When Barkerville mining activity ended, the miners moved north and the paddle wheeler Enterprise was dispatched north, in 1870, from its run on the Fraser River, to serve the Omineca gold fields. The stern wheeler was beached on Trembleur Lake in August, 1871, for the winter, but in the spring of 1872 it caught fire and burned to the water line. This year, almost 100 years later, the office of the Provincial Secretary requested the Department of Highways to recover the remains for historical purposes. All that remained were the boilers and the crankshaft which were loaded on a barge and transported to Fort St. James. Picture on the bottom, right, shows the remains of the Enterprise on the beautiful sandy beach of Trembleur Lake. Bottom left, Road Foreman Wilf Patten inspects the remains before sending in a barge for retrieval, and, left, Pilot Jerry Johnson looks at the ancient boiler.
There isn’t any new way of saying it so I won’t try, but again I would like to extend to each employee of the Department my personal wish for a Merry Christmas and a Happy New Year. For many on winter maintenance and ferry operations, the holidays are working days.

To these I would like to add a special word of thanks on behalf of the British Columbia Government, which employs them, and the travelling public, which makes heavy demands on them in this period.

W. D. BLACK, Minister.

Nine-foot multi-plate culvert about to be put in place on the Trans-Canada Highway near Duncan. This large culvert, installed in August, provides school children with a safe crossing to a school on the busy highway. Arnold Glover, Bridge Foreman 3, and A. Castagrande, Road Maintenance Foreman, Duncan, supervised the installation. Others on the job were Allen Stewart, Don Vincent, and Alfred Olson.

Cover Photo—Unusual project for the Department in July and August, 1970, was the paving of the runway for the new Revelstoke Airport. Work was done under a British Columbia Hydro contract with specifications prepared by the Department of Highways Paving Branch and supervision of the job by a crew under Project Supervisor J. R. Callaghan. The old runway was flooded by the storage reservoir behind the Duncan Dam.—Photo courtesy of Hans Giesen, Revelstoke.
PROMOTIONS

NEIL C. TATTRIE was recently promoted to the position of Chief Property Negotiator, following the retirement of Les Moore earlier this year. Neil commenced working for the Department on a temporary basis in 1936 and, after war service, rejoined the Department in 1946. He is married and has three children. His hobbies are woodworking and gardening.

STAN PALOPOSKI recently won through competition the position of Regional Landscape Supervisor in Region 2. He started with the Construction Branch in May, 1957, then transferred to the Paving Branch in February, 1959. Stan is married and has three children.

DENNIS ANDERSON, new Road Foreman, Stewart, in the Prince Rupert District, is finding that his new job keeps him almost too busy to enjoy the excellent fishing and hunting in the area.

W. C. PURDY, Assistant Mechanic Foreman 1, has been promoted and transferred to New Denver as Mechanic Foreman 2. Bill started with the Department at Cloverdale in December, 1964. The recent move is to familiar surroundings, as Bill worked in New Denver from May, 1966, to July, 1968, as a Heavy Duty Mechanic. A farewell gift was presented to Bill by B. K. Austin, District Superintendent, on behalf of fellow employees.

LLOYD ROSELL, promoted to Road Foreman 2, Prince Rupert District, recently moved from Prince George, where he was employed as a Construction and Maintenance Crewman.

ROGER PRATT has been promoted to the position of Regional Materials Engineer in Kamloops. He was previously with Materials Testing Branch in Victoria. Roger was born and educated in England, where he graduated with a B.Sc. from Leeds University. He came to Canada in September, 1964, obtained a Masters Degree in soil mechanics at Queen's University. He started with the Construction Branch in July, 1967, at Nakusp, transferred to Materials Testing Branch at Nelson in March, 1968, and then transferred to Victoria in October, 1968. Roger is single. His outside interests are sports, particularly track and field, middle distance running, tennis, and badminton. Other interests are reading and Chinese cooking.

T. W. TAYLOR won through competition the position of Road Foreman 4, North Vancouver District. He was formerly with Bridge District, at Pattullo Bridge, and worked for a time at Celista, Salmon Arm District. Tom has, in addition to his occupational duties, the responsibility for the needs of a family of nine children.

STEVE CUTT has won, through competition, the position of Mechanic Foreman 3 at Courtenay. A gathering of the maintenance crew, as Bill worked for a time at Celista, Salmon Arm District, was held on September 11, 1970, to wish him the best on his transfer. Steve has been a Mechanic Foreman 2 at New Denver since 1966.

JIM HAWES, of the Dock Design Department, has been reclassified from Engineering Aide to Engineering Assistant.

NEW FACES IN NEW PLACES

J. A. ARNUSCH is the new Engineering Aide 2 at Grand Forks. Jim has worked for the Construction Branch for three and one-half years in Prince Rupert, Terrace, and on the Stewart-Cassiar Highway. His hobbies are hunting and fishing.

The position of District Technician at New Denver has recently been filled by W. D. COOPER. Bill had spent the last four years of his career at 100 Mile House. With his wife and two children, he has taken up residence at Silverton.

10-7 CLUB

Fort St. John District employees recently held a retirement party for JACK MCDONALD, who has been with the Department since 1956. He has worked in many jobs—truck driver, loader, and low-bed operator. Jack will now devote his considerable energies to his farm, after a well-deserved winter holiday in Mexico.

V. "BUD" GREEN retired August 31, 1970, from the Merritt Highway District maintenance crew, after 13 years with the Department. Bud was given a surprise party at his home, and he and Mrs. Green were presented with gifts from fellow employees.

GORDON SPIERS retired recently after working in the Quesnel District for the last 11 years as a Cat and Grader Operator. Gordon started originally with the Department in 1927, at Creston, until he joined the army in 1940. After the war, he worked for Emil Anderson Construction for a time. Gordon was presented with gifts and best wishes by fellow employees.

Retiring after 10 years with the Quesnel District, ALEX KLAS- OFF leaves for the Okanagan to take over an orchard. Alex was presented with gifts and his fellow employees wished him every success in his new venture.

A social and dance were held on October 30, in the Sacred Heart Hall, to mark the retirement of HARRY BALL, Golden District Bridge Foreman. Harry was presented with a cash gift from fellow employees. He started work with the bridge crew in 1957 as a labourer, working his way up to Foreman in 1963.
Charlie Eva Retires
After 39 Years of Service

A large group from Headquarters staff gathered recently to mark the retirement of Charlie Eva, after 39 years' service with the Department. He started with the Department of Public Works in July, 1931, worked for a time in the District Engineer's office and then as secretary to the Chief Engineer and Assistant Chief Engineer. Charlie joined the army in 1942 and served in the R.C.A. and R.C.E. until April, 1946, when he returned to work in the District office. He then transferred to Headquarters in 1948, where he processed contracts, permits, gazette notices, subdivision, and classification of highways. With the growth of the Department and highway system in recent years, Charlie's work has been mainly concerned with the latter three of these subjects, and he has also worked for several years as recording secretary for the Highway Board and Ferry Committee meetings. In his long career with the Department, Charlie has served under 10 different Ministers of Public Works and Highways and five Deputy Ministers.

EDWIN DAVID ODDY retired from the Delta East maintenance crew of the New Westminster Highways District on September 30, 1970, after serving in the Aldergrove yard from April 1, 1943, until it closed, and then moving to Cloverdale. He has held several jobs, and fellow employees from both Delta crews gathered to present Edwin with a gift.

Charly Eva Retires
After 39 Years of Service

A wedding of interest took place in the United Church at Golden, in October, when JACKY ESTEY and ISABEL GRANT were married. Jacky is a Truck Driver with the bridge crew at Golden, and has been with the Department for the past six years.

ROBIN A. VALENTINE was married to FLORENCE ZELENZNIK, of Nakusp, in September. The couple will reside in Nakusp, where Robin is a member of the New Denver survey crew.

SONIA LANGIS and ROBERT AYOTTE were married in Our Lady of Lourdes Church, Coquitlam, in October, by Rev. Father Surette. Robert is an Engineering Aide with the Dock Design Branch in New Westminster.

A wedding of interest took place in the United Church at Golden, in October, when JACKY ESTEY and ISABEL GRANT were married. Jacky is a Truck Driver with the bridge crew at Golden, and has been with the Department for the past six years.

Leslie Marion and Rob Rippengale were married at First United Church, in Victoria, on September 12, 1970. Rob is employed at the Head Office of British Columbia Ferries.

OBITUARIES

Former friends and fellow employees were saddened recently to hear of the death of former Fernie District Superintendent, M. C. K. (MIKE) STRUVE, who retired from the Department six years ago. He was struck down while crossing a street in Aarhus, Denmark, October 27. He and his wife, Anne-Marie, left in 1964 for Denmark, Mike's native country, to spend their retirement years.

Headquarters office Location Branch staff members were saddened by the sudden death of J. C. (CAM) PORTEOUS, who died October 22, at 61. He leaves his wife Carrie and two sons. He had worked for the Department as a Draughtsman since July, 1967. Mr. Porteous served in World War II with the R.C.A.F.

RALPH F. SNOYER, Machine Operator at Nakusp for the past five years, was fatally injured on October 1, 1970, while working on Project 672, Halfway River Bridge, north of Nakusp. He was 50 and is survived by his wife, Aileen, and four children. Mr. Snyder was born at Didsbury, Alberta, educated at Edgewater, British Columbia, and served in World War II.

BRUNO LILLENWEISS died suddenly at his home, October 1, 1970, in Quesnel. Prior to his retirement, Mr. Lilienweiss was a Bridgeman I, having worked for the Department of Highways since 1962. He is survived by his wife, three sons, and one daughter.
C. J. D. (DON) McCORMICK, Engineering Technician 2, Bridge Design office, Victoria. Don was born in Nelson, and moved at an early age, with his parents, to Vancouver. After completing studies in engineering technology at evening classes, he worked for several mining companies in the Kootenays until 1939 when he went to work for a structural steel company. Early in World War II he worked in aircraft production at Sea Island, then shipbuilding at Prince Rupert and Victoria. Don joined the Department in 1945, and in 1960 worked as Project Supervisor on the Swartz Bay ferry terminal improvements. His hobbies are golf, tennis, and curling.

BRUCE WALKER, Engineering Technician 1, working on design for one of the Patricia Bay Highway structures. Born and educated in Glasgow, Scotland, Bruce served his apprenticeship as a structural draughtsman with a steel firm. After two years with the Royal Air Force, he returned to his former work until he decided to move to Canada in 1959. He joined the Department's Bridge Design office in June of that year, and in 1969 Bruce worked for eight months as Project Supervisor on the Little River ferry terminal modifications. He is active as a coach in juvenile soccer and his hobbies are golf and fishing.

B. “BILL” NIELSEN is Project Supervisor currently on reconstruction of a section of the Patricia Bay Highway. He is also in the process of wrapping up the field and office work on his last project, the new Cowichan Valley Highway. Bill started with the Department as an Engineering Aide in 1959, and has done a circuit of some big projects, Rogers Pass, Highway 401, Simon Fraser University access, Highway 16, Buttle Lake, and Gold River. He is a member of the Society of Engineering Technologists. Bill is married with two children. Leisure time is for travel, camping, and reading.

FRED F. DE CUGLIELEMO is District Office Manager at New Denver and has been there for just over a year. He is married with four children, and in his spare time enjoys working on his stamp, coin, lighter, and gun collections.

R. M. (DICK) YAMAOKA, Engineering Assistant with the Location Branch, was transferred from field crew to Regional Location office in Kamloops, June, 1970. He has been with the Department since September, 1963. Dick and his wife, Donna, have two sons. His interests are fishing and hunting.

D. M. (DON) JOHNSTON is Project Supervisor on the reconstruction of Patricia Bay Highway through Salmon. He started in 1956 as a Levelman on Hospital Bay–Squamish Highway and duty tours included freeway construction on Highways 499, 401, multi-lane construction in Surrey and Langley and then reconstruction of the Britannia–Squamish section. An excellent mathematician, Don's alma mater is University of Saskatchewan. He keeps "brushed up" at U.B.C. and B.C.I.T. Married, with two daughters, he also finds time for photography, sign writing, exotic languages, cryptography, horticulture, and astronomy.

BILL TEAL, Auto Mechanic, Vernon Highways District, joined the Vernon crew in March, 1967. He has since proven to be a great District asset, not only to the Mechanical Branch, but to the local B.C.G.E.U. branch for which he is an untiring organizer and worker.

MISS DONALDA NELSON, Clerk 2 with British Columbia Ferries Division Traffic Department. Miss Nelson started with the Division in September, 1968. Her hobbies include sewing, singing, and playing the piano.

THOMAS GENE MUISE started with the Williams Lake District in September, 1970, as Yardman. Tom is married, with a son and daughter, and pursues a very interesting hobby, painting on velvet. He was born in Nova Scotia and spent four years in Kamloops before moving to Williams Lake.

GLEN WILEY, Road Foreman 2 at Fraser Lake, Vanderhoof Highway District, but raised in the Lakes District most of his life. Formerly with the Burns Lake Highway District, Glen is an ardent hunter, amateur prospector, and rockhound.
“EXTRACURRICULAR” ACTIVITIES

Employees of the New Denver Highway District gathered August 28 to convey to D. C. WAY, District Superintendent, their best wishes on his recent transfer to Grand Forks. Dave had served as District Superintendent at New Denver since 1961.

Ray White.

Convalescents

A. N. CLARKE, Road Foreman 2, Fort St. James, is on extended sick leave. Art is to undergo surgery in January, and all employees in the Vanderhoof District wish him a speedy recovery.

KENNETH C. BOYD, Machine Operator 4, Yahk maintenance crew in the Cranbrook District, recently underwent surgery and all his fellow employees wish him a quick recovery.
Two of the few places in British Columbia where concrete was used for road building were on the Island Highway near Colwood, top picture, and on the route from Victoria to Sidney, both on Vancouver Island. These photos were taken in 1922, when crews laid about eight miles of concrete from the Craigflower Bridge to Colwood and about four miles on what is now East Saanich Road in the municipality of North Saanich, bottom picture. The latter is still used today though asphalt shoulders have been added to increase width. The Island Highway section has been covered with an asphalt pavement. Notice wooden screeds with wheelbarrow-type handles and long-handled roller. Concrete was poured between wooden plank forms.
One of the early Federal trucks, number S-35, at Creston in 1930. Picture was loaned by Gordon Spiers, who was the driver at that time.

Peter Chaprun under the canopy of Caterpillar Tractor " Model Sixty " of 1927/28 vintage, presently being restored by Prince Rupert Garage for the museum.
ON THE JOB . . .

South approach spans on Mischinsinika Creek Bridge, near Mackenzie, constructed by Prince George crew in August, 1970.

Frank Peck, Senior Road Foreman, Prince George District, backing roller P-191 off lowbed.

Prince Rupert District employees, left to right, Bill Pelch, Junior Jack, and Foreman Lloyd Russell at work on Highway 16 sign bridge.

New sign, at the start of the Yellowhead Route in Prince Rupert, welcomes Alaska visitors to British Columbia. Prince Rupert crew is placing the sign.

Prince Rupert sign man, Donato Grossi, putting up new "Yellowhead" 16 route markers, near the extreme western end of the 700-mile long highway across British Columbia.

Installing curb and islands at the intersection of 22nd Avenue and the Prince George bypass in the Prince George District are Richard Stelzer on the truck, left to right on the road, Dean Ireland (Foreman), Eli Caplette, Fred Heger of the patching-crew, and Art Froelich from the survey crew.

Prince George bridge crew at Mischinsinika Creek Bridge with Glulam beams in background. They are, left to right, Albert Hembrow, Dave Rowatt, Euclid Tremblay (Police Coupe), Pat Fay, Ron Mattison, and Jack Pyle. Eighty-one foot beams were moved on a logging-truck 49-foot "highboy" over the 12 miles from Mackenzie to the site.
Len Hassell, operator of pavement-burner truck, burning off excess asphalt which bled on Northwood Pulp-mill Road in the Prince George District.

Q-3 crusher in operation at Stewart. Warren Hassell, Prince Rupert District Technician, left, talks to Gordon Rodine, Crusher Foreman.

Instalation of boxwall along the Pine Pass section of the John Hart-Peace River Highway. Seen on the project are Rod Capenalo, John Kipke, Walter Pyle, and Donald Bombard. Others on the job were Fernand Marcill and Nick Prymo. Site is old slide area.

C. B. (Chuck) Rolston, Senior Road Foreman, left, Burnt Lake District, and F. W. (Mike) Tetreau, Road Foreman for Southbank area, pause after inspecting Skinns Dam at Ootsa Lake.

Ed Sangal, Mechanic Foreman at Fernie, on top of Trinity Mountain assisting with the installation of a radio repeater. The cone was taken up by helicopter.

Fort St. John District Mechanic, John Lines, making a delicate adjustment to the faith. John came to Fort St. John earlier this year from the Langford shop.

Left to right, Project Supervisors, A. Mednis, D. Chisholm, and Engineering Assistant E. O. Tukane completing the final quantities for Construction Project 1991, an 11-mile reconstruction job on the Cariboo Highway, south of Quesnel.
ON THE JOB...

Preparing forms for concrete cattle passes are Gordon Duffus and Bill Luciow. The Fort St. John District crews constructed two concrete box-type cattle passes along the Hudson Hope Highway this year as partial compensation for right-of-way used during the reconstruction of the highway in 1968/69.

Paving Branch Technician, Frank Mar­tens, left, has spent considerable time in the Vanderhoof District, and it is expected he will be in the area again in 1971. He is shown here with Herb Hey­wood, Engineering Assistant, inspecting the new pavement in the Vanderhoof yard. (Frank puts in a bid for the Van­derhoof District to get some goose-shoot­ing in the fall.)

First phase of Highway 401 beautification project was completed at the end of October, under the supervision of Mike Pope, Landscape Supervisor, Maintenance Branch, the planting of 13½ tons of daffodil bulbs along freeway between Chilliwack and Vancouver, a total of 175,000 to 180,000 bulbs. Bridge District, New Westminster District, and Chilliwack District personnel did the planting with a two-man power auger and farm tractors with augers. Art Regier, Abbotsford maintenance crew, left, and Jerry Wheeler, Co-ordination of the work was by Ian McLennan of the Bridge District.

Preparing forms for concrete cattle passes are Gordon Duffus and Bill Luciow. The Fort St. John District crews constructed two concrete box-type cattle passes along the Hudson Hope Highway this year as partial compensation for right-of-way used during the reconstruc­tion of the highway in 1968/69.

In October, 1970, the Paving Branch conducted an experiment by placing an open-graded, carpet-coat pavement on the west­bound lane of the Trans-Canada Highway 401 at Carvolth Road, where wheel paths retained water during rain storms and caused hydro-planing at high speeds. The purpose was to determine if the open-graded mix would stand up to heavy traffic, if the open texture would disperse the water and improve traction, and if it would reduce headlight glare. The photograph shows the mat after rolling. Results to date are encouraging.

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Momentarily relaxing in the sunshine, is the Golden Garage Crew, left to right, A. Lotosky, Mechanical Foreman 2; F. Rus­sell, Heavy-duty Mechanic; S. Howe, Mechanic-Welder; T. Sime, As­sistant Foreman 1; and N. Schuler, Mechanic 1.
Dave Williams, Graderman, left; Norman Ninatti, Truck Driver; and Russ Galloway, Road Foreman, are reconstructing a road in preparation for roadmix paving in the Nanaimo District.

Road Maintenance Foreman, Nanaimo District, Alex Brayden, speaking to a satisfied resident of the area who reported all the roads in perfect condition. Or so it was reported to the RRI.

Doug Van Tine, Atlin Foreman, Fort St. John District, checks one of the emergency shelters on the Atlin highway. These shelters were originally established by the Canadian Army during the period they were responsible for maintenance. Since the Department took over the highway, these small "havens" have been kept up in this remote area of the Province.

Doug Van Tine, Atlin Foreman, Fort St. John District, checks one of the emergency shelters on the Atlin highway. These shelters were originally established by the Canadian Army during the period they were responsible for maintenance. Since the Department took over the highway, these small "havens" have been kept up in this remote area of the Province.

Norman Taylor, Mechanical Foreman, Nanaimo District, at Parksville, preparing a requisition for mechanical parts.

Ernie Malmo, Bridge Foreman 1, looking over a sea wall along the Departure Bay Road. The wall was built by the Nanaimo District bridge crew to protect highway facilities against winter storms and high tides.

Bob Williams, Graderman, Nanaimo District, is busy keeping up to gravel trucks rebuilding the extension road at Cassidy.

Fort St. John District Mechanical Shop Foreman Lawrence Harding, right, discusses the fine points of tire changing with Grader Operator George Anderson.

Don LeBerge, Truck Driver, Nanaimo District bridge crew, is also a competent welder and has just completed a set of forms for curb and gutter work.

Lloyd Antrim, left, Mechanic, and D. W. Brittain, Nanaimo District, are extra busy in the Parksville shop getting trucks ready for ploughing and sanding along with regular repair work.
SAFETY AWARDS, INFORMATION, RALLIES

At a special meeting on November 12, Kamloops Regional Highway Engineer R. G. White presented an award of honour to Region 2 Construction Branch. Regional Construction Superintendent A. G. Jones accepted the award. Left to right, R. G. White, H. D. Francis (Region 2 Safety Officer), A. G. Jones, G. L. Bray, E. E. Cummings, W. Coxon, N. Makrayev, A. Nesting, A. P. Park (Senior Safety Officer).

YOU BET YOUR LIFE

Going through a traffic signal on the yellow light will save you at best about 30 seconds. Let's say you are about 40 years old, making $7,000 a year. During the next 25 years before retirement age, you will earn at least $175,000.

Assuming you progress salary-wise, you would earn between $200,000 and $250,000 during this period. Therefore, each time you "go through on the yellow" you save as much as 3½ cents worth of time, at the risk of $250,000 of earning capacity. These are financial odds of 10 million to one!! Pretty risky business, isn't it?

Think about this now, so you will remember it next time you are inclined to risk accidental injury or death just to save a few seconds. Remember, "going through on the yellow" doesn't necessarily mean just on the highway. There are plenty of incidents both on and off the job where people go against the imaginary caution light. Don't do it! The odds just aren't worth it.

YOU CANT

SEE IT . . .
SMELL IT . . .
TASTE IT . . .
FEEL IT . . .
HEAR IT . . .

BUT IT CAN KILL YOU . . .

Carbon Monoxide

Take these precautions:--

1. Check your vehicle regularly for a leak in the manifold, exhaust pipe, muffler, or tail pipe. In cold weather, exhaust pipe and muffler leaks emit steam and can be seen—other leaks usually can be heard.

2. Shut off the engine when parked for more than a few seconds.

3. Keep a window open at all times for proper ventilation.

4. Close air intakes temporarily when travelling in slow-moving traffic or while driving through tunnels, or waiting at stop signs or signals behind another vehicle.

5. Always keep the garage door open when a vehicle is inside and its engine running, or connect the exhaust hose.

6. Never drive with a car's trunk door open or with a stationwagon's back window down, even slightly, unless there is a forced-through draft from open front windows or ventilators. Without forced-through ventilation, the suction created can bring the exhaust gas into the passenger compartment.

The New Denver shop crew receives the gold safety award from D. C. Westaway, District Superintendent, for working 126,007 man-hours without a time-loss accident. Accepting the award is Shop Foreman Steve Cott.
Safety Officers and Mechanical Superintendent recently visited the Charlettes. Left to right, A. F. Park, Ken Jackson, Tom Yearsley, and Wilf McDonald leaving Port Clements following a short but lively safety meeting in October.

A safety rally was held at Burns Lake Civic Centre, October 5, 1970. Members at the head table from left to right, T. R. Yearsley, Regional Mechanic Superintendent; K., Jackson, Coordinator of Accident Prevention; W. J. McDonald, Regional Safety Officer; A. F. Park, Senior Training and Safety Officer; R. C. Saul, Driver Trainer, and R. W. Veitch, District Superintendent, Burns Lake.

Jim Lyons, left, receives silver award of merit from Les Broddy, Regional Highway Engineer, Prince George, on behalf of the Houston road maintenance crew. Crew of 10 men worked 84,540 man-hours from June 1, 1966, to April 30, 1970, without a time-loss accident. Award was presented at a safety meeting held at Burns Lake, August 19, 1970.

C. G. Jeffs, Road Foreman 4, recently received B.C. Safety Council silver award from P. B. McCarthy, Regional Maintenance Engineer. Award was earned by Nelson District road crew for working 135,434 man-hours without a time-loss accident.

At staging area, top photo, Wilf Conlon (Director of Communications) and John Bergen (Road Foreman), Prince George District, prepare equipment for radio repeater site on Tahor Mountain. Middle photo, helicopter lowers the nose-cone shaped antipode (for antenna protection dome) onto the site. Above, close-up view of the "nose cone," with John Bergen on the left, and on the right, Wally Stewart, Road Foreman from the Nanaimo District, who accompanies Wilf on his field trips.
The Road Logger getting ready to test the completed project on the Hudson Hope Highway.

The trailer housing the radioactive carriage.

A detailed look at the carriage which carries the radioactive source. Note the geiger counter detector at the top of the photograph.

Department Engaged in Nuclear Testing - of Pavement Densities

The Paving Branch has arranged for the use of a nuclear density measuring device on a trial basis. Owned by a private firm, the machine was transported from Saskatchewan to Project S-5769 on the Hudson Hope Highway, in October. This project was under the supervision of Ian Douglas and Clarence Wittig and was completed in late September.

The nuclear densometer was successfully used in Saskatchewan in determining the densities of newly constructed subgrades as well as newly paved bituminous pavements. The device works on the backscattering of radioactive particles. It is known that these radioactive particles contain a high concentration of energy, due to the high velocity at which they are travelling. This machine, called Road Logger (the daily recording kind, not the sawing and chopping kind), uses cobalt 60 as a radioactive source. This emits gamma rays, non-charged photons moving at approximately the speed of light and with a frequency of about $3 \times 10^{18}$ cycles per second. Because these particles or photons carry no charges, they are not affected by electromagnetic fields or any electrical fields of that medium.

The gamma ray, emitted from the radioactive cobalt 60 is channelled onto the ground. As the rays enter the ground, and because of the high energy content, they collide with the electrons in the material through which they pass. There is transfer of some energy to these electrons, and it excites them, and the rays depart in a different direction with a reduced level of energy. In other words, they bounce off one another. The process is analogous to a cue ball striking a billiard ball at an angle. When the cue ball hits the billiard ball then the cue ball will depart in different directions. This phenomena is called Compton Effect. Thus the denser the material, the greater the collision and the lesser the energy when the photons are deflected. It is on this principle of physics that the Road Logger functions.

Unlike other nuclear density testing devices, this is a self-propelled system consisting of a half-ton truck containing moisture-measuring units, electro-mechanical controls, twin-channel recorder, and a small two-wheel trailer containing the density-measuring unit.

The unit is a 430-millicurie radioactive cobalt 60 and a single sodium iodide detector mounted in a four-wheeled carriage inside the carrying trailer, to provide a fixed geometric relationship between the source and the detector.

Nuclear pulses reaching the detectors are converted into electrical energies which in turn are amplified and converted into mechanical energy to drive the two-channelled recorder. All the electro-mechanical equipment is contained in module-construction panels in the bulkhead, immediately behind the operator on the truck's cab. The system is designed for full operation by one man and, therefore, controls for all systems are within easy reach of the operator.

As the Road Logger "reads" the pavement, the densities are automatically stored by the recorder. The rate the machine can travel varies from 150 f.p.m. to 600 f.p.m. In order to achieve a constant velocity, important in the operation, the truck has hydraulic-drive controls which tend to keep the speed constant.

The machine was used successfully on the S-5769 project to check the in-place pavement densities. The Paving Branch has a correlation study presently under way to determine the degree of accuracy. If the machine is accepted, possible uses are the determination of subgrade densities, moisture content of the subgrade and densities of newly paved bituminous roads. This will provide better quality control for the project supervisors and engineers because the results furnished by the Road Logger are instantaneous. Weak structures could then be corrected immediately, resulting in better and safer highways for the travelling public.