

## The Early Years of Bushflying

With the advent of war in 1914, there were few registered pilots in Canada, and even fewer aircraft. Flying was a novelty of the well-to-do, and certainly, the daring.

But over the next five years, young Canadian men would come to comprise almost one-third of the British air services. For many, it was an opportunity to escape the horrors of the trenches – the mud, cold, rats, lice and the ever-ominous threat of a horrible death. It was a chance to take to the pristine blue skies, with the wind in your face and a silk scarf round your neck trailing in the breeze.

But there is little glamour in warfare of any kind. And many paid an exacting price. While the airplanes kept them out of the trenches, it posed its own threats. There were no parachutes. A pilot was strapped into a flimsy, wood-framed, fabric-covered aircraft that was held together with bolts and wire and sealed with layers of flammable dope and paint. In many cases, the fuel tank was directly beneath the seat. Should their worst fear be realized – fire – a pilot had few choices. He could attempt to ride the burning craft to the ground and hope he survived the ultimate crash. He could escape a fiery death by jumping from the aircraft, but without a parachute, the end was not in doubt. Or, he could take out his service revolver and shoot himself. None of the options afforded much hope. It is little wonder that the average lifespan of a WW1 fighter pilot was 17 flying hours.



But many did survive and with the signing of the Armistice in 1918, they headed home to Canada. It has been said that pilots did not work for a living; they just wanted to fly. The end of the war afforded many a continuing opportunity. Surplus training aircraft were plentiful and cheap. The government felt that “the war to end all wars” had been too costly to contemplate the expense of employing idle pilots and their ground crews. Politicians were convinced that war was a thing of the past. There would be no need for an air force.

For \$1200 anybody could pick up a surplus Curtiss JN-4 Canuck and take to the skies. But civilian airfields were few and far between, and most pilots knew little about maintaining the aircraft. Accidents were commonplace, and soon, every small airfield had its boneyard of wrecked and rusted aircraft. It was but a few years to the end of the postwar aviation boom in North America.

It was not until January of 1920 that Canada’s first private pilot’s license was issued, the first air engineer’s certificate signed, and the first commercial aircraft was registered. At the same time, the government granted provisional approval to establish a Canadian air force.

Regimented flying was, of course, not for everybody. The war-torn, embattled skies of Europe had unwittingly give birth to a new era in Canadian history – the era of bushflying. Veterans of aerial combat, and others, were to become the pioneers – the bushpilots.

Nobody can say precisely who the first bush pilot was or when the first bush flight took place, and does it really matter? But we do know that the first purely commercial flight into the northland took

place in October 1920 at Winnipeg, when a fur buyer walked into Canadian Aircraft's downtown office and asked to be flown home to The Pas. That was hundreds of miles to the north over bush, lakes and muskeg. It had never been done, especially in a wheeled aircraft. But it was done and it was a history-making flight. By 1921, Imperial Oil aircraft were exploring the Northwest Territories and reached to within 100 miles of the Arctic Circle.



But of more importance to Northern Ontario is what was taking place in Labrador and Quebec a year earlier. Canada's first aerial survey was completed in Labrador in the summer of 1919 when 15000 aerial photographs were taken of the timberlands leased by the Southern Labrador Pulp & Lumber Co. Inc., of Boston, Massachusetts.

Around the same time, one of the most significant of all early Canadian aircraft operations was taking place in the St. Maurice River Valley, of Quebec.

The St. Maurice Forest Protective Association had arranged the loan of two Curtiss HS-2L Flying Boats from the Canadian government. In June they were flown from Halifax to the operations base at Lac a la Tortue, near Trois-Rivières. The age of bushflying in Canada was imminent. Over the next three summers, these aircraft were employed in transporting personnel, patrolling for forest fires, sketching of timber limits and aerial photography. And one was even used in the making of a mining claim – a Canadian first.

It would not be long before the aircraft would be reaching into the hinterlands of Ontario. On August 17, 1920, Roy Maxwell, a former Royal Air Force captain, accompanied by engineer Geordie Doan made the first flight into James Bay. They flew from Remi Lake, near Kapuskaping, into Moose Factory on an H-Boat. Only 11 days later, this same crew completed the first ambulance flight in northern Canada, flying a gentleman from Moose Factory to Remi Lake. In September, Maxwell completed the first volume carriage of airmail in the country, when he carried 100 pounds of mail into Moose Factory aboard the H-Boat.

The year 1922 is especially memorable for Ontarians. Maxwell and Herve St. Martin made the first winter flight into James Bay, flying an Avro 504K in February. That summer, the Ontario government hired the men and aircraft of Laurentide Air Services, which had been formed out of the original air service of the St. Maurice Forest Protective Association.

The large government contract provided flying work in connection with detailed mapping showing lakes, waterways and forest types. In 1923, Laurentide was awarded all flying required by the provincial government, not only for continued mapping but also for transportation of firefighting personnel, and for forestry patrol. They surveyed 20000 square miles of country as far west as Lake of the Woods, and north as far as James Bay. Twelve aircraft were used. And over that season, 400 forest fires were spotted and reported.

Flying for thrills was rapidly giving way to flying for profits. By 1924, the number of licensed pilots, registered aircraft and flying companies was dwindling. Pilots dropped from 122 to 21, aircraft from 60 of all types to only 32. In 1921, no fewer than 23 private firms had been engaged in flying.

Three years later, there were only eight left. But in 1924, with only half the aircraft flying, freight carried was at more than 77000 pounds, up from 14600 pounds in 1921. And flying hours almost doubled to 4389.

Part of the reason was the fact the Canadian Air Force discontinued any flying operations that could be carried on by private companies. But a major change in the Ontario aviation scene was the creation of the Ontario Provincial Air Service. The Ontario government was convinced of the wisdom of utilizing aircraft to the point it felt it would be advantageous to own and operate its own aviation service.

The new government flying service attracted many of the best pilots and engineers from Laurentide, including Roy Maxwell, who would become the first director.

If any single enterprise, in the years immediately following the war, could be called the "cradle of bushflying", that title would perhaps have to go to the Ontario Provincial Air Service. It was through their ranks, often as fledgling pilots, that passed a high-spirited group of young men who went on to become legends in the annals of Canadian aviation.



The primary base of the OPAS was established at Sault Ste. Marie, where the government constructed a large riverfront maintenance hangar over the winter of 1924. East and west bases were built at Sudbury and Sioux Lookout. Eventually, the OPAS would establish bases all across Northern Ontario. Their first fleet consisted of 13 surplus U.S. Navy HS-2L Flying Boats.

Losing lucrative contracts and key personnel spelled the beginning of the end for Laurentide. In an effort to stay alive, the Laurentide Company established a scheduled air service into the Quebec goldfields between Angliers, Lake Fortune and Rouyn. Later, the main operating base was transferred from Angliers to Haileybury, as the facilities were better. It was the first scheduled air service in Canada.

While the mining and prospecting companies welcomed the service, it was not paying the bills. That fall Laurentide also began regular, scheduled airmail service between Haileybury, Angliers and Rouyn. It was another Canadian first. A less distinctive first was the fact that in November, Canada's first aerial stowaway was discovered on a flight between Angliers and Rouyn. Laurentide purchased two aircraft that would allow them to carry on scheduled winter flying between Larder Lake and Rouyn. One proved to be less than airworthy and the second was lost in a takeoff accident at Larder Lake on January 21, 1925. The activities of the Laurentide Company terminated that year. But their positive impact on Canadian civil aviation would be far reaching for years to come.

The discovery of gold by Lorne and Ray Howey at Red Lake in the summer of 1925 provided the catalyst needed to revise Canada's fledgling aviation services industry. Anxious to get work

underway, they prevailed upon the aircraft and pilots of the OPAS to fly in all the men, supplies and equipment they would need, prior to winter freezeup.

Opportunity attracts opportunist. And with the gold rush at Red Lake, there was another rush forming – the rush to provide needed aviation services. J.V. Elliott of Hamilton formed an air service company, purchasing two JN-4 Canucks and shipping them by rail to Sioux Lookout, where they were assembled and flown to Hudson, Ontario. Red Lake's first air service commenced in March 1926. Meanwhile, Maxwell interested some backers into financing Patricia Airways and Exploration Ltd. Ironically, some of his own aircrews from the OPAS would leave to become the first employees of the new flying venture, which commenced in April. Foremost was pilot Harold "Doc" Oaks.

Back in northeastern Ontario, the demise of Laurentide spelled the birth of Northern Air Service Ltd., which kept up the supply of the Quebec goldfields. Its inaugural flight was May 18, 1925 from Haileybury to Rouyn.



Fortunately for aviation in Canada, a Winnipeg businessman saw the merits and potential of aircraft to serve the remote northland. James Richardson formed Western Canada Airways with its base of operations at Hudson, Ontario. Doc Oaks was the manager. One day, Richardson would be hailed as the father of Canadian aviation.

Up to this point, the development of new aircraft had been somewhat stagnant in North America. Bushflying operations had made do with surplus WW1 aircraft like the lumbering, unreliable H-Boats, Canuck trainers, Avro 504K's, and others. Suitable, rugged bush craft simply were not on the design boards. Similarly, the development of a suitable engine was a holdback.

With the formation of Western Canada Airways came the introduction of a new airplane, the Fokker Universal, complete with the newly developed radial, air-cooled engines. The aircraft had been designed in Germany and built under license in the United States. The engine was designed and built by Pratt & Whitney in the USA. This engine design would be the mainstay of all power plants until the introduction of the turbo props and jets in the 1950's. The high-wing cabin monoplane design became the industry standard until 1932, when low-wing aircraft with retractable undercarriages were introduced. Another innovative development was the introduction of the variable pitch propeller in 1927 by Canadian W. R. Turnbull.

WCA's new Fokkers proved their worth almost immediately. A New York businessman needed financial papers signed by a prospector in the goldfields at Narrow River. A telegram was sent from New York to Doc Oaks at Hudson. He flew to Narrow River and snowshoed to the prospector's cabin. They both hiked back to the airplane, flew to Sioux Lookout and had the papers signed at a local bank. What once would have taken three weeks was done in less than half a day.

The first major undertaking of its kind in northern Canada was the supply of men, machinery and materials to the west coast of Hudson Bay at a place called Fort Churchill. The airlift had to be done in the winter to permit drilling while the ice was in the harbour. The elements would prove a challenge for both man and machine but WCA was up to the task, which included the transportation of 800 pounds of dynamite. In a government report following the completion of the largest Canadian airlift ever, the report indicated "The decision during 1927 as to the selection of Fort Churchill as the ocean terminus of the Hudson Bay railway was made possible by these flights. There has been no more brilliant operation in the history of commercial flying." Shortly afterwards, the company received another large contract to move men and equipment into a new mining development north of Senneterre, Quebec. The north was opening up twelve months of the year.

In the meantime, another associated industry was developing – a Canadian aviation industry. While truly worthwhile aircraft, the Fokkers were not designed for the bush. Fokker-designed skis simply did not hold up to the rough landings on frozen lakes. The Elliott Brothers of Sioux Lookout, Ontario designed and built replacement skis that would be utilized on northern bush planes for many years to come. The design was so good, that Admiral Byrd was to use Elliott Brothers' skis on aircraft for his three expeditions into the Antarctic. Between Oaks and his chief engineer Al Cheesman, they designed an all-weather canvas-covered nose hangar, complete with a small stove for servicing aircraft engines outdoors.

At Montreal, the Vickers Company had built and tested the first commercial aircraft to be built for a civil company – the Vedette. They would go on to design and build many other types.

Shortly after, other companies were assembling aircraft built elsewhere, or manufacturing aircraft under license. DeHavilland Aircraft of Canada Ltd. began operations in a small plant near Toronto in 1928, assembling 62 small, two-seater Gypsy Moths. By the end of 1929, they had enlarged the facility and produced 192 Moths of their own adventure.



The Reid Aircraft Company was established at Montreal in 1928. In 1929, the Fairchild Company built a large aircraft manufacturing plant, also at Montreal. The number of aircraft engine plants in Canada increased to four.

By the end of the 1920's flying in the "southern bush" had become fairly commonplace. Aviation companies looked to the far north, well into the Arctic Circle. By establishing fuel caches at distant points and operating on floats in summer, and skis after freeze up, the utter isolation of the northland had become a thing of the past.

So far we have heard primarily of the exploits of half of the pioneer aircrews – the pilots. But no tale of the early days of bushflying would be complete without fitting tribute to the other half – mechanics or air engineers.

Often unreliable aircraft left the crew sitting on a remote lake miles from anywhere, and of course, without communications. Either the aircraft was made flyable or it was a long hike out of the bush to get help. Sometimes outside assistance was required. It might even mean changing an engine on the spot. Take your pick; in the summer the blackflies would chew you apart, and in winter, the sub-zero temperatures made work very difficult. Simply starting an engine in winter meant a certain procedure had to be followed. At the end of the day, the oil had to be drained from the engine and carried to the nearest shelter. It had to be kept warm overnight, if that was possible. In the morning, it was poured back into the engine. If it was too thick, it had to be heated first while another fire pot was placed under the engine to thaw it out. When the engine failed to start, the process was repeated. And with the days being so short, this was usually done in the early morning darkness to permit the maximum amount of daylight flying.

The early aircraft had few comforts. Even when winter flying commenced, pilots and engineers often sat exposed in open-cockpit planes. Imagine flying at 35 below zero. The wind-chill factor would be horrendous.

In November of 1930, a new Canadian aviation company was formed – Canadian Airways. It was formed by uniting Western Canada Airways with the Aviation Corporation of Canada, and adding the new flying interests of both the CPR and the government-owned CNR. James Richardson was its first president and held controlling shares in the company. By the end of the year, that one company controlled almost all air transport business in Canada.

The continuing development of aircraft meant the introduction of CF-ARM, a German-made Junkers JU52 in November of 1931. This machine remained the largest civil aircraft in the country until 1938. And it was the largest single-engine aircraft in Canada for years after that. It is worth of mention, since it became a common sight all across the country and performed some amazing feats of freight. It aptly earned the nickname “The Flying Boxcar”. No other single aircraft could handle the large, heavy freight items carried by the Junkers. It is little wonder it would be freighting in the Yukon one day, at Sioux Lookout the next day, and somewhere in Quebec shortly after that. Ironically, in 1940 this German-built aircraft played a hand in the war effort against the Nazis. New deposits of aluminum had to be exploited and processed. This required new hydro dams being built. CF-ARM was a leader in moving 3000 tons of freight to a dam construction site in northern Quebec between August 1940 and October 1941. The freight included bulldozers, tractors, a complete sawmill, cement, dynamite, gasoline, fuel oil, a 1600 pound, 20 foot boat, six horses, four oxen and a cow to supply fresh milk to the camp.

But Canada was catching up in aircraft designed for the bush. A prominent machine was the Fairchild Super 71, followed by the Fairchild 82. The Super 71 was the first aircraft designed in Canada for bush operations but since it retained the original US Fairchild 71 wing, it was not completely Canadian.

The Noorduyt Norseman, on the other hand, was completely designed and built in Canada at the Noorduyt plant in Montreal. It was fast, roomy, comfortable and economical. It was capable of operating on wheels, skis or floats and carried ten people. A tribute to its endurance is the fact so many are still flying today. The prototype was flown in November 1935.

It was just about a year before that a couple of brothers in Ontario took an interest in aviation, an interest that still carries a legacy in Northern Ontario. Jack and Chuck Austin had something of a dream when they entered the aviation business in Toronto in March 1934, as Capreol and Austin Air Services. Not too long after, this would change to Austin Airways. Linking northern communities from Sudbury to Hudson Bay was a large part of that dream.

Their first two aircraft were Waco cabin biplanes, CF-AVL and CF-AVN. One of the aircraft arrived with a new feature – a removable panel on the port side behind the cabin facilitated the loading of a stretcher. This aircraft became Canada's first commercial air ambulance. In the coming years it would make numerous trips with ill and injured northern passengers to hospitals in Sudbury and Toronto.



Early on, mining personnel were the main clients of the new air service. Lake Ramsay at Sudbury would become their primary base in 1935 and would remain so for 20 years. The 1936 season featured plenty of large forest fires in northeastern Ontario. Austin's, like several other air service operations, spent considerable time under contract to the Department of Lands and Forests.

Austin's soon established bases at Chapleau, Gogama and Biscotasing, in addition to a summer base at Temagami. Early names that would become legends in Northern Ontario included Phil Sauve, Jim Bell, Rusty Blakey, Jimmy Cairns, Frank Fisher, Frank Russell and Jeff Wyborn.

In 1937, Jack Austin was paying his pilots about \$200 a month and a dollar a flying hour. We often chuckled that they had the slowest planes in the sky. When he changed the bonus system to so much a mile, the planes suddenly seemed to start moving a lot faster.

But regardless of how fast they moved, there was little doubt the Austin aircraft were on the move all over Northern Ontario and beyond. Life in remote native communities like Fort Hope, Ogoki Post and Osnaburgh House took on a new dimension with the arrival of the Austin airplanes. They were not the first in, but they lasted and paid for fish in cash. Fish hauling became a lucrative business. The aircraft also meant a dependable supply line for the communities.

By 1941, they were opening bases in South Porcupine and Nakina. Regular flights into James Bay were soon to follow. It would not be long before the sight of Austin Airways aircraft became a regular feature on both sides of Hudson Bay.

In the ensuing years, Austin's would utilize a number of different types of aircraft, each capable of filling a variety of needs. And there was no shortage of variety in the needs that had to be filled.

### **Development of Waterbombing within the Ontario Provincial Air Service (OPAS)**

In the mid-1940s, a pilot-engineer from the Ontario Provincial Air Service, Carl Crossley, was stationed at the Temagami Base. It was during this time that Crossley hatched the idea that if

military aircraft could carry large loads of bombs against enemy forces, why couldn't civilian aircraft bomb forest fires with loads of water?



Crossley's initial tests involved either an open cockpit biplane or a high-wing Stinson Reliant. In any case, he created an elaborate system of metal tubes, elbows and nipples to get the water from the source into the barrel, while the aircraft was moving along the surface of a lake. These efforts proved less than satisfactory until a firefighter suggested using a fire power pump and hose. While this was an efficient way to get the water into the barrel, dumping it from the air with any degree of accuracy proved disappointing more times than not.

Crossley did not give up, however. He got the idea of taking water directly into the floats. The problem here was that the floats of the day were not baffled or compartmentalized. A pilot attempting this manoeuvre ran the risk of filling the floats too full, and this could spell disaster. The two main problems were that the pilot had no way of knowing how much water was going into the floats, and had no way of dumping the load quickly. There were no hydraulic bomb doors for water load release.

Crossley realized what had to be done and a set of floats was converted based on his detailed drawings. Fitted to a rugged Noorduyn Norseman aircraft, complete with water pickup and bombing controls installed in the cockpit, Crossley was successful in attacking a fire near Temagami in August 1945. While only carrying about 100 gallons of water, which took nine seconds to jettison, Crossley was able to knock the fire down and give fire crews a chance to get in on the ground and put it out.

Crossley's other problem was air service management. They did not share his enthusiasm for the concept. Shortly afterwards, he left the OPAS and tried to market the idea to the federal government. While they listened, little action was taken.

The Air Service though kept up some related experiments. Actual water "bombs" – five gallon waterproof bags of water dumped through the camera hatch of a piston Beaver in the 1940s. Not much success there. And in 1946, the OPAS tried to convert a former twin-engine reconnaissance aircraft, a PBY-5A Canso into a heavy water-bomber. At that time, they were trying to fit it with external tanks. This aircraft was also converted to use as a forest spray plane, and was disposed of a year later.

But Crossley's initial ideas were not forgotten by everyone. Tom Cooke, a former RCAF Canso pilot, and a pilot with the OPAS, firmly believed that Crossley's idea had merit. And he set out to prove it in the 1950s.

The idea of carrying a water-filled tank in the cabin of the aircraft, with the water load exiting through the side doors was quickly scrapped. Then, an engineer named George Gill suggested they try open-top tanks mounted on each float. These roll tanks could be easily filled by simply moving the aircraft rapidly along the surface of the water. A series of cables and pulleys allowed

the pilot to dump the load and the tanks, weighted at the bottom, would automatically right themselves, ready for the next pickup. Success at last!

The first aircraft to be outfitted with the system were the single-engine Beavers, each carrying about 80 gallons of water. Later, similar, larger rollover tanks were developed for the larger piston Otter aircraft, followed by the building of a single 210-gallon belly tank.

In the summer of 1957, Cooke got his chance at a fire in the Sudbury district. Using a lone Otter equipped with roll tanks, he was able to hold a strip of fire about one mile long until the ground crews could get in and get their firefighting equipment set up. It was later conceded that without aerial waterbombing, the fire would have quickly grown into unmanageable proportions.

The advent of the more powerful Turbo Beaver aircraft in 1965 led the Air Service back to the idea of taking water directly into the floats. In collaborations with Field Aviation, this original 1944 idea was perfected, and later adapted to all OPAS aircraft. Carl Crossley's dream of aerial firefighting through waterbombing had come full circle.

### **A History of Firefighting Techniques in Ontario**



Forests – a traditional resource and one that is a key to our future, cover more than 85% of Ontario's land area. Fire is a natural element in the renewal of that forest. It is as much a part of the ecosystem as sunlight and water. It has played a part in the growth, the shaping, and the environment of much of Ontario and a number of northern communities.

Although historically people have utilized fire in a beneficial but minor capacity, generally, wildfire was perceived a destroyer. It will always have that capability in our forests. However, fire management is showing us that fire can be beneficial under strictly implemented guidelines and controlled circumstances, and when it forms part of an integrated land and resource management program. One of the roles of the Aviation and Fire Management Program is to protect the forest resource for the benefit of all Ontarians.

During World War 2, several pilots of the Provincial Air Service got the idea of bombing forest fires with water from the air. Initial tests in the Lake Temagami area by pilot Carl Crossley, using an open cockpit biplane, proved that it could be done but the details had to be worked out. Crossley then worked on a system to pick up and carry water inside the floats or pontoons. The problem of picking up water, keeping the aircraft afloat and dumping the water, proved formidable tasks, not to mention the management, which felt that such tests were a waste of time.

A few years later, the air service attempted to show that small fires could be bombed from the air by dropping five gallon bags of water held in waterproof paper bags, each weighing about 50 pounds. The salvos were relatively small and ineffective. In some cases, the bags, bursting open when hitting the ground or a tree, would spread burning embers farther. And accidents can

happen. It was reported that during early tests here in Sault Ste. Marie, pilot Reg Parsons took off on the St. Mary's River with a load of the water bags. While in the process of turning around over the Michigan Sault, the apparatus holding the bags on the rollers let go and Parsons inadvertently bombed the neighbouring city, dropping exploding bags of water down the main street. Fortunately, nobody was injured and our American neighbours did not retaliate. In another test, pilot George Beauchene, with a flair for accuracy on a test bomb run on the river, hit the target dead on and put a 50 pound bag right through the floating raft. Although the tests were abandoned, again the air service was on the right track.

It was not until the early 1950s that Crossley's ideas were revived. Successful tests were concluded utilizing the roll tanks, which were mounted on top of the floats of the Beaver and Otter aircraft. Later on, a larger tank suspended beneath the belly of an Otter was also utilized. In the late 1950s, a piston Otter outfitted with roll tanks on the floats, successfully attacked and held a new forest fire in check in the Sudbury District, until ground crews were able to get to the site and extinguish the fire. Waterbombing forest fires had come of age.

The twin roll tanks on Beaver OBS carry a total of about 80 gallons. Metal probes sticking into the water are the means by which the tanks are filled. When the aircraft speed up along the surface of the lake or river, water is forced up through the probes and spills into the roll tanks. When the tanks are full, the pilot lifts off. Once over his target, he activates a switch which rolls both open top tanks inward, dumping the load of water on the fire. The tanks then roll upright by themselves, empty and ready to go again. The air service, with assistance from Field Aviation in Toronto, was leading the world in developing a new way to combat forest fires.

But the pioneering ideas of Carl Crossley were to come full circle. The air service rekindled Crossley's ideas of carrying water inside the floats of the aircraft. The main problem had been in getting water out of the floats quickly enough to make a profound impact on the fire. What they came up with were hydraulically operated bomb bay doors, much like those used on conventional World War 2 bombers. But these doors had to be absolutely watertight.

Before long, piston Otter aircraft were being equipped with the successful bombing floats, and were being utilized to fight forest fires all over Ontario, and were even called to other parts of Canada to help out. Ontario no longer has piston Otters with water bombing capability, but the successor to this very successful initiative, the DeHavilland Twin Otter, demonstrated the capabilities of the in-float water bombing system.

The turbine-driven Twin Otter can carry 13 passengers and has a top speed of 260 km/hour. But during water bombing, no passengers are permitted aboard the aircraft. The Twin Otter delivers a load of 1800 litres of water in a single drop. Six of these aircraft are flying for the Ministry of Natural Resources, with five of them equipped with bombing floats.

The Twin Otter, unlike earlier floatplanes, does not have water rudders at the ends of its floats, which the pilot would use to steer the aircraft while taxiing on the water. Instead the pilot controls the movements of this plane utilizing the variable pitch propellers on the turbine engines. In this way, he makes the aircraft go straight ahead, left or right and can even back up. Such manoeuvrability is extremely important, when pilots are attempting to steer aircraft into shore on a remote bush lake where there are rocks, overhanging trees and nobody to assist.

The mainstay of the waterbombing fleet is the Canadair CL-215. This all-Canadian aircraft is manufactured by Canadair in Montreal and is the only aircraft in the world designed and built specifically for waterbombing forest fires. The Ministry of Natural Resources maintains and operates a fleet of nine CL-215s, five that it owns and four that are leased from the federal government. A number of other provinces also fly the 215s, as do countries like France, Spain, the former Yugoslavia and Malaysia.

This amphibious machine is powered by twin Pratt & Whitney R2800 piston engines, each with a capability of 2100 hp. The CL-215 can pick up 5455 litres of water, or six tonnes, in less than 10 seconds and requires less than a mile to do so. The cruise speed with a load of water is 241 km/hour, while the maximum flying speed is 270 km/hour. The aircraft flies for about four hours while on a long distance ferrying flight. It is crewed by a captain and co-pilot at all times during flight.

The 5455-litre waterbombing load is dropped from two bomb bay doors. Both doors can be opened at once, dropping the full load, or the crew can elect to drop the load in two separate parts over a longer line of fire.

When working a forest fire, the CL-215 crews often work under adverse conditions – heavy smoke, turbulence caused by heat from the fire, low altitude flying and other air traffic in the area. But safety is paramount. A bird dog officer in a twin-engined aircraft is in complete charge of all aircraft in that air space. The bird dog directs the heavy water bombers to where the water should be dropped and controls the movements of all aircraft, including helicopters. Forest fire crews on the ground maintain close radio contact with the bombers. When a bomber is making a run, fire crews clamp off their hoses and move away from the fire perimeter to be bombed. Six tonnes of water dropped from 120 feet at 240 km/hour is capable of snapping off trees and scattering them around like matchsticks. Anybody on the ground accidentally hit by the bomb load could be badly hurt.

But all the water-bombers in the world do not put out forest fires. The bombers hold the spread of fire in check, until such time as ground fire crews could get in, set up and attack the fire using power pumps and hand tools.

But whatever did we do before the advent of the water-bombers, helicopters and computer equipment? We still had to fight fires in Ontario, and the backbone of the firefighting effort was, as it is today, the unit fire crew. Once a fire was reported, time was of the essence.

The smaller a fire on initial attack, the easier it is to put out – that's something that does not change. And so, the Ontario Department of Lands and Forests would swing into action. Crews would be dispatched by truck, boat, railway motor car and yes, even canoe, if necessary.

They were undoubtedly paid more in 1942, but in 1933 firefighters in Ontario were getting 10 cents an hour while working on forest fires. As usual, they were well fed. It was the type of work that gives you a hearty appetite, and if you were going to work hard, you had to eat well. The camp cook was one of the most important men in the fire organization and you always stayed on his good side.

The development of firefighting techniques in Ontario has steadily progressed over the years, but the concept of effective initial attack remains. The only difference is that we are now able to detect and get to fires even more quickly. Today's fire crews can still be dispatched by boat, truck and railway motor car but more often than not, they rely on fixed wing aircraft but mainly on the helicopter. A helicopter is capable of putting a crew down very close to the fire, or the nearest water source; the crew would otherwise be lost if they first had to walk a mile or more through the bush with all their heavy gear. And the bird's eye view of the fire and the surrounding terrain allow the crew to plan his strategy of attack before they get in on the ground.

## WORKSHEET

### **A/ The Early Years of Bushflying**

1. Why did many men join the air force instead of the army in 1914?
  
2. What was the first commercial flight into northern Ontario? When did this happen?
  
3. Why was Roy Maxwell an important person in the world of bushflying?
  - i)
  - ii)
  - iii)
  
4. What organization is known as the “cradle of bushflying”?
  
5. a) What are 2 differences between the Fokker Universal and the H-boat?  
  
b) What was one thing that made the Fokker Universal a poor Bushplane?
  
6. What was the first 100% Canadian Bushplane?

### **B/The Development of Waterbombing within the OPAS**

1. Who was the first person to have the idea of waterbombing?
  
2. What were two problems Crossley came across when trying to design water tanks inside the floats?
  
3. Crossley had some success in 1945. What happened?
  
4. Who continued on Crossley’s project after he left the OPAS?

## **C/ Firefighting Techniques in Ontario**

1. In early tests, 50-pound bags of water were dropped on fires to put them out, but sometimes this plan backfired. How?
2. Reg Parsons surprised the residents of Sault Ste. Marie, Michigan one day when running water-bombing tests. How?
3. What 2 kinds of planes, named after Canadian animals, were first outfitted with roll tanks?
4. What aircraft was the first to be designed specifically for water bombing?
5. Despite all this technology, what is still the best resource for forest fire fighting?

## **Answers...**

### **A/Early Years...**

1. The air force provided an opportunity to escape the horrors of trench warfare.
2. The first purely commercial flight into the northland took place in October 1920 at Winnipeg, when a fur buyer walked into Canadian Aircraft's downtown office and asked to be flown home to The Pas.
3. 3 reasons Roy Maxwell is important (here are 4 examples):
  - a. first flight into James Bay
  - b. first ambulance flight
  - c. first air mail transport
  - d. first director of the OPAS
4. The Ontario Provincial Air Service (OPAS)
5. Fokker had a radial, air-cooled engine (more reliable than any designed thus far); high-wing cabin monoplane in Fokker; disadvantage: Fokker skis were not tough enough for rough landings on frozen lakes
6. Noorduyn Norseman

### **B/Development of Water Bombing...**

1. Carl Crossley
2. 2 problems: the pilot had no way of knowing how much water was going into the floats; had no way of dumping the load quickly
3. While attacking a fire near Temagami, Crossley was able to knock the fire back and hold it until fire crews arrived
4. Tom Cooke

### **C/Firefighting Techniques**

1. When the bags burst open, sometimes they would spread burning embers even farther into the forest.
2. He dropped the bags of water accidentally along the main street of Soo Michigan.
3. The Beaver & the Otter
4. The Canadair CL-215
5. Ground Crews (people)!