INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD NEAR GALLITZIN,PA., ON DECEMBER 9, 1931.

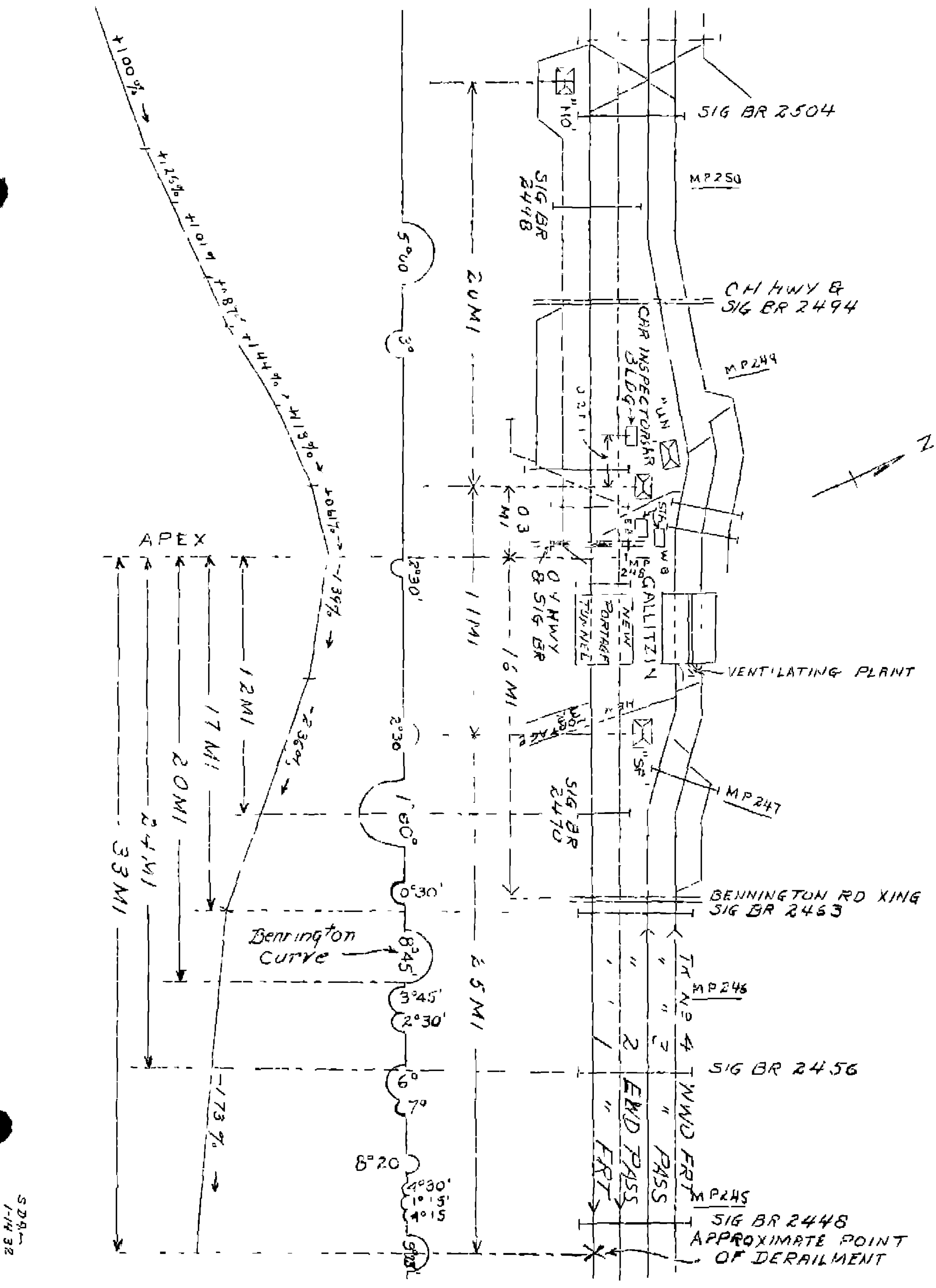
January 18, 1932.

To the Commission:

On December 9, 1931, there was a derailment of a freight train on the Pennsylvania Railroad near Gallitzin, Pa., which resulted in the death of one employee and the injury of three employees. The investigation of this accident was made in conjunction with a representative of the Public Service Commission of Pennsylvania.

Location and method of operation

This accident occurred on that part of the Pittsburgh Division extending between Pittsburgh and Altoona, Pa., a distance of 113.8 miles. In the vicinity of the point of accident this is a four-track line over which trains are operated by time-table, train orders, and an automatic block-signal system, supplemented by a cab-signal system. The tracks are numbered from north to south, 4, 3, 2 and 1, and the accident occurred on track 1, the eastbound freight track, at a point 5.5 miles east of the summit of the grade at Gallitzin and 3.5 miles east of SF Block Station. Approaching the point of accident from the west, beginning about at the summit, there is a tangent 2,694 feet in length extending through the tunnel and ending about opposite SF Block Station, this is followed by 318 feet of 3° 30' curve to the right, 321 feet of tangent, 1,935 feet of 1°30' curve to the left, 730 feet of tangent, 700 feet of 0°30' curve to the left, 300 feet of tangent, 903 feet of 8°45' curve to the right known as Benscreek curve, 372 feet of tangent, 704 feet of compound curve to the left partly 3°45' and partly 8°30', 1,054 feet of tangent, 1,476 feet of compound curve to the left partly 8°35' and partly 7°, 260 feet of tangent then 537 feet of 8°30' curve to the right, 422 feet of tangent, and 730 feet of compound curve to the left on which the curvature is 4°30', 1°15', and then 4°15', this is followed by 300 feet of tangent and then 923 feet of 8°15' curve to the right on which the accident occurred at a point about 835 feet east of its receiving end. The grade from the summit and through the tunnel is 1.39 per cent descending for eastbound trains, then 2.36



SIG BR 2504
MP 250
SIG BR 2498
CH HWY &
SIG BR 2494
MP 249
CAR INSPECTOR'S BLDG.
GALLITZIN
NEW PORTAGE TUNNEL
OY HWY & SIG BR
VENTILATING PLANT
MP 247
SIG BR 2470
BENNINGTON RD XING
SIG BR 2463
MP 246
SIG BR 2456
MP 245
SIG BR 2448
APPROXIMATE POINT OF DERAILMENT
TR No 4 WWD FRT
" " 3 " PASS
" " 2 EWD PASS
" " 1 " FRT
APEX
Bennington Curve
20 MI
11 MI
65 MI
12 MI
17 MI
20 MI
24 MI
33 MI
10 MI
03 MI
5°00
3°
2°30'
2°30
1°60°
0°30'
8°45'
3°45'
2°30'
6°
7°
8°20
4°30'
1°15'
4°15
-1.39%
-2.36%
-1.73%

per cent for approximately 1 mile, and is 1.73 per cent to and beyond the point of accident. New Portage tunnel is 1,631 feet in length, the western portal being 0.3 mile east of the summit of the grade. The station at Gallitzin is located just west of the summit of the grade.

The track is laid with 130-pound rails 39 feet in length, with 22 or 23 ties to the rail-length, fully tie-plated with heavy-duty tie plates and anchor-spiked; it also has six rail anchors to the rail-length. The track is rock ballasted and well maintained.

The weather was cloudy and somewhat misty at the time of the accident, which occurred about 7.09 p.m.

Description

Eastbound freight train extra 4273 consisted of 88 cars loaded with coal, and a caboose, 7200 tons, hauled by engine 4272, and was in charge of Conductor Meacox and Engineman Leasure. Extra 4272 picked up 47 cars at St. Michael, a station on the South Fork branch 2.7 miles from South Fork, which in turn is 16.3 miles from the station at Gallitzin. The balance of the train consisting of 41 cars, was picked up at South Fork and the train left that point with helper engines 3537 and 4463 coupled to the rear of the train behind the caboose. This train left the yards at South Fork about 5.44 p.m., and passed AR Block Station, near the summit of the western slope of the mountain and 1.1 miles west of SF Block Station, at 7.01 p.m. The two pusher engines were cut off just east of AR Block Station, and the train proceeded without stopping, passing SF Block Station on the eastern slope at 7.06 p.m. and being derailed shortly afterwards while traveling at a speed estimated to have been from 50 to 70 miles per hour.

Engine 4272 stopped on its left side parallel with the track and fouling tracks 1, 2 and 3, with its tender directly behind it, also on its left side, the head end of the engine was about 280 feet east of the approximate point of derailment. The first 75 cars and the forward truck of the seventy-sixth car were derailed. The first 14 cars stopped east of the approximate point of derailment, the following 61 cars being piled up back of that point as their momentum forced them against the derailed cars ahead, these 61 cars were bunched within a distance of about 480 feet. All four tracks were blocked and tracks 1, 2 and 3 were also torn up for distances of 500 feet or more. The employee killed was a brakeman, who was found under the forty-second car in the train.

Summary of evidence

Engineman Leasure said he picked up 47 cars in the yard at St Michael, tested the brakes and proceeded to South Fork, where 41 cars were coupled to the rear of the train. When the entire train had been coupled with two pusher engines at the rear, he increased the brake-pipe pressure to 90 pounds and then applied the brakes, making a leakage test from a pressure of 75 pounds which showed the leakage to be 5 pounds per minute. He was then given a signal to release the brakes and received a proceed signal, and at the same time one of the car inspectors gave him a card showing that all the brakes in the train were working. The run up the west slope of the mountain to AR Block Station usually took 1 hour 15 minutes and on this occasion he consumed 1 hour 16 minutes, there being nothing unusual in the operation of the train in any way. After passing Lilly, a station 5.7 miles west of Gallitzin, he increased the brake-pipe pressure to 98 pounds, a time-table rule requiring 100 pounds, before descending the grade between Gallitzin and BO Block Station, and after passing MO Block Station, 3 5 miles farther east from Lilly and 3.3 miles from the summit of the grade, he began watching for signals from the pusher engines and the train crew which would indicate that the brake system throughout the train was in order and the brake-pipe pressure up to the required minimum amount of 85 pounds on the rear end of the train. He was unable to hear the whistle signals given by the pusher engines but finally received a proceed signal from the train crew when his engine was about one-half mile west of AR Block Station. As the head end of his train passed over the summit east of AR Block Station, moving at a speed which he said was about 7 miles per hour, he eased off on the throttle, using the independent brake to bunch the slack and then made a 6 or 7-pound brake-pipe reduction in order to apply the brakes lightly on the head end of the train. The engine at this time had started through the tunnel and the gauges had not indicated that there was anything wrong with the air-brake system. Engineman Leasure said that after making this 6 or 7-pound reduction he returned the brake-valve to running position before the exhaust had ceased and after travelling a distance of about 10 car-lengths, by which time the speed was 10 or 12 miles per hour, he made a service reduction; he obtained little or no exhaust, indicating that the brakes on only four or five cars were working, and at once moved the brake-valve to emergency position but without result, he did not reverse the engine. Engineman Leasure then told the fireman that he did not have any brakes and sounded the whistle signal calling for brakes, although he said he did not think anyone could have heard it as the engine was still in the tunnel. On coming out of the eastern end of the

tunnel, however, he began whistling for brakes, the train was increasing in speed and passed SF Block Station at a speed of 25 miles per hour the fireman jumped off at the first signal bridge east of SF Block Station, while Engineman Leasure also jumped off about half a mile farther down the hill. Engineman Leasure said that after jumping off he watched the train and saw fire flying from the engine wheels and from the wheels on the first three or four cars in the train, he also saw fire flying from the wheels of two or three cars back in the train but did not see any sign of any of the train crew on the cars Engineman Leasure further stated that he had been handling trains over this mountain since 1901, that he had had the same engine westbound out of Altoona on the day of the accident, and that it was in perfect condition so far as he knew. The distance between the point where he received the signal from the train crew indicating that the brake system was in proper condition to the point where he began to apply the brakes was about ½ mile, he estimated that his train consumed six or seven minutes in traveling this distance and thought that within that period someone must have closed an angle cock in the train line.

Fireman E.E. Wright, of engine 4273, practically corroborated the statements of Engineman Leasure as to the taking up and testing of the brakes at St Michael and South Fork. After passing PO Block Station on the west slope of the mountain, at which point the gauge on the engine indicated a brake-pipe pressure of 100 pounds and a main-reservoir pressure of 130 pounds, the usual signals from the rear end could not be picked up owing to the weather conditions, but finally a proceed signal was received from one of the brakemen, which indicated that the brake-pipe pressure at the rear of the train was up to the minimum required amount of 35 pounds; the fireman also said that the pressures shown on the gauges when passing AR Block Station were the same as when passing PO Block Station. The engine entered the tunnel at a speed of 6 or 8 miles per hour and about at that time the engineman applied the brakes. There was no noticeable exhaust and when the engineman looked across at the fireman in a surprised manner, Fireman Wright said he asked the engineman what the matter was and was told that they did not have any pressure The fireman suggested that the engineman make a 20-pound reduction immediately, which was done, and when no exhaust resulted from this reduction the engineman then placed the brake-valve in emergency position and opened the sanders, while the fireman also thought the enginemen reversed the engine. The train came out of the tunnel and passed SF Block Station at a speed of 30 or 35 miles per hour, with the engineman whistling for brakes, and shortly afterwards Fireman Wright jumped off. He watched the train as it passed him but did not see any fire

flying from the wheels back of the engine and first three cars Fireman Wright further stated that he had not seen anyone around the train when in the vicinity of Gallitzin and that when he proceeded to the scene of the accident he found the angle cock closed on the rear end of the caboose but did not notice the hose between the caboose and the rear car in the train. Fireman Wright met the conductor up at the head end of the train near the derailed engine and the conductor told him that he had crawled back over the cars until he had reached the caboose and then had broken the hose between the caboose and the rear car.

Conductor Heacox said there were no car inspectors on duty at St Michael at the time he picked up the 47 cars at that point, but that 35 of the cars had been worked by the inspectors before they went off duty, and that his crew made a road test of the air brakes before leaving that point He then took these cars to South Fork, the air brakes working properly en route, and on arrival at that point these 47 cars were gone over by car inspectors and 11 cars added to the train, after which Engineman Leasure made a leakage test and a terminal test, while a card was received from the car inspectors showing that the air brakes were 100 per cent operative, with 5 pounds brake-pipe leakage. After this had been done the pressure was pumped up and a road test made which consisted simply of an application by the road engineman, answered by two blasts on the whistle by the pusher engines as soon as they noticed that the brakes were applying. Conductor Heacox said that after the tests had been completed he stood at the front end of his train looking it over as it pulled by him, but noticed nothing wrong with the brakes, and on boarding the caboose he saw that the gauge showed a pressure of 87 pounds. He finished his wheel report when in the vicinity of Lilly and shortly afterwards Brakeman Allison went out on the train to turn up retainers. The usual practice when approaching the summit of the grade, provided the air is pumped upon the rear end to 85 pounds or more, is for the leading pusher engine to whistle off brakes and for the trainmen to pass proceed signals to the engineman. In this particular case the pusher engine sounded the usual whistle signal and the proceed signals were transmitted to the road engineman by Brakemen Allison and Jones who were out on the train about 30 car-lengths from the head end and 40 car-lengths from the rear end, respectively. Conductor Heacox did not notice the pressure again until 50 car-lengths east of where the pusher engines whistled off brakes and at that time the gauge in the caboose showed from 96 to 97 pounds brake-pipe pressure. About 1 mile east of MO Block Station Conductor Heacox went out on the train, and went forward a distance of about

eight cars, where he remained to observe how the train was being handled and also to observe the proceed signals given by the car inspectors stationed at the summit of the grade. The pusher engines were cut off by the flagman and when about two-thirds of the train had passed over the summit, Conductor Heacox suspected from a jerk of the cars that something was wrong, and as he went into the tunnel he looked at a piston and saw that it was not out, while judging from the speed he realized that the train was not being properly controlled. On coming out on the eastern end of the tunnel, Conductor Heacox gave a signal for the flagman to apply the brakes, and then started back toward the caboose. The speed of the train by this time was from 40 to 50 miles per hour, after reaching the caboose, by which time the rear end of his train was in the vicinity of Bennington curve, which ends 1.3 miles from the point of derailment, Conductor Heacox said he opened the conductor's valve on the head end and obtained a blow of air, although not a very strong one, and felt the brakes apply on the caboose. Conductor Heacox said he then asked the flagman if he had opened the conductor's valve on the rear of the caboose and was told that he had. The accident occurred shortly after he had returned to the caboose, he did not at any time look to see if the conductor's valve on the rear end was open. He estimated the speed at the time of the accident to have been 60 or 70 miles an hour. Conductor Heacox further stated that on a tonnage train all retainers would be turned up except on the last 10 cars and that when a train began going too fast down the grade the only thing to do was to open an angle cock on the rear end. It was apparent from his statements that he did not think the conductor's valve on the rear end of the caboose had been opened, as stated by the flagman, in view of the fact that he himself obtained a blow of air when he opened the valve on the head end and also felt the brakes applying on the caboose.

Brakeman Jones said he was the one who made the coupling when the 41 cars were picked up at South Fork and that he also opened the angle cock at that time. The brakes then were tested, the flagman recalled, and the train proceeded up the mountain. He remained in the brakeman's cabin on the tender of engine 4273 until just west of the station at Cresson and then started back over the train turning up retainers. Brakeman Jones said he turned up 67 retainers and then met Fireman Allison, who had been working from the rear end. He heard the pusher engines whistle off, indicating that the brake-pipe at the rear end of the train was charged to the required pressure, and began giving proceed signals to his own engineman, not getting any answer he started ahead and had reached the fiftieth car from the

head end when he heard the whistle signal indicating that the engineman of the road engine had received the proceed signals. Brakeman Jones said that he then suggested that Brakeman Allison, being an older man, should work farther ahead to end the front end of the train, leaving to Brakeman Jones a greater portion of the train on which to turn down the retainers after coming down the mountain. In accordance with this plan Brakeman Jones then got off, boarded the eleventh car from the rear end, and went ahead over the train until he reached the eighteenth or twentieth car from the rear where he was riding when the train started over the summit. He first realized that something was wrong when about half way through the tunnel and got down to look at the pistons to ascertain if the engineman had applied the brakes. About the time he came out of the tunnel he began giving signals to the flagman to apply the brakes from the rear of the train, at the same time watching the brake-cylinder pistons and noting that the brakes still were not applied. He received no response to his signals, applied a hand brake on one car, looked again at the pistons, and then tried the release valves on the auxiliary reservoirs of two cars, finding both cars cut in and apparently fully charged. Brakeman Jones said he then tried to cut the air hose with his foot, but was unable to do so, apparently because of the fact that the train line was fully charged. It was at this point, after passing SF Block Station, that Brakeman Jones started back over the train toward the rear end, finally getting down into a corner of a car to await the occurrence of the accident. Brakeman Jones was thrown clear of the wreckage and upon calling to the conductor, he was answered by two men who helped him to his feet. These men were the only ones he had seen at any time and he said he was sure they had not been on the train at the time it was wrecked as he was in position to know if anyone had been on the train. Brakeman Jones did not at any time hear a whistle for brakes sounded by the road engineman neither did he at any time feel an application of the brakes at the rear of the train.

Flagman Himstead, of engine 4272, was out flagging while the 41 cars were being picked up at South Fork, upon being recalled he returned to the train, which then proceeded up the west slope of the mountain. On reaching MO Block Station he looked at the gauge in the caboose and it showed a brake-pipe pressure of 95 pounds and a few car-lengths east of this point the pusher engines whistled off; After this had been done Flagman Himstead looked ahead along the train and saw a proceed signal being passed along to the road engineman. Just before reaching AR Block Station, Flagman Himstead came out on the rear end of the caboose and gave a signal to the engineman of the

first pusher engine indicating that he was going to cut the air, this was answered, assuring him that the required brake-pipe pressure was also shown on the gauges of the pusher engines, and Flagman Himstead then proceeded to cut the air and shortly afterwards he cut off the engines from the caboose and gave a signal accordingly Before the pusher engines were cut off, however, there was a slight bump about four or five-car-lengths west of AR Block Station, not as severe as usual but enough to indicate that the brake had been applied upon the head end of the train When the caboose had reached the tunnel, however, Flagman Himstead thought the speed was a little high and started to climb up in order to look at the gauge, but there was a severe bump, as if the slack were running in, which knocked him down and it was then, as he was leaving the tunnel, that he went to the rear end of the caboose and opened the emergency valve, at the same time bracing himself for the expected shock. He could feel the air applying on the caboose but the blow indicated a short train line and there was only a little jerk, after which the speed of the train continued to increase He looked out on the left side of the train to see if fire was flying from any of the wheels but could not see any and he said that dust blowing and mist collecting on his glasses interfered with his view, he also looked at the gauge and at this time it had dropped to zero Shortly afterwards Conductor Heacox returned over the train to the caboose and asked him if he had applied the brakes and he replied to the conductor in the affirmative. Flagman Himstead further stated that at no time did he see any signals given by any member of the train crew after leaving the tunnel, although he did not look out along the right side of the train, that he did not hear any whistle signals after leaving the tunnel, and that the emergency valve on the rear of the caboose was still open when he went back to flag after the accident

Engineman William Wright, in charge of engine 4537, which was the first of the two pusher engines, said that when his engine coupled to the 41 cars at South Fork he found 25 or 30 pounds air pressure in the train line. He coupled these cars to the 47 cars which engine 4272 had brought over from St Michael, using the automatic brake and also the independent brake, these brakes held properly, and he was able to control the cars without difficulty. The feed valve on his engine was set at 70 pounds and after coupling the 41 cars to the head portion of the train, Engineman Wright cut out the brake valve on his engine and watched the gauges while engine 4272 pumped up the brake-pipe pressure to 90 pounds A leakage test was then made, which he said indicated a leakage of 6 or 7 pounds per minute, after this test had been completed the road engine-

man again pumped up the train line and made a terminal test with a reduction of about 28 pounds. This test consumed five or six minutes and after it had been completed the brake-pipe pressure was pumped up to 95 pounds, which was the pressure when leaving South Fork. At MO Block Station Engineman Wright whistled off brakes, indicating that he had the required pressure at the rear of the train and at AR Block Station the flagman gave a signal indicating that he was closing the angle cock between the caboose and the first pusher engine and that Engineman Wright was to cut in the brake valve on his own engine. Just east of the overhead bridge at Gallitzin station, which is about half way between AR Block Station and the western portal of the tunnel, Engineman Wright felt what he described as a rather severe shock, indicating that the road engineman had made a brake-pipe reduction, and at about this time the flagman signalled that he had cut off the pusher engines and Engineman Wright then applied the brakes and brought the pusher engines to a stop. Engineman Wright estimated the speed of the train at the time the pusher engines were cut off as having been 18 or 19 miles per hour, which he said was about normal, and he estimated that at the time he felt the shock indicating that the road engineman had applied the brakes, the road engine must have been leaving the tunnel at the eastern end Engineman Wright further stated that he did not see any suspicious persons around the train at any time and that the brake-pipe pressure of 95 pounds which obtained when leaving South Fork remained constantly at that figure during the run up the west slope of the mountain.

Fireman Turner, of pusher engine 3537, made statements similar to those of Engineman Wright except that he estimated that when his engine was cut off the road engine must have been near SF Block Station, east of the tunnel. Both Engineman Wright and Fireman Turner heard Engineman Pahal of the second pusher engine say he had noticed two young men standing along the right of way at or near Gallitzin. Fireman Turner also said that after the accident his engine was sent down to the scene of the accident for the purpose of bringing back to Gallitzin the caboose and cars which had not been derailed After the engine had been coupled to the caboose the air was pumped up and a test made of the brakes Fireman Turner did not know the result of this test and did not hear any one say anything about closed angle cocks on any of the equipment which still remained on the track.

Engineman Pahal, in charge of the second pusher engine, which was engine 4463, said that after the 41 cars had been coupled to the rear of the train at South Fork the air was pumped up and a leakage test made following a brake-pipe reduction of 30 or 35 pounds, he did not, however, check the gauge in his engine when this test was made and so did not know the amount of leakage. The air was then pumped up again and a road test made, consisting of a 15-pound reduction, and after this had been completed, the air was pumped up for a third time, the flagman recalled, and the train departed with the gauge in his engine showing a pressure of 95 pounds. Engineman Pahal did not notice any fluctuations in the pressure during the run up the west slope of the mountain. Just after passing AR Block Station he felt a little bump, about the same as usual, and estimated that at this time the road engine was coming out of the eastern end of the tunnel. The speed of the train was between 17 and 19 miles per hour, or about the usual speed, when the two pusher engines were cut off and at that time the gauge still showed a pressure of 95 pounds. There was nothing at all unusual in the handling of the train at any point, while the only persons he had noticed around the train were two boys standing near the dwarf signal about 25 car-lengths west of the cut-off post at the summit of the grade, at which time the pusher engines were still against the train. These boys were between the train and the cribbing alongside the track, standing in plain view, and judging from the good look he had of them he did not think they were tramps but rather that they belonged in the town, he did not see them again after cutting off from the train and backing up to the interlocking plant. There was nothing suspicious about them or their actions, although he said it was possible they might have been on the train and have gotten off, although if they had been on the train he would have expected them to get off on the opposite side of the track. The statements of Fireman McCall, of engine 4463, added nothing to those of previous witnesses.

Engineman Bell, in charge of engine 3444, which was helping a westbound freight train, extra 1108, and was standing at SF Block Station on track 3 at the time extra 4272 came out of the tunnel eastbound, said he heard a whistle signal calling for brakes, shortly afterwards this signal was followed by another call for brakes. Engineman Bell was unable to estimate accurately the speed of the train but thought it might have been between 25 and 30 miles per hour. The roar of the train, however, was unusual, and from what he could see of the train he thought it was running away. He did not hear any sound like brake shoes grinding against wheels, and about the only thing he saw except the tops of the cars was a lantern back near the rear end of the train, this was a white lantern

and he did not see any signals being given with it.

Fireman Dale, also of engine 3444, said his attention was attracted by hearing the call for brakes and also the rear of the train, which he thought was traveling 35 or 40 miles per hour when its rear end passed SF Block Station. Fireman Dale heard the second call for brakes mentioned by Engineman Bell, and also saw the lamp back near the rear end of the train, but did not see any signals being given with it.

Flagman Bamrick, of extra 1508, said the rear of his train was about opposite SF Block Station and that he was standing on track 3 about five car-lengths back from his train when his attention was attracted by hearing the engineman of extra 4272 whistle for brakes. Engine 4372 at that time was between the tunnel and SF Block Station and a second call for brakes was sounded when the engine was between SF Block Station and the signal bridge east of that point. Flagman Bamrick saw fire flying from under the first four or five cars in the train and also saw a brakeman about 40 car-lengths back on the train, 10 or 12 car-lengths back of this brakeman there was a little fire flying, apparently due to a brake shoe striking against a wheel, and back of this point the only thing that he noticed was a lantern about 12 car-lengths ahead of the caboose. Flagman Bamrick said that after the first call for brakes he kept watching the train, of which he had a good view, expecting to see the brakes come on throughout the length of the train, but nothing of this kind occurred. He estimated the speed of the train to have been 35 miles per hour and said the speed was increasing rapidly as the train passed him.

Brakeman Hardman, also a member of the crew of extra 1508, was engaged in setting out cars and estimated that he was about 150 feet from track 1. His attention was attracted by hearing the call for brakes, followed by a second call. When engine 4272 went under the signal bridge east of SF Block Station fire was flying heavily from the engine, tender, and the first four or five cars in the train, but back of that point he saw only occasional instances of fire flying from the wheels. He thought the train was running 30 or 35 miles per hour when he first noticed it and that this speed had increased by about 5 miles per hour when the rear of the train passed him. After the accident Brakeman Hardman talked with Flagman Himstead, he asked the flagman whether he opened the conductor's valve, and he quoted the flagman as saying he did so when coming out of the tunnel, but on the other hand Brakeman Hardman said that had this been the case, and had there been 95 pounds of air in the brake pipe as he understood was the case, fire should have been flying heavily

from the wheels of the entire train before the train passed the point where he was standing, 20 car-lengths east of the tunnel.

Operator Miller, on duty at SF Block Station, said extra 4272 came out of the tunnel about as fast as usual, but when the engine was about opposite the block station, at which time Operator Miller was facing in the opposite direction, the engineman whistled for brakes Operator Miller felt that the train was out of control and at once notified the dispatcher and then looked out at the train but did not see anything except a lantern about 10 car-lengths ahead of the caboose. Operator Miller did not see fire flying from any of the wheels and did not notice but the one call for brakes.

Gang Foreman McBroom, stationed at Cresson, reached the scene of the accident at 8.50 p.m. He did not examine that portion of the train which remained on the track and did not know whether or not all angle cocks on that portion of the train were open, neither did he know whether the brakes were still applied, but at once started ahead examining the derailed cars and working his way to the head end of the train along the north side of the track, then starting back along the south side He said he found several angle cocks which had been partly turned, all of which bore evidence of having been struck by some object, but there was an angle cock on the twelfth car from the engine which was entirely closed and which had not been struck by anything. This angle cock was of the self-locking type, and on trying it he found that it worked a little stiffly but was in perfect condition. It was Gang Foreman McBroom's opinion that the end of the car on which the closed angle cock was found was the rear end as it stood originally in the train. During the course of his examination of the equipment, Gang Foreman McBroom covered both sides of the train throughout its entire length, and while some of the equipment was buried in the wreckage, he found no other closed angle cocks. He said he also examined about 10 trucks in the wreckage at the head end of the train and found evidence of severe braking, the brake shoes being reddened and the faces of the shoes being blued and cracked.

Car Inspector Curry, on duty at South Fork, said that when extra 4272 arrived from St. Michael with 47 cars, he assisted Car Inspector Lucas in making an air-brake test of 12 of the cars which had not been tested by inspectors at St. Michael. The 41 cars picked up at South Fork had been tested before being placed in the train and also their retainers, all of which held the brake applied for three minutes or more, and after these cars had been placed in the train the brakes of the entire train were tested, engine 4272 first pumping up the train line and the brakes

then being applied. Inspector Curry said he was on the engine at the time and checked the brake-pipe leakage, which was 5 pounds per minute. He then got off and went back over the train until he met Inspector Lucas working from the opposite end. The engineman was then signalled to release the brakes, which was done, and they again examined the cars to see if the brakes released and Inspector Curry said that the brakes on the cars which he examined were in good condition with no long or short piston travel. After this test had been completed the road engineman whistled for a road test and then the pusher engines whistled off brakes, indicating that the brakes had applied on the rear end. The statements of Inspector Curry were corroborated by Car Inspector Lucas, who began working at the rear end of the train and continued ahead until he met Inspector Curry working back from the engine. Car Inspector Lucas added, however, that on the first test the retainers did not hold properly on three or four cars and that after repairs were made they held properly when tested a second time

Car Inspectors St Clair, Wagstaff and Berkevile, used the yard plant in examining and testing the air brakes and retainers on 35 cars in St Michael yard, which afterwards left that point in extra 4272, and their statements indicated that only one retaining valve failed to hold properly and that after repairs were made the test was repeated and then all the retainers were found to be operating properly. Inspector St. Clair in addition said that he adjusted the piston travel on one car while Inspector Wagstaff said he adjusted the piston travel on three cars It was subsequent to their examination of these cars that 13 cars were added to the 35 cars and it was these 12 additional cars which it was necessary for the inspectors at South Fork to test when extra 4272 arrived at that point preparatory to filling out its train.

Car Inspectors Bradley and McGraw, on duty at the car inspectors' building just west of AR Block Station, said they inspected opposite sides of extra 4272 as it pulled by them and that all the brakes were properly released, with no indications of any defects. They also said that they did not see anyone riding on the train other than members of the train crew.

Car Inspector Bosley, who arrived at the scene of the accident with the wrecking crew from Conemaugh, 23.2 miles west of Gallitzin, said the wrecking train stopped opposite the rear end of the derailed train and that he got off and walked down the north or left side of that train. He did not notice the position of the angle cocks on the rear of the caboose, the position of the conductor's valve, or whether the air hose had been parted between the caboose

and rear car, although his statements indicated that this latter condition was not the case, neither did he check the brake shoes to see if the brakes were still applied, nor did he examine them to see if there was any evidence of excessive braking, he thought all the angle cocks on the cars were open and that the pistons on some of them were out. At the head end of the train, however, Car Inspector Bosley looked at the brake shoes and found that they were burned red, some of the other men with him found the closed angle cock on the rear end of the twelfth car and he was assigned to remain at that point and see that no one disturbed it.

Air Brake Instructor Stein said the speed limit between MO and AR Block Stations is 8 miles per hour in order to permit trainmen to turn up retainers in safety, and that when passing MO Block Station the engineman on the first pusher engine, provided the gauge on his engine shows a brake-pipe pressure of 85 pounds or more, is required to whistle off brakes, the flagman is also required to see that the caboose gauge shows at least 85 pounds pressure Judging from the statements made by Engineman Leasure, Air Brake Instructor Stein could not see that the manner in which he handled the brake valve was irregular in any way except that he should not have released the first light application until the brake-pipe exhaust had ceased Mr. Stein said he could offer no explanation as to why there was no evidence of the brakes having been applied back in the train beyond the first few cars, and yet on the other hand he also stated that it was his positive opinion that extra 4272 could not have gone as far down the hill as it did go before being derailed unless there was some retarding force in addition to that provided by the engine and from 6 to 10 or 12 cars on the head end, and he thought it was possible that brake-pipe leakage might have caused an application of the train brakes which provided such additional retarding force Chief Air Brake Inspector Walker said that careful examination and test was made of such parts of the brake valve, gauges and other air-brake equipment on engine 4272 as were not damaged in the accident, but nothing was found to indicate that they had not been in good working order.

Passenger Trainmaster Grieve said that about three hours prior to the accident, a westbound freight train ran a stop signal at MO Block Station for a distance of 40 or 50 car-lengths, also running through a switch lined for the movement of train No. 25 The operator on duty realized that the freight train was not going to stop in time and restored the signal for train No. 25 to the stop position and the engineman of that train was able to stop in time to avoid an accident by making an emergency application of

the brakes. Investigation developed that when the engineman of the freight train tried to stop he found he had no air and notified the head brakeman, who started back from the engine and found a closed angle cock on the rear end of the second car, which he opened in time to enable the engineman to stop the train. This investigation also developed that a man had been seen on the train near the head end just before it passed through the tunnel westbound. Mr. Grieve further stated that on December 15, four days after the occurrence of the accident, an eastbound freight train of 75 loaded cars passed MO Block Station at 5.21 p.m. with 90-pounds brake-pipe pressure showing on the pusher engines and 97 pounds on the caboose gauge. The pusher engines whistled off brakes, there being the required pressure at the rear of the train, but it became necessary to stop at AR Block Station because at that time there was not the required pressure at the rear of the train. Investigation in this case developed that angle cocks were closed on the head ends of the eighth, ninth, tenth and eleventh cars. One of the car inspectors on duty at the car inspectors' building at Gallitzin had seen the closed angle cock on the eighth car and gave a stop signal, and at the same time this car inspector also heard the pusher engines whistling down brakes. Mr. Grieves' statement in connection with that particular instance also showed that although the brake-pipe pressure on the pusher engines at MO Block Station was 90 pounds, it had dropped to 30 pounds within 15 car-lengths, and later to 70 pounds, with the brakes leaking on.

Conclusions

This accident was caused by the train starting down the grade at excessive speed, by a closed angle cock near the head end of the train which prevented the engineman from making an effective application of the brakes, and by failure of the members of the crew at the rear end of the train to take necessary action in time to bring the train under control.

According to the evidence in this investigation, the brakes on the cars in extra 4272 were tested at St. Michael and South Fork, and were found to be in proper operating condition, brake-pipe pressure when leaving South Fork was more than 35 pounds at the rear end of the train, the minimum permitted by rule. The train proceeded up the west slope of the mountain and as it neared the top, the road engineman increased the brake-pipe pressure until it showed 98 pounds on his engine and the evidence is definite that it was then 95 pounds at the rear of the train, indicating no obstruction in the brake pipe at that time. The pusher engines were cut off just after passing AR Block Station, at which time the brake-pipe pressure on the rear

of the train was still 95 pounds. Shortly after entering the tunnel the road engineman realized that something was wrong and he found that he was not able to control the train, the conductor, 80 car-lengths back from the engine, began to suspect something was wrong shortly before entering the tunnel. The road engineman said the speed was 10 or 12 miles per hour when he started to make the service application to control the train, while the pusher engineman said the speed was from 17 to 19 miles per hour when they cut off from the train, these estimates are reasonably consistent with the road engineman's further estimate that the speed was 25 miles per hour when he passed SF Block Station, east of the tunnel. The evidence is also clear that while still in the tunnel, and after leaving the tunnel, the road engineman sounded the whistle signal for brakes, and that, except for a few sparks here and there at different points in the train, there was fire flying, indicating that the brakes were heavily applied, from the wheels of only the engine, tender and a few cars at the head end of the train. After the accident a closed angle cock was found which was thought to have been on the rear end of the twelfth car.

The facts set forth in the preceding paragraph seem to have been definitely established. The engineman had apparently done all that he could do to control his train and to warn the train crew that the train was beyond his control. None of the surviving members of the train crew heard the engineman's signal for brakes, but each of them soon realized that the train was running away. When he came out of the tunnel Brakeman Jones, who was on about the seventieth car, tried to pass a signal to the flagman to apply the brakes from the rear end, and he also made an unsuccessful attempt to part the hose between two cars, Conductor Heacox, on about the eightieth car, also tried to pass a signal to the flagman and then went back over the train to the caboose and said he opened the conductor's valve on the front end of the caboose. Flagman Himstead, who was in the caboose, said that after being knocked down he went out on the rear end and opened the conductor's emergency valve. Both the conductor and the flagman claimed that they opened emergency valves on the caboose, the flagman on the rear end shortly after coming out of the tunnel and the conductor on the head end of the same caboose after returning to it from about the eightieth car. The conductor's statement that he received a blow of air and could feel the brakes applying on the caboose indicates that the emergency valve on the rear end had not previously been opened by the flagman, and it appears that the conductor did not reach the caboose until the head end of the train had nearly reached the point of derailment.

From the evidence it appears that someone had been tampering with the air brakes on various trains in the vicinity of Gallitzin. A few hours before the accident a closed angle cock was found near the head end of a westbound freight train, being discovered in time to enable the engineman to stop but not until after he had passed a signal displaying a stop indication. A few days after the accident, four closed angle cocks were found on the head end of an eastbound freight train and it was brought to a stop at AR Block Station; in this latter case, however, the brakes were applying due to brake-pipe leakage, as might have been expected, and the pusher engine whistled down brakes due to falling brake-pipe pressure at the rear of the train. In the case of extra 4273, the engineman of the second pusher engine saw two boys standing beside the track near the interlocking at AR Block Station, he said they did not appear to be tramps but apparently were boys belonging in the town. No member of the crew, however, saw anyone on the train, although the members of the train crew were out on the train and one of the brakemen had been over practically the entire length of it in connection with his duty of turning up retainers. Assuming however, that the two boys seen by the engineman of the second pusher engine had been riding near the head end of the train, unseen by the brakeman when he went back over the train turning up retainers, and assuming further that they had closed the angle cock at the rear end of the twelfth car before getting off at AR Block Station, nevertheless it is not believed that the presence of the closed angle cock will explain the occurrence of this accident. Had it been closed at or just after passing MO Block Station, observation of the gauges in the caboose and on the pusher engines would have indicated something was wrong before the rear end passed AR Block Station, entirely aside from the fact that the brakes probably would have leaked on by the time the train reached the tunnel, had it been closed after passing AR Block Station, it would not have interfered with prompt action on the part of those at the rear end of the train to bring it to a stop. There was no evidence of any character that there was more than the one closed angle cock in the train prior to the accident, and at the time of this investigation it had not been determined by whom or when the angle cock was closed.

As a result of this investigation it is believed that the brake equipment on this train was tested in accordance with the usual practice before starting the descent of this grade and that the braking power available on the train at the summit of the grade was sufficient for the proper control of the train. The evidence is definite that the brake pipe was charged to the required pressure at the summit of the grade. The road engineman quickly

found, however, that he did not have proper control of the train brakes, he thought there must have been an obstruction in the brake pipe four or five car-lengths from the head end of the train and subsequent investigation disclosed a closed angle cock on the twelfth car This obstruction prevented him from making an effective application of the train brakes after the train started down the grade Assuming that the brake pipe behind this obstruction was properly charged, which the evidence indicates was the case, there was still sufficient braking power available to have brought the train to a stop had the brakes been applied from the rear end in proper time and before the speed became excessive in view of the curvature of the track. That the brakes were not effectively applied in proper season from the rear end of the train is apparent from the results which followed. On account of the grade and curvature, it is believed scarcely possible that the train could have run as far as it did without being derailed had there been no retarding force other than the few brakes on the head end which were applied by the engineman and it is believed this retarding force was supplied by the train brakes gradually creeping on due to brake-pipe leakage, and that the emergency valves in the caboose were not opened by the flagman and conductor, if at all, until a very short interval before the derailment occurred Had the flagman been fully alive to the situation and to his own responsibilities under the circumstances, he could have applied the brakes from the rear end in time to control the train and prevent the accident.

Attention is called to the fact that the speed of extra 4272 was in excess of the maximum permitted by the rules at the time the pusher engines were cut off from the rear of the train Special instructions in the time-table provide that eastbound freight trains will not exceed a speed of 8 miles per hour while trainmen are turning up retainers between MO and AR Block Stations, and the "Brake and Train Air Signal Instructions", prescribe a speed limit of 12 miles per hour between AR and SF Block Stations. Notwithstanding these instructions, however, the two pusher enginemen estimated that the speed was from 17 to 19 miles per hour when they cut off a short distance east of AR Block Station, and, furthermore, they stated that this was about the usual rate of speed The physical conditions in the immediate vicinity of Gallitzin are such as to create a situation calling for the exercise of great care and rigid adherence to the rules. There is no point at the top of the mountain where a train can stand on level track before starting down the opposite side; the grade going up the west slope drops away to 0.61 per cent ascending for about 0.3 mile beginning at AR

Block Station and it then changes abruptly to a 1.39 per cent descending grade until a point about at the eastern portal of the tunnel is reached, where the grade increases to 2.36 per cent descending. The tunnel, which is 1,631 feet in length, is on the eastern slope beginning only 0.3 mile east of the summit of the grade, and the presence of the tunnel makes it difficult for an engineman to communicate with his train crew until the train has passed through the tunnel, by which time practically the entire train is on the 2.36 per cent descending grade, on the other hand, the distance at the western end of the tunnel, between the summit of the grade and the beginning of the tunnel, is so short as to give the engineman of an eastbound train little or no opportunity of finding out whether there is anything wrong before his engine enters the tunnel. Under these conditions, it is imperative that speed restrictions be rigidly adhered to and that every member of the train crew be on the alert in order to take full advantage of what little opportunity there is for detecting air-brake trouble in time to prevent an accident. If this can not be done in safety, then it should be required that trains stop before entering the tunnel, with the pusher engines still attached, and be given a test before proceeding down the mountain.

All of the members of the crew of this train, including pusher engine crews, were men of long experience and thoroughly acquainted with the conditions existing in the territory in which they were operating, and at the time of the accident none of them had been on duty in violation of any of the provisions of the hours of service law.

Respectfully submitted,

W. P. BORLAND,

Director.