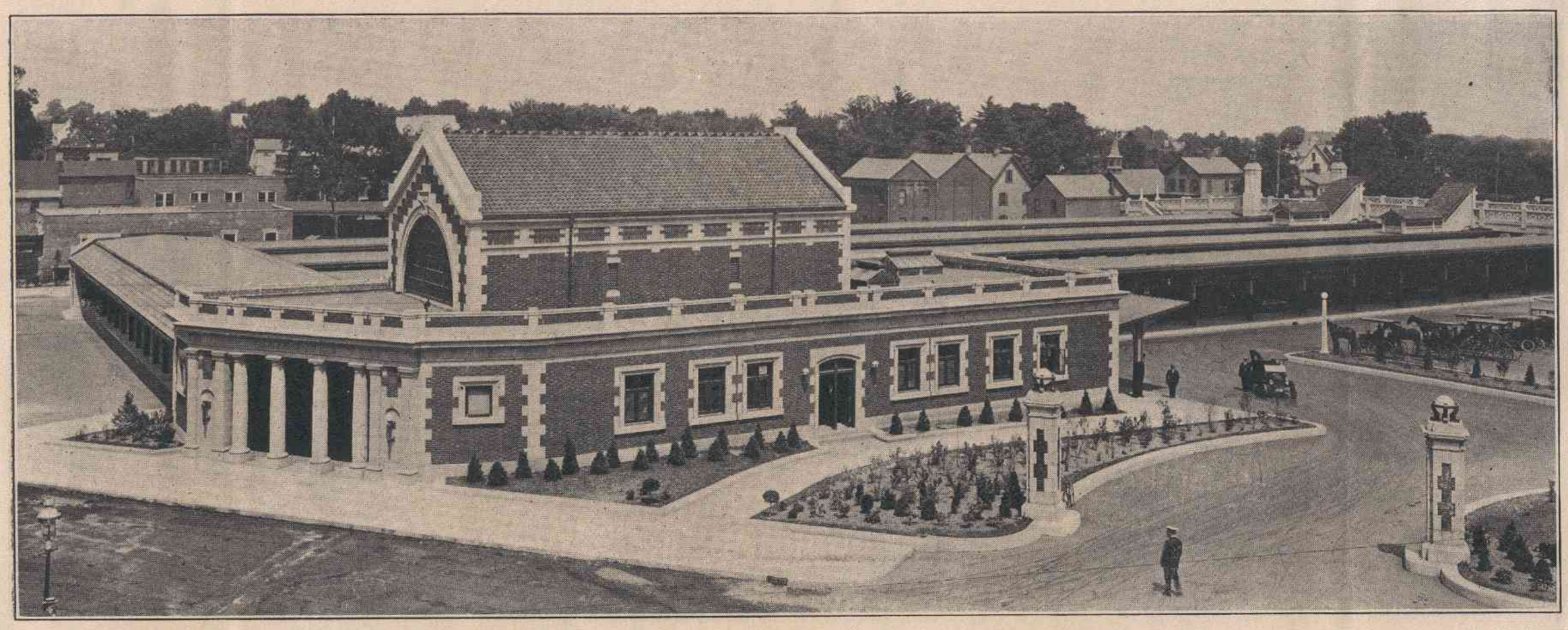

Fig. 1—General View of New Passenger Station of the D., L. & W. R. R., at Montclair, N. J.

France. A year or so ago they asked the Grand Panjandrum of the Ouest-Etat how many employees he had. "Ah, messieurs!" quoth he, "may the devil fly away with me if I can tell!" Still, he would investigate. A week later he reported: "This, cheres confrères, is one of those things no fellow can find out. Voilà l'affaire."—N. Y. Tribune.

The Threatened Strike of Trainmen.

Announcement was made on Monday, July 7, that the Erie Railroad and its subsidiaries the New York, Susquehanna & Western and the New Jersey & New York, have formally withdrawn from the conference committee of railroads which is dealing with the wage increase demanded by the conductors and trainmen in the eastern territory. The letter of the Erie Railroad stating its reasons for withdrawal, in extract, is as follows:

"Similar proceedings have in the past resulted in increased wages, and while it may be possible for some roads to meet these increases, the Erie Railroad Co. is not in a position to do so at present. The wage increase demanded of it amounts to an increase of 25 per cent, or a total annual cost on the basis of the present business of approximately $1,200,000. To offset this increase without disturbing the net earnings (on the basis of 1912) it would be necessary to increase the force and handle an additional volume of traffic representing a gross annual increase of $4,377,195.

"The employees making the present demands are the best paid, as a class, of any of the Erie Railroad. They received a substantial increase in 1910. The orbit has been completed, and the present demand is the beginning of a new cycle. It has frankly been stated that if the conductors and trainmen receive the increase asked for all other organizations will promptly follow.

"The New York state law, effective September 1, 1913, stipulates that an additional brakeman, known as a 'full crew' brakeman, for which the railroad officials can find no occupation, must be placed on certain trains. His rate will be the same as the brakeman cited, so that the present wage demand contemplates an increase of 27 per cent to a 'full crew' brakeman who has not yet been placed in service, or whose real value has never been developed. This will appeal even to a layman as a most unusual and unfair proceeding.

"While the company is willing to consider the wages or conditions of individuals, it will not agree to a general increase to any class of employees until safety appliances, such as block signals, steel cars and greater facilities, have been provided and the net earnings justify further wage increases.

"If this demand and those which will follow are to be conceeded as they have been in the past, the officials of the Erie company, who are held responsible both by the public and the owners, cannot be expected to join in its spoliation; therefore we have to decline a further participation in the proceedings under the present conditions."

The outcome of the strike vote taken by the unions was overwhelmingly in favor of a strike, as had been expected. The result was announced to the conference committee of railway managers, on Tuesday, which promptly reaffirmed its refusal of the demands and its refusal to arbitrate under the Erdman act for reasons already given.

An understanding reached between the leaders of both parties in congress contemplates the passage of an amendment to the Erdman act covering the present situation, on Saturday, July 12. Two bills amending the Erdman act have been before congress, one introduced in the house by representative Clayton, and the other introduced in the senate by Senator Newlands. The latter has the support of both labor and railroad interests, the National Civic Federation, and other individuals of prominence. It is the Newlands bill upon which an agreement is now reached. The impression is general that if congress acts promptly on this proposed legislation the measure will prove adequate to avert the threatened railway strike.

New Passenger Station for the D. L. & W. R. R., at Montclair, N. J.

Recent freight and passenger terminal improvements of the Delaware, Lackawanna & Western R. R., at Montclair, N. J., costing in the neighborhood of a half million dollars, include a new passenger station. By courtesy of Mr. Geo. S. Cullen, passenger traffic manager of the road, we are able to present several views of the construction, together with the following descriptive details.

The station is designed on the Grecian Doric order, with a colonnade for the main entrances direct to the main waiting room and train concourse. The walls are faced with genuine tapestry brick, and all trim, quoins, base courses, pilasters and columns, cornice, frieze and parapet walls, large arches in clerestory, etc., are of marble chip concrete. The roof over the clerestory of the main waiting room is of Brookville green glazed tile. The roof of the lower portions is of red quarry or

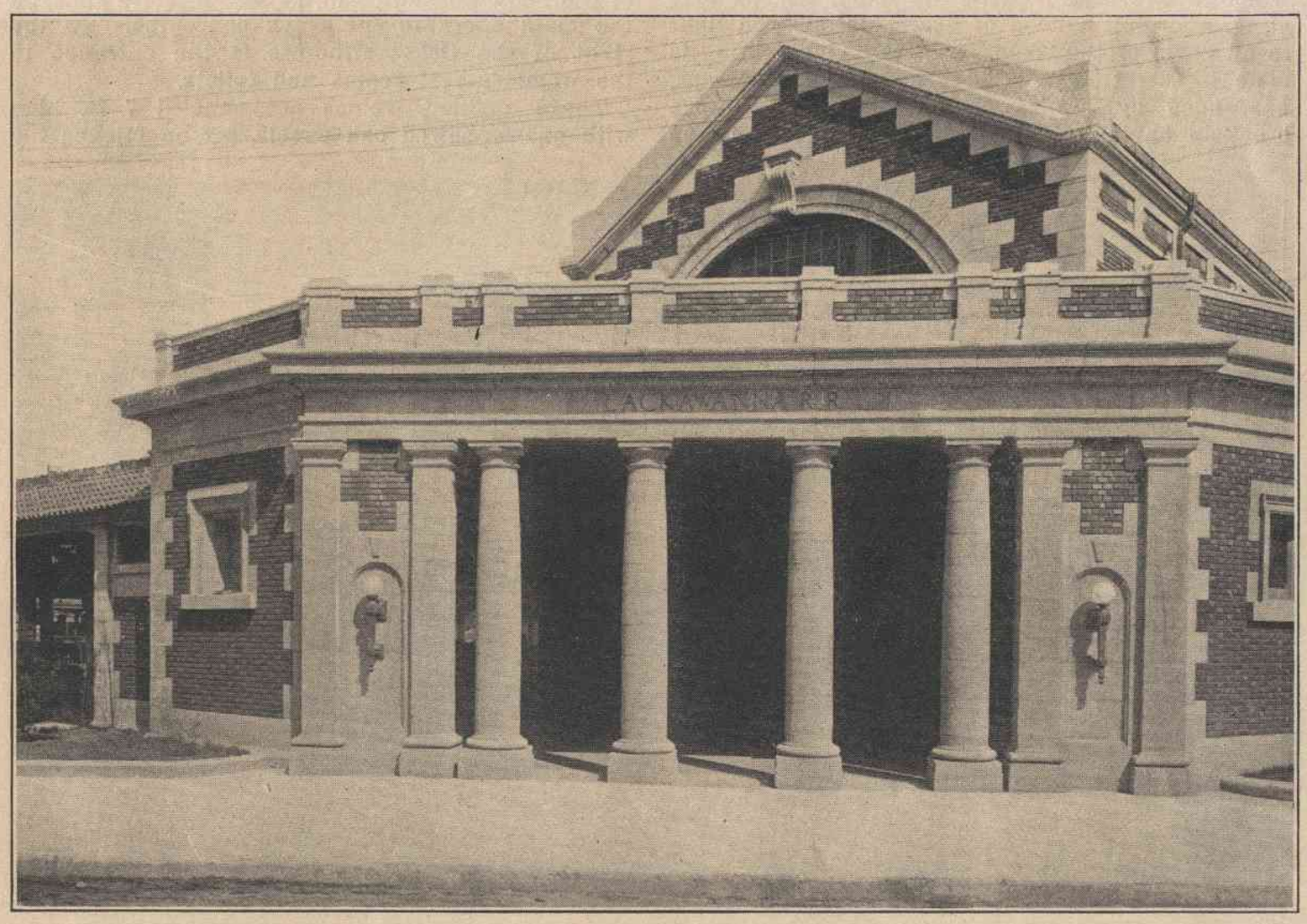

Fig. 2—Main Entrance to the Montclair Station.

Fig. 3—Rear View of Montclair Station and Driveways.

promenade tile. The floor of the loggia is of the same kind of tile as was used on these lower roofs.

The walls of the main waiting room are faced with buff-colored iron-spot pressed brick, laid in Dutch cross bond. The wall surfaces are broken with pilasters and moulded belt course 16 ft. above the floor line. This belt course and the moulded brick of the large semi-circular arched windows at each end are of a gray color, similar to that of limestone. The brick work starts on a 12-in. high faience tile base course, having a sanitary cove at the floor line. The floor is of marble chip terrazzo of color to harmonize with the walls and has a marble mosaic border. This marble mosaic border is also carried around the seats. The seats are set on faience tile bases five inches high, with sanitary coves at the floor line. The ceiling is paneled with heavy oak beams.

The ventilation is accomplished by register faces concealed by the trusses, and ventilated ridge tiles which are directly connected through the roof beams with concealed openings in the purlins, along the side walls. The day lighting is accomplished by two large semi-circular windows, one at each end of the room, above the belt course. These windows are glazed with amber-colored pebbled glass, affording a flood of agreeable subdued light to all parts of the room. The artificial lighting is done by eight semi-indirect hanging side lamps, suspended by bronze chains from cast bronze brackets having alabaster bowls and four lamps placed on the seats, the standards and frames of which are all of bronze and glazed with leaded glass. These seat lights were intended particularly for passengers wishing to read while waiting for trains.

At the end of the waiting room, just below the large window, is a cast bronze clock, controlled by a master clock located in the ticket office. These clocks are regulated and corrected every hour by the Western Union time service, which is directly connected to the master clock. The waiting room clock is the secondary clock which is regulated by synchronization from the master clock. Below this clock is a drinking fountain, of grape vine design, executed in faience tile. On the left hand side of the fountains is a door leading to the hand baggage and parcel check room and to the right of the fountain is the auxiliary or side entrance to this room which is through a vestibule. This vestibule is treated and finished in the same style as that of the main waiting room. On one side of this vestibule is a door leading to the men's smoking room and toilets, and on the opposite side is a door leading into the ticket office.

There are two ticket windows in the side wall of the main waiting room, located directly opposite the main doors to the track concourse. To the right of the ticket windows is the entrance to the women's rest rooms and toilets.

These auxiliary rooms are paneled 7 ft. high with quarter-sawed oak panels, set on faience tile sanitary bases and have floors similar to those of the main waiting room. The toilets are paneled and have partitions of "Argentine" glass 6 ft. high, with sanitary bases at the floor line, and are provided with the latest sanitary fixtures. All water closets have local vents directly connected to ventilators placed on the roof and the rooms are provided with additional register faces located in the ceilings, which are also connected to ventilators on the roof. The floors in the toilets are of hexagon pattern ceramic tile and all wood work is of cherry-finished mahogany. The lavatories are provided with hot and cold water.

On one side of the loggia there are public telephone booths, and directly back of the same and facing the main concourse is the news stand. At the opposite end of the concourse and in a position similar to that occupied by the news stand is a flower stand.

The heating of the building is provided from a boiler plant located about 800 ft. distant and on the opposite side of the tracks, and this plant also provides night heating for the coaches, which are left at this point for the early rush hours. All pipes are brought to the building and to the ends of the track through a 4x5 ft. reinforced concrete conduit. The telegraph and telephone lines and all electric lighting wires are located in a separate conduit, which is built into the walls of the steam pipe conduit.

All platforms, of which there are four, serving six tracks, are 17 ft. wide and 650 ft. long, built of concrete, and are covered with canopies for a length of about 350 ft. These canopies are built of steel with reinforced concrete slabs, and waterproofed with promenade tile roofing. The canopies are 20 ft. wide, overhanging the platforms by 1½ ft., thus affording shelter in inclement weather. The canopies on the driveway sides overhang the curbs about 6 ft., thus giving protection to passengers alighting from cabs, or automobiles. There is a total of about 730 ft. of this overhang.

On account of the location it was necessary to put the tracks on a four-tenths per cent. grade, in order to get proper clearance under Grove St. bridge. The distance from the station to the end of the yard is very nearly half a mile.

The entrances to the driveways are flanked by gate posts, built of tapestry brick and designed in keeping with the station and are surmounted by handsome electric light fixtures of hammered copped. At one end of the carriage stand is a water trough for horses, built of concrete and tapestry brick and surmounted with concrete urns to contain flowers. The driveways and flower beds are curbed with concrete, and the driveways are paved with creosoted wood blocks.

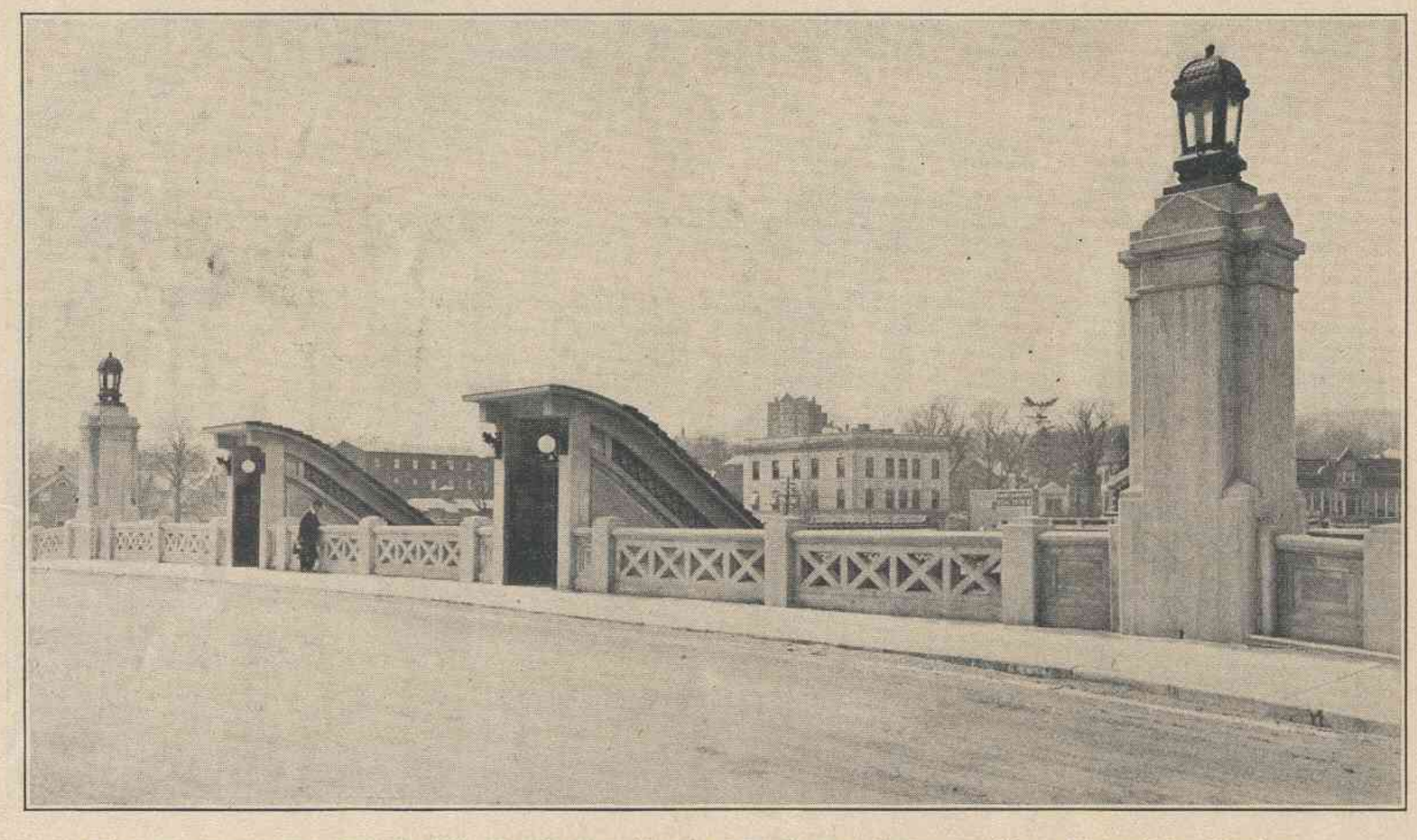

Fig. 4—Stairways to Track Platforms from the Grove Street Bridge, Montclair Station.

The Russian government has given its consent to constructing two new railway lines, the Odessa-Vilna and the Odessa-Zhlobin. The latter line was

built as far as Zhlobin some years ago, but conditions then prevented its completion. It will be extended to join the main line of the Southwestern Railway, the work being done under supervision of the ministry of railways. The Odessa-Vilna line will be constructed by private capital to connect regions in the northwest with the Black Sea.

Coal-Tar and Asphalt Products for Waterproofing.*

By S. T. Wagner.

The increasing number of solid-floor bridges, especially in cities, involving waterproofing and the expenditure of large sums of money, and the necessity of thoroughly protecting steel reinforcement in concrete under certain conditions, as well as the waterproofing of masonry in general, make the study of the various external methods of waterproofing of the greatest importance. The methods referred to consist in the application to the surface to be waterproofed of either a membrane of felt or fabric of some kind thoroughly cemented together with some bituminous material, or a layer of inorganic material impregnated with the same substance. There can be no question but that the bituminous material so used is the real waterproofing medium, and that all other materials incorporated therein are simply fillers to retain the bituminous material in place and give it additional reinforcement of some kind.

Whether the waterproofing is applied for the protection of the public from drippings from an overhead railroad bridge, or is used to prevent the corrosion of reinforcing material in concrete construction exposed to water, the object in either case is to obtain a layer of durable waterproofing material which is suitable to each particular case.

Waterproofing is expensive, it is always very difficult and costly to repair if defective, and it behooves the engineer to use the best materials that he can secure and to apply them with the greatest care to the structure, which should be especially designed to meet the necessary details required in good waterproofing practice. There is much uncertainty at the present time as to a number of points in connection with this character of work, but there appears to be almost complete agreement that the perfect or imperfect application of the materials determines a good or a bad piece of work.

It would appear that, outside of particular instances where waterproofing is used to keep water in, the majority of cases are those in which the object is to keep the water out; and of these a very considerable portion of the structures requiring its use are essentially different as indicated above—first, solid-floor bridges; second, underground masonry.

In the first case the conditions are such as to require special elasticity at all temperatures, in order that the waterproofing may adjust itself to the vibrations of the structure, especially in the cases of railroad bridges of relatively short span. It is usual to have a regularly ballasted floor, which, if properly drained, makes a condition for which we can say in general that the oxidizing action of the air is probably a more potent factor in the disintegration of the waterproofing material than the action of whatever water may be present.

In the second case we may safely say that when the masonry is covered with even a small amount of earth, the action of the air is negligible and that of the dampness, or water, is the more serious. In some instances water may be in constant contact with the waterproofing. The materials to be used should therefore have chemical and physical characteristics which make them suitable for the above-mentioned conditions.

There are in use at the present time two general classes of materials for waterproofing purposes when the conditions are as just described: First, compounds of an asphaltic nature; second, coal-tar pitch. Both of these materials have been and are at present used quite extensively and with varying success. The successes or failures in many cases have been due to proper or improper application as much as to the inherent qualities of the materials themselves; and it is believed that the successful use of either class has often been attributed to this fact rather than to the real qualities of the materials, and that at the present time the amount of reliable data as to what is needed in the way of a specification for the proper material to be used is woefully lacking.

*Paper presented at the annual meeting of the American Society for Testing Materials, Atlantic City, N. J., June 28, 1913.

To one who is not a modern chemist and thoroughly versed in the mystic symbols of the hydrocarbons, the chemistry of these materials is almost hopeless in its practical application; but it is quite evident that there is an essential difference between them chemically; that is, between such figures as are usually given in chemical analyses.

The physical properties are apparently much more interesting and useful to the practical engineer, and it would seem that we could do away with the chemical data unless they indicate properties which, when translated, will enable us to distinguish undesirable, or, it may be, dangerous, elements. We can understand and appreciate such figures as melting point, brittle point, elasticity at various temperatures, and consistency, and data concerning these properties give us a very fair idea of the various physical properties.

The data which seem to be needed are those from laboratory tests which will enable us to determine the relative durability of these products, first, when exposed to the air; second, when exposed to water; and third, when alternately wet and dry. Any such test is, or would be, essentially an accelerated test. It is possible that at the present time the question of durability might have to be answered by practical experience with the different materials in existing structures. However, it does seem that some information as to what we should aim for and what should be avoided is due from the manufacturer or the chemist. Nothing inspires the confidence of the user of a structural material so much as the free discussion of the methods of manufacture on the part of the manufacturers. Experience in the past with other materials has shown that this confidence is not abused in the prepaartion of specifications. Such information is badly needed in connection with waterproofing materials.

From recent investigations and research there seems to be a general impression that when exposed to the air, asphalt products are more durable than coal-tar products, and that the opposite is true when exposed to water. The opinion that asphalt products are more suitable for use on solid-floor bridges seems to be of general though not universal prevalence, on account of the greater elasticity of this material at low temperatures. In other words, an asphalt product with a melting point of 150 deg. Fahr. which will be ductile at a temperature of 40 deg. Fahr. or lower can be obtained, while a coal-tar pitch with the same properties can not. It has been the experience of the writer that asphalt mastics made with natural rock asphalts, when fluxed with asphalt compounds of high ductility at low temperatures, produce mastics which are much less liable to crack in service than are those in which the flux used is brittle when cold.

Water to a certain extent is a solvent of all asphalts, but from the tests of Whipple and Jackson† it is quite evident that the question of solubility is a comparative one, and the tests there given show that there are classes of asphalts upon which the action of water is very slight. In this paper a quotation is made from Richardson¶ which shows that the action of water upon coal tar is about two-thirds of that upon Bermudez asphalt cement when expressed as the gain in weight in water in a given time. Bermudez asphalt in the tests made by Whipple and Jackson is among those which were most affected by water. A number of cases of the durability of coal-tar pitch in actual service in underground work seem to indicate very positively its suitability for this class of work. Will some one say whether or not properly selected asphalts are unsuitable under similar conditions?

Fig. 5—View in Waiting Room of Montclair Station, D., L. & W. R. R.

Apparently the questions which need to be answered are the following:

1. What kind of materials are most suitable f r general application to (a) solid-floor bridges; (b) underground masonry?

1. What kind of materials are most suitable for (a) solid-floor bridges; (b) undergr.und masonry?

3. If asphalt products are used, what should be specified?

4. If coal-tar products are used, what should be specified?

Probably the answers to these questions belong

†Proceedings, Brooklyn Engineers' Club, March 8, 1900.

¶Municipal Engineering Magazine, June to August, 1897.

to the work now under consideration by Committee D-8 on waterproofing materials, but a general discussion of the subject may be of material assistance to the committee in its work.

Proposed Plan of One Central Railway Terminal for Chicago.

By R. C. Sattley, C. E.

"All Gaul" was, and all Chicago is, "divided into three parts." The suburban business of Chicago should be done in three locations. All the through and transfer business should be done in the same terminal, or combination of terminals.

The total suburban business outside of that of the Illinois Central R. R. and of the North Western Ry. combined, with all the through and transfer business of all the roads in Chicago, amounts to 25,000 less than that of the Illinois Central alone today. Argument against the business being handled in one place, on account of congestion, has no ground in fact.

The suburban business done in Chicago is shown by the following tabulation.

Percentage of Suburban Business Done by each Terminal in Chicago.
June, 1913.

Station Index Letter	Station Name	Percent sub'n business done at each station
Station B	Union Station.....	7.4 per cent
Station C	La Salle Station.....	8.2 per cent
Station D	Grand Central.....	.7 per cent
Station E	Polk Street.....	3.6 per cent
Station F	Illinois Central.....	52.0 per cent
Station H	C. & N. W.....	28.1 per cent
		100 per cent

As shown, the principal suburban business is done by the Illinois Central, which is 52 per cent, and the Chicago & Northwestern, 28.1 per cent, leaving only 19.9 per cent of the suburban business handled by the remaining railway mileage entering Chicago, namely 60,813 miles. The combined mileage of the North Western and the Illinois Central represent only 12,400 miles, out of 83,213 miles accommodated by Chicago terminals.

By locating a suburban station as near the business district as the new North Western station for the accommodation of the 19.9 per cent of the suburban business done at the four stations, B, C, D and E, would fully meet the demand of the total suburban business in the City of Chicago, as the new North Western terminal now perfectly filling the demand of its patrons accommodates 28.1 per cent of the total suburban business done in Chicago, 8.2 per cent more than the combined suburban business of the four terminals outside of the Illinois Central and Chicago and North Western. Only 7.4 per cent of the suburban business is done at the Union Station B, and this business it is proposed to take care of at the site of the present Union Station, so as to in no way inconvenience the present patrons of the railroads coming into the Union Station.

There is no ground for argument against the proposition that the through and transfer business of all the Chicago roads could be better and more economically handled in one combination of terminals, placing the roads that are now grouped in the present terminals adjacent to one another in the new terminal, and in no way break up present leased privileges by change of location, which change of location is desired to relieve business property which is too valuable for use under train sheds and railroad tracks, and should be in the market for business extension.

One of the worst complications of the present system is the transfer business. Under present conditions, there being six terminal stations, there are five possible routes for passengers and baggage for each through and overland train arriving in Chicago. These five routes necessitate one or more passenger busses to leave for five different stations; and these are followed by five or more baggage wagons to the same stations. Suppose that a through train arrives at each of the six stations (which occurs every day) about the same time. The case then is that thirty different complications arise with both passengers and baggage, and this is leaving out the matter of the transfer of mail and express, and extra carriages and hacks

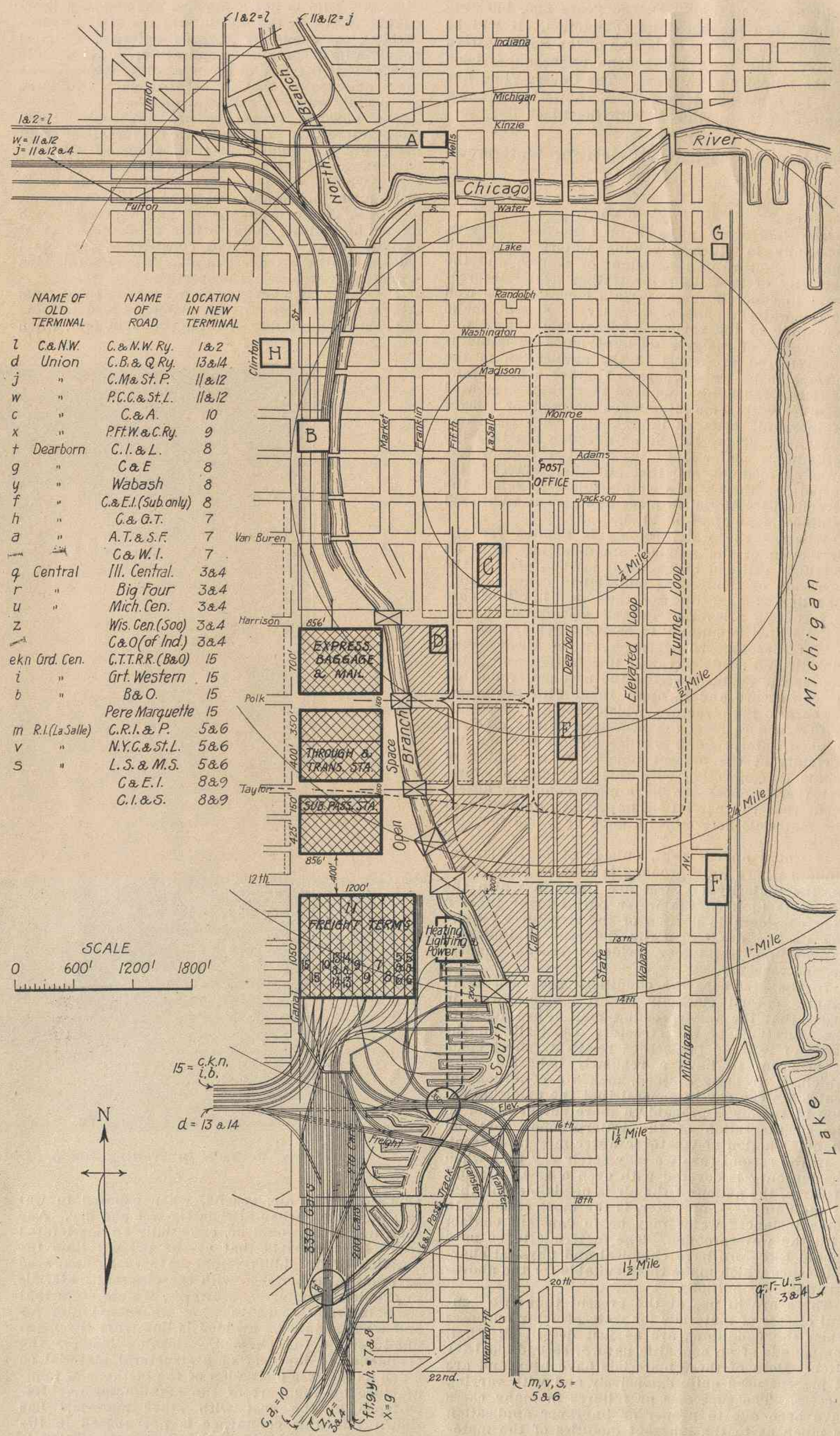

Fig. 1—The Sattley Plan for a Central Freight and Passenger Terminal for Chicago.

that transfer passengers, in addition to transfer busses. The peculiar feature of this transferring work is, that in passing from one terminal to another the busiest and most crowded part of the city is crossed by these transfer busses, baggage wagons, express and mail wagons, hacks and carriages. This condition could be worse only by having a greater number of transfer passenger stations. The remedy for this complicated situation it is here proposed to offer in a grand terminal station. A station to fill all these requirements must—

First—Be so located as to be approached by wide and commodious streets and avenues for reaching and leaving the station, and command an additional space for the exclusive use of the