In re investigation of accident which occurred on the Pere Marquette Railway near Melvin, Mich., on June 20, 1917.

July 24, 1917.

On June 20, 1917, there was a derailment of a passenger train on the Pere Marquette Railway near Melvin, Mich., resulting in the death of two employees and the injury of one employee. After investigation of this accident the Chief of the Division of Safety reports as follows:

The subdivision of the Pere Marquette Railway upon which this derailment occurred extends between Saginaw and Port Huron, Mich., a distance of 90 miles. It is a single track line, upon which trains are operated by the train order system, supplemented by manual block rules for spacing trains running in the same direction a full station apart. Orders are transmitted by telephone.

The train involved in this accident was westbound train No. 23, en route from Port Huron to Saginaw. It consisted of engine No. 388, one wooden freight car with passenger car trucks, one wooden combination express and baggage car, one wooden smoking car, and one steel underframe coach, and was in charge of Conductor Ellsworth and Engineman Kull. This train left Port Huron on time, at 8:20 a. m.; it left Melvin at 9:39 a. m., two minutes behind time, and was derailed about one mile west of Melvin at about 9:43 a. m., while running at a speed estimated at 25 to 35 miles per hour.

The derailment occurred on a fill about 4 feet in height. The engine came to rest on its left side, on the south side of the track, with its rear end about 10 feet from the roadbed. The tender frame, still attached to the engine and torn from its trucks, lay between the fence and the track at the rear of the engine; the cistern was torn loose from the frame and turned bottom upward between the engine cab and the fence. The box car was turned diagonally across the track, with its front end near the fence on the south side of the track; its rear end remained coupled to the combination car, which came to rest with its front end just off the roadbed and its rear end partly off the roadbed to the south side of the track. The smoking car was derailed and came to rest in an upright position near the center of the roadbed. The coach, entirely derailed, remained upright on the roadbed.

The first mark of derailment was found on the ball of the south rail, 420 feet east of where the front end of the engine came to rest. This mark continued on top of the south rail for a distance of 1-1/2 rail lengths. At this point was located the first mark on the ties, outside the south rail. From the first mark on the tie on the outside of the south rail

to a point about 25 feet farther west, the marks continued on the ties and then dropped off on the south side. About 35 feet west of where the north wheels dropped on the ties, those wheels struck the inside of the south rail and started turning the south rail over and shoving it out of place. At this point the first derailed truck was apparently shifted and the wheels which had turned the rail over were turned back toward the center of the track. The following portion of the train, however, became derailed at this point and the following derailed trucks continued to displace the south rail and turn it over until it was shoved off the end of the ties, allowing the forward portion of the train to leave the roadbed and plunge down the embankment. The fourth rail west of the point of derailment, on the south side of the track, was turned slightly outward and showed flange marks on the web at its west end. The fifth to thirteenth rails inclusive were turned and shoved outward, and showed flange marks on the web. The fourteenth rail was thrown off the ends of the ties and was broken about 18 inches from the east end, and was partly broken and twisted at a point about 18 inches west of the first break. It was opposite this broken rail where the engine lay on its side. On the north side of the track the rails were all in place up to the twelfth rail west of the point of derailment. The twelfth and thirteenth rails were loosened and pushed to the north, and the fourteenth rail, opposite where the engine lay, was pushed to the north and badly bent at its west end.

At the time of the accident the weather was clear.

The derailment occurred near the center of a tangent over two miles in length, and at about the foot of a slightly descending grade to the west about 4,800 feet long. The track is laid with 30-foot steel rails, weighing 67 pounds per yard, made by the Illinois Steel Co. in 1889. There are from 16 to 18 oak, elm and cedar ties under each rail, and the track is ballasted with about eight inches of coarse gravel. Tie plates are used only to a small extent, and mainly on cedar ties. Rail braces are used on curves.

Conductor Ellsworth stated that his train left Melvin at 9:39, and that when he looked at his watch immediately after the accident it was 9:43. He did not believe his train was running to exceed 25 or 35 miles per hour, but was not paying particular attention to the rate of speed. He was in the rear end of the smoking car at the time of the derailment, and at once went up to the head end to see what was the cause of the accident. He said he saw Engineman Kull sitting by the fence and asked him if there was anything he could do for him; the engineman replied: "No, see after the fireman." Conductor Ellsworth stated that there were a number of persons

there looking after the fireman, and he went back to the depot to report the accident and see if he could get a doctor. He had no further talk with Engineman Kull, and had formed no opinion as to the cause of the derailment.

Brakeman Russell stated that he was in the rear end of the last car when the accident occurred; he thought the train was running 20 or 25 miles per hour at that time. He said he first thought the emergency brake had been applied. He said he noted the marks on the ties and from them he formed the opinion that the forward engine trucks were the first to leave the rails. He said he noticed nothing out of the ordinary about the track, and it was apparently in good condition.

Wreckmaster Downs stated that he arrived at the scene of the accident about 1:15 p. m. He made an examination of the equipment and found nothing wrong with it, and in his opinion there was no defect in the equipment of engine or cars that could have caused the accident. He said he walked back along the track and noted the wheel mark on the top of the south rail, but he formed no opinion as to what caused the accident.

General Car Foreman McKenzie stated that he personally inspected the equipment of the derailed train at the scene of the accident and found no defect in it that could have caused the derailment. In his opinion it was some portion of either the engine or tender that first left the rails.

Trainmaster Wilson stated that he arrived at the place of derailment about 12:30 p. m. He found the engine on its side in the ditch with the lead wheels on the ties and trucks astride the rails. He said that he made a personal inspection of the track and saw no indication of anything wrong. He stated that he had heard rumors that Engineman Kull had stated that the engine trucks left the rails, but could not believe that to be the case, in view of the position in which the trucks were found after the derailment. He examined all wheels on the engine and tender and found nothing wrong with them. He said that there were marks which showed plainly where wheels on both sides of the track had hit the same time, but he could not determine which wheels they were.

Section Foreman Campbell stated that he had been employed as section hand and foreman by the Pere Marquette Railway two and one-half years, ten months of the time as foreman; he had had about nine months' previous experience as a section hand on another railroad. He took charge of the section on which this accident occurred on March 16, 1917, at which time he had three men in his gang. His force was increased by one man on April 15th, since which date it has been increased from time to time until it reached a total of seven

men, which constituted his force at the time of the accident. He stated that his section is 7-1/2 miles long. On the date of the accident he patrolled the track and his men started to work in the yard at Melvin, weeding the track. On his return from patrolling the track he joined his men about thirty minutes before the arrival of train No. 73, at which time his gang was working about 80 rods west of the station. After the train had passed he stepped into the center of the track, and heard a noise and saw that something had happened to the train. He at once had the hand-car placed on the track and proceeded with his men to the scene of the accident to render any assistance necessary. He said that he made an examination of the track and equipment, and formed the opinion that the front trucks of the engine mounted the south rail at the point of derailment; as an additional reason for this opinion he stated that one of his men had told him that he talked with Engineman Kull after the accident and Kull had told him of having trouble with the truck at Yale, a station five miles east of Melvin. He stated that since he had had charge of this section of track its condition as to grade, level and alignment had been good. The last work he had done on the track at the point of accident was about a month previous, at which time he lifted and jointed the track over the entire section.

Sectionman Tower stated that he saw Engineman Kull about three minutes after the accident and heard him say that the front engine trucks had bothered him since leaving Yale, and that the front end of the engine was the first to leave the rails. He had no idea what Engineman Kull meant by his remark about the trucks bothering him, neither did he hear any other person say anything about the trucks, nor did he examine them himself.

Superintendent Anderson stated that he was advised of the accident about 9:30 a. m., and immediately ordered out the wrecking crew and personally accompanied the special train to the scene. Upon his arrival there he made an examination of the track and found flange marks on the rail where a wheel had run 7-3/4 feet on the rail and then dropped off onto the ties, and from there the marks led toward the fence. He said that in his opinion the leading truck of the tender was first derailed, and this in turn derailed the engine. He stated that Engineman Kull stated before he became unconscious, that the leading engine trucks left the rail, but in his opinion this could not be true, as the leading engine trucks were found astride the rail and right side up on the ties, whereas if they had left the rail first they would have continued toward the

fence and could not have been in the position found. He further stated that he examined the track and while it was not in perfect condition it compared favorably with track east of there. He examined all wheels of engine and cars and found them in perfect condition.

Sectionman Marshall stated that he arrived at the scene of the accident about three minutes after it happened, and found Engineman Kull sitting down by a post and heard him say that the trucks bothered him all the way from Yale; he heard the engineman say that the trucks were not working right, but he did not say in what way they were working wrongly. He said that Engineman Kull said the front end of the engine reared up and left the track first, and kept asking where his fireman was. Sectionman Marshall stated that he saw the trucks, but did not examine them closely, and that did not hear anyone else speak about them not working right.

Following the accident a careful inspection was made of both track and equipment. Engine No. 388 was turned out of the shop after receiving general repairs, on May 19, 1917, and had been in service one month. Nothing was found about the engine, tender, or cars, that could have caused the derailment. The total weight of engine and tender was 255,000 pounds. The track rails had been in service 28 years, and were somewhat light in weight (67 pounds per yard) to support such heavy equipment. Furthermore, the track was not in first-class condition with respect to surface and alignment. Many of the cedar ties were badly rail cut, and immediately east of the point of derailment there was some irregularity in surface.

Notwithstanding the statement of Engineman Kull immediately after the accident, the condition of equipment and track after the derailment indicates that the forward tender truck wheels were the first to leave the rails. The tender was practically fully loaded; the cistern had been filled with water at Yale, 6 miles east of the point of derailment, and the coal space was nearly full, as the train had proceeded but 30 miles from its starting point. It is believed that the tender derailed first, and as it ran off to the south side of the track it caused the engine to leave the track.

What caused the tender truck wheels to leave the track cannot definitely be stated, but in view of the fact that nothing was found about the equipment that might have caused the derailment, it is believed that irregular track conditions in the immediate vicinity of the place where the wheels left the track was the cause of the accident.

The members of this train crew had been on duty about two hours at the time of the derailment.