NORTH-WESTERN PASSENGER STATION AT CHICAGO.

The Chicago & North-Western Railway has made public the general plans for the new passenger station and terminals it is preparing to build in Chicago. The architectural plans are completed. There are presented herewith reproductions of two drawings by the architects of the exterior of the proposed station and train shed.

The drawings indicate that the new terminal will take rank among the finest buildings, architecturally, in Chicago. Messrs. Frost and Granger, the architects, who were also the architects of the La Salle street station at Chicago, have had charge of the design and have visited and studied the principal railroad terminals at London, Liverpool, Paris, Vienna and Edinburgh in search of suggestions that would help to make the new station not only beautiful, but also of the greatest practical use as a portal or entrance in which patrons of the North-Western may most expeditiously and comfortably transact the business of entering and leaving Chicago.

The essential feature of the design is a great colonaded entrance of lofty proportions that towers 140 ft. above Madison street, on which the station will face. There will also be an entrance on Canal street, the station being at the corner of Madison and Canal. Before the entrance is to be a broad pavement or esplanade from which will rise granite columns that will guard the inner vestibule. The esplanade will be lighted by large bronze lamp standards having clusters of electric lights and four big clock dials, each 12 ft. in diameter, will look down from the granite wall.

Madison Street Entrance; Chicago & North-Western Terminal.

The new terminal will be, with the exception of the South station at Boston, the largest railroad terminal in the United States, and will involve an expenditure officially estimated at $20,000,000. Many plans had been investigated and discarded before the one finally chosen was selected. More than 300 trains a day now use the North-Western's Wells street station Chicago for arrival and departure, the total number of people now handled there daily being almost 50,000. The train capacity of the new terminal will be more than five times that of the present station; in other words, it will have facilities, it is estimated, for handling a quarter of a million people daily.

TREATMENT OF THE TRAIN SHED.

One of the most important features, from an architect's point of view, is the treatment of the train shed. This structure will be 840 ft. long, extending over three city squares, but it will not have the usual long black expanse of sooty roof that offends the eye. On the contrary, the facade running north and south along Canal street and Clinton street will be a finished and artistic curtain wall of brick and granite, 48 ft. high, and including in its length the fine portal of the Washington street subway. The train shed roof will not be visible. The 16 long tracks which will occupy the shed will be covered by what is known as the "Bush roof," in which the graceful curve of the roof over each pair of tracks is broken by a concrete slot or duct, running the length of each track and so placed that the locomotive funnels will discharge through it into the open air. The roofs will be of concrete, covered with water proofing material. Skylights will be of wire glass and sufficient in extent to light every part of the train shed.

The train shed concourse has also received in the architect's plans a treatment that is far superior to that usually seen. Instead of being an open space, fenced off from the train shed proper by wire or open ironwork, it is a great waiting room, completely enclosed in glass and metal, with a glass and metal roof, making an airy, bright, clean room, 318 ft. by 60 ft. At either end of the concourse great stairways will communicate directly with the street, and cab stands will be reached without going through the station. There is also to be a stairway to the street floor of the station proper. These broad stairways between the street level and the train shed level of the terminal are of such extent that placed side by side they would form a stair over 100 ft. broad. There will be six public entrances to the station, besides the main entrance on Madison street.

Many months have been spent in negotiations for the necessary real estate for the big station and its approaches. These purchases and transfers have been made in a spirit of liberal settlement with property owners. The site is now being rapidly cleared, and the workmen will soon begin to sink the great caissons on which the building is to rest, reaching 106 ft. down to bed rock.

The management of the North-Western expects to have the new terminal ready for occupancy by January, 1910.

TERMINAL TO BE ELEVATED.

The plans call for an elevated terminal, reached by two elevated approaches of four tracks each, and a train shed 840 ft. long and 320 ft. wide, that will contain 16 tracks, each with a capacity of 15 cars.

The approaches alone to this structure will embrace some 30 acres of ground, 15 acres for the north and an equal amount for the west approach. This is entirely separate, and in addition to the present main lines.

Between Kinzie street and Madison street and Clinton and Canal streets, some 13 acres will be occupied by the tracks and

station. Some idea of the magnitude of the station will be conveyed by the statement that the area of the basement will be over two acres; the street floor of the station building will be 1¾ acres; the train shed will cover six acres. There will be practically 10 acres of floor space devoted to public use.

The new terminal will occupy practically four entire city blocks, bounded by Madison street on the south, Kinzie street on the north, Clinton street on the west and Canal street on the east, passing over Washington and Randolph streets by means of brilliantly lighted subways.

THE THREE LEVELS.

For a clear understanding of the architecture of the new terminal it must be borne in mind that there are first, the street level; second, the train shed level, or main floor; and above this, a third floor, containing several features, such as rest rooms and emergency rooms for the care of invalids.

On the street level, the essential feature of the whole floor is the great lobby, or concourse, where all the business of preparing for travel is conducted. The lofty vestibule or portico which forms the Madison street entrance, opens directly into this public concourse, which has an area of 100 ft. by 250 ft. Surrounding it are ticket offices, cab offices, news stands, baggage checking rooms, telegraph offices, telephone booths, an automobile office, taxicab office, and a well-stocked shop or store in which may be purchased practically everything that a traveler is likely to be in need of, from a handbag or package of fact, everybody can arrive and leave the terminal under cover, either by cab, automobile or street car.

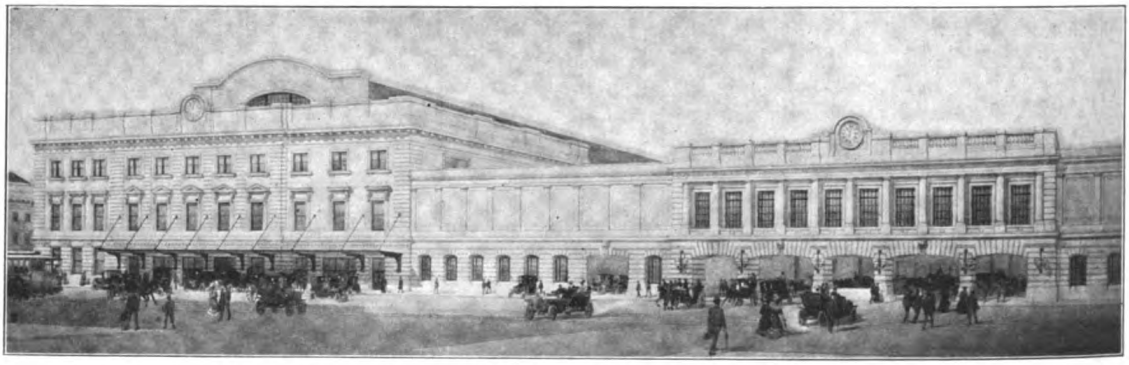
Another part of the great space that is to be utilized is devoted to the care of immigrants. There will be here bath rooms, toilet rooms, and a dining room where for a small sum the immigrant can get excellent service, lunchroom, kitchen, laundry tubs, and every conceivable means of adding to comfort and cleanliness.

President Marvin Hughitt has insisted that all subways and all apartments in the lower story of the station shall be bright, clean and cheerful; and the architect has given all of these lower parts of the building a treatment of cream-colored enameled tile and a brilliant lighting equipment.

The structure croses Washington street over a subway, which of itself is a work of architectural perfection. The white enameled tile with which the subway is lined, and the brilliant arrangements made for its electric lighting, make it one of the most attractive features of the structure. This subway at Washington street has been provided with great portals of granite, the arches of which are treated in the monumental style of architecture.

The street will be widened at this point to 120 feet instead of the street width of 80 feet. This provides for the future widening of the street, and the arched walls of the subway will form a fine pasageway.

On the second floor, which is the train shed level, is a splen-



Canal Street Entrance; New Chicago Terminal of the Chicago & North-Western.

shoe polish to the usual fruits, candies and materials for luncheons. The management proposes to develop this store into a feature the like of which has never been seen in Chicago, and it will be completely stocked with all travel conveniences. There will be a lunch-room on this floor—quite a large one—occupying a room 50 ft. by 90 ft, where luncheon can be had quickly, conveniently and at reasonable prices.

The ticket offices will immediately adjoin the entrance to this great lobby on the street level floor. They will be commodious and fitted with a number of features that will enable ticket sellers to handle large crowds of people in the shortest possible space of time. There will be plenty of windows, and a carefully chosen corps of experienced attendants.

The Information Bureau will be upstairs upon the train level floor, in the great waiting room.

A splendid suburban concourse is provided in the center of the station on the street level floor, extending through from Canal to Clinton streets, through which suburban passengers inbound and outbound can conveniently reach the northern part of town via Randolph or Washington street. Those whose destination is further south can use the Madison street entrance.

The cab stands and automobile stands will adjoin the suburban concourse, which will be also provided with ticket offices and other conveniences.

These cab stands and automobile stands are under cover. In did marble lined waiting room, 100 ft. long, 200 ft. wide and 80 ft. high with a vast barrel-vaulted ceiling. The walls are treated with a series of columns or colonnades corresponding somewhat with the main entrance.

The lighting arrangements of this room will be of a most brilliant character.

On this floor there will be, in addition to the great waiting room, one of the finest dining rooms in the country, a splendid room, around the walls of which will be a series of panels that can be utilized for magnificent mural decorations portraying the history of the west and northwest with which the development of the North-Western line has been so intimately connected for the past sixty years. It is proposed to make the service in this dining room equal to that of the best Metropolitan hotels and clubs.

On this main floor is also a ladies' waiting room, a beautiful apartment, reached by separate elevator service. Connected with it are retiring rooms, baths and toilet arrangements all of which will be in charge of a corps of maids and attendants.

RETIRING ROOMS AND HOSPITAL ARRANGEMENTS.

Perhaps some of the most novel features of the entire plan for the new terminal, and of most interest to the traveling public, are those which are found on the third floor of the building. Here away from the noises of the street and the crowds, the architects have planned a series of rooms where invalids or ladies with children or infants, or others seeking

privacy, may go directly by private elevator to rooms where they may rest while waiting for connecting trains, surrounded with conveniences for which one must usually go to a hotel or to one's own home. Here are baths, tea rooms, retiring rooms, and emergency rooms where hospital service is rendered and nurses are in attendance. A competent matron is in charge.

On the other side of the building on this same floor are baths, barber shops and a lounging room for men.

This suite is also reached by separate elevator service, and here are private rooms where the suburban dweller or the traveler from a distance may remove the stains of travel, change to evening clothes and proceed to his various social appointments. It is anticipated that this will be greatly appreciated by the large suburban clientele of the road.

SANITATION, LIGHT, HEAT AND VENTILATION.

The terminal will be provided with its own lighting, heating and ventilating plant, in which modern and complete machinery will be installed. Toilet facilities have received, like the various other conveniences, a great deal of serious thought, and not only are the usual public toilet rooms being provided for on a most expensive scale, but special rooms are also planned, where uniformed servants are always in attendance and where a small fee is required. In fact, the toilet facilities of all the terminals in the United States have been looked over in detail, and their capacity multiplied upon. There will be men's attendants, women's maids, men's baths, women's baths, and every imaginable feature that will add to comfort.

The entire structure is fireproof. All floors will be of marble or of marble tile, the interior finish of waiting rooms and lobbies will be of marble and the exterior of the building will be of a light gray granite.

RAILROAD ELECTRIFICATION PLANS ON THE CONTINENT.*

Sweden is likely to assume a distinct lead as regards electric traction on railroads on a comprehensive scale, for the state railroads of that country have taken up the subject. Both in Norway and Denmark, also, electric railroads are under consideration, and in the latter country several electric lines are likely to be taken in hand in the immediate future. Of much greater interest, however, is the preparatory work proceeding in Austria and Germany, where the respective states appear to be anxious to see the question advanced through rational and exhaustive investigations.

A distinguished member of the Imperial and Royal Austro-Hungarian Railway Board, Ober-Baurat Baron von Ferstel, recently delivered an interesting lecture on the subject, as far as it concerned Austria, at the Austrian Society of Engineers. This lecture has attracted much attention on the continent. He first dealt with the clsas of railroads which particularly called for electrification, and the different advantages and savings arising from it. The increasing cost of coal, he said, was an important reason for adopting electric traction; the price had risen 64 per cent. within two years, and for the present year Austrian railroads would require 730,000 tons of imported coal from German-Silesia, the Saar and the Ruhr district, and from England, the inland coal mines supplying some 640,500 tons. Matters in Austria resemble in this respect the conditions in Italy, Switzerland and Sweden, where the dearth of inland coal has an important bearing on the case for the introduction of hydro-electric power on the railroads.

The consideration is emphasized, as far as Austrian Alpine railroads are concerned, by the fact that the cost of transport is exceedingly high, in some cases almost equal to the cost of the coal; hydro-electric traction would seem, therefore, for more than one reason, a natural and desirable substitute for steam. Moreover, in Austria, as elsewhere, a fear has arisen that several comparatively young industries may seize upon so much water-power that the state will be left in the lurch; hence, the extensive purchasing of waterfalls by the Swedish state, and legislation, already effected or still under consideration, in various countries, to secure, if not a monopoly for the state, in any case a power to control and regulate the disposal of the waterfalls. This, at least, is the case in Norway, Italy and Bavaria.

The investigations carried on in Austria cover all the lines worked by the state railroads, irrespective of their being owned by the state or by private concerns. The aggregate mileage of the railroads in question amounts to 2,500 miles. In Austria the electro-technical studies of the question, and those referring to the traffic, are so far being carried on apart from the investigation of the water-power question. In order, however, to be fully prepared with all particulars of power requirements for the different districts, and from the different waterfalls, the whole of the system of railroads has been divided into 150 sections. The clubbing together of the different sections likely to come within the area of any one water-power central station will be comparatively easy, and will allow of various alternatives. It is claimed that never has the electrification of a comprehensive railroad system been more carefully prepared than in this case. The comparative details for steam and electric traction have been made out in as exhaustive a manner as possible. Experts in various industrial branches are also being consulted as regards the system to be chosen.

The survey of the waterfalls likely to come within the limits of this great scheme—numbering about 40—is being proceeded with, and will be pushed ahead energetically during the present summer. So far plans appear to have been completed with regard to some 12 power plants, referring to a length of valley of some 55 miles, between Boden Lake and the Kufstein streams; these 12 falls have an aggregate height of fall of 5,500 ft., averaging 460 ft. for each station, with an aggregate minimum constant power of 41,100 h.p.

Within the German Empire experimental electrification of railroads has, of course, been carried on for several years; but the more comprehensive schemes of electrification at times put forward, as, for instance, a Berlin-Hamburg electric railroad, have so far been allowed to remain in abeyance. Of late different plans of electrification have assumed more definite shapes, and, as in Austria, the whole question is now being officially investigated and reported upon, and, as far as can be foreseen at present, it is possible that the next few years may witness important developments in this direction.

Among the German states it seems probable that Bavaria will take the lead on account of the natural conditions of the country, which is rich in water-power, but poor in coal. The Ministry for Public Traffic has recently prepared an exhaustive and instructive report on the question of electrification of the Bavarian state railroads, advocating a classification of the state railroads into two groups, of which one comprises such lines or systems of lines which, on account of the nature and extent of their traffic and their proximity to cheap water-power, are well suited to electric traction. The state railway board is prepared to point out the requisite waterfalls as soon as the Department of the Ministry for the Interior, which deals with the water-power of the country, is ready to take action in this connection. With regard to the second group of lines, the adoption of electric traction may not be found expedient for some time to come, and the water-power, upon which this second group of railways will have to rely, is in the meantime to be placed at the disposal of industrial concerns, but only on such conditions, as regards the nature and duration of the concessions and the state's option of purchase, that the state railroads, when it may be found necessary, from time to time, will be able to acquire such falls or power stations. The state railroads are expected to act in a spirit tending to ad-

*From a paper in *Engineering*, London.