THE BOYS' BOOK OF RAILROADS

By

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WITH ILLUSTRATIONS

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To

"JIMMY"

This Book is Affectionately
Dedicated

ACKNOWLEDGMENT

One of the pleasures of writing this book has been the association I have had with scores of railroad men in various positions, from superintendent of a division and chief dispatcher down to the humble job of track walker. I want to make this an opportunity to express my appreciation to all of them for the assistance that they have given me in assembling many of the facts herein set forth. I am especially grateful for the interest and kindness of Mr. J. M. Condon, Superintendent of the New York Division of the Erie Railroad, Mr. Thomas J. Kelly, Chief Dispatcher of the same Division, Mr. J. E. Ingling, Superintendent of Freight Service of the same road, and William Francis Hooker, also of the Erie Company and a genuine "Old Timer."

During the time that I have been planning and writing this book I have frequently referred to several very helpful volumes on the subject of

railroads, and I should feel that I were very ungrateful if I did not express my sincerest appreciation of Edward Hungerford's "The Modern Railroad" and "The Strategy of Great Railroads," by Frank H. Spearman, both of which I found tremendously interesting and of valuable assistance.

I. C.

Oradell, N. J.

CONTENTS

ILLUSTRATIONS

The Boys' Book of Railroads

CHAPTER I

RAW MATERIAL

"It's as true as anything ever was," said the veteran roundhouse foreman with a smile, "railroad men seem to be railroad men from the very beginning,—from the time they are chaps in knee-breeches. It seems to be in their blood. It used to be when a boy grew up in Salem or Gloucester he knew and his parents knew that as soon as he got old enough to ship he'd become a sailor, a whaler or fisherman or something of the sort. It was the salt water. It just seemed to be in the blood. The boy couldn't see anything but the sea for a future.

"It's just that way with railroading. The romance of it gets into a fellow's blood, seems like. From the very beginning it takes hold of you and almost before you know it you find your-

self just naturally gravitating toward the place where the shining steel rails and the trail of cross ties lead on, off into the distance, off to the other side of things you know, off to the places you yearn to go. That's the last step toward being a railroad man. Sooner or later you'll find your way into the railroad service in some job or another. After that it's like the sea—once you've been associated with those big iron horses and the clanking of the rails has become music to your ears, you rarely get over it. Once a railroad man, always a railroad man—at least so it seems to me."

The wise old foreman spat, wiped off his chin, and gazed off in the direction of a side track, where a dozen still giants, veritable mastodons, with steam roaring from their exhausts and black smoke billowing from their stacks, were being cared for almost tenderly by the "hostlers," preparatory to their departure for their night's work on the division.

"Yes, sir," he mused half to himself, "it's a mighty funny thing, but I guess we're all the same. It's the romance of the thing, the adventure and the pure love of it all that brings most

of us into the game and keeps us there. Why, some fellow not long ago—he was a mathematics sharp, I guess—figured out that one out of every dozen to fifteen men in the country was on the pay-roll of a railroad. It don't seem possible, does it, but then railroading is a great game.

"And let me tell you," he raised his voice a little here and seemed to challenge contradiction, "the men who follow railroading don't follow it because they can't do anything else. I mean it is a very high type of man we get in railroading—not the plug-ugly, or the down and out. No, sirree, they wouldn't last a day. They wouldn't even get a chance at our game—they'd never get through the employment office.

"Railroad men are the highest type of men you can find. To be sure they are big fellows as a rule, broad chested, two fisted, and men you couldn't back down on anything. But they are clean, clear-eyed, level-headed fellows with *brains*. I want to emphasize that to you, young man,—they have *brains* and they are brains that have been trained to think quickly and clearly and to act with the best of judgment. Unless a man has a good set of machinery under his hat he

can't get very far railroading, and the better his machinery is the farther he can get along the line. The offices of superintendent, general manager and even president with a salary of fifteen to twenty-five or thirty thousand dollars a year or more, if he is worth it, are open to men who are climbing up from the line. They are the kind of men the directors want in official position, and there is many a big railroad man in office to-day who started firing or as call boy in a roundhouse. See that chap over there in jumpers and gloves, the one just climbing into the cab of No. 988, Mal Crawford, that's who he is. Young fellow, isn't he, to be an engineer? But Mal's the best we've got around here. He's too good for his job even now at his age and the bosses all know it. He's slated for a bigger job—a lot bigger job. Wouldn't be at all surprised to see him superintendent of this division in a year or two, and he won't stop there. He'll go higher.

"Say," he seemed to be inspired, "Mal's the very man for you. If you want to know how a fellow gets to be a railroad man get hold of him; get his story and you'll know what I mean when

I say it is the romance of railroading that gets into our blood and just won't let us get very far from the sound of a locomotive whistle."

The veteran roundhouse foreman's suggestion was a good one and I hurried over to the cab of No. 988 to get a word with Engineer Mal Crawford, before he began to ease his big steel horse out onto that network of track of the terminal yard. He smiled when I told him what I wanted. Would he tell me his story? Sure, if it was worth while he'd tell me all about it some time when he got a chance.

But I never did get the full story from Mal, only snatches of it. Most of it I gathered from his friend and from other sources and what I gathered follows.

* * * * * * *

It was three hours after midnight—a "mighty dirty morning"—as big Bill Sexton, brakeman on No. 38, the slow Chicago freight, classified it. Although the rain, that had been falling steadily for two days, had left off since the hour of twelve, the air was chilled and the night was overcast, the blackness, blanket-like and almost suffocating in its thickness.

It was not a strange hour for railroad men to be awake and active, for these men of the line know no regularity of waking and sleeping hours, but it was a strange hour for a boy of eighteen to be abroad. However, Malcolm Crawford had several things on his mind that morning, not the least of which was his desire to be at a certain trout stream six miles from town before gray dawn began breaking in the east.

Up Ulster Avenue of the little town of Bridgeboro, toward the railroad station, Mal swung his way, fish rod in hand and home-made creel slung over his shoulder. Mal felt the chill and the excessive blackness of the night. The half dozen gas street lamps scattered along the street scarcely seemed to puncture the darkness, while far ahead, at the railroad tracks, red and green signal lamps seemed to blink with an effort, as if trying to battle against the smother of blackness. The only really strong rays that dispelled the night with any success was the white shaft of the powerful headlight of the big "freight hog" locomotive that headed the long string of cars of the Chicago freight, held on the siding,

to await the passing of the Chicago limited which Mal knew was due to go flying through Bridgeboro within half an hour.

As the boy swung up the street toward the tracks, he kept his eyes fastened on the winking signal lights and the large shaft of the engine's headlight.

"Doggone," he mused to himself, "that's the work I'm cut out for. Railroading must be about the bulliest sort of a job a fellow could want. I could see a lot more of the world, live out-of-doors and make something of myself at that game. But here I am stuck in a down-at-the-heel town in a down-at-the-heel job in a factory office." Mal grinned to himself.

"I don't mean down-at-the-heel—I mean down and out job," he added with a smile, for that was one of the problems Mal had on his mind at the moment. He had lost his job. Not through inefficiency. Not through any personal fault. The shoe factory he had been working in had been the failure. It had closed its doors the day before and Mal with seventy other men of Bridgeboro suddenly found himself wondering what to turn to next.

It was not a big misfortune in his case, however, for he had his parents to fall back on. He had been graduated from high school but two months before and had taken the position in the office of the shoe factory in order to be occupied while he determined what was to be his future occupation.

His short experience of office work had, however, taught him that working indoors cramped over a desk piled with yawning ledgers was not the sort of a life he would choose to lead. Mal liked the out-of-doors too well for that. That was the reason why he had seized his fishing rod and creel and aroused himself at the unusual hour of three o'clock that morning. He meant to spend this first day of idleness off beside a trout brook, where he knew the water was high and the fish would be hungry after the rain.

The long siding on which the big freight engine stood panting ran directly across Ulster Avenue and Mal could but pause a moment and watch with interest the activities of the train crew, who like gnomes, with dangling lanterns, moved from car to car, seizing the opportunity

while the train was on the siding to inspect their charges thoroughly.

Presently big Bill Sexton, brakeman, dodged out from between two cars in front of Mal where he had been inspecting an air brake coupling.

"Hello, old scout. Top o' the mornin' to you, even though it is a mighty dirty one to be out in," said the always affable Bill as he grinned at Mal.

"It is a sort of rotten weather, isn't it?" said Mal cheerily, "but it will be good for fishing."

"Fishing, laws, boy, I wish I were going fishing right now instead of tinkering on this old string of freights," said Bill as he removed a dirty glove and felt for a handkerchief with which to wipe the perspiration from his forehead.

"Huh, I wish I had your job tinkering on your old freight cars. I'd like to work on a railroad, believe me," said Mal with a smile. "Laying over for the Chicago flyer to go down?" he queried.

"Yep," replied Bill as they parted, "she's due in ten minutes but I heard she was a few minutes

late. That means she'll come through here a-roarin', tryin' to make up time. So long. Wish you luck. Hope you get a big one."

"So long," called Mal, and he swung off down the long line of freight cars, crossed over in the glare of the engine's headlight and started stumping down the ties, for the railroad right of way crossed his favorite trout stream about four miles below the town of Bridgeboro.

The night seemed blacker than ever as he left the headlight's glare, but Mal knew this stretch of railroad as well as he knew the main street of the town.

"Guess I'd best get a wiggle on if I don't want to get caught in the cut with the Chicago limited coming down on top of me," he said to himself as he increased his stride. He knew that just around the bend the track cut through a steep bank of clay and rock that rose twenty feet above the road-bed. It was a mighty unpleasant place to be caught in while a train was passing, for if, as it often happened, an up train came through at the same time, one had little choice but to flatten one's self against the clayey bank and hope that the train would pass without hitting

one. It was close and unpleasant quarters to say the least, and Mal knew he would feel far more comfortable with the cut behind him.

Soon he was rounding the long curve that led into the cut. He paused a moment to listen for a sound of the expected flyer.

"I suppose I could climb up over the bank and follow the wagon road. Then I'd have nothing to worry about," he told himself. He even paused a moment to consider the question.

"Oh shucks, I might as well go on," he said. "I've done it before. I can't hear her coming and anyhow she's late. I'll get through all right." And having made the decision he pushed on, little realizing how much this decision was going to mean to him and others in a few minutes.

In the cut the darkness seemed even blacker. Mal strode on as swiftly as he could over the uneven ties. He could feel the damp, rain-soaked walls towering over him. Rain water trickled from rock to rock and splashed down into the drain ditch beside the tracks. There

was a raw earthy smell in the cut. Mal had often smelled the same odor in the spring time where frost and thaw had caused the earth to slide.

Presently Mal's foot struck something soft on the track. Another step and he plunged ankle deep into soft earth covering the ties and rails, then he stumbled over a good sized rock and sprawled headlong, not to the track but into a bank of earth and stone that had slid down onto the track.

Even as he struggled to regain his feet he became conscious of more dirt and showers of pebbles falling about him. Then suddenly with the roar of a great mass of earth falling, Mal felt a second slide into the cut, just ahead of him. Great clods from the extreme outside edge of the caved-in bank plunged down upon him. One caught him squarely between the shoulders as he struggled to get up, and knocked him flat again. Then as he rolled over more fell upon him and, with a dull thud and crushing force, a rock as big as his head crashed down and grazed his side. Mal cried out with pain and rolled over in the first agonies of the blow. He

clasped his side and knew by the feeling that flesh and bone had given way under that terrific impact.

With a painful effort he struggled to his feet again and blindly staggered out of the cut back the way he had come. His head was in a whirl and his mind seemed muddled and fear-struck with the pain he suffered and the sudden shock of it all. His only clear thought was that he must get out of the cut, out of the path of the sliding bank, out of danger. Almost in a panic he plunged up the tracks until he knew by instinct that he was out from between the overhanging walls of the cut.

For a moment he paused and stood between the tracks swaying giddily with the pain he was suffering and trying to master himself. He was bewildered but in his bewilderment he knew that there was something he must do—something he had to do before he could give way to his pain and suffering.

It was then that he thought of the Chicago flyer—the express that was due to come roaring through that cut in a few minutes. Somehow Mal's brain cleared like a flash. He understood

everything. The rains of the past two days had loosened the heavy earth above the cut and it had slid down onto the tracks, covering the rails with several feet of earth and rocks.

He remembered vaguely hearing of a similar slide in that same cut ten years past when a freight train had been wrecked by it. A stone retaining wall had been built then in the more dangerous places in the cut, but evidently this had given way under the pressure of earth and rock. The tracks were buried and the Chicago limited was due any minute!

With a groan of pain and despair Mal plunged forward through the darkness, staggering over the tracks toward the Bridgeboro station and siding where the lone freight train was being held over to await the passing of the flyer. It was here and only here that the fast train could be stopped. Unless he could reach the freight train and warn one of the crew to flag the flyer the great passenger train would plunge to disaster in the cut.

She was due in ten minutes! It seemed hours ago that Mal had heard that. Could he make it? He must! He would. Forward he staggered,

stumbling blindly on, suffering agonies from the pain in his side.

Presently he ran clear of the turn that preceded the cut and had a clear view of the stretch of tracks to and beyond Bridgeboro.

There on the siding stood the big freight with its panting engine, the long finger-like rays of its headlight reaching toward him, while other lights bobbed about it and red and green switch and signal lights winked at him. Oh, if he were only in the glare of that headlight, he could signal and shout a warning. He was half afraid he would collapse before he got there. It seemed so far—so far and it required so much strength and will power for him to go on.

Suddenly he was spurred on to renewed effort by still another light. Away beyond Bridgeboro, deep, deep into the darkness of the night, he saw a glow above the track, the red glow of an open furnace door, while the tops of the trees were faintly lit by the white glare of another headlight. It was the Chicago limited roaring through the night, plunging swiftly forward toward him and the cut behind him and the sure destruction that awaited it.

Mal cried out in his anxiety and with every ounce of strength plunged forward. On and on he pushed himself, shouting at the top of his voice between great sobs of breath.

Oh, if he could only make some one hear,—some one hear and understand. It could not be! It *must* not be. That flying train loaded with hundreds of human lives *must* not plunge into the cut to be derailed and wrecked by the slide.

On and on he struggled. Oh, if he could only reach the white glare of the headlight on the freight engine. Then the engineer and fireman would see him and perhaps understand.

He struggled on a hundred feet more. The glow of the fires of the flyer and the glare of its headlight were growing more distinct with every passing second. At a mile a minute she was rushing toward him. And he, on clumsy feet and with aching side and splitting head, was racing with her, racing to reach the freight and the assistance of the freight crew.

Fifty feet more and he would be in that pathway of light from the freight engine's lamp. Twenty-five feet, twenty, fifteen. He was staggering now and waving his arms like a madman.

He felt his strength going and the grip of his will power failing.

On he stumbled. A few feet more, only a few. He could hear the roar of the flyer far down the tracks. She was late and tearing through space to make up for lost time. He must save her! He must! He was almost beside himself now in his agony. Pain and fear of the catastrophe that would result if he failed had made him beside himself. He shouted, he screamed in terror and waved his arms. He stumbled, fell forward, rolled over and dragged himself to his knees. He tried to get up. His strength was all but spent. It took a mighty effort, but he reached his feet. He took one step forward and stopped, swayed a moment, then collapsed in a heap, for everything had gone black. There, almost lifeless he lay in the white rays of the freight engine's headlight sprawled across the rails and the ties, helpless.

* * * * * * *

Dave Dickson, engineer of the freight locomotive, waiting for the limited to go by so he could start his long train out of the siding, was startled to see, from the cab window, the form of a

boy staggering blindly up the tracks in the glare of his engine's headlight. The lad seemed frantic. He was waving his arms and shouting like a maniac. Then he collapsed into an apparently lifeless heap almost in front of the locomotive.

"What in time—quick, Jim, something's wrong. That chap out there, did you see him?" Jim Britton, the fireman, had seen him and he and the engineer swung down from opposite sides of the cab at the same moment. The engineer bumped into the burly form of big Bill Sexton as he landed on the ground.

"Quick, Bill, something's wrong," he shouted, and the three rushed over to the limp form between the rails. The engineer stooped down and turned Mal over on his back. Big Bill Sexton recognized him immediately.

"It's the chap who was going fishing. He went down the track. Look, he's covered with mud and dirt. He —— Great guns, he was making for that cut and—and ——"

"Bill, there's something wrong. Listen, he's talking. 'The cut—limited—cave in.' Great Scott, Bill, quick, flag the limited,—flag it something's wrong. Something's happened in ——"

But Bill Sexton was not there. He was leaping across the track and waving his lantern madly toward the roaring limited now rushing up the stretch of tracks paralleling the siding.

It was a tense and awful moment. Even Bill Sexton, with all his railroad training, shouted at the top of his voice as the big engine of the limited roared past, forgetting that his voice could scarcely carry above the roar of the big locomotive.

But the engineer of the limited had seen his light just in time. Two short querulous shrieks sounded from the flyer's whistle, then, with a hiss, the air let go and sparks flew as the brake-shoes clamped down on the grinding wheels. But with all this the great train crunched and clanked a hundred yards further down the tracks before she came to a full stop.

* * * * * * *

"Two broken ribs and slight internal injuries that will not prove serious," Mal heard some one say as if through a fog. Then he opened his eyes to find himself in his own room at home so trussed up in bandages that he could scarcely move.

A strange physician, and the local physician of Bridgeboro were bending over him. There was a white-capped nurse in the room, too, and his father and another man, a very stern looking man, were standing at the foot of the bed.

"Ah, he's conscious," said the strange physician, whereupon every one in the room looked at him and he felt very much embarrassed.

"Fine!" exclaimed the very stern looking stranger. "You've been pretty badly off these three days past, young fellow. You had us all worried, even though we did know you had a fine, clean, strong young body to fight with. I feel better now to know you are nearer being alive than dead, as you have been. I'm Buckman, the superintendent of this division. Came up to-day to see how our railroad physician and nurse were taking care of you. But now that you're conscious, I want to thank you for what you did and the lives and property you saved for us the other night. And let me add, that when you are well I want to see you in my office at Kingsland. Bill Sexton tells me you are interested in railroading and your dad here confirms it. That's

fine. There will be a job waiting for you when you report at Kingsland, my boy, for we need just your kind in railroading."

* * * * * * *

That is how Mal Crawford got into railroading. But he did not get in because of his heroic act alone. He got in because, as Superintendent Buckman said, the railroad needed just his kind, men with courage, grit, and a fine, well-trained, quick-acting brain.

Railroading is comparable with no other vocation or trade because of the responsibilities the men employed in it are called upon to bear. Where in any other trade or occupation, save perhaps that of pilot, does one man or one little group of men hold the safety of hundreds of human beings and thousands of dollars' worth of property in his hand, so to speak? In what other line of employment does the safety of so many and so much depend upon the clearness of eye and the swiftness of thought?

The men who operate our railroads are picked from among their fellow men as best fitted for the responsibilities that are given them. They are educated and well read, they are sober, in-

dustrious, upstanding citizens. Indeed, they must be, for look what they are called upon to do.

It is their daily task to move great groups of human beings or valuable cargoes of freight over the country in rushing trains that must make speed on their steel highway. They are called upon to do this and keep their trains moving in time and in relation to other similar trains, to switch and shunt the cars here, there and everywhere and always in safety. A crash between trains or cars of a train is all too often fatal to life and dangerous to property.

To do this these men of the railroads must know the giant steel steeds they pilot as thoroughly as a boy knows his parents, or the parents know their boy. They must be able to handle it and control it under all conditions and circumstances.

They must know the hundreds of miles of tracks and side tracks, with their tunnels, crossings, grades, and bridges, and their myriads of switches and sidings, as well as a pilot knows the river he navigates. Indeed, these men in overalls and jumper must be as familiar with the

line as the average boy is familiar with the street he lives on.

Signals, train schedules, and a host of operating details must be so clear in their minds that the knowledge is automatic. Never once dare they make a mistake, for not one of them knows but what a single mistake may mean an appalling loss of life and the destruction of millions of dollars in property.

When all this is considered we can easily understand why railroad men are picked men, why Superintendent Buckman was so eager and willing, ten years ago, to induce Mal Crawford to become a railroad man. He saw in Mal the type of boy he knew would develop into the type of man that the railroads must depend upon. And we can understand why the veteran roundhouse foreman assured us that Crawford was bound for a higher and better job with even greater responsibilities than those that are his as engineer.

Indeed, even while this book is being written Mal (of course that is not his real name, for he would not care to have his real name used) has been elevated one step nearer to the office of superintendent of the division.

CHAPTER II

IN THE CAB

Ask the average locomotive engineer if he ever had any thrilling experiences, any narrow escapes or any really close situations where quick thinking and quick action were demanded, and he'll say no.

"Shucks," rumbled a great, big powerful fellow with closely cropped hair, who drives a fast passenger train into Jersey City every morning, "shucks, no. There aren't any thrills, just plain humdrum every-day experiences. That's all."

Any fireman you ask will tell you the same thing.

They are not evading the question. They are truthful when they make the statements they do, for to most of them the expression "all in a day's work" means just that and nothing more.

But the average human being knows that they

are wrong. They are constantly facing situations that would make the other fellow's hair stand on end and his courage ooze out of his finger tips. Indeed, they have become so accustomed to quick thinking and quick action that they hardly know how to distinguish the heroic from the commonplace.

Take the experience of Fireman Tracy—Jim Tracy, we'll call him, for he is too modest to be willing to have his name appear in print.

Jim Tracy was firing for Gordon Nixon on No. 8, the fast passenger express between S——— and W———. No. 956 was their engine, one of those hard coal burning, camel back type, where the cab is perched midway on the boiler and the fire pot reaches to the rear. On engines of this kind the driver is alone by himself cooped up in his cab forward, while the fireman is between the fire box and the tender—a mighty unsociable sort of an arrangement since the two men are separated by ten or twelve feet of boiler with only a narrow board foot-path by way of reaching each other in case of trouble.

But Nixon and Tracy had been driving old 956 so long that the arrangement had grown to be

perfectly satisfactory. Up forward the engineer operated the train, knowing full well that behind him Tracy was firing with the care and attention that all good firemen devote to their work.

Number 8 was an evening train out from S——— that made a run of 148 miles to W——— arriving there in the small hours of the morning. It was a fast run with but few more than half a dozen stops and these only at the big towns on the way to W——— which is the state capital. Every night they pulled out of the terminal at S——— at 9.35 promptly and every morning at ten minutes after two they arrived at W———, old No. 956 thundering into the train shed, snorting and puffing for all the world like a big animal of steel whose brazen lungs were heaving and panting after the run. But there came a morning when the hour of two ten passed and No. 8 did not put in her appearance at the W——— terminal. Indeed it was after three before she rolled into the train shed and wonder of wonders, it was not Nixon but a strange engineer who climbed down from the cab, while a mighty relieved looking Tracy swung down from behind the fire box. It all happened this way.

It was a cold but snowless December night. Nixon and Tracy buttoned their overcoats about them as they left the warm companionship of the glowing stove in the bunk house. Lunch pails in hand, they began picking their way toward the roundhouse across the network of track in the yard. Red and green signal lamps seemed to wink and blink in the frosty air, while above them gaunt semaphore arms with their equipment of lights stood out against the cold starlit night sky.

Across the yard was the roundhouse, from which rolled clouds of black smoke and white steam, to be whipped away into the night by the bleak wind. Beside this strange looking stable for the engines were the glowing ash-pits about which gnome-like figures worked with long pokers cleaning out the fire boxes of several powerful locomotives, that, with their day's work done, were being made ready for their rest period in the stalls of the roundhouse.

Beyond the ash-pits on another track were several other engines, their fires up, and steam hissing from cylinders and exhausts, looking for all the world like steeds champing at

their bits and waiting to be off. Busy hostlers and wipers were pottering about giving them their final touches before their departure for the night's run.

One of these was Nixon's 956 and the engineer and fireman automatically looked the big camel back over as they approached. Stripping off his overcoat, Tracy climbed up between fire box and tender. The scorching heat from the furnace doors as he swung them open to inspect the fires felt mighty good after the bleak winds of the night.

Nixon did not climb to his place immediately. Instead, he reached into the cab for kerosene torch and long goose-necked oil can, and, with this in one hand and the light in the other he began to inspect his big charge, squirting tiny jets of oil into various places with a care that almost suggested affection for the big beast.

Presently he finished, and, with a word to Tracy about the yellow train order sheet he held in his hand, he went forward and climbed into his cab. Then he eased steam into the cylinders and with a great hissing and snorting the engine rumbled slowly across one switch after another

and backed down toward the train shed where, on track three, the string of coaches and sleepers had already been made up and were waiting for the engine to be coupled fast.

At 9.35 on the dot Nixon saw the yard signals giving him all clear, and with the monotonous call of the train crew's "All aboard!" echoing through the terminal and the clanging of iron gates, No. 8 started rumbling off on her nightly trip.

Across the switches of the yard they clanked, then through the roaring gas-filled tunnels and out onto the broad meadows that reached away toward the distant mountain. Here the winking signal lights were left behind and Nixon knew that he had a clear track with plenty of room for speed until he struck the stiff grade that would let them into the mountains through which their way to W——— led. Slowly the engineer opened the throttle and No. 956, as if eager to be unleashed, rushed forward with a roar, dragging its snake-like appendage of coaches and sleeper through the night at forty-five miles an hour.

On and on they thundered while Tracy, know-

ing each curve and grade, watched his fires and steam gauges to see that the engine had power enough to carry her through. Past fields, through sleeping towns, over bridges, through cuts and tunnels they roared, the engine's siren-like whistle shrieking warnings as they raced through the night.

The first hour of the run had slipped by when, suddenly, Tracy got a strange presentiment that something was wrong. He became peculiarly uneasy. He wondered what it was that disturbed him. He paused a moment in his shoveling and listened. There was nothing wrong about the rhythmic throbbing of the engine and the constant clanking rumble of the big drive wheels over the rails. It was all quite regular and as it should be. Quite too regular, Tracy began to think. He noticed that there was hardly a variation in the speed of the train. It had gone on at the same high rate of speed for goodness knows how long. There had been no slowing up for crossings or curves.

Even as Tracy was turning the matter over in his mind, the train struck a sharp curve which Tracy instantly recognized as one at which

Nixon always eased up a little in his speed. There was no change in speed to-night; the train struck the curve at a smashing rate and whipped around it under such perilous headway that Tracy staggered across the narrow confines of his own cab. He wondered as he clutched to save himself from falling, why the rear cars of the train were not snapped off the tracks.

Then another disturbing situation arose in Tracy's mind. He recalled that he had not heard the deep-throated whistle of the locomotive for a long time despite the fact that several serious grade crossings and at least three whistle posts had been passed during the last ten minutes.

"What on earth ails Nixon to-night? He's running like a madman. Why doesn't he blow? Why ——?"

Tracy stopped, startled at the thought that flashed through his brain.

Could anything have happened to Nixon? Was he ill? Was he injured? Was he (Tracy shuddered at the thought) dead at the throttle? The fireman had heard of such an accident on another line and it frightened him to think that

perhaps his partner had passed away of heart failure or something else up there in his little cab, and the train with its precious freight of human beings was roaring down the night with a dead man's hand clutching the throttle.

Tracy leaped to the window of his own cab and looked ahead. For several seconds he strove to pierce the blackness with eyes that were blinded by the glare of the furnace. And as the outline of the cab became clear to his vision he gasped with surprise, for he was certain that he could see the limp form of Nixon hanging out of the window of the engineer's compartment, one arm flapping loosely against the cab's side, while his head rolled on his shoulder each time the engine swayed.

A closer scrutiny left no doubt in Tracy's mind of what he saw, and he knew that he must climb to the engineer's cab and take control of the flying train immediately. But what a task that was to be! Tracy saw it only as a matter of duty, nor did he reckon the risks he would have to run. Not once did he consider that only a narrow path of board scarcely six inches

wide afforded him access to the cab. Not once did he think of the perilous rate the train was going, of the curves ahead around which it would careen in its mad flight onward, of the cutting cold of the December night and the roaring arctic wind created by the train's headlong plunge. None of these factors entered Tracy's mind, or if they did they did not cause him to hesitate a fraction of a second.

Without even pulling on his overcoat, though his body reeked with sweat from the heat of the fires, he climbed through the narrow doorway of his cab, and, clutching at the iron railing, crept out on to the narrow pathway that led to Nixon's cab. The blast of cold air that struck him caused him to gasp for breath, and the swaying of the speeding engine made him cling on with all his strength.

Stronger courage than Tracy's would have failed there, for every inch of that fifteen feet of plank was covered with ice crystals from the moisture of the condensing steam that had spattered there and frozen in the cold December air.

But Tracy's courage was plussed by that sense

of responsibility that all railroad men possess. Never once did he think of his own safety. His thoughts were all for the lives that were in those snug coaches and sleepers behind him, all blissfully unconcious of their peril.

Tracy crept forward slowly, grimly, despite the numbing cold that had driven the blood from his face and fingers; despite the swaying of the big steel giant that now, without the restraint of human control, seemed to Tracy to be bent on running away—running amuck and wrecking itself and the cars it carried on some perilous grade or at some dangerous crossing.

Inch by inch the fireman moved forward. His progress was slow—all too painfully slow for him, for into his brain were crowding a thousand terrible thoughts of curves and crossings ahead, of open switches, perhaps, and towns where speed must be controlled.

He was half-way across that perilous space—half-way to the cab, where he could see distinctly now the pathetic figure of the unconscious Nixon lolling out of the cab window—when ahead loomed just the hideous situation he had conjured.

Far up the track he saw the ominous red light of an open switch while beyond it crawling slowly into a siding was a freight train, trying in its tortoise-like way to get out of the path of the flying passenger train.

It was the midnight way-freight that always laid over in this siding to let the flying passenger train go by. Tracy recognized it and his heart sank. No. 8 had been booming along at such a terrific speed that it had overrun its schedule, and he knew now that, unless he could reach the throttle in a matter of seconds, his train would overtake the freight before it had drawn its full and cumbersome length onto the siding.

There would be a rear-end collision and the —— Tracy muttered a prayer as he thought of the consequences.

All caution thrown to the wind, the fireman worked his way along the narrow path at redoubled speed. How he clung on he himself could not tell you. He only knew he must hurry, for every fraction of a second meant something now.

At last, in safety, he reached the narrow doorway of the engineer's cab, and stepping through

and over the body of Nixon he reached for the throttle. A glance ahead made him gasp with horror. The ominous, red blinking eye of the switch seemed almost before him, while up the tracks he could see the glimmering lights of the caboose directly in the path of No. 8.

Desperately he shifted the throttle, and grasped the air brake lever. His hands moved with lightning swiftness but with precision. Then as the air hissed through the pipes he deluged the tracks with sand from the sand chest and breathed another prayer.

Sparks flew from every brake-shoe, the engine lurched and its brakes shrieked as if in protest at being throttled down. The headway decreased swiftly but not swift enough to suit Tracy. Sliding and grinding along the rails the heavy train plunged on toward the switch light. Tracy watched with eyes bulging. Would it stop in time? Could a collision be avoided? He yanked again at the air, and threw down more sand. The brakes seemed suddenly to clutch on with renewed vigor, and with a clank and a rattle and a jolt that shook the whole vertebræ of cars, No. 8 came to a dead stop not twenty feet from

The engineer is a very high type of railroad man. He must be, for to his care are entrusted human lives and millions of dollars in property

The track walker is a trouble hunter, always searching for defects along the line. He walks a good many weary miles a day

the open switch and the caboose of the way-freight that was just crossing onto the siding.

"Did it, by George!" was all that Tracy said, then solicitously he turned to Nixon.

* * * * * * *

It was the engineer from the locomotive of the way-freight who finished the run to W——— while Nixon, suffering from a fractured skull from a stone that dropped from a grade crossing bridge through the cab window, was left at the hospital in Blue Lake.

That heroic achievement was "all in a day's work" for Tracy, and he hardly ever mentioned the episode to his friends in the roundhouse. To be sure he was made an engineer soon afterward and perhaps his heroic action had a great deal to do with his quick promotion, but the fact remains that he had accepted the perils of the situation as part of his duty, and after the climax was passed he felt quite sure that his life as a railroad man was really a humdrum existence after all.

The way up to a position in the cab of a locomotive, which to us all seems to be the most interesting position one could possibly hold in rail-

roading, is long and tedious and crowded with hard work, uncertain hours and serious responsibilities.

Jim Tracy attained those heights while still a young man, yet he had been railroading nearly ten years before he finally got his hands on the throttle of his own engine.

Let us, for an example, trace his progress from the time he first discovered that the only way he could be thoroughly happy through life was to be in the service of a railroad.

He was a boy of eighteen then, just out of high school. For several years he had been hearing the call of the railroad. From the windows of his school he could look out across the fields to the highways of steel that reached out across the country leading to distant points; places that he longed to visit.

Most of his leisure time he spent at the train station, absorbing railroad romance, listening to the clatter of the Morse keys, and making friends with the trainmen who periodically put in their appearance at the long freight shed across the track while their trains dropped off or took on cars.

At eighteen, having graduated from high school, he heeded the call and taking a train to S———, the terminal, he found his way to the employment office. He underwent a close scrutiny there, for the men who hire railroad employees are most careful of the human timber they pick to build into their road.

But Tracy had a clear eye that told of a clean, quick thinking mind within. He had a smile, too, and his fingers were free from that smudgy yellow that tells of cigarettes. Tracy passed inspection with flying colors and was told to report to the foreman of the roundhouse.

"Roundhouse," that was a magic name to Tracy. He had seen one only at a distance and how he yearned to have a peep inside! Would he report? At double quick and in a real hurry.

Armed with the card that told inquisitive people that he was now an employee of the road, employee No. 5787, Tracy left the office in the terminal building, and with new blue jumper and overalls rolled in a bundle under his arm and a sandwich or two in his pocket by way of lunch, he found his way into the busy terminal railroad yards.

For a few minutes the big and extremely busy yard almost awed this boy from the sleepy country village. But Tracy gradually mastered a feeling akin to panic that the bigness of the yard had caused, and, standing on an island of safety between the tracks, he decided to have a good look about him and take in all the details of this huge railroad plant.

His eye swept the busy expanse of tracks (he learned later that there were nearly 150 miles of trackage in the yard with several hundred switches) with the endless procession of cars, its snorting engines, and myriad of gaunt semaphore signals.

Into the train shed were backing and drilling passenger and Pullman coaches while to his right near the long freight houses, he noted the fact that all the activities seemed to be with the constantly drilling freight cars. Here, he learned later, the freight cars were being sorted according to their destinations and made up into trains, some for the south, some for the north and some for transcontinental shipment. It was a busy scene, indeed, and for a time it held him spellbound.

But soon his roving eyes picked out the sooty, grimy looking roundhouse, with the glowing, steaming ash-pits hard by. There were strings of inactive giants clustered about the place, some being wiped and polished, some having fires drawn and fire boxes flushed out with hoses, some proceeding in a leisurely way to their stalls in the big round stable, to rest after a long run, some just emerging from the roundhouse, fires built, exhausts hissing and plumes of smoke rising gracefully from their stacks. They were waiting for the master hand at the throttle to guide them to the waiting trains to be started on some overland journey.

It was while he watched this activity that Tracy got the real thrill of railroading and he knew then that never could he be happy until he could grip the throttle of his own engine. He little dreamed then that he would acquire his engine in the spectacular way he did.

His nerves were all atingle with anticipation, and it was with eager tread that he picked his way across the intricacy of tracks toward the roundhouse.

He found the foreman of engines in his little,

booth-like office against the wall of the round-house. He was a gray-haired, keen-eyed veteran of the road, and when Tracy presented his employment credentials he felt very nervous and he had to gulp down a lump in his throat before he could speak clearly.

"I—I—I've come from ——" he began.

"Sure, I know. You're Tracy. Just got a call on the 'phone about you," said the foreman. Then he was silent again as he looked deep into the big brown eyes of the boy from the country village.

"You'll do, I guess," he said succinctly. Then he added kindly, "Get into your jeans and I'll turn you over to O'Brien. He'll show you where to start."

That was the beginning of Tracy's career as a railroad man. He was a humble messenger boy first, carrying orders and messages about the domains of the engine foreman, and routing out engineers and firemen to tell them of their runs. He was not long at this, however, and then he became one of the dozens of men who were tinkering about the big giants of the round-house. These men were called "hostlers" and

wipers. He considered it strange that the name "hostler" should apply to these men who cared for and polished up the engines, but when he found that each engine had a "stall" in the roundhouse he quickly deduced that these names were strange survivals of the days before steam engines were known and railroads were run by horses.

Tracy worked hard and willingly as an attendant to the engines and you may be sure that he examined and studied and asked questions about every mechanical part and contrivance of the huge mastodons of the line. He absorbed the real spirit of railroading there and the pleasure he got in listening to the gossip of the roundhouse and in the association with the men made him more than ever convinced that he had made no mistake in selecting railroading as his vocation.

By asking questions and listening to the gossip of the roundhouse Tracy learned a host of things worth while and that later were to stand him in good stead. He took special pains to learn the meaning of the red lights of danger, the yellow lights of slow and cautious operating. He

learned the meaning of the different positions of semaphore arms. He discovered that on some roads these indicated a system of blocks of sections of tracks and that no two trains were permitted to be in the same section at the same time. He learned the meaning of switch lamps, and how the one type of switch differed from another in that some were turned by hand while others were operated from switch towers at some distant point, the operating being done by electricity, compressed air or another form of hand levers which was fast passing out of existence. He committed to memory the train signals sounded by means of the locomotive which he mentally catalogued in this way.

Short blast, stop apply brakes. Two long blasts, release brakes. Two short and three long blasts, flagman go back along the tracks with flags, torpedoes or caution lights to protect the rear and warn approaching trains that a train ahead is stalled. Five long blasts, flagman is called to return to train. Three long blasts, train in motion has parted. Three short blasts, standing train must back. Four short blasts, a call to conductor, trainman or switchman for

signals. Two short blasts, acknowledgment of signals. One long and two short blasts, calls attention to train following on same track. Two long and two short blasts, warning at highway crossing. One extra long blast announces approach to station, junction or grade crossing.

The code of hand signals between engineer and some one standing on or near the track puzzled him for a long time until he mentally catalogued them thus: hand or arm swung across the track, stop. Hand or arm raised and lowered vertically, proceed. Hand or arm swung vertically in circle across the track meant that a standing train should back or that a train in motion had parted. Hand or arm swung in a circle called for air brakes. Hand held at arm's length above head called for brakes to be released. He also learned that any object waved violently by any person on or near the tracks was a stop signal.

All these and hundreds of other interesting details he learned and stored away in his memory for future use. He even rigged up a Morse key in his boarding-house bedroom, and after

hours he practiced sending on this, for he was determined to become a first rate railroad man.

He sought and created opportunities to climb into engine cabs and study the gauges and other mechanism there. He learned to operate the control levers, and after a time, usually nights, he got permission to start and stop the engines that were being shunted out of their stalls onto the big turntable in the center of the roundhouse, which provided means for turning the hundred ton giants.

Then one day came the longed-for opportunity. Somehow there was a shortage of men in the staff of the train-master. He needed two firemen and needed them badly. He communicated with the engine foreman for suggestions and the keen old boss of the roundhouse assured him that Tracy and another chap of Tracy's age were the brightest boys to be had.

They were called before the train-master, who looked them over critically but with a good-humored smile on his face.

"Both of you have the arms and shoulders of young giants. If you have the brains that

should go with 'em to make a railroad man, you'll do."

Enthusiastic Jim Tracy was elated. To be sure, he was assigned to the crew of a freight engine, for that is the bottom rung of the ladder on most roads, and thereafter he fired for grim old Dave Carroll, on No. 1090, a freight engine of no mean standing in the roundhouse. Tracy knew 1090, for he had wiped and polished her bulging flanks many a time.

It was as fireman of the freight hauler that he learned what really hard work was. To heave countless shovels of coal into the yawning maw of the fire box for hours in a stretch called for the back and shoulders of a Hercules and muscles and sinews of steel.

It was hard work, but Tracy loved it and he was never happier than when he was in the swaying cab of the huge locomotive.

He studied the engine as a cavalryman studies his horse. He knew just how much coal was needed to bring her steam gauge clicking up to eighty and a hundred pounds or better. He studied the line, too, and learned each grade and curve of the division, for he soon discovered that

grades and curves demanded more power, and more power meant more steam, and more steam, steadier and hotter fires.

Soon he was getting along famously and 1090 did some exceptional work in hauling the clanking freights across the division. Grim Dave Carroll knew he had a real fireman beside him, one who knew his job and knew it well. He warmed to the boy with real affection and told him frankly that he was good enough to go into the passenger service.

Tracy got into the passenger service in due time. Gordon Nixon, the driver of 956, had been watching him for a long time and when his fireman was given an engine, he asked to have Tracy made a member of his crew.

Again the bright chap from the country, now a man in the twenties, found that he had more to learn.

Firing a passenger locomotive required even more careful attention than his old job. But he bent to the work with a will, despite the fact that more than once by careful estimation he discovered that he shoveled between twelve and fifteen tons of coal into the fire box on a run. Still,

with all his hard work, he found time to study the line. Every bridge, every crossing, every siding, every switch, he added to his mental catalogue of grades and curves until gradually he began to know the division as well as a river pilot knows the stream he navigates. He learned more about the mechanism of the engine, too, and he absorbed every scrap of knowledge he could gather, for he was preparing;—preparing for the time when he should be called, perhaps at the most unexpected moment, to assume command of the engine, nor did he guess how soon or through what circumstance this call would come.

CHAPTER III

WITH THE TRAIN CREW

JERRY WEST was a veteran of the line. Also Jerry was a cripple, one of a big army of men who have sacrificed an arm or leg or even life in the service of a railroad, for railroading, although the lines to-day are operated under the most careful supervision and by the best engineering brains in the country, can scarcely be called a vocation to which no danger is attached. But, thanks to greater knowledge and experiences, a multiplicity of safety devices, the elimination of whiskey and all that goes with it, and the coming of a keener, brighter, and more intelligent lot of men into the service, the danger in railroading to-day has been reduced to almost nothing when compared with danger attending the work in the old days.

Jerry West was a product of the old days. He was a brakeman, a member of a train crew thirty years ago, when that great invention, the

air brake, was young and not in universal use. Because Jerry West had the misfortune to be a product of those times when certain appliances that since have been perfected were in their crude form and surgery was not what it is today, he has gone about for three decades with but one arm, and has been a pensioner of the road, a gateman. Jerry lost his arm in the performance of his duty as a brakeman on a freight train.

"Them were days when railroading was a rough, tough and nasty proposition," Jerry assured the writer, in telling his story.

"Sure there was air brakes and they worked too; but they was expensive, that they were, and it wasn't every road that had them, nor did every train on them what had them have them." (There was no questioning Jerry's nationality after that, for none but a true Irishman could have done a better job at manhandling the King's English.)

"What did we use instead of air brakes? Why, hand brakes, of course. We had to jam a stick into the wheel for leverage and turn them that way. And a tough job it was. You notice

those wheels stickin' up on top of the freight cars even nowadays. Well, them's the hand brakes. In the old days all cars had 'em and when the engineer used to toot-toot for the hand brakes, you should see us boys a-humpin' ourselves scramblin' over the tops of the cars and jammin' 'em on as fast as we could. Sometimes we got 'em on and sometimes we didn't. It was one of the times we didn't that I lost me arm and lucky I was at that I didn't lose me life."

"What? Tell you about it. Sure, I'm doin' that thing, ain't I? Give me a little time an' I get it out." Jerry looked up the tracks reflectively and was silent for several minutes. Evidently his memory was living once again in those old days of railroading, for presently he spoke.

"Lots of 'em look back and call 'em 'the good ol' days,' but I can't see it their way. I'd call 'em 'the bad ol' days,' for bad they were. The good days are here now with lots more coming, for railroadin' is a lot easier and a lot safer now than it ever was in my day. And all together is a lot more interesting nowadays too. I remember the morning we took out No. 121 way-freight, that was the old train I near got killed on.

"It was a bitter morning in January. The thermometer was down low flirtin' with the zero mark an' it took a lot of will power to pull a fellow away from the stove in the 'hack.' We were all bundled up in overcoats and ear muffs and mittens and the tops of the cars were just covered with ice, so a fellow had to be like a cat to hang on. That's the kind of weather that's hard on the train crew, let me tell you.

"An' to make matters worse, a lot of the hand brakes were froze up tight an' we had to work like slaves to keep 'em loostened up. Of course, Number 121 was inspected before she left the yard and all the ice was chipped out of the brake gears, but that didn't keep it from formin' again while the train was on the run. In fact every drop of moisture or vapor from the condensing steam from the locomotive froze solid the minute it hit anything and the engine and forward freights looked like pictures you see of arctic exploration ships, only not quite so bad, perhaps.

"We were makin' the run to Scranton and if you know anything about the country in those regions, you know that it's all one hill after another. That was the mountain division of the

line, and when a train isn't strainin' itself to climb one grade it's havin' a hard time tryin' to get down another. We never got a level stretch on that line.

"Well, this morning I'm telling you about, all was fine and dandy in spite of the cold and we were booming along, a-snorting up one grade and down another with occasional stops on a siding to let some of the flyers go by.

Of course every time we pulled into a siding it meant work in the bitter cold for the train crew, for the head brakeman, who stays up in the cab with the engine crew, had to swing out and flop over the switch while the rest of us dug out of the 'hack' and went climbin' along the slippery roofs of the cars pulling away at the brake wheels as soon as the train had slipped past the switch.

"We'd made three sidings in the course of the morning and things looked pretty good for a quick neat run and then a 'swing' for us in the bunk house or roundhouse or most any old place where it was warm and where there was sociable companionship.

"But we had another siding to make about noon time to let the limited go by. That was

where the trouble came, and after it was over there wasn't much in the way of warm comfort or companionship they could give me. Most of my pals in the crew figured I wasn't ever going to need much more except a long box and a hole in the ground and it looked like they was right for several weeks. You see it was this way.

"We reached the siding all right and started to pull onto it slow and cautious like, for we had fifteen minutes to spare before the limited would go by.

"Now although they try to build most sidings on a level stretch where there isn't any grade, they had to build this one where there was just a little slope because, as I said before, the country was all hills and mountains. We got the whole train on the siding and was just pulling up so we would be as much off the grade as possible when clankety-clank, gurr-r-r-r went something and I looked up the line. At the same time the engine whistle whooped out three long blasts.

"'Good night, Murphy,' says I, for that meant that the train had parted. And I was on the hind end! Scared? I guess I was! A little bit.

"I looked back and I saw that the last eight or ten cars had split from the rest of the train, and was slowly but surely rolling back down the siding!

"It flashed through my head right there all the awful details of the situation. Those ten cars would roll down the siding faster and faster and smashing the switch break through and out onto the main line, runaways in every sense of the word, and able to play the dickens with everything that got in their way. It was down grade for three miles and the limited coming up. I could see those ten cars tearing down the track to meet the limited. I could see the crash that would follow and I guess I groaned when I thought of the wreck that would be piled up there on the main line, not to mention the bodies and like of that. Oh, boy, I was some scared.

"What was I to do! I thought quick, I did. I could save myself, of course, by jumping. Maybe I'd get a broken leg at the worst. But that thought didn't stick in my head long. My duty was to prevent the crash if I could. I knew I'd set the brakes on two of the ten cars. I could

hear 'em grinding. Now I figured if I could set the brakes on the other eight before the cars got to the stiffest part of the grade, perhaps I could bring the runaway to a standstill in time to flag the limited.

"Believe me, as they say nowadays, Jerry West was some busy boy. I started legging it over the tops of those ice-covered cars mighty careless of consequences, and jammin' my stick into the wheels a-wrenching and a-heaving with all the strength I had. Good night, but that was tough work. The bloomin' old brakes were stuck fast with ice and that made it about the hardest kind of a braking job a fellow wants to tackle.

"I was working and sweating and praying to beat all get out and seconds seemed like minutes and minutes like hours. Honest, my heart was in my mouth and I was most afraid I'd bite a piece out of it if I wasn't careful. Then—

"*Crash, Bang, Wow.*

"I thought sure the limited had hit us, for the old freights just rose up off the tracks and spilled over, and went rolling down the embankment, busting up into a million splinters, and I was right in among the whole heap.

"What had happened? Well, the brakeman who had flopped the switch had seen the train part. When he saw what had happened, he did the same kind of quick thinking I did and when he realized it was his move he moved fast. On the ground close by the track was a discarded brake shoe. He grabbed this and slammed it onto the rail of the siding and of course that derailed the whole ten cars and piled 'em up in a pretty mess. He said he yelled for me to jump but I was so busy I never heard him. Anyhow he figured my life was only one where the limited carried a couple hundred, so he let her flicker and figured on looking me up in the wreckage. He found me all right and I was all stove up and unconscious. They figured I was dead, but they put me on the limited after they got the line clear and carted me to the nearest city that had a hospital. When I woke up ten days later I had a broken leg, three ribs caved in and my left arm was so crushed they had to take it off.

"But the point of it all is that if that freight had parted to-day instead of thirty years ago it wouldn't have moved an inch. When the air coupling breaks between cars now all the brakes

go on with a bang and the cars can't move. So you see when a man talks to me about 'the good old days' I tell him to go chase himself.

"The good days of railroading are here and now and the lot of brakemen of a train crew is much easier to-day than it was in the days when I worked at the job."

There can be no questioning Jerry West's statement. Railroading has changed a great deal and is to-day far safer and far more interesting. But with this change in operation a change has taken place in the type of men who compose the train crews. The old type, the rough, rugged, and sometimes uncouth brakemen, trainmen and conductors have given way to clean, bright eyed, intelligent chaps, none the less courageous but far more ambitious than the men who manned the railroads forty years ago.

But although modern inventions and new ideas in operating have made the work of the train crew less difficult, their task can hardly be considered one of ease and inaction even now. There is work to be done, abundance of it. There are still the cold and storms of winter to be faced from the tops of ice-covered cars, there

are still hours of tedious work on the long hauls where a man must work the whole night through and then often work all day, too, before he gets his "swing," as a rest period between runs is called in the language of the railroaders.

All trains, both passenger and freight, are in the charge of a conductor, and he is supported by a crew of brakemen, or trainmen as they are called in the passenger service. The conductor has the full responsibility of the train on his shoulders, and it is for him to see that everything goes right, from the safe conduct of the train to its destination to the clerical work that results from being in charge of forty or more cars loaded with thousands of dollars' worth of valuable freight destined to twenty different points on the line.

Of course, certain of these responsibilities are delegated to his assistants. It is on them that the burden of the hard manual labor falls. Usually there are two, sometimes three brakemen, to a crew of a freight train, and they have certain specified duties. One brakeman has charge of the forward end of the train, another the middle, and the third the rear end, and they are held

The man on top of the freight car can be president of the road some day

(c) Ewing Galloway

Slow freight but mighty important when a coal famine threatens a city

accountable, by the conductor, for their portion of the freights. It is necessary for them to range the narrow foot-path on the tops of the cars, leaping the two-foot spaces between cars, and in a measure maintain a sort of a patrol to see that nothing goes wrong, and, in the cases where hand brakes are still used, operate these.

This is no mean responsibility, and patrolling the tops of a string of freight cars in motion is not without its danger. In the patrol the brakemen are always likely to meet the roughest and most desperate type of man in the "hobo" or "yegg" who makes the freight trains, illegally, of course, his special conveyance.

Many a terrific battle has been staged atop of swaying freight cars between these denizens of the underworld and the men who are patrolling the tops of the trains, for the "hobo" is a vicious character, ready and willing to fight or to kill if he is in a tight corner. Indeed, there has been many a death charged up to these encounters, for the trainmen are just as quick and eager to fight as the outlaw is, since theirs is the responsibility and they know that with "hobo" or "yegg" aboard the train there is always a chance of some

of the freight being stolen, in which case they are held accountable.

Alike they are held responsible for accidents to human beings and they know that if a crushed and mangled body is found between the rails after their train has passed they will be asked to explain, even though the body is that of a tramp. So, to avoid such gruesome consequences, they are quick to drive from the train any who are stealing rides.

But there are other dangers in riding the tops of freight cars that the brakemen have to face. In truth, the mere being a-top the swaying, lurching car when it is under full headway is hard enough. Then, to do this at night with a swinging lantern in one hand, and being forced every little while to jump from one moving car to another, is still harder. It is always necessary for brakemen to be on watch for a thump in the face from the "tickler," that gallows-like telltale of ropes that hangs over the tracks at frequent intervals to warn of the approach of a low bridge or tunnel.

When a brakeman gets a slap in the face from this he knows that he must instantly

throw himself flat on his stomach on the car roof or he will be brushed off the train and dashed to Kingdom Come by a steel girder or a masonry arch. Fortunately, such gruesome accidents rarely happen, for the men, dare-devils though some of them are, heed the warning of the tickler and take few chances, for they do not always know just how high the bridge or tunnel is. Some of these over-track constructions are built high enough to give full clearance to a man standing upright. These are survivors of the days when all freights were equipped with hand brakes and it was frequently necessary for men to stand upright on the cars to manipulate the brake wheels while going through tunnels or under bridges.

But those that have been built within the last twenty years do not allow so much clearance. Indeed, some of them hardly allow three feet between car roof and bridge girder. One can well understand, then, why a man needs to be flat on the car roof when passing under these.

Tramps and "hobos" are not the only troubles that brakemen guard against in their patrol of the freight train. There is always the danger

of a coupling breaking and the train separating or a break in the air connections between cars. To add to the present-day brakeman's troubles there are refrigerator cars and heated cars to be cared for and a host of other details. Then, too, when the train pulls in at a siding or lays over for any length of time, each brakeman is supposed to give his section of the train a thorough inspection to see that all is well with the mechanical parts.

And all this is outside of the work that is necessary at every stop that is made where the freight the train is carrying is due. To be sure, most freight train runs are made from one central point to another without breaking up the train. For instance, freight that is to be delivered at points west of Buffalo is hauled as a solid train from New York to Buffalo, where it is split up, some of the cars for the farthest points west being attached to other solid trains, while the cars containing the freight for towns near at hand are coupled onto way-freights that run but a short distance from the central point, dropping off the cars at the towns they are consigned to.

It is at such times as these that the train crew is called upon for extra tiresome work, for it is up to them to break up the train, cut out or drop off the car or cars that are to be left, couple up the train again and get under way.

Every member of a train crew must know intimately a hundred details of railroading. Of course, he must know all the rules of the road regarding signals and one of the crew, usually the brakeman who has charge of the rear end of the train, must act as flagman. When the train is at a stop on the main line, or on tracks on which other trains are liable to be traveling, he must swing to the ground at the sound of the call for flagman from the whistle of the locomotive, and hurry back along the tracks a train's length or more and there post himself with a red flag in hand to warn any trains that might be following that they must stop to avoid a rear end collision with the freight train.

He uses flags in the daytime to do his warning, but at night a red light is necessary. Sometimes, if the stop is only for a very short time, he will leave a red caution light sticking in the ground beside the tracks. This can be seen a

long way at night or even through a thick fog, and while it burns approaching trains travel very cautiously. It is assumed that by the time the red fire is burned out the freight will be in motion again, so the engineer of an approaching train when he sees this red fire stick does not come to a full stop, but he does slow down his train until it almost creeps along for the next half mile until he is certain that the train that has left the burning light has gone on its way. Torpedoes are also used. Every flagman carries in his box of signals a number of light sticks and a half dozen or more torpedoes. These are made of a hollow disk filled with powder and fulminate of mercury and they are clamped onto the rails by means of two strips of lead that bend under the flange of the rail and hold the torpedo in place. When a flagman goes out from a train that is going to be delayed only a short time, he promptly clamps two of these torpedoes on the rails at intervals of a rail's length and returns to his train. When the train following runs over these torpedoes two quick reports are sounded that can be heard above the clank and rumble of the train, and the engineer promptly slows

down and feels his way along until he sees the stalled train or until he feels certain that it has gone on its way.

All of this flag and signal work is usually done by the brakeman at the rear end of the train. But the brakeman who guards the forward end, and has his headquarters in the locomotive cab, also has his special duties, for it is his job to swing down from the cab each time a siding is to be made, and run ahead and unlock and throw over the switch. There he waits until the train has passed over the switch point and onto the siding, when he throws the switch back into position and locks it again.

Thus both front and rear brakemen have definite duties, each of which requires that the brakeman be careful and alert, for if the man protecting the rear of the train is careless a collision is likely to result in which lives and property are lost, while if the brakeman who handles the switch is thoughtless and does not set the switch back in its proper position and lock it, the next train may be derailed and a serious wreck occur, all of which indicates quite clearly that a railroad man must have his wits

about him and must always realize his responsibilities no matter how humble his position might be.

But what of the conductor?

It would seem that with the train crew doing all this work and the engineer and fireman taking care of the motive power, but little remains for the conductor. That official, however, has all the work that he can attend to and usually a lot more. First of all, because he is fully responsible for the train, he must see that his brakemen do their work properly. He must see that the forward brakeman attends to the switching properly, he must be certain that they carry on their inspections, and he must take a hand in their clashes with "yeggs" and "hobos" too. So the conductor is found walking the tops of the swaying freights too occasionally, and at every siding he is out with his lantern looking things over.

Between times he is to be found in the caboose, or "hack," as railroad men call the queer boat-shaped car on the rear of each freight train. Here at his desk, for he has a sort of an office in the caboose, he attends to all the clerical details

of the train. He handles all the way bills involved in the shipment of the thousands of dollars in merchandise in his cars, and he alone is responsible for caring for these and all the details that they involve. In addition to this he is the one who receives all the train orders from the train dispatcher in the terminal, and consequently it is on him that the responsibility of seeing that the orders on these flimsy yellow typewritten sheets that he receives at the beginning of the run are carried out. One may tell him that train number so-and-so will lay over at such and such a point to let his train through, another may say that he is to hold his train on a specified siding to permit train number whatever-it-is pass and so on. All of these must be obeyed to the dot and he must see that crew and engineer are properly informed and that the orders are carefully carried out.

His caboose is an interesting car from several points of view. Besides being the office of the conductor it is also the home of the crew. To be sure, it is a rough and crude sort of a home in many respects, but in other ways it is homey and cheerful, especially on a bleak winter night

when the wind is howling a gale outside and the snow is drifting and blowing up the tracks.

Inside, the caboose is arranged with four bunks on either side, and these, covered with gray army blankets, are mighty snug and comfortable beds. Then, of course, in winter there is a stove in some; others, of a more modern build, are heated with coils of steam pipes kept hot by steam from the engine. In the center of the car, especially those of the old type, is a pyramid of steps ending in seats up in the cupola. These seats are arranged so that the men can sit up there under that peculiar sort of a skylight and look the full length of the train without obstruction and in that way keep a watchful eye on things at all times. In the more modern cabooses this pyramid has given way to an iron ladder which reaches up to the seats in the cupola.

The equipment of the average caboose is mighty interesting, because there are hoarded all sorts of emergency tools, such as axes, crowbars, ropes and tackle and numerous other odds and ends that sometimes are not in demand from one year's end to another, but when they are needed

they are needed badly. There are locks here, too, for the train crew and an emergency first aid kit. Usually too there can be found a collection of pots and pans and coffee kettles, for when the train crew is called upon to make this snug little car their home for any length of time, you can be sure that they make themselves perfectly at home in every way and cook a snack or two for themselves to go along with the contents of their lunch pails. And the writer knows from experience that some of these trainmen are accomplished cooks, for some of the "western" sandwiches, or concoctions of chopped meat and onions, or some of the "mulligan" he has tasted that has been turned out by a brakeman cook on a long run, has been well worth sampling.

There are good times to be had in the "hack" of a freight train, for always railroad men are good company. Fancy sitting on one of the bunks with two or three trainmen as companions and listening to the "yarns" they spin. It is bully. Then, some one of them tunes up a harmonica that he has dug up from the bottom of his locker, and a rich, rollicking concert

blends with the clanking cadence of the train, and the visitor settles down on the bunk and begins to think that if he had his life to live over again he would choose to share it with the fine, strong, clean-eyed huskies who compose a freight train crew.

As with the engineers and firemen, promotion is made from the freight service to the passenger service with the men of the train crews, and sooner or later these good-natured, hard-working, rollicking young chaps of the caboose, if they have ambition, as most railroad men have, are given a chance in the passenger service. They are no longer brakemen when once they don the blue uniform of the passenger service. They become trainmen then. But their duties on the passenger trains are essentially the same except that they have more details added to their regular routine. They must here see that the cars under their care are properly heated and ventilated, they must show every attention and courtesy to the passengers, but they have full authority to act in the case of disorder in their cars, ejecting or even causing the arrest of rowdies or other type of objectionable people.

As in the freight service, the trainman is given a section of the train to take care of. One man works from the back forward, another has charge of the middle of the train and still another the forward end. As in the freight service, too, the rear trainman is also the flagman, protecting the rear end of the train whenever the occasion demands.

The conductor in the passenger service has infinitely more details to trouble him than when he was conductor of a freight train. The clerical work on a passenger train is very much more difficult, for it involves money and tickets and, if there are any errors, why the conductor must reimburse the company out of his own pocket.

Of course, on a passenger train there is necessity for a much larger train crew than on a freight and there are, too, additional employees on these trains for which there is no need on freights, such as the baggageman, for instance, and the clerks in the express and mail service.

CHAPTER IV

THE VIGILANCE OF THE STATION AGENT

THE station agent is an important personage no matter where his station may be located. Indeed the smaller the station and the town it serves, the more important is his work and the more he becomes a man of affairs in the community.

In many of the small western towns, and in fact small eastern towns as well, the station agent occupies a position next in importance to that of constable or postmaster. He has a position with a certain amount of authority and because of this the townspeople have a great deal of respect for him. But he is as a rule deserving of this respect, for he is a man of good education, he has a good general knowledge of things that go on in the outside world and he has a good position with good wages, and he is the representative of a big and strong company.

Next to the postmaster, he comes in contact with a greater number of the townspeople than any one else. He has a wide circle of friends and he is in a position to do many services both for the community and the individual. In small towns he is the local telegraph operator and all the messages coming and going from town clear through him. He is in close touch with all that goes on in the town, for strangers coming in or going out must pass beneath his window. Freight and express packages of all values are left in his care and at many stations he is given the responsibility of money shipments for banks and for manufacturing plants or other industries in the town.

Of course, such valuables are guarded with extreme care for, back of his personal responsibility, is the company's responsibility and the company's honor, all of which are sacred in the eyes of the station agent. Indeed, there are many thrilling tales told of the courage and bravery of station agents, who have sacrificed even life in the protection of property left in their care.

Not the least thrilling of these stories is the

one told about Fred Foster, agent at Cordele on a certain western road.

Cordele was a small town, a tank town in the parlance of railroad and traveling men, for there was a watering tank beside the track kept filled by a windmill, from which engines drew water when necessary. The actual inhabitants of the town numbered about three hundred men and women, but there was a floating population, so to speak, of twice as many, for seven miles back of the town in the mountains were two rich silver mines and a smelting plant. All of the business of the mine was transacted in the town and all of the miners who came to the works or left it, left by way of the Cordele railroad station. The station was of reasonable importance on the line, too, since the mines were responsible for the coming and going of a great deal of freight as well as the "bohunk" passenger traffic, which is the name given to travelers of foreign extraction, especially the laboring class.

There was another big reason, especially to Fred Foster's mind, why the station was important. Twice a month, on the thirtieth and the fourteenth, he received from the express mes-

senger of No. 6, the local passenger train up from Rawson City, a small but heavy safe, which he was ready to guard with his life, for it contained twenty thousand dollars in currency, the bi-monthly pay-roll of the two mines and the smelting plant.

Twenty thousand dollars! That was a big sum of money and Fred Foster considered anew his responsibilities each time he lugged the little safe, by means of a platform wagon, to the station, and stowed it away in his bigger safe until it was called for by Jeff Sturgess and his well armed assistant from the smelting plant.

"Twenty thousand dollars. That's a goshawmighty lot of money," he would say to himself. "There's lots of men in these parts that would commit murder for less than that. Fred, my boy, you got to watch your step or some fine night some one is going to try and take that away from you like they did from poor old Dicky Crawford twelve years ago. Wish No. 6 got in here at twelve o'clock noon instead of six o'clock nights. Then Jeff Sturgess could get it out of my hands and up to the mine the same day. I'd get more sleep on the night of the thirtieth and

the fourteenth of each month than I do now. I guess Minnie would be glad, too, because I know she worries over it." Minnie was Fred Foster's wife. They lived in quarters provided for them by the railroad on the floor above the station.

As time went on Fred Foster never let down in the care with which he guarded that precious safe with its treasure in currency. Twelve years back, when the mine and smelters' pay-roll amounted to less than half its present value, one of Foster's predecessors, Dicky Crawford, had let down just a little in his vigilant guard of the money and the station was robbed. Dicky arrived on the scene just in time to stop two bullets that tried to get through the doorway at the same time he did, and after that there was a headstone with his name on it in the local cemetery.

So Fred Foster never became careless about the pay chest. Indeed, he made it a point to have a great deal of work to be done on the nights of the thirtieth and the fourteenth of each month and as a rule he sat up in the office all night doing it, so that there was little chance of a robbery being attempted without his knowl-

edge. Yet for all his vigilance he feared that some night some one was going to be tempted by the possibilities of a big haul and give him a lot of trouble. He tried to shake off this presentiment time and again, but it persisted. And then one night, the fears he had were realized.

It was on the fourteenth of the month, a raw and rainy day that grew more ugly as night came on. Number 6 was late and it was dark and soggy outside when Foster trundled the station truck up beside the baggage car and helped the express messenger lift off the heavy safe. Foster waited only long enough to give what dispatches he had to the conductor, then he made haste to trundle the truck down the short platform.

Before the train had left the station he had lugged the little safe through the deserted waiting room into his own wicker-windowed office and stowed it away in the safe. Once more back at his desk and his telegraph instrument, he looked out upon the sodden world and watched the rear red lights of the train disappear down the tracks. Then he cleared her with a brief message clicked off to stations down the line.

This done, he locked the waiting room with great care, looked once again at the combination of the safe, then left his office, locking the door of this too and all the windows, before departing upstairs to his waiting supper.

It was half-past seven when Foster came down again, and unlocking the door of the ticket office, went inside to his desk again. He did not bother to unlock the waiting room doors, for there were no more trains scheduled to stop at Cordele that night.

Alone in his office he lighted his corn-cob pipe and sat there listening to the sporadic clicking of the telegraph instrument. He could hear No. 6 being cleared far down the line, her automatically deciphered messages from J. G. to K. C. about work to be done on the track at Oakland, he heard B. F. tell X. M. about a car of coal that was lost between Kelly's Corners and Newton, and so the chatter of the key went on. Sometimes it was business up and down the line, sometimes it was mere wire gossip between stations.

By and by the key seemed to grow sleepy. There were longer intervals between its chatter and Foster knew that one after another the sta-

tions up and down the line were closing and the agents were going to bed. Fred envied them. Only the stations of the big towns would stay open all night and the nearest to Cordele was Oakland, thirty miles away.

The gradual diminishing of the gossip of the key began to make Foster feel lonely there in his little office. The station was quiet, dreadfully quiet. The ticking of the big station clock seemed very loud by comparison. Outside wind and rain swept the platform and tracks and beyond Foster could see only one or two dim street lights in the town. Every house was dark and silent, its occupants gone to bed. How Foster envied them! There would be no bed for him that night and it was a long, long time until dawn.

"Oh hum," he yawned, but his voice seemed so loud and strange in the silent station building that it made little chills run up and down his spine.

"Shucks, I must be getting as nervous as a cat," he muttered to himself. And, a little bit disgusted at the way he felt, he threw himself into the mass of clerical work that was stacked up before him.

But it was hard for him to concentrate his mind on what he was doing. Somehow it seemed to wander.

"What on earth ails me to-night?" he muttered as he put down his pen and reached for his pipe. In doing so he looked up and his heart jumped, for he was almost certain that he saw a shadow flit across the shaft of light his lamp cast on the station platform. He stood up and peered out into the dark, but he could see nothing save the rain spattering down.

"Blamed fool you," he upbraided himself as he sat down again. "Blamed fool. You are getting worse than a rabbit. What's the trouble? Liver out of order or have you been drinking too much coffee lately? You didn't see anything. That was just the wind blowing the rain in sheets. Come on, get to work and forget it."

Again he tried valiantly to crowd disturbing premonitions out of his mind. But the harder he tried the more they persisted. Once he thought he heard footsteps on the station platform. They were guarded footsteps, at least so they seemed to him. Then he thought he heard the soft muffled rattle of the knob of the wait-

ing room door, as if some one was surreptitiously seeking to discover whether it was locked. It was terribly creepy. He tried to tell himself that it was all imagination, but somehow he knew better, somehow he felt certain that out there in the rain and the darkness some one was lurking about the station, slinking from window to window or door to door, trying to find some way of getting in.

Chills raced up and down his spine. He began to feel the presence of that safe behind him, with the smaller safe inside and its precious contents of $20,000. He turned and looked at it almost accusingly. It was like a millstone about his neck. He wished heartily that it was not there. Then he could be abed and asleep.

Just when his nerves were most unstrung he *did* see something that told him all too plainly that out there in the dark there were human wolves bent on breaking in and robbing him. Foster's heart began pumping hard. For a moment he was panic stricken, for, half turning his head, he looked out through the grill of the ticket window toward the window of the waiting room. He saw a hand traveling slowly around

the edges of the window pane. Beyond it he thought he could dimly see an ugly face leering at him from the darkness. Instinctively he gave a start and his right hand slipped down underneath the desk, where in a holster nailed to the table leg, but out of sight, he always kept his big six shooter. His hand grasped the holster and felt about gropingly for a moment. Then his whole body went limp with surprise and disappointment. The revolver was not in the holster! Some one had stolen it!

For a moment he was stunned. He could hardly realize the situation he was facing. His gun gone and the thieves forcing their way into the station. He glanced toward the window. A big hand was pressed flat against the pane, forcing it inward. He was certain that he saw the ugly face in the dark grin at him. It was a terrible grin. It made him realize how helpless he was.

Then suddenly he gripped his shattered nerves and became master of himself. He could beat them. He would beat them. His hand flashed for the telegraph key and he began clicking with deliberate slowness.

"O. L.—O. L.—O. L.—" he called. He was calling Oakland, the nearest station at which he knew there was a night operator.

Presently there came a break in the call and he closed the wire to hear Oakland's answer.

"O. L. What — do — you — want — this — time — of — night?" came the query.

"This — is — Cordele —" snapped back Foster. "Thieves — are — forcing — their — way — into — the — station —. Twenty — thousand — dollars — here —. They've — stolen — my — gun —. Send — help — or — they ——"

Came a crash of glass as the window was forced in. Foster closed the key and ducked out of sight below the ticket grill, but not before he had seen a big hand reach in and unlock the window. He heard the lower sash raised upward on squeaky pulleys. Then he heard the thump of feet as first one man, then another, and still a third dropped to the floor inside. Three men against him. Foster gasped. Then reaching upward he put out the light in the ticket office and the rest of the station building. He did not mean to be a target for them through the ticket office window.

"Cut that stuff Bo," growled one of the robbers in the darkness of the waiting room. "We got you now. You ain't got no gun because we pinched it this afternoon, so you ain't got a Chinaman's chance. Best open up the ticket office and let us in. We don't mean no harm to you if you're a good guy. We don't want no killin' 'lessen we haff to. See?"

Foster saw and understood but he did not reply. He was too busy fumbling behind the big safe in the rear of the ticket office. Hidden behind this, magazine fully loaded, was a short barreled riot gun. It had been gathering dust back there ever since Dicky Crawford had been killed by station burglars. Foster was not sure that it would work, nor was he sure that the twelve-year-old ammunition would explode. But he realized that it was his only chance and he grasped at it eagerly.

He found the old gun and drew it forth. Crouching behind the safe he tried the pump mechanism. It was so badly rusted that it required all his strength to move it backward. He gave a mighty wrench and it gave way with a clatter, ejecting a shell onto the floor.

The sound of the gun caused the robbers to stop in their tramping about in the waiting room outside.

"Hear that, Slippey? The bloke's got a gun at that," said one with a slight suggestion of concern in his voice.

"Naw he hasn't. He's bluffin'," replied Slippey. Then he shouted, "Hi you in there, we'll give you two minutes to open up." He kicked a heavy foot against the door of the ticket office and Foster heard the wood crack and splinter under the impact.

For answer Foster aimed the riot gun at the door and pulled the trigger. There was a terrific roar and a blinding flash that lit up the close quarters of the ticket office and a charge of nine buckshot carried away the splintered panel of the door.

Beyond from the waiting room came a yell and a volley of oaths.

"Ugh, got me in t' wing. Take that."

"Bang! Bang! Bang!" roared the forty-five out there in the darkness and three bullets ripped through the door and flattened themselves against the safe behind which Foster crouched.

"Fight, will you?" came a coarse voice. "Well, we'll give you enough if that's what you're looking for," and another string of shots ripped out.

Through the broken panel of the doorway Foster saw the jets of flame from one of the six guns and he let another charge of buckshot fly in that direction. He was cool now, perfectly cool and collected. He knew that he had the best of the situation. The only way they could get him out from behind the safe was to kill him and drag him out, and he could repel any assault of theirs—that is *if his ammunition held out.*

Foster had not thought of that before. He suddenly realized that the magazine of the gun held but six shots and that was all the ammunition he had on hand. He had spent two shells and pumped one good one out onto the floor. That meant he had just three shots left. Three shots and there were three men outside. He would have to make every shot count.

He thought again of the one good shell he had pumped out of the gun before he fired it. He needed that, needed it badly. He began groping for it in the dark, reaching as far as he could

from the protection of the safe. But while he searched a sound came to his ears that made him shudder. It was the scraping of a heavy timber through the open window of the waiting room. In a moment he knew what was happening. The robbers, determined to get into the ticket office the quickest way possible, had brought in a heavy railroad tie. Doubtless they would use this as a battering ram against the all too flimsy ticket office door. He knew only too well how quickly the barrier would give way under the crushing impact of such a missile and his heart sank. He knew there was nothing left for him now but to stand up and as the door went down repel their rush with buckshot. If he could lay them low in three shots he would be saved, but if he failed—he knew what the end would be.

In the waiting room he heard the scuffle of feet and the thumping of the heavy tie as the men gathered it into their arms.

"Ready, Fargo. Right. Crash it down, then go in and clear him out. Can't waste any time now or some one will be here."

Foster heard them start—heard the scuffle and tramp of heavy feet, a muttered curse or two,

then a jarring, splintering crash. He jumped erect as the door splintered and crashed down. In the darkness he could see vague burly forms filling the doorway. He knew that ugly faces glared at him. Revolvers roared almost in his face. Then he cut loose.

"Bang! Bang!" He paused an instant for the third shot. Something had happened to him. He felt very strange. A peculiar dizziness came over him. He could hardly hold the gun for the next shot—his last. He had been hit! He gritted his teeth and steadied himself. Then, as a big form hurled itself at him, he fired.

The gun fell from his weakened fingers. He staggered, sagged back against the wall and tried by a mighty effort of his will power to keep from going unconscious.

Then as he leaned there unsteadily he became conscious of a light that flooded the waiting room. There were other shots fired in quick succession. They ripped out with smashing violence. Through half-shut eyes he could see two of the robbers rushing for the opened window. One went down, rolled over and lay still. The other gained the sill and was part way through

when another string of shots ripped out and with a groan he swayed, clutched vainly at the window jamb, then fell with a crash.

For a moment absolute, deathlike quiet fell in the station. Then the fast sinking Foster beheld through the shattered doorway a figure in a white nightgown coming toward him, a lantern in one hand and a smoking revolver in the other. It was his wife. Minnie Foster, despite the danger, had come down into the bullet-swept waiting room just in time to save the whole situation.

Foster with a smile on his lips sank to the floor unconscious.

* * * * * * *

To be sure, not every station agent has the thrilling experience that Fred Foster had. Indeed, Foster is one out of thousands, and yet the list is all too long of the number of station agents who have given their lives to the service in encounters such as this. Yeggs and tramps continually have their eyes on the usually prosperous cash drawer of the country railroad station and such men have small regard for life or property.

But a few months before these lines were

written the station agent at West Point on the Hudson was shot and killed by yeggmen who robbed the station cash drawer. At West Point, within hearing distance of the army academy, almost under the nose of Federal authority, such an act was committed. It would seem from this that the average station agent has something to worry about.

Yet the station agent takes his task in the same way that an engineer takes the job that is before him. Again it is "all in a day's work." But the day's work of the small town agent is likely to be far more than the work of so many hours. Indeed, it seems never ending in many instances, so many are his duties.

The station agent of a small town must first of all be a thoroughly trained A No. 1 telegraph operator. This is essential, for the telegraph is the nerve system of the railroad on the smooth operation of which depends the safety of the entire line. Paralleling every set of railroad tracks is a telegraph line that touches every station and signal tower. The whole line is one long circuit, so to speak, and by means of it headquarters and every station agent on the line can keep in

Changing rails between trains means hard work for the section gang

The station agent is a man of many responsibilities

touch with every moving object on the rails. All important messages concerning train operations are sent over these wires and each station agent can read them and translate them into written messages.

All orders to trains upon the line are sent and delivered by way of the telegraph and the station agent. A freight may leave the terminal yard with definite orders to go through to a given point before side tracking to permit a faster train to pass. When the freight is half way up the line it may be necessary to send a flying special, perhaps the wrecking train, to some point, and this special must have a clear track. Orders are flashed ahead by telegraph and are received by the station agent through whose station the freight will soon pass. He immediately flags the train and gives the conductor the order for a clear line, and the freight pulls in at the nearest siding or middle until the flying special goes by.

Or again freight trains are often sent out with incomplete orders—that is, the conductors are told to report to certain stations for orders from the dispatcher's office as to what to do next. All

these messages reach the men operating the trains by way of the telegraph instrument and the station agent; that is, unless it happens to be a line where the telegraph has been supplanted by telephone, and all the dispatching is done over telephone wires.

Thus we see that the station agent is a very important link between the operating management of the road and the men who actually operate the trains. Indeed the station agents on some lines are daily receiving messages over the busy railroad wires on which the safety of life and property depends.

This in itself would indicate that the agent must be a man of high caliber. He must first of all have a quick ear and an accurate brain to be able to translate the dots and dashes of the Morse code into intelligent messages. He must also have a full realization of the responsibilities of his position.

But the telegraph instrument can only claim a portion of the station agent's time, for he has a host of other duties besides. He must take care of the sale of all tickets at his station, and for that reason he must have at his tongue's end the

variety of rates between his town and other points on the line. He must also know all the details of arranging for Pullman accommodations, and of course he must know the road's train schedule to the dot. The many and varied details of the passenger service of his line must be as an open book to him.

That is not all. Indeed, it is only a part of this varied knowledge of railroading. He must know, too, equally as much about the freight service of his line, for in a one-man station he is also freight agent, having all to do with the complicated work of figuring out freight rates and making out freight bills.

Then, too, he is the baggageman at the same time, checking and accounting for all baggage, such as trunks, suit-cases, valises and packages of personal belongings that arrive or depart from his station. He is likely also to be the agent of the express company, transacting all its business along that part of the railroad. And if the town is small enough to require him to do all this, he is probably required also to be the local telegraph operator, sending and receiving messages for the telegraph companies that, by ar-

rangement with the railroads, send messages over the railroad wires.

And there are many stations, too, where the agent having all this to attend to is given in addition the job of local postmaster. The station agent is a man of many and varied occupations, and one wonders as he looks out from the window of a flying train at the station of some tiny and remote town how the station agent ever finds time to keep the little grass plot cut and trimmed so neatly and how he can afford to devote even a little of his day to the care of the pretty flower bed beside the station platform.

But they manage somehow—manage because they are railroad men and made to manage just such affairs as these. To them operating details come naturally. They know by instinct, it seems, the workings of signals, the use of flags, the meaning of raised or lowered arms of a semaphore, or the blasts of the locomotive whistle. They are railroad men and when that is said a lot is implied, for railroad men represent a class; a type of men that stand head and shoulders above the average run of human beings. They are Americans of the one hundred per cent.

variety. They are of the same stock as the pioneers, the Indian fighters, the men who built the Republic and the men who 4,000,000 strong showed Europe and the whole world what America and the American people stand for.

CHAPTER V

SECRET SERVICE STUFF

THERE is a department of railroad operation about which very little is known to the outside world and even to railroad men themselves. Hardly anything is heard about this department save for occasional mention in the newspapers that some particularly bold "bad man," yegg, or tramp, or railroad hold-up man was finally arrested by Detective So-and-So of the detective bureau of such-and-such railroad. But for these occasional glimpses into the "inside" of the business the average individual would never guess that almost every one of the big railroads operates a special secret service department or, as it is generally termed, detective bureau.

These men are the railway police and their operations are as varied as those of the sleuths of the average city police force. These detective bureaus are composed of some of the best sleuths or secret service men in the country and the work

they do is as clever as that of the well-known but fictitious character, Mr. Sherlock Holmes.

Why does a railroad want to go to the trouble and expense of operating a detective bureau? How does the railroad benefit? You only have to use your imagination to figure that out. Here is a company with property extending over hundreds, yes thousands of miles of country. There is valuable property in every town on the line and there is valuable property moving up and down across the country every hour of every day and night. I refer to the rolling stock and equipment of the railroad alone, and the various buildings, offices, stations and baggage rooms, freight sheds, coal pockets, wharfs, grain elevators and so on.

In addition to this all of these buildings, cars, piers and what not, contain millions of dollars' worth of valuable property in the form of merchandise being shipped to all corners of the country. And while this property is in the hands of the railroad for shipment the railroad is entirely responsible for it. If any part of a shipment is missing, no matter how trifling it is, the shipper or the one to whom it is consigned, or being

shipped, is bound to come down upon the railroad for damages, and in the end the railroad has to pay the bill.

It can be very easily understood that with so many millions of dollars' worth of goods on hand at all times and scattered so widely there is every opportunity for the railroads to lose a great deal by theft. Although the average railroad has a tremendously long list of employees, these men, efficient though they are, are just as widely scattered as the property. Under such circumstances there are bound to be points on the system that are rather loosely guarded, and it is generally at these places that thieves in general try their luck.

There is one type or class of criminal who looks to the railroads almost entirely for loot. This class includes the tramp, hobo, or yeggman, all of the same criminal brand, but each a distinctive type. Not only these men look to the railroads for illegal transportation to any point they choose to go, but they mark railroad property as especially desirable and easily stolen. They will force their way into railroad storehouses, freight sheds, or ticket offices whenever the op-

portunity presents itself and steal everything that they feel they can carry away without difficulty. They will force their way into loaded freight cars and appropriate anything in them that they feel in need of, whether it be a case of canned condensed milk or ham or slab of bacon.

For years, ever since the Civil War, in fact, the tramps, hobos and yeggs have been an organized menace to the railroads of this country. Old timers insist that before the Civil War this country knew no such denizens as these. They say that this country was in such a chaotic state immediately following the close of the war that thousands of soldiers returned to civil life to find that there was nothing for them to do in the way of work. They proceeded then to go to other towns, and being generally without funds they stole their transportation from the railroads by riding in empty cars, or on brake beams, trucks or between cars. They found their grub too by stealing from the railroads, or "plinging" it (begging it) from door to door in towns at which they stopped.

This wandering life seemed to appeal to a tremendous lot of these former soldiers, rovers

and dare-devils that they were, and gradually they stopped looking for occupations and proceeded to live on their wits and the railroads. And thus was born an entirely new type of citizen, a disreputable type to be sure, and one that the railroads have had to reckon with ever since.

Gradually these tramps, as they were then termed, began to organize into a regular underworld fraternity, with a vernacular of their own, and cabalistic signs by means of which they communicated with each other. They would chalk up those queer signs on fences, gate-posts, water tanks, box cars and even jail doors, and by their presence other members of the fraternity would know which houses in town could be "panhandled" for a meal or which house had an ugly dog. They could tell whether certain towns were wide open so far as they were concerned, or whether the police of certain communities had an eye out for tramps and put them into the town lock-up readily. They had individual signs too and descriptive names and the Chicago Kid could tell from certain chalk marks on a water tank along a railroad right-of-way whether his

pal, Bull McCabe, had gone east or west and where he was headed for.

They had rendezvous and camps too almost always hard by a railroad right-of-way. These rendezvous were usually in a woods where shacks or caves afforded them protection from the weather, and where frying pans, pails and cans were to be found snugly stored away in which they could make their " slum " and other descriptively named concoctions that they were accustomed to making, for these ex-soldiers of the Civil War were good cooks and all-around good campers as you may believe.

And so the fraternity of tramps grew out of this group of wanderers, and others besides former Civil War soldiers were attracted to the life. Men with trades, such as printers, umbrella menders, tinsmiths, and even plumbers and mechanics joined their ranks. They became the hobos of a little later date, riding via " side door Pullman," the same being empty freight cars, from town to town or city to city, stopping off to do just enough work (when they were not successful at begging) to earn sufficient money to buy their meals for a few days. Then they

would move on "hoboing it" from coast to coast and from Canada to the Gulf. The writer is acquainted with one of these former hobos, a printer, who "hoboed" through every state in the Union, stopping at nearly every town and city of more than 5,000 population, but never remaining in the same place longer than two days. He was "on the road" six years. He is, fortunately, reformed and has since become the foreman of a large printing plant in a western city.

Among these two classes of rovers, the tramp and the hobo, there developed a third type, the yeggman. They were the lawless, fearless, human wolves of the clan, the worst feared of them all, for they stopped at nothing, not even killing, when it became necessary.

The yeggs are the worst of all the denizens of the underworld, for they are not content to lead the careless irresponsible life of the tramp or the hobo. They are criminals at heart and they, more than the others, are responsible for the hold-ups on fast mail trains, the blowing of post-office and station safes, the wholesale thefts from freight sheds, storehouses and freight cars, and all the other crimes that occur on the railroads.

All of them are expert makers of "soup" or nitro glycerine, which they develop from stick dynamite, and most of them carry weapons of one sort or another, usually automatic pistols, and a small kit of burglar tools. With this equipment, like wolves, they travel across the country, jimmying their way into freight sheds, or storehouses here, and the next night, miles away (having traveled via freight cars), they will blow the safe of a station ticket office or hold up a station agent while they appropriate the contents of his cash drawer.

Many an honest, clean living, fearless railroad man has met death at the hands of these fellows, while protecting railroad property, and many a bloody fight has taken place along the railroad right-of-way, when a group of these yeggs come face to face with the fighters of the railroad detective squad.

With such men abroad and preying on the railroad, one can readily understand why all of the big systems of the country maintain a special squad of secret service men to guard property and round up these criminals whenever the opportunity occurs. The yeggs and the railroad

"Bulls," as the detectives are called, are sworn enemies and neither misses a chance to square accounts with each other, even welcoming gun play to even up matters.

Shrewd and ingenious, and crafty to a high degree, the yeggman almost always meets his match in a railroad detective, for none but the keenest and quickest of men are employed by the railroads for this sort of work. Usually they are men with a broad knowledge of criminals in general and yeggmen in particular and for the most part they are recruited from among the experienced detectives of some of the big city police departments.

But that does not always follow, for more than once big, broad-shouldered, fearless men of the line, real railroad men, are selected to join the detective force. Such men usually have an uncommonly good understanding of the ways and methods of railroad thieves, with a pretty broad knowledge of the yeggmen as individuals. They doubtless have come in contact with these bad men so frequently in their railroad work that they know Philadelphia Jack, or the Roco Kid, and the rest of them by sight; they know their

records as criminals too and they know their favorite hang-outs and their methods of operating. It is these men then, with that background of knowledge, who make the best railroad detectives, for some of them are so familiar with ways and means of the yeggman world and know their language so thoroughly that it is not difficult for them to disguise themselves in old clothes and a week's growth of beard and join one of these groups of criminals any time. Indeed, if it were possible (which it is not) to secure some of the reports that are turned in to the chief of the railroad detectives, many a thrilling story could be had of the operations of some of these experienced "operatives."

Some of these stories have come to the writer in fragments, as it were, and with just these few details it is not difficult to judge just how serious some of the situations are that these railroad detectives often find themselves in. There is the story told of one man, who, suspecting a certain pair of yeggmen of a particularly neat safe blowing job in one of the stations along the line, set out to get them. But they were a slick pair of yeggs, as he well knew, and when he started out

on the case he told his chief that it might take him months to find the men and get the "drop" on them.

He proceeded to become a member of the yeggman's world by being a yegg himself and after weeks of "bumming" about the country in the company of first one yeggman and then another, he had the fortune, or misfortune, if you will, of running across his men one night in an empty freight car attached to a freight bound out of Chicago for some western city.

But he was not alone with them in the freight car. Indeed this side door Pullman seemed to be a special excursion car, for there were no less than six yeggmen in it all traveling together.

By the light of a stolen railroad lamp, on the floor of the car a card game started in which he joined with the rest of the yeggs. And it was some card game, from what the writer can learn. It began to get disorderly right off, the two yeggmen under suspicion by the detective being the chief aggressors. They proceeded to bulldoze the other players and act in general like the "bad men" that they were. They seemed to be particularly nasty to another pair of yeggs and

the detective learned afterward that they "had it in" for these men for double-crossing them on a particular "job" that they had tried to "pull off" some time previous. One word led to another and suddenly, without a great many preliminaries, the two suspected thieves flashed their "gats" and a shooting began in the narrow confines of the freight car. But the other yeggs were as handy with their guns as were the first two, and they were on their feet almost as soon as their enemies. The first shot shattered the lantern and put it out and then the car was in darkness.

You may be sure the detective and another "innocent bystander" scuttled for the nearest corners and flattened out on the floor, hopeful that the lead that presently began to fly would not come hissing in their direction.

The shooting began immediately and for a few seconds stabs of light punctured the darkness everywhere, it seemed, and there were curses and groans and some lively scuttling about.

Then, as suddenly as it began, the firing stopped. All of the gunmen were wounded, but apparently not seriously. They realized too that

banging away in the darkness was getting neither side very far, and they proceeded to hunt each other out so that they could come to grips and make quick work of it. Softly and stealthily they began creeping around the darkened freight car feeling for their victims, and meanwhile the detective huddled close to the floor realized that at any moment one of them might stumble over him and, feeling him and not knowing who he was, put a bullet through him. He drew his gun too, determined to shoot first if he could.

Presently a grunt came from the far corner of the car. In the other end a shot ripped out, aimed blindly at the corner from which the sound came. The flash brought an answering flash from the other end of the car and the fusillade was on again until all the automatics were emptied. Then the combatants were silent again as they softly filled their weapons and proceeded to search for each other.

Five times these outbursts of firing took place in the car, and all the time the bullets were thumping about the detective, splintering the floor and the side walls on either hand. But finally the firing from one end of the car stopped

entirely, nor did there come answering shots when an occasional flash ripped the darkness from the other end. It was evident to the detective and what combatants were left that one side had been put entirely out of the encounter.

Silence reigned for ten, fifteen, twenty minutes. Then from the blackness came a husky whisper.

"Fargo."

A groan answered.

"Fargo."

"Huh."

"Did they get yuh?"

A groan was the only response.

"Fargo, did they git yuh?" came the husky voice again.

"Yeh, got me hard. Guess I'm goin' t' croak."

"Aw cut that. They got me, too. Twice. In the shoulder and hand. I ain't no cripple, though. Guess we've croaked 'em. Where are you?"

Once more Fargo groaned by way of an answer.

"Stay there, I'll find yuh," called the voice, and the detective knew by this time that the

two men he was after had survived the fight, but he knew too that both were wounded.

A moment later the white rays of a pocket batter lamp punctured the darkness. The detective knew that Fargo's pal was looking for him. The yegg staggered uncertainly across the swaying freight car in the direction from which Fargo's groans sounded. He found him and, leaning over, examined him.

"They sure got you, pal," he said rather lugubriously as he searched Fargo for injuries.

Fargo groaned.

"Don't play the baby."

Fargo muttered something ugly to him.

"That sounds more like yuh."

Again a groan answered him.

The yeggman stood up and flashed the light about the car. In the far corner was a pathetically huddled heap, while not far away sprawled face downward on the car floor was another silent form. Over near the door crouched another yeggman, wild-eyed with fear, and beyond was the detective sitting up now, and rolling a cigarette.

"Youse guys come give me a hand," said the

yeggman aggressively as he waved his automatic about. The yeggman near the door got to his feet almost timidly. As for the detective, he finished rolling his cigarette, then got up and brushed off his clothes before he came over toward where Fargo lay.

"You're a fresh guy, ain't you?" said Fargo's pal as he surveyed the detective.

"What's it to you?" answered the detective, but with no show of aggressiveness.

"Don't git lippy," snarled the yeggman, making a threatening gesture with his gun. "See them guys?" he motioned toward the two still forms. "That's what will happen to you if you ain't careful. Then I'll drop you out of the side door and under the wheels of the train. When they find you on the tracks to-morrow morning they'll think you're another Bo that's been hit by a train or dropped off some brake beam and been run over. Here, git busy, that's your job now. Pry open that side door and swing these two croaked guys off between the wheels. The further up the line we can leave them, the better it'll be fer all of us. Come on, git busy while this guy helps me with Fargo."

The detective looked the yeggman over. He was of a mind to come to a show down with him then. But on second thought he realized that the yegg had his gun drawn and ready while he had discreetly put his away when the fighting stopped. Then, too, he was not quite sure how friendly the other yegg might be, and Fargo, though badly wounded, was still able to hold his pistol. No, the time was not ripe. Yet he loathed to have a hand in the nasty job the yeggman had allotted to him.

"No," he said. "Let me tend to Fargo with you. I know a little about first aid work."

"A educated Bo, eh?"

"Nope, was drafted in t' army. First aid guy there. Know a lot about it."

"All right. Git busy. You guy" (he poked his gun at the other yegg), "jimmy open that side door and swing these stiffs down under the wheels. Get busy now. We don't want no wise railroad bulls trailing us fer this, see."

The yegg proceeded to open the side door with alacrity while the detective, watching every move of the yegg with the gun, proceeded to dress Fargo's many wounds. In the course of his

work, he was careful to move Fargo's gun out of his reach, and then he watched the movements of the other yegg, who with his one good hand and his bandaged and only partly serviceable other hand, helped him. Presently the yeggman slipped his automatic into his pocket so that he could work the easier, and that was what the detective was watching for.

Like a flash he jumped to his feet and whipped out his own gun, at the same time flashing a battery lamp too.

"Now you Frisco Ed, up with those hands. That's the boy. Come over this way a step while I remove your gat."

The yeggman put up his hands with the single exclamation, "Bulls!"

"Yep, one of those 'fresh railroad bulls' you been talking of. Been after you and Fargo for weeks. Got you dead to rights now. You'll swing for this and so will Fargo if he lives. Step this way. Easy now, and keep the hands up."

The yeggman came over to him and with his pistol pressed against the thief's ribs, the detective "frisked" his gun and battery lamp.

"Now over in a corner there. That one. Sit down and be nice. I can shoot some."

The yeggman obeyed with muttered imprecations.

The detective gathered up Fargo's gun, who now was unconscious.

"Hi, you other yegg, cut that. Leave the side door open and leave those stiffs alone. Git over in the corner too and sit down. Wait, come over here first and let me remove your gat. Hands up. That's it."

But this yegg had no shooting irons. He was more a tramp than a yeggman, the detective could see that. He was not used to rough work like that that had taken place in the car that night. He obeyed the detective's command with frightened looks.

"Need you for a witness anyhow," said the detective crisply, as he sat down in such a position that he could command a view of the whole car.

And there he sat with the yeggman and tramp at the point of his pistol and the three dead men in the car (for Fargo passed out without regaining consciousness) for the rest of the night, and when dawn showed through the still open side

door of the freight car, the long train of empties pulled into the freight yard of a big western city and shortly after the prisoners were in the hands of the local police and the detective, having made good on his job of finding Frisco Ed and Fargo the Frog, was calmly having breakfast in the railroad station lunch room while he scribbled out telegrams to his chief and wired to his wife to send him on some respectable clothing so that he could return home in a real Pullman, as a gentleman.

But the experiences of this detective are not unusual in the life of a railroad detective. They face unbelievable situations sometimes, and more than once in the course of their work life or death depends on their quick wits and quick thinking, not to mention the quick right hand.

The writer knows of one railroad detective who will wear a silver plate in his skull for the rest of his life as a result of an encounter with a yeggman in which he was felled and almost killed by a railroad spike that was hurled at him. And there is another one who belongs to the same force whose front teeth are missing and whose nose is flat and bridgeless as a result of a "free for all" with a pair of yeggmen.

CHAPTER VI

OPERATING THE ROAD

THE heart of a railroad, as well as the brains, are located in the dispatcher's office. Here the entire control of the operating end of the road is centered, and here if a mistake is made a catastrophe results. The dispatcher has his finger on everything that is moving on the road. He knows every minute, day or night, where every train—freight, passenger or work train is. He knows whether they are on time or behind schedule, and he knows within a few minutes after the train has finished its run every detail of the trip and what has occurred. He is responsible for the entire operation of each train, so far as providing a clear road for it is concerned, and if he makes an error hundreds of lives and thousands of dollars are liable to be destroyed.

From this it can be gathered that the position of dispatcher is a highly responsible one, as indeed it is. Only picked men who have stood the

test of emergencies, who have clear brains and who can think quickly and carry a hundred details in their minds without getting one confused with the other, are selected to hold these positions.

At eleven o'clock at night, when there is a change of tricks and a new dispatcher comes on to relieve the one who has been at his desk since three o'clock in the afternoon, the road is running smoothly. Every through passenger train is booming along on time, every long crawly freight train is moving over the darkened landscape, with orders how to proceed and where to pull in on sidings.

It looks like a comparatively quiet night and the relieved dispatcher pulls on his coat, says good night to the man who has slipped into his chair, jokes a moment or two with the rest of the dispatchers in the room, then goes out into the terminal and turns homeward. The relief operator slips into the chair, adjusts head-piece and mouth-piece (if 'phones are being used) or turns the resonator box at the proper angle so that he can hear the constantly clicking Morse key while he glances over the big

chart sheet on the desk before him that tells him the complete story of every train that has left the terminal that day.

He notes with interest that No. 137 was five minutes late at Scarston. He sees that No. 317, a slow freight, is in the siding at Warton, the next station above, patiently waiting until No. 137 shall pass her. Even while he is looking the sheet over a voice comes in on the wire.

"N. X.?" it queries. "This is W. N."

"All right, W. N.," the dispatcher replies to the man in the tower at Warton, whose tower is known as W. N.

"No. 137 under the bell. Three minutes late."

The dispatcher translates this into the facts that the passenger train, No. 137, that he had noted was five minutes late at Scarston has made up two minutes between Scarston and Warton, where she is just coming into the station. "Under the bell" means that the crossing bell at Warton is ringing to warn vehicles that the train is approaching. The dispatcher knows that in a few minutes W. N. should call him up and tell him that No. 137 has cleared the station and the siding and that No. 317 has pulled out of the

siding and is proceeding again on the main line on her necessarily slow way westward.

Presently a voice comes in on the line again.

"N. X. (the terminal call), this is W. N."

"All right, W. N.," acknowledges the dispatcher.

"There's a nasty mess up here," says the man in the Warton tower, in a very deliberate, unhurried voice, "No. 317 is wrecked. Split a switch going out onto the main line and eight freight cars are spread all over the right-of-way, all four tracks are blocked."

All of which means that things have "busted wide open with a bang," to quote the dispatcher, and the chances are good for about five hours of terrific work and quick thinking.

Does the dispatcher lose his nerve? Indeed not. If he did the chances are the whole railroad system would be tied into a double bow knot that would take twenty-four hours to untangle with the chances of more and very serious wrecks occurring, resulting in a tremendous loss of life and thousands of dollars' worth of property.

He keeps his head. He has to or things will go to smash in a jiffy. He knows that in the

quickest possible time he has to have that wreck cleared up, and while it is being done he can't let a wheel stop anywhere on the line. With lightning swiftness he proceeds to think himself out of the tangle.

His first move is to send out a call for the wrecking train. This is done by his assistant or student dispatcher, who proceeds to get in touch with the wrecking boss. Meanwhile the dispatcher secures for the wrecking train a clear track from the terminal to the wreck. This he does by flashing orders along the line to points where he knows certain trains are proceeding. A quick summary of the chart shows him that eight miles this side of Warton there is a short line that leaves the main line at an angle and reaches north for seventy miles, where it crosses another road's tracks. These tracks reach southwestward and ninety miles above Warton cross the main line again.

He sees in this angle of tracks the possibilities of a big détour that will take the trains of his line around the wreck and put them onto his main line ninety miles above where the freight cars are piled up.

When the wrecking crew gets busy. The wrecking train has just arrived and the powerful derrick has begun to pick the wreck to pieces, lifting heavy cars bodily back upon the track

He immediately flashes orders to every train between the terminal and the short line to swing in on this line and proceed on the détour as directed. Those trains that are not near enough to the short line to reach it before the wrecking train goes through he orders to put in on certain sidings along the way until the wrecking train is cleared, after which they are to proceed on the détour.

All this takes time, although the dispatcher is working with every bit of energy he has to accomplish the task. And while he is doing this the wrecking train has cleared the terminal yard and is booming along up the main line at a fifty-mile-an-hour clip, for the dispatcher has reminded the wrecking boss that the wreck is located in the path of all of the fast commutation trains and that by daylight these will be coming through on the main line and must have a clear track. In other words, between eleven-fifteen, when the wreck occurred, and five o'clock, the following morning, at least two of the four tracks of the main line *must* be cleared to let the commutation trains, twenty of them between five o'clock and nine, come through on time. These

trains can't be a minute later or the "howl" that will be raised will be enough to make the "super" come storming down on everybody.

Is the wreck cleared away? Of course it is. The road *must* be kept open and that *must* means exactly what it says and nothing less.

That is only one type of scores of emergencies that come up every day in the life of a dispatcher. It illustrates only one of the reasons why he must know at every minute of every twenty-four hours why and where each wheel is turning on the line. It also serves to indicate how swiftly and accurately a dispatcher must think and why he can't afford to make a single error. Oh, yes, errors have been made by dispatchers. A story is told of one who let two fast passenger trains from opposite directions in on a single track at the same time. After he had done it he saw with horror the mistake he had made and he knew how terrible the consequences were going to be when those two trains out there in the mountains miles away crashed together. He knew there was no way of averting the crash. Even then he did not get excited. He thought out the best thing to do under the cir-

cumstances. That was to order out a hospital train filled with doctors and nurses and the wrecking train to follow it. Both were ordered out, cleared and on the way to the point where the two trains would crash before the wreck had occurred. After that was finished the dispatcher turned his telegraph key over to his student for a few minutes, stepped out of the room and, placing a revolver to his head, shot himself. He knew he could not live with it always on his conscience that a mistake of his had caused the tremendous wreck that did follow and the resulting heavy toll of human lives.

We can picture the dispatcher as a man who sits in an office with a number of strings in his hands; each string is attached to a train that is moving over the landscape sometimes a hundred miles away. He knows, just as well as if he could see each train, exactly what they are doing. He, figuratively speaking, has a finger on each one of them and he moves them up and down the division in the best possible way to avoid trouble, to get them through the fastest, the most economically and to the best advantage of travelers and shippers of freight.

The dispatcher's office is at the business or yard end of the division. Nearly all roads are divided up into sections called divisions, that include a hundred or more miles of out and in bound track, with yard areas and all the mechanical equipment that goes with that section of the road. Usually a division includes the trackage reaching from one big city to another, with a division terminal and yards in each city.

Along the tracks of the entire division, you know, wires parallel the right-of-way. These are both telegraph and telephone wires, and each one touches at every switch or signal tower along the line. On some roads they touch each station and the station agent functions instead of the tower men.

The dispatcher sits in his office with either key before him or telephone set clamped to his head, with an open wire that extends from his office to the other end of the division. At every tower or station along the line another man sits in with key and resonator before him or telephone set clamped to his ear. These men in the towers are the eyes and ears of the dispatcher back in the office and it is through them,

through what they see or hear, that the dispatcher keeps in touch with the trains on the division.

Generally a division is split up into districts, or sections of between thirty and fifty miles of tracks, and each dispatcher is given one of these districts to care for. He has absolute control of everything moving east or west on his section and his responsibility lasts until the train is clear of his territory and is picked up by the dispatcher who controls the next section up or down the line.

Usually two dispatchers sit opposite each other across a table and each has an assistant dispatcher, or student dispatcher, as they are called by the railroad men. They have a large sheet in front of them, on which appears a full history of the day's operation of every train on the road. For an instance, the sheet is made out with first the train's number appearing, as for example No. 9, which designates the train as No. 9 (on the *out* sheets the numbers are all odd and on the *in* sheets the numbers are all even). In the next column on the blank appears the number of the engine that is hauling the

train, as No. 786. In the next column is the name of the engineer. Following there are ten paralleling columns with the letters, "C. B., Ex., C. P. B.; C. M. B., Pro., P. P. C. Mail; S. Fr't"; each of these groups of letters distinguish a certain type of car, as for instance C., in the first column means passenger coaches, C. M. B. in the fourth column means combination mail coach and baggage car, and Fr't in the last column means freight cars. In some of these columns numbers appear opposite the number of the train, as for instance, 9 under C. means that there are nine passenger coaches attached to the train, 1 under C. M. B. means that there is a combination mail and baggage car also with the train. The next column gives the name of the conductor. Thus the dispatcher knows that train No. 9, drawn by engine No. 786, of which Mr. Blank is engineer, has nine coaches. It is a mail train and it also carries baggage, and is in charge of conductor Mr. So-and-So. There are still more columns on the blank, a series of them extending to the right and at the head of each one strange letter combinations, such as RS; HI; ZY; NC; etc. These are the call names

of the various towers along the line past which the train will go and from which a man will be watching for her to pass.

As she rushes by each of these points the man in the tower will report back to the dispatcher that she has passed or cleared his point and that she was running on time or, if late, behind time, and give the number of minutes. As each of the towers report on a train the dispatcher enters upon the blank her time. Thus he follows her on her run, checking her passing of each tower, and if at the end of the run she is late, there is a space on the blank labeled remarks, in which is entered the conductor's report and his reasons for being late.

So it goes throughout the entire twenty-four hours. The dispatchers and students work in shifts of eight hours, the first shift reporting at seven o'clock in the morning and being relieved at three in the afternoon by men who work until eleven at night and then give over their chairs to men who come in and work until the seven o'clock men appear again. The same shifts prevail on the towers along the line and thus there are eyes on every train moving at all times.

These dispatchers' sheets are made out with accurate care and every morning at eight o'clock their contents is made up into a report which is placed on the desk of every official of the road, so that these men can see what has transpired, and how well their railroad has operated during the past twenty-four hours.

But it is hardly as simple as it might appear set down here. Those dispatchers' sheets in a few cryptic remarks may convey a story that will occupy columns in next morning's papers. There may be a big difference in time figures between two columns, which means that somewhere between one tower and another something has happened.

One tower has reported the train clear while the next tower up the line has been looking down the track in vain for her to put in her appearance. Presently he gets a telephone call from the outside somewhere. It is the conductor of the expected train two miles down the line telephoning him that the train has struck a spreaded rail and jumped the track. Cars are piled over the right-of-way and the line is blocked. A wrecking train is needed.

And so it goes. All sorts of trouble can happen, after which all sorts of trouble happens for the operator, for with the road blocked he must take care to see that every other train he has running on the line does not run foul of the wreck, nor be slowed up or hampered any more than is necessary. At the same time he must see that the mess is cleared up as soon as possible.

But there are a thousand other details to a dispatcher's job. Not only must he keep the line moving but he must be the medium through which all orders affecting individuals and trains are passed along the line. He must be a veritable news bulletin concerning the condition of the line.

There is a Special Order book maintained at the dispatcher's office into which are entered all special orders. These must be read and signed for by every conductor and engineer at the beginning of a run. This special order book contains everything of importance that a conductor or engineer should know about the condition of the line. As these special orders come in copies are made and posted at vari-

ous points on the line where these Special Order Books are kept. A copy is promptly posted in each book, and the conductors and engineers are supposed to read them and sign their names on the opposite page, thus indicating that they have read the order and that they are familiar with the condition or matter the order speaks of.

Before beginning a run the conductor may find in the order book the statement that a section gang is repairing tracks at such and such a point, that a mistake has been made in a new time table, that his train is required to make a new stop, that it is snowing at a certain point on the line, or raining, or there are high winds, or perhaps there has been a wash-out or a wreck that he must look out for. In that way, through this special order book the men on the line are kept in touch with every condition of affairs so that they have no excuse for a mistake.

At the beginning of each run the conductors must report to the dispatcher's office for orders. These orders are read over carefully, and read to the members of the crew, who repeat them back to him to show that they have a clear understanding of them.

At the end of each run the conductor's first duty is to make out a train slip giving a full report of the run and all excuses for lateness. These reports get back to the dispatcher's office, where they are carefully noted.

The dispatchers also see to the ordering out of all special trains, such as extra sections of passenger trains or special freights; they arrange for the engines from the master mechanic's department or roundhouse boss, they arrange with the callers for engine crew and train crew, they make up all special orders for the train and see that it gets out on time and has a clear track to the end of its run.

Mention of the callers reveals a special little department closely associated with the dispatcher's department that is highly interesting. The callers operate a telephone system all their own. Their responsibility is to call the train and engine crews and to this end they maintain a little telephone system, and a group of willing errand boys.

In this department is listed the names, addresses, and telephone numbers of all firemen, engineers, brakemen, trainmen, and con-

ductors working for the division. There are men on duty day and night and the minute the dispatchers ask for a crew for a special train or engine the callers get busy with telephone or errand boy, routing men out of bed if needs be, to fill each crew. The callers have the responsibility entirely of furnishing men to do the work of the road and sometimes they are called upon to do some quick work in the way of manning trains in the middle of the night, especially the wrecking train that stands ready and waiting to be sent out upon the line at any hour, to clear up a mess that may be blocking the tracks.

A variety of details come under the head of duties in the dispatchers' office. Such unthought-of things as saving coal and fuel is part of their work. The cutting down of stops for trains is part of their work, that to the average person looks to be unimportant, but when it is considered that in fuel and wear and tear on equipment each stop and start of a train costs the company never less than five dollars and in the times of high costs as much as $9.60, it can readily be seen that the dispatchers are eager to eliminate all unnecessary stops. Then, in addi-

tion to other details, the dispatchers are supposed to render a full report of every incident, such as the breaking of a driving rod on an engine, the loss of a brake-shoe, a bent journal, a smashed freight car and things of a similar nature that may be reported by conductors or engineers.

They must follow up each report with still other reports on the situation until the whole thing is explained and the incident finally closed. The work of the dispatchers is unending, it seems, and when all things are considered the dispatchers' office can truly be said to be the heart and brains of the division.

Over all the dispatchers, these men who work at the desks operating telegraph or telephone lines, whichever the case may be, is a chief dispatcher, and he is held responsible for the entire department and all that goes on. He must, as you can readily see, be a man of remarkable capabilities, as accomplished as the superintendent himself. Indeed, many a chief dispatcher steps up from his position to the office of executive of the division.

"The dispatcher must be a live wire indi-

vidual," said a chief dispatcher to the writer. "He must have, besides the qualifications for the job, a pleasant disposition, a cool head and no nerves. He must never be a grouch or a pessimist. The dispatching staff of a railroad is the heart of the line and if the men are full of pep the road moves. If the men are grouches the road stands still. They must have intelligence and drive but they can't be offensive. They must be real chums with the men on the line, willing to listen to the other fellow. A dispatcher who growls over the telephone or snaps a conductor up at every turn soon makes the other men afraid of him. They don't want to call him on the 'phone, they don't want to have anything to do with him. They fight him instead, and where there's that sort of friction a road can't go ahead. In other words, a dispatcher must be a 'regular fellow' plus a keen brain, a quick ear, and intelligence, and the ability to think his way out of trouble in the shortest possible time."

All dispatchers must be experienced telegraph operators. True, to-day the telephone is used to a great extent in dispatching trains, but the

telegraph is still maintained for emergencies and the ability to operate a key and read Morse code is the first requirement of a man who hopes to become a dispatcher.

It is a long hard row to that responsible position, however, covering a period of from ten to fifteen years, depending somewhat of course on the capabilities of the candidate. A chap just out of high school could master telegraphy in a few months, but to become a really qualified expert, of the type that dispatchers must be, he must spend at least a year and a half of hard practice work at the key, taking and sending all types of messages.

After that he must get out upon the line, as a member of a train crew, perhaps. Here he must absorb all of the romance of railroading and learn everything that he can learn about the movement of trains and all that goes with this fascinating work. He can spend five years profitably with a train crew or in some other branch of railroading.

Then if he has showed unusual brightness, has been studious, careful, and indicates that he has a sense of responsibility, he will one day be asked

to report to the dispatcher's office. Here he becomes a student dispatcher, or assistant to a dispatcher. From five to eight years are required to learn all the details of this job, but meanwhile he has already attained and is taking care of a worth-while position. If he shows cool judgment, is not too nervous, can think quickly and has the pep and drive required, one day the man whom he is assisting will be moved up to the job of chief dispatcher and he will take the dispatcher's chair and have a student of his own.

CHAPTER VII

THE MAN IN THE TOWER

CLOSELY allied with the dispatcher's office and part of the force under the chief dispatcher of the terminal division of a railroad is the starter. He is an important personage, and a very capable individual. He must be when one stops to consider his work. He is the man who sends each train away on time, and in a terminal where there are two hundred passenger trains going out upon the line every twenty-four hours, you can well imagine that there is keen work to be done.

But those figures do not tell half the story. At most terminals there are a great many commuters' trains to be handled and this creates a strenuous rush hour between half-past five and seven o'clock each afternoon. At such times the starter is on the jump every minute and, watch in hand, he is sending trains away almost as fast

as they can clear the terminal yards. Indeed he often sends three away at once at the very climax of the rush period.

To start the trains may not seem to be such a hard job, but when all the details of the starter's work is taken into consideration it is seen that the man who occupies that little bay-window-shaped balcony in a terminal train shed has got to be a keen, quick-thinking individual.

The starter's tower, for it really is a tower, although it appears to be only a balcony in the terminal train shed, is equipped with a formidable looking board of push buttons, buzzers, drops and telephone plugs. Some of these connect with the tracks in the train shed, some with the gates, some with the ferry house and others with the switch and signal towers out in the train yard. All of these come into play in the single operation of starting a train.

Let us step into the starter's balcony of the Erie Railroad terminal in Jersey City at a few minutes before six in the evening at the very height of the rush hour. This terminal, although among the smallest of the railroad terminals serving New York City, stands second in the

number of commuters handled during each rush hour.

Here we find the starter, a bright young chap in his early thirties, standing, watch in hand, before this big key board. Despite the rush and turmoil of crowding commuters in the station below him, despite the din and confusion of a hundred different types of noises always heard in a terminal, not the least of which is the chugging and snorting of locomotives, the rumble of baggage truck and the thumping of trunks and baggage being loaded, he stands there as cool and unruffled as if he were almost anywhere else. But he is alert and as keen as a man can be, for there is something new happening out there in the train shed every minute and he is responsible for all that goes on that has anything to do with starting the trains.

At the moment we enter there are three trains due to go out at once, three trains that should start at 5.52, for the Erie terminal not only serves the Erie main line but five branch lines, the Greenwood Lake, the Northern Railroad, the Susquehanna and Western, the New Jersey and New York, and the Newark Branch line, a short

line that does a heavy commuting business. On three of these five branch lines trains are due to go out together, while a fourth will start out on the main line four minutes later.

Three minutes before train time a buzzer announces to the starter that the ferries serving these trains are in the slip and that the passengers are streaming up the gangways toward the ferry terminal. The starter knows that three minutes is enough to unload the passengers from the ferry and load them aboard the trains. He knows then that he does not have to hold the train because of a ferry delay. But the terminal is also served by a subway by which just as many passengers reach the trains. This is the next point of interest that the starter must think of, as he notes the hands of his watch.

Twenty seconds before the trains are to leave, by push buttons he announces in this subway station the fact that the train is ready to start. There is a different ring for each track and his hands slip hurriedly from one button to another flashing the call. At the same time he signals to the man in the main waiting room to give the "all out" call.

Every one is on his toes now, for in twenty seconds the trains must be in motion, three of them, and not a minute can be lost in this rush hour jam, for every minute means that a much needed track is blocked and that thousands of anxious commuters are figuratively "piling up" waiting to be hauled to their homes.

Twenty seconds is up!

Again the starter's fingers hop from one push button to another. Down in the train shed green lights pop out giving the conductor his "All aboard" sign, gates slam, and the train begins to rumble out of the station.

But while all this has been going on new trains have been backing into the shed and made up, word of each being flashed to the starter, other ferries have been coming in, preparatory signals must be flashed for other trains that will be ready to leave a few minutes later, and so on. So many are the details that it seems almost beyond the human brain to keep track of them all, yet everything must be done exactly at the right second, and with the utmost care.

And that is not all. If a train is delayed in starting for any reason it is up to the starter to

record the delay and investigate it. If it is engine trouble, he must find out every detail and the reason for it, for he keeps a careful and accurate record of each train starting, in a book in front of him, and if he cannot put a cryptic "Ot." after the number of the train he has to write out a report of why the train is late in starting. And there are still other details.

There is a report book in his office and each conductor must report there and sign the book to indicate that he is on time himself and ready to take his train out. There is also a special order book here in which all personal orders for the conductors are noted. A conductor on finding his name posted in the book asks the starter for his personal orders. It may be an order informing him that he can have a day off on Tuesday as he has requested or it may tell him that he is to have a special car attached to his train, or that there will be a group of prisoners for Elmira loaded aboard his train at a certain point on the line. All these special orders must come through the starter.

Besides this each conductor, as you know, makes out a train slip before starting a

run. This slip tells the number of the train, the number of the engine, the destination and similar details. These slips are dropped into a box as the train is about to leave the terminal and later they are gathered up and taken first to the starter, where, in a space calling for remarks he must note the reason for any delay in starting if there has been any, before the slips are passed on to the dispatcher's office, there to help the dispatchers make out their train sheets.

But if the work of the starter seems complicated and nerve wrecking, consider that of the man, or men rather, in the tower out in the yard—the terminal switch tower.

All things considered, there is probably no other job in railroading that can compare to that of the tower director, in the demand it makes on his nervous energy.

His work reduced to its simplest terms is this:—the terminal is equipped with ten tracks in the train shed onto which trains are backed to be loaded. These ten tracks all lead into the four tracks of the line, the whole layout resembling very much a big long-necked bottle, the tracks in the train shed being the bowl of the

bottle and the four tracks leading out onto the main line the neck of the bottle. The director of the switch and signal tower must pour the traffic of the road in and out of the bottle's neck without causing a jam, or a minute's delay to the traffic, or worst of all a collision. And he must do it all by the manipulation of a hundred or more switches and twice as many semaphore signal arms.

With commutation trains rumbling in and out at the rate of one every few minutes, with empties backing down to be made up into trains, with puffing switch engines chugging in and out and big mastodons of engines dragging in the important trains of the line, snorting and pawing for train shed space, all at the same time, it seems almost impossible that it can all be done, and done as it is in almost perfect safety. The man or men in the terminal tower seem almost superhuman in their work.

A visit to the terminal tower of a big railroad convinces one immediately that this is one of the most vital points of the whole railroad system. Inside the tower one gets the impression that here watchfulness and extreme care are used, for

every order that crackles out from the tower director is snapped up and repeated by the men at the battery of levers. Every movement is made swiftly but with care and accuracy and every one seems at every moment to be "on his toes."

The terminal tower is located where it commands a view of the four main tracks of the line and all the tracks in the train shed. There is a bay or balcony here, too, and in this the tower director and his assistant sit, the latter with a battery of push buttons, keys, drops and telephone plugs in front of him and a telautograph at his elbow.

Behind the two executives is a huge boxlike affair that takes up the entire room and contains the delicate and complicated mechanism of the interlocking switch and signal system. All of the mechanism that is visible is a series of crank-like levers and blinking telltale lights. It is these levers, operated by three men who man the board, that accomplish the great work done in the tower.

The switches and signals of this interlocking system are of the electric-pneumatic type. That is the switches are operated by air pressure that

is controlled electrically from the tower. As these levers are moved electricity actuates the valves that control the air pressure at the switch, and by this pressure the switch is moved over or back as is necessary.

In days gone by all this work was done by the strength of a man's arm rather than the force of compressed air (as was also true of hand brakes on cars before the coming of the present-day air brakes). In those times the terminal tower, in fact all towers, had quite a different appearance. Instead of the tiny levers, there were batteries of huge hand levers, and as a switch was moved a man used all his strength and braced his feet against the iron frame of the lever to help him in his effort. There are still many towers in which these great hand levers of the "Manual type," as they were called, are used, but fortunately they are fast giving way to the safer, swifter, and more accurate electric-pneumatic system.

The rest of the tower equipment consists of a set of tiny semaphore signals set above the director's head, but where he can see them without effort. One group of these tells him which of the

An old type of switch tower where switches and signals are turned by hand

Inside the Terminal Tower where electricity does everything except the thinking

ten tracks in the train shed are clear and which are being used, while the other tells him the condition of the signals on his four main tracks and other points in the yard.

Outside on a bridge across the tracks are the real semaphores that give the signals to the engineers. There are two signal arms to a track, one suspended downward from the bridge and slightly smaller than the upper one. This, in the slang of the railroader, is the "low ball" and means when its arm is dropped that he can proceed with caution. The upper arm or "high ball" is the "all clear" signal, and when this drops the engineer knows that he has a clear track ahead.

The normal position of both is at right angles to the post supporting them and this position means "danger." At night when they are set at normal they show a red light which also calls out "danger." When they are dropped they show a green light which tells the engineer that "all is clear." These semaphore arms with their lights are all moved by the movement of the levers in the tower.

Such is the equipment of the terminal tower,

and by means of it the tower director has control of every switch and signal leading in or out of the yard. From his balcony he has to create new pathways for trains moving in or out, nor can he make a single error, for that error might mean death to hundreds of commuters as well as the loss of a great deal of money to the road.

Of course when all trains are running on schedule the tower director can in a measure plan his work. He knows that at certain times certain trains are to be made up and he knows which track they are to be made up on. Then too he knows that certain trains are due at certain times and he can set his switches to throw them in on their accustomed tracks. But although all railroads have schedules and every effort is made to make them as inflexible as possible, emergencies are constantly arising that throw the tower man all out of his stride, so to speak, and he has to use all sorts of snap judgment and quick thinking to keep things moving properly.

An accident out upon the line that might delay a train ten minutes on its run will bring it to the terminal just at the time when

some other train is occupying the track it would have gone in on ten minutes before. It can't be left standing in the yard. It must be put somewhere. The tower director has to find a place for it in the face of the scores of trains passing in and out on their own time. Meanwhile this delayed train may be delaying others. Presently the tower man finds trains piling up on him. The yard is perilously near a jam that might tie it up for an hour. He can't let that happen. He must work in a perfect frenzy to get the mess cleared up.

Of course he has some assistance in the flexibility of the four tracks that lead into the yard. Under normal operation these tracks are divided equally, two for outbound trains and two for inbound trains, but during rush hour he can convert one of the tracks to suit his purpose so that there are three tracks to dispose of his heaviest traffic. There may be three tracks carrying out the heavy evening traffic while the single remaining track handles the lighter incoming traffic.

But even with this his work is strenuous and nerve wrecking. At night for an instance, there

are a thousand lights blinking at him out of the dark. He must know them all; some are train lights coming in, some are signal lights, some are train lights going out, but he cannot become confused by any of them. Or in winter when a heavy snow has blocked some of his switches or frozen them solid, he must handle his rush crowds even though switches are blocked or frozen and an army of men is out there in the yard trying frantically to dig them out and keep them in working order.

Winter is hard on the tower director because it is then that he has all sorts of switch trouble. When a cold spell comes, or snow starts falling, men are assembled in the yards and given the job of keeping the switches open. Sometimes this is done with burning oil that keeps a fire blazing around the switch, melting snow and ice and keeping them sliding smoothly. Sometimes the plain old-fashioned pick and shovel are used, but they must be used carefully, for the mechanism of the interlocking electric-pneumatic switch is in a measure delicate; so delicate that there is a rule for engineers that forbids them sanding the tracks in the vicinity of the switches

for fear that the sand may cripple the mechanism.

The more progressive roads have installed in some yards electric heating units that during cold spells or snow-storms are kept glowing hot, thus preventing the switches from freezing.

It can be well understood that the men who work in the terminal switch and signal tower are constantly under a terrific nervous strain which is liable to tell upon them physically too. They must have nerves of steel and they must be able to keep calm and collected under the most stressing conditions, and goodness knows situations in which an ordinary chap would get badly "rattled" occur far too often in their day's work.

Like the operators in the dispatcher's office the men at the levers work in "tricks" of eight hours each, although their schedule is arranged a little differently than the one on which the operators work.

They come to their task at six o'clock in the morning and quit at two in the afternoon, when they are relieved by another group of men who come into the tower at two and work until ten at night. Then there is a shift that comes

on at ten to complete the twenty-four hours, for they work until relieved at six the next morning by the first group. But the men could not stand up under the strain of working eight hours steadily even in these shifts, so another group known as a "split trick" is provided for. These men come on at half-past seven each morning and work until eleven, when they "swing," in the language of the railroad men, until two o'clock in the afternoon, when they appear again and work until half-past six. These "split tricks" men come on just at the beginning of the morning and evening rush hour when the strain is the greatest, and fresh for their work they carry on until the rush of trains in and out of the terminal is over with, when they rest until the next rush period. This eases up on the hard grind of things for all concerned.

There is still another group of tower men who are known as "student lever men." They are subject to call as relief men at any time, day or night, taking the places of men who may be ill or away. They also fill in at towers when extra men are needed.

The life of a student lever man is hard because

of the irregularity and uncertainty of his hours. He may be called on for night work for several nights in succession, then called to fill in on day tricks for a week or more, only to be shifted to another trick after that. But then that is railroading and somehow that is part of the fun railroad men find in the game.

There is one more man attached to the tower director's staff and he is the expert electrician and all around mechanical man who must always be on hand to see that things are working smoothly from a mechanical standpoint. Of course he must know everything there is to be known about the electrical apparatus in the tower as well as the pneumatic devices and the switches in the yard. When things go wrong he is a busy man, for all his work is of the rush variety with a capital R. A slip in the mechanism is liable to smash the system in the whole yard and throw the operation of the line into chaos for the time being, so he must work fast and furiously while he works and he must work with care, nor can he leave a job with the work partly done, for this might mean that a train sent over the switch he has been working on

would be derailed and wrecked and then the yard would be tied up seriously.

The towers out upon the line are far different than the towers in the terminal. They are switch and signal towers, too, but they usually guard a single track junction or a cross over switch or the switch of a siding and these are only used at intervals during the day, so that there rarely are any tense moments in the lives of the men who watch the tracks from these points.

However, on the roads where these towers are used as points for watching and clearing trains the man in the tower has a really great responsibility. Besides caring for the switches and the semaphore signals that help to guard these switches he is required to report on all train movements in the section of track that comes under his observation. As you already know he is connected by telephone and telegraph with the dispatcher's office at the terminal of the division and it is through him that the movements of both the outgoing and incoming trains are made known to the dispatcher. As each train passes the tower the man aloft takes note of it. From his schedule he knows the number of the

train, or if it is an unscheduled freight train he identifies it by means of the number of the engine or by word previously sent out from the dispatcher's office.

He knows, too, the make-up of the train, how many cars and of what type they are, and as the train passes under his tower window he makes note of the fact that the entire train is in order. In the old days before the invention of air brakes it was possible, especially in the case of big freight trains, to have trains part. Some of the cars of the rear end would be left standing on the track while the engine and the forward cars would go blithely upon their way, not knowing anything about the cars that had been left behind, standing without motive power, on the rails somewhere back in the distance. Such accidents, though fortunately rare, were very serious in those days, for the cars left behind blocked the tracks and were an obstruction into which some oncoming train could plunge or at best they would block the tracks and keep them blocked until some form of motive power could be brought up to move them out of the way or push or pull them into some siding or finally

move them to some destination where they could be hauled out of the line of traffic until they were picked up by a new freight train.

If a train passing a tower is not intact the tower man does not clear it, but sounds a signal either by bell or whistle. At night, of course, it is difficult to count the cars as they go by and that is one of the reasons for the tail light on a train. The man in the tower at night will not clear a train until it has passed his point of vision and he finds that two red lights are burning on the rear.

The lights (or flags in daytime) displayed by trains all have meanings to railroad men. For an instance all trains running under normal conditions are supposed to display two red lights (or flags) on their rear end. If a train is on a siding waiting for another train to pass it the lights displayed are green. A blue light (or flag) is displayed by a train that is being inspected for mechanical troubles. This signal is displayed so that the inspectors, who may be under a car, are protected. No train burning a blue light can be moved.

Two white lights are burned on the loco-

motive of an extra train on the line, and if a train is running in two sections green lights are burned ahead. Under normal conditions the locomotive displays only its headlight.

Aside from watching out for trains and occasionally operating the switches and signals under his control the men in the towers out upon the line lead a lonesome life indeed. He always has the gossip of the wire to listen in on, of course, and if it happens that on his road the telephone is used for dispatching work he has the companionship of human voices up and down the line.

But that is not the companionship he often craves. To be stuck out in a desert in a tower, miles from civilization, or to be isolated on some mountainside or in the center of a huge meadowy swamp is not the happiest sort of a situation, at least it would not appear so to the average man, but somehow the tower men are willing to take it as it comes—"all in a day's work," which after all is the philosophy of the railroad men. Some of them find real pleasure in their isolation despite its apparent drawbacks.

Away from human companionship and human

aid some of these tower men have queer adventures. More than one of them has been held up by desperate characters, tramps or yeggmen. Indeed only recently a story came to the writer's attention of an attempt on the part of some tramps to force their way into a tower station on a forlorn and deserted section of a certain line. The tower man fought them off as best he could and kept the door securely barred. They laid siege to his tower all night long, finally resorting to a bombardment of stones that broke every window in the tower. When morning came the place was indeed a sad sight and so was the operator. He was cut and bruised and well shaken up.

While the stone bombardment was going on he reported the situation over the wire to division headquarters, but his tower was so remote that it was impossible to get help to him that night. However, the next evening a train stopped at the tower and let off a member of the road's police force (yes, railroads have an extensive police force and an excellent corps of detectives, too). The policeman had with him a shotgun, the most effective weapon in the world for

jobs of that sort, and when the tramps put in their appearance the next night, as they did, they went away again as fast as their legs could carry them. And they took with them, too, a goodly quantity of fine bird shot which was distributed over their anatomy in such a way that they found difficulty in attending to all their wounds at one time.

There is a story, too, of a tower man out in the Rockies who was besieged in his tower by a grizzly bear, and an ugly customer he proved to be. He climbed the tower stairs twice and tried to get through the windows at the tower man, against whom he seemed to have a particular grudge, and it was only by beating him on the end of his sensitive nose with an iron coal shovel that the man was able to drive the beast away. At that he did not go until he had practically wrecked the stairs leading to the tower, by tearing the rails out and smashing them to splinters.

Some tower men in very remote sections, like the men in the lighthouse service, live at the tower or very handy to it, but the majority of them live in the nearest town and go out to the towers on the trains. They too work in shifts;

in the busier towers their shifts correspond with the shifts of the dispatchers, but in the remote towers there are frequently a night and a day operator, each working twelve hours.

The signal systems employed on these remote sections of a railroad are often quite different from the interlocking systems operated in the terminal tower. Usually the lines as they reach out into sparsely settled sections of the country are of the single track variety, trains bound in both directions using the same track. It can be easily understood that a very accurate signal system is needed to prevent two trains from operating in opposite directions on the same section of tracks; for that reason the "block" system is used.

In this case the track is divided into "blocks" or sections varying from one to five miles in length. Each section is protected by a set of semaphore arms located on a post at the right of the tracks. There are two arms to each post and each arm tells its own story. These semaphores are operated electrically, the lines being connected up with the rails of the track. As a train passes a semaphore post and goes into a "block"

or section of track, both arms of the post at the beginning of the block register their normal signal of danger. They remain so as long as the train is traveling in that "block." When it passes on into the next "block" or section of track, the lowest arm on the first or "home" post drops. This is a caution sign that tells the engineer of the following train that the first "block" is clear but that the next "block" beyond is occupied by a train. He knows then that he can go into the first "block" without danger of a rear end collision but that he must watch carefully as he approaches the section of track ahead of him.

When the first train has cleared the second "block" or section of track the upper arm on the first or "home" semaphore post also drops, thus giving the signal "all clear," meaning that there is no train within two "blocks" of that point.

Of course where single track systems are in operation tower men, or station agents, if they are handling orders from the dispatcher's office, must hold all trains traveling in opposite direction on sidings until the line is clear for them to pass on to the next siding.

CHAPTER VIII

IN THE ROUNDHOUSE

RAILROAD romance centers in the roundhouse. This squat semicircular building, that always looks grimy, and wreathed in a pall of smoke and steam, is the most interesting point on the whole division for those who love the romance of the game.

Perhaps it is because this strange building is the home of those great steel animal-like locomotives that are the life of the railroad, that the roundhouse strikes the fancies of every one, even the railroad men themselves, as an ideal loafing place where good companionship is to be found and where railroad gossip is the news of the day.

Not alone the engineers and firemen, and the "hostlers" and wipers gather there during their leisure hours, but the trainmen, too, especially those of the freight crews, find their way there to exchange the news of the day and listen to the

railroad yarns that are always on tap when a group of blue, jumper-clad, oil-blacked railroaders are gathered together. Roundhouse gossip is roundhouse gossip the country over and every division has its group of story tellers, who gather there to tell how Murphy with 928 made the run the night of the big blizzard, or how Jones with the big new "freight hog" of the K91 type hauled twenty-eight coal gondolas up the grade at Summit without a pusher.

By means of these same groups news of the road is carried up and down the line. An engineer and fireman, finishing their run over the terminal division, may stop an hour or two in the bunk house, where are gathered the men of the next division of the line. The latest news from headquarters is disseminated by them. They tell of the new system that the recently promoted roundhouse foreman has established, or the gossip about the men of the terminal division, of how Dave Jordan got caught between two cars and would likely lose an arm as a result of the accident, or how Lafe Crawford twisted his leg hopping a freight in the yard.

This gossip is all absorbed by the men in the bunk house and when they go out upon the line and reach the bunk house of the next division they pass the stories on to other men, and so railroad gossip is carried clear across the country for hundreds of miles, and by word of mouth friends hear from friends in all corners of the country.

This all makes for a fine feeling of fellowship among railroad men, for it is easy enough for Jim Smith in New Jersey to get word to Dick Clark in Colorado, or California. Many of the "footloose" unmarried railroad men are adventurers at heart too and always craving for new fields of travel, and certain groups of them are constantly changing jobs, railroading one year in New England and perhaps the next in the southwest, riding the tops of cars across the plains of Texas. In that way they make hosts of friends in all sections of the republic, and their roundhouse gossip is always rich with tales of adventures in remote corners.

But although the roundhouse, or rather the bunk house adjacent to it, is the place of gossip and many stories, the big "engine stable" is also

a place where a great deal of hard work is accomplished, for it is here that the giants of the line are housed and cared for.

The roundhouse and the section of the yard it occupies is frequently the most unprepossessing in appearance of any corner of the division's terminal, but then how could it be otherwise when there are great coal pockets there, and ash-pits, and water cranes, not to mention the grease and oil that are used there and the constant rain of cinders and soot from the belching locomotives.

The semicircular structure forms the center of a group of queer shaped buildings, the most conspicuous of which are the coal pockets. On some lines these coal pockets are in the form of great round silos that look like huge hogsheads on stilts. They are arranged so that locomotives can pass under them and pause there while their tenders are filled with coal from chutes protruding from the bottom of the pockets.

Hard by are several gruesome, gallows-like affairs that stand up beside the track with a huge arm extending over the right-of-way. These are big and round, however, and their roundness indi-

cates that they are made of big six or nine inch hollow iron pipes. They are the water towers, or cranes which, while the locomotive is being coaled, fill the tender's water tank with hundreds of gallons of water.

Close at hand is a long track that looks very unlike other tracks in the yard in that its sleepers or ties are not of wood but of iron, nor do they extend from rail to rail. They are, rather, iron blocks that support the rails while the space between the rails is excavated to a depth of several feet, some of them having a line of movable buckets on a chain belt running through the pit to scoop up the ashes and carry them to waiting gondola cars near by. In some yards a steam shovel or scoop digs the ashes out and loads them into the gondola cars.

Entering the broad portals of the roundhouse one sees first of all a queer wheel-like affair of huge proportions. This is balanced on heavy but interesting looking mechanism and the whole is enclosed in a pit just deep enough to make the surface of the movable platform even with the many lines of tracks that converge toward it. This is the turntable, and by means of it the

great one hundred and fifty or two hundred ton locomotives can be turned as easily as—as—well, as a caboose cook can turn a flapjack.

This turntable is situated much as a hub is situated in a wheel, and radiating from it are short lines of tracks like spokes, each leading to the stalls in the roundhouse, for this resting place of the locomotives is made up entirely of stalls, each large enough to contain a single locomotive.

Each stall is fitted with a door that can be closed and locked when desired. This arrangement, coupled with the fact that the word "stall" is used by railroad men, and that there are certain employees about the roundhouse that are called "hostlers," leads one to suspect that the roundhouse is a survival of the days before the coming of the steam engine when all railroads were "horse car lines" and when the roundhouses were the resting places of four-legged horses of flesh and blood instead of the steel, steam-driven steeds of to-day.

The roundhouse is still the home and resting place of the motive power of the line, for like animals of flesh and blood, these mastodons of

steel need resting periods. They get tired out, too, after a fashion, and they need rest and food, and a good brushing and curry-combing, so to speak. For that reason after each long run, if it is possible an engine is given a rest period in the roundhouse, and as they are called out again they come out in the order of their going in, that is, those that have had the longest rest periods are used first.

The care and attention that an engine gets in the roundhouse is of the best, for while the engines only represent about eight per cent. of the total value of a railroad's complete property, they are in a sense the life of the entire line and upon their efficiency depends the efficiency of everything else.

Of course first of all is the care that the engineer and the firemen give these pet giants of theirs. The firemen are entirely responsible for that portion of the engine above the running board, or running gear. It is his job to polish up its bulging round back, its brass bell, valves, pipes and headlight and keep it up to mirror-like brightness. This work he does just before or just after a long run, wiping off the dust, polish-

ing all bright metal parts and applying blacking wherever it is needed.

The engineer does his share of this work of upkeep on the portion below the running board, and he is constantly to be seen crawling about the big drive wheels poking into inaccessible places in the engine's vitals, with his long-necked oil can.

The mechanism in the cab he cares for in a similar manner while the fireman polishes up the brass cups and gauges, dials and such like and keeps them always sparkling. There are some roads on which a constant competition is maintained among the engine crews, and the engines on each division that are kept in the best condition carry on the sides of the cab the name of the engineer in charge. This honor is taken away from the engineer if he is so unsuccessful as to have a collision, or any other accident in which he can in any measure be held responsible.

But this is by no means all the care that an engine receives. When it comes panting in after a long hard run of several hundred miles the fireman dusts it off and polishes it and the engineer

does a little pottering here and there, just before it is turned over to the hostlers and wiper of the roundhouse.

They take charge as soon as the locomotive is driven into the roundhouse section of the yard, and their first attention is to the fire box. If the engine is likely to have a long rest in the roundhouse the fires are entirely drawn; that is that ashes and clinkers are shaken down and the fire box entirely cleaned out. A hose is applied after the fire box is cooled off and all the tiny clinkers and cinders are flushed out of the big ash pans.

If, however, the engine is likely to be called into service again within a few hours the fires and ash pans are merely cleaned; that is, the accumulation of ashes is dropped down into the ash-pit, the grates are shaken, all the clinkers cleaned out of the fire, the live coals raked over smoothly and the fires banked.

While this is being done a hose is used on the big drive wheels, the tender and other sections where dust and grime have accumulated. When these portions have all been soused down thoroughly the wipers get busy and rub the washed

parts thoroughly, just as a stableman would rub down a horse after a long run.

This done the engine is moved over to the turntable. The man in charge of the electrical mechanism or the stationary engine that operates the table turns the platform with the engine on it slowly around until it is in the proper position to run onto the tracks that lead into its stall, then the engine moves to its accustomed sleeping quarters, as it were, and settles down for its well-earned rest. If there is any tinkering to be done on it, mechanics potter around it meanwhile.

When a call comes for it to go back into service the hostlers back it out and by means of the turntable get it out onto the tracks again. Here another careful going over is given it, and meanwhile a mechanical inspector peers into its vitals carefully to see that there are no cracks or lose bolts or lost nuts that might cause an accident out on the line.

Everything being given an official O. K. by the inspector and the wipers having completed their task the banked fire is revived, and a full head of steam is worked up.

Then the engine is backed down toward the

coal pockets, the chutes swung out and the tender loaded with ten or twelve tons of coal, the amount to be consumed on the run that she is about to make. The coal loaded, one of the gallows-like arms of the water tower is swung over and the water tank in the tender is filled with hundreds of gallons of water. The water of course is used in the engine boiler to make steam. It is fed or rather pumped from the tank in the tender to the boiler by means of pipe lines connected between the two points.

There is still another operation to be performed before the engine is ready to be turned over to the engine crew. One of the iron domes atop the engine boiler, that looks very much like an inverted iron kettle, is the sand chest of the locomotive.

This chest contains hundreds of pounds of dried sand (kept dry usually by the heat from the boiler). There are long copper pipes that lead over the bulging sides of the boiler and down to a point just ahead of the drive wheels and within a few inches of the tracks. Through this the sand can be spread over the rails on steep grades, or on wet or icy tracks, to pre-

vent the locomotive from slipping and to give it traction where under ordinary circumstances the big drivers would spin around hopelessly trying to grip the rails. The filling of this sand chest is as important almost as the filling of the tank or the coal compartment, and great care is exercised by the roundhouse men to see that every engine has a full supply of sand before it is turned over to the engineer. Just how important this sand is can be gathered from an incident that occurred recently while the writer was sitting in the dispatcher's office of a big railroad. A report had come in of a delay of a certain train. The delay occurred in the vicinity of a steep grade, and fifteen minutes were wasted by the engineer in trying to climb the rise. When the run was finished and the conductor filed his train report it came over the wire to the dispatcher's office with the explanation that the delay was due to wet sand that had been put into the sand chest. It seems that when the train struck the grade the engineer pulled the lever to let the sand down, but no sand came through the pipe. He tried and tried and tried again.

He began to think that the engine had been sent

out of the roundhouse without having its sand chest properly filled. He sent the fireman out on the running board to find out. He peered into the depths of the sand chest and much to his surprise found it filled with sand, but it was wet sand and it had caked and clogged up the pipe. Without the sand it took the engineer fifteen minutes to get the train up the grade.

When this report was read by the dispatcher he immediately wired to the roundhouse of the division and demanded to know how wet sand happened to be put into the sand chest. An hour was spent investigating the situation before it developed that the sand box had been left open at the roundhouse and the nozzle of a water tower carelessly turned had dripped water into the sand. This had frozen and the moisture was retained by the sand until it had been put into the steam chest, where the heat had thawed it out and caused the sand to cake. You may be sure a roundhouse helper was thoroughly talked to by his foreman for that.

Most big roundhouses are directly in charge of a roundhouse foreman, who is responsible for all that goes on in his domains, but where the

division is small and the motive power not so varied or extensive the roundhouse comes under the supervision of the yardmaster.

Here is a minor railroad official who has a tremendous responsibility and who has to be hustling every moment of his working day to keep track of the thousand and one details that are all a part of his work.

There is on each division a trainmaster, who is entirely responsible for all the trains, both passenger and freight, to go out upon the line from the yard or yards of the division. Next in line under him is the hard-working yardmaster, who does a great deal of the work and lifts much of the responsibility off the shoulders of the trainmaster. There is a yardmaster for each yard on the division and where the division is big enough or busy enough to maintain one yard for passenger trains and one for freight trains there is a yardmaster in charge of each. Under him is a night yardmaster who stands the strain of the work when the yardmaster is not on duty.

Every train that comes into the yard must be cared for by the yardmaster, trackage provided for it and care taken that each car is given the

individual attention that its freight demands. He must see to the proper making up of each train that leaves the yard, he must see that an engine of the proper hauling capacity is provided by the roundhouse, he must see that the callers provide a train crew, he must see that all orders for each train are received by the train crew and the engine crew, he must be sure that all cars and engines in the yard are carefully and regularly inspected, he must see that all trains leaving the yard are properly cleared and he must be certain that a host of other details are attended to.

Of course he is given an adequate and competent staff to take care of all this work, but that does not relieve him of a single responsibility. If his yard gets choked or blocked with freight or empty cars, if his motive power is not properly cared for, if there is a derailment or wreck in his domains, he is the one who has to answer to the superintendent of the division.

Of course all yardmasters do not have to do the same amount of perspiring and worrying, for all yards are not the same size, nor do all yards have to handle the same amount of traffic. But it can easily be seen that the life of a yardmaster

in charge of the big terminal yards where trains are coming in and going out at the rate of one every ten minutes, is full of hectic moments and situations that demand the best of his ability.

CHAPTER IX

IN THE FREIGHT YARD

ALTHOUGH the limited makes an impressive appearance as she comes roaring down a straightway stretch of track at better than a mile a minute as if she were the all-important train of the line, and although the lesser passenger trains demand with imperious whistles the right of way over everything that turns a wheel ahead of them, when considered in the light of earning power, they are, so to speak, hollow shams, all front and appearance with little to back them up.

True enough, the road spends a great deal of money in advertising them, boasts of their records, and spends thousands in keeping them immaculate with varnish and gilt paint, yet when it comes to returning earnings to the railroad's treasury, they cannot hold a candle to the grimy, red and yellow vertebræ of clanking

freight cars drawn up on a siding and looking very humble as they roar by. The earnings of the passenger service of the average road is rarely as much as a third of the earnings of the line, and it is left to the humble freight trains to make up the remaining sixty-six and two-thirds per cent. of the railroad's income.

Measured in romance, too, there is little to the passenger service of a line when one considers the romance that trails along with the snake-like freight trains that in the dark of the night go rumbling on their way through sleeping city, town, or hamlet, hauling hundreds of thousands of dollars' worth of merchandise from one corner of the land to the other.

True, there is romance to the speed of the limited, but this factor is not lacking in the freight service. There are fast freights, too, that never give way to the passenger trains, indeed there is no need to, for they can and do pound out their forty-five and fifty miles an hour on their long night runs. These are the trains that carry the preferred freight, the food and milk with which to feed the cities. Where is the romance, pray, in rushing a few hundred

human beings from city to city to keep business engagements or visit friends, compared with the romance of feeding the population of a great city?

Think of the thousands of tons of flour, or fruit in pre-cooled cars, or fish or meat iced down in refrigerator cars that each night come roaring down the polished rails toward every big town or city to supply the wants of the workers there. Think of the long black trains of milk cars that each day pick up the cans and cases of bottles at a thousand sidings in the dairy districts and rush them forward, a hundred miles and more, so that it can be served on the breakfast tables of the city homes next morning, fresh and pure. Where can one find greater romance or be of greater service to his fellow men than in this work of bringing food to the cities?

Trains of preferred freight have almost as much reason for demanding a clear road as the haughty limited herself, for cities cannot wait to be fed, and food delayed may mean food spoiled, and thousands of dollars wasted. Food trains are fast trains with huge engines, that are both fast and powerful. True, these trains of

perishable freight may waste a few precious minutes on a siding to let the limited pass, but all other trains stand aside for them, and slow old freight trains put in on sidings and middles to let these long lines of refrigerator and ventilated cars go whirling by.

Then there are the coal freights, long heavy ugly looking steel gondola cars that seem to wind interminable lengths on the track through the mountainous coal districts. They are not of the preferred freight variety, they are too slow and cumbersome for that, and food is consumed faster than coal is used. They go plodding on their tortoise-like way across the lines of the country.

But there are times when they are the most important trains on the line. When, through strikes or for some other reason, coal famine threatens a town or city in the middle of the winter they are given clear way and fast locomotives, for it is upon the railroads that all inland communities to-day depend for their fuel to keep their factories going and their homes warm. Here is romance indeed in rushing fuel to a community that even while the train is roaring down

through the mountains is burning the last of its reserve supply. Sickness, death or financial disaster may follow the delay of the coal train. No city's fire department performs a greater service to the community than do the railroads at such times as these.

So, although the passenger service of a railroad may appear to the casual observer to be the really vital part of railroading, it is after all nowhere near as important to the nation as is the freight traffic.

It would seem to the casual observer also that the handling of freight by a railroad calls for nothing more than the crudest facilities and the crudest labor, but here again the average person makes a grave error. One has only to stop to consider that passengers can walk and think. They can load and unload themselves. They know when they have reached their destination and can leave the train at their own accord. Freight unfortunately has none of these faculties.

Even the most inconsequential fifty-pound box of soap or case of condensed milk cans requires the individual attention of a man with a

brain that thinks clearly, otherwise it is likely to land on the Pacific coast instead of New Orleans.

Infinite details and the hardest kind of work surround the movement of freight from one section of the country to another, and although the man engaged in its transportation may wear blue jumper and overall, and look far from prepossessing when compared with the immaculate conductor of a special train of Pullman cars, they must have just as comprehensive a knowledge of railroading as he has.

Night is the time that freight is moved over the railroads. One of the reasons for this is that the heaviest passenger traffic is in the daytime, and the rails are less crowded with trains of coaches during the hours of darkness. Another reason is that all day long the freight cars in the yards and at the various freight depots are receiving goods from shippers. The business houses deliver their packages and barrels and what not during the daylight hours, and the railroads undertake their transportation at night so as to conserve as much time as possible.

That is the reason why at night the freight yards of the modern railroad are filled with

gnome-like figures of men in blue jeans, with winking lanterns hooked over their arms. Almost weird they seem as they hurry in and out among the clanking freights or flit across the burning white searchlight rays of engine headlights. What a picture a railroad freight yard presents at night! Here is railroad romance indeed.

Let us visit the freight yard of a modern railroad. Here is a great stretch of level territory covered with an appalling number of paralleling and intersecting tracks and with switches that run up into the thousands. Perhaps there will be a huge roundhouse with its turntable, too, and its coal pockets and water towers, for often the freight engines of a busy division are kept separate from those of the passenger service. Likely enough there will be other interesting sights; the wrecking train for an instance with its squat but powerful derricks on a siding all clear so that quick access can be had to the tracks of the main line. There are likely to be repair shops handy, too, where quick repair can be made to freight equipment temporarily useless because of some minor accident.

But the most conspicuous section of this great railroad plant, and at all times the busiest portion of the yard, will be the "gravity hump" that stands up almost in the heart of the yard with tracks leading up its gradual incline from both sides. This gravity hump is a product of modern railroading, and there are many freight yards that do not have them.

In the old days of puffing and snorting freight engines, several of them, sometimes a perfect horde of them, were employed to shunt the freight cars back and forth from track to track, cutting them out of some trains and adding them on to others. Now all this work is done by a single switch engine or two or three at the most, and it is all accomplished by means of the gravity hump.

Here is a long freight train coming in from the west, bumping and rattling over switches as she comes into the yard. Her track has been picked by the man in the signal and switch tower that overlooks the yard, and presently with a wheeze of air and several gasping sighs, as if tuckered out after her long all-night run, she comes to a stop.

Almost before her own big freight hauler is uncoupled and started slowly back toward the roundhouse, a saucy freight engine comes chugging up to her rear end, uncouples her caboose or "hack" and shunts it over to a side track where it will remain until its occupants, the conductor and his crew of brakemen, are called upon to take out another freight in the evening, perhaps.

There on the siding, like a many-jointed red and yellow snake, the freight train reposes. It has come in from Chicago with a varied lot of cars. Here are refrigerator cars of meat, bound for cities further east, New York, Boston, Albany. Here are cars of merchandise bound for Philadelphia, and cars of raw silk scheduled for New York, or Baltimore; here are pre-cooled fruit cars, a few of them picked up at Chicago from an overland freight from the Pacific coast and bound for the eastern seaboard, in all a varied and strange collection of commodities, all on their way somewhere.

The job confronting the railroad men in the yard, the yardmaster in particular, for this is his domain, is to break up this long train into sec-

tions and get each car, or group of cars, attached to a train bound for the city in which the cars are expected. It is in this work that the gravity hump is used.

Almost before the yard inspectors have gone over the newly arrived freight looking for injured or crippled cars which must be drilled out of line and sent to the shops for repairs, snorting switch engines begin to break apart the line of cars, taking several cars at a time and scurrying off with them toward this gravity hump.

The arrangement of tracks in the vicinity of the hump is interesting. Again we have the bottle as a fine example. At the foot of the hump on the ground are a number of paralleling tracks.

On each of these tracks trains are being made up, one for New York, another for Philadelphia, and so on. As these tracks reach toward the hump they gradually converge by means of switches until by the time they reach the crown of the rise they have converged into one or two tracks.

Now the snorting switch engine that is dismantling the newly arrived freight drags or

pushes the cars it breaks loose from the group up to the crown of this hump. Here they are uncoupled and by gravity they start to move downward toward the trains that are forming below.

As they rush downward switches are thrown, so that a car bound for Baltimore is shunted in onto the track where the train for that city is being formed, the car for Philadelphia is shot in onto the track where the Philadelphia train is forming, and the car for New York goes on across the switches to the point where it swings in onto the tracks where the New York train is being made up. And so it goes, hour after hour, cars are drilled up the hump and shot down into the slots where they belong, brakemen a-top of each handling the brake wheels to see that these cars that seem to be running wild across the yard do not bump into the fast-forming trains too hard to smash things.

And as each train is formed on the level stretch at the foot of the hump, cabooses are brought forth from the sidings where they have been resting, engines come rumbling from the

roundhouses where they too have been catching up their wind, so to speak, all are coupled on to the newly formed trains, orders are received by conductors and engineers, from dispatchers by way of the yardmaster, and presently a train composed of cars all bound for New York, or Philadelphia or Baltimore, cars that had come into the yard on a dozen different trains, go bumping over the switches and onto the main line, off on another lap of their journey toward their destination.

It is a wonderfully efficient system and it is truly remarkable how swiftly trains can be broken up and reassembled into new trains by means of the puffing switch engines and the gravity hump. But it must needs be efficient nowadays, for in the big freight yards of a busy railroad division there can be no lingering or delay. Trains come rumbling into some yards at the rate of one every ten minutes. That means that they must be broken up, reassembled and started out again just as swiftly or the yard will become congested and the line blocked, which is the most serious situation that can develop in railroading.

All this is the responsibility of the yardmaster. We did not exaggerate then when we mentioned, back a little, that he must be a genius and a man able to think quickly and accurately every second. Fancy how it must seem to be in his position with all these trains thundering in on top of you, knowing all the time that trackage must be found for them, that they must be sorted and drilled into place as units of a new train, and that they must be started on their way again without any delay.

Nor is that all that this genius must have in his mind. There are freight houses connected with his yards probably where merchandise is being received. He must provide cars for this, too. He must see that there are no "empties" standing around idle on his siding, for empty freights mean money lost. He must keep in mind, too, the number of cars from foreign lines that he has on his division, and at every opportunity he must see to it that these cars get started back toward their home lines with merchandise bound in that direction, for there is a daily charge for each car of a foreign line that he has on his tracks, and the only way to get

rid of this charge is to hustle the car toward its home line as fast as it can be arranged.

And so it goes. The yardmaster must indeed be a genius, but the men under him must be just as capable in their work. There can be no time lost or no false moves made in the ever busy freight yards.

CHAPTER X

THE WRECKING TRAIN

DAWN was breaking behind the mountains to the eastward and the sun, still hidden, was sending out cheerful tokens of a pleasant, warm spring day, with its great splashes of orange that painted the clouds and the mountain tops. Down the converging steel threads of railroad tracks, out of the darkness of the west, thundered a fast freight of perishable commodities, fruit from California and beef from Chicago and the west.

The big mogul engine, headlight still lit, came roaring onward, black smoke belching, white plumes of steam curling outward, looking for all the world like some sinister night-borne monster charging out of the west to meet the day.

Because her products were perishable the

freight was making fast time. She approached the treacherous S turn at the head of the valley, traveling thirty-five miles an hour. But fortunately Jim Folsom, the engineer, was not willing to snap the long heavy freight around those turns at that rate, and began to let in the air and ease down considerably on the speed. Just then something happened. What it was neither Jim nor any of the rest of the train crew knew. Perhaps a rail spread. Perhaps the spring rain had eroded the embankment and caused the tracks to shift slightly under the weight of the engine, but whatever it was, it accomplished a quick and effective job in wrecking the freight.

The big mogul hit the curve, seemed to pause and shiver for a moment, as if staggering under a blow. Then it reared slightly on its big drive wheels, its head swung to the left and with a hissing roar, amid a cloud of steam and smoke and scattering fire, it rolled over on its side and plunged down the high embankment into the ditch.

It was a horrible spectacle. It was like witnessing the death of some huge prehistoric animal, for the big mogul, struggling, coughing,

sputtering there in the ditch, resembled in every way a terrifically big and strong mammal, mortally wounded.

What followed resembled more the results of an earthquake. The long red and yellow vertebræ of freight cars shivered and clanked and groaned from one extremity to the other. Three of the forward cars went rolling and tumbling down the embankment with the engine. A fourth shot off at a tangent and, crashing through iron fence at the bottom, rolled end over end into a field of wheat beside the tracks. The fifth and sixth in line staggered over and crashed into a heap of splinters across the west-bound tracks, while several behind crawled up on top of each other in a mighty pyramid. The rest of the long train, after a shudder or two, stayed on the track.

An eye-witness to the wreck would have viewed, beside the spectacle of the dying locomotive, two figures in blue overalls and jumper sprawled apparently lifeless, one on the track, the other stretched out part way down the embankment. They were Jim Folsom, the engineer, and Lafe O'Neill, the fireman. Both had

jumped to save themselves when they saw the situation was hopeless.

First one stirred, then the other. Then the man on the tracks sat up and looked about in a dazed way. He was scarcely conscious. O'Neill on the cindered slope began suddenly to claw his way up the embankment. Presently he reached the tracks and stood up, brushing his hand across his eyes with the uncertainty of a dazed man. He felt as if he were gradually awaking from a bad dream. Then he saw Folsom sitting upright, and his brain cleared quickly. He helped the engineer to his feet.

By that time three men came running along the line of cars, climbing over the wreckage. They were Dolson, the conductor, and the front and rear brakemen, who had been in the "hack" having breakfast when the crash came.

"Alive! Hurt! No! Thank heavens," cried Dolson, clutching at the shoulders of the still dizzy engineer and fireman.

"Great snakes, what a mess," groaned Folsom as he gazed out at the wreck.

"No fire, thank goodness."

Dolson gave the scene a hasty survey.

"Bad wreck," he said crisply. Then, "Come on, boys. Out with the flags. You, Meyers, take the east track. Hurry. No. 87 will be along in twenty minutes. You, Lewis, take the west track. Go up there and flag everything the other side of the bridge. I'm off for Maple Corners station."

And Dolson, although he was gray and forty-five, started off at a run to cover the half mile between the scene of the wreck and the nearest telegraph station. As for Folsom and O'Neill, they sat down on a rail of the west-bound tracks and, still dazed, said nothing.

It took Conductor Dolson nearly ten minutes to reach Maple Corners. Arthur Canner, the station agent, was just unlocking the door of the box-like station house when he saw Dolson come panting around the curve and down the station platform.

"Hello, Dolson—for the love of Pete what's happened? You are white and all out of breath."

"We're—puff—in—puff—the ditch—puff—down at the—puff—curve," panted Dolson, struggling with his breath.

Canner asked no more. He plunged into the

station, kicked open the ticket office door and the next minute his fingers were ripping out two letters that called for a clear wire to New City, division headquarters.

"W.K.—W.K.—W.K.—W.K.," he ticked out, and up and down the line every one who heard it knew that he was calling for the wrecking train.

Down at New City the dispatcher heard the call. Swiftly he cut in and called for details.

"Fast—freight—No. 417 ditched—at—curve —below—Maple Corners," rapped out Canner, and turning asked Dolson for details.

"No one hurt. Engine in the ditch. Seven cars piled up. West-bound tracks blocked," snapped Dolson.

Canner rapped out the facts with expert speed while the dispatcher at the other end took them down as calmly as if he were listening to a train report or the news of a ball game.

"Right. Set—flag—for—No. 18—Side-track —at Maple Corners—to—let—wrecking—train —through," he snapped back to Canner, who knew by this that somewhere between his station and the one further west was the early morning passenger train. He must flag her and run her

up onto a siding to clear the line for the wreckers.

From the dispatcher's office other messages were being shot out to clear the line. Everywhere that a wheel was turning between New City and the point of the wreck, trains were being stopped and side-tracked to clear the line for the wrecking crew.

Meanwhile at division headquarters things were humming. Out in the yard the best locomotive in the roundhouse was being coupled to the wrecking train, which day and night stands in readiness on a siding waiting to shoot out onto the main line and make a record run for the point of trouble.

While the engine was being coupled up 'phone messages were flying, routing the members of the wrecking crew out of bed in the cases where they were still asleep, or hauling them from their breakfast tables. They came on the run. Inside of two minutes after the 'phone call the first of them came running into the yard pulling on his coat. In five minutes they were all there, a round dozen of husky, big-chested, clean-eyed men trained in the work of wrecking by years of

experience in railroading. They tumbled aboard the wrecking train like firemen manning the hook-and-ladder truck just before it rolled. Big Mike O'Rourk, boss of the wreckers, was everywhere. He was hurrying the engineer, yelling for the wrecking crew's cook, checking up his men and in other ways putting things in shipshape for a hard job and hours of almost frantic work.

In twenty minutes after Canner had snapped the sharp "W.K." over the wires, the wrecking train, fully manned and ready for anything, rolled out of the siding onto a cleared main line.

The engineer opened up and they were off at a fifty-mile-an-hour clip for the scene of trouble twenty miles away. No speed laws hampered them, no blocks were set against them. Every semaphore arm beckoned them, and what a run they made! They burned up the rails, flashing by everything. Even the Overland Limited, the pride of the line, was held fretfully on a siding to let them pass. It was a record run, and as the wreckers ploughed their way through slumbering Maple Corners, grizzled old Arthur

Canner swore he had never seen a train travel that way before.

In less than twenty minutes from the time they left the yard they were at the scene of the wreck, the men tumbling from the flat cars, crowbars and axes in hand, Mike O'Rourk, the wrecking boss, in front of them all.

For a minute this veteran of a score of wrecks surveyed the scene. Then he began to rip out orders that started the men attacking the two freight cars piled up across the west-bound tracks. These must be cut away first and one set of rails opened, anyway. The rest could wait until this was done.

With shouts that sounded more like battle cries, the men plunged in and with axes swinging and crowbars clanking, they began their work of demolishing the wreckage that blocked the west-bound tracks. Meanwhile the aproned cook from the wrecking car appeared on the scenes with a bucket of steaming coffee and sandwiches prepared during the rail-burning run. The men ate as they worked and paused only long enough to swallow cups of steaming coffee. Folsom and O'Neill and the crew of the

wrecked freight joined in the feast and in the work, too, for they were as eager as the wreckers to get at least one set of rails cleared.

Under the frantic efforts of the men the two cars that blocked the west-bound tracks disappeared as if consumed by a fire. Inside of an hour the wreckage had been cleared, and the big steel crane of the wrecking train was slowly feeling her way forward to get a grip onto the trucks of the cars and lift them out of the way and onto the flat car. Then the west-bound line was clear and word was flashed along that would let the majestic Overland Limited and the rest of the waiting trains through.

Boss O'Rourk, the emergency met and overcome, now turned his attention to the rest of the wreckage. He scattered his army of workers into little groups and set them attacking at various points, for he was a master wrecker, and his experienced eye had been able to pick out the vital points of the whole hopeless-looking mess before him.

Here was the key to one situation. There was the key to another. He knew that these were the points of attack by which the whole

mass could be cleared up in the shortest possible time.

The men leaped to the work like fighters plunging to an attack. Axes flashed, crowbars rang, the long arm of the crane reached in and out like the trunk of a giant elephant, picking out great chunks of wreckage here and there and depositing them on the side of the right-of-way or on the flat cars of the wrecking train to be hauled back to the shops and salvaged.

For hours they worked. The cook served dinner, meat salvaged from the wrecked refrigerator cars and cooked as only wrecking crew cooks know how, with side dishes of cooked prunes and raisins taken from one of the scores of smashed crates scattered on the right-of-way, and oranges for dessert, these also gathered from the wreck of the fruit cars.

Again the men worked and ate between times. They seemed hardly human in the way they sweated, and panted, and labored. Where, save among railroad men, could one possibly find men who could, or would, work so ceaselessly, so tirelessly? The afternoon wore on. The wreckage on the east-bound tracks was cleared away, and

a section gang summoned to the scene began relaying sleepers and rails that had been ripped up.

Meanwhile an engine called from New City arrived, passed on the west tracks to the nearest cross over, backed down to the rear end of the freight and hauled all the cars that were still on track out of the general mess and back to the yards, where they could be made up into a new train and sent on their way.

The tracks cleared, O'Rourk's men began salvaging the wreckage in the ditch. Two cars, not so badly smashed, were lifted bodily by the big steel wrecking crane and placed back upon their trucks on the tracks and hurried away to the yards.

Then the big wounded mogul, its steel sides dented and its cab shattered, became the object of the attention of the wrecking crew. Here, it would seem, was a real test for the sturdy, stock-looking crane. Steel cables and chains were belted about the engine and then, with scarcely any apparent effort, the crane settled to its task, brought the heavy steel monster out of what looked to be its grave, and set it back

on trucks to be hauled limpingly back to the shops. It seemed to be scarcely a real task when the wreckers put their shoulders to it, so to speak.

Then all that could be salvaged was salvaged by the still toiling wreckers, and when the flat cars were piled high with all sorts of things, men with cans of oil and torches went about among the débris and cleaned up the rest. What a blaze it made! The wreckers lined the track, their task done, and watched the licking flames and the curling smoke complete their work. Then as night came on and the fires burned to embers and the wrecking train departed, the men, dog tired, sprawled out on flat cars or in the single coach, wearied to the point of utter exhaustion, but happy in the consciousness of a task well done.

* * * * * * *

The wrecking trains of a railroad and the crews that man them are ready for any emergency, day or night. They are to the railroad what the fire companies are to a large city, for they are subject to call day or night, and the call may mean to them an hour's work or a round of

twenty-four hours of constant back-breaking toil, for it is on them that the company depends to keep its line open and traffic moving, no matter how great the catastrophe.

In the yard of every division headquarters, ready and waiting, stands a wrecking train on a track of its own that is always clear and has quick access to the main line. The train is composed of from four to six cars equipped with every sort of tool or implement that might be needed in an emergency. One car is equipped with a sturdy but squat-looking steel crane. This is built low to give clearance through tunnels and under bridges. But in spite of its proportions it is of Herculean strength, able, as we have seen, to lift bodily into the air a one-hundred-ton locomotive and swing it in any direction. The other cars of the train are flat cars, piled up with blocks and tackle, great jacks, spare wheels or trucks, pickaxes, crowbars, shovels and the like, and a host of other equipment too varied to mention.

The rear car of the train is usually a coach, and this is the quarters of the wrecking crew when on duty. There are bunks or cots

here, a mess hall and a kitchen, the domain of the cook, for every wrecking crew has its own "hash slinger," as the wreckers dub the cook. An army travels and fights on its stomach. So does a wrecking crew, and the railroad officials know that it is highly necessary to provide these men, who are willing to sweat and toil ceaselessly on a job, the best of grub to keep them happy. The "hash slinger" of a wrecking crew is always the best of his kind to be found.

The wrecking crew does not always live with the train. Perhaps one or two members, who are unmarried and have no other homes, bunk in the coach of the wrecking train, but the majority of the members of the crew have their own homes within a reasonable distance of the yard. But they are sure to have telephone sets at the head of their beds, by means of which they can be summoned at a moment's notice.

When a wrecking train rolls, to use the parlance of the fire fighters, it is always the best and fastest locomotive in the roundhouse that is called out to do the work of getting the train and its crew to the point of trouble. Some record runs have been made by the wrecking train's

speeding engine, for no time can be lost when a call for action comes. There is only one train that can have the right-of-way over the wrecker, and that is the hospital train, which fortunately is rarely needed except when big passenger train accidents occur, and these are few and far between.

The thought and desire that spurs on these men of the wrecking crews is that the line must be kept open under all circumstances. A blocked line may mean a great deal, ranging from the loss of money to the railroad and shipper to life and death. Should a milk train supplying a large city be held up for a day, it means that there will be a shortage of milk somewheres and babies will go hungry, weak ones becoming weaker and possibly ill ones dying. Should food trains be stalled for any length of time and the food will spoil in transit, there will be a shortage at some point which may result seriously.

Should the speeding passenger service be stopped untold harm may result. Physicians may be kept from dying patients, men of big business affairs may be kept from appointments

that may mean a loss of millions of dollars or the crippling of an important industry of the country. Indeed there is no limit to the catastrophes that might result if the line is blocked.

So the most important task in the world to the railroad man is the necessity of keeping the line open. Wrecks must not be permitted to block it any longer than is absolutely necessary, and floods or storms must be fought and conquered before they can cripple traffic, and sometimes this task is far more difficult than that of clearing away wreckage.

A severe winter storm will do more to upset traffic and block the line than the most disastrous of wrecks, especially in mountain districts. One of the biggest difficulties that some of the western roads encounter are the heavy winter storms that over night pile up drifts on the right-of-way that will delay traffic for hours or even days.

These roads, and in fact all northern roads, in addition to having their wrecking trains constantly awaiting a call, have other emergency equipment in the form of snow-plows. These vary from the flange-like affairs that can be

Bucking the drifts. A big snow plow forcing its way through drifts in an effort to keep the line open

bolted to the front of a locomotive to the huge rotary plows that are employed by the big western roads, and which can cut through drifts higher than the average dwelling with as much ease as the flange plows of the eastern roads push aside a six-inch fall of snow.

The rotary snow-plow is an ingenious piece of mechanism that has been developed by American railroad genius to fight the storms of winter and help the men keep the line open. It is in reality a huge sucking fan driven by a powerful engine that pushes its way into a snow-drift and literally eats through it, sucking the snow in and spraying it out through a huge nozzle at the side which throws a stream of snow away from the right-of-way that would bury a house in short order.

Pushed forward by two or three heavy locomotives, these plows can conquer almost any drift if given time, and few are the storms that can snow in these mountain divisions nowadays and hold them blocked for any length of time. The rotary snow-plow can eat its way through a veritable mountain of snow if need be.

Keeping the road open in snow weather calls

for all sorts of emergency work, and it is not only the men on the line, but the generals in the office as well, who spend hours in harness, disregarding the necessity of sleep or meals or anything else until the emergency is passed. Out on the line switchmen, section men, laborers, station agents, engineers and firemen are all busy bucking and trying to conquer a snowstorm, for there are drifts to clear, crossings to clean, frozen switches to be thawed out and kept open, signals that must be cared for and a host of other disagreeable details that the big snowstorms bring on; while in the offices the superintendent and his assistants are giving orders, backing up the men in their work, flashing words of encouragement over the wires, suggesting changes and doing everything in their power to help out, for they know that under any and all circumstances *the road must be kept open* and the men on the line must do it.

But there are a host of other men besides the wrecking crews and the snow-plow brigade who have that slogan close to their heart. It is part of the gospel of the humble track walker, for instance, that solitary individual who day after

day and night after night walks countless ties and innumerable miles in his own effort to keep the line open.

It is for him to watch for defects. If a storm has eroded the embankment or a stream seems to be encroaching too seriously on the right-of-way of the line, he must report it. If he finds a loose bolt or a loose fish-plate, he must stop and repair the trouble if it is possible, or if it is beyond him, do all that he can and then report the condition to the section boss. If he finds loose spikes, he carries with him one of those long-headed track sledges with which to drive in a new spike where it is necessary. If he finds badly worn or splintered ties he marks them for the further inspection of the section boss, for he knows that any one of these details might result in something more serious, even a wreck, and the line would be blocked.

Then there is the section gang, that group of laborers, track builders, and shovelers of ballast. They, too, have at heart the necessity of keeping the line open. The section gang is in reality the track repair crew. These gangs, under the direction of a section boss, are given a section of

from two to ten miles of track to keep in repair. They have at their command a hand car, and with this bug-like contrivance they scurry up and down their section to points where new ties are to be put in or new rails laid, or where the grade, constantly settling under the pounding of heavy trains, needs rebuilding. Always at hand they have equipment to work with, for the hand car carries their picks and shovels, sledges, tamping bars, stone forks, jacks, track gauges and what not, and work trains appear occasionally and drop by the track side at various points on their section new ties or rails or kegs of spikes, bolts or fish-plates, so that the section boss shall never be without the necessary supplies to help his men in their work of keeping the line open.

CHAPTER XI

GIANTS OF THE LINE

THERE is a story told of an engineer, of Irish extraction, who let one of those tiny puffing toy-like engines, that were used on a city elevated railroad line, play such a part in his life that the loss of it made a moral and physical wreck of him, and it was not until fifteen years later, when he once more had the responsibilities of caring for that same engine, that he got back on his feet and made a success of life. Such is the sentiment of an engineer for his locomotive.

The engineer of the story was Danny Carroll and the engine was No. 9, once the pride of the Third Avenue elevated line in New York City. Danny petted and pampered and cared for that puffing, snorting "fuss-budget" of an engine for five years. He came to regard it as his very own —almost a companion, a chum, and he endowed

it with a personality. He even talked to it as a chap might talk to a horse or a dog. He oiled it and pottered about its steel limbs with the care and evident affection of a cavalryman and his favorite charger.

Then came the blow that took No. 9 out of Danny's life and made a wreck of him. The Third Avenue elevated line was electrified—a third rail was laid down, motors were installed in the hauling cars and in a year's time the last of the sputtering, coughing little engines of the line disappeared—No. 9 among them. Danny, with all the other engineers of the road, was given an opportunity to learn how to drive these new forms of locomotives. But Danny refused in no uncertain language and proceeded to condemn to the nethermost regions the civil engineers who had installed the electric system. Doing away with the steam engines was to him a hideous crime and not to be countenanced without a protest.

Protest he did, but it did him little good and the day he witnessed the dismantling of No. 9 in the shops of the company preparatory to its being shipped via steamship to Central America, where

it with several companions was to serve out the remainder of its years hauling sugar cane across the big plantation, Danny Carroll took to drinking.

That was Danny's downfall. From a sober, industrious, hard-working young chap he became a frousy, disreputable creature in the course of time, always bemoaning the loss of No. 9 and condemning the engineers who were responsible for it. Year after year slipped by. Danny went from bad to worse until he became a denizen of the underworld, not actually a criminal, but so closely associated with crime that the mere sight of a police uniform struck fear to his heart.

One night, fifteen years after he had lost No. 9, he was caught in a police raid on a dive that had become the hangout of a gang of thieves. Danny was there because he had not the money or friends to be in more respectable quarters.

The raid burst upon the disreputable characters in the rendezvous so unexpectedly that a terrific fight resulted between police and gangsters and in the mêlée, somehow, Danny Carroll

detached himself from the mob, slipped through an unguarded window, and presently found himself in a water-front street with the yawning doors of a darkened pier inviting him to hide within.

Danny seized the opportunity and slipped inside, only to disturb the night watchman, who began searching for him. To avoid capture the erstwhile engineer climbed a hawser hand over hand and presently let himself down onto the deck of a steamship moored to the pier. But this was hardly a secure hiding place, so he slipped along the deck rail until he came to an open hatchway, where he let himself down into the hold of the vessel. Then being very tired, and with his brain fogged with drink, he lay down on some bales of cotton cloth and promptly fell asleep.

When he awoke Danny found to his consternation that the vessel was at sea, and after three days of hiding and starving in the hold Danny appeared on deck and was promptly put to work with a scrubbing brush.

The first port the ship touched at had an unpronounceable Spanish name to it, but that

made no difference to the chief officer of the ship. He put his super-cargo off there and the ship sailed away, with Danny standing mournfully on the dock, trying to decide what to do next.

About that time he heard shouts and the clank of a sledge-hammer and the hiss of steam, out beyond a long storage shed. Danny hied himself in that direction and presently came upon a motley crew of pajama-clad soldiers gathered around a dinky locomotive. They were trying to repair it with a sledge and cold chisel. For a moment Danny was struck dumb with astonishment, for in the snorting little engine he recognized old No. 9, his friend of fifteen years back.

With a roar of rage he plunged in among the crowd of soldiers and scattered them right and left. He acted for all the world like an enraged bull as he seized the man who was wielding the sledge and flung him end over end along the dock. The man with the coal chisel ran before he could get his hands on him. Single-handed Danny whipped the entire army, for they all fled in panic.

Danny took charge of things immediately. Once more associated with his engine he became the same forceful man he had been fifteen years before. He found that the soldiers were the government force of the little republic and that the engine had been captured from the forces of a revolutionary army. The engine promised to be of real value in their military campaign if they could somehow get it to move. Something was out of order, however, and their efforts to mend it looked hopeless until Danny had appeared on the scene.

Of course Danny repaired the engine and got it to operate, and for his efforts he was made chief of the republic's single railroad by the president. He became a man of prominence and responsibility immediately and at the throttle of No. 9 he played a real part in putting down the revolution and getting the country in order. And he is still the country's most prominent railroad man for all the writer knows, and No. 9, hopelessly crippled in the fighting, now occupies a huge granite block in the public square of the republic's capital as the hero engine.

If this dinky, little, snorting "stove on

wheels," as the railroad men characterize the old-time elevated railroad engine, could exercise such an influence over Danny Carroll, think what an influence one of the present-day giants of the line must be to the average railroad engineer. True, to wax sentimental over one of these huge freight hogs would seem like an attempt to coddle a mastodon, but nevertheless the average engineer is almost as devoted to his big steel horse as Danny was.

An engineer, and his fireman, too, take a tremendous lot of pride in their engine. They also seem to endow these animate man-made creatures with a personality, and they watch over them and care for them as carefully as they would a pet horse or dog.

But well they might, for these giants of the line are conceded to be the greatest engines in the world. American locomotives are the biggest, speediest, strongest and finest in the whole world, and it is an honor indeed to be in full charge of one of them—an honor that carries with it a salary amounting to almost as much as that of a division superintendent, and real prestige among railroad men.

There seems to be no limit to the massiveness and power of the railroad locomotive, and although perfectly enormous ones have been built and are being used to-day, railroad men agree that the limit has not yet been reached. Increasingly heavy freight traffic rather than passenger traffic has been responsible for the development of the locomotive to its huge proportions of to-day. To haul some of the immense trains of freight cars over the steep mountain grades of the west veritable giants are required.

One of the biggest type of locomotive in use to-day is in the service of one of the western roads, the Atchison, Topeka and Santa Fé Lines, where they are used to push huge freight trains over the steep grades of the section of the southwest traversed by these lines. Those great engines are one hundred and twenty-one feet long and have sixteen drive wheels. In reality they are two locomotives served by the same steam system and fire box. The drive wheels are divided into groups of four and are served by separate sets of cylinders, and the massive giant, although it is too long to conveniently navigate sharp curves, is made almost flexible by an in-

genious set of joints in its steel frame. It weighs better than four hundred tons and the amount of freight that it can move is enormous.

This is known as the Mallet type of locomotive and is without a doubt the most powerful railroad engine in the world. Other Mallets not so big but almost as powerful are in use on other lines of the country, the Delaware and Hudson Company having some with sixteen drive wheels that are ninety feet long and weigh two hundred and twenty-three tons. These too are used as pusher engines for the huge freights of coal cars that are operated by that company in the mountainous region of the line.

It is interesting to know that this last named road was the first in America to use a steam locomotive and the first locomotive used was not American but English. It was a tiny seven ton machine imported from England and named the *Stourbridge Lion.* It is interesting to compare this little fellow with the giants who travel the same right-of-way now weighing thirty times as much and having the power of a perfect fleet of these little fellows.

Rivaling these giants both in size and in power

are the new engines that the Erie Railroad recently added to its powerful equipment of pushers in the coal fields district of the line. This type, new to the Erie, is an engine well over the four-hundred-ton variety, having a total weight of 853,000 pounds with a tractive force of 160,000 pounds. It has a water tank capacity of 10,000 gallons and a coal consuming capacity of sixteen tons. Its length is one hundred and five feet.

These engines have six cylinders, two of them high pressure, thirty-six inches by thirty-two, and four low pressure of the same dimensions. The drive wheels are huge affairs of sixty-three inches diameter.

Some idea of the terrific pulling power of this engine can be had when it is explained that in a test one hauled two hundred and fifty-one fully loaded fifty-one ton gondola cars, making a train of 35,824,000 pounds. But this is not its limit by any means, for it is said that it can haul a train four and three-quarter miles long (containing about six hundred and forty cars). A train this size would weigh 90,000,000 pounds.

As mentioned before, it was the freight serv-

ice, and not the passenger service that is responsible for the development of these wonderful Mallet type of engines that are built for power rather than speed. But America has outstripped the world in speed locomotives, too.

There are three tremendously swift types being used in the passenger service in this country to-day. They are known as the Atlantic type, the Pacific type and the Prairie type, all of which are huge things with great drive wheels and they can whizz a train of passenger coaches over the landscape at better than a mile a minute with great ease.

It is interesting in digging back into the history of locomotives to find that sixty miles an hour—a mile a minute—was not unheard of on American railroads very early in their history. Indeed it is said that a train driven by a locomotive built in the foundries of Matthias Baldwin, a watch-maker, and the man who founded the now famous locomotive works that bears his name, drew a train of special coaches on the Pennsylvania Railroad, one of them the private car of President Zachary Taylor, at the rate of

sixty miles an hour during Taylor's term of office.

But before that even greater speed was attained, for this same famous locomotive builder constructed an engine for the Vermont Central Railroad that from a standing start covered a measured mile in forty-three seconds. The speedsters of to-day have only been able to shave this a matter of a few seconds, ten to fifteen at the most.

It was this performance, along with others of a different character but equally as important, that made American locomotives famous the world over and has ever since kept Europe's eyes turned to us for all things new and wonderful in railroading.

In the early history of the locomotive it was difficult to construct one that was capable of hauling a great load up a grade. Until then England was considered to be building the best locomotives in the world, but her best were not capable of power enough or traction enough to conquer grades.

Among the pioneers in locomotive building was one Norris of Philadelphia, who had been

experimenting with locomotive construction. He finally developed the engine since become famous as the "George Washington," which succeeded in climbing a heavy grade dragging two cars behind. It not only made the grade, but midway up came to a dead stop and started to climb again. This was indeed a remarkable achievement and news of it traveled around the world. But England, jealous of her prestige as a builder of locomotives, jeered and scoffed and the British papers said that the stories told of the Norris engine were fairy tales. This nettled the Philadelphian as it nettled many other Americans, and Norris promptly built another engine and packing it up shipped it to England, where he had it assembled again. Then he demanded to know the stiffest grade they had to test it on, and when the grade was made known to him he made his engine climb it and come down again, stopping and starting midway in the journey, as his American engine had done.

That was enough. Doubting old England believed. It stretched its head and sighed, but it believed, for the representatives of

Germany, France and Italy, as well as other European nations, promptly acclaimed America the leader in locomotive construction, and Norris returned to America with so many orders that he could not fill them all in the time specified. It was then in 1835 that America outstripped England as the nation of railroads and we have continued to run well ahead of her ever since.

One of the early British engines to make a record for itself in this country was the "John Bull," which is now on exhibition in the Smithsonian Institute in Washington. There are other American made engines of the early days of railroading that were just as conspicuous as this one. The engine known as the "Best Friend of Charleston" was the first American built locomotive to be successfully operated in this country. It was built in the West Point foundries in New York City.

The "De Witt Clinton" was the first locomotive to travel the rails that were laid along the historic Indian trail up the Hudson valley. The "Arabian" is another famous early American engine, so is the "Tom Thumb," that was built

by Peter Cooper and used on the Baltimore and Ohio.

From these strange specimens to the present-day Mallet is a far cry, but the steps in between have been many and labored. For years wood was the fuel of the engines. Then coal became the fodder for the fire boxes. Now there are fast locomotives that are known as oil burners, their tenders being huge tanks that supply them with petroleum. There are steps that hardly look like progress in the development of the steam locomotive, such as the adoption of the steam whistle in addition to the original bell, and the headlight for use at night. All these represent the ingenuity of American engineers.

To-day's locomotives, for there are a variety of types for a variety of work, are real triumphs. They are the reasons for our nation's supremacy in railroading. Good motive power, although it represents scarcely ten per cent. (about eight per cent.) of the investment of a railroad, is really the life of the road itself, for the money-earning capacity of the road depends entirely upon how modern its haulers are and how well they are cared for and maintained.

Every railroad takes good care of its engines. In truth every railroad takes good care of its rolling stock, whether it be engines, flat cars, freights or coaches, for it is on these that the wear and tear of traffic first shows itself, and it is by the appearance of these that prospective patrons, whether shippers or passengers, judge the road. They must keep their equipment looking nice *and they must keep it mechanically flawless in every detail as a safety measure.*

To this end every railroad maintains special groups of men who, while their work is not as romantic as that of the engineer or the brakeman atop the swaying cars, is every bit as necessary to the safety of the road. There are inspectors who day and night go over the equipment of the road. They are trained men who by the tap of a hammer on a car wheel can tell from the sound given off whether crack or flaw is there.

Tirelessly by day and by night they are to be found crawling under cars or climbing over them, working by torch-light or sunlight, but always working, looking, searching, testing, in quest of the flaw that might mean a wreck and

the death of a score of human beings or the loss of thousands of dollars in freight.

And back of the inspectors are the shops with their thousands of trained employees who can do anything from casting a car wheel in the foundry to rebuilding a locomotive.

The shops are an important department of a railroad, for it is on them that the road depends to keep its rolling stock in service order. On the care with which repairs are made depends the safety of its equipment, and on the speed with which this repair work is done depends the earning capacity of the rolling stock. To keep a car in the shops a week means that hundreds of dollars is being lost by the road. To keep a locomotive in the shop overlong means that thousands of dollars are being lost by the road.

As a rule, shops for minor or light repair work are maintained on each division, with larger and more complete shops at some central points where locomotives or cars can be sent when their overhauling is to be of an extensive nature. One road, the Pennsylvania, maintains at Altoona, Pennsylvania, a tremendous plant where not only repair work is done, but where equipment

is manufactured. Facilities are provided at Altoona for the manufacture of one thousand cast-iron car wheels every twenty-four hours and for the building of complete locomotives or steel passenger coaches.

But not all roads have gone in for the manufacture of equipment the way the Pennsylvania has. Most of them are content to buy locomotives and new equipment from the foundries of private companies and keep them in repair at their own shops.

The giants of the line make periodical visits to the shop, there to undergo attention. It is estimated that every locomotive after it has traveled from 50,000 to 70,000 miles of rails should be turned into the shops to be thoroughly overhauled. And thorough is the overhauling.

The shops are provided with huge traveling cranes that can lift a locomotive clear off the tracks and swing it into the air as easily as one lifts a ten-pound bag of sugar. When a locomotive reports for an overhauling it is entirely dismantled; this huge crane lifting the boiler from the trucks and taking the huge cylinder weighing tons to the far end of the shop deposits it in

the boiler maker's department where men tinker up the tubes and scrape it and otherwise put it in order.

Meanwhile other workmen begin on various other parts, some caring for the drive wheels, others the cylinders, and still others the pumps and other machinery. They work swiftly, these men of the shops, for they realize that every minute the locomotive is out of commission means just so much loss to the road. But with all their swiftness they work carefully, too, for they realize that upon the carefulness of their work depends a tremendous lot. Just how swiftly they do work can be realized when some of the records for complete dismantlement, overhauling and reassemblying of a locomotive are given. Two shops of the Erie Railroad hold the records. The first was made by the men at the Hornellsville shops when they took down a locomotive, cleaned and repaired all of its five to seven thousand parts and reassembled it again in twenty-four hours of solid work.

This stood as a record for a short time until the workmen of the Susquehanna shops undertook to smash it. And smash it they did. From

seven o'clock in the morning until thirty-four minutes after seven at night they did all that their rivals in the Hornellsville shops accomplished, and the night of the same day that the big locomotive came to the shop she was out on the line dragging a long clanking vertebræ of red and yellow freight cars westward. That is the last record, and it is questionable whether the best of organized shop crews will ever reduce it by many minutes.

An interesting phase of the work of keeping the rolling stock of a railroad in working order is found in the work that is done by many lines on cars that are not their property. You are familiar now with the method of interchanging cars and the rental basis that prevails among the roads. In order to keep these cars constantly in service the line on which the car is in use at the time it breaks down repairs it whether the car belongs to them or a rival line, or a line clear across the continent. It would obviously be an act of folly to try and send a crippled freight car back to the shops of its own line to be repaired. It might be two thousand miles away from the nearest shop of its own line and

in the ordinary course of events it might take weeks to get it back to its own base. This would be a waste of space and equipment and time, not to mention the power required to haul an empty car two thousand miles. For that reason the road on which it is being used at the time it breaks down sends it to its own shop, makes the repairs that are necessary, puts it back into service and charges the home company for the repair work.

With all the lines in the country doing this, it is evident that a tremendously complicated bookkeeping system is necessary, but somehow, through good management and system, they are all able to keep track of this repair work.

Nearly all roads of any size maintain carpenter shops and freight car building shops, in which the most of the wooden freight cars are constructed. Building the bodies of these wooden cars is not difficult. But now that steel cars are fast replacing cars of wood construction it is likely that these car building shops will gradually be reduced to shops in which the old type of freight car will simply be repaired and

rebuilt until it is ready to be declared unfit for further service.

Then there are the paint shops. Just as important are these shops as are the foundries and machine shops, for few structures are called upon to face the weather conditions that the cars of a railroad must withstand. The freight cars are out in all sorts of weather. They are hauled through blizzard, sleet and rain-storms, they face the salt winds and spray of the seaboard, only to be hauled in a few days across the blistering sands of the desert, they are snow-bound, mud spattered, dust caked and begrimed with oil and soot until sometimes the lettering on them is unrecognizable.

Such conditions are bound to make wooden structural work depreciate unless liberally protected with paint. Liberal is the word. Freight cars are not painted with brushes and buckets of paint as are houses. In the railroad paint shop they are literally deluged with paint. It is squirted onto them through hose lines and the coating they get is thick indeed. But it must be to protect them against the elements. Red or yellow are the colors usually

selected, and they are spattered from end to end, after which they are left to dry out before other painters come along with stencils and number them and letter the name of the line on their shining sides. But in spite of this paint bath they are destined to visit the paint shops again inside of a year, so roughly are they treated on the road.

Passenger coaches must survive almost the same conditions as the freight cars are called upon to face, and they too must make their periodical appearance at the paint shop where, although their treatment is not quite so rugged, it is just as effective. Several coats of paint are applied to their sides while men inside are wielding varnish brushes. Three coats of varnish is finally applied to the exterior of the coaches and thoroughly rubbed and polished before they are turned loose to face the elements once more.

CHAPTER XII

THE DIVISION'S KING

A VERITABLE king is the superintendent of a division. He is king in that his word is law. His is the hand of authority over the division. He rules the several hundred miles of trackage that composes his division along with the yards, roundhouses and equipment. But unlike the kings of old, the style of kings that disappeared with the great World War, the superintendent can't sit back in his throne room or office in ease and comfort, speaking with authority and yet passing on the hard work and trouble to the prime ministers and others gathered around him and keeping his own hands clean.

"No sirree," with the "super's" authority goes for all the responsibilities of his empire. Every problem of the division is laid before him and it is his head that gets gray and bald thinking out situations. He is a czar all right, but he's a czar who has his coat off and his shirt sleeves rolled up, sweating royal sweat over his job, and sweat-

ing sometimes fourteen, sixteen, eighteen, twenty-four, yes, sometimes twice twenty-four hours without any sleep when his division is facing a crisis. It's fun to be a king in the railroad world but it is also "bloomin'" hard work.

The men out on the line may struggle with real tasks, but the head of the division toils harder. His are all the problems of his territory and he is constantly busy trying to meet them. Daily he faces the necessity of providing better facilities to increase the road's business. His division must stand up and keep pace with the rest of the line or else the power behind the throne, the general manager, and the men he represents, the directors and stockholders, demand to know the reason why. He must be constantly on the alert to provide means of unloading cars faster and getting them back into service so as to earn more money for the road. He must see that his division has enough equipment, and that it is in good condition. He must see that the heads of a score of departments under him are doing their work and in turn getting the best results out of their men and equipment. He must see that the men who are working under

him are kept satisfied and happy with their jobs. He must keep in constant touch with the service that is being maintained on his end of the line. He must know, and in a measure help shape the road's policies.

He must be ready to pacify all disgruntled patrons of the road, whether they be the humble holders of a one-way ticket to Askog or the merchant prince who is shipping freight over his division in car-load lots. He must do a million and one things as a regular part of his job and after he gets those done he must do a few million more.

Then in addition to all this he is the man to meet every emergency of the road. If a freight train is wrecked and a dozen cars of coal are scattered over the right-of-way, blocking the tracks of his division, he has got to think out the way of keeping everything moving. This happened recently on the terminal division of a big road serving New York, and it will serve as a good example of how a superintendent must work in an emergency to keep his division operating.

The wreck occurred between one and two

o'clock in the morning when most men, excepting of course railroad men, are supposed to be in bed and asleep. The cars tore up several hundred yards of tracks, bending rails, ripping out sleepers like so many match sticks, smashing freight cars, and bending the heavy steel coal gondolas all out of shape, while coal piled upon the right-of-way in a veritable mountain, between three and four hundred tons of it. There *was* a mess.

Of course word of the wreck was flashed to the dispatcher's office and when the chief dispatcher got the news, he recognized it as an emergency that he was not expected to tackle alone, so he immediately got the superintendent on the wire. Yes, he routed the sleeping king out of bed. A half hour later, with eyes still blinking with sleep, the superintendent whizzed up to his office in his swift little roadster and climbed into his chair behind his desk. A report on the entire situation was before him and the chief dispatcher was at his elbow, a ready and willing assistant.

The wrecking train had already been ordered out and was clear of the yard and booming along

at high speed toward the scene of trouble. Other emergency measures had also been adopted and the decks were clear for the superintendent to work out the problem.

Chewing an unlighted cigar the "super" scanned the report and sat back to think a moment.

"Rotten mess. Two o'clock now. In three hours the commuting trains will start down. We will have to get 30,000 people around that wreck and not lose a minute's time." Thus he summed up the situation.

Then he began popping out orders. Out and incoming trains were rerouted, some of them making a détour of two hundred miles on other lines to avoid the wreck. Then additional motive power was requested from near-by points and a brand new train schedule was worked out with emergency trains made up to run from the terminal to the wreck.

As dawn began to paint the sky across the river and throw into a golden relief the impressive sky-line of the mighty city across the Hudson River, the first of these trains were started out toward the wreck. Meanwhile wreckers had

built a foot-path around the piled up jam of coal cars and when the first commutation train came down the line the passengers were detrained, walked around the wreck and reloaded into trains that were constantly arriving to meet them. They reached the city just fifteen minutes later than usual. That was an achievement.

It sounds simple when set down here in cold print, but think of the work involved. Think of the army of men needed during the night hours. Think of the care and attention demanded by these trains with their loads of human freight. It all had to be done without an accident and with as little inconvenience to passengers as possible. And the burden of the responsibility for it all fell upon the superintendent.

And in the general order of things emergencies demanding as much work may occur with great frequency. Indeed in the winter time there seems to be no limit to the number of disagreeable situations that can come up as the result of the traffic-blocking storms. Many a night this same superintendent has been routed out of bed or prevented from going to bed in an all-night fight to keep the line from being blocked

by snow. Many a time with but little notice he has mobilized a veritable army of men to shovel out the switches and keep them from being frozen solid with burning oil torches.

And then there may be still other emergencies resulting from situations developing within the road's organization. Within recent years there have been several unfortunate railroad strikes. It is not difficult to believe the concern and sleepless hours of the superintendent of a division under such circumstances. Or it may be that suddenly so much business is dumped onto one division of the line that the entire equipment of the division is used up and there is still a tremendous bulk of stuff to be moved. All the reserve motive power at one point on the division may be in use and the superintendent finds that he still needs more and needs it in a hurry. Then it is that the engines from some other point must be requisitioned. But there is heavy traffic at this point, too. The superintendent plays a regular war game then, shooting engines to the first point and clearing up the jam there, then rushing them back to the place from which they were borrowed and getting the situation there

untangled before it gets too serious. Oh, the division superintendent's life is a busy one and no mistake.

But there are men constantly striving and working to attain that position. It is the goal to which all ambitious railroad men's eyes are turned and the high school boy who comes into the service of the line as a call boy begins to dream immediately of the day that he will occupy the " super's " job and have the reins of the division in his hands.

And all roads lead to the position of superintendent. The humblest employee, in the most inconsequential position on the line, can hope to be a superintendent, and by hard work can attain that pinnacle if he has the background of a high school education, the never-say-die spirit of railroading in his make-up, and a brain that he has trained to be keen, quick and observing.

The operator in a tower can hope to be superintendent. If he has the qualities needed he can soon become a train dispatcher, then chief of the dispatchers, and from there step up into the position of division superintendent. The fellow out on the track, the ambitious, bright-eyed fellow of

sixteen who carries water for the section gang, can become superintendent if he is willing to work hard days and study nights. He can become the foreman of that gang first, then with time and study of technical subjects, he can become track foreman and later track superintendent, then perhaps division engineer, and if he is the right man from there he will eventually move up to superintendent.

Even the chap who goes in as office boy or clerk on the big staff that is always employed in the superintendent's office can hope to have his chief's job some day. If he has the backbone and fighting qualities to forge ahead and become chief clerk, and after he has mastered all the office details, go out upon the line for four or five years to get the practical experience of railroading, he, too, can hope to occupy the position of chief of the division.

Take the career of the superintendent who solved the problem of getting the commuters around the wrecked coal cars. It is a mighty good example of just what a boy can do for himself if he works hard.

John Campbell (we will call him that because

he prefers to keep his identity a secret) loved railroading. He thought, ate and slept railroading, it seemed, while he was in school. After school hours he was always to be found somewhere about the railroad, but usually at the big interlocking signal tower that was situated near the station of his home town.

He made friends with the operator of that tower, a typical railroad man and always interested in any one who was interested in railroading. The tower man called him Jack and taught him all that a chap of fifteen could learn about railroading. Best of all, he learned to become a fair telegraph operator.

At sixteen Jack Campbell graduated from high school. He decided then to take a position, and of course the one thing uppermost in his mind was to get a position with the road. He got it. Viewed in the light of his present position as superintendent, his first job was humble indeed. He was employed as combination night ticket agent, baggagemaster and express agent at a tiny station on the line known in railroad circles as the Big 4. His salary was the magnificent sum of twenty dollars a month—less than

five dollars a week. But to him it was a real job with real responsibilities, and he made up his mind that he was going to do his work with real enthusiasm. Every night he trudged to the station, his lunch pail on his arm. It was hard to have to keep awake and work, struggling with baggage trucks that were so big he could hardly see over them (for he was short for his age) while the whole town, his boy chums included, were fast asleep. But he worked with a will and he grasped every opportunity to learn railroading. Every time a freight was held over on his station siding for orders Jack was out fraternizing with the train crew. He always sought the company of men older than himself, for he knew that he could learn things from them where he could not learn anything from chaps his own age. And learn he did. He absorbed railroad gossip and information as a sponge absorbs water, and he was doing his job well at the same time.

Then came his first jolt. He lost his job. A wave of economy struck the road and it was decided to cut down the force. His station was considered too unimportant to demand a night

ticket agent and it was closed for night service. This future superintendent was fired.

But that did not make him disgruntled at railroading. Instead he promptly began scouting around among his now big list of railroad acquaintances and inside of a few weeks landed a job as yard clerk on another line for which he was paid at a better rate, his salary being thirty-five dollars a month. Here, too, he worked nights. But he did not mind that, for it gave him some daylight hours to study and work for himself. Still he pursued the policy of chumming with the men who were older in the service than he was, learning all he could from them about their part of the business.

He began to show real ability then and quite unexpectedly he was given the job of night yardmaster with all its responsibilities. He was then in full charge of the make-up of all trains in and out of the yard at night. That was only a step behind being in full charge of the yard as day yardmaster, and in a surprisingly short time he was promoted to that post. And he was still comparatively a boy, not yet having cast his first vote. He was sure now that hard work and con-

stant application to his job were well worth while.

About this time he began to analyze himself and felt a little discontented with things. He knew there was a lot about railroading still for him to learn. So he gave up his position as yardmaster and went to work for another big transcontinental line as brakeman, a member of a freight train crew. There from the tops of the swaying cars he saw the Rockies in all their grandeur, and California. It was a wonderful experience for him. And still he worked and learned by doing the things that were important in railroading. Before long he became a conductor of a freight train, and a high grade one at that. Indeed the superintendent of the division on which he worked soon saw that he had an exceptional man in this chap who had come to him a brakeman from a smaller road, and when he needed a first class yardmaster he picked Jack Campbell for the job. Thus it was that he came back to a position similar to the one he had occupied, but with a larger road. He had more responsibilities but he also had a broader knowledge of railroading.

Right there Jack Campbell set his eyes on the position of division superintendent and he never let his gaze waver. He adopted a policy, too, of training a man under him for the job he occupied, for he said to himself that the superintendent might hesitate to take him out of a position and put him into a better one if there was no one to take his place. So he trained a man to be ready to take his job when he left it and held him ready.

Meanwhile he studied the job of the man ahead of him until he knew that thoroughly, and the result was that he was soon made inspector, then trainmaster over the trains of the entire division. Still he trained men to fill his job and kept his eyes on the next position above him, and when the time was ripe he stepped into the position of assistant superintendent, and from there he moved to the head of the division, becoming a superintendent while still in his thirties and one of the youngest men to occupy that position in the history of his road. Nor has he stopped climbing, and likely enough this boy who spent all his spare time hobnobbing with the towerman back in that little middle western

town at the age of sixteen, will one day be heard of as general manager or an official of one of the really big railroad systems of the country.

It is worth a great deal to the fellow who is interested in railroads, and possibly hopes some day to make it his vocation, to have a word with a man who has gone from the bottom to a place near the top in railroading, and since he is the bulliest sort of a chap he quite willingly gave the writer some bits of advice to pass on to fellows who are as eager as he was to some day find employment at the fascinating occupation of a railroad man.

"The young man who does not feel that he is in every way qualified to go into railroading should never think of entering the service, for if he balks at hard work, uncertain hours and all sorts of hardships, he will never make good. If, however, he is the sort of chap who just knows he can't be happy unless he is railroading he'll make good in spite of the hard work and he'll find fun, romance and adventure in it.

"But it is hard enough for even that type of fellow to keep from feeling discouraged and downhearted sometimes. Why, I remember the

first night I was made yardmaster. It seemed to me as if they ran every train on the line into my yard that night. And then didn't I have a wreck at one end of the yard that tied up the whole outfit.

"I put in fourteen hours steady work, and I was a mighty blue and discouraged chap when I saw my boss coming up the tracks next morning. I figured right there I had made a bull of the whole thing and I guessed I wasn't cut out for railroading after all. But when I told my boss of the troubles and expected that he was going to fire me on the spot, he slapped me on the shoulder and said, 'Good work, young fellow. Fine night's work. You're tired. Go home and have a good sleep. You'll feel better then.' I went out of the yard happy after that and I decided that perhaps after all I might be a railroad man some day.

"It is a wonderful life. No two days are alike. No two days bring the same problems, and there is a chance for a chap to go home every night with that fine feeling of a job well done."

CHAPTER XIII

RAILROAD HISTORY

ALTHOUGH America is to-day the foremost nation in the world in relation to railroads, and all that goes with this wonderfully romantic industry, the railroad, nor yet the steam locomotive, can be properly credited as American inventions, as you already know. It is quite true that America leads in railroading to-day. Hers are the biggest railroad systems in the world. There are more tracks in America than anywhere else on the globe. There are bigger, faster and better trains here, and American railway equipment is considered the world over as the last word in design and workmanship. American locomotives stand to-day as the best that engineering skill has developed, and they are sought after by every nation on the globe.

Yet in spite of all this, America cannot claim

the credit of the invention of the steam locomotive which made the fine systems of to-day possible. Records indicate that a Britisher, a young man by the name of Stephenson, was the first to experiment successfully with a "steam wagon" or locomotive, as he called his invention. Indeed, according to Edward S. Hungerford, in whose excellent book, "The Modern Railroad," a wonderfully accurate history of railroads in America is published and from which many of these facts were gleaned, the first steam engine, or locomotive, to turn a wheel on American soil was built by the same Stephenson, and brought to America by one, Horatio Allen, for the Delaware and Hudson Company, a prosperous canal company of New York State.

Canals were the national traffic highways of this country in the days before the railroads. These, too, were copied from a European idea, for in England and on the continent of Europe, extensive canals were maintained to carry foodstuff and heavy freight from inland towns to the seacoast for shipment over seas.

In America the development of canals, like the development of the railroad of to-day, had out-

stripped the inventors in Europe with long waterways that cut across the country for hundreds of miles.

But at best these were unsatisfactory, and various forms of freight highways were experimented with, which after all were really the forerunners of the railroads. In England in the coal mining districts a type of railroad was developed, the rails being made of wood, and horse-drawn vehicles being used to drag the heavy bulky freight overland. These horse-operated, wooden-railed railroads were tried in this country, too, short lines being constructed in sections of the mining district of Pennsylvania, Virginia, and in the granite quarry district of New England. One notable railroad of this type being constructed and maintained by one Gridley Bryant in 1826, which was used to carry the heavy granite block used in the construction of the Bunker Hill monument, from the quarries in Quincy, Mass., to the docks four miles away. This railroad, though using horse-drawn vehicles, was a national curiosity, and people became so curious about it that it was considered an excellent busi-

ness opportunity to open a hotel near the railroad to accommodate sightseeing visitors. It is said to have done a remarkable business.

But the canal continued to be the safest, fastest, and generally the most satisfactory way of transporting freight and passengers despite certain drawbacks. The most serious handicap that canal operators were confronted with was the fact that canals could not be successfully carried across mountain ranges. Hills could be surmounted by locks and inclined planes, but mountain ranges were out of the question.

It was this fact that led the officials of the Delaware and Hudson Company to send Horatio Allen to England to interview Stephenson when word reached this country that he had perfected a steam wagon. The outcome of his visit abroad was that eventually four strange looking locomotives arrived here, the first and most conspicuous of which was the *Stourbridge Lion.*

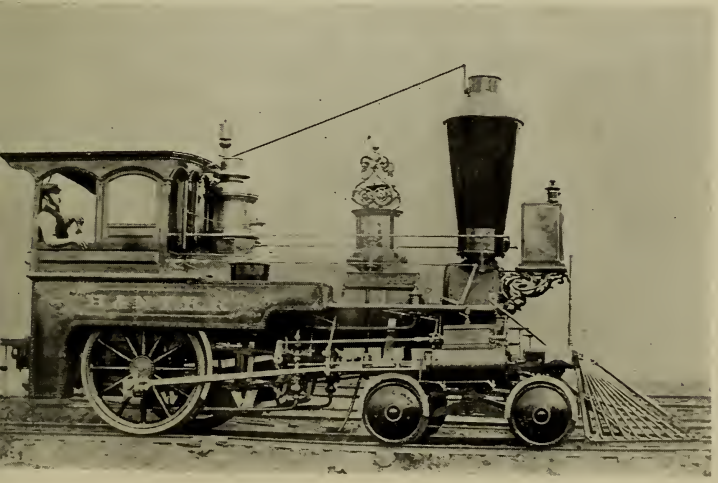
This "steam bug," you may be sure, created a sensation in this country when it arrived. It was landed in New York, from one of the big freight boats that plied between America and

England, and so intense was the public's interest in the thing that Allen and the directors of the Delaware and Hudson Company were not loath to have the thing assembled, set upon blocks and exhibited to public view. We can well picture what a strange sight it must have been and what a sensation it caused among the hundreds of men in their quaint, tight-fitting breeches and high beaver hats, and the women in their strange flounced skirts, when the boiler was filled and a fire was built in its fire box. Fancy the tenseness of the crowd as they waited for the steam to gather, the mixture of awe, admiration and perhaps downright fear with which they watched the fearless Allen let steam into its ungainly cylinders. How the old horse must have smoked and coughed, and choked and sputtered and rattled as she got her big drive wheel slowly revolving, and how the crowd must have gaped, and wondered and finally skeptically shook their heads and muttered, "You won't catch *me* riding behind one of those fearsome things. Canal boats may be slower but they are a lot safer."

Thus did the steam engine make its *début* in

(c) Ewing Galloway

A modern passenger locomotive. Contrast this with the proud "dinky" below



A veteran of Civil War days, a real "flyer" of its time

this country. After its appearance in New York it was packed aboard a river steamboat and shipped up to Rondoubt, and thence by canal to Honesdale, Pa. Here let us quote from Mr. Hungerford's book, "The Modern Railroad," the first actual operation of the steam locomotive in America.

"Allen placed the *Stourbridge Lion*—which resembled a giant grasshopper with its mass of exterior valves and joints—on the crude wooden track of the railroad, which extended over the mountain to Carbondale, seventeen miles distant. A few days later—the ninth of August, 1829, to be exact—he ran the *Lion,* the first turning of an engine wheel upon American soil. Details of that scene have come easily down to today. The track was built of heavy hemlock stringers on which bars of iron, two and a quarter inches wide and one-half an inch thick, were spiked. The engine weighed seven tons, instead of three tons, as had been expected. It so happened that the rails had become slightly warped just above the terminal of the railroad, where the track crossed the Lackawaxen Creek on a bending trestle. Allen had been warned against this trestle, and his only response was to call for passengers upon the initial ride. No one accepted. There was a precious Pennsylvania regard shown for the safety of one's neck. So, after running the engine up and down the coal dock for a few minutes, Allen waved good-bye to the

crowd, opened his throttle wide open and dashed away from the village around the abrupt curve and over the trembling trestle at a rate of ten miles an hour. The crowd, which had expected to see the engine derailed, broke into resounding cheers. The initial trial of a locomotive in the United States had served to prove its worth."

From then on the desire for railroads in America grew with the swiftness of a prairie fire, it seems, and this despite really stubborn opposition from the owners of canals. Throughout the Atlantic Seaboard, from the southern states to New England, companies were formed to promote railroads. These were all small lines, almost insignificant when compared with some of the giant systems of to-day. Yet they were bold ventures indeed.

For the most part these pioneers in railroading sought to connect the cities on some inland waterway with the seaboard. Indeed it was only the seaboard cities of the country that were really developing then, with the cities on the inland waterways pushing along slowly. There was little development of the country, otherwise, except where mineral deposits attracted the venturesome to build up mining communities. But it

was the railroads that this country was waiting for, for these meant that towns could be built anywhere, and that food could be brought to them from the outside world and their products brought to market without depending upon the slow canals.

Some of the earliest of these railroads were weird in their conception. Some were regarded for years as common highways over which horse-drawn vehicles were hauled along with the operation of steam trains. Indeed it is said that it was not unusual for a steam train to spend an entire morning creeping along with snorting locomotive in the rear of a slow-moving truck hitched to a four-horse team and loaded with farm products or something of the sort.

The operators of the canals, however, saw the handwriting on the wall with the appearance of the first of these steam horses. They could see that railroads were eventually going to be able to touch sections of the country into which they could not get their canals. They saw, too, the possibilities of swifter travel and they knew that if it became a matter of competition, as it quickly did in some sections of the country, ship-

pers would be far more eager to have their merchandise hauled to market by the trains than by the canals.

The first railroad to parallel a canal was built up in New England between the cities of Boston and Lowell, but while the project was being planned and even while the road was being built and operated, the owners of the Middlesex Canal started a fight to prevent the road from carrying freight. This was the cue for other canals to begin similar fights, and for a decade or longer there was constant friction. The canal owners were strong politically and financially, and for a long time held railroad development in check and prevented many of the roads from carrying freight at all. The fights waged hard and furiously and for the railroads, some of them mere weaklings in finances, things looked very unfavorable. But of course the canals could hardly hope to survive, and after a warfare that extended in some cases for many years, the railroads were victorious. Indeed most of the canals were eventually purchased by the railroads they sought to defeat, and then put out of business.

Another situation that in a measure retarded the growth of the railroads was the big mountain ranges that reached from north to south and cut off the inland towns from the coast. It required real exertion on the part of the railroad engineering genii to conquer these mountain ranges. Of course these were the same difficulties that the canals had faced in their day, but it had long been proved that canals could not climb mountains, whereas the railroad engineers knew full well that they could send steam trains over the ranges by the proper methods.

The first railroad to conquer the Alleghany Mountains was the Portage Road, a peculiar sort of a railroad built in planes. This was a horse-operated road for a time, but later became steam. The first road to conquer the Appalachian chain was the road that afterward became the present Pennsylvania Railroad of to-day.

The first really big railroad system was the present New York Central Railroad. New York financiers and promoters of industry early became enthusiastic over railroads as compared with canals, and all over the state little lines were built, some connecting one large city with

another, some extending to touch a half dozen large towns.

A railroad directory of New York then, had there been such a volume, would have showed an array of names, sometimes almost as long as some of the railroads themselves, and most of them were fighting among themselves over territory, freight and everything else. But the captains of industry of the time, who, as they are now, were located in New York City, realized the business possibilities of these roads, and soon a group of them, headed by Commodore Vanderbilt, himself a steamboat and canal enthusiast in his day, began to buy up these small roads that were bickering and quarreling among themselves, and almost before the country realized it, a real railroad system had been established.

During this time bigger projects in railroading were being developed throughout the country. The Baltimore and Ohio, a tremendous project then, the Erie, four hundred odd miles long, the Pennsylvania and some now middle western roads were growing swiftly. Tremendous strides were being made in the rolling stock and

equipment of railroads, too. The locomotive in a short span of years developed and grew into such a remarkable piece of mechanism that the young Englishman who conceived it could scarcely recognize his child. Coaches, too, grew swiftly from old stages equipped with flanged wheels to something that began to resemble the coaches we recognize now.

Steel tracks were pushing out toward the Mississippi. The Rock Island Railroad from Chicago was the first line to span that stream and push tracks westward into the fine country that for years had been slowly developed by the pioneers who fared westward in their prairie schooners. The Rock Island's tracks crossed the Mississippi in 1859 and the march westward was on.

Then came the Civil War, and the railroads were pressed into service in every way. In truth the railroads were responsible in a great measure for the final victory of the Northern forces, and the maintenance of the Union. In the north the railroads had reached out and were spread across the country in a great network of lines.

These extended well below the Mason and Dixon line and afforded excellent means of moving troops and supplies across the country swiftly. Some of the Civil War generals utilized the railroads for the shifting of troops from one front to another with tremendous success. Some famous battles were fought for the possession of railroad lines as the Union forces advanced into Confederate territory, and there were many G. A. R. veterans who could tell thrilling stories of how they walked the track in front of a snorting locomotive, fighting every step of the way so as to get provisions through to a detachment cut off by the enemy.

The North had a decided advantage in the number and miles of railroad at its command, for although there were several prominent railroads in the South, there was nowheres near the mileage or equipment available to the forces of the Confederacy.

At the close of the war the railroad fever reoccurred, so to speak, with renewed vigor. Suddenly several groups of railroad promoters saw the necessity for pushing westward while out on the Pacific Coast other groups were struggling

to conquer the Sierras and cross them eastward. Transcontinental lines had been undertaken before the war.

Work was renewed where it had been abandoned. Kansas and the border states were growing in leaps and bounds, and as fast, and even faster, than the railroads were pushing forward, towns were springing up.

Terrific railroad building campaigns started and miles of new tracks were laid every week despite all drawbacks. Those were romantic days in railroading. Tremendous herds of buffaloes roamed the west. Thousands of Indians swarmed the plains and sought in every way to check the advance of the railroads. The railroad builders were fighters, too. They had to be. Every work crew was armed and armed guards accompanied them, for it was never possible to know when some war party would sweep down on the builders, kill and scalp them all and leave the railroad temporarily stranded out in the bad lands. Those were the days of Custer and Cody, General Miles and a host of other Indian fighters. Cody won his name of "Buffalo Bill" then while working for a railroad. His

job was that of hunter for a railroad building crew. He kept the construction camp supplied with fresh beef by slaughtering buffalo from the great herds that roamed the plains.

Associated with the railroad history of the west are hundreds of stirring tales of Indian fights, great hunting parties, of boom towns, mining adventures, bad men, two gun men, robbers, gamblers and all other types that went to make up this great new and expanding country.

The railroad was fast forcing the famous pony express, and the western stage-coach out of existence, and the highwaymen, too, who preyed on these carryalls found that pickings were growing meagre with the coming of the new form of transportation. But the always versatile lawless ones of the border lands decided that if they were to be deprived of the stage-coach, as a means of earning a living it might be well to try and hold up the stage-coach's successor, and so a new breed of lawbreakers developed in the form of train robbers. They were daredevils and no doubting it, and many were the brilliant hold-ups that took place. They were lawless, godless, fearless men who shot equally as accu-

rate with their left hand as they did with their right. They recognized not the slightest moral obligation to society, and a human life was little to them. Their exploits were so daring that they almost became heroes to the reading public.

But of course they could not long survive. Two decades of this and the old west, with its Indians, two gun men, train robbers and the rest, began to fade into the background, into the historic past, for thanks to the railroad a new west was coming on, a west rich and prosperous with farms, mines, cattle ranches and billions of dollars in resources, and a railroad system to reach its long arms into the mountain ranges, across the prairies, and gathered all corners of the vast open country into close communion with each other. And thus America is to-day a great country, made great by the greatest group of railroad systems in the world.

THE END