If facilities are provided for the continuous and rapid handling of baggage and express without interfering with passengers it is believed that a terminal can be operated with such efficiency as to give an average of 6.5 trains per hour. In order to obtain this high efficiency, the track layout and all facilities must be designed with this object of saving time.

In the plan shown in Fig. 5, representing a typical dead-end station, with eight platform tracks, it will be noted that the double-track arrangement is preserved at the entrance to the train shed in such a way as to give practically continuous use of the platforms and tracks. This double-track arrangement is only made possible by the use of slip-switch cross-overs which allow a train to keep to its own right-hand track

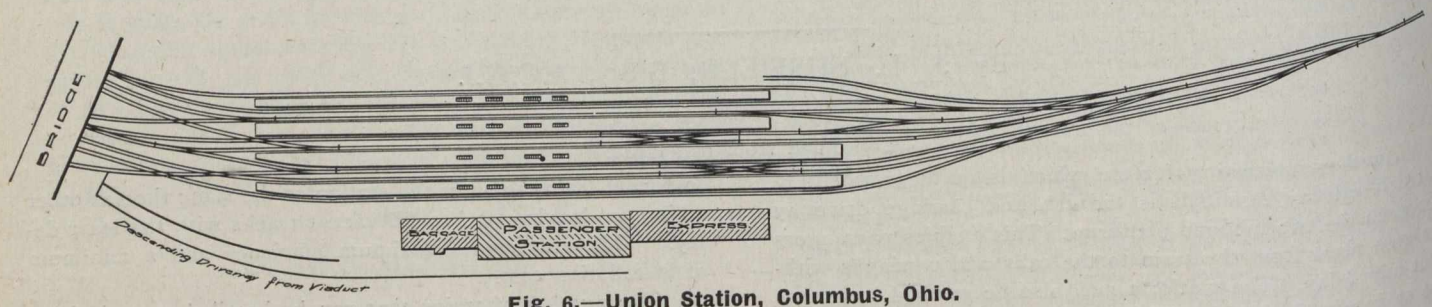

Fig. 6.—Union Station, Columbus, Ohio.

until it reaches the outer end of the platform to which it is assigned. Similarly a train can arrive at outermost platform at the same time and without interference from an outgoing train from any of the other platforms. With the old layout of a single ladder, the incoming train would have to wait at the throat of the yard until the outgoing train had passed on to its own main line track.

In connection with this typical plan of a dead-end station, the committee of the American Railway Engineering Association came to the following conclusions:

"(1) To avoid excessive cost in providing passenger terminal facilities largely in excess of ordinary requirements, it is imperative that provision be made for the economical, efficient, and practically continuous operation of the terminal during the periods of greatest activity, which may reasonably be expected within a period of, say, twenty years. To this end the track layout may be designed to permit incoming and outgoing movements to be made at the same time without interference as far as possible to arrange this."

"(2) At passenger terminals where large quantities of baggage and express must be handled, and it does not appear expedient to use intermediate platforms exclusively for this service, it is recommended that (where conditions permit) baggage and express be received, delivered and handled below the train floor and raised and lowered by elevators, conveniently located, to avoid interference with the movement of passengers."

The plan in Fig. 5 shows, in addition to the train shed trackage and platform arrangements, typical recommended arrangements for the coach yards for storage and cleaning, etc. These are only incidental to the general scheme, as in most cases the layout and location depend entirely on local conditions.

The design and layout of a terminal passenger station of the through type is a very different subject to that of a dead-end terminal. The through terminal can be more economically and efficiently built and operated than a dead-end terminal, as the number of platforms required to handle a certain volume of business is less in a through terminal, because trains can be handled in and out very much more rapidly. There are practically two types of through terminals proper, namely, those with the station building to one side of the tracks, and those with the building built over, or above the level of the tracks.

A large terminal of the through type is the Columbus Union Station owned by the Pittsburg, Cincinnati, Chicago & St. Louis Railway, and by the Cleveland, Cincinnati, Chicago & St. Louis Railway jointly. There are in all six railway companies using this terminal. The general layout is shown in Fig. 6. There are four platforms, three 17 feet wide and one 11 feet wide. Two are 678 feet long and the other two have been extended to a length of 774 feet. These platforms are all 8 inches above the top of the rails. The tracks in pairs are spaced at 11 feet centres and the edge of the platform is placed 5 feet ¾ inch from the centre of the track. The tracks are all below the street level.

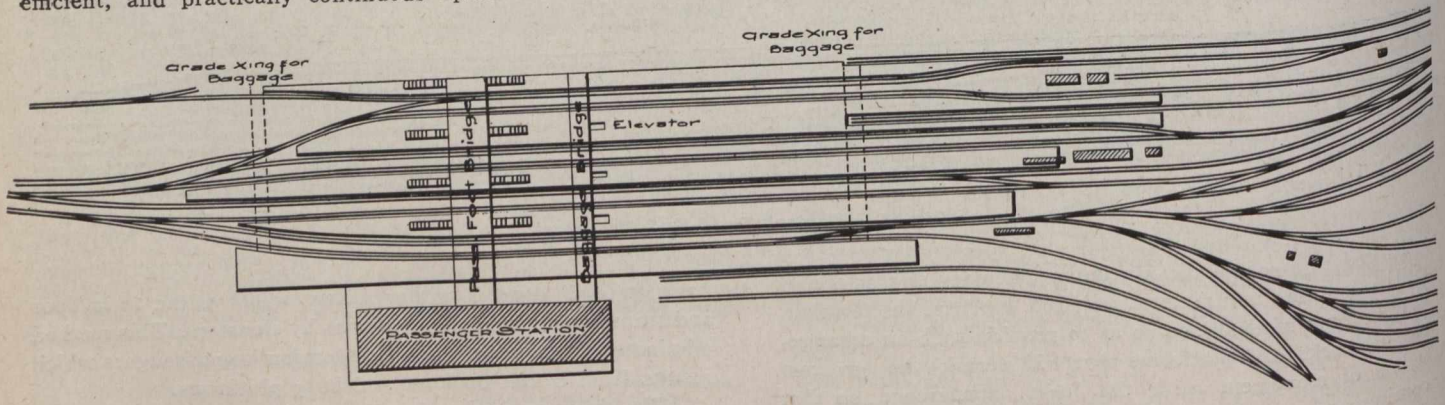

Fig. 7.—Harrisburg, Pa., Pennsylvania Railroad.

The front entrance and general waiting room are all on the street level. The passengers reach the platforms from the general waiting room by means of an overhead bridge extending across all the tracks, from which stairways lead down to the platforms. There are also stairways from the platforms down to a subway below the tracks which connects with the basement of the station. This subway is only used for rush business. The baggage and express rooms are on