INTERSTATE COMMERCE COMMISSION

# REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD AT READVILLE, MASS, ON SEPTEMBER 11, 1923

OCTOBER 10, 1923

To the COMMISSION

On September 11, 1923, there was a derailment of a passenger train on the New York, New Haven & Hartford Railroad at Readville, Mass, which resulted in the death of 2 employees, and the injury of 48 passengers and 1 employee The investigation of this accident was made in conjunction with representatives of the Massachusetts Public Utilities Commission

## LOCATION AND METHOD OF OPERATION

This accident occurred on that part of the Boston division extending between Readville Transfer and Boston, Mass, a distance of 10 43 miles, this is a four-track line over which trains are operated by time-table, train orders, and a controlled-manual block-signal system The tracks are numbered from south to north as follows 4, 2, 1, and 3, the point of accident was on a No 8 crossover leading from track 2 to track 4, the switch on track 2 being 105 feet east of tower 181 and 1,952 feet east of the station at Readville Approaching this crossover from the west, the track is tangent for a distance of 3½ miles, this tangent continuing for an additional distance of nearly 1 mile beyond the point of accident The variations in grade are slight, at the point of accident it is about 0 2 per cent descending for eastbound trains The track is laid with 100-pound rails, except through the western end of the crossover, which is part of a double-slip switch and is laid with 107-pound rails, tie-plates are used through the crossover The track has 18 or 19 ties to the rail length, is single spiked, and is ballasted with rock, it is maintained in good condition

The switches and signals in this vicinity are operated from tower 181, which is on the south side of the main tracks and contains a 100-lever Saxby & Farmer machine of the lock-and-block type, there is no approach or route locking The signals are of the two-

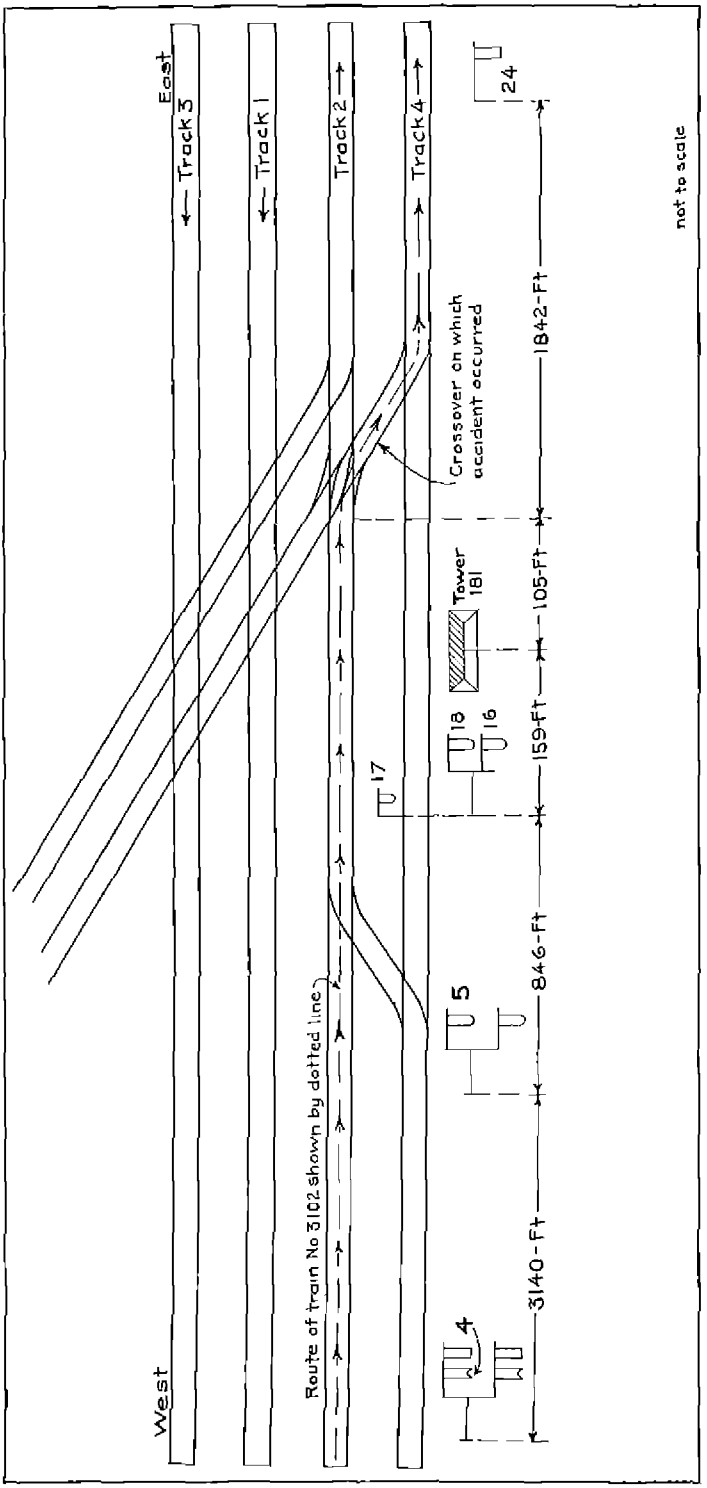


FIG. NO. 1.—Diagram showing relative location of tracks and signals involved

position lower-quadrant type, with the route set up for a crossover movement from track 2 to track 4, which was the condition existing at the time of this accident, an eastbound train on track 2 would

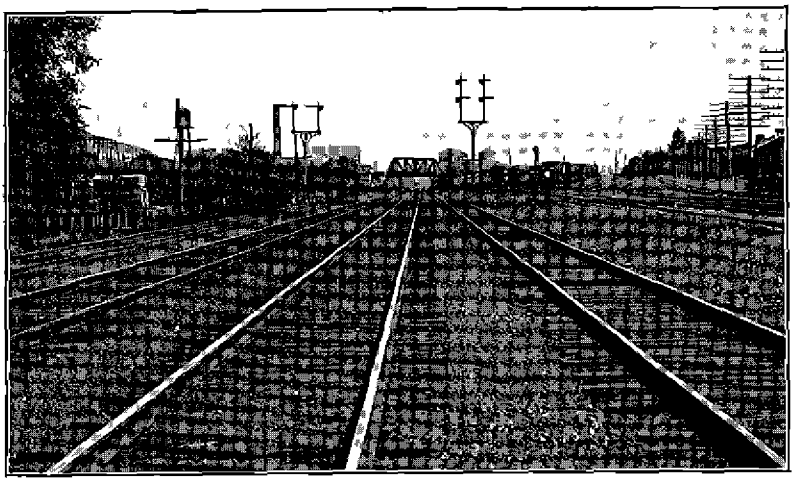

FIG. No. 2.—View approaching semiautomatic distant signal 4

encounter the following signal indications. A caution indication at semiautomatic distant signal 4, which is 4,145 feet west of tower 181, a clear indication at interlocking home signal 5, which is 1,005 feet

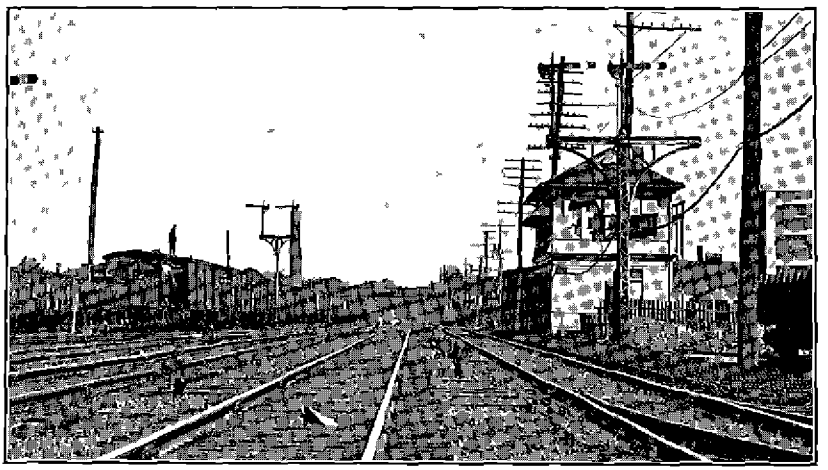

FIG. No. 3.—Close up view of home signal 18. dwarf signal 17 is second signal to the right of track 2

west of the tower and governs only to signal 18, a stop indication at interlocking home signal 18, which is 159 feet west of the tower and governs the straight route on track 2, a caution indication at dwarf signal 17, located between tracks 2 and 4 opposite signal 18, this

caution indication giving a train on track 2 the right to pass signal 18 at slow speed prepared to pass through the crossover to track 4 at a speed not in excess of 15 miles an hour, as per rule 661-A, and a proceed indication at block signal 24, which governs track 4 and is located 1,947 feet east of tower 181 The background for signal 18 is not good, on account of the cross arms of a line of telegraph poles on the south side of the tracks, while the view approaching this signal from the west is obscured by two overhead bridges, the nearest being 1,153 feet from the signal, which is visible from a point approximately 1,500 feet distant Under rule 401, when a distant signal is displaying a caution indication, enginemen are required to "reduce speed at once and proceed with caution" The weather was clear at the time of the accident, which occurred at 10 23 a m

DESCRIPTION

Eastbound passenger train No 3102 consisted of one coach, one combination car, one baggage car, one combination car, and one coach, in the order named, all of wooden construction, hauled by engine 840, and was in charge of Conductor Smith and Engineman Gotham It originated at Fall River, on the Old Colony division, passed to the Providence division at Stoughton Junction, and reached the tracks of the Boston division at Readville Transfer, 0 8 mile from Readville According to the train sheet, train No 3102 passed Readville Transfer at 10 23 a m, one minute late, and was derailed at the crossover at tower 181 while traveling at a speed variously estimated to have been from 30 to 50 miles an hour

The engine and tender turned over on their right sides and came to rest to the right of track 4, about 260 feet beyond the first mark of derailment, which was at the frog of the switch on track 2 The first two cars continued past the engine, coming to rest with the head end of the first car about 385 feet beyond the first mark of derailment, this car remained upright, with its right forward corner torn off, while the second car turned over on its left side, a portion of its right side being torn out The third car stopped opposite the engine, with the fourth car directly behind it, both of these cars remained upright and were not badly damaged The fifth car was not derailed The employees killed were the engineman and fireman

SUMMARY OF EVIDENCE

Conductor Smith said his train left Canton Junction at about 10 16 30, or one and one-half minutes late, and passed Readville Transfer, according to his statement, at 10 22 a m, on time Conductor Smith noticed no reduction in speed approaching the crossover at tower 181, and while from his position in the baggage car

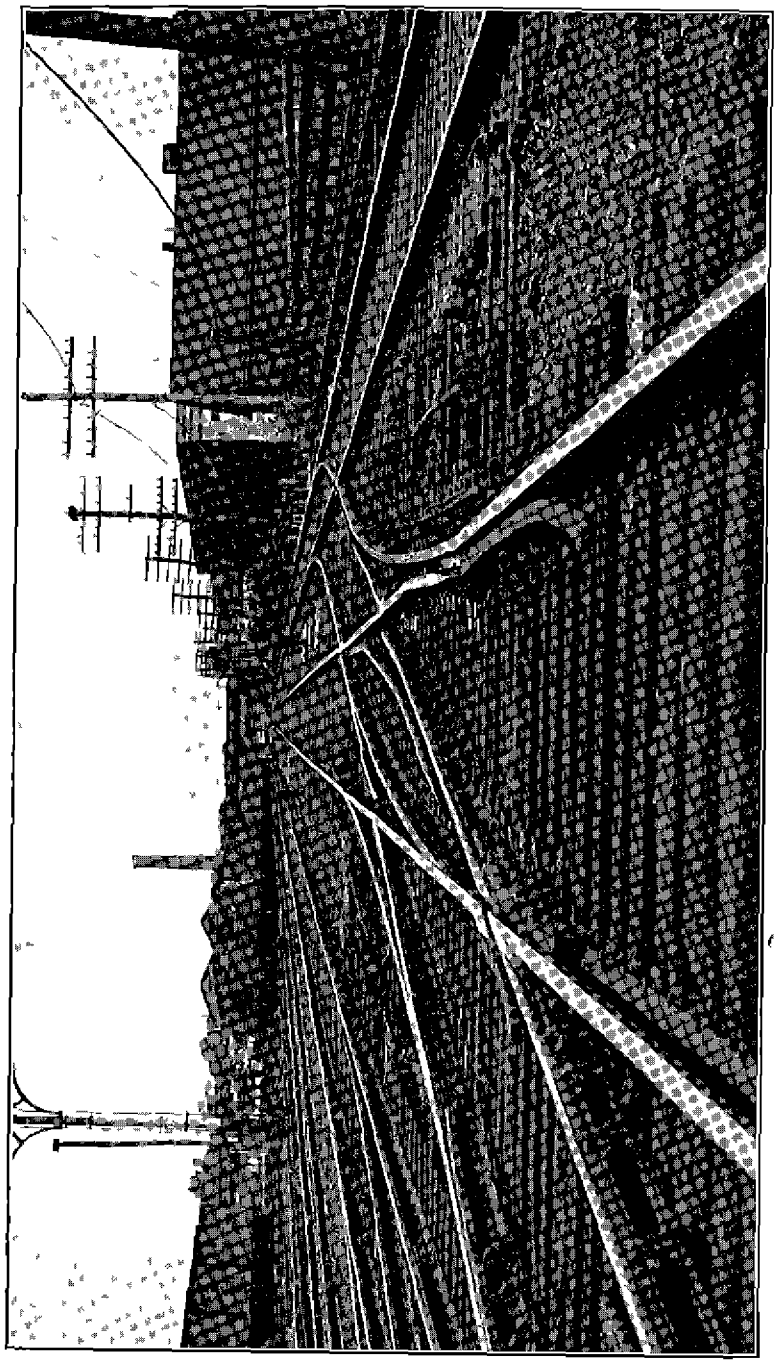

FIG. No. 4.—View showing No. 8 crossover on which derailment occurred.

Fig. No. 5.—Crossover in vicinity of frog, white streak on guard rail indicates first mark of derailment

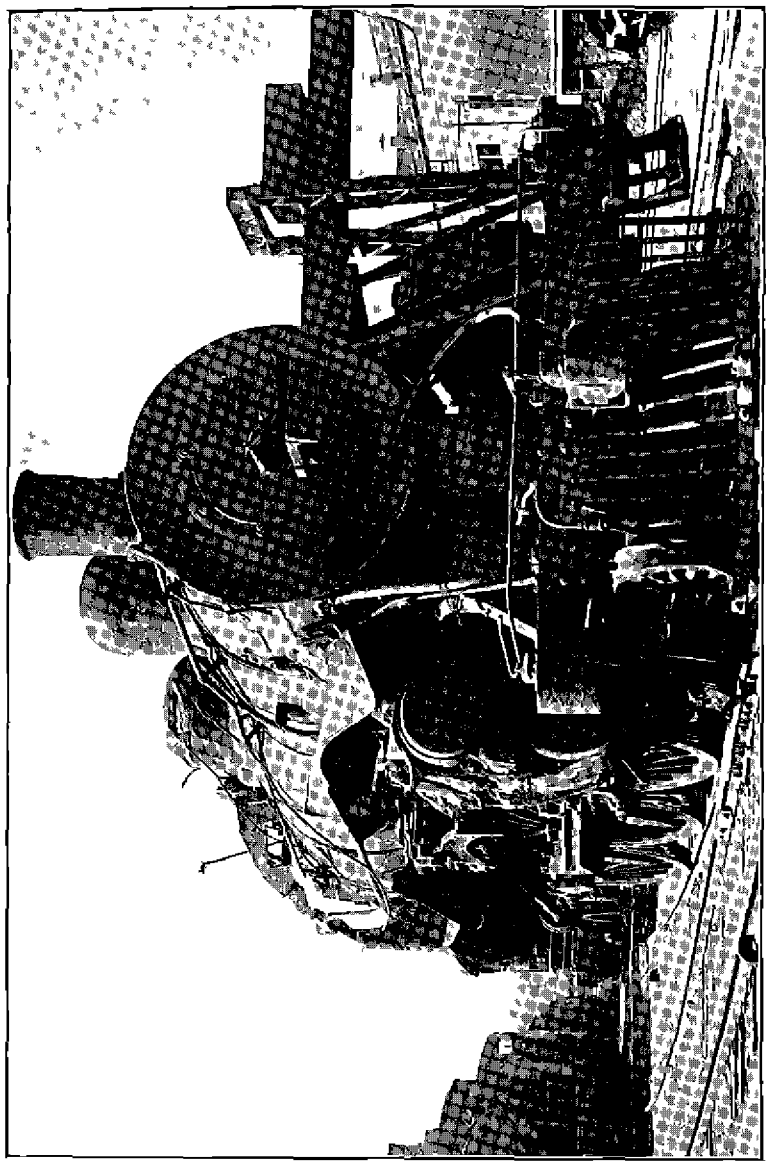

FIG No 6—View of engine 840 after having been rerailed

he was unable to estimate its speed, he thought it was moving at normal speed, and said he felt an application of the air brakes, which he did not judge to be an emergency application, the derailment occurring before he could reach the door of the baggage car to ascertain the reason for the application, he estimated the distance between the point where the application was made and the point of derailment to have been approximately 200 feet After the accident he looked at the crossover and the signals and found them to be set for the crossover movement Ticket Collector Trussell did not notice any reduction in speed until between the dwarf signal and the crossover, when an application of the air brakes was made which seemed to him to be a rather heavy service application, which reduced the speed from about 40 miles an hour to about 30 miles an hour when the derailment occurred Baggagemaster Normand had gone into the first car and was in the head end of that car when he felt what appeared to be an emergency application of the air brakes, made about an engine length before entering the crossover, at which time the speed was from 35 to 45 miles an hour Flagman Riley was in the head end of the fourth car, and he stated his first knowledge of anything wrong was when a service application of the air brakes was made, and he said he thought the engine then must have been near the point of the crossover, he estimated the speed at this time to have been from 30 to 35 miles an hour Immediately after the accident he went back to flag, he noticed that the switch leading from track 2 to track 4 was open, but did not notice the indications of the signals

The statements of all of these employees were to the effect that the air brakes had worked properly in making the various stops en route Conductor Smith had talked with Engineman Gotham and said that the engineman seemed to be in normal physical and mental condition, while the baggagemaster and flagman said they had not talked with the engineman, but had seen him and that he appeared to be in normal condition

Signalman Willard, on duty at tower 181, said an order had been issued to divert trains from track 2 to track 4, this order having been put out on account of track maintenance work being done on track 2, and he said all eastbound trains were diverted from and after 8 08 a m, the last train so diverted being train No. 3092, which passed at 10 08 a m After that train passed, the signals were restored to normal position, but the crossover was left lined for the crossover movement, and when tower 180 asked for an unlock for train No 3102, Signalman Willard cleared the necessary signals to permit the movement of the train through the crossover, these signals being displayed about three minutes prior

to the arrival of train No 3102 As the train approached, Engineman Porter, who was in the tower, remarked about its speed, and Signalman Willard said he held his arm out of the window as a warning to the engineman to reduce speed, this being when the engine was about opposite dwarf signal 17 Signalman Willard estimated the speed of the train to have been at least 45 miles an hour, said the engine was working steam and so far as he knew continued to do so, and also said there was nothing to indicate that an air-brake application had been made Signalman Willard said the fireman was standing in about the middle of the gangway, and that while he had no clear conception of the engineman, he thought he was on his seat box, but was unable to say what he was doing, whether or not his head was out of the window, or whether or not he was looking ahead Signalman Willard further stated that the last westbound train to pass the tower was at 10 19 a m , and that the only engine in the vicinity at the time of the accident was a switch engine some distance east of the tower on the north side of the tracks, so that there was no smoke obscuring the signals

Leverman Lyons, on duty at tower 181, said Engineman Porter called out and first attracted his attention to the approach of train No 3102, the engine then was in the vicinity of dwarf signal 17, working steam, traveling at a speed of about 40 miles an hour, and he watched it until it was derailed He did not notice any application of the air brakes, although the engineman was on his seat box, apparently looking ahead, and he said that so far as he knew the engineman did not make a movement of any kind Leverman Lyons verified the statements of Signalman Willard about the route not having been changed since the passage of train No 3092

Engineman Porter said he was in tower 181 for the purpose of learning the signals and routes governed thereby, that he saw train No 3102 approaching at a speed of 35 or 40 miles an hour, and commented about it to the signalman, as it appeared to him that the speed of the train was too great to enable it to move through the crossover in safety He did not know what signals were displayed, but knew that the crossover was lined for a movement from track 2 to track 4, and he said that both he and the signalman held their arms out of the window in an endeavor to have the engineman reduce speed, and when opposite the tower the engineman, who was on his seat box with his head out of the cab window, looked up, and it then seemed to Engineman Porter as if Engineman Gotham reached for the throttle with one hand and the brake valve with the other, but he was doubtful as to whether or not Engineman Gotham succeeded in shutting off steam

Signal Maintainer Francis was also in tower 181 at the time, but had his back toward the approaching train, and did not notice it until he heard some one talking about its speed, he turned to look, but by that time the train was passing the tower at a speed which he estimated to have been 40 or 50 miles an hour He had not noticed the position of the signals as the train approached, but immediately told the signalman not to touch anything, and proceeded to check up on the position of the signals and the various switches, finding them to be properly lined

Signal Maintainer's Helper Thibault was working just east of the tower when he heard train No 3102 approaching, and on looking around saw it about 300 feet west of the tower, moving at a speed of about 35 miles an hour, while signal 18 was displaying a stop indication He at once got out of the way, and while he said he saw the engineman apparently looking ahead, he did not know whether or not the engine was working steam, neither did he know whether or not the air brakes were applied Immediately after the accident he looked at the crossover, and found it to be properly lined and locked, he did not notice the indication of any signal except signal 18

Section Foreman Gregory was working on track 4 between tower 181 and the crossover, and said he saw train No 3102 approaching at a speed of 50 miles an hour, that the two signals immediately west of the tower, meaning signals 18 and 16, were displaying stop indications, and he at once called to his men to get out of the way He was unable to say whether or not the engine was working steam, but said that the speed was not reduced

Maintenance Foreman Fisher said he examined the signals as soon as he reached the scene of the accident, and found them to be functioning properly, with no irregularities of any kind Assistant Signal Engineer Chapelle also said that when he arrived he found some signal men on the ground at the distant signal, and that they tested the signal, but were unable to discover anything wrong in its operation

Road Foreman Burton found the engineman's brake valve in the emergency position, the throttle lever closed and latched, with the reverse lever a notch or two in front of center He was not able to tell which part of the engine was first derailed Road Foreman Burton said he regarded Engineman Gotham as one of the most careful enginemen with respect to reducing speed where required

Master Mechanic Daley verified the statements of Road Foreman Burton as to the brake valve, throttle lever, and reverse lever, and added that he also examined the angle cocks and found them all to be open, he also found the brakes cut in on all of the cars except one, in which case the damage sustained in the accident prevented the

obtaining of accurate information as to whether or not it had been cut in

Division Engineer Ruff said he reached the scene less than an hour after the occurrence of the accident, and found the track to be in good condition throughout The first mark of derailment was on the right side of the guard rail opposite the frog in track 2, and about 2 feet west of the point of the frog, this wheel then mounted the guard rail, while the opposite wheel struck the point of the frog and mounted it The track at this point was not disturbed in the accident

The tracks of the Dedham branch connect with those of the main line at tower 181, and the switch at the west end of the crossover connecting tracks 2 and 4 is of the double-slip type This crossover has a length from point to point of 153 feet 5 inches, while the curvature of the turnout is 8° 28′ No operating difficulties of importance would be encountered should it be desired to install a No 20 crossover at this point

An examination of the interlocking plant operated from tower 181 disclosed nothing to indicate that the mechanism was not functioning properly at the time this accident occurred

Engine 840 is of the 4–6–0 type, with a driving-wheel base of 13 feet 6 inches, and a tender capacity of 10 tons of coal and 6,000 gallons of water, the weight of the engine and tender, light, is 296,360 pounds This engine came out of the shops of the Schenectady Locomotive Works on April 3, 1923, after having received class 5 repairs The work reports for 15 days prior to the occurrence of the accident indicated that there was considerable work done in the way of running repairs, but examination of the engine failed to reveal anything which could have contributed to the occurrence of this accident

The distance from Canton Junction to Readville is 5 34 miles, and the schedule of train No 3102 allows eight minutes for this distance, or an average speed of 40 05 miles an hour According to Conductor Smith's statement, his train was about one and one-half minutes late leaving Canton Junction, and on time at Readville, if this were the case train No 3102 traveled this distance on the day of the accident at an average speed of more than 49 miles an hour

On the day of the accident an autopsy was performed on the body of Engineman Gotham by Doctor Leary, medical examiner for Suffolk County, Mass, and his report shows that death was due to asphyxiation and burns Doctor Leary's examination also showed that Engineman Gotham was afflicted with an oedema of the brain, which he states is accompanied by a clouding of the sensorium which may vary from slight lapses up to delirium and irrationality, and his report says that the history of the accident indicating that when En-

gineman Gotham saw the waving arms of the men in the tower he responded by applying the air brakes, is consistent with a temporary lapse from which he was brought back by the waving arms Doctor Leary also states in his report that oedema of the brain of as high grade as was present in this case is the result of a slow gradual development, and also expressed the opinion that the thickening of the meninges which was found was the result of a long-standing oedema and furnishes further evidence of the chronicity of the process Doctor Leary also stated that the chronic form is most commonly met with in connection with chronic disease of the kidneys, and in his opinion a physical examination of Engineman Gotham prior to the accident "would have shown a high blood pressure, and in all probability an abundant urine with low specific gravity, and possibly the presence of hyaline casts"

CONCLUSIONS

This accident was caused by the operation of train No 3102 through a short crossover at an excessive rate of speed

The crossover was lined for a movement from track 2 to track 4, and under the rules the speed of trains moving through it should not be in excess of 15 miles an hour The signals were properly displayed, indicating that the route was lined for a crossover movement, and the straight track and clear weather were all in favor of a proper observance and obedience of signal indications by Engineman Gotham, who had an unusually good record The examination made of the body of Engineman Gotham by the medical examiner, however, showed that he had an oedema of the brain, which would result in temporary lapses, from which he might be brought back by some object suddenly waved in front of him The fact that the air brakes apparently were applied at about the time the engineman was opposite the tower, at which time two men in the tower were waving their arms out of the window as a stop signal, indicates that Engineman Gotham might have been suffering from one of these temporary lapses and was not brought back to keen consciousness until it was too late to avert the accident

Engineman Gotham, who would have been 60 years of age in December, was examined for life and accident insurance on September 11, 1908, exactly 15 years prior to the occurrence of the accident, and the doctor who made that examination said that Engineman Gotham's blood pressure, heart action, and kidneys must have been in proper condition at that time or he would not have been approved for the insurance, which approval the records show was granted Careful investigation failed to show that Engineman Gotham had ever passed a physical examination since that time,

although it appeared that he had successfully passed an examination for vision, color sense, and hearing on April 11, 1923 In an interview with members of his family in an endeavor to ascertain when Engineman Gotham was last attended by a physician, it was developed that he was treated for an attack of influenza in 1918 The consensus of opinion of those interviewed with regard to Engineman Gotham's apparent condition was to the effect that he was a man of keen observation and robust health, and it seems clear that the disability which was stated by the medical examiner to have existed developed in the interim of 15 years since his last physical examination, and that its presence would not have been detected except upon an examination by a competent physician

Although this is the first accident in which detailed information has been obtained concerning the physical condition of the engineman involved, it is not the first in which a question has arisen on this point, the most recent prior case having been the accident which occurred on the Atchison, Topeka & Santa Fe Railway near Domingo, N Mex , on July 3, 1923 , in that case the accident occurred under circumstances indicating that the engineman probably was not in full possession of all his faculties, and the county health officer said that death was due to "heart failure and shock," previous to the accident Attention is also called to the fact that many of the most serious accidents investigated by this commission have resulted from the failure of employees of long experience to obey signal indications, these employees usually lose their lives in the accident and no apparent reason for their failure is discovered

After consideration of all the above facts, it is not believed that the situation is met by the arrangement now in force on the New York, New Haven & Hartford Railroad for the examination of its employees in engine service This arrangement, according to General Manager Bardo, is the result of accidents which occurred on this railroad in 1913, and consists of an agreement reached at that time that the company should be furnished with a record of the result of the physical examination of all enginemen and firemen made in connection with their application for insurance in their respective brotherhood organizations, this agreement also provides for reexamination whenever in the opinion of the superintendent such reexamination might be necessary Mr Bardo also stated that all employees promoted to the position of engineman and all new employees hired since that time have passed a physical examination

In the interests of safety it is believed that not only should the railroads have their enginemen examined by competent physicians but that they should be reexamined at stated intervals In this particular case it seems probable that had Engineman Gotham been

recently examined the nature of the trouble which may have been responsible for his failure to observe and be governed by the signal indications and rules might have been discovered

The operating conditions surrounding this accident are substantially the same as those which existed in the accidents which occurred on this railroad at Westport and Bridgeport, Conn., several years ago, in each of these three cases a train was being diverted from one track to another through short crossovers, and in each case the signals indicated the route which was to be taken, but the signal indications were not observed and a disastrous accident resulted, and in the accident here under investigation, if the first car, a wooden coach, gas lighted, containing many passengers, had come in contact with the engine instead of sliding by on one side, the number of fatalities undoubtedly would have been as great as in the Bridgeport or Westport accidents In view of the circumstances it is believed that the recommendations contained in the report covering the Westport accident, particularly those dealing with short crossovers between high-speed tracks and automatic train control, apply with full force to the accident here under investigation That part of the Westport report dealing with short crossovers which applies particularly to the present case reads as follows

Proper measures for the safety of the traveling public have not been provided where crossovers are installed which may be used with safety only at low speed and which are protected simply by signals and rules requiring reduced speed This fact is emphasized by disasters which have occurred as a result of the disregard of such signals and rules Longer crossovers than those used by the New York, New Haven & Hartford Railroad should be installed at all points where high speed passenger trains are to be diverted from one track to another track on which the current of traffic is in the same direction, then if signals or rules were disobeyed, or if an engineman was incapacitated, the possibility of disaster would be greatly reduced, if not entirely eliminated Until these long crossovers are installed, to provide adequate precautions for the safe movement of trains at any crossover shorter than a No 20, the switches should be left for a straight route, stop signals should be displayed, and the crossover switches should not be set for the diverging movement until after the train which is to make the movement has come to a stop

In the Westport report there is a statement that Mr Mellen, then president of the railroad, had notified the commission of the issuance of instructions requiring No 20 crossovers wherever possible between high-speed tracks, and an endeavor was made to ascertain whether the crossover at Readville had always been as short a turnout as a No 8, but this information was not obtained, it was developed, however, that the crossover was renewed on December 11, 1921, and that no change in the number of the turnout was made at that time The necessity for automatic train control was also pointed out in

the Westport report, and in many other reports the commission has called attention to the need for the use of such a device in order to prevent the occurrence of accidents due to the failure of enginemen to obey fixed signal indications The following recommendation contained in the Bridgeport report was quoted in the Westport report, and applies to the present case

That in the absence of such automatic control apparatus, on tracks where high speed trains are run, switches should not be set to divert a high speed train from one track to another at a crossover which is not safe for high speed, until after the train has been brought to a stop

Engineman Gotham had had 40 years' experience, while all of the other employees involved in this accident were experienced men, at the time of the accident the crew of train No 3102 had been on duty from 4½ to 6 hours, after from 11 to 17 hours off duty

Respectfully submitted

W P Borland,
*Director, Bureau of Safety*

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