

ACROSS THE GREAT

DIVIDE BY



CP Rail

H.W.Elson

Whether it be on the head-end of CP RAIL's crack transcontinental passenger train, the "Canadian", or behind the throttle of a fast freight from Vancouver, British Columbia to Calgary, Alberta, railroading through Canada's Rocky Mountains is always a challenging and ever-changing experience.

The heart of this mountainous country is the 136-mile run over the Laggan Subdivision of CP RAIL, east from Field, British Columbia, up and over the main chain of the Rockies and the Continental Divide to the valley of the Bow River and onward to Calgary, Alberta, where the vast flatness of the prairies begins.

Waiting with the Laggan Sub. crew at the station at Field, the sound of the eastbound train's air-horn, coming up the valley of the Kicking Horse, ricochets echoing from side to side in the valley below and from mountain to mountain above. The new crew for the eastbound train makes a final check of their watches and orders, just as the lead units of the twenty-two car, stainless steel "Canadian" rumbles up to the end of the platform, exactly on time.

Let's ride the lead unit - Number 1400 - of a three-unit lash-up, which includes Number 1902, a powerful "B" unit, with "A" unit No. 1416, trailing. Even before the wheels have stopped turning, the engineer for the eastbound trip calls up to the cab, asking if all of the units are running all right and whether or not there are any problems.

"All okay", is the reassuring answer, as the Revelstoke-based crew climbs down from the cab.

There is still time to look back along the 164-foot length of tuscan red, chrome yellow and grey and to listen to the rhythmic throb of the prime-movers, recalling that these giants cost about \$ 100 per horsepower-unit and that there are 4,500 such units combined in the

↩ WINDING DOWN THE "BIG HILL" BETWEEN PARTRIDGE AND YOHO, B.C., CP RAIL westbound freight with a couple of DRF-30a units on the point, was caught for this month's cover on 18 August 1971 by Ronald C. Hill.

↩ FROM THREE-QUARTERS OF THE WAY UP MOUNT OGDEN, YOU CAN LOOK WEST DOWN the valley of the Kicking Horse River to Field, B.C. in the distance. When the artist made this sketch, the tunnel under Cathedral Crags had not been daylighted and no one had heard of the Trans-Canada Highway. But the Lower and Upper Spiral Tunnels were there, as were the two crossings of the Kicking Horse River. Sketch courtesy CP Ltd.

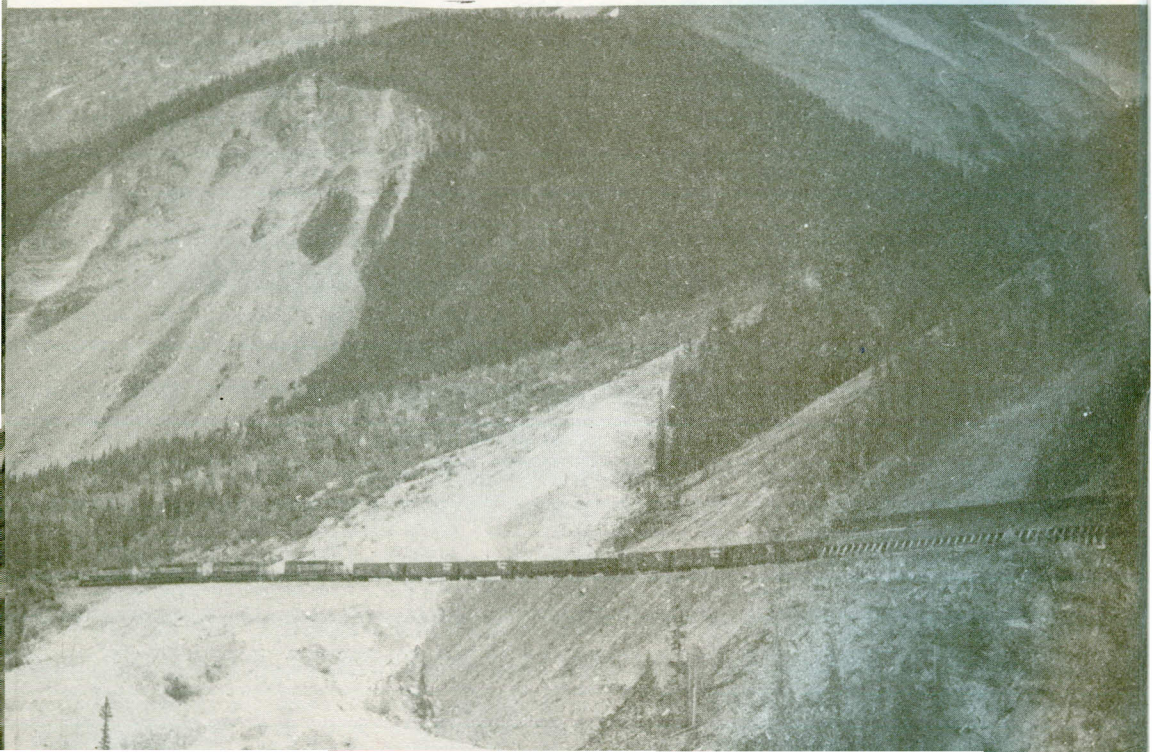
three engines. Although popularly called "diesels" or "diesel units" these engines are basically electric locomotives which carry their own generating plants.

The prime-mover in each of the three power sections is a 16-cylinder, two-cycle, V-type diesel engine, rated at 1,500 horsepower. This prime-mover turns a generator which, in turn, feeds electrical energy to the traction motors on the trucks. These motors are geared to the axles and thus provide power for the train.

Let's reach for the grab-iron and follow the engineer and fireman up the steel side of the unit to the vantage point of the cab, while the airbrake test is being made for the car inspectors along the train. Safety is of prime importance on CP RAIL and the Company does everything possible to guarantee it. Brake tests at Field are obligatory. Moreover, in addition to the engineer, the fireman is on board to check the diesel engines, pick up orders, check signals and act as engineer in an emergency.

In front of the fireman's seat is a control panel, on which a bell rings or a light flashes whenever part of the equipment malfunctions. The engineer explains that the safety devices on the unit include a "dead-man" pedal, which must be depressed by his foot at all times when the diesel unit is operating. Whenever the pedal is released, power is cut off and the airbrakes are applied to stop the

↓ ANOTHER DAY - ANOTHER CP RAIL TRAIN 902 - CLIMBS LABORIOUSLY UP THE SIDE of Cathedral Mountain, past Morant, B.C., through the avalanche shelter. Units Numbers 5529, 5520, 5554 and 5523 were on the point. W.R. Linley, Secretary of the Ottawa Branch of the Association, took the picture on 11 September 1968.





↑ FOUR UNITS WITH PIGGYBACKS GROWL UP THE "BIG HILL" EAST OF CATHEDRAL, B.C. - Canadian Pacific Railway's Train 902 - on the way to the top of Kicking Horse Pass, Lake Louise, Banff and Calgary. Photo courtesy CPR.

train. Thus, if the engineer were to become ill, the train would still be brought to a stop safely, or slowed down until the fireman could take over the operation of the train.

The cab of the unit is clean, roomy, quiet (as compared to the engine room behind the bulkhead) and weatherproof. A control panel is installed in front of the engineer, with half-a-dozen or so gauges and switches, the latter operating the headlight, marker lights and other accessories on the unit. At the engineer's left is the throttle stand, airbrake controls and track-sanding valve, while on his right is the engine-bell lever. Overhead, within reach, is the air-horn cord.

Soon, the air-whistle sounds twice. The engineer releases the brakes and gradually notches up the throttle. The prime-movers begin their powerful roar and the train starts slowly out of the station, through the yard, on its eastbound run to Calgary. Ahead, the brilliant green light on the CTC signal announces a clear block ahead. In the distance, the track winds up the lower slope of Cathedral Mountain.

To cross the Continental Divide, the "Canadian" must overcome a difference in altitude of 1,265 feet, from the town of Field to the top of the hill at Stephen. The "Big Hill" is 11½ miles of curving, twisting railway and includes some of the most extraordinary mountain scenery in Canada, along what is probably the most notable part of CP RAIL's transcontinental line.

With the diesel engines roaring just behind the bulkhead, the

shiny stainless steel train winds up the hill, in the shadow of Cathedral Mountain, through the avalanche shelters, past the long siding at Cathedral, finally turning towards the lower portal of Spiral Tunnel Number 1. Just before entering the tunnel, the train rumbles across the bridge over the foaming, rushing Kicking Horse River.

Entering Spiral Number 1, the engineer flips on the headlight switch and explains that in the 2,922-foot long circular bore, the train will turn through 226 degrees and emerge 50.4 feet higher on the side of Mount Ogden, travelling in a westerly direction upgrade towards the lower portal of Spiral Number 2. In the cab, the exhaust fumes from the diesel engines are hardly noticeable, but as the train emerges from the tunnel, the pale blue haze of diesel exhaust hangs over the cars. As the long, silvery train curves around the side of the valley, it passes over the lower portal of the tunnel it has just left and crosses the raging, foaming Kicking Horse River for the second time. Just ahead is the operating point of Yoho, 6.8 miles from Field. About a mile-and-a-half further on, below the parking area and overlook on the Trans-Canada Highway, is the long siding at Partridge, where a westbound freight is often waiting for the eastbound "Canadian".

As the train slowly climbs the 2% grade, the lower portal of Spiral Tunnel Number 2 comes into view. In this 3,255-foot bore under Cathedral Crags and Vanguard Peak - both portions of Cathedral Mountain, 10,464 feet high - the "Canadian" will turn through 288 degrees, emerging 55.7 feet higher on the side of Vanguard Peak and on a level with the rushing Kicking Horse River, as it emerges from Wapta Lake, its source.

Coming out of the tunnel, there is a magnificent view of the Kicking Horse and Yoho Valleys below. In less than a mile, as the crow is supposed to fly, the "Canadian" has climbed 105.7 feet. But this 11.5-mile stretch of track is true mountain railroading, requiring constant vigilance on the part of the engine crew. CTC signals are invariably checked, as are the warning flags, protecting the maintenance-of-way crews and track inspectors, who are constantly patrolling and working on this section.

The names of the operating points on the "Big Hill" are of interest. Partridge is named for the railway employee who gave the alarm when, in 1925, a huge rockslide came roaring down the bare slope of Cathedral Mountain. His timely warning cleared the immediate area in time to prevent any loss of life.

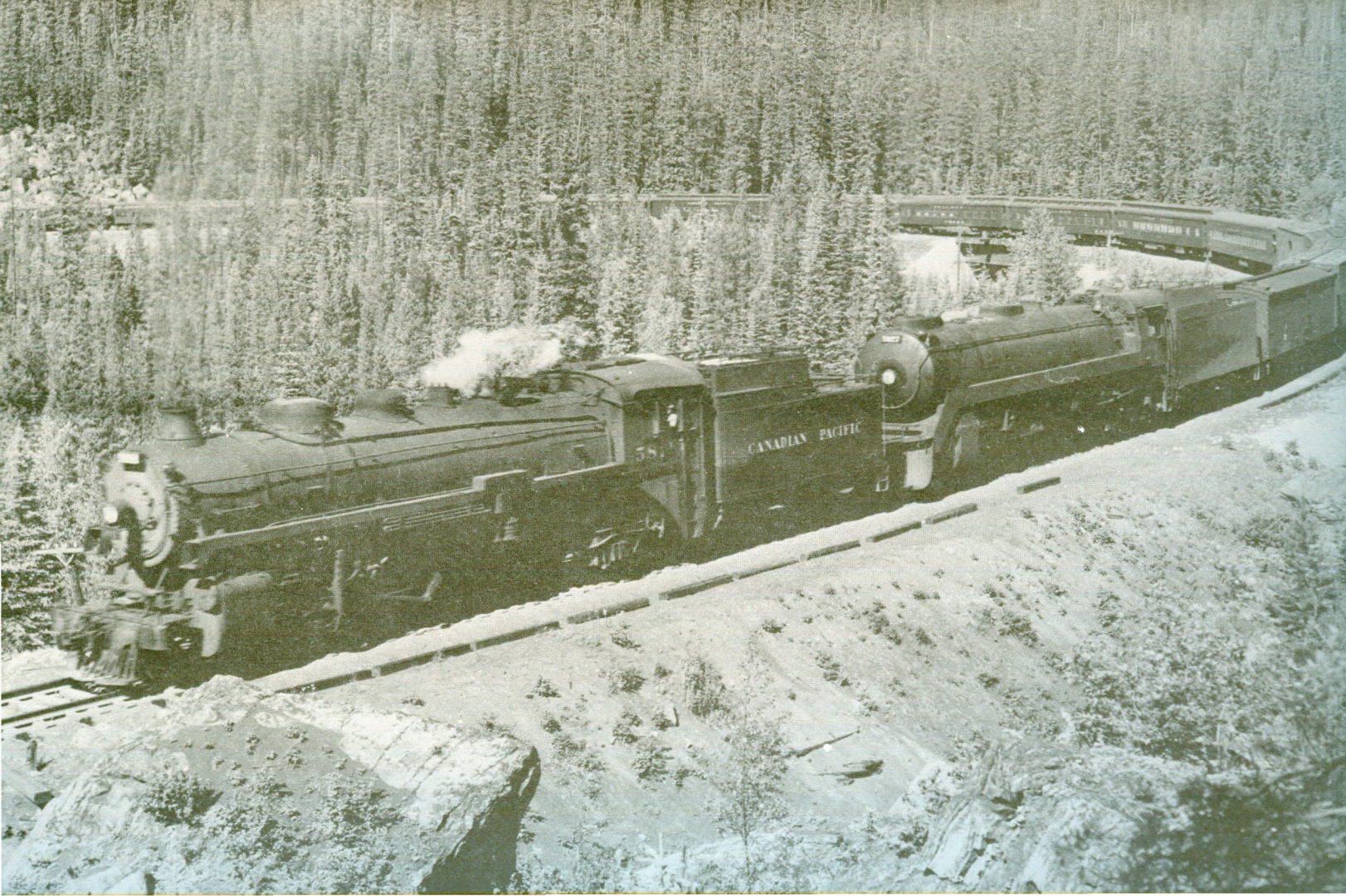
➔ THE LAUNDRY ON THE STATION CLOTHES-LINE AT PARTRIDGE, B.C., WASN'T THE same after a Canadian Pacific eastbound freight pounded up the hill to the Upper Spiral Tunnel above Field with engines Numbers 5352 and 5443 on 11 July 1951. The photo is from the E.A. Toohey Collection.

↻ HIGH ON THE MOUNTAIN SIDE ABOVE THE KICKING HORSE RIVER, SECOND NUMBER 2, doubleheaded with a 5800-class and Number 5924, passes over the lower portal of Spiral Tunnel Number 1 near Yoho, B.C., on 11 July, 1951. The photo is from the E.A. Toohey Collection of the Association.

THE SECOND SECTION OF CANADIAN PACIFIC RAILWAY'S TRAIN 2, ENGINES NUMBERS 5811 and 5927, works up the grade to the Upper Spiral Tunnel near Yoho, B.C., on 10 July 1951. The photo is from the E.A. Toohey Collection.







Suddenly, the engineer interrupts the conversation to point out several Wapiti elk at the edge of the woods. He can tell you about the time when a train was forced to come to a stop to avoid killing several of these beautiful animals. Because this area is in Yoho National Park, the elk are protected from hunters and they seem to know it!

Soon, the train rumbles slowly past the site of the old station and wye at Hector, which used to be the "top of the hill" in the days before the Spiral Tunnels. As first constructed in 1882-83, the line between Field and Hector climbed steeply up a 4%-plus grade, trains requiring up to six steam locomotives to make the climb. The line was relocated in 1907-08, the Spiral Tunnels were driven and today, the Trans-Canada Highway occupies parts of the original line.

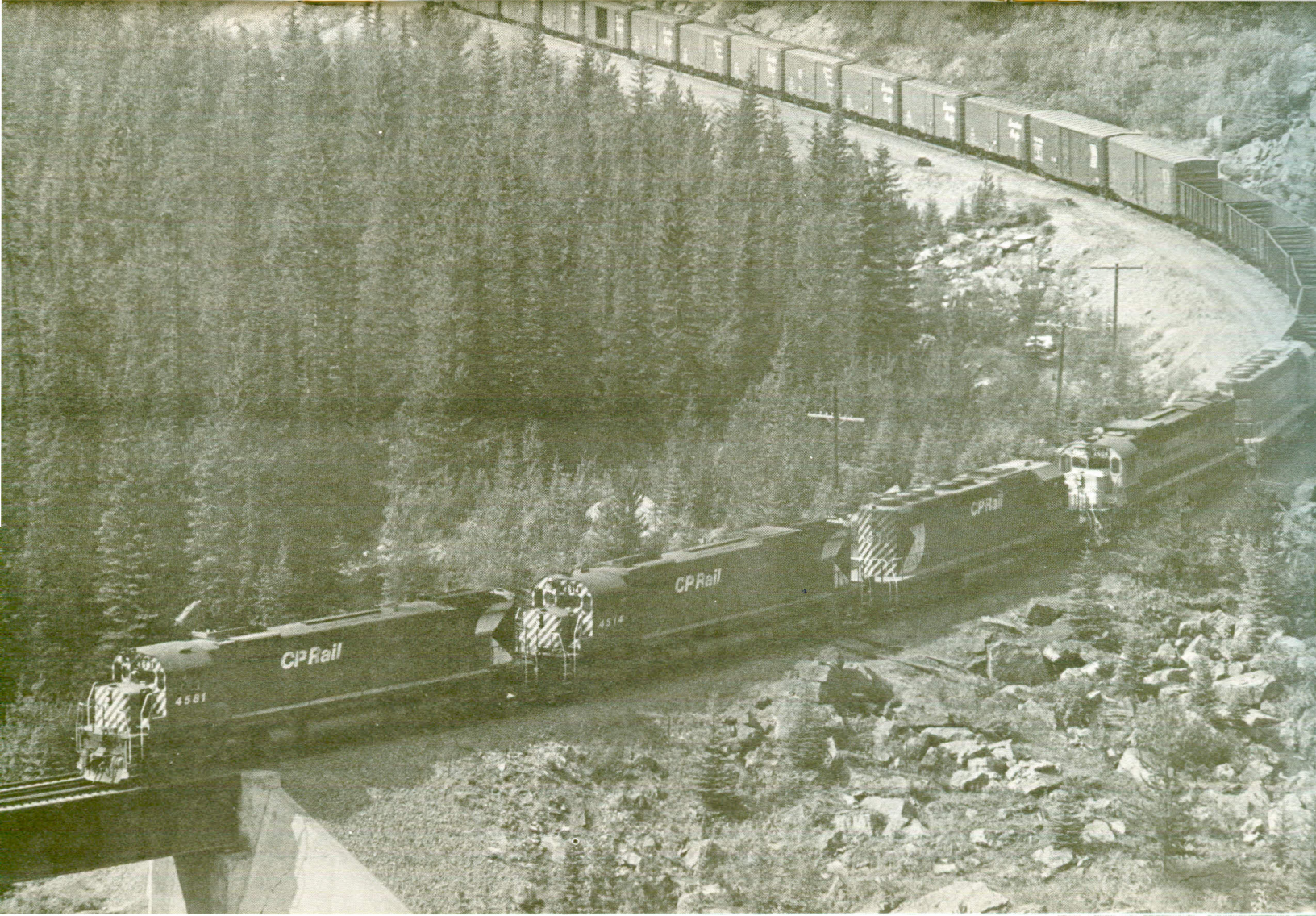
The station at Stephen, now demolished, used to stand 219 feet west of the Continental Divide, which is also the boundary of Banff and Yoho National Parks, at an altitude of 5,399 feet, the highest elevation on CP RAIL. To the right, through the trees, it is sometimes possible to catch a glimpse of the massive wooden arch over the old highway, which marks the "Great Divide" and the boundary between British Columbia and Alberta. Through (or under) this wooden arch runs a little brook, which divides some distance further on into two tiny streamlets. One of these turns westward to flow into Wapta Lake and the Kicking Horse River, finally reaching the Pacific Ocean through the mighty Columbia River. The other rivulet turns east to join the Bow River and reaches the Atlantic Ocean through the South Saskatchewan River and Hudson's Bay.

From an altitude of 5,332 feet at Stephen, the "Canadian" begins to descend the 1.8% grade towards Lake Louise and Banff. Using the dynamic braking system, the engineer controls the speed of the train to the permitted maximum. At the top of the grade, the dynamic brake system is selected on the throttle stand and the traction motors become generators, the energy required to turn them holding back the train. The power produced is dissipated through resistance grids, located in the roof of each unit.

Minutes later, the station at Lake Louise appears in the distance. The train has descended only some 280 feet from Stephen.

"Red board!" calls the fireman and crosses to the engineer's side to lean out the cab door to pick up the order hoop, held aloft by the operator on the station platform. There are no extraordinary instructions to the crew of the "Canadian" and after the station stop, the train will proceed onward to Calgary.

➔ IT TAKES A FEW UNITS TO BOOST FREIGHT TRAINS OF EMPTIES AND LOADS OF British Columbia forest products up the hill at Field, B.C. and over the summit of Kicking Horse Pass, through the Spiral Tunnels. Here is an eastbound CP RAIL freight on the middle level - with an MLW M-630 on the point - about to cross the Kicking Horse River - for the second time - on 15 August 1971. Photo was taken by Ronald C. Hill.





↑ BY 1968, PARTRIDGE, B.C. WAS JUST A MILE-BOARD WHEN SECOND 901 WESTBOUND came down the hill, headed by units 8652, 4447, 4445 and 8631. W.R.Linley was there to take the picture on 11 September 1968.

There is a brief stop at Lake Louise station to entrain and de-train passengers for the Chateau Lake Louise, before continuing the run down the Bow River valley to Banff, through Banff National Park. Now and again, trackside signs point to the high mountain peaks, telling the passenger their names. It is a comfortable ride through beautiful mountain scenery, yet no matter how scenic the country may be, the crew is constantly on the alert, but not so preoccupied as not to be able to wave a greeting to the sectionmen patrolling the right-of-way or to hikers on the mountain trails.

Castle Mountain, now named Mount Eisenhower, is a well-known landmark. In its shadow, we can see the westbound "Canadian" waiting in the siding at Massive for us to pass on the main line. Our train slows, to pass Train 1 and members of the crew wave a greeting from the open vestibules. As the rear of our train clears the east switch, the speed begins to increase on the descending grade to Banff. Banff is a well-known and important stop for the "Canadian" east and westbound and, while passengers are alighting and boarding, the crew has the opportunity to check around the diesel units, before starting on the last non-stop lap of the long descent to Calgary.

In the afternoon sunlight, the long silvery train winds along the banks of the Bow River, in the shadow of the Fairholme Range, past several osprey nests built on specially-constructed crossbars on the telegraph poles. The famous Three Sisters Peaks and Grotto Mountain appear and are left behind. Then the train rolls through the Bow River Gap, described as the eastern entrance to the Rockies. Leaving the Gap behind, the click-clack of the wheels on the rail joints in-

creases in tempo. Down the spacious, green valley the speed climbs to 50 and then to 60 miles per hour, the green CTC signals pass with increasing rapidity and the scenery changes from majestic mountains to bare, high hills and then to ever-broadening plains. Suddenly, the train rumbles across the bridge over the Bow River and the mileage board on the telegraph pole shows 25 miles to Calgary, the end of the Laggan Subdivision. Road crossings become more frequent. The engineer sounds the air-horn for every one of them; nevertheless, a battered automobile barely beats the train across a crossing ahead.


"Whenever I see a crossing-beater", exclaims the engineer, "I wish that he could be up here in the cab himself, to see how stupid motorists can be. Then he'd know what it really feels like to be in my place!"

Around a bend in the track, the skyline of Calgary appears, growing larger, taller, higher with each passing minute. The speed of the train begins to decrease, as the engineer makes a brake application. Now the train slows almost to a walking pace, as the first of the innumerable switches in the yard slide by. Then, under the towering spire of Husky Tower and beneath the Palliser Hotel, to slow to a stop in the station, some 1900 feet below the Continental Divide.

On this particular trip of the eastbound "Canadian" over the Laggan Subdivision, everything was pleasant and without incident. But there are days and nights when this run is a nightmare, in a blinding blizzard, in a terrible thunderstorm or in the spring, when dangerous rockslides threaten. Late in January, 1972, the "Canadian" was stuck fast in the mountain snow for over 48 hours.

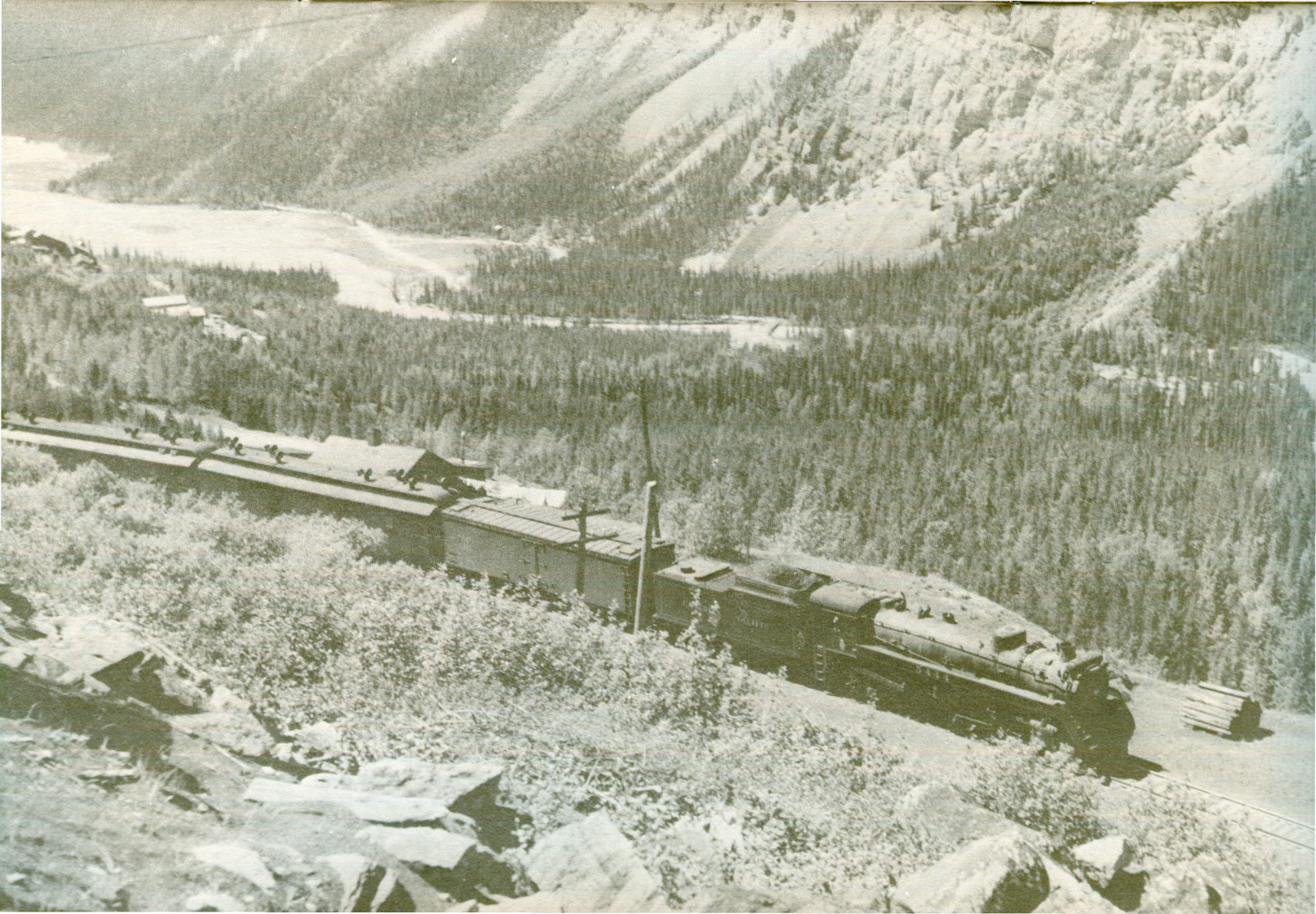
In 1972, with diesel-electric engines for power, centralized traffic control and dynamic braking, railroading in the Rockies could perhaps be said to be less hazardous and less exciting than it was fifty years ago. On the contrary. The never-ending battle with the forces of nature continues and, to win this battle, the crews of the "Canadian" must be ever watchful - true railroaders - possessing that essential quality, derived from years of experience, which enables them to take the "Canadian" from division point to division point promptly and safely.

And after all, to the occasional traveller, these men are long-time employees of CP RAIL, who are doing the job that is expected of them.

 TRAIN 13 WESTBOUND WITH ENGINE NUMBER 5930 ROUNDS LAKE WAPTA, NEAR HECTOR, B.C. on the Canadian Pacific Railway on 13 July 1951. The photo was taken by the late Allan Toohey and is from the Association's archives.

CANADIAN PACIFIC'S TRAIN FIRST NUMBER 3, ENGINE NUMBER 5444, PASSES THE station at Partridge, B.C. on the downgrade to the lower Spiral Tunnel and Field. The photo was taken on 10 July 1951. E.A. Toohey Collection.





POSTSCRIPT

Mr. J.A.Beatty, Director of Membership Services of the Association, has kindly provided the following historical background for Mr. Elson's story of the Field-Calgary main line of CP RAIL, with particular reference to the Spiral Tunnels:

When the main line of the Canadian Pacific Railway was opened in 1885 and for many years thereafter, the stretch of track between Hector and Field, British Columbia, bore unchallenged the reputation of being the most difficult piece of standard-gauge railway to operate in North America.

It was well-built, well-ballasted and kept in perfect condition, but the descent westbound and the climb eastbound over the "Big Hill" was so steep (4.5%) that the operation of trains was both dangerous and expensive.

It required the use of 4 steam engines weighing 154 tons each to haul a train in the eastward direction (consisting of from 14 to 28 freight cars, or 11 coaches) over the summit, taking, under favourable conditions, about an hour to make the trip.

Every westbound train was required to stop on reaching Hector, at the top of the "Big Hill", while the air brakes and sanders were tested. Eight miles an hour was the enforced speed limit for passenger trains descending the hill, while freight trains were restricted to a maximum of 17 loaded cars by day or 9 by night.

If a descending train got out of control, there were three safety switches, about 0.9 miles apart, with spurs leading away up the mountain side on a steep incline. These three switches were manned twenty-four hours a day. The switchmen were notified by telephone whenever a train started down the hill. The switches were set for the safety spurs in the normal position. As the down-bound train approached the safety-switch, the switchman consulted the automatic speed indicator and, if the descending train was exceeding the speed limit, he kept the switch lined for the safety spur. If the speed of the train was normal, he threw the switch to allow the train to continue on to the next safety point. After the train had passed, he returned the safety switch to "normal", set for the spur.

Trains were operated over the "Big Hill" on the staff system. Staff machines at Hector or Field allowed the removal from the machine of a small steel wand, which allowed the train conductor to proceed. The replacement of this metal staff in the interlocking machine at Hector or Field allowed another staff to be removed, whereupon the train conductor of the next train on the line was allowed to proceed.

In 1907, the Company decided to reduce this remarkable gradient and, in 1909, after twenty months of rapid work, the two Spiral Tunnels, the first in North America, were opened. The approximate cost of this vast project was \$ 1.5 million,

and the "Big Hill" became a thing of the past. The 4.5% grade was reduced to 2.2%, all danger was eliminated and, instead of being able to make only 4 or 5 miles per hour with four engines, two engines could now haul a train at 20 miles per hour.


The project involved an increase in distance of 4.5 miles, two bridges over the Kicking Horse River and the removal of 650,000 cubic yards of rock from the two spiral tunnels. There were 75 carloads of dynamite (1.5 million pounds of explosive) costing \$ 250,000 used in the excavation.

In spite of the special complications introduced by the spiral curves, the sections of the tunnels, which were constructed from both ends, met exactly and the work is notable for having been completed from start to finish without a hitch in spite of its magnitude.



THE DOME TRAIN OF THE '70s - CP RAIL'S "CANADIAN" EASTBOUND REACHES the summit of the Canadian Rockies at Sink Lake, B.C. at the top of Kicking Horse Pass. Ronald C. Hill took the picture in August, 1971.



 A SOUTHBOUND CP RAIL FREIGHT, WITH AN INTERESTING AND VARIED CONSIST,
passes the balancing yard at Fort Steele, B.C. en route to Colvalli
and the Crows Nest district. Ronald C. Hill to the picture on 08/14/71.

