

average time during which a person can keep his health is ten weeks. About 2,000 men are employed, mostly Gallegos. There is a large hospital built of lumber, one doctor at Portovelho and one other up the line. There is only one man who has been there three months who has not had malaria—that is the First Assistant Engineer. There are about 20 houses which are built of cedar, mostly from the United States.

The insects are very annoying, especially a very small one called "Pium." Mr. Jeckyll killed a boa constrictor about 20 ft. long. A friend and I took a walk in the jungle one day and in a short time were lost, but we were fortunate enough to find our way back to a clearing.

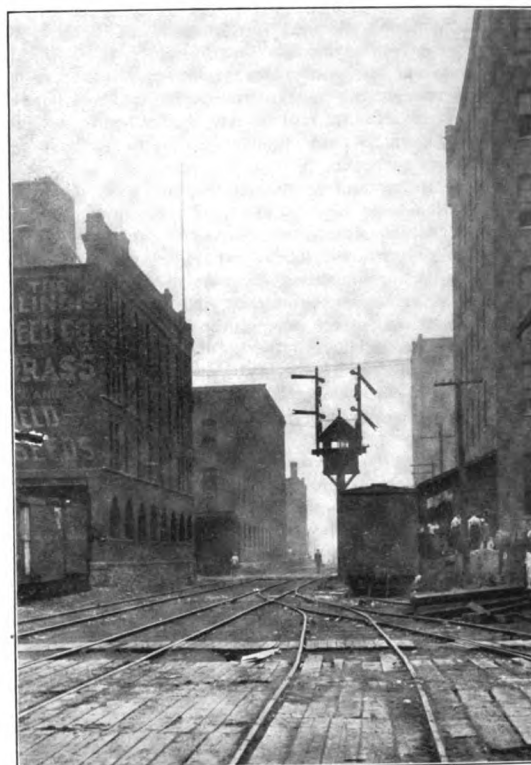
The water rises about 40 ft. in the wet season. The thermometer registers from 11 o'clock to 3 about 115 deg., and in the early morning about 60 deg. The cold is very hard to bear.

#### CHICAGO TERMINAL TRANSFER TRACK ELEVATION.

The Chicago Terminal Transfer Railroad is completing the elevation of a rather difficult section, about two miles long, of its line along Fifteenth place, Chicago. The work is just north of the Sixteenth street work of the Chicago, Burlington & Quincy and the Chicago & North-Western, described in the *Railroad Gazette*, May 10, 1907, and is being carried out under the same ordinance.

The Chicago Terminal Transfer is the Chicago entrance for the Baltimore & Ohio the Pere Marquette and the Chicago Great Western, which use its passenger terminal—the Grand Central station—at Harrison street and Fifth avenue. The east end of the section just elevated is not far from this station, and about 100 train and light engine movements a day had to be taken care of while the work was being done. The line is double track, on a right-of-way which at some points is quite narrow, adding to the difficulty of the work. One of the accompanying photographs shows a section where the right-of-way, for a city block, is only 33 ft. wide, and runs between high buildings. For several blocks east of this the width is only 50 ft. The retaining walls had to be built and the tracks raised in this narrow space with a train or engine movement over the line on an average of every 10 minutes, exclusive of the construction trains which were used in the elevation work.

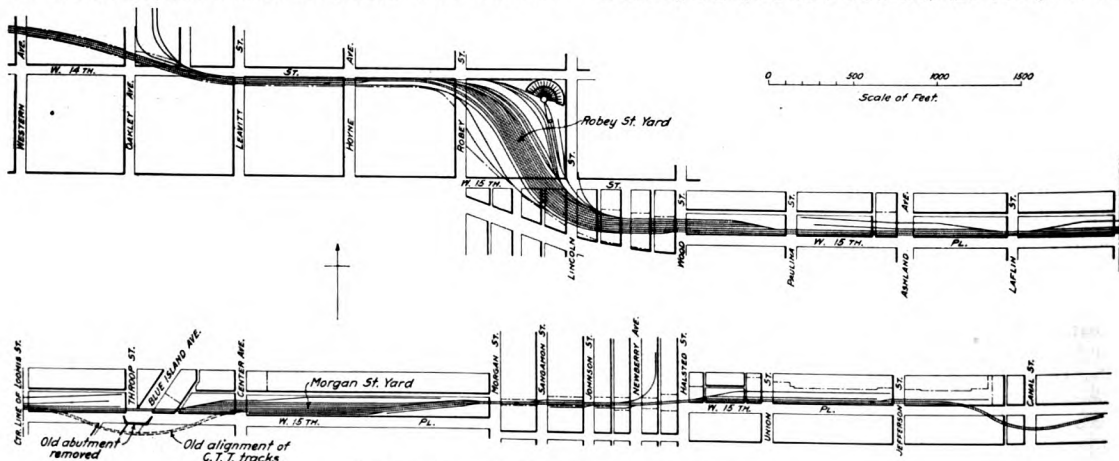
The accompanying plan shows the portion of the line cov-



Narrow Right of Way, Before Elevation.

the latter changed at Blue Island avenue, as indicated on the plan. This avenue is on a skew with the tracks and also intersects Throop street at the railroad crossing. Formerly it was carried over the tracks on a viaduct and the relation of this viaduct with Throop street made necessary the irregular alignment which the removal of the viaduct and elevation of the tracks eliminated.

Including the work here described, the Chicago Terminal



Chicago Terminal Transfer Track Elevation.

ered by the elevation ordinance. The work includes the raising of Robey street yard, but it was decided not to begin this until the line east of the yard had been finished. The present work, therefore, extends from Wood to Canal street, leaving the part west of Wood street to be done next. A small yard at Morgan street was raised with the main line, and the alignment of

Transfer has about eight miles of elevation work to do under ordinances already passed. In preparation for this work, which on account of the complicated conditions the company decided to handle with its own forces, a considerable amount of equipment was provided, including a lot of side-dump cars of 100,000 lbs. capacity for hauling the filling material. They

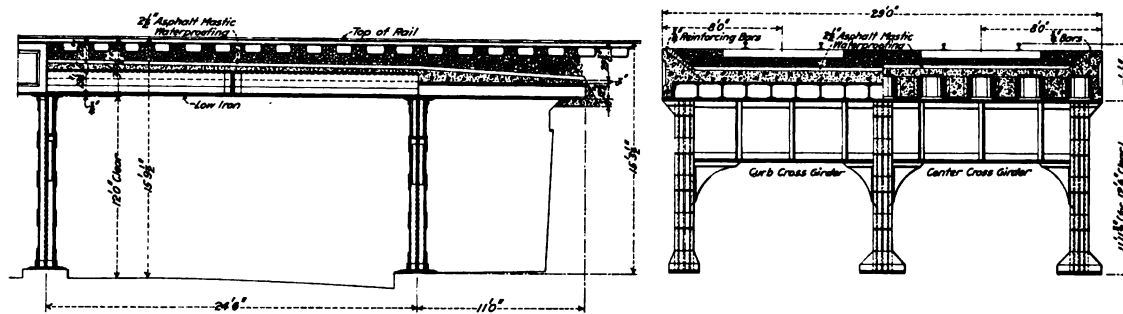
are of a design suitable for carrying coal, stone, etc., and will be used regularly in this traffic.

West of Blue Island avenue the right-of-way is 150 ft. wide, while east of that avenue is Morgan street yard and the narrow right-of-way referred to above. On the wide right-of-way, temporary main tracks were laid north of the old line, far enough away to clear the slope of a three-track bank, this section requiring a south retaining wall only. The land on which the temporary tracks were laid was formerly occupied by coal yards. They are to be replaced by the team tracks shown on the plan. The temporary tracks were connected with the

Fifteenth place, the traffic then being on elevated tracks all of the way from Wood to Union streets.

During the work, the line from Blue Island avenue to Union street was single track and trains were run over it by telephone. The men in charge of the two ends were experienced freight conductors, the one at the east end being in control. There was also a telephone station at the middle of the section for the convenience of the men on the track elevation work.

On the narrow right-of-way east of Morgan street, extreme care had to be taken in the different stages of the work so



Longitudinal Section and Cross Sections Through Sidewalk and Road Spans of Standard Right Angle Crossing.

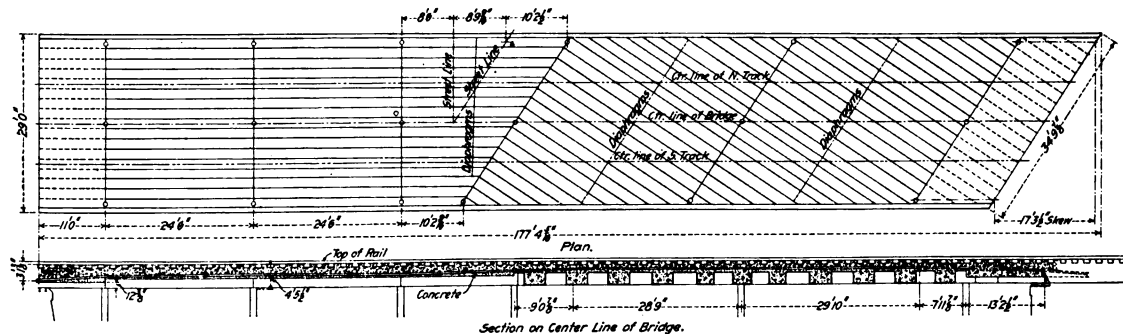
curve at Blue Island avenue, leaving a clear stretch between Loomis and Wood streets to be raised without hindrance.

The method here used was to build a light trestle resting partly on the retaining wall, capable of sustaining the weight of the cars, but not of a locomotive. The filling material was plowed from the cars with a 60-ton-pull Lidgerwood unloader, and was spread with a Jordan ballast spreader when the bank got high enough. The filling material, which was sand with some loam mixed with it, was brought in 30-car trains from a pit on the line about 10 miles south of the work. When this section had been filled, a trestle, with approaches at each end, was built over Throop street and Blue Island avenue, so placed as to permit the retaining wall to be built from Loomis street to Center avenue. Meanwhile, an approach was being built at Wood street, and when the whole was ready, traffic was

that one move would not block another and unnecessary delays result. Work was begun at the east, or Halsted street, end, the outfits backing toward Morgan street as the work was completed. Most of it was done from the track on the ground, though a part of the concreting, and the filling, of course, had to be done from the trestle.

The raising of Morgan street yard has been mentioned. The small freight yard between Halsted and Jefferson streets, which is leased to the Chicago, Milwaukee & St. Paul, and the team tracks between Throop and Paulina streets were also raised. The latter are built on a 2 per cent. grade, their entrance, at Laffin street, being at the street level and their opposite ends at the full elevation. The two subways under the yards are crossed by highway bridges.

The regular subway bridges, one of which is shown here-



Plan and Longitudinal Section of Blue Island Avenue-Throop Street Crossing.

transferred from the temporary tracks to the elevated ones, coming down on the east end at Center avenue.

A temporary main track was next laid in Fifteenth place south of Morgan street yard, this part of the street, under the ordinance, having been raised to the height of the elevation. One main track east of Morgan street was then abandoned and a trestle built above this track. This trestle was of a design requiring four piles to each bent, but because of the narrow limits, only three were driven, the retaining wall on the south side taking the place of a fourth row of piles. A run-off from the trestle was built at Union street and traffic changed to the trestle and the temporary track in

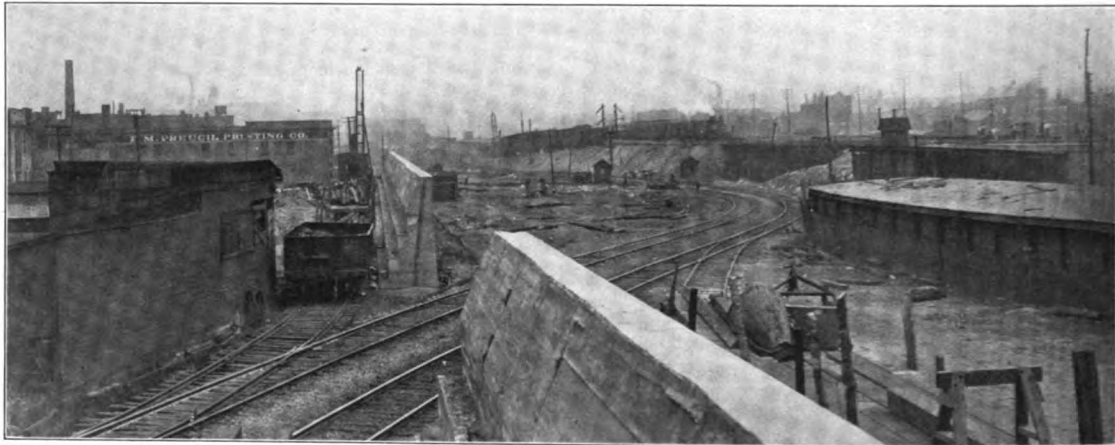
with, are similar in design to those of the Kinzie street elevation work of the Chicago & North-Western described in the *Railroad Gazette*, November 10, 1905. In the present design, however, the troughs of the street spans are about one-half wider than those of the former design, and the sidewalk spans are I beams instead of shallow troughs. At right-angle crossings, the bridges are 66 ft. long between abutments. One here shown is the Blue Island avenue-Throop street crossing where special conditions had to be met. An extra long bridge—162 ft. between abutments on the center line—was necessary, and, because of the length of the street span over Blue Island avenue, the troughs were put on a skew

to the side girders to avoid increasing their section or providing additional support. The Throop street portion follows the standard for a right-angle crossing.

The retaining walls, bridge abutments and column foundations are concrete. All the concrete rests on piling. The first 7 or 8 ft. of the soil is fairly hard material, beneath which is a very soft stratum 20 to 30 ft. thick. The piles were driven through the latter to hard-pan. The concrete for the body of the walls and abutments was a 1:3:6 mixture, 1:2½:5 for the coping, and 1:2:4 for the bridge seats and pier caps. Instead of sand, limestone screenings were used, principally because that material was easier to get than good sand. The walls were built in sections 25 ft. long, two sections being erected each day by a gang of about 45 men and the necessary mixing outfit. These two sections were made a day's work, regardless of the time taken, and the men then allowed to quit. The arrangement, the primary purpose of which was to avoid horizontal joints in the concrete, proved economical, the men working exceptionally well under it. The footings were built at about twice the rate of the body and allowed to harden thoroughly before putting on the upper part. For bonding, short pieces of old rail were used. There were three mixing outfits, each comprising a Smith No. 2½ mixer run by a 15 h.p. Otto gasoline engine, mounted on a flat car. There

#### ENFORCED RAILROAD COMPETITION.\*

The main fabric of American railroad legislation rests on two principles, which are all but irreconcilable with each other: first, that carriers serving the same or adjacent territory must compete with one another; second, that rates for like and contemporaneous service under substantially similar circumstances and conditions must be the same to all comers—that is to say, not competitive—and that one city or territory must not be built up at the expense of another (long-and-short-haul clause); a process which is directly and naturally the result of competition. The Act to Regulate Commerce prohibits pooling, and the Sherman Anti-Trust Law apparently makes every kind of trade agreement between persons engaged in the same kind of business an act of conspiracy, so that Congress has strongly affirmed the competitive principle; yet the 1906 revision of the commerce act makes it specifically impossible for a carrier to change its rates without giving thirty days' prior notice to the Interstate Commerce Commission, unless the Commission exempts it by special action, an exemption which the commissioners have been very loath to give. This provision is, of course, along lines the reverse of competitive, since a thirty-day-notice cut-rate to move competitive traffic is about as effective



Alignment at Blue Island Avenue before Change. Chicago & North-Western Elevated Tracks on the Right.

were no delays from machinery breakage. The concrete forms were built for repeated use, some of the sections being used as many as ten times.

Robey street yard is to be enlarged in elevating it by moving the east entrance, which is now at Wood street, eastward to Paulina street, as shown on the plan. The work west of this yard, to Western avenue, will be complicated by operating conditions, but will not offer the engineering difficulties of the part already done. E. N. Layfield, Chief Engineer of the Chicago Terminal Transfer, is in complete charge of all of the work, and to him we are indebted for the data for this article.

Consul-General Norman Hutchinson, of Bucharest, reports that several high officials of the Austrian railroads have arrived in Roumania for the purpose of studying the question of petroleum as a railroad locomotive combustible. The consul-general adds: If it is found that the use of petroleum as a locomotive combustible is working satisfactorily upon the Roumanian railroads, it is intended to introduce the use of petroleum upon the Austrian railroads. Petroleum does away with coal dust and cinders, but the odor of smoke issuing from the locomotive is offensive to many persons, while others consider it more or less healthy.

a device as setting a tortoise to catch a squirrel. So the railroads are told with blunt plainness that they must compete, and are then immediately reminded that they must not.

Are we, as a nation, correct in assuming that individual competition should be enforced by law—and, whether it should be or not, can it be? The fallacy of the Sherman Law originates in the national reverence for competition, and in the lack of clear thinking on the way competition works out, in its varying forms. As applied to the railroad situation in the United States, the discouraging fact about competition legislation is that it was given an exhaustive trial in England fifty years ago, at which time certain truths were developed at great cost which, so far as we are concerned, need never have been developed at all, since we have not noted the relation of these truths to our own problems, but are proceeding independently, at still greater cost, to develop the same principles in this country.

Charles Francis Adams showed that it had always been the theory in England that the railroads ought to compete, until the commission of 1872 demonstrated that in the forty years since railroads began, English railroad legislation had never accomplished anything which it sought to bring about, nor

\*From a paper in the September *Atlantic Monthly* by Ray Morris, Managing Editor of the *Railroad Age Gazette*.