

Fig. 1.—Morris & Essex Branch, West, Before Filling.

The district between the rivers Loire and Cher, once densely wooded, was steadily deforested until by the beginning of the nineteenth century, 1,250,000 acres had been utterly abandoned. About the middle of the century the work of reclamation was started which has resulted in a forest property worth \$18,000,000. France and Germany spend on their forests \$11,000,000 per year and get from them in net returns \$30,000,000 a year, while the United States spent on the national forests in 1906 \$1,400,000 and secured a net return of less than \$130,000.

#### Germany.

Each state in the German federation administers its own forests, the method of management calling for a sustained yield; that is, no more wood is cut than the forest produces, while in the United States we are now using about three times as much timber as our forests grow. As a result of good management, the yield of timber has increased from 20 cubic feet per acre, in 1830, to 65 cubic feet in 1904, and within the same time the percentage of saw timber rose from 19 per cent to 54 per cent, which means that through the practice of forestry the timber lands of Germany are of three times better quality to-day than when no system was used, and their forests are in better condition than ever before. In addition to the state forests a number of private ones are managed under the same system and with equal success.

#### Switzerland.

The first law regulating forests was issued 600 years ago, and one of the most famous forests in the country, being at the same time one of the most perfectly managed and profitable in the world to-day, was first planned in 1680. Severe floods with their attendant damages, from time to time, made the question of forest protection a vital one, and the work was at last undertaken by the general government. All Swiss forests are now classified as "protection" and "nonprotection," and whether public or private, are controlled by the government. In protection forests all cuttings must be such as to preserve the protective value of the forest cover intact, and for this reason clean cutting is usually forbidden. In such forests stumpage sales are prohibited, and all trees must be felled and measured under the direction of a forest officer. Nonprotection forests are also subject to regulation. On these, when in private hands, clearings may be made only by consent of the state officers, and logged areas must be reforested within three years. Where protection forests can be created by planting, this may be ordered, and where forests are converted after cutting into farming land or pasture, an equal area may be ordered reforested. Where barren ground is required to be forested for protective purposes the government pays from 30 to 50 per cent of the cost. Between 1876 and 1902, 16,000 acres were reforested at a cost of \$1,000,000, the government paying one-half. In protection forests grazing is entirely prohibited, but in the others it is allowed under careful supervision.

#### Austria.

Forestry regulation was first started in 1872, and on 60 per cent of all the Austrian forests, and on 82 per cent of the private forests, excellent results have been obtained by co-operation between the government and private owners. Private forestry is encouraged by a system of taxation which relieves forests in which forestry is practiced.

#### Hungary.

About half of all the Hungarian forests are under working plans by which the cut is regulated so as to provide for a sustained yield. The manage-

ment of all corporation and protection forests have been supervised by the government since 1879; and all so-called "absolute forest land," in other words cleared timber land unfit for farming, must be reforested within six years after cutting. Three-fourths of all the forest land of Hungary, including private as well as public forests, falls under the classification of "absolute forest land." All mountain forests are required to be managed under government working plans, so that in one way or another two-thirds of all the Hungarian forests are brought under state supervision. The work of reforestation is constantly going on, free seedlings are distributed each year and bounties are paid for forest plantations established on private waste lands.

#### Norway.

Forestry here is on a low level. The various provisions for the better use and protection of the forests, which began 300 years ago, have been only half hearted in nature and do not meet the situation.

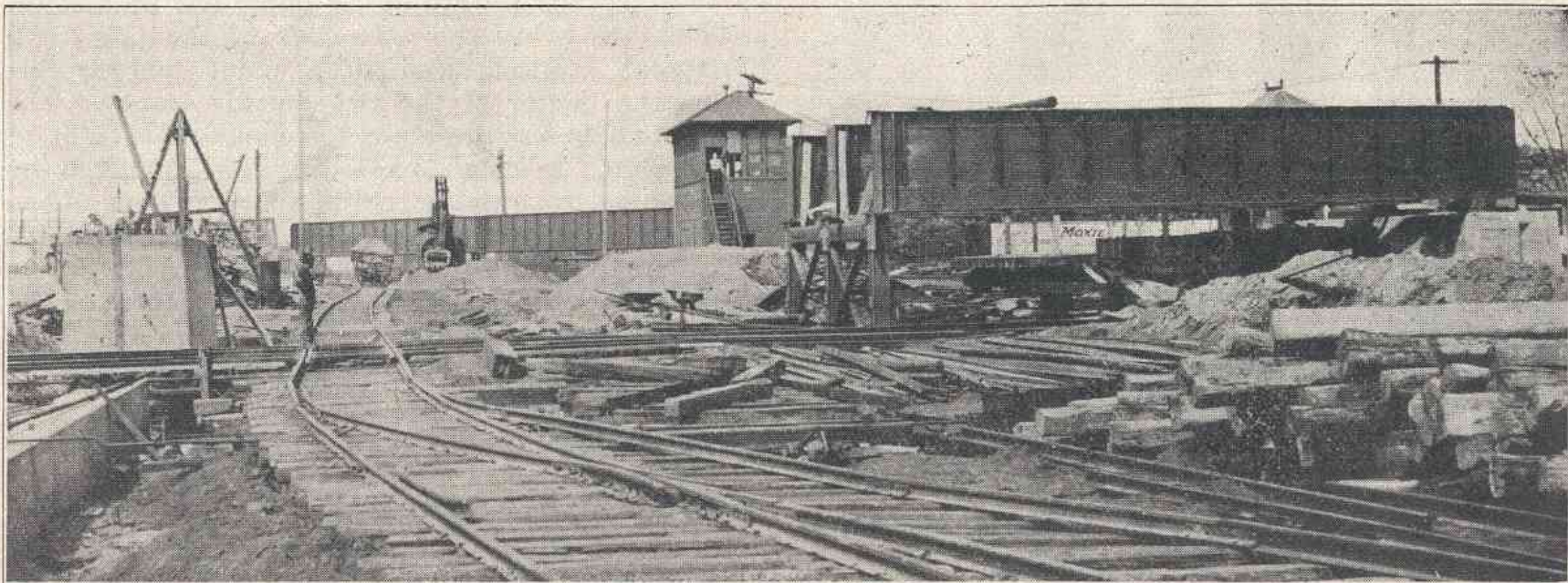


Fig. 2.—View North on N. Y. S. & W. R. R. Tracks, Showing M. & E. Crossing with D., L. & W. R. R.

The total yearly cut is 18,000,000 ft. board measure greater than the amount of wood grown by all the forests in the same time. Since 1860 the government has been buying cut-over lands in order to plant them to forest, where forest protection is needed.

#### Sweden.

After centuries of waste in timber cutting, the present forest policy came into effect in 1905. By it provincial forest protection committees have to approve the local felling plans. A diameter limit is set, below which trees may not be cut. Clearings are forbidden, and cleared land, unless used for other purposes, must be reforested. Pasturing is restricted where it would do harm. The trees to be cut are marked, but only a moderate amount of planting is done to secure the future crop, natural reproduction being mainly relied upon.

#### Italy.

Italy has suffered extremely from the ruin which follows the removal of protected forests. One third of all the land is unproductive, and though some of this area may be made to support forest growth, one-

fourth is beyond reclamation, mainly as the result of cleared hill sides and the pasturing of goats. The rivers are dry in summer; in spring they are wild torrents, and the floods, brown with hill-side soil, bury the fertile lowland fields. In spite of excellent forest laws regulating cutting and forbidding clearing on mountain slopes, large areas have been persistently cleared, and though provision has been made for thorough reforestation work, very little has been done. A recent commission has decided that 500,000 acres will have to be planted at a cost of not less than \$12,000,000 before the destructive torrents brought on by stripping and over-grazing hillsides, can be controlled.

#### Roumania.

In 1881 the first effective forest law was passed. The state and district forests are now placed under management and such private forests as are located on steep slopes and near streams are supervised. This plan of protection covers 84 per cent of the whole forest area. In these forests clearings can

be made only by permit, and all cutting must be done in accordance with approved working plans.

#### Japan.

Under the old feudal system of Japan the forests were for centuries reserved and cared for, and a continuous policy assured; in fact Japanese forests have been managed longer than any of those of Europe. They were controlled before the birth of Christ, and during the early Christian centuries forest planting on watersheds, to prevent floods, was enforced by frequent edicts, the felling of trees being supervised by provincial officers. As a result Japan alone among the nations, began its modern industrial progress with forests not only unimpaired but improved after centuries of use. In 1868 when the Mikado was restored to power the old restrictions were removed, and the forests were over-cut, wherever they were within easy reach of the market. This practice has since been regulated, and forest laws have been put into force by officers educated in Germany as foresters, whereby all public forests are properly managed. There are two classes of forests, called "reserve" and "available."

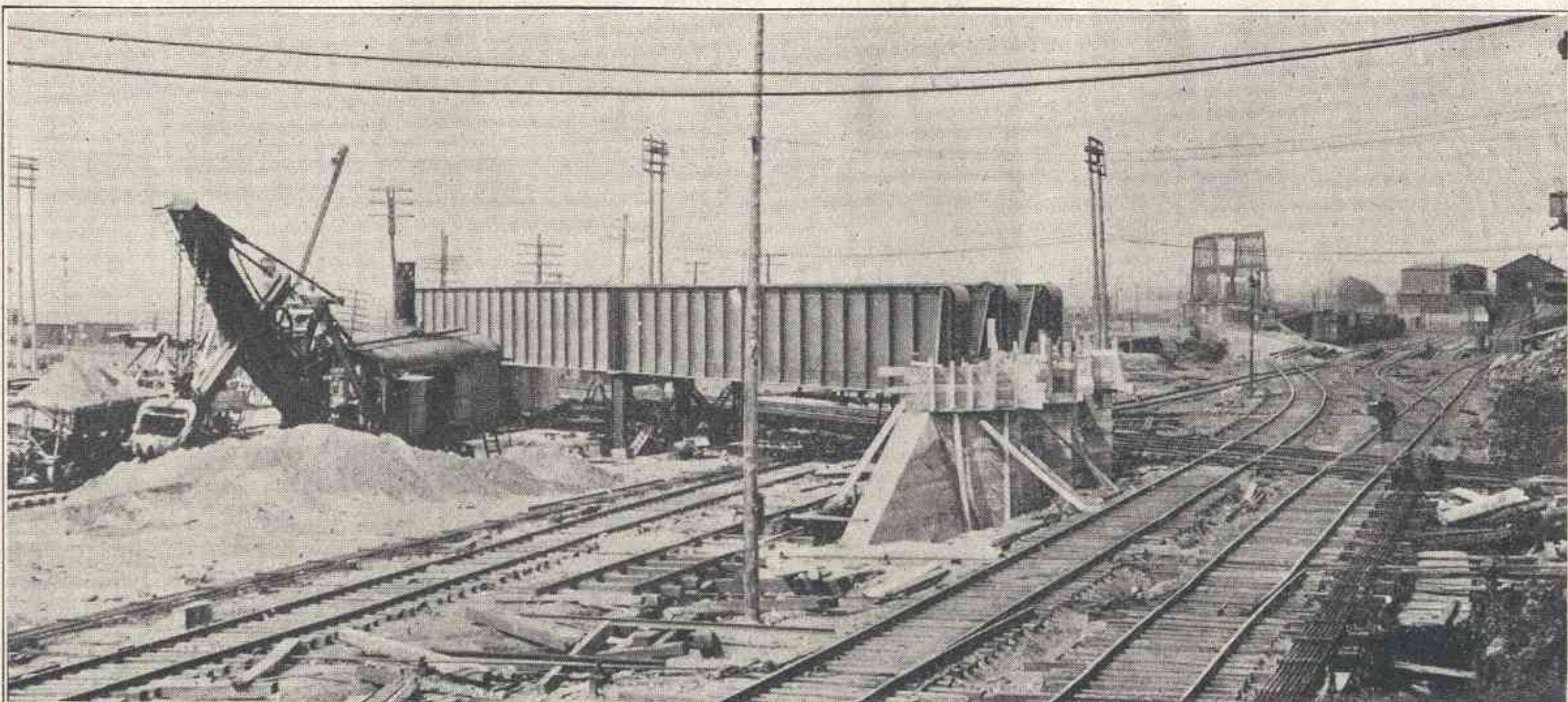


Fig. 3.—View North on N. Y. S. & W. R. R., Showing Boonton Branch Girders for D., L. & W. R. R. in Place.

The first are guarded from reckless felling which would expose the soil to injury; the second are intended to be developed to their fullest capacity as a source of wealth for the country. Private forests are under government supervision. Where they protect mountain slopes they cannot be cleared without permission, but must be handled so as to keep forest cover intact. During the past 25 years 200,000 acres of forest have been planted at a cost of a little less than \$9 per acre.

Mr. Cleveland further goes on to say that the more advanced and progressive countries go farthest in forestry, as they do in other things, England being one of the exceptions to the rule, as, although provided with mountain and heath lands capable of producing a large part of the timber needed for home consumption, she has been leading all nations in volume of wood imports, depending upon foreign sources for her supplies. There are, however, indications that the change has come, as reports are made that steps are being taken to start forestry work on a large scale, which, when started, will probably be continued permanently.

In every country without exception, where the initial steps were left to private enterprise, but little was accomplished until either the general or the state government, or both, took hold. In this respect it would seem as though their experience might be valuable to use, and, through the press, backed up by public opinion, an influence created which would cause the national and state governments to proceed in ways beyond the individual or the corporation.

Recently Mr. Pinchot called a meeting of railroad officials soliciting their co-operation, and showing that in the planting of trees for a future timber supply, satisfactory financial results would be obtained in fifty years or perhaps less. The expressed opinion of two presidents of leading railway systems was that under present conditions, while willing to co-operate as they were able, it was not possible for railroads generally to raise money for the purpose of buying lands and planting them to trees, for a tie supply in the distant future, while needing all the capital obtainable for present necessities; and that in their opinion it was a work for the government to take hold of. This seems to have been the experience abroad, and the sooner we realize that fact the better. It may be said that conditions are different in this country as regards the separate authority and duty of the federal and state government. To some extent this is true, but scarcely such as to prevent their joint co-operation for the general good. The federal government spends large sums yearly in improving and developing waterways within state boundaries. Through the Reclamation Service it has impounded water for irrigation purposes, and it is now proposed that a large sum be raised by bonds for the further and general improvement of waterways throughout the country. Is not our future timber supply of equal importance? From the laborer building his cottage to the greatest industry in the country all are more or less dependent on the lumber market, and if what the forestry officials tell us is true, that, as matters go now, within twenty-five years our forests will be largely a thing of the past, it is time we were up and doing. There is no use waiting or relying on private capital: it is too big an undertaking.

One of the best opportunities for afforestation ready at hand seems to me to be in taking care of the "cut-over" lands. Every year there are probably hundreds of thousands of acres of timber land being cut and stripped that are afterwards left to the fire or to be pastured, which would, if properly preserved, soon grow again into a splendid young forest, and probably produce results as soon if not sooner than trees planted in the same locality. I have seen loblolly pine trees being cut in Texas and made up into ties that had grown on land that was under cultivation during the war. No special care had been given to their growth, but if there had been a quicker result might have been obtained. The same experience is reported elsewhere in the south. It may be that a few lumber companies are taking care of their future lumber supply themselves, but, if so, they are scarce, the item of taxes and interest on unproductive land being generally considered too great a drain.

Why not the federal government issue bonds and buy such lands where they can be obtained at a

reasonable cost, and then place them under the control of the Forest Service? The question of taxes would be eliminated, and an important advance would be made for our future timber supply. Mr. Pinchot says he has urged this on congress without avail. Here is a way in which co-operation can be of benefit, as if congress is once convinced that the business interests and the people are behind the suggestion, it would be approved. At present the Forest Service is doing this on the forest reserves. If it is of value there it is more so in many districts where climatic conditions are especially favorable for quick growth.

Another important point is the question of regulating the cutting on private lands. This is a matter of state control, and it is reported that the Louisiana legislature has already taken action in this direction. It is also said that the supreme court of Maine has given a decision in reference to the extent an individual can go in the cutting of timber on his own land. This is, of course, a delicate matter to touch on, and one which should be carefully considered, but if it can be legally done a limit should be placed on the diameter or size, in cutting, with such additional restrictions as may

value of the home grown product that does not exist today in any other state; in fact it has increased to an appreciable extent the price of land favorably situated for the purpose.

"Jock, when ye hae naething else to do, ye may be aye sticking in a tree; it will be growing, Jock, when ye're sleeping."—  
"The Heart of Midlothian," Chapt. 8.

E. O. FAULKNER,  
Manager Tie and Timber Dept., A. T. & S. F. Ry.

#### Elimination of Grade Crossings, D., L. & W. R. R. and N. Y., S. & W. R. R. at Jersey City.

Extensive improvements have been under way for some time on the Delaware, Lackawanna & Western R. R., west of the Bergen Tunnel, in Jersey City, N. J. The work consists of the elimination of grade crossings, both on the Morris & Essex divisions, and on the Boonton branch of the D., L. & W. R. R., where the New York, Susquehanna & Western R. R. crosses at grade. In order to give the required clearance, the Lackawanna tracks are to be elevated about 12 ft above their

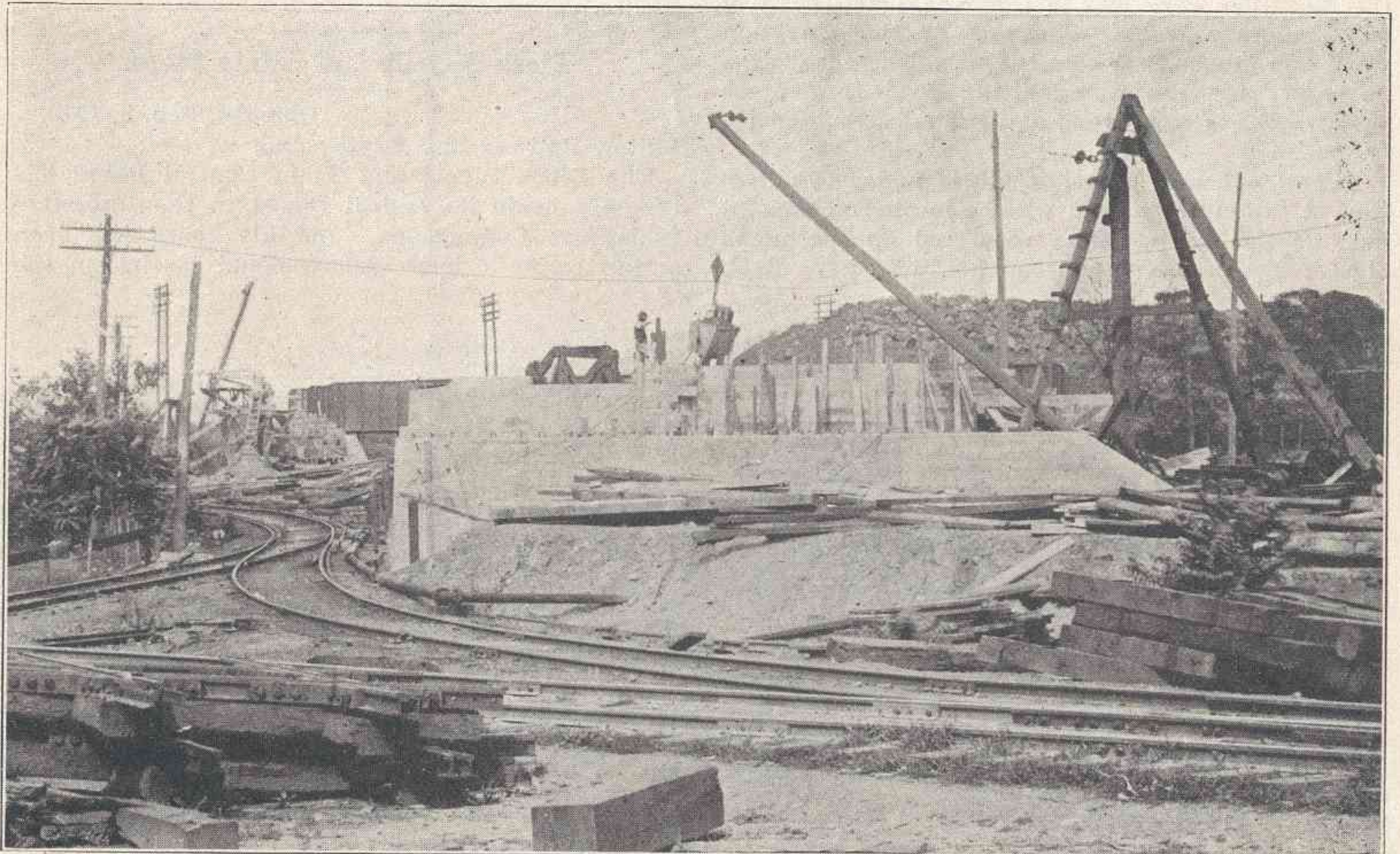


Fig. 4.—Looking around the Y-Track, Abutments under Construction.

be advisable where the land is to be left for re-afforestation and not turned over to agriculture. I have seen forest land stripped just as though a cyclone had gone over it, not even poles six inches in diameter being left, and the clearing was not done for farming purposes either.

Again the question of taxation on planted forests or on cut-over lands in private control, and set aside for forest growth, should be considered and dealt with by the state. Where an individual or company does either or both, the least the state can do is to exempt the same from taxation, under proper restrictions, until such time as the crop comes in. Then let it pay on what it produces, or on the value.

Nearly every state now has a state forester. Why not he arrange to grow a small nursery stock of forest trees suitable for the locality, and distribute a limited number free to those residents who may desire to plant a few trees in an out lot not otherwise used, and at the same time advise how best to proceed in setting out and taking care of them. As an evidence of the force of example, three or four years ago, the Atchison, Topeka & Santa Fe Ry., after fully investigating the value of certain species of eucalypts for railway purposes and the suitability of California conditions for their growth, bought a ranch and started tree planting. The local press soon caught on and called attention to the matter, so that since then a considerable acreage has been planted by individuals and companies which is increasing largely every year. An interest has thus been created in tree planting and the

original grade, and the Susquehanna tracks will be depressed about 9 ft.

The Morris & Essex branch starts to elevate at a point just east of the Hackensack river draw-bridge, and rises on a grade of about 1½ per cent until the point of crossing is reached; and then returns to the original track elevation at a point west of the Bergen tunnels, descending on about same grade. The Boonton branch starts to elevate at a point east of Pen Horn creek, on the Hackensack meadows, and rises on a grade of about 1 per cent to the point of crossing, and finally enters the Bergen tunnels at the same grade as does the Morris & Essex branch.

The cut for the Susquehanna road will be about 88 ft. wide, lined with concrete retaining walls, and will extend from a point south of the M. & E. branch, to a point north of the Boonton branch of the D., L. & W. R. R., and it provides ample room for six tracks.

Heavy, through plate girder bridges will be the type used on the work, except for the bridges over highways, where deck plate girders will be used. The bridge for the M. & E. branch over the Susquehanna tracks will be a three-track structure of two spans of 19 ft. 6 ins. each. The bridge for the Boonton branch provides for four tracks and is also arranged in two spans. Owing to the large angle of skew of this crossing the length of girders required is 78 ft. 6 ins. In each case the center support of the girders consists of a steel bent on a concrete foundation pier.

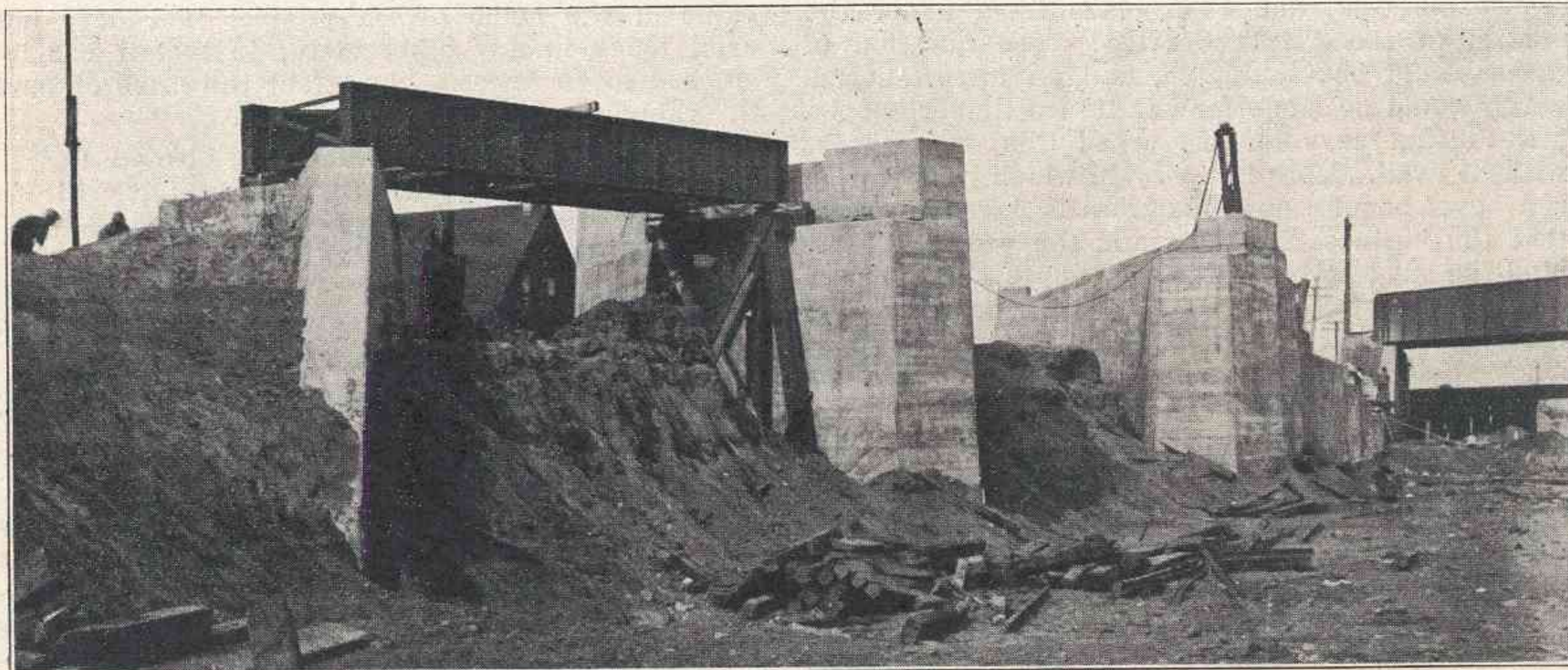


Fig. 5.—Concrete Foundations for Y-Track.

Considerable filling has been necessary, and the entire work has been carried on without any great interference with traffic, the trains during the time the elevation work was in progress, being handled on temporary tracks alongside of the elevation work and proposed permanent line. The excavation necessary for the Susquehanna road to depress their tracks is completed, and the track laying has commenced.

A new concrete signal tower is under construction at the crossing, and will be located at a point east of the Susquehanna road and on the north side of the M. & E. branch of the D., L. & W. R. R.

known Leach sanders, of which this company has been the sole owner for more than ten years. A copy of this catalogue will be sent to anyone on request, mentioning the Railway and Engineering Review.

### Block Signals and Safety Stops.

Chicago, Feb. 9, 1910.

Editor, Railway and Engineering Review:

The Block Signal and Train Control Board has recently made its annual report to the Interstate Commerce Commission. As this board has been acting under a joint congressional resolution, the

stallation by the railways of block signals as follows: "It has long been my notion that such laws are undesirable, inexpedient, and in the long run pernicious." He seems to admit that there may be some fallacy in his logic by conceding in the same paragraph that "on the face of the records alone the experience of the two great branches of the English-speaking people would go a good way to sustain the position of the advocates of government intervention, and perhaps enlightened selfishness does need an occasional jogging from a higher power."

Before proceeding to further analysis of Colonel Prout's article upon this most important subject, let us examine what he seems to conceive are the twin troubles which render the railway signal situation unsatisfactory in our country. He says in the eighth paragraph of his communication: "The rapid extension of protection by signals is mostly a matter of money." He seems to indicate the twin trouble, as he conceives it, in the following statement: "In the one matter of safety for those who travel and for those who work on the railways, nothing else is so important as discipline and a high sense of duty among the men. Mechanical appliances are insignificant compared to the moral element in railway operation. But it is the opinion of many well-informed men, and I have no doubt of the correctness of that opinion, that the standard of discipline and of duty is steadily falling."

That his opinions should find ready acceptance is not surprising, and the evidence is at hand in the following editorial comment upon his views which appeared in "The Signal Engineer" for January, 1910: "In the light of this keen and timely analysis of the relation of block signals to railroad accidents in general, it is not difficult to un-

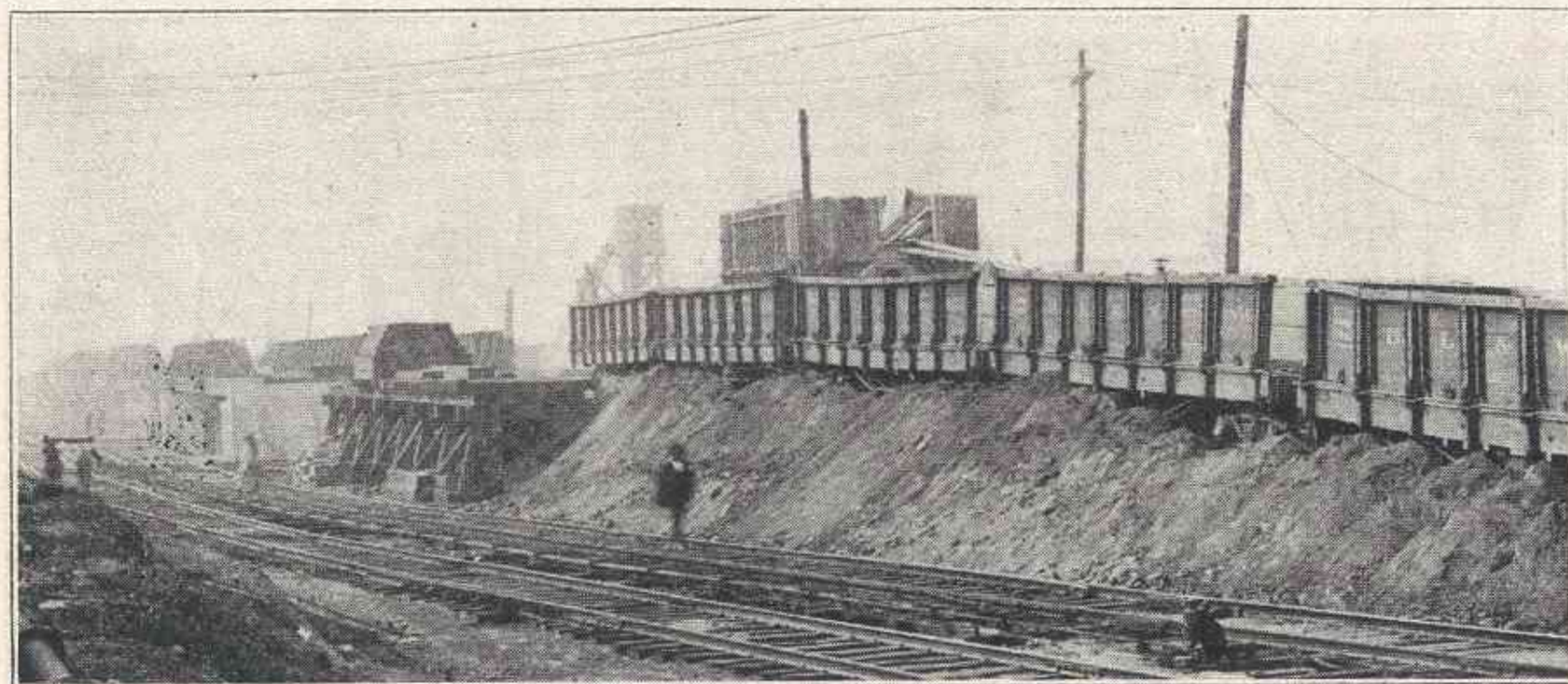


Fig. 6.—Filling Work on M. & E. Branch, Looking West.

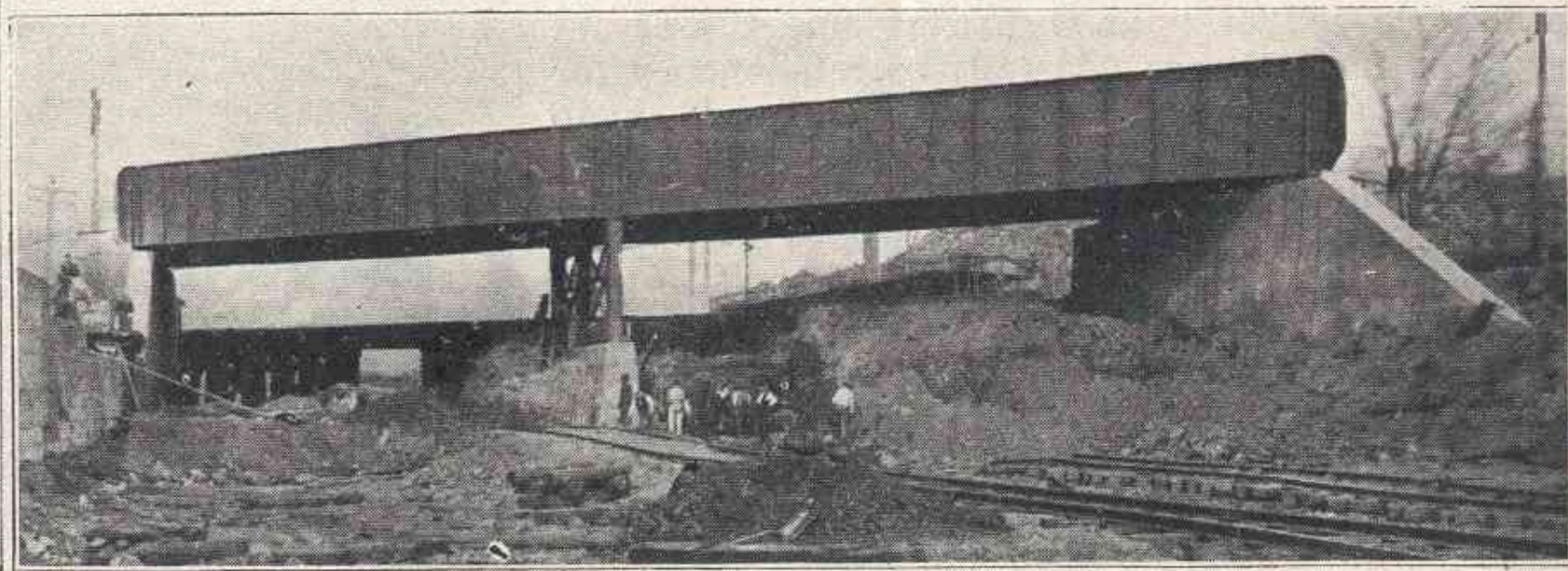


Fig. 7.—Bridge over N. Y. S. & W. R. R., at Boonton Branch of the D., L. & W. R. R.

The elevation work also provides for a "Y" track between the two branches, which is used by the Lackawanna for turning trains, the same being brought from Hoboken on M. & E. branch backed around the "Y" and returned to Hoboken terminal via Boonton branch tracks.

The concrete retaining walls, bridge abutments, etc., are completed and bridge girders on the "Y" track are being raised to their positions. Some rapid work is being done in the line of filling, King-Lawson automatic dump cars being used, which are operated by compressed air from the locomotive. The bridge girders used on the work will be chiefly from the American Bridge Co. and the Fort Pitt Bridge Co.

The excavation work for the Susquehanna road was done by Henry Steers, Inc. The Lackawanna work is being done largely by company forces, and the concrete signal tower is being erected by the Economy Construction Co. The track switches and signals will be of the electro-pneumatic type, and controlled and operated from the signal tower.

The trains are now being run over the new grade, the first train starting about December 3. The entire work is under the direction of Geo. J. Ray, chief engineer, and E. I. Cantine, division engineer. The track work is under the supervision of A. J. Neafie, principal assistant engineer. The signals and interlocking are in charge of M. E. Smith, signal engineer, and the bridge work under A. E. Deal, bridge engineer.

The American Locomotive Sander Co., 13th and Hamilton streets, Philadelphia, Pa., has issued a catalogue showing the various styles of the well-

subjects of its special investigation and possible legislation pertaining thereto, have quite naturally been discussed editorially, and in communications to various technical journals. The most lengthy, perhaps, of these communications, was by Col. Henry G. Prout, in Harper's Weekly. In his article, Colonel Prout devotes some space to a comparison of the accident records upon British and American railways, conceding "the immensely greater number of casualties to persons in this country than in Great Britain" and the further fact that "we find that the British government compels the British railways to protect by block signals every foot of track that carries passenger traffic," while in this country, he says, "only a trifle more than one-quarter of the railway mileage is worked under block signals." After this statement of facts, he expresses his opinion concerning legislation designed to bring about the compulsory in-

derstand that the block system is not a cure for all the risks of travel. Attention is being turned toward the questions of discipline and responsibility, and the improvement of efficiency of the individual 'unit of man.' These are the real issues. With them block signals will furnish safety, but without them the compulsory adoption of the block system will not avail to improve conditions to a degree commensurate with the hardships it will entail upon roads now doing the best they can to furnish protection to their passengers. Legislation to this effect may result in appeasing for the moment the demands of the regulation propagandists, but that, certainly, is not sufficient reason for avoiding the main issue any longer."

Note that the editorial says in one place: "Attention is being turned toward the questions of discipline," and in another place: "These are the real issues." There may be some question con-

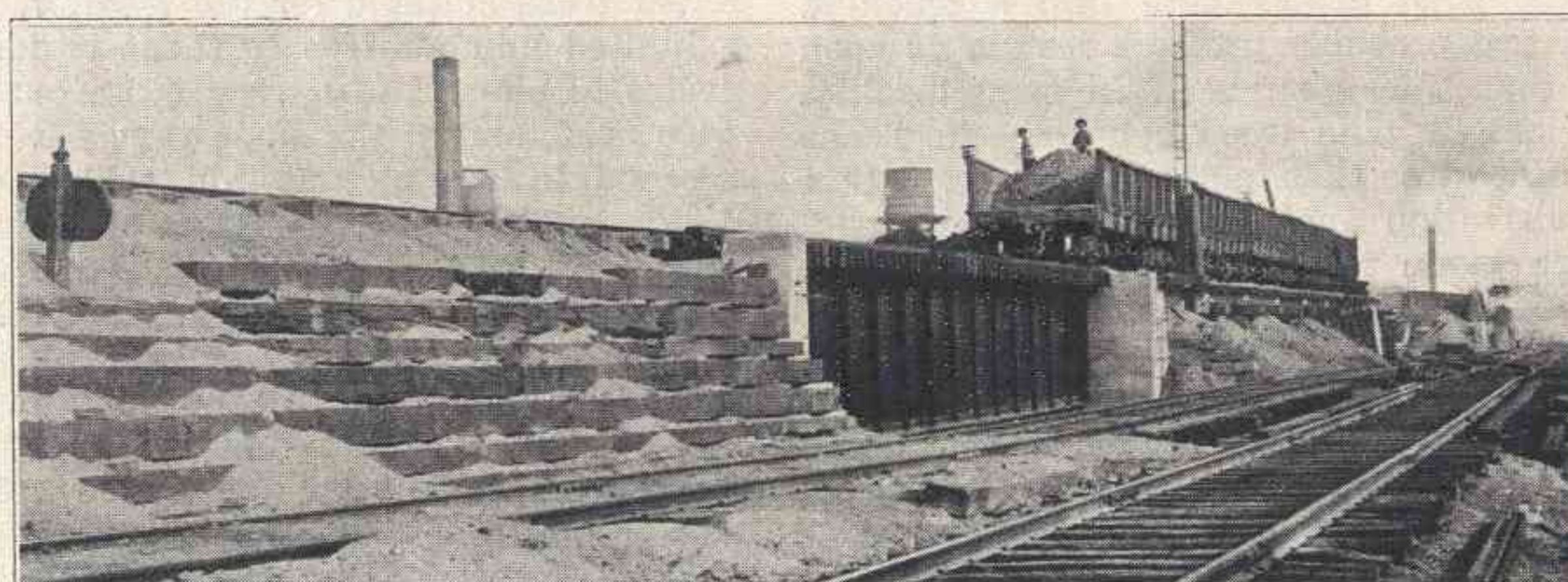


Fig. 8.—Morris & Essex Temporary Track, South Side of Elevated Track.