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Minds Plus Money

Until about thirty years ago, making gasoline was simple. It was just a matter of heating crude oil to distill the gasoline content. The result was as good—or as bad—as the quality of the crude.

Today's gasolines are the end products of many processes in refining units that took years to develop and require millions of dollars to build. Their components are blended with the care and attention that druggists give to medical prescriptions.

Canadian motorists this summer are buying gasolines which are at least 50 percent more efficient than the gasolines their fathers bought: two gallons will do the work of three gallons of the gasoline sold in the Twenties. And, just as important, the price per gallon of a modern gasoline—exclusive of taxes—is lower although the processes and equipment used to make it are much more elaborate and expensive.

The improvement in gasolines is a result of competition to serve the motoring public. It was accomplished by a combination of two resources—minds and money.

Modern gasolines are the product of keen, inquisitive minds engaged in many fields of research. Imperial, which has the oldest and largest research group in the Canadian oil industry, has 122 persons—with degrees from universities in 15 countries—actively engaged in product research.

Over the past 10 years the company has spent more than $20 million on research to develop new products and improve existing ones.

The manufacture of these new or improved products has needed specially designed equipment. Since 1946 Imperial has invested more than $110 million in new refineries or new process units for existing plants. Much of this equipment has been designed by Imperial's engineers.

While the research chemists and engineers have been producing new or improved products and processes, other minds have been devising more efficient marketing and distribution methods. Over the years gasoline quality has vastly improved but prices have risen far less than those of other essential commodities.
WATCHDOG ON THE MEDICAL BEAT

by FERGUS CRONIN

J. H. Johnston is a combination of doctor, scientist, detective. The only full-time industrial hygienist in Canadian industry, he searches out invisible threats to the health of Imperial’s employees.

No occupation is without its hazards to physical or mental health. Advertising men, it is said, have their stomach ulcers; fishermen have rheumatism; store clerks get fallen arches. Silicosis is traditional to miners and housemaids are prone to hurtful knees.

Occupational diseases are as old as history. Pliny the Elder in the first century A.D. wrote of knife grinders’ phthisis (consumption). Early sailors had to contend with scurvy, phosphorus poisoning afflicted matchmakers, painters contracted lead poisoning and the Industrial revolution of the 18th and 19th centuries spawned a variety of ailments due to long workdays and deadly conditions.

Many occupational diseases have been conquered by science, but some persist and others have been born with new industries. Every year more are discovered. However, with the development of new health hazards there has grown up in the past 30 years a new method of combating them, known as industrial hygiene: the science of helping employees keep healthy at work. Industrial hygiene, as part of a plant medical program, and accident prevention have been developed to such an extent that today employees, in general, are healthier and safer at work than they are at home.

Witness the New York dry cleaner who almost died from a severe case of jaundice. A careful check of his shop showed that the utmost care was taken with the cleaning fluids. Ultimately it was discovered that the day before the outbreak of his illness he had taken home a gallon jug of carbon tetrachloride and used it to clean the living-room rug.

Again, the employee of a Texas oil company was found, in the course of a routine check of his body fluids, to be suffering from mild lead poisoning. All efforts to discover the cause in the plant failed, then a check on his off-duty habits revealed that he had been spending his spare time spraying farm machinery with a red-lead primer.

The science of industrial hygiene is still young. Canadian industry can boast of only one full-time industrial hygienist: John Howard Johnston, hired in 1953 as part of Imperial Oil’s program of preventive medicine. He is a new type of industrial expert, part doctor, part scientist, part detective, who looks for usually invisible threats to the well-being, and even the lives, of Imperial’s employees. He spends about 40 percent of his time away from home, traveling about 25,000 miles a year, to visit Imperial’s plants in all parts of Canada.

“I try to anticipate trouble before it happens,” he says. “I don’t run into any dramatic incidents. But if I find a man comes in contact with fumes in the course of his work, I have to decide whether he’s getting enough to produce bad effects over a period of perhaps 10 years. There is no day-to-day evidence of someone getting into trouble. My job is to sell the idea of constant prevention and care.”

Benzol, for example, is highly toxic. It attacks the blood-forming mechanism of the body and more than 35 parts per million in the air is considered a health hazard. Workers dealing with benzol have to do so in a well-ventilated area. Even in a laboratory where testing is done with benzol, glassware which contained it must be washed under a fume hood which sucks away the dangerous vapors. But it might take a number of years working on a daily basis before a worker who washed them without the hood could feel any serious effect.

There are seldom any outward signs of sickness or disease in
Imperial. Take Johnston's campaign against the careless use of mercury, for instance.

Mercury—or quicksilver—and its effects on the body have been known for hundreds of years. Plutarch, the early Greek biographer, once wrote a reprimand to an owner of a mercury mine for employing slaves who were not criminals. Mercury fumes attack the central nervous system and have been known to change the personalities of people. The most common symptom is a trembling of the limbs. Until a generation ago mercury was widely used in the processing of felt hats and hatters often developed mercury poisoning; the typical trembling became known as hatter's shakes. The madman of Alice in Wonderland was, perhaps significantly, a hatter.

Mercury is used in a variety of instruments, such as meters for measuring the flow in pipe lines. When these meters are being repaired the mercury has to be taken out and is sometimes spilled. If it is left, particularly in the form of small globules on the floor or in cracks, it gives off toxic vapors. Johnston makes a point of always checking such shops, using a special instrument which detects the vapors. In most cases he has recommended installation of a special stand containing water which catches any mercury spills. Droplets under water give off no vapors. If much work with mercury is being done he urges that the floor be made impervious and spills easier to clean up by resurfacing with either linoleum or smooth concrete.

In one instance he found a repair shop considerably contaminated. A urine specimen from the man working there showed a high mercury excretion. The shop was cleaned up and, in subsequent tests taken every few weeks, the repairman's urine test returned to a safe level. "Here was a man on his way to trouble," says Johnston, "although it might have taken another year or two before there was any physical evidence of it."

Johnston, a quiet, serious-minded man of 41, has extensive practical training for his unique position. He graduated from the University of Toronto in 1937 as bachelor of arts in chemistry, and was granted a fellowship for a year's post-graduate study at the university's School of Hygiene. He then joined the staff of the Banting Institute and spent two years on silicones research—the disease of the lungs caused by breathing rock dust over a period of years. In the industrial hygiene division of the Ontario Department of Health he worked for 12 years under Dr. J. G. Cunningham who, in 1920, organized the first such division in Canada and is one of the country's outstanding authorities in the field.

Early in 1953 Dr. Russell G. Birrell, Imperial's medical director, went to Dr. Cunningham and asked him if he could recommend a man to become Imperial's industrial hygienist. He was looking for a man with either engineering or chemical background and a flair for both the engineering and medical aspects of preventive medicine. He had started his search soon after setting up the company's preventive medical plan in 1947. By 1953 he still hadn't found one because, just as today, there were no courses offered in Canada for industrial hygienists.

Dr. Cunningham passed on the request to Johnston who shortly after joined Imperial's medical department.

There are two aspects to the physical welfare of workers in industry, according to Dr. Cunningham: their general health while at work, which is a medical problem and ideally is looked after by the company's own medical department; and their surroundings, which is the responsibility of industrial hygiene.

At Imperial, Johnston is a member of the medical department staff—now in its tenth year and comprising 12 full-time and 17 part-time doctors and 28 nurses working in health centres across Canada. Dr. Cunningham regards Imperial's medical department as "one of the best."

Dr. Birrell sees industrial hygiene as the designing of equipment and processes and the provision of working conditions to avoid exposure of employer, employee, neighboring inhabitants or customers to materials of danger to health. He says,

"We try to get it at the blueprint stage. If our refiners are going to build a new cat cracker, for example, we like to get Johnston in on the planning discussions." Johnston examines all plans for new or renovated buildings. For the most part the planners are now aware of the necessity for "building health into a plant," as Johnston puts it. But he is usually able to suggest some health improvement in ventilation or the handling of materials—perhaps the building of an exhaust hood in a paint or welding shop.

His job becomes easier all the time as company officials become increasingly aware of the principles of industrial hygiene in all the company's operations: producing, manufacturing, marketing and transportation. But he still runs into the occasional new face and is greeted with something like, "Industrial hygienist, eh? Then I suppose you'll want to look at

He also tests velocity of paint sprays, uses a mercury vapor detector, makes sure exhaust is drawn off and doesn't contaminate air.
After unloading his equipment at Surnia, he chats with Manager G. R. McMillin before his discussions with refinery safety experts.

Johnston—inveterately known as “Johnnie”—has been successful in his work because in addition to his technical knowledge, he has a high degree of patience, diplomacy and a willingness to compromise on occasion. For example, when a plant is shut down temporarily due to safety concerns, he will arrange for temporary measures to improve conditions which he considers hazardous.

“It is up to the plant manager to meet the people and find their problems without antagonizing anyone,” says Dr. Birrell. “He is not only accepted but he is invited back.”

When he starts out on an inspection trip he usually carries with him a briefcase containing about $500-worth of instruments. Another $2,000-worth of the bulkier kind has preceded him in two trunks. He begins by talking to the plant manager and the accident prevention manager.

During his plant visits, Johnston works closely with the men charged with plant safety and accident prevention. To some degree his work and that of the accident prevention division of the company overlap, and before Johnston arrived the company’s industrial hygiene problems were shared by the accident prevention personnel, company doctors and nurses, and outside industrial hygiene consultants.

After his discussions with the plant manager and the safety personnel, Johnston tours the plant, talking to workers as he goes, his eyes probing into every corner and every process. Then he starts to unpack instruments.

One of them might be an impinger, with which he can take a dust sample and actually count the concentration of particles of any particular substance in the air. If the count is above a known safety level he makes a recommendation for its correction.

Then there are special instruments which detect and measure the concentration in the air of such vapors as benzol, carbon monoxide and sulphur dioxide. As he wanders into parts of the plant where good ventilation is essential, he uses a velometer or a thermo-anemometer to measure air velocity.

Among his most frequently used instruments are a noise level meter (better known to radio and television audiences as an “aphone meter”) and a frequency analyser because, although the petroleum industry is not as noisy as some others, like industry in general, it has in recent years been fighting what has become a major problem: noise, and its effect on hearing, comfort and efficiency.

Johnston fights noise principally in two ways: trying to reduce it at its source by encouraging good maintenance, and installing mufflers and rubber bumpers; and secondly, trying to reduce the noise heard by workers by putting buffers between them and the source. In plants where it has not already been done, he either encloses the machine or the operator in a booth, uses acoustic materials, or, when all else has failed to bring noise down to the comfort level, uses ear muffs or plugs.

Imperial has recently begun audiometer tests in health centres on the hearing of as many new employees as possible, because an audiogram is most useful when compared at later examinations to earlier ones taken on the same person. The purpose is to provide a continuing record of an employee’s hearing during his service with the company.

Other instruments play their part. At one warehouse Johnston took air samples which showed concentrations of 100 parts per million of carbon dioxide due to use of gasoline-operated forklift trucks. While there was no immediate danger, this was the maximum concentration of carbon dioxide recognized as safe, so Johnston suggested ventilation be increased and the trucks be equipped with catalytic mufflers which convert carbon monoxide to carbon dioxide—only one-tenth as toxic.

“Like most of the hazards I come across,” says Johnston, “there was a potential danger.”

Dr. Birrell believes that Johnston’s work as part of the company’s over-all medical program helps contribute to four major goals: good health of employees, pleasant working conditions, efficiency, and good management-employee relations.

Imperial established its own industrial hygiene section so that it could maintain the same standards in its operations in all 10 provinces. At present five provinces—Ontario, Quebec, Manitoba, Nova Scotia and British Columbia—have industrial hygiene divisions in the departments of health. The federal government operates an occupational health division of the Department of Health and Welfare which acts as an advisory group to industry and the provinces.

It takes more than the determination and efforts of plant managers to have the healthiest employee-group in the country. The skill and knowledge of an industrial hygienist is necessary. Should an employee fall unconscious or have his skin turn yellow, any foreman knows something is wrong. But, in most cases, by the time symptoms of illness become so dramatic, the damage is already done and for those immediately affected, it might be too late. Looked at in this light, Johnston does more than prevent poor conditions—he actually saves lives.

For example, in a company photo lab he found a static eliminator—a brush for removing dust from photographic film. Johnston made a report and the brush was removed, because at the base of the brushes is a piece of metal foil placed with potassium—a radio-active element known to break loose in the form of dust which might enter the body through the skin or mouth. In a pipe line terminal he found employees cleaning filter screens with compressed air. They were subsequently told to use wet wire brushing or a water hose because the compressed air could scatter particles of lead sludge into the air and create a danger of lead poisoning.

He has been responsible for many other improvements in various company establishments: an underground exhaust system to carry truck fumes out of a marketingStatusCode; a muffler on the exhaust pipe of a noisy, air-operated “barrel upender”, and, because of the danger from fumes, draftsmen now use methyl chloroform, rather than carbon tetrachloride, for cleaning drawings.

But the piece of work he found most satisfying involved workers at a pipeline pumping station who had complained that their drinking water, which comes from a nearby city, had a queer taste. Johnston suggested a special filter and one was installed with completely satisfactory results. “My stock is pretty high on the pipe line,” he says. “More people comment on that simple bit of work than about much more involved decisions that have quite possibly prevented tragedy.”

It is a fast-moving field and he spends lots of spare time reading scientific papers in order to keep abreast of frequent advances. He finds time for one hobby—a noisy one, too. When he’s home in the six-room bungalow he built himself in Toronto’s western suburbs, there is often a comfortably whirring or blaring coming from the basement where he has a well-equipped workshop and recently completed a recreation room.

Being Canadian industry’s only industrial hygienist has its difficulties. Johnston finds. Friends look blank when told his occupation. Censor take to have it spelled for them. But, for his wife Dorothy and his nine-year-old daughter, Pat, the only drawback is his recurring absence from home. The most frequent comment from Pat which indicates an appreciation of her Daddy’s work is “Not another trip!”

Drawings by Len Parker
He took the “skunk” out of oil

by MAURICE GILES

In 1884 the Canadian oil industry was in trouble because its lamp oil reeked of sulphur. Herman Frasch, a volatile chemical genius called in by Imperial, solved the problem and later became the world’s sulphur king.

William Spencer, one of the country’s pioneer refiners and a co-founder of Imperial Oil in 1880, had beaten the sulphur problem to some extent by adding litharge (lead monoxide) to the crude oil, but Frasch found that this, like other methods, partially covered up but did not eliminate the sulphur. Also, it was expensive.

Frasch had gone to London at the request of Melville (W.M.) Spencer, first secretary of Imperial Oil and a son of William. Frasch helped Imperial to develop new types of oil, which went under such names as magnetic engine oil, ruby engine oil, bolt cutting oil, emulsion wool oil and Rabbit oil—“specially adapted for new work, fast running machinery and brass journals.”

He formed a short-lived partnership with Melville Spencer as Spencer, Frasch and Co., specializing in a waxed paper— invented by Frasch and something new to Canadian housewives—and high-grade lubricating oils. But on his own he toyed with the idea of eliminating, rather than covering up, the sulphur content of the oil.

He already knew that the sulphur compound of the crude oil would dissolve a number of metallic oxides. When the oil was saturated with oxide, the disagreeable odor disappeared, only to reappear in the burning. One night early in 1885, while working late in his lab, he made an exciting discovery: if more oxide than was necessary to precipitate all the sulphur were added to the petroleum while it was being distilled, a complete desulphurization took place—smell and all.

But he had to prove that what he could do in a test tube could be done on a large scale. He decided he needed the manufacturing know-how of an experienced oil refiner and joined forces with a prominent Londoner, J. R. Minshewick, another of Imperial’s founders. They formed the Empire Oil Co., bought a defunct oil property in London and built a 1,200-horsepower still.

Frasch found they could produce a burning oil containing only 0.02 percent sulphur—identical to that contained in the much sought after Pennsylvania oil of a similar specific gravity and 30 times less than the 0.6 percent sulphur left in Canadian oil by other refining methods.

He made the method inexpensive by using copper oxide. This was agitated with the crude oil in heated vats. The sulphur reacted with the copper oxide to form copper sulphide which sank to the bottom, leaving the oil sulphur free. Frasch then devised a simple method for roasting the copper sulphide so that it was restored to copper oxide, and could be used over and over again.

On Feb. 1, 1887, Frasch applied for a patent for “refining Canadian and similar petroleum oils,” and by 1895 he had patented 20 oil refining inventions. His smokeless, odorless oil
sold as fast as he could turn it out and two of Empire Oil’s trade names, Royal Palace and Aurora illuminating oils, became among the best known in Canada.

Frash returned to the U.S. where the Standard Oil Co. bought his demobilizing patents and hired him as chief chemist at a salary said at the time to be the highest ever paid to a man in his profession. After Frash left London, Empire Oil carried on under Mishoshuck’s direction until he sold it to the Bushnell Oil Co. in the early ’90s. Frash supervised installation of its process in various American refining plants.

In the meantime, Frash’s fertile brain moved on to other problems. Between 1875 and 1912 he was granted 64 American patents in a wide variety of fields: the utilization of tin scrap, an improved oil lamp, a revolutionary method for making white lead, improvements in the manufacture of salt, a simplified method of producing elements for thermal electric generators. One of his most notable inventions was a chemical method of retarding quiescent oil wells or increasing their flow. It proved far superior to the method then in use in which nitroglycerin was exploded at the bottom.

This inventive genius was born in 1853 in the little town of Galldorf, Württemberg, Baden, Germany. His father, Johann, was burgomaster of the town and Frash’s boyhood was a happy one, no expense or effort being spared to give his lively imagination full scope. He grew up with a keen sense of humor, a reputation as a practical joker and a lifelong fondness for good food and theatre.

He worked for a time as a druggist’s apprentice, but at the age of 16, decided America held better opportunities for a young man and emigrated to Philadelphia where he immediately obtained work in the College of Pharmacy. He studied chemistry in his spare time and became interested in the application of chemical science to industry, particularly the petroleum industry, then coming to the fore.

At 22 he opened a laboratory of his own and built up a small clientele among Philadelphia manufacturers. In 1876 when still only 24, he discovered a new process for refining paraffin wax which he patented and sold to the Cleveland Petroleum Co., a subsidiary of Standard Oil. Standard hired and installed him in its Cleveland laboratories. His enterprising nature, however, would not permit him to be content as a cog in a big machine. He opened his own office as a consulting chemist in Cleveland, and it was there that Spencer found him.

The rapid growth of the petroleum industry made Frash restless. So much was happening and so many new avenues of discovery being opened that he once remarked: “Twenty-four hours a day just isn’t enough.” He worked about 14 hours of every 24 and sometimes spent all night in his laboratory.

Years later he was to be remembered as “an erratic, explosive genius,” as “the wild Dutchman,” as an intense, dominating and violent man with a sometimes hair-trigger temper. One associate, while classing him as a chemical genius, added, “But he was a most uncomfortable critic to work with.”

Somehow he found time in 1890 to conduct a bustling courtship and marry Romulda Berks in Philadelphia, and by her had two children, a boy, George, and a girl, Frieda. Romulda died in 1899, and three years later Frash took a second wife, Elizabeth Blew of Cleveland.

By that time he was 41, wealthy, and his services were in great demand. His accomplishments in oil business alone would have made him a millionaire in those times and he could have retired, assured of a modest place in history. But Herman Frash was not the retiring kind. His pioneering instinct had been attracted to an entirely new field—the mining of sulphur—and before he was through he had revolutionized a second industry and earned the accolade, “The Sulphur King.”

Almost all the world’s supply of sulphur came from Sicily and, although production costs were low, many of the miners being children, the King of Sicely took advantage of his virtual monopoly to charge exorbitant prices. In 1865, while boring for petroleum in Louisiana, wildcatters had discovered large sulphur beds. The tantalizing fact, however, was that they lay about 800 feet deep, beneath a 500-foot layer of quicksand. Several companies tried without success to sink shafts to mine the sulphur.

In 1891 Frash formed the Union Sulphur Co., bought property a mile and a half from the site of the known deposits, and began drilling. He had decided the sulphur might be melted by melting it in the ground and pumping it to the surface—a method he had found effective in the mining of rock salt. He drilled four holes to 2,000 feet but found nothing. When the company that owned the original deposits abandoned them as irretrievable, Frash took them over.

He drilled a hole down to the sulphur bed, then sank three concentric pipes in it. The outside pipe was to carry water superheated to 335 degrees Fahrenheit (well above its boiling point of 212° F); the innermost pipe was to carry compressed air which would force the melted sulphur up the third pipe. The danger was this: if the water temperature should drop below the melting point of sulphur (about 230° F) the well would fill up with solid sulphur and become useless.

The crucial test was described later by Frash: “We raised steam in the boilers and sent the superheated water into the ground without a hitch. After permitting the melting fluid to go into the ground for 24 hours . . . the pumping engine was started on the sulphur line and the increasing strain against the engine showed that work was being done. More and more slowly went the engine, more steam was supplied, until the man on the throttle sang out at the top of his voice, ‘She’s pumping.’ A liquid appeared on the polished rod, and when I wiped it off with my finger I found my finger covered with sulphur. Within five minutes a beautiful stream of the golden fluid shot into barrels we had ready.”

But it was not until 1905 that the Union Sulphur Co. (operating today under the name, Union Oil and Gas Corp. of Louisiana) showed a profit. The following year it produced enough to supply the entire sulphur demand of the U.S. and send its first cargo to Europe.

Today the sulphur beds of Louisiana and Texas, still mined by the Frash process, account for most of the approximately 6.5 million tons of sulphur produced yearly in the U.S. In 1918 the U.S. National Museum, noted that the Frash method had changed the centre of world sulphur production from Sicily to the U.S., and commented: “Without the Gulf deposits the U.S. would have scarcely been able to meet successfully the war needs of sulphur and sulphuric acid.”

Frash’s long and active career finally broke down his health. After a lengthy bout with kidney disease, he died in Paris, France, in 1914 at the age of 62. Unlike the traditional inventor who dies penniless, it was estimated that Frash was worth about $12 million at his death, and part of his fortune is still working for progress in chemistry. His widow, who died in 1924, left a bequest of one million dollars, the income from which was to be used for research in agricultural chemistry.
Two men who work on the tugboats delivering vital oil supplies along the lonely 2,635-mile Mackenzie river to Canada’s northern outposts fight conditions which at times make deepsea sailing seem a rest cure.

Afloat for only four and a half months, their schedules are so tight there’s hardly time to step ashore for a haircut—and in most places where they can step ashore, there’s no barber. They do a year’s work in those months; from the first of June to mid-October. During those 135-off days they run the gamut of a year’s weather, from ice-floe to semi-tropical flash storms. They brush bottom on 18-inch shallows, and get tossed about by eight-foot waves. They battle shifting sand banks, rapids, razor-like rocks, whirlpools and mosquitoes by the millions.

Their life is all part of one of the strangest transportation operations in North America: the Yellowknife Transportation Co., which operates on the 1,600-mile stretch of the Mackenzie river system, from Yellowknife on Great Slave lake, to the Arctic ocean.

The YTC tugs, and their large red barges, are one of the most essential fuel oil delivery services in Canada. A slip-up in schedules, an engine failure, a grounding, can mean disaster to the residents of Canada’s northland.

The Mackenzie river basin and the surrounding area cover one and a half million square miles. Dotted from the Arctic to the farmlands of northern Alberta are scores of small settlements where winter temperatures often drop to 60 below zero. Wood is scarce, and most settlements simply couldn’t exist without the oil products delivered by the Yellowknife Transportation Co. If YTC can’t meet fuel deliveries before the great river ices over—the only other way of getting the fuel in is by air—it means a bleak winter for the northern settlements.

From Imperial Oil’s refinery at Norman Wells, about 100 miles south of the Arctic circle and the only oil refinery in the north, four powerful little tugs, the Sandy Jane, the Marjory H, the Richard E, and the Saime, haul nearly eight million gallons of oil products a year in 12 red flat-bottomed barges, to Yellowknife, Aklavik, Hay River, Fort Simpson and dozens of other settlements. Six of the barges are steel and carry about 120,000 gallons of oil; the other six are wooden barges for deck cargoes. They cross one of the largest inland seas in the world, Great Slave lake; visit lonely two-men outposts, mining camps, government experimental agricultural centres, and Indian and Eskimo settlements.

With so much at stake, no chances are taken with equipment or schedules. Each tug is fitted with two-way radio. One, the Marjory H, can develop 1,000 HP; two others, the Sandy Jane and the Richard E are rated at 800 HP. The Saime is smaller, but this is often an advantage in the shallow water. Each tug has propellers specially fitted into the hull to cut down the chances of damage. Even with such power, parts of the Mackenzie are so swift that tugs have to shuttle barges through one at a time. Usually a tug pushes up to three barges. In rough weather the tugs pull them at cable’s length to avoid damage to the tugs or barges.

However, as much by luck as by strategy, no barges have been lost in storms during recent years. A fortunate circumstance, for each barge costs $100,000, and they aren’t easy to come by. They are built in parts at Fort Nelson or Victoria, B.C., and shipped overland to YTC headquarters at Hay River, NWT, where they are assembled and floated.

The company’s latest tug, the Marjory H, was completed this year at Victoria and shipped by the overland route. Like the other three tugs it offers a lot to keep crews happy during

**Member of the crew matches a last few moments with his family**

**Each tug can push three steel oil-carrying barges, line abreast**

**An hour before reaching port, all hands are on deck to ready the equipment**

**To prevent collision in rough weather, barges have to be shaved**
Fuel oil is taken on at Imperial’s Norman Wells refinery, the only one in the north country. A gauge shows how much oil is in the hold.

the seasonal operation: modern cabins, showers, washing machines, refrigerators and goof food.

A crew on the three larger boats consists of eight men, each on watch for eight hours at a stretch. They usually collect most of their pay at the close of navigation, existing on “toberm money” aboard ship.

Senior skipper of the line is Captain Cec Kirkland, with 20 years’ experience on the Mackenzie. He got his master’s papers in 1948, after a tour in the Navy. Cec maintains that navigation on the river is a nightmare at the best of times. A man can only go by instinct. Most of the time there is no need for normal navigational aids. Skippers work through a chain of markers along the shoreline—lined trees, boulders, cabins. The river channels change every season as the ice piles up silt and mud. With luck, says Kirkland, you can make 170 miles a day.

The Cree name for the river means “Big River”, and it’s the only consistent thing about it. It is the largest river in Canada. Its chocolate waters vary from 18 inches to 40 feet in depth; it is peppered with rocks uncomfortably close to the surface; its current ranges from a leisurely trickle to 10 miles per hour; it embraces islands and flows through lakes. At times its banks are so low you can’t tell where the river ends and muskox begins. In other places there are towering cliffs. It is punctuated by four sets of wickedly bubbling rapids.

Under Cec Kirkland on the Martha H, is a young pilot who one day hopes to get his master’s ticket. He is Noel Bouvier, a Slave Indian, with an Irish accent and 16 years’ experience on the river. Also working with Kirkland is Mike Nychyporuk, an apprentice, who is “learning the river” for his mate’s ticket.

Along with the captain, each tug carries a mate, two engineers, three deck hands and a cook. These men sign on for the season. Not long back the Sandy Jane had Russian-born Vadim Straznakov as first engineer. Now a Canadian citizen, this bearded sailor kept the ship rocking with his stories, and ran a serious-long argument with the cook, Martyn Bennett, an Englishman who had once been a cook on the Queen Mary. Vadim has done many things. Once he was on an Arctic expedition, once he managed a troupe of ballet dancers in New York, and during the war he served as a Japanese interpreter.

To break the monotony, which isn’t as bad as on some ocean-going ships because of the changing landscape, the crew members usually read a lot, play cards, strum ukuleles and banjos, or just sleep. A neat line of men’s underwear usually decorates the tugs forward, and occasionally a fishing line aft. Wildlife—

muskox, fox, lynx, muskrat—abounds on the river banks, and not infrequently the tugs have to stop to let a herd of caribou cross their path. Once a bear swam right under the Sandy Jane and came up the other side.

About an hour before each port of call is reached the crew leaves all recreation and the big rush begins. Hoses are connected, the large diesel pumping engines on the barges are started. Deck hands position themselves for work ashore. The moment the barge touches the dock, it’s like an army section going into action. Two men tie up. Another starts ashore with the hose. Another checks the tanks with the local Imperial agent, and soon oil products are flowing into the tanks ashore, sometimes as fast as 12,000 gallons an hour. Often the whole operation is over in one hour and the tug is once more on its way.

Right now, the great river is beginning to come to life again, and the game little tugs and their barges are coming out of winter storage. The season has just begun. The doughy little river craft will work night and day for four months. By that time the fuel tanks at Canada’s outlets will be full. Winter will have set in. The tugs and their crews will disappear for another eight months.
Every year the rugged little outboard is becoming more popular. Eskimos use them to chase walrus and seal and the Chinese attach them to fishing junk. One was even used to power a bathtub.

by JOHN LARGO

They say that recently a fun-loving U.S. citizen clamped an outboard motor to the stern of an old bathtub (with the stopper in) and navigated this cast-iron contraption down part of the Mississippi. And a couple of years ago, an equally enthusiastic but more practical mariner named De Blicquy, piloted an outboard-powered scow about 1,200 miles from Orlando, Ont. to Florida.

Dubbed a “bungehout” because it was half boat and half bungalow, the De Blicquy craft was a husky 32-footer. Powered by a 25-horsepower Johnson, the Betty K put-putted at a comfortable seven or eight miles an hour down the Trent Canal, across stormy Lake Ontario, navigated the various locks of the Erie Canal, slipped down the Hudson river to New York and finally arrived in Florida by a route known as the Inland Waterway. Trouble’s in a while the family dog or one of the crew would fall overboard, or the big houseboat-scrow would make a mud bank, but otherwise it was just a pleasant cruise, thank you.

These two little incidents will help to make a couple of points—one, that the great joy of the outboard is that you can clamp it to one edge of a washbowl and lo, you’ve got a boat and two, that today’s outboard is a highly reliable box of tricks, and a fine piece of engineering. These are also the reasons for the great popularity of this little power package throughout the world, and especially in North America, the home of the outboard. This year it’s estimated that about half a million outboards will be sold in the United States, about 40,000 in Canada. By the end of 1955 there were 4,173,000 outboards in the U.S., some 700,000 in Canada. Each year, recently, has seen 10 percent more outboards sold than the previous year.

The outboard is used all over the world. Much of the barge traffic through the canals of the Netherlands is outboard-powered, as are some Hong Kong fishing junkies. Eskimos of the Bering Sea have taken to attaching outboards to their skin umiaks, for faster pursuit of the walrus and seal.

In Canada, the outboard has helped the airplane open up the north country. Many a pilot, coming down unexpectedly on a northern lake, has clamped his trusty kicker to a pontoon and motorboated his ailing plane to shore, or hulled a passing trapper crossing the lake with his outboard. Inside the Arctic circle, many a missionary goes his rounds with the aid of his outboard. On Hudson Bay, Eskimos chase white whales from big freighter canoes driven by outboards. The Royal Canadian Mounted Police, working sea patrol out of Halifax, carry outboard-driven skiffs on the big patrol boats—for chasing poachers.

One of the longest outboard safaris in Canada occurred in the summer of 1954, when four government men traveled from Waterways, Alta., to Tuktoyaktuk on the Arctic ocean—2,500 miles in a heavily-laden 16-foot boat. They made only one portage, to get past the Rapids of the Drowned on Slave river.

The party was seldom near a garage, but their outboard got them there.

During the devastating Winnipig flood of 1950, only outboard-powered small craft were able to work in the shallow waters that covered city streets, doing most of the jobs usually done by cars—freight in food and medicines, forming police patrols. The same handy little engines pumped out basements using small pumps coupled in place of propellers, a method also used by those who fight forest fires.

All this no doubt would prove astonishing to the inventor of the outboard, but nobody can say for sure who he was. In 1876 a Frenchman named de Sanderal invented a sort of raft, to be held up in the water by four horizontal propellers, with a fifth vertical propeller to push. The poor fellow had nothing but steam engines to work with and they were pretty heavy, so the raft didn’t float too high. In fact, it didn’t float at all. It sank.

Then there was Gottlieb Daimler, of auto fame. William Steinway, the piano man, exhibited one of Daimler’s outboards at the Chicago World’s Fair in 1893. Steinway is said to have built 100 Daimler motors, under license, and sold them during the 1890s.

Near the turn of the century various individuals and firms were working on the outboard problem. In 1896 the American Motor Co. was producing an outboard with most of the major components found in today’s “kickers”—such as steering by a tiller that rotated the propeller—but the company was not commercially long-lived. In 1907, however, Cameron Beach Waterman, of Detroit, secured patents on a water-cooled “outboard”—it was Waterman who coined the name—and sold 3,000 in his first year.

But perhaps the man who made the biggest commercial contribution was the Norwegian-American, Ole Evirude—helped by his remarkable wife, tiny Bess Cary Evirude. A Milwaukee, Wis. maker of patterns for engine castings, Evirude made his first outboard in 1909. When Bess said, “Make it better. That thing looks like a coffee grinder,” Ole, a shy, gentle man, obediently went back to his shop and produced Model II. One Sunday, he lent it to a friend. The friend brought the outboard back on Monday, with orders for 10 more like it, and the Evirudes were in business.
There are, of course, many other brands of outboard. In fact, a North American shopper has his choice of no less than 32 different brands — of which 29 are American-Canadian. There are three British: Anzani, Atco-Villiers and Seagull. A couple of these, Silverwood and Troll-King are battery-operated electric motors, so silent the fish are fooled completely. Two of the motors, the up-to-eight-horsepower Lauseon and the mighty 75-horsepower Riley (about $1,200.00 U.S.) are four-cylinder motors, similar to some auto engines. The others are two-cylinder motors, like the gadget that drives a power lawn mower.

Each type has its advantages. The four-cylinder is more economical, with fuel consumption as low as half that of the two-cylinder. The latter is lighter, with fewer moving parts, and is simpler, although modern outboards are not precisely simple. Ah, but they were simple in the old days. Or were they? To start you merely laid hold of a knob on the flywheel on top of the cast-iron contraption, and spun it and spun it and spun it and — spun it. If you were lucky, you got it started before you sprained your wrist. Then your only problem was to keep it going at its normal nervo-shattering roar. Ignition was by coil-and-battery, but the timing device was crude and there was only one cylinder. If that was missing, the motor was missing. The carburetor, at first, was a sort of valve. It had to be adjusted just right, or the cylinder would either flood with fuel, or starve to death. Still, as Ben Eviradene pointed out, it was better than rowing.

Improvement came gradually at first, then faster. In 1915 came the swirl-mixing motor, so that the motor would tilt up when the underwater portion hit a rock or a swimmer. In 1917 came twin cylinders — more power — and the first use of light aluminum alloys. In 1922 came the "float-feed" carburetor — like the one in your car, or that magical device that controls the rushing waters in the family toilet. This made fuel flow self-regulating; no more hungry motors, cylinders pouting for fuel.

Then, in 1924 (on this continent at least), came racing. As always happens, this improved the breed magnifically. The best speed this year was about 10 miles an hour. Next year, motor makers brought out more powerful units, and the speed hit a dizzy 16 miles an hour. In 1926, outboard-propelled ships broke the 20 miles-an-hour mark. By 1935 they were hitting over 60 miles an hour. In 1954, an outboard-propelled hydroplane did better than 100 miles an hour for the first time.

Of course, this is not the world's water speed record. Donald Campbell, son of England's famed speed king, Sir Malcolm Campbell, rocketed his jet-propelled Bluebird II last November to a fantastic 216.2 mph while the inboard hydroplane record of 178.49 mph in 1952 is still held by Sio-Mo-Ship IV owned by Stanley S. Sayers of Seattle, Wash.

The record for outboards (1936.63 mph, or 3080 ft per sec) is quite fixed because Italian driver Massimo Leto de Prisoli at Milan, Italy, but his motor was not the unit to power the family cabin cruiser. It was a custom Italian unit, a Lenso — four-cylinder, four cylinders and supercharged, like some racing car engines. The Lenso developed an amazing 162-horsepower at 7,000 revolutions per minute. Its cylinder capacity was just over 60 cubic inches. A car engine developing the same power requires almost five times as much fuel-using combustion space.

Does this mean Italy has outstripped the United States in outboards? Not exactly. Italian naval officers hailed for motor torpedo boat duty get their training on small hydroplanes powered by American-made Mercury engines. But European engineers have become most expert at extracting high power out of small engines — due, no doubt, to the high cost of gasoline on that continent.

Getting back to the racing Twenties and Thirties, it was natural that outboard manufacturers should try to outrun each other in the search for more power, greater reliability, more convenient controls - all essential in racing. At the same time, the marine hot-rodders made a few discoveries of their own. The "stock" under-water units — gear-box housing and propeller housing — were causing undue drag, they found. So with hacksaws and files, the engineers improved streamlining.

They also invented remote controls. When you put a fairly heavy engine and a well-muscled driver at one end of a very light, flat-bottomed skiff, the bow goes up in the air and the stern squats. This causes loss of control and speed. So some unknown genius installed an automobile-type steering wheel forward in his bow, ran airplane-type cables through pulleys to swing the tiller to and fro. Somebody else came up with the spring-loaded safety throttle: if the driver is tossed out, the spring closes the throttle, and the man in the water is saved from being run down, at least by his own boat.

Thus today's outboard is almost as simple to operate as a car engine. Even starting can be done electrically. A separate, pressurized tank can hold enough gasoline for a full day's cruising. One firm even supplies an attachment by which the engine bails out the bilges. The modern motor has been quieter considerably. The exhaust is conventionally underwater. Quieter gears are used, and there are air-intake silencers, rubber seals between the engine underpan and the binged hood. Oil companies have kept pace with the improved engines and provide special lubricants and greases done up in screw-topped or specially wired packages.

One development that has brought joy to those in the outboard industry has been the invention of the outboard cruiser. It is a small, craft, up to about 22 feet long, with a forward cabin and most of the comforts of home — bunk, toilet, galley. Prices start at $400 for a "kit" and the most popular class will cost you around $1,200 although you can shell out $5,000 for something special. The advantage of the outboard cruiser against the inboard engine jobs, is chiefly that the outboarder is all boat, no space wasted on engine compartment. Also, the outboard cruiser is usually built light enough to be hauled from the family garage to the lake by trailer behind the family car. As you might expect, families are taking to the water like ducks — it's peaceful, and everybody wants to be a sailor, anyway.

And what of tomorrow? More outboards? Yes. More power? Yes — chiefly because the outboard cruiser is getting bigger; people are finding that 20 feet isn't very big for a boat, and wouldn't it be nice if we had some place to stuff Mother? As the cruisers get bigger, they need more power. This year's biggest Eviradene is a 30-horsepower unit, up five from last year. More outboard marinas? Yes. A marina is a sort of motel-by-the-sea (or lake), where you can park your boat or your trailer, get accessories and repairs, gas up, shop, or go ashore and sleep in a bed that doesn't sway.

Even the Outboard Boating Club of America doesn't know how many there are, but there un-doubtably is a vast market.

And the future? Well, when the first rocket ship lands on our nearest neighbor in space, a couple of the crew will be seen unloading a folding boat. To the scene they'll attach a small motor, then go happily put-putting along the Canals of Mars.
She prefers cars to cookies

In these advanced days when it is not uncommon for a lady to quit her kitchen for such male preserves as the House of Commons or the wrestling ring, an attractive Toronto housewife named Alice Ferguson has won acclaim in the unlikely field of places—behind the steering column of an automobile.

None of the jokes about women drivers—as old as the wheel itself—apply to Alice Ferguson. She is a sports car driver, one of that gay breed of men—and a very few women—who race jazzy autos at breakneck speeds, who talk of double overhead cam and transverse leaf springs, and who delight in whipping their vehicles through driving conditions that would terrify a Wells-Fargo Express rider.

By all accounts, Alice is one of the best. In the last five years, competing mainly against men, she has won a dozen trophies at speed and driving-skill tests in Canada and the U.S. She has hit more than 100 mph in an Austin-Healey and coaxed an ordinary passenger car through a labyrinthine course at 90 mph backwards. Last year, in a 25-mile race at Akron, Ohio, she came fifth in a field of 20, and stole the show from the winner—with the smallest car on the track. She simply cut-jockeyed the bigger cars on hairpin turns. "Alice has the nerves of a cat-burglar," says John Edmonson, founder of Toronto's British Empire Motor Club, to which she belongs. "Nothing ever rattles her."

But nerve alone does not make for good driving, nor longevity. The chief aim of the Canadian Auto Sports Club's 15 locals—total membership about 2,000—is to promote safe driving. (Members are suspended for violations of highway traffic laws.) Here, too, Alice excels. Not long ago Sgt. Charles Pearssall, head of the Toronto Traffic Safety Council, watched her steer confidently through a stiff driving test that many BEMC members had failed.

"If more women—and men—drove like she does," Pearssall remarked, "my job would be a heck of a lot easier."

This whiz on wheels is a pleasant-looking matron of 39 years who, in a big comfortable house in Toronto's Beaches district, cleans, cooks and sees to her two school-age daughters and her husband, Jim.

It is from her attachment for Jim that Alice derives her attachment for motor vehicles. A former professional racing driver, he has taught her how to drive, to build and repair auto engines, to fix flats, to pull out of a skid—everything she knows about cars, in fact, from servicing new models to selling old ones.

Jim Ferguson owns two new and used-car agencies in Toronto, one in the northwestern part of the city, and the other closer to home on Queen street. Each week day morning, after Jim has left for his northern garage, Alice stacks the breakfast dishes, bundles the kids off to school and drives down to the garage on Queen Street. She runs it.
follow a route map that leaps from super-highways to dirt roads to bumpy timber trails in the dark. On such a journey only one car out of 43 got back.

But the stiffest test of both sports cars and driver is the BEMC winter rally, a motor marathon. The winter before last Alice and a friend of hers, Vivian Petura, made up the first all-woman team to enter a BEMC rally, a 1,500-mile, three-day grind along highways and backroads of Ontario and Quebec. Before they started, club officials told them not to feel badly if they couldn't finish, that new ones often didn't. "We were bound we would get through," Mrs. Petura said, "even if we had to come back on the rim."

To discourage speeding, contestants had to report at certain times and places en route. The penalty for arriving one minute late was one point, for arriving a minute early, two points. Starting off on a Friday evening — again in a small car — the two women drove steadily, except for an eight-hour sleep Saturday, until Sunday night. At one stage, while Alice was at the wheel, they ran into a four-hour blizzard in Quebec. While they were struggling through it, Mrs. Petura glanced at Alice and cracked, "This is a silly place for two grown women to be!"

"Sure, it is," said Alice, pushing on.

They got through, but the blizzard defeated 32 male drivers. Later they came upon glare ice and Alice froze three fingers putting on skid chains. Several times they became stuck in snowdrifts. The two women not only finished the grueling course, but they came in 31st in a field of 60.

In sports car circles, unlike ordinary driving circles, there is little built-in prejudice against women drivers. They're invited to compete on an equal footing with the men. The only discrimination Alice Ferguson has suffered was at the hands of professional stock-car racers. On the only occasion when she tried to enter a race at a Toronto track, the male drivers notified the management they wouldn't race against a woman. They said she might get hurt.

In Alice's book, the chief trouble with women drivers is men. "Most husbands," she says, "only let their wives have the car when there are groceries to be picked up. Then they blow up because the poor gal gets flattened in heavy traffic and dents a fender." Alice usually gets in about 25,000 miles of driving a year, more than three times that of the average male motorist.

To do so she has her choice of three vehicles — a $5,000 110s Austin-Heleen, a Berger 170S and a Hillman convertible. Plus, of course, anything from her speed-car lot. Until last year the Fergusons had a Rolls-Royce, too, but they sold it to make a down payment on their new house. The house has a two-car garage, but the cars seldom get inside. It's filled with Jim's motorcycles.

Apart from the British Empire Motor Club and a home-and-school club, Alice belongs to no ladies' groups. "I can't stand tests," she says. It is probably just as well for all concerned. When Alice starts to talk about a neat little number with de-tachable head, synchronized top, removable chest cover and closed bodywork, the other girls would probably think of Dior's latest A-line. Fortunately for conversation's sake, most of the Fergusons' friends are also members of the club and speak the same language.

Naturally, such an example has its own peculiar effect on the Ferguson children. Recently, at school, six-year old Margie was told to draw a picture of anything in the world. What she brought home was a passable reproduction of something she'd seen at Indianapolis, Ind. — a racing car, of course.
A well-worn easy chair near a crackling fireplace, flanked by a diminishing stack of cigars and a radio blaring sports bulletins, is the throne from which a remarkable Canadien rules his fabulous backwoods barony. Close by are some of Quebec's renowned highlands and one of its finest lakes, for this is St. Jovite, 70 miles northwest of Montreal, heart of the Laurentian vacationland, where one comes to ski and swim and fish and hunt and conquer a city disposition.

This is the domain of Frederick Haskell "Tom" Wheeler, by profession an innkeeper, by inclination a sportsman, by consequence a millionaire in physical assets.

The unhurried atmosphere and the idyllic surroundings are deceiving. As founder and proprietor of the country's oldest existing airline, and of fishing and hunting camps nearby, and sprinkled from the shores of James Bay to the Labrador coast, Tom Wheeler, the huxling figure in the slacks, sports shirt, string bow tie and shoulder, is more preoccupied and far busier than his casual manner and unpretentious apparel suggest.

Somewhere in the sub-Arctic wilderness Wheeler's tank planes disgorge thousands of gallons of aviation gasoline to replenish caches. Further north, Wheeler freight planes unload meat and vegetables to feed radar technicians. Over the New Brunswick and Gaspé timberland Wheeler spray planes wage chemical warfare against the spruce budworm. In isolated, odd-sounding places like Cabbage Willows, Seal river, Tugluk lake and Northwest river, Wheeler guests bag the plentiful Blue Goose, pursue the mysterious Arctic char and investigate the legendary land-locked seal.

Wheeler knows what or who they all are, what they hope to do and what they are actually doing. It is a tribute to his well-ordered mind, and his genius in selecting and retaining able deputies that, seemingly without effort and in the retreat he loves best, he can keep a finger firmly on the pulse of such a diverse enterprise. A lesser man might, while nursing ulcers, dominate this activity from a Montreal skyscraper.

An even six feet, 220 well-proportioned pounds, with straight features, outdoor complexion and gray-feckled brown hair, at 63 looking a fit 50, Wheeler walks with a measured, hoping gait and maintains a tranquil demeanor. On occasion he vacates his easy-chair throne to enjoy a flying inspection of his far-flung barony, taking time to explore likely campsites, visit fuel caches, renew acquaintances with friends and squeeze in a few hours' fishing. Such a trip, lasting 23 days, covering some 4,000 miles was made a few years ago. It was a classic of its kind.

Two sturdy, single-engine Norseman floatplanes carrying nine adventurers and their equipment left Wheeler's Lac Ouimet anchorage at St. Jovite and flew in stages to Rupert.

Sunday's supper at Wheeler's Lac Ouimet Club is always brilliant.
House, the Hudson's Bay Co., ancient trading post on James Bay; to the goone hunters' paradise at Cubbage Willows; to Seal river; up the rugged coastline to the top of Hudson Bay; eastward over Hudson strait; on down across Ungava to Chubb Crater, the world's largest known meteoric excavation.

There, the Norsemen became the first aircraft to land inside the crater, on a perfectly round, crystal-clear lake 325 feet deep and two miles in diameter. The travelers had been constantly on the alert for traces, or even promising rumors, of the land-locked seals which legend says abound in some of the obscure glacial pools of the northeast. None was to be found, but in Crater lake, Wheeler and his companions got their fill of Arctic char—a little-known branch of the trout family about which few ichthyologists agree.

After repairing, in ice-cold water, a rock-torn gash in one of the Norseman's pontoons the party returned to Hudson strait at Cape Hopes Advance; to Fort Chimo, an HBC post at the southern end of Ungava bay; to the Labrador iron ore outpost of Kisba lake; to the Atlantic coast near Hopewell; to Goose Bay; over the Saguenay country to Lac Ste. Jean and thence to St. Jovite.

A feature that made this such a noteworthy expedition was that in some of the most desolate country in the world there was always fuel for the Norseman's tanks. At any one time the Wheeler organization has as much as $12,000 worth of aviation gasoline cached in drums along any of the hinterland routes its aircraft are likely to take. It is ordered a year in advance and during the short northern navigation season shipped by Imperial Oil to prescribed points along the coasts of Labrador, Ungava, Hudson and James bays, where it is left in the care of traders or missionaries.

Practically a dock-side, if not a curb service is presently provided at Fort George, Port Harrison, Cape Smith, Clearwater lake, Chimo, Nain, Hopedale, Slova, Chibougamau, Saguia and Cape Hopes Advance. And Wheeler, an Imperial customer from his earliest days, is generous in his praise of these facilities. In no other way, he says, could his bushplane operation have such extended range. His most eloquent testimonial: "I just give Imperial Oil the problem. They solve it.

Tom Wheeler, scion of the Laurentians' best-known family, industrial and political, son of the Roman Catholic dean, presents some curious contradictions. Strictly speaking, his name is not Tom at all. He is a Canadian by adoption. He studied to become a scientist.

Business affairs are discussed comfortably in the Club lounge.

To run his northern air service, Wheeler relies upon Bob Rykhlik, his uncomplaining general manager, who has been with him for three years.

Gray Rocks Inn was established. Most of the original timbers are still standing. The Inn became the Laurentians' first year-round resort, the first to develop Laurentian skiing, the first to engage a skiing professional (a Dr. Wagner from Austria), the first to advertise widely in U.S. newspapers, the first to provide its own golf course. Young Tom was from the start an enthusiastic promoter of skiing. He received his first skis at the age of nine and he and brother Harry were the first to clamber on skis to the top of Mont Tremblant.

World War I gave Tom Wheeler a taste for, and a determination to engage in, flying. He became an aviation cadet in the U.S. Army Corps of Engineers and was sent to Kelly Field, Texas, to master the idiosyncrasies of the venerable Curtiss Jenny, later the founding stone and flagship of Wheeler Airlines. The Armistice cut short his training and he enrolled as a science student at McGill University. He had finished second year when his father became ill and he was summoned home to help conduct the family business.

In 1921, as an experimental adjunct to the successful Inn, Gray Rocks Air Service was formed, with a war-surplus Jenny, a convenient, stump-flotted farm field as an airport and the services of a colorful bush pilot named Herve St. Martin, on whom Tom could practise his admittedly uncontrolled French. At that time the Montreal-St. Jovite highway had not been extended to nearby Lac Ouimet and the rail journey occupied an entire day. Here, Tom reasoned, was a heaven-sent opportunity to increase the Inn's attractions by providing easy air access to faraway trout lakes and ski trails. It was his big chance, too, to get in on the ground floor of Canadian aviation.

By 1926, when Tom assumed control of Gray Rocks on his father's death, both the Inn and its air service were firmly established. The Jenny had been succeeded by an open-cockpit flying boat, the Currius Seagull. There followed an all-metal Junkers, a six-seat Travelair, a Fairchild 71 and a Waco biplane, all of which could be operated on wheels, skis or pontoons. The conscripted pasture, pretentiously licensed as St. Jovite airport, was turf-lapped to provide first-class runways of 3,200 feet.

Spor announces from all parts of Canada and the U.S., including a well-traveled celebrity named Lowell Thomas, became regular guests, sampling the growing number of lakes on which Wheeler had obtained provincial government leases. Some of the country's greatest leisure-time aviation spectacles were witnessed at St. Jovite when for two years the U.S. Sportsmen Pilots Association selected it as a convention site. Every spring, when northern flying was suspended so skis could be exchanged for pontoons, bush pilots by the score made Gray Rocks their temporary headquarters.

Flying activities of the airline were extended to include five patrol over timber stands, aerial photography and aerial restocking of lakes with fingerlings. Wheeler co-operated with the Quebec government in experiments over several years which resulted in the creation of a fish-dropping technique now accepted.

His mother lives at the Club with Tom and his wife and daughter.
ed as standard throughout the world. The mortality rate between hatchery and lake was initially high, so refrigerated oxygen-supplied containers were developed. Extensive tests were made to determine the best altitude and most efficient method to unload until, finally, Wheeler’s Waco aircraft became familiar sights in the lands beyond the highways, reefs, lakes and streams, ensuring good luck to future generations of anglers.

World War II, bringing fuel restrictions and manpower shortages, drastically curtailed operations. But after the war, aircraft and Wheeler experience were in renewed demand. A twin-engine Anson V transport, Norseman and Beaver bushplanes and light Cessnas were purchased. They were equipped with two-way radio, as were the growing number of helo base camps the firm was setting up. Ex-RCAF pilots were hired and indoctrinated into flying northern-style. Plans were made to extend runways to 4,000 feet, to construct a large hangar to house improved repair-and-overhaul facilities, to build a bigger and better seaplane dock with paved ramp. The pre-war network of fuel caches was re-established and expanded.

In 1945, Wheeler established a 30-minute skiers’ service between St. Jovite and Montreal’s Dorval airport, tying in with a U.S. airline’s schedule to bring the Laurentian slopes within three hours’ flying time of New York. He offered an air ambulance service, more than once rushing to a Montreal hospital some unfortunate skier who had been delivered to the Laurentians hours before by the same aircraft.

The airline obtained contracts for control of mosquitoes and blackflies, in spray planes ranging through the resort area. The Anson was sent to Newfoundland to conduct an aerial survey of the Avalon peninsula from the 48th parallel to Cape Bona-vista. Under French government sponsorship it photo-surveyed the coastal islands of St. Pierre and Miquelon. Another Wheeler plane carried a polioymytis research party from Montreal to the village of St. Augustin, 400 miles north of Seven Islands. An expedition of the American Museum of Natural History in New York, anxious to determine whether grizzly bears roamed the eastern shores of Hudson Bay, was flown on a 3,000-mile round trip to Great Whale River. The scientist found no grizzlies, but returned with such lesser species of Arctic life as mice.

In 1946, Gray Rocks Air Service became what, in fact, it had been for so many years: Wheeler Airlines. Its growing fleet was well-supplied with assignments. Private leaseholds were held on more than 80 Laurentian lakes, a mere fraction of the region’s estimated 25,000, but sufficient to keep a floatplane shuttle service busy. Thus there was Cabbage Willows, a permanent camp for goose and duck hunters selected from aerial reconnaissance along salt water marshes on the south-east coast of James Bay, 150 air miles northwest of Moose Factory, and 35 miles from Rupert House, where in the 17th century the French explorer Groseilliers established temporary residence. Previously the area had been accessible only after a long and tedious rail and canoe trip.

Wheeler retired in 1950 from the management of Gray Rocks, retaining 80 percent financial interest, and devoted his energies to the airline, to his smaller Lac Outimet Club and to the string of fishing and hunting camps. In 1952 his aircraft flew a record 274,500 miles. The next year, handsome dividends were returned on his early investment in aerial insect control. He was selected as prime contractor for the New Brunswick “Battle of the Budworm,” the most extensive, most expensive aerial spraying operation ever undertaken anywhere. It involved amassing 77 specially-equipped aircraft and directing them from a half-dozen bulldozed airstrips over hundreds of thousands of acres of timberland under attack by the destructive spruce budworm; a furry little tree-killing caterpillar.

Again in 1954, Wheeler was given the budworm contract, this time providing 58 aircraft. In 1955, the contract was larger than ever, with two million acres in New Brunswick and the Quebec Gaspé to be covered. Wheeler obtained 90 aircraft, including seven newly-purchased ex-U.S. Air Force Stearman biplane sprayers. For weeks, as the fleet built up, St. Jovite airport resembled a World War I fighter field, with rows on row of spray-rigged biplanes awaiting action. Wheeler’s airborne bug fighters will take to the air again this year too.

In the midst of the budworm buildup, another emergency arose. Wheeler, with unscathed experience in northern flying, was invited to become a sub-contractor in freight supplies to Arctic positions of the Distant Early Warning radar line. Cargoes were of a bulk and weight that required heavy, multi-engine aircraft. The largest unit of the Wheeler fleet was a lumbering Canco flying boat, pressed into service in 1954 to carry press representatives covering the Duke of Edinburgh’s Canadian tour. If he lacked the equipment himself, Tom Wheeler knew where it could be found, and in short order arranged to lease from U.S. operators two four-engine Douglas C-54 and nine two-engine Curtiss C-46 transports.

Soon, the augmented Wheeler line was working around the clock on its defense assignment, hauling tractors, QMmelt, cement, food, personnel and aviation gasoline from Mont Joli, P.Q. to the Arctic circle and beyond, landing on makeshift strips carved on the Arctic ocean. A Canco became a flying tanker, making regular 1,300-mile round trips between Churchill and Coral Harbor, draining 720 gallons of high-octane fuel from wing tanks to replenish caches before starting back.

Wheeler Airlines is now in the big business to stay. Its pre-D.E.W. line-up of one Canco, an Anson, seven Stearmans, three Norsemans, three Cessnas and a De Haviland Beaver, was increased by the outright purchase of another Canco, a four-engine Douglas DC-4, a twin-engine Douglas DC-3 and a twin-engine C-46, with other heavy equipment being chartered.

But, though Wheeler Airlines has entered the big-time, Frederick Haskell Wheeler still maintains his friendly, relaxed, informal approach to life. From his easy chair at St. Jovite he appended to the company’s annual report an observation that is as typical of the man now as it was during the Curtis Jenny days of 1921:

“I feel that we owe a lot to the widespread goodwill which has been built up over the years, and I must say that it is awfully gratifying to be engaged in a friendly business”
The route of the Mackenzie’s Tugboat Vikings—story on page 11