the tracks, and the last spans of the elevated structure are being put in place. It is probable that it will be open for traffic about the end of the year. Line No. III. makes a similar half-circle through the southern part of the city; when joined to the preceding section it will, in fact, make a continuous belt-line around the city, running nearly parallel to the Belt Railroad, which passes around the fortifications. The line No. IV. lies entirely in the northern part of the city.

The main line which traverses the city from north to south is No. V. Another line, No. VI., also passes from north to south and somewhat parallel to the former, lying to the east of it. No. VII. branch lies in the northern part of the city, starting from the Palais Royal and making a turn to the east, and after passing the East Depot ends at the Place du Danube. The concession has only recently been obtained for No. VIII., passing from the Opera toward the southwest; it will cross the Seine twice and ends at Auteuil. While No. II. is almost finished and a part of it may be put in operation in October or November, No. III. will not be completed before 1905; No. IV., which is just commencing, may be finished by 1904; Nos. VI. and VII. in 1905-1907, and No. VIII. in 1908. When the whole is completed the *ensemble*

difference of level in the tunnels and would oblige the passengers to mount and descend from one section to the other, which would be a great inconvenience. Accordingly the overhead structure, although the most costly, was finally adopted. The total length of the line is 6.6 miles, and that of the overhead, which crosses both railroads at once, is about 1.2 miles. The overhead part is thus in the middle of the line, with a tunnel section on each side of it. The tunnel communicates with the overhead section by an easy grade, which allows the trains to mount without difficulty. There are twenty-three stations over the whole length, of which three are in the overhead part. The underground work has had many difficulties owing to the displacement and reconstruction of the large sewers, and the preparatory work took a considerable time before the tunnel could be begun.

The tunnel has about the same dimensions and section as on the existing Metropolitan, and there are a number of large underground stations at the points of connection with the former and of the bifurcation of the new tunnels to be pierced later, and here the width of the vaulting has been doubled from 23 feet to 46, which is a considerable width for an underground work. The whole of the tunnel is constructed in masonry vaulting, with the exception of the Rue de Rome station, where the Metropolitan passes above the West Railroad tunnel.

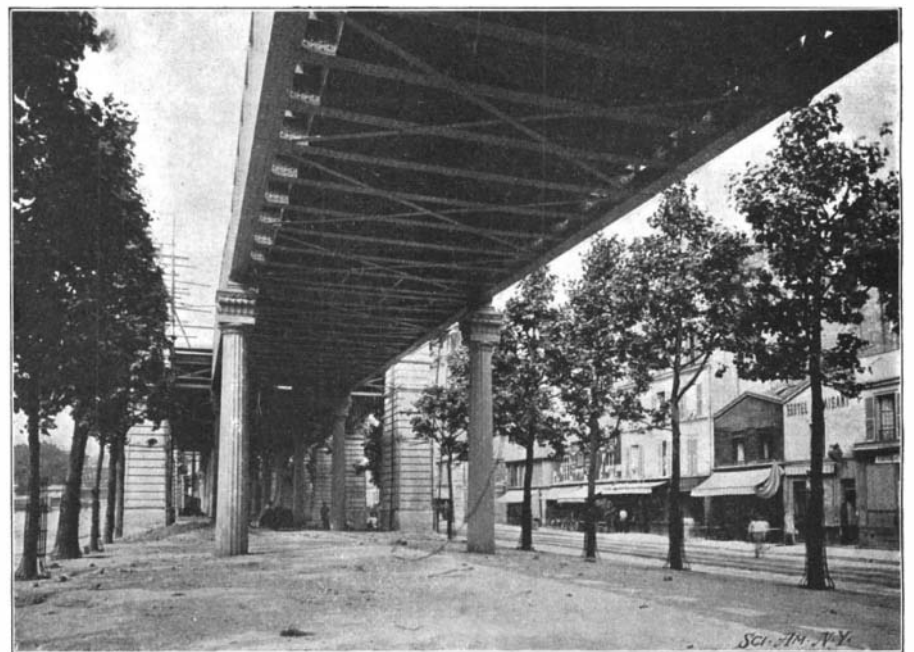
The overhead construction is formed of a series of trusses resting on cast iron columns of a tasteful design. This portion, 1.2 miles long, passes along a strip of free ground in the center of the boulevards, with the wagon tracks passing on each side; it is thus not close to the houses and does not interfere with the circulation. The platform is from 16 to 20 feet above the street level, and the pillars are spaced generally 22 feet apart. Each truss comprises the two main

beams with the cross I-beams which support the tracks; between the latter is laid a brick vaulting 9 inches thick. The truss thus formed rests at each end on a roller support which allows for expansion. At the stations, of which there are three, the middle portion is supported on the columns, and it is supplemented at each side by an extra structure supported upon solid masonry pillars, in order to increase the width and afford a platform on each side of the track. The staircases for mounting to the stations will be placed against the masonry pillars. The internal width of the trusses is 18.4 feet for the double track, and at the stations this is increased by 13 feet on each side. The station platforms have now been made 280 feet long instead of 245 feet as formerly, since the length of the trains has been increased. The trusses are generally 70 feet long, but as they cross the streets in a single span their length varies here; the longest spans, over the railroads, are 244 feet. The junction of the tunnel and the overhead structure is made by a cutting lined with masonry, which is partly covered over by a metallic roofing.

#### Sverdrup's Arctic Explorations.

Sverdrup, who returned from the Arctic regions soon after Peary, has given out statements of his work. Sverdrup spent the winter of 1898-99 in winter quarters at Ellesmereland, whence scientific expeditions were started with sledges. The summer of 1899 was unfavorable, and the "Fram" was obliged to return and pass the winter in Ellesmereland. A great part of the surrounding region was mapped out.

In May, 1900, there was a serious fire on board the "Fram." At one time it was thought that the ship would be completely destroyed. After a hard fight the flames were extinguished. In August, 1900, Jones Sound and Cardigan Strait were traversed. Winter quarters were established at latitude 76 deg. 48 min. north and 89 deg. west longitude. There was no lack of fresh meat, for the region abounded in reindeer. Polar wolves were brought back as specimens. The

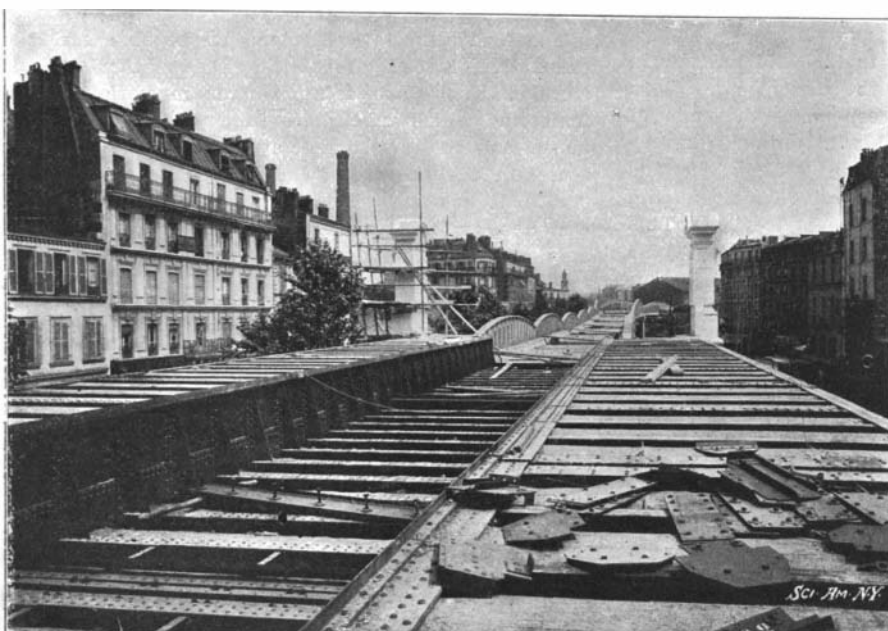


PILLARS AND STATION FROM THE STREET.

following winter was more than ordinarily cold, the average temperature being 45 deg. below zero. During the spring and summer of 1901 and the early part of 1902 sledge expeditions were made. On the 6th of August the "Fram" succeeded in breaking away from the ice and reached Godhaven on the 18th. Cape Farewell was left on the 28th for home.

Capt. Sverdrup has rescued so much from the unknown and made so many solid additions to science that his achievements, taken in conjunction with the all-important part he took in the Nansen venture, entitle him to high recognition as an intrepid explorer. He carefully mapped out the region of the coast of Ellesmereland, which has been practically unknown, a task rendered peculiarly difficult by reason of the number of fjords, reaches and mountainous elevations. To the north of Peary Island a great island was discovered extending to about 80 deg. north; but no other land was seen either to the north or west of this island.

Dr. Redwood, a leading English chemist, is endeavoring to secure some legislation to compel the general adoption of use of oil as fuel in the city of London. With such action, he argues, the pall of fog under which the city frequently struggles would disappear entirely. The doctor says that the London fog is composed almost entirely of the unconsumed particles of carbon in the air emanating from the thousands of factory chimneys which are belching forth thick smoke for the greater part of the day. There is no soot from oil.



STATION PLATFORM, FOLLOWED BY REGULAR STRUCTURE.