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Oral History Project  
Canadian Meteorological Service

PATRICK D. MCTAGGART-COWAN

Interviewed by D.W. Phillips  
October 5, 1983

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Transcription approved by P.D. McT-C \_\_\_\_\_

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## ORAL HISTORY PROJECT

### An Interview with Dr. Patrick D. McTaggart-Cowan

This is another in a series of personal interviews with outstanding figures in Canadian meteorology, as part of the Oral History Project of the Canadian Meteorological Service. Today is October 5, 1983, and I have the privilege of interviewing Dr. Patrick D. McTaggart-Cowan, at the McTaggart-Cowan home near Bracebridge, Ontario. The interviewer is David W. Phillips (DWP).

Patrick D. McTaggart-Cowan was born in Edinburgh, Scotland in 1912, and emigrated with his parents to Vancouver, British Columbia in 1913. He attended school in North Vancouver, graduating from the University of British Columbia with an Honours degree in mathematics and physics in 1933, and the following year proceeded to Oxford University as a Rhodes Scholar, receiving a second BA Honours degree in natural science in 1936. At this point he accepted a position with the Canadian Meteorological Service. Before taking up his first position as officer-in-charge of the Meteorological Service in Newfoundland, he went through several weeks of training at Croydon, London's main airport. It was during his time in Newfoundland that the feasibility of passenger carrying trans-Atlantic aviation flights was being tested.

With the outbreak of World War 2, he became chief meteorological officer for the newly-constituted Royal Air Force Ferry Command at Dorval in Montréal. For a short time after the war, he was secretary for air navigation in the Provisional International Civil Aviation Organization, where he was instrumental in designing procedures for post war trans-Atlantic civil aviation operations.

In 1946, he came to meteorological headquarters in Toronto, as Assistant Director and Chief of the Forecast Services Division. Upon the retirement of Andrew Thomson in 1959, Dr. McTaggart-Cowan became Controller of the Service, the position he retained until 1964. In that year, he left the Service to take up the challenge of founding president of Simon Fraser University in Burnaby, British Columbia, a position he held for five years.

In 1968 he became Executive Director of the Science Council of Canada in Ottawa, and it was during his time as head of the Council that Dr. McTaggart-Cowan was asked by the Minister of Transport to direct the Task Force Operation Oil to clean-up the Arrow oil spill in Nova Scotia. In 1975, after 40 full years of government and education service, D. McTaggart-Cowan retired to his home in Bracebridge, Ontario.

Among the many medals and honours that he has received, are Member of the Order of the British Empire in 1944 for his services with the

Royal Air Force Ferry Command, the Coronation Medal in 1953, the Patterson Medal in 1965 for outstanding service to Canadian meteorology, the Centennial medal in 1967 and Officer of the Order of Canada in 1979. Meteorological societies in Canada and the United States have bestowed several awards on him and he has received seven honorary doctorates.

With the World Meteorological Organization, he was a member of the technical commissions for Synoptic Meteorology and Aeronautical Meteorology, was a member of Executive Council and was president of Regional Association IV - North America. Throughout his career in Toronto, Vancouver and Ottawa, he has been active in several clubs, in organizations, and is a professional member and fellow in a dozen or more scientific societies.

In retirement Dr. McTaggart-Cowan has become active locally with the Bracebridge Agriculture Society and nationally with an environmental quality committee of the National Research Council, on the board of directors of John Wiley & Sons, Canada Ltd., Publishers and a member of the selection committee for the Royal Bank Award.

**DWP:** **Dr. McTaggart-Cowan that is a very short biographical sketch. Are there any errors you wish to correct or any other information you wish to add at this time?**

**McT-C:** My activities are two-fold. I am vice-president of the Bracebridge Agriculture Society and I am a non-viable farmer. I was founding president of the Muskoka-Parry Sound Beekeepers Association because my cash crop is honey, which is a good field to be in because there is no marketing board. I can produce as much as I want, and sell it at whatever price I wish because there is a ready market for it.

Regarding the environmental committee I am on, it is an associate committee of the National Research Council and it glories in the horrible name of the Associate Committee for Scientific Criteria on Environmental Quality. It's a typical Ottawa name, you have to take a deep breath before you start. I had been on that for two or three years before I retired. They invited me on and then they invited me to stay on. It is one of the most active Associate Committees in the National Research Council, dealing specifically with the cause and effect relations between any environmental pollutant we choose to study, from pollution in the atmosphere to mercury and aluminum in the ground and pesticides used in agriculture. We publish criteria documents that try to set out what we know and what we don't know about the cause-effect relationship, the dose response and any threshold values that have been substantiated. I got out of all the other Ottawa committees because I felt that they were a waste of time but this committee does an excellent job and has a

dedicated staff of scientists on the payroll of NRC but working full-time for the committee. We have our own budget so that we can do things when we want.

The other item that I wanted to mention: you said I had a few weeks of school at Croydon (1936), that wasn't quite accurate. There was the Quebec Agreement between Canada, U.S., U.K. and Newfoundland on how the experimental trans-Atlantic flights scheduled to start in 1937 were going to be carried out. As a result of that agreement, Canada naturally said that they would take care of all responsibilities regarding communication, air traffic control and meteorology within Canadian territory; the U.S. and the U.K. similarly.

The problem was Newfoundland because at that time they were bankrupt and governed by a Commissioner sent out from Britain. It was quite clear that Newfoundland itself couldn't contribute even though it was in the strategic position to be the western terminus of the main Atlantic crossing. Canada said that they would provide the meteorological service. Britain undertook to do the control and communication services and to build the airport at Gander and the flying boat base at Botwood.

John Patterson was party to this agreement and had to establish a full-fledged meteorological service in Newfoundland. He sent Archibald and Jacobson to pick the network of observing stations, largely lighthouses. Before that time, there was an observing station at Cape Race and another at the Straits of Belle Isle for storm warnings.

Patterson hired me (I was just coming down from Oxford at the time). He sent me to Croydon to participate in a group, led by Mr. Entwhistle, which was writing the green paper for the British Government to prove that the Atlantic could be flown. When I joined them it was obvious that I knew nothing about meteorology because no university gave courses in meteorology at that time. The in-house leader of the group, S.P. Peters, who later became Deputy Director of the British Meteorological Service, told me which papers to read: Brunt's book had just been published, and the papers from the Norwegian school were available, Bjerknes et.al., and the Swedish papers. I was learning how to plot and draw weather maps.

**DWP:** You may be the last of the self-taught meteorologists.

**McT-C:** Well I am one of them. Some of the British are still around. Peters is still alive though he is retired and Pat Meade, who was the third member of the team, has just retired. He went to Hythe in southern England and Peters went to Foynes.

Another member, Portas went down in the Atlantic with those two old freighters which were converted into British weather ships. They were the forerunners of the American Coast Guard cutters which did weather ship service in the latter part of World War II.

Another member of the team was Arthur Davies. He was based at Croydon as a member of the team but his contribution was to make as many passages as he could across the Atlantic on a slow freighter to take weather observations. He made almost a dozen crossings in two years, sea sick the whole time. He learned a lot because he was a trained meteorologist taking pilot balloon observations and recording what he saw and what he thought was happening from single station observations. My training in meteorology was incidental to this main writing of the green paper. It was undertaken simply because Peters thought I was a trained meteorologist until I had told him otherwise.

**DWP:** Did you have any interest in meteorology before you went over to Oxford?

**McT-C:** No, I had never thought of it during my undergraduate work. In fact, when I decided not to seek an advanced degree at Oxford, I was therefore looking for a job. I had two offers - to join the Canadian weather service and ultimately end up in Newfoundland, or to go out to join Dr. Plaskett at the Dominion Astrophysical Observatory in Victoria becoming an astronomer. I knew Dr. Plaskett and it was an appealing offer but I chose the meteorological service simply because I knew nothing about it. If I went with Dr. Plaskett I knew exactly what I would be doing for the rest of my life. It was too predictable. It wasn't a choice based on science at all.

**DWP:** Did Dr. Patterson hire you?

**McT-C:** Yes.

**DWP:** Without interviewing you, he was in Toronto and you were in Oxford?

**McT-C:** Yes, that is right.

**DWP:** Was there any meteorology in your program at Oxford?

**McT-C:** None. I took what was then called quantum mechanics, which is now central to nuclear physics. It had nothing to do with meteorology at all.

**DWP:** When you arrived in Newfoundland, how did your training compare to that received by your Canadian compatriots before they arrived?

McT-C: Their basic meteorological training was from the early University of Toronto course. They had been looking at North America alone, whereas I had been studying the Atlantic intensely with the Croydon group. I had an advantage in understanding the marine climate and Europe and they had an advantage in understanding the continental climate of North America. When you combined it, the experience was complementary.

DWP: You left England in December 1936 and arrived in Newfoundland in March of 1937. Were you in Toronto in the intervening months?

McT-C: Yes, just getting to know the bureaucracy, and to meet Dr. Patterson and Dr. Thomson. I analyzed the Atlantic every day and gave a briefing on it. I tried to get more Canadian meteorologists looking at the Atlantic.

DWP: Was the Newfoundland posting what you might call a prize posting or was it less desirable, like being sent to Resolute?

McT-C: I was hired to go there. There wasn't a choice. Nobody knew really very much about it.

I remember C.P. Edwards was the Deputy Minister of Transport and C.D. Howe was the Minister. They didn't have a clue as to how much I would have to pay Newfoundlanders. Civil Service rules didn't apply because it wasn't part of Canada. They just said don't waste money, but pay what you have to pay.

I don't remember what I had to pay, it wasn't very much because Newfoundland was in desperate straits. There was real poverty. I was able to get the pick of the young people graduating from what is now Memorial University. It was then called Memorial College, a high school. I was able to recruit the technicians from Memorial College because no other jobs existed. They were quite happy to work seven days a week. There were no doctors so illness was forbidden. They were a marvelous group.

I don't remember what I paid them but I know that I was earning \$1,750 a year. I was well paid by Newfoundland standards.

We discovered that no tax agreement existed between Canada and Newfoundland. I suffered double taxation. I was unable to change that until I returned to Canada and put some pressure on the Government. Those who came after me escaped double taxation.

DWP: Was there any trouble from Newfoundland authorities over hiring foreigners to do local jobs?

McT-C: The press in St. John's was hostile because it felt that foreign Canadians were coming in and taking high-paying jobs with me. They were seeing the same thing on the control and communications side, the top people were British. I had to meet with some of the key people in St. John's, with the publishers of the newspapers, and with Joey Smallwood, who had the main radio program, to inform them that I was going to hire Newfoundlanders for every job that we possibly could. However, none of them had the necessary background of a university degree, to qualify for meteorological training in Toronto.

DWP: **Who were the other key people in opening the Newfoundland stations?**

McT-C: I don't remember the exact order in which they came and it is impossible to get those data now because Bindon, bless his heart, when he took over from me at Gander, decided to house clean. I had a complete set of files covering all the early days and a file on each of the experimental flights but he threw the whole lot in the furnace, and didn't tell me until after. Getting angry didn't bring them back to life. Peters kept another complete set of files over at Foynes because we knew history was being made. He took them back to London after the war broke out but they were destroyed in a bombing raid. So there are now no records. His was unavoidable, the Canadian one was avoidable.

DWP: **I've seen photographs of you walking out to the sea with your weather maps about to board one of the early aircraft.**

McT-C: Oh yes, we used to go aboard. After the crossing they always night-stopped because of nervous exhaustion and after an 8 to 12 hour flight the crew was tired. They would come ashore and bunk in with us.

Quite apart from that, I already knew most of the pilots because they were the cream of Imperial Airways pilots who flew out of Croydon. That experience with Croydon, which was Dr. Patterson's decision, became very valuable.

DWP: **Who were the other key people in opening the Newfoundland stations?**

McT-C: H.H. Bindon was in Newfoundland ahead of me to start a daily upper air flight based at Norris Arm (across the bay from Botwood) and using an old Fox moth. Andrew Thomson accompanied me to ensure that I got properly established. He nearly died there when, getting out of bed one morning, he barked his shin and got blood poisoning in his leg. We shipped him out in poor condition to Toronto and the doctors there treated him.

Reg Noble arrived shortly after I did. Gib Henry was the next, then Reg went to Halifax, or was it Boucherville (which was the Montreal flying boat base where the C-class boats went).

In 1937 and 1938 the experimental flights took place and were highly successful. In December 1938 we moved the main forecast office to Gander. Up to that time we had been at Botwood. We moved it to Gander because the wheeled airplanes were supposed to start flying in the summer of 1939. The C-class and other flying boats were to continue the experiments, so we in effect had to operate two forecast offices.

We had no facsimile or teletype so the reports had to be relayed by radio over to Botwood. We ran a twenty-four hour service from there until the flight was either past the point of no return over the Atlantic, or control handed over to New York or Boucherville. That continued after war broke out because the flying boats continued to shuttle to and fro. The Americans terminated their flights at Foynes because they were neutral. The British continued through to Hythe because it was the one way to shuttle important people across the Atlantic for war or peace conferences.

**DWP:** What was done during the winter when the flights did not take place?

**McT-C:** I would make a pilgrimage back to Toronto to report to Dr. Patterson and to Dr. Thomson on where I thought the thing was going. We maintained a full set of weather maps and made forecasts because we knew the land planes were scheduled to come on. The flying boats had to stop when the water and the air got sufficiently cold that spray froze on their wings during takeoff. Their propellers threw up a lot of spray which froze on the wing.

The winters were spent improving our knowledge of winter weather: how to forecast it, training the staff and visiting observing stations that had problems. When we began forecasting at Botwood we offered public weather forecasts for Newfoundland taking over from Toronto all marine forecasting for the seas around Newfoundland 12 months a year.

We started some industrial forecasting. I remember the Bowater Pulp and Paper Company in Cornerbrook had a bad problem with frazil ice. We were able to tell them how it formed. We gave them a special forecast during the cold part of the year so that they could cope with the problem and avoid having the mill shut down. It wasn't part of the agreement with Newfoundland but it was darn good P.R.



DWP: Some early applied meteorology.

It has been said that much of the development work for opening the offices or running them at Botwood, Gander and Halifax was done on an ad-hoc basis, you made up the rules and the procedures as you went along. Did you get much direction from Toronto during those years?

McT-C: None. There was no one in Toronto who knew anything about the Atlantic. Administratively, yes. I reported to Andrew Thomson and any advice he thought I needed or I thought I needed I got, and the same with Dr. Patterson. But as far as the procedures go, they were based on what we had worked out in Croydon, because I was there from June to December in 1936. During that time we reached agreement on the procedures for setting out the forecast and exchanging terminal forecasts, we had radio contact but not voice contact across the Atlantic. All of us at this Croydon group knew how we are going to start and then as we worked with the crew, Peters and I were able to refine the procedures on the basis of experience and crew reaction. It was a very deliberate process and one that was based on initial set of agreements. That continued right into the war years.

When Ferry Command was set up, there was a unified command. All the bases on both sides of the Atlantic came under Sir Fredrick Bowhill. When the Americans started delivering aircraft in substantial numbers, after Pearl Harbour, General George was the Commander in Chief of the USAAF Transport Command. He and Sir Fredrick Bowhill decided that unified procedures were still necessary. They set up what they call the Joint Control Committee, which consisted of one communications officer, one operations officer, and one meteorologist from each command. I was the meteorologist from R.A.F. and Arthur Merrywether for the USAF. Before the war he was chief meteorologist for American Airlines and became command meteorologist at Air Transport Command. We continued to refine the procedures adjusting them for mass delivery rather than single experimental flights.

When the war was nearing its end, we knew that there was going to be an explosion of civil aviation all over the world because we had opened up air routes everywhere for delivering aircraft. The Chicago conference in 1944 drafted the ICAO convention and produced practices and procedures for communication for air traffic control and meteorology. The meteorological procedures were written by Bob Craig of the U.S. Weather Bureau and myself in a month at the Stevens Hotel in Chicago. These became the basis on which ICAO has continued to improve and expand.

DWP: What were your thoughts and those of your colleagues in the Fall of 1939, when war broke out, about the future of trans-Atlantic aviation? Did you think that the war might kill it or did this idea of the ferrying of aircraft come up almost immediately?

McT-C: No, there was a major difference of opinion between the British and Canadian Governments and ourselves. (Ourselves being H.L. Pattison, the R.A.F. squadron leader, who was the senior Operations Officer in Newfoundland, Feaver a very fine communications officer from Britain; and myself.) The three of us were convinced that flying the Atlantic was going to be critical in the war.

But in the late fall of 1939 we received instructions from our two governments that we were to wind down the operation at Gander and Botwood, and mine the runways so that they could be blown up if the Germans tried to use them. I was to work out a care and maintenance met staff that would just keep some observational records and look after the equipment. We dragged our feet. We sent in, quite deliberately, incomplete interim reports and refused to carry out orders.

In the spring of 1940 there was a sudden awakening. The R.C.A.F. was first because they had some old Digby bombers they were using for anti-submarine control. Those bombers didn't have enough range to cover the Newfoundland coast out of Halifax, so they said they wanted to use Gander Airport to extend their range for anti-submarine patrol.

As luck would have it, the pilot of the Cambria, the second British flight, was Taffy Powell. Wilcox and Caledonia was the first Atlantic crossing by the British. Powell was another one of the pilots whom I met at Croydon. And who should turn up as the senior officer of 10BR Squadron RCAF but Taffy Powell. He had arrived to see about using Gander for these 10BR people. He was Air Operations Officer at RCAF Halifax at that time.

We got our heads together and he saw immediately that we were right and the governments were wrong. We had a friend in higher places (Beaverbrook) and it wasn't long after that when Beaverbrook said that the losses of shipping aircraft on freighters was too high and that we had better start flying them. Even if we lost every second one it was still going to be worth it.

Taffy Powell was loaned from the RCAF to Canadian Pacific Air Services. I believe that they were the first to start organizing the flights across the Atlantic. He appeared in that role later as the Senior Air Operations Officer for RAF Ferry Command, stationed initially in Gander. It was he and I, working together, who determined whether the pilots would fly or not. I could describe to

him what I thought was going on in the weather and he had the authority to say go or no go. When he moved back to Command Headquarters in Montréal, it wasn't long before he arranged with Dr. Patterson that I should be seconded to the R.A.F.

DWP: In a Zephyr article about the Nazi automatic weather station, you said: "If we want to remember war operations in the North Atlantic, why not recall the building of Goose Bay Airport. It was a feat all Canadians should be proud of." Is this a story for Canadian history that should be told?

McT-C: Yes, it is. Again I think the key figure in the decision was Taffy Powell because he knew the Atlantic and he knew how to get the weather information from me because we were close friends. He was convinced that the shorter-range aircraft had to be ferried. He could see Gander becoming saturated. The decision that we needed an airport in Labrador and southern Greenland was shared by the Americans (who were then coming into the war). There was already one being built by the Americans at Reykjavik in Iceland, which would give us the short stepping stones. The Americans said they could build Goose in a couple of years, but the Canadian decision, also shared by Lord Beaverbrook, was that, it had to be done, right away, fast. The Canadians said that they would build it and started immediately. They loaded a lot of equipment and lumber on seven freighters in the summer to go soon because the navigation season was coming to an end. There was some leakage out of Montréal and the German U-boats got four of the freighters. Fortunately the sawmill equipment did arrive but all the lumber was lost. There were good stands of timber in the Goose area.

A frantic search was made for a fellow who knew how to run a small sawmill. The man who was given the job was the farmer who has the next farm to us here and who died just a few years ago, Harold Moore. The Moores are one of the oldest families here. They ran a small sawmill at Falkenburg, just north of here. He was sent up to Goose to cut all the lumber for the first stage of construction. It was a remarkable feat of construction with minimal amount of equipment and a lot of ingenuity, and it opened right on time.

The selection of the base in Greenland was done by D.C.T. Bennett who was also one of the early Imperial Airways pilots. He was remembered best perhaps for two things: one, he wrote what for many years was the best book on air navigation - he was a pilot, a navigator, radio operator and an aeronautical engineer. He also flew the top half of the MAYO Composite aircraft.

DWP: What is the MAYO Composite aircraft?

McT-C: To speed the mail across the Atlantic they would lift a small, fast float aircraft on the back of a C-class flying boat so that they could load enough gas on this small float plane to fly the Atlantic. It was designed by a fellow by the name of Mayo. It had to be lifted off the water because it had too heavy a gas load. It would have sunk by itself, so it was refueled after being put piggyback on this flying boat and lifted off the water. Bennett was the pilot. He went non-stop from Foynes to Québec city. He was trying to reach Montreal but he didn't have enough gas. That stood as a record for some time. On the way back, the flying boat piggyback wasn't there to lift him off, he had to go from Botwood to the Azores and then up to Foynes to stay within range. It was one of those early experiments. It was successful but technology out-stripped it. It was used militarily.

The other way of stretching range was flight-refueling which was carried out again at Gander and Foynes in the early days because a C-class boat had gas tanks that couldn't be fully filled and still take off. The idea was to get it airborne and then to refuel it, top it up so that it could extend the range and miss out Ireland or miss out Newfoundland on the way. That was conducted successfully at both Botwood and Foynes. There was a lot of experimental work going on both before the war and during the early days.

DWP: Bennett was a remarkable fellow. Are there any other feats of his that you recall?

McT-C: Bennett turned up, as many others did, with the Ferry organization because he had experience. He conducted the flight that picked the Greenland bases. It was a super secret at that time, and very few people knew what his mission was but he had a B-24 bomber that was just full of fuel. He wanted me to go with him on the flight but the weather for his return was not good and I just felt that I should be on the ground to bring him back early, if I had to, because by the time he got back he had no alternatives. So much to my regret, I just stayed on the ground. He picked Sondre Stromfjord and the other bases both on the west and east coasts of Greenland.

DWP: Let me ask you what you know about that Nazi weather station. I undertand you were aware of it.

McT-C: Yes, we knew the submarine was up there. Our radio operators heard signals that were not coming from a submarine but were obviously land-based signals so we knew that they had put it on shore. I don't think we knew precisely where it was but we had direction-finding equipment so we knew roughly. From the length of the signal we knew it wasn't a very sophisticated station so it wasn't worth going to find. There were other more important things.

DWP: When did early land-based aircraft start flying the Atlantic?

McT-C: The first land plane that was supposed to fly the Atlantic was the Albatross, a British all-wood version that broke its back on a rather stupid overload test. In those days they didn't know very much about stress analysis. They would test the airplane by putting on twice the load that it should carry to see how it handled. The pilot made a somewhat hard landing with this overload and broke its back. They had to go back to the drawing board to find out how to strengthen it but the war came along and that was it.

The next one was to be a French Farman. It was actually scheduled out the night the Germans started roughing up the French. France was in a bit of turmoil. I don't remember if it was the day they got around the end of the Maginot line but it was one of the French military losses in the early part of the war that shook everybody. The flight was delayed and subsequently cancelled. The aircraft was a casualty in a German bombing raid but it could have flown the Atlantic - it had plenty of range. This was 1939.

DWP: Did you ever think of writing a book about your war experiences?

McT-C: Yes, but I have too much sense because I know that I am not a popular writer. If it was a scientific paper fine, but I have seen too many of my friends try to write a popular history and fail.

Have you read John Patterson's labour of love? He wrote the history of the meteorological service and it is completely unpublishable. I read it as sympathetically as I could and it will be wonderful source material for Morley because John was meticulously accurate. Everything is there, detailed to the nth degree, but he had no ability to make it readable to a lay audience. That is a skill that I don't pretend to have and I will leave it to others.

That's why I am a strong supporter of these oral interviews because 90% of what I am saying is probably useless but to the best of my knowledge it is accurate. A person with the skills to weave a story out of this can pick and choose, knowing, if anything, what he is choosing is at least reasonably accurate.

DWP: What are some of the other early aviation stories that you recall?

McT-C: While we were conducting these experimental flights across the North Atlantic, (initially with Imperial Airways and Pan American Airways and then later with American Export Airlines), the Germans conducted some very successful experimental flights using flying boats. They put a mother ship down in the Gulf of St. Lawrence but they used our Meteorological Service. The Italians had flights of military aircraft across the northern part of the North Atlantic through Hebron on the Labrador coast, again using our information.

"Wrong-way" Corrigan, was an Atlantic flyer after Lindberg with a light airplane. The American government refused to clear him to fly the Atlantic so he filed a flight plan for San Francisco. An airplane appeared over our radio mast in Botwood. He had obviously been homing in on us. He circled, flapped his wings and headed out into the Atlantic. He knew exactly what he was doing. He was dubbed "wrong-way" Corrigan because everybody thought he left for San Francisco. Being successful, the U.S. government couldn't do a darn thing. It was a brilliantly clear day and I think we actually talked to him. He asked how the Atlantic weather was. It was a well-planned flight and we spotted the identification marks on the airplane, so we knew who he was.

The French had some amazing flying boats. They were the Latécoère, built like a battle cruiser, how they ever got off the ground I don't know. They had six engines and they took about five miles to become unstuck, but their range was phenomenal. They were doing experimental flights across the Atlantic using our facilities and I think they had as much champagne as they had gasoline. One flight that I will never forget - it started from New York and was supposed to come to Botwood to refuel. When they were over the Azores they were told not to land but proceed non-stop to Marseilles. They did it all without refueling. This was before World War 2. They actually had a deck on the outside of the hull. When they landed they had people running around on the deck handling anchorchains. I think both of those aircraft were caught on the ground and destroyed by the German Luftwaffe. The French were well ahead of the game with their landplanes as far as range went, and although they weren't built as passenger-carrying airplanes, they had the technology.

**DWP:** In the early part of the war the civilian companies were doing the ferrying. Why did the R.A.F. take over?

**McT-C:** I think largely because of Lord Beaverbrook, who was a man who could see both problems before they occurred and priorities. They went through about three or four different civilian organizations in rapid succession. The original group of pilots was made up of very experienced Imperial Airways pilots and pilots of fortune that emerged from all over the world. A large number of them were like Louis Bison. The key bush pilots from Northern Canada came. They received \$1,000 a flight, which in those days was a lot of money. They felt the risk was worth it. Of course, they were highly skilled people, not in long distance trans-Atlantic, but in flying and keeping themselves alive. It became obvious that the demands were going to exceed the supply of that kind of person.

I wasn't part of the decision to go to the Air Force. The civilian organization was pushing too hard to get the pilots back faster. They converted four B-24 bombers, just by putting planks in the bomb bay, and would fly these pilots back. They started taking too many chances, overloaded the airplanes and wrote a couple of them off killing all the pilots. I was angry because they wouldn't have been allowed to take off from Gander with the load. We would have stopped them. They were taking off from Prestwick. One of them crashed at the end of the runway, never did get in the air. The other got in the air but couldn't clear the little mountain. Goat Fell on the island of Arran, just smeared itself all over the mountain top. That shook everybody because two plane loads of priceless pilots were killed.

The Americans were coming into the war and theirs was going to be a military operation, that was foreseeable. The civilian organization didn't have the depth in leadership. One of the things that you learn about the military; they may have redundancies, sometimes they do things the hard way, but they have built-in trained leadership in depth - instantaneous leadership because of the hierarchical system. As soon as the Command was established you had a hierarchy and discipline was imposed. That is why I used the military at Chedabucto Bay for Operation Oil, because I needed a lot of people and I had no time to run around the country finding leaders. The army and the Navy divers came with their leadership built-in, so that when I said this is what I wanted to do, the commander would turn around and say, "Do it."

**DWP:** You were an employee of the meteorological service, providing a service to the R.A.F. Did this administrative arrangement complicate or facilitate the kind of service that you were providing to them?

**McT-C:** No problems arose from this arrangement. Sir Fredrick Bowhill considered me as his Command Meteorological Officer and had gazetted me accordingly. The source of funds was unimportant and staffing for the meteorological office was my responsibility.

C.D. Howe, who was then our Minister, understood better than any other politician, before or after, how to work with people. The dollar-a-year man was his idea - getting the top industrialists to help his Ministry in war without pay. It had an advantage in that if Bowhill wanted something from C.D. Howe or the Department of Transport he could send me up to get it and I knew who I was talking to.

**DWP:** Would your job have been easier if you had been in uniform?

McT-C: Only once and that didn't last very long. Sir Fredrick Bowhill and I stopped at Accra. When they saw a civilian getting off the airplane they felt he must be a spy. I was arrested on the spot. Sir Fredrick Bowhill turned around to see why I wasn't with him only to see me being escorted off the airport. That was rectified quite quickly because he was a firey little guy. He just blew his top. Apart from that there was no problem at all. I had the authority to go with the rank, and the fact that I wasn't in uniform didn't bother anybody.

DWP: If the duty forecaster wasn't confident in his forecast, or there wasn't enough information, could he cancel the flight or was that really up to somebody else, the information was there for someone else to make a decision?

McT-C: That was nominally the responsibility of the Duty Operations Officer. In point of fact, Taffy Powell delegated it to me after our experience at Gander where we worked together. The decision was his in the early flights. They could always appeal to him if they didn't like what my decision was but it wasn't much use. Unless I was away from base, when I delegated it to Hugh Bindon or whoever was going to act in charge for me, it wasn't something I delegated to the duty forecaster. It wasn't fair, he had enough problems with the forecast. I would review it with him and then conduct the briefing of the crew.

DWP: Could you describe for me what a briefing consisted of? What were the facilities? How long did they last? How many people were involved?

McT-C: Before the war it was on a straight one-to-one basis because there was just one crew working. It was formal in that we had a pictorial as well as written version of the forecast. The Atlantic was broken down into zones and a discreet forecast was made for each zone. Whether the pilot liked it or not he had to listen while I went through all of that, then he could ask any questions he wanted and there was ensuing discussion. Debriefing procedures were similar. When a flight came in the skipper was under orders to come up to the met office for a complete debriefing, in which he would tell me where he thought the forecast issued at the other end had gone wrong. The learning process was quite important. We didn't know an awful lot.

When the groups began flying, the final briefing was a classroom exercise with the charts on the wall. Most of the senior civilian pilots came in well ahead of time for a one-on-one briefing, but for the final met briefing, all the crews were in the room where they worked out their flight plans and I would give them the briefing as



a group. Occasionally, we would go through that exercise and then there would be some event that we would just cancel them. Briefings would generally last three quarters of an hour.

**DWP:** How many planes flew at one time? What did the crew consist of?

**McT-C:** The first land planes across the Atlantic were really the Hudson bombers. To have enough gas for flying the Atlantic they had to take out everything in the cabin filling it with gas tanks. There was only a handful of navigators from the R.A.F. and from Imperial Airways. The decision was to send them off in groups of seven with one navigator in the lead aircraft. They were supposed to play follow-the-leader across the Atlantic. We knew it wouldn't work but the Air Ministry in Britain and Lord Beaverbrook didn't. They would line up on the runway and take off one after the other. What we did for the pilots that were to follow was a very detailed flight plan with compass headings and everything for each zone. We would try to pick a route that kept them south of the centre of any depression, so if the storm was deeper than we anticipated, they would drift south and then drift back north. They never knew they had been off course because it was self-correcting. We needed self-correcting conditions since the planes might be off-course within an hour. There was no possibility of following the leader especially on night flights. On no account could we get them north of the centre of the depression because if they encountered head winds they wouldn't arrive. The planes were that marginal.

We had no losses. They made it in spite of the fact that virtually no navigational aids existed for the approach to Britain. Britain at that time was suffering from German bombing raids and they turned everything off. One small marine beacon on Storrey Island, a little rock off the north coast of Ireland served as the only aid to home on. It signaled I think for two minutes every twenty minutes. I had some real rows with the security people in London trying to get an acceptable beacon in Ireland for homing. As far as I was concerned we were going to instruct the people at Prestwick to send out plain language landing reports because they had insisted that we had to send them in a secret cipher to the airplane. Can you imagine how the pilot felt after he had been stretching gas all across the Atlantic? He was in no mood to decode the weather reports.

With the support of Sir Fredrick Bowhill I won the argument. We were granted the Durnacross beacon for incoming flights and when the pilots contacted the station they got everything they needed in plain English. The Germans never molested us because their chance of intercepting and shooting down one of these flights, (that came all the way across the Atlantic), was miniscule. It wasn't worth

their while. This is what I had a difficult time trying to get across to the security people in the Air Ministry in London. It was just like the German weather station. It wasn't worth our while to destroy it. There were far more important things to accomplish.

**DWP:** In the spring of 1944, were there any requests that you heard of or received for weather information, data, services that would have led you to think that this information was going to be used for an invasion campaign at Normandy?

**McT-C:** We knew what was going on for two reasons. One, I knew both Stagg and Yates, the British and American meteorologists, who were on Eisenhower's staff. I was frequently in London either arguing or asking for better communications (you had to fight for priorities the whole time and many of the people I had to fight with and got to know, were from this Croydon group).

The other reason: I was on a 6-member Joint Control Committee which travelled all over the routes settling arguments between local base commanders and deciding priorities for aircraft movement. We were travelling much of the time so we had a pretty good idea of what was going on everywhere.

We didn't know precisely when the invasion would happen but we knew things were building up simply by the indications. For example, we were squeezed out of Glamorgan airbase in the southern part of Wales because they needed it as a base from which the air umbrella would be mounted. We pretty well knew what was coming.

**DWP:** Was the period right after the war, an unsettling, disconcerting one for meteorologists?

**McT-C:** No, it was planned.

In the Canadian service during the war we had recruited a lot of people with scientific backgrounds who had no intention of making a career in meteorology. Their dedication was in other areas of science. Those people had always had every intention of demobbing and picking up the pieces of the career they wanted to follow. The assessment of the needs for meteorology postwar had been planned for in Toronto and consisted of returning to the Air Canada service as well as highly centralized public weather. The assessment of the post-war size of the met service was really very small so that these war-time recruits were encouraged to return to where they wanted to be because we had to cut the service down. When I went to Toronto this mass exodus was taking place. It became quite obvious that the assessments had been wrong but we were slow learners.

One of my early jobs was to decide how to phase out the various Air Force meteorological stations. This phasing out was planned far too rapidly. The people with wartime military experience had become accustomed to meteorological and other scientific services keeping them alive during the war, whether it was Navy, Army or Air Force. When they returned to civilian life, they began looking at the effects weather was having on their industry in a way they never did before the war. We were deluged with requests for services. The whole combination of that plus the very rapid expansion of aviation meant that we were out recruiting while the last of the wartime staff was still retiring. The deficiency was tremendous.

**DWP:** So there were jobs for people if they wanted them?

**McT-C:** Not at the beginning of the exodus but towards the end we were trying to encourage everybody to stay. The ones who left were those who really had other careers they wanted to pursue and they had only joined the met service as a wartime effort.

**DWP:** Let me ask you a question about the accuracy of forecast: I read a paper that you presented at the American Meteorological Society in Buffalo in 1952 in which you were highly critical of some authors who had deplored the lack of progress and the effectiveness of operational forecasting. You mention in that paper that in the eight years since the war forecast accuracy had improved slightly.

In the thirty years since that paper have we continued a steady improvement in the accuracy of forecasts?

**McT-C:** There is no question. The myths surrounding the accuracy that we had before the war and during the war in the Atlantic, I hope have been dispelled. If you have the authority to prevent people from flying until you think you've got a self-cancelling error in the forecast you could look pretty good and so they were good. They went when we specified, not on schedule. Therein lies the difference from the schedule-flying that started very soon after the war when people were buying tickets and they wanted to go. If you felt that the weather was severe enough to be a risk you merely talked them out of flying.

Before the war, almost nobody flew above 10,000 feet, so we were only concerned with lower air space. During the war, as the operating altitudes of the engines improved, altitudes were raised to 20,000 feet. It wasn't until the big jets flew that we forecasted up to 40,000 feet. On a volume basis that's more than four times more than what we were forecasting before the war. We didn't know anything about the jet stream before the war. We experienced it once or twice but we didn't know what it was. We knew nothing about

air turbulence. We learned the hard way about the tops of cumulonimbus. The early literature had the tops far below what they really are. When you have a fellow struggling up 25,000 feet going down to Nassau from Gander and telling you that there was as much cumulus above him as below him you rapidly start changing your views.

That improvement was in large measure brought about by improved methods of observation including the satellites but also by the insights brought about by Charney's work in the early computer days. While the forecasts weren't perhaps operationally usable immediately they forced us to look at parameters that had been largely ignored just by the effects they got when they plugged this in and that in to the computer models.

I think the forecaster today is in a different world. During the war the five-day public forecast was just a dream. Twenty four hours was considered about all you could do. I remember Bowater Pulp and Paper wanted an eight-hour warning of frazil ice, one shift in advance in order to deal with the problem. The strategy was to close the mill down, back the water up in the canal, allow ice to form on the top and then they could draw the water from underneath. We felt we were using just about all the knowledge we had to accomplish that.

My only criticism today is that so few of those giving the forecast on television have the skill to make use of all the facilities that the meteorological service makes available to them. If I was giving that paper over again I would sound the same optimistic note - that there has been steady progress. There is a lot of additional progress still to be made and will be made.

**DWP:** Has the public attitude towards forecasts and meteorology changed over the last 30 years?

**McT-C:** The need for it has become more sophisticated. The acceptance of it amongst those who really need it as opposed to the mildly curious or the dilettante, I think has improved.

From an agricultural standpoint, our complaint here is that the service given on our CTV television station from Kitchener and the CBC from Barrie is quite inadequate. They are just not giving us everything they have available because the people just haven't got the skills. I've written several letters telling them that if they don't improve I am going to try to get their license cancelled next time it comes up before the CRTC for failing to provide the service we have a right to expect. Now I think both the use of the information and the demand for improved and more information has increased. I think the popularity of your Climatic Perspectives shows the value of both the climate side as well as the predictive side.

**DWP:** I would like to return to the period just after the war. Was John Patterson instrumental in getting you involved in the Provisional ICAO?

**McT-C:** Yes. Patterson had more foresight than I think people give him credit for because, while he didn't participate in the Civil Aviation Conference in Chicago in 1944, he realized that when the decision was made to have the world headquarters in Montréal, a small group of Canadians loaned to the Provisional Organization was necessary to get it started.

As soon as Patterson realized this, he immediately volunteered me as a member of an eight-man Canadian team. He wanted to have meteorology involved there from the start.

As soon as VE-day was over and VJ-day was in sight, (since we knew about the U.S. plans on bombing), he felt that I was no longer needed in the Ferry Command which by then had been downgraded to a 45 member group. He loaned me to the Canadian team as the Secretary for Air Navigation until December 1945. By this time we had the first ICAO Council meeting. The new President, Warner, wanted me to stay on in the position I was in but I had no desire to become an international civil servant. It didn't appeal to me although I had enjoyed setting the thing up.

**DWP:** With your work completed, did you return to Meteorological Service headquarters in Toronto?

**McT-C:** Yes. Patterson brought me back to Toronto and I was put in charge of scaling down and reorganizing the forecast services. The staff then started to increase because it was quite clear that we had to rewrite the observation manual, the public weather manual, the aviation manual and the whole ball of wax. Science had changed so dramatically, both in observational requirements and in weather services between the beginning of the war and the end of the war, that you had to start fresh.

**DWP:** What was going on in communications technology after the war?

**McT-C:** There was literally a communications revolution going on. When I started in Newfoundland the only communication across the Atlantic was either by Morse cable or Morse radio. There were no voice cables across the Atlantic and voice on shortwave hadn't reached the point where it could be used across the Atlantic.

Very shortly after the end of the war, we became the first user of teletype in the new trans-Atlantic voice cable. The Canadian and the British met services were the first users of teletype across

the Atlantic. This was not all. I was "gung ho" about doing all of this but Andrew Thomson and John Patterson still had to find the money (which they did) and they gave me their support.

Teletype was of course a must. The full teletype network for the met service I felt was absolutely essential. Art Childs had the technical knowledge and we moved fast enough that we prevented the closing of a lot of wartime circuits that would have otherwise been allowed to disappear.

One that I remember most vividly was the teletype line up to Churchill, which the military had installed during the war. In their wisdom they decided they had no further use for Churchill and closed it down. I decided that the station there was vital to the Canadian network so we paid the full cost of that teletype from Churchill for years. When the military found that they had to return if they wanted to have any skill in Arctic warfare, the channels were there. The line had been maintained at our expense.

We were also the prime movers in getting the teletype to Whitehorse maintained after the war. It had been put in by the U.S. military. I remember that they were very generous because their instructions from Washington were to take all movable equipment and leave the rest for the Canadians if they wanted it. We didn't have money to buy teletype machines at that time. None of the wire companies were interested in taking it on themselves and leasing it. The U.S. Army Air Force met service nailed the teletypes to the table and claimed that they were immovable so they could leave them for us. We acquired equipment along the staging route to Alaska and in the interior of B.C. up to Prince George that way. They nailed them down and left them. The CN or BC Telephone could maintain them for us.

**DWP:** How receptive did you find our communications people to the introduction of facsimile?

**McT-C:** When I first arrived in Toronto, Childs and his team were very apprehensive of what I was going to do. They thought I was wedded to radio because that's all that we had in Newfoundland. I remember John Patterson telling me once, "you've got a problem there, you'd better deal with it. They think you are going to destroy them. Make them all go to radio."

I won Art Childs' confidence - he was a magnificent, technically competent communicator. We had the first major facsimile network in the world, anywhere, using British Muirhead equipment. This was the first time that CN and CP had combined because I called

for bids on this network with the stipulation of what we wanted it to do. Neither CN nor CP felt they could do it individually but by combining their resources they outbid Bell and the Trans-Canada Telephone. Bell was furious. They sent one of their Vice-Presidents to the Ministry to tell them that I had cheated them out of the contracts.

The system worked well, thanks to Art Childs and some very dedicated people in CN/CP. I don't know if you watch these CN/CP ads with McDaniels. He was the fellow who was the junior engineer that did the key work. That got him the recognition. That's why he rose so far in the organization. The communications system that the meteorological service pioneered has had a unique history and has led the way in many areas without ever having much money.

**DWP: Was the expansion of meteorology into the Arctic a thrilling venture for the service?**

**McT-C:** Oh yes. The founding of the Joint Arctic Weather Stations was unique and is still unique in the world's history of the development of meteorology. When it started, we in Canada really had no Arctic ice-breaking capabilities at all. The Americans did. We both wanted the stations in the Arctic for sound, scientific reasons. We had quite a bit of opposition from External Affairs which was afraid that we were giving away the sovereignty of the Arctic.

We argued by pointing out that the joint stations there always had a Canadian in charge with an American as deputy. When this has been established over a quarter of a century, no argument arises over ownership.

**DWP: What were the financial arrangements between the Americans and ourselves?**

**McT-C:** The key point in my mind is that no money ever changed hands. If the Americans were doing one thing we would do something else. By the end of the year, it was so close to a 50/50 cost splitting that there was never any residual payment. One year we'd buy the fuel oil because they would be providing the food. It was always balanced.

We had trials and tribulations amongst them being the first man we sent to be in charge, Cleghorn. He turned out to be a disaster. As soon as he embarked on the American icebreaker, (it was either the East Wind or the West Wind), he wanted to raise the Union Jack. The Americans started complaining. When he got ashore, he was so hostile to the Americans that we had to fly him out and replace him. He would have endangered the project.

Between Dr. Reichelderfer, who was the Chief of the U.S. Weather Bureau and John Patterson and then Andrew Thomson and then myself, we kept on top of the little bits of friction. In the end, all the icebreaker support was Canadian, all the air support was Canadian, (though Canadians who supplied Alert used to stage through the U.S. military base at Thule in North Greenland). It was a marvelous example of good partnership in international co-operation with the budgets being balanced without any cash. The two treasury boards never had to get involved.

I think we were wrong in inviting the U.S. to leave at the end of 25 years since the stations are closing down. I am not saying that five years from now the satellites will make them redundant. That is not yet true and in my mind the stations are essential both for the network and for ground-proofing the satellite observations.

**DWP: Where did the initiative for terminating the JAWS agreement come from?**

**McT-C:** Canada. The supernationals got the upper hand. How they got away with it, I don't know. It may have been just as simple as Art Collin not being in Toronto and not knowing the arguments. Just as simple as that because we had to fight these ultra-nationals about once a year to put them back in the cupboard.

The cooperation we got from the U.S. was very substantial and vice versa. For example, the early met satellite group had struggles between the U.S. Weather Bureau and NASA which were both vying for supremacy. Reichelderfer invited me to be a Member of that group because I was very keen to see the birds fly and yet I could be completely objective on the competing claims of NASA and the U.S. Weather Bureau. I think I was able to help. That's an indication of how close the two organizations worked together.

**DWP: Did Treasury Board pressure the Service to close weather stations and reduce services after the war?**

**McT-C:** The struggle on what bases to close occupied a tremendous amount of time. Ottawa quite rightly did pressure us to cut back to peace time standard and yet you could see certain retrenchments in non-meteorological areas were wrong. The teletype circuits to Churchill being one of them.

Another one was Prince George. I was convinced that the tremendous natural resources around Prince George were going to need a first-class airport, so I dragged my feet and left the met office, left the upper air station and had the place manned around the clock. The growth came but it was about five years later than I thought it would be. We took quite a bit of abuse from Treasury



Board for not cutting back. I was convinced that it was going to explode but I didn't know when.

There were tough decisions like that across Canada. Whitehorse was a terribly tough one because, if you had any vision of the North, it was quite clear an airport was needed. But the accommodation we had downtown was absolutely appalling. The struggles to get the community built on the airport so that people wanted to stay there instead of considering it Siberia was quite an issue. The meteorologists continued to look at it as Siberia until Sid Buckler became OIC. Sid and his wife decided that they were going to take hold of the community to try to make it something. He got on the school board and the recreation committee. He got curling and other activities started. Wahl who succeeded Buckler wanted to stay. He may still be there.

**DWP:** He still is there. You can't get him to leave.

**McT-C:** They were probably the best educated people there. Instead of becoming an area with a chronic staffing problem, it became a waiting list situation. Yellowknife was another one where T.B. thought we should cut the staff, and every year we would have a battle with the Treasury Board to hang onto the operation.

**DWP:** Immediately after the war you said there were tremendous pressures to add weather services in various sectors. In the Annual Record for 1945, it is said: "at the close of the war the public were demanding a service equal to that provided to the armed services".

If such a service didn't exist before the war, and if it was semi-classified during the war, then how did the public know what they wanted?

**McT-C:** The people who were leading the vanguard in Canada's post war development were those who had been wartime soldiers, sailors and air men. The ones who wanted to become involved in private initiative operations were the first to be demobbed because they merely shouted until the Forces let them go. As soon as they hit the business world or stepped back into civilian clothes, they said, "we are alive today because you people provided us with a weather service, now give. I've got an industry here that's highly weather sensitive and we want the kind of service we know you can give to us".

**DWP:** Right after the war, Ottawa was calling for financial restraint and staff cuts and yet the budget of the service had more than doubled in five years following the war. How were you able to pull that off?

McT-C: That may be a bit of a swindle. At that time a large portion of the budget that had been borne by National Defence was transferred to the civil side. Military expenses had to be cut back. That was a number one political priority. Meteorologists were all part of the Canadian met service regardless of whether we or National Defence paid their way. It was a very obvious trick by Treasury Board to claim that they were reducing the National Defence expenditures when they were really shuffling the salary and operating money over into our budget. That was part of it and it may have been the largest part.

It was also necessary to take over services that the U.S. military had been providing. Right down the north-west staging route from Edmonton to Alaska, as the U.S. withdrew, there were certain communities where the service had to be continued (i.e. Fort Nelson, Watson Lake, all the major staging posts). We received those funds with little argument.

For the next 10 years our problem was not money, it was people. We couldn't recruit at the salaries we were permitted to offer. Even after the first major exodus had taken place we had a steady drain to the high schools, like Jefferson. He's the one I remember because he turned up teaching high school mathematics at Thornhill. He had been a key instructor in the Commonwealth Air Training Plan. Throughout the war he had been teaching and loved it. When he found that the high schools were paying sort of half as much again as we were it didn't take very much prodding to go. Also, the schools were highly competitive because they would credit you with seniority equal to the number of years in the met service. We had a steady drain of some of our best people into teaching which was fine as far as the schools were concerned, but it was hard on the met service. We were carpet-bagging on all the campuses offering salaries for people with a bachelor degree to come to take a masters degree at our expense.

**DWP: What measures did the Service take to overcome the severe staff shortage?**

McT-C: We began with a lot of short-term measures. You really have to look at the history of the Treasury Board. At the beginning of the post-war period there was a fellow by the name of Ronson who was the Secretary of the Treasury Board. The Secretary is the key man, not the minister. He was just, well, all you can describe him as is a son-of-a-bitch. He really was in the full sense of the word. Why nobody shot him I don't know.

The Government must have realized what was going on because Ronson retired. They got in Bob Bryce with two very senior people. One was Allan Robertson and the other was Ernie Steele. They were

Bryce's right and left hand. They decided that Ronson's methods were the wrong way to manage the public purse. The departments had to understand what the Treasury staff's problems were and they had to understand what the department staffs' problems were. They knew that they had better sit down and start reaching compromises rather than shooting one another from the hip. This turned the whole process around.

I remember after meeting Bryce that I felt the best thing to do was to be as firm friends with him as I could be. John Baldwin was Deputy Minister of the Department of Transport at that time. He said I was absolutely crazy wanting to make friends with Treasury Board. Baldwin had been a classmate of mine at Oxford and the fact that he was a deputy minister didn't bother me. I didn't have a very high regard for him and still haven't. He wasn't going to stop me. I would paddle off and every time I was in Ottawa, and had anything to talk to the Treasury Board about, I would go over and talk to whomever was available.

I remember the next Christmas I gave Bryce a copy of Kendrew's Climate in Everyday Life and he read it. He became meteorologically educated. When we went up with our submission to move the climatological data on to punch cards, Bryce had a feeling for what we were talking about. We'd have to punch back data for about 10 years before we could really have a useful bank of data. The judgement was: should we try to do those 10 years in one year, three years or five years? The argument was how fast the public purse could afford it?

Each year when we had a trial budget struck we would invite the Treasury Board officers who were going to process our budget down to spend one or two weeks with us and talk to everybody that they wanted to talk to. There was a real depth of understanding. We had no problems with money, it was people.

**DWP:** Just after the war, there were a number of challenges that the Service faced and you have alluded to some of them already. One way of meeting these challenges was to reorganize.

Was the kind of reorganization that took place ( a sort of parallel echeloning below the Controller) modelled after another weather service?

**McT-C:** No. They all reflected the older ones, like the British Meteorological Office. Their civil service bureaucracy is so different that there weren't too many parallels. The U.S. Weather Bureau was reflecting the political realities in the U.S. There was a similiarity. You had to have somebody in charge of observations but their superiors varied widely.

John Patterson, even though he was getting close to retirement, felt it had to be done. Andrew Thomson knew he was going to succeed John so he had a vital interest in getting it done. It was just a matter of looking at the alternatives and making what seemed to be a rational decision. Not made without tensions I might add.

**DWP:** Were there any casualties?

**McT-C:** Middleton left because he felt Instruments was being downgraded and he wasn't going to stay around. Jacobson got out and Hewson took charge of the research side.

Before the war, I was pretty well autonomous. Don Archibald was autonomous out in Winnipeg. He was running the Trans-Canada Air Lines Service. Marine services out of Toronto had really not arrived into the 20th century. It was done by old people who were doing what they knew best but it wasn't good enough. The main divisions were fairly straight forward. Climatology under Connor had to have its own ballywick. The establishment and running of the observation networks was Don Archibald's territory but forecast services wrote the manuals because we had the requirements. Don didn't like that but he learned to live with it. He felt he should write the requirements as well. My war-time experience and pre-war experience made me feel very certain that it was the user who had to state the requirements and forecast services included the user. The question of where to put telecommunications was solved under forecast services. There were no casualties there but I had to win Childs' confidence. I was gradually bringing younger people into Forecast Services. The older people were gradually pushed to the sidelines and there was really nothing you could do about it. It was wrong to say that these were done without tensions. There were tensions. Looking back on it, I think it was at a minimum and the casualties were mainly in the Instruments side which was unfortunate because we needed them.

**DWP:** Shortly after re-organization of the met service, the Department of Transport had a reorganization where they went more to the regional concept. I understand that the met service strongly resisted that restructuring.

**McT-C:** I fought it tooth and nail and lost but not 100 percent.

**DWP:** It was five years before the service went along with it.

McT-C: That's right. We objected to the regionalization that Baldwin and others wanted to introduce. It was so strict that it would have perpetrated real nonsense. They were going to build seven water tight compartments. You can see what would have happened to the standardization that we had achieved. We fought it. I had many stormy meetings with Baldwin on it.

Eventually, we worked out a sort of compromise where the Regional Directors would leave the regional meteorologist alone. We had to make sure that we had very frequent conferences with the Regional Meteorologists in Toronto. It was a horribly expensive way of running the country at that stage without passing judgement on whether it's needed now. Canada was much smaller in population and the demands were much easier to identify.

DWP: **One of the first crises you faced was the severe staff shortage.**

McT-C: We had to break this recruiting log jam. The whole career structure of the met service had been frustrated by the unwillingness of the Public Service Commission to recognize that we had a problem. We decided that a major breakthrough was necessary. The only means of achieving it was to approach the Civil Service Commissioners face to face.

Frank Benum, Reg Noble and I made ourselves unpleasant with two of the three Public Service Commissioners who were at the table. On cue, Frank Benum lost his temper. I came in and said, "Well look, I don't like everything that Frank has heard but he is just showing you the frustration that you will find from coast-to-coast, and you'd better stop and listen." Reg then came in with all the facts and figures. By the time that meeting was over, we had a promise that there would be a major reassessment of the met service classification system and salaries would be given top priority.

From that time, Paul Johns became my staff officer on this reassessment. As I gave it top priority, I was going to meet with the classification pay people in the Public Service Commission. For the first six months I was director - I was in Ottawa three days a week and in Toronto for the other four. We hammered away until we had reclassified every single job in the met service. By the time we finished, we had a completely new pay schedule that made us competitive and a good classification.

The classification system had never been properly redone to reflect the changes in the science and the character of service. From the meteorologist to the teletype operator, they were all a mess. Reworking was necessary to achieve a satisfactory pay schedule.

**DWP:** Why was it ever allowed to deteriorate to such a state?

**McT-C:** The Public Service Commission didn't care much. They were busy with other things and we were just low man on the totem pole. This was why we had to go and make ourselves throughly unpleasant to the Public Service Commission deliberately in order to get the attention and priority. Once we got it we decided that we were going to take full advantage of it. Paul Johns and I worked hard until we got the best deal we could.

**DWP:** I suppose it was an easy job convincing your employees that the agreement was a good one?

**McT-C:** I had to travel around selling it to all the main and subordinate stations around the system. After the agreement had been approved, I flew a hundred thousand miles in under a month visiting all met stations from the Arctic to the Antarctic and Pacific since everyone had to know.

It was physically exhausting but I was young and healthy. Mentally, it was exhilarating because once you'd communicated to them what was in the package and what it would mean for them, the majority of people were happy.

**DWP:** Only a majority, I thought there was total elation.

**McT-C:** No, because in some areas people who had considered themselves equal had to become unequal. Some people got \$4,000 salary increases immediately, (in those days \$4,000 was a lot of money), others got \$500. You had to rationalize to them why this had happened. I didn't expect the losers to be overjoyed but I tried to make it quite clear that if they felt that we were wrong they could appeal and we'd go over the darn thing again to see if we had made a mistake and it would be corrected. The technicians and the teletype operators were by and large 100 percent behind it because they never had a proper career structure and now they could see one.

**DWP:** As Director of the Service, did you do as much international traveling as Andrew Thomson did? Did you travel to Central America, Africa and Asia?

**McT-C:** No, I had my own priorities. I didn't shortchange WMO. When the Executive Committee was meeting I was there but I didn't have time to traipse around the world because I wanted to traipse around Canada. Andrew never got up to the Arctic weather stations in the winter. It's fine going up there in the summer when everybody is happy. What I wanted to do was to see how they lived in the winter. If you want to find out how much tension is on the staff, you have to visit them when the going is rough.

**DWP:** Did your good relationships with the Department of National Defence continue at a high plane after the war?

**McT-C:** At the same time as we were straightening out the civil side, Des Kennedy aided by Reg Noble were doing a marvelous job in straightening out the military side. We had excellent relations with the postwar military, some of it personal. A lot of it was simply straight good organization and the fact that we were delivering a damn good service. As a result of this very close working relationship, I had the use of an Air Force airplane when I was travelling. A lot of this mileage I put on to explain the new system was on military aircraft. They were happy to help and it was a good relationship. I think it is still probably good.

The British Service looked at us with envy - we had a better recipe. The Americans were so large that having the three separate services made sense. The U.S. Air Force Weather Service was almost as large as the U.S. Weather Bureau. The U.S. Navy Weather Service was large as well. Our requirements were not large enough to justify that.

**DWP:** One of the more interesting and successful programs was the secondment program. In a way you were the experiment's first seconded meteorologist. Could you tell me when secondment started and how it worked?

**McT-C:** I guess the beginning as far as I was concerned, was when I was seconded to the Croyden School, then seconded to the R.A.F. and then seconded to ICAO. Each of those worked far better than any other solution would have. I was sold on it from personal experience, having experienced it I knew how to make it work. I knew what Sir Fredrick Bowhill had to do to make sure that his other senior officers treated me as a senior officer which was essential. I was given the rank of Group Captain and the others had to treat me as if I was. The fact that I didn't have a uniform wasn't to be of any substance. I knew the ground rules, I had the experience, and I was committed to the fact that Canada at that time needed one weather service. They didn't need a multiplicity. If we were going to attract the best people from university to enter the Service we had to preserve the mobility so that people could move around into secondment, out of it and so on.

It meant that we had to provide service wherever it was needed. When it became obvious that agriculture needed more of a service than we could provide them from the nearby forecast offices, I was convinced that secondment was the route. By that time we were also working out the details of postwar secondment with the

military with very considerable success and goodwill on all sides so that Treasury Board was quite happy. They saw what was happening and saw that this was a way of keeping things lean.

I guess one of the first provincial governments with a seconded meteorologist was British Columbia, where the B.C. Forest Service with their very particular needs on fire and weather forecasting needed to be served directly.

It worked well as long as you were prepared to work at it. You had to visit the people you were serving frequently to ensure that they were happy with the arrangement. I also had to be prepared to find out that a seconded meteorologist demonstrated qualities that made him more valuable for something outside the organization. You had to see him go and wish him well and send somebody else in and not start crying in your beer. I was convinced that this was the proper procedure.

**DWP: To some it is unfortunate that this program is no longer in effect. I guess Don Boyd was the last of our seconded meteorologists.**

**McT-C:** The secondment program wound to a halt because Reg Noble, Collin and Jim Bruce weren't committed to it. I think the country is the worse for it. You've got to be prepared to forgo the doubtful pleasures of globetrotting in order to stay at home and visit the home stations if you want to make it work. It died from neglect not from the correctness of the concept, simply neglect. I think there are a lot of exciting things out there that are waiting to be done that won't get done until somebody smart enough has another look at it.

**DWP: Store front operations such as the one at Hamilton were successful programs that were started during your time.**

**McT-C:** Yes. I didn't call them store front operations, that was the British who were the first to have that. They had a real store and sold forecasts for something like a penny at a time. They didn't make any money, it just about covered their costs. You were just taking money from the public to spend on pushing paper that nobody wanted.

We looked at the key population centres that were not served by resident meteorological staffs and then tried to find a solution. The solution in Hamilton was to send a met officer (was it Lamont who went in there first?) whose interest was working with the diversity of industrial and government people, to see if the need was there to justify his keep.



But there were two that really worried me. One was in Victoria, where we had the expensive Gonzales Observatory. We had a meteorologist trying to provide a service that nobody was listening to. He wasn't a very good worker. He was reaching retirement, hadn't kept up to date, and had a sloppy operation. The other was in Québec City where there was an equally sloppy operation by a fellow Roy. I decided that they were both on my hit list and they would be closed down. There was a public outcry on all sides when they knew this was in my mind.

At Québec we had to wait until the fellow retired. Waste some money but it was a peaceful one.

In Victoria I just closed the office down and all hell broke loose. I remember there was a Conservative Government at that time and George Hees was our Minister. He was on tour out west and found he was pretty unpopular in Victoria. I got a frantic call to go out and see the Minister in Calgary. We had breakfast together and I told him what the problems were and what I had done. He said, "Well I guess you have to go out and put the fire out. Do whatever you have to do but put the fire out."

C.D. Howe was the best Minister I worked for on delegating. He would get a problem that was really hurting, understand it and then say, "Over to you chum, that is your problem" and then he'd back off. As long as you delivered the goods, he'd stay out of your hair. George Hees was second to him.

I went out to Victoria and appeared on radio and television, spent hours with the newspapers and the provincial government. I was totally convinced that, though we hadn't been providing the service they needed, there was a real need for it. That had been articulated and the old man had to go and we had to get one of the younger aggressive people in to follow up and make sure that what they were telling me was true.

**DWP:** Did you suspect the staff was working against you?

**McT-C:** No, the staff wasn't against me. The staff observers were disgruntled because this old boy was just ready to retire, and he hadn't been doing a day's work. You were having to be regular and the boss was obviously cheating. That gets under your skin. No I had no trouble with the junior staff.

I sized up the situation and before I left Victoria I went on television and announced that I was putting a meteorologist back in. Of course, I became a hero of the hour. The fellow we put in stayed there and he retired a little while ago. He did an

excellent job. He was the right vintage and had wartime experience on communicating and teaching. He just found out what was necessary and there has been no trouble there ever since. But I had to do some back-training pretty fast. That was the advantage of having somebody like Hees or Howe. If you know you've got the backing you can solve a problem right there; but if I had to say, "Oh I have to go back and talk to the Deputy Minister and the Treasury Board and I'll try and get you somebody," that's not nearly as effective as standing up and saying you got it!

**DWP:** How were your relations with the Service météorologie du Québec?

**McT-C:** The Québec Government had a little internal met service to serve their tourism and so on. For reasons I'll never understand Villeneuve and Andrew Thomson just fought tooth and nail. They hated one another and I don't know why. As soon as I became Director, I decided that the real way to provide Québec with the service was to have the aviation side out at Ancienne Lorette Airport. If we supported Villeneuve and offered to provide instruments and inspection for his climate stations, we could bring them up to standard and we could back him for his in-house met service to the government.

I found him a delightful fellow. We became firm friends even to the point when he published that wonderful lexicon of meteorological terms, he invited me to write for it in English because my French writing isn't up to the quality required. He said "well, we expected that and we are going to publish it however you write it." That showed the degree of friendship we had and as far as I know that still goes on. There was a 180 degrees turn around in our relation with them and I presume their climate stations are as good as anybody else's now.

**DWP:** Were you aware of any political interference in the affairs of the weather service?

**McT-C:** Oh sure the Victoria situation was straight politics. There were several other amusing instances when McIntyre and Godson were running the cloud seeding operation around Rouyn and Val d'Or with the air force doing the flying. We had another real political rhubarb the first spring that that operation was running. There were some of the worst floods that the farming community ever recorded. They were convinced that we were doing it. The fact is that we hadn't been seeding. We had a big ugly military airplane there and we had all kinds of evil devices out around the countryside and we'd done it. I forget which minister it was, anyway again he just said, "Now look, you just either put that fire out or stop the experiment".

DWP: Was the minister, Pickersgil?

McT-C: No. He wouldn't have had the sense to diagnose the problem, let alone let us find the solution. It was one of the better ministers because he was quite clear, the fire had to be put out, but he left us to our own devices.

First of all we got a public relations firm from Montréal to go up with an unlimited expense account and find out who the leaders were and presumably leave a lot of liquor around, as was the custom. This is Québec politics, you always send it that kind of fellow first and they then set the stage for me to go up and have a big public meeting. We had the aircraft on the ground out at the airport. I had samples of all our equipment on the stage and the Catholic hierarchy, (because it was a very devout Catholic area), were there on stage and blessed the meeting before we started. Because what happens in those rural communities, if the priests don't know what is going on, the parishioners get scared very quickly. The priests are the educated people. The people go to the priest for counselling and guidance when any problem arises. If he doesn't know the answer then Satan has obviously taken over. They were just scared that they were getting flooded out. They should have been out ploughing their fields but their fields were a foot under water. It was a marginal existence to begin with so they were desperate.

I showed them the flood area which extended way west from where we'd been working and gave them sort of a climatology of the thing. I then took all the instruments apart in little pieces and left them on the stage so that they could come up and see that there were no hidden black boxes. I invited them to play with the equipment and then invited them to an open house to come and inspect the airplane. I had to do this in English, the priests were all bilingual, some of the audience were not so they got limited information on what I said but when they were able to come up and play with the rain gauge the fear started going away. The main issue was that the priests were informed. They decided that it was fine so that put the fire out in the community.

In retrospect that was good experience for me because I ran into the same thing at Chedebucto Bay. There was even less of a local government than there was in Val d'Or or Rouyn. It is run by the priests because again it's strongly RC. The priests didn't know anything about Bunker C. When it got on a cat or a dog, they wondered whether it was going to die a horrible death, if it was toxic to humans, or what happened when it got in your well. They knew it tasted foul but they didn't know whether it did any harm. The priests were scared and the population was just about ready to

mutiny through sheer fear. They were shooting dogs and cats down on the beach that got smeared and so I knew the thing I had to do was to get around to every parish in that Bay and get the priest to call a meeting and talk. We flew in some of a cleaning solvent, poly complex A and put barrels of it at R.C.M.P. stations. We used the radio to inform the people that the children and pets that were smeared with it could be cleaned. They were to bring a coke bottle, fill it with free poly-complex A, dilute it and finally wash them. The number one priority was not picking up the oil, it was defusing the public fear. This was the same thing that I had run into in Rouyn and Val d'Or. It just demonstrates the need to be conscious of who the public is.

DWP: Let me introduce a totally different subject by asking you about the AES building at Downsview. Morley gives you most of the credit for 4905 Dufferin. That surprised me somewhat because we moved into the building about nine years after you retired.

Do you recall the discussions which led to the decision to go ahead with constructing the building?

McT-C: When I became Director, I wanted to keep in touch with all parts of the headquarters staff, but by that time, we were in 15 different buildings. If I started at Bloor Street, which was the sort of Kremlin of the outfit in the heart of Toronto, at eight o'clock in the morning and drove hard all day, I would arrive about five o'clock to visit the fifteenth building at the Scarborough Bluffs. Climatology was hived off, moved about three times, as you perhaps know. It was being bedeviled. The waste of time was appalling. We were doing everything we could. The Meteorological Committee of heads would meet once a week in a different building. We gradually sensitized everybody but it was an extraordinary waste of time.

I was convinced that we had to have a proper building. The easiest thing to do was get my Treasury Board officers down and drive them around. I remember I got Ernie Steele down, who was then number two in the hierarchy and by five o'clock I had worn him out. At one stop he was going into the warehouse on Richmond Street when he bumped his head on one of the girders. He is a really tall fellow. That he wasn't going to forget. By the time Ernie finished his day of tribulations, the Treasury Board staff realized that something had to be done.

The Organization Branch of the Public Service Commission also saw what we were coping with. The backward people were our own, John Baldwin and Roy Baxter, the Deputy Minister and Chief of Personnel. We had to fight that through.

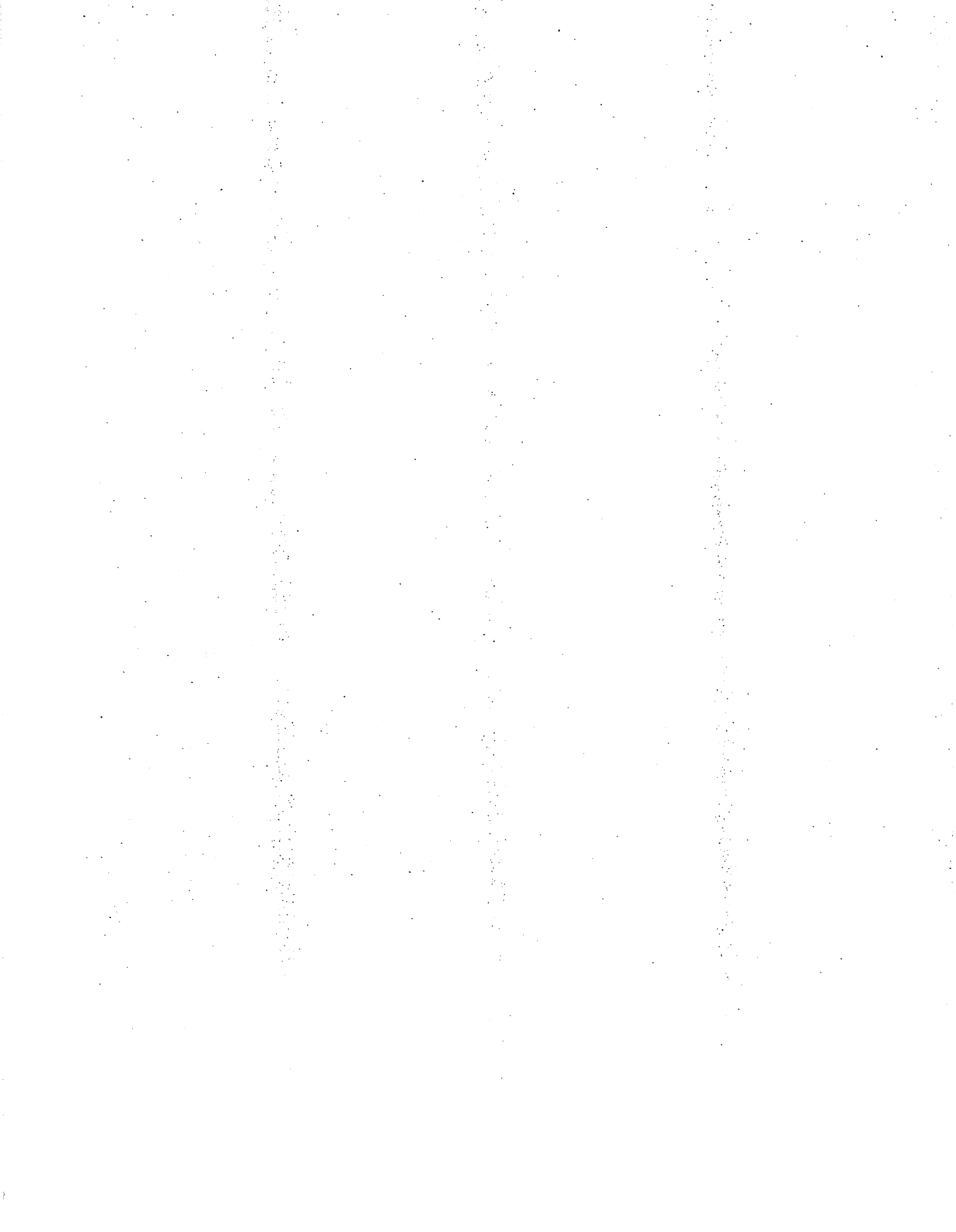
Eventually Public Works was brought in to see what we wanted. They started off very gungho because they thought they would inherit the Bloor-Devonshire Building. The property was then worth three or four million dollars. They thought that they would be able to sell it off on the public market, make a big profit, and then invest in our building. They were keen and I had to let them go for long enough that they'd get their teeth into the planning cycle and then tell them, "Sorry chums, there is no three million dollars. That building belongs to the University of Toronto. As soon as we close our observing station here they get it." They said, "Oh no they haven't." I said, "you come on down, the original deed is in the University of Toronto but I have a copy and the only reason you don't know about it, is because it is dated from 1845, and you weren't born."

When we moved from old Fort York to the university campus, where Hart House now is or just outside it, the university entered into an agreement with us. For the price of one shilling, we got use of the ground to erect an observatory for as long as it was used for observatory purposes. As soon as it ceased, the university had the right of repossession, with the use of force if necessary. That is right in the agreement. Then, at the university's convenience, we were asked to move from the Hart House area (between Hart House and McLellan Lab) up to the corner of Bloor and Devonshire Streets. The agreement was still in effect. We didn't have to pay them another shilling. The original shilling was still good. The title to that ground and the building was quite clear.

Public works was very upset and got the Department of Justice to send down a man to straighten me out on this. It often happens that when bureaucracy is offside, they really make mistakes. The lawyer they sent down was a University of Toronto grad. I showed him my carbon copy of the original agreement and told him the story. He said that this is going to be a real pleasure - to have some fun and yet see that justice is done at the same time. He went down and saw the original deed in the Archives and assured Bissell, who was the President of U of T, that he had nothing to worry about.

We had a delightful idea. If I had been there when we retreated from the Bloor Street building, I was going to have some of the University of Toronto constabulary with muskets borrowed from Fort York march up Devonshire Place and take it by force. On television it would have been wonderful. It would have been a bit of history that they could have televised.

But I guess that wasn't done. Public works were somewhat less then enchanted when they realized that there was no three million.



Certainly John Patterson, Andrew Thomson and I had close working relations with all of them - mutual support. There were no problems we couldn't sort out. The trans-border service to aviation was vital and there was no problem.

**DWP:** There were annual meetings between the U.S. - Canadian Directors of the Service. Do you recall the first one you attended? That was in 1946.

**McT-C:** I don't specifically remember the meeting you talk about because the relationship between our service and the Americans was so close that it wouldn't be considered a special event. If you asked me when the first meeting of the OIC's of main forecast offices across Canada was held in Toronto, I wouldn't remember that either because as soon as I got there I knew we had to meet. These weren't events that would stick in my mind. I expected everybody who had a specific role in met headquarters in Toronto to be in close touch with his opposite number. A suggestion of joint meeting would have been routine.

**DWP:** Do you remember any delicate situations between the U.S. and ourselves or were they all very cordial, handshaking get-togethers?

**McT-C:** Oh that negotiation between NASA and the Weather Bureau on the satellite was delicate. I'd been invited by Dr. Reichelderfer to get in the middle of a domestic squabble and not even the police handle that very well. That was a tough one.

Oh sure there were differences of opinion but they were always sorted out. There was never any name calling like that son-of-a-sea cook down in Washington. I just wouldn't have put up with that. I would have said you get on the next airplane and sort that thing out. I don't remember what the political climate was but it couldn't have been very bad at that time. I can remember periodically dropping in and seeing the Canadian Ambassador just to tell him that everything was going well.

**DWP:** At the end of the war, did Canada give any aid in the form of training or instruments to some of the war-torn countries?

**McT-C:** We did a little. We gave Nigeria punchcard equipment and trained their people because at that time Nigeria was popularly conceived as being the central African country most likely to achieve real status. The British had trained the government servants well and nobody foresaw their vicious civil war. We helped them and we trained their people. Cudbird went over there and set them up.

Andrew Thomson in his travels in Central America, when he was President of RA-IV, did a lot of informal good in advising the Mexicans and trying to help them get established. The best record of that is probably in the Annual Report. Andrew used to write the international section himself and you'll get an abridged version there.

Another one was with the Philippines. At that stage the U.S. was being extraordinarily generous in their offering to train anybody but the problem was that the bright guy would get over to the U.S., get used to the flesh pots of the western world and wouldn't go back. The casualty rate of return was very high. I don't know why the Philippines came to us, probably through a contact. Andrew Thomson used to stop there periodically, probably just friendship. They came and asked if we would arrange for some of their people to have training. I became very stupid and said that I couldn't talk to the University of Toronto about training until I knew exactly what job the man was going back to. We had made the same mistake with the Nigerians and had quite a job getting them properly back in the Nigeria service after six or eight months over here. I just got very stupid and couldn't understand what training they were talking about until they told me what job he was actually being trained for.

I told External Affairs what I was doing, and they warned me that it was completely illegal. I had no right to require that kind of decision of a friendly power but I got away with it. People came over, they were trained well, and they went back. As far as I know, they're still here.

We did the same with the Portuguese who came over to look at our communication system and our aviation weather service system. That was no trouble because the Portuguese were well organized. They had just been isolated during the war and had big gaps to fill quite apart from the fact that they were having trouble with all their colonies.

During the war I got to know the people down in the West Indies quite well because we had Ferry Command bases in Nassau and Trinidad and emergency bases on some of the other islands. Britain helped them for a while after the war to re-establish themselves but the British policy then was to withdraw in the most orderly fashion possible in order to achieve the self-government they sought. The British were not very generous in the length of time they would leave for their meteorologists to do the hurricane forecasting. The day-to-day forecasting is not very hard but the hurricane forecasting is.



At that time we had the dream of the Confederation of British West Indian Islands. They were all going to stay together. They found that one of the strings on this concept involved a lack of enough professionals to guarantee a hurricane service. Some of the islands were criticizing Trinidad because it was their job to provide the hurricane service for the eastern half but they didn't have the people to do it. Nassau was close to the west but they couldn't do it either. The Americans offered to do it but they didn't trust the Americans.

Finally, against the advice of External, I offered to loan Trinidad some met officers for as long as they were necessary. The condition imposed was an agreement in writing that the whole of the West Indies Islands, including Nassau, would remain under one met service. I specified that no one would be sent until this was agreed. Again External Affairs said, "If you get caught in that don't come crying in our beer because you are being completely illegal." I obtained the agreement and we sent several people and some equipment down giving Trinidad quite a bit of help. The islands didn't stay together but the met service did for a longer time than anybody else. It was just pretty jealousy at the political level that broke up. They couldn't agree on who would be the leader or in what way it would rotate. At least we tried. I have no regrets on that.

One of the most irritating bits of foreign aid we gave was to India. This was just after the Commission that looks after communications met. We had devised a global teletype network. India had to be a key link in that because Peking could come to New Delhi and then New Delhi could go to somewhere in Tashkent and then get through to Moscow and down into Europe. Africa was going to be served by a north-south leg. India was one of the key relay stations. Rolly Michener, who was then Ambassador (and who later became Governor-General), and I discussed what we could offer. I felt that we should provide India with the equipment. They had the people but they had no foreign currency and they couldn't manufacture the kind of equipment that was specified. Michener thought that was an excellent idea because he was looking for ways of giving support. It was all agreed. We got back home and the in-fighting started. The Telecommunication Branch became angry because they said that I had trespassed on their preserves, that I knew nothing about communications and I ought to stick to meteorology. I told them that they weren't at the right place at the right time and that I had External's agreement. They chivvied around and they objected to Treasury Board because only 90 percent of the equipment could be built in Canada and the other 10 percent had to be offshore and this wasn't in accord with the government aid regulations. They just made themselves miserable. CIDA also

got into the act. I had promised the equipment in two years but sadly it was five years before they got it. The goodwill had just disappeared.

On the basis of our promise, India was to join the world network of synoptic exchanges. They became frustrated when they were unable to keep their promise. When they finally received their equipment, no one was pleased. Internal bickering in Ottawa was the cause. As far as I know, that's the only foreign aid that really left a sour note.

Another area was when the Belgians got out of the Belgian Congo. They had deliberately not trained any of the natives. Vanderoust was the last Belgian Director of the Congolese met service. When he left, the man the newly-independent country made director of the met service was Vanderoust's secretary since he knew where the files were. It was a tragedy. There were calls for help.

We sent out some French-speaking meteorological technicians just to help them with their observing network because when independence had come a lot of the observers took to the woods or high ground. They expected tribal warfare which did happen but not to the same extent as in Nigeria. The stations were unmanned. Our boys had to go in (not without personal risk), to try to encourage these observers to come back out of the trees to man their stations, find out what equipment we could send them, and try to obtain some training manuals that would fit the situation. I am sure there were other foreign-aid stories.

**DWP:** In August-September of 1947 Canada hosted meetings of the nine IMO technical commission meetings, the first time these meetings were held outside of Europe.

How significant were these meetings to us? Had we now arrived on the international meteorology scene?

**McT-C:** We had already arrived. We'd never played our fair share in IMO but that was simply because the budget of the Canadian service under John Patterson wasn't large enough to send people to meetings. He went but very few others did. I don't think Connor ever went to an IMO meeting, the money wasn't available.

**DWP:** Did you participate in the Toronto meetings in 1947?

**McT-C:** Oh yes. The organizing of them was entirely the Canadian met service's responsibility and we put a lot of work into them. The University of Toronto helped a great deal. There was a very effective wife's committee because we knew that there would be many coming. It was well-organized and well-run. The weather was hotter than the hubs of hell and the old McMaster Building wasn't air-conditioned. A little sweating went on.

They were good meetings and some of them were pretty cantankerous because the old order was giving way reluctantly. Notice had been served at the previous meeting in Washington of the Directors of services that changed IMO to WMO which was to make it a treaty body but unaffiliated with the United Nations. That came later. Notice had been served by us young radicals that things were going to change and when the Technical Commissions met, that is where the change had to start. There was some very heavy slugging in the sessions to bring it about. I think even members of old guard would admit now that it was necessary growing pains. The old IMO had been very much a club, whereas when you become a treaty body, you are exposed to all the world politics that everybody else is. If Spain is in the dog house then you have to solemnly vote Spain out even though you think differently. It was the watershed series of meetings and because it was well organized and a fair number of parties were planned for the delegates, the watershed was crossed relatively peacefully.

**DWP:** It has been said that if you stayed in meteorology you would have played an important role in the World Meteorological Organization as Secretary-General or President. When you left the service, was it difficult to turn your back on this possibility?

**McT-C:** Well I wouldn't have been Secretary-General because I was perfectly happy that Arthur Davies was there. I would never have run against him because he was doing a good job and he was somebody I could talk to. When you've got the inside track, you don't rock the boat.

I would have had an opportunity to become President and I would have enjoyed that. Sure it was hard, you don't turn your back on a quarter of a century without regrets. We were within sight of getting a new building.

**DWP:** What association had you with the University community and the Provinces before you took on the challenge at Simon Fraser?

**McT-C:** Because of our problems of recruiting and because we were very close to the U of T, I was appalled at the short-sightedness of the provincial governments in funding the universities. The universities were going to be made the whipping boys for the politicians who were refusing to see what was going on and provide the financing. More and more in my public speaking I had been using the shortage of meteorologists and saying that the reasons that we couldn't give the service being demanded of us was because the governments were being completely unfair to the universities. When the opportunity came along to put my effort where my mouth had been, it was just irresistible. I was perhaps conceited enough to think I knew how to work with governments either provincial or federal to help change the level of funding.

I knew I could work with the provincial government because I had that row over the closing of the Victoria station. I felt that if the new university was going to be built, perhaps I had the talents to do it. There was much regret but it was just one of those decisions; you have to either fish or cut bait, you can't sit on the fence.

I have no regrets and it allowed me to prove a lot of things. I was completely disgusted with the speed Public Works had made in planning this building. I had the opportunity to prove what could be done. I went to Simon Fraser University and we accomplished \$18 million dollars of construction in 18 months. Building the university with all its chemistry, physics and biology labs and libraries was far more sophisticated than the Dufferin Street building. The faster you can get the building built, the lower the overhead.

There were other attributes. I could still try to influence the universities collectively to stay in meteorology in a realistic way. One must remember that U of T made their first meteorological appointment in 60 or 80 years at the urging of Andrew Thomson when Allen Brewer came over from Oxford. A little while later Roland List came over but that was right at the end of Andrew Thomson's term of office. The McGill group got together a little earlier than that but they were highly specialized at the start.

Academic meteorology was on a very tenuous footing at that time and I felt, being inside a Canadian university's organization, that I could help a little on that. I had a secret desire to try teaching a little meteorology to biologists because it always struck me as odd that biologists graduated with no knowledge of the environment in which their fauna and flora lived. Most of them still come out completely illiterate in terms of the environment in which their creatures live.

In all my involvement concerned the challenge of trying to ease the university's situation in one province as well as tackling a job that everybody said was impossible. Nobody believed we would open in September 1965. Part of the time even my own Board of Governors wouldn't believe it.

**DWP:** Would you mind commenting on the government's choice for your replacement, Tom How?

**McT-C:** Tom was a classmate of mine at U.B.C. He was simply a wrong choice. He had not had formal meteorological training.

I was instrumental in getting Tom into the met service. He and I both specialized in spectroscopy at UBC and he went on to get what I have always considered a very cheap PhD in spectroscopy at Purdue University. No slur intended on Tom How or Purdue. It was just that physics at that time had focused on spectroscopy and universities were giving people PhD's for devising a new kind of discharge tube, putting some element in there and analyzing the spectral. And that is a cheap PhD. A lot of physicists got through that way. Tom could have done a good PhD if he had gone to another university.

When we were desperately keen for more senior meteorologists during the war, I told John Patterson about Tom How who was then working in Edmonton. John Patterson contacted him, I followed up with a letter telling Tom How I found meteorology. I told him because he had no formal training. He had to be willing to sit down and read so that he could understand it. Tom joined but he didn't read. But to be fair to him, it was during the war and the Americans were developing the North West staging route so he was pretty busy. He had no depth of knowledge in meteorology and he wasn't a robust person anyway but very conscientious. When I heard they had picked him I knew it was a disaster because he didn't have the scientific background to provide the leadership, he didn't have the stamina and his consciousness would make him worry himself sick. I didn't predict that he would have a heart attack before he ever sat in the Director's chair, but I knew he wouldn't last long. Fortunately, it worked out all right because of the heart attack, which he took as a warning. He backed off, went to the Region in Vancouver and is still alive. If they had asked me I could have told them that he was the wrong choice.

**DWP: Did the public opposition in the newspapers and voiced in the House of Commons, surprise you?**

**McT-C:** You'd get that kind of reaction anytime a westerner was chosen to top an Ottawa bureaucracy. That wasn't specific to Tom How at all. I think you can get it even worse now.

**DWP: Allen Brewer was quoted in the Globe and Mail as saying, it was a mistake, the position is basically a scientific one that requires a considerable scientific talent. Did you agree with his comment?**

**McT-C:** Yes. And Tom didn't have it even though he had the PhD.

**DWP: You were active in the Canadian Branch of the Royal Met Society as councillor and President. Did you support the move to have an independent Canadian meteorological society?**

McT-C: Oh yes. We formed the Canadian Branch soon after the war on the road to autonomy. We wanted to take it in steps because we were still small. The Branch was carried by the met service almost 100 percent. We were a long way from being able to stand on our own feet. I guess CMOS still gets a fair amount of hidden subsidy from the met service.

DWP: **How effective has the Society been in furthering the advancement of meteorology in Canada?**

McT-C: It's been up and down. I think it is on the upswing now. You can never tell until you can look backwards. It was something that had to happen and I was delighted when they welcomed the oceanographers into it. I think that it was an absolute must. I don't think its influence has been as spectacular as I would have hoped. I guess, it requires greater strength in meteorology outside the Canadian meteorological service before it would really have the impact. But I think it needs support because in the long run if you've got a professional, you've got to have a professional society. It is as simple as that.

DWP: **You once said that joining one or more professional or learned societies is both the responsibility and a privilege of the professional. However, to some being a member just gets you the journal. Do these scientific societies offer more than just that?**

McT-C: They have to. Quite apart from the journal are the contacts that meetings establish. You go to an annual meeting and meet somebody who you have been wanting to meet. That may then flourish into direct contact, direct correspondence or exchange of visits. Eventually you come to look on it purely as something that the two institutions you belonged to have worked out, where in fact if you sat back it was the meeting of that professional society that established the contact.

That's why I think any practising meteorologist in Canada should belong to both the CMOS and to the AMS. You must go to both meetings to find out who is doing what. There are younger people coming along and if you keep your eyes open you can spot the winners and get to know them.

I can still remember the anniversary meeting that the U.S. Weather Bureau sponsored and the AMS held in Washington, 20 years ago. After Charney had given his paper on modelling the atmosphere, this fellow gave a paper on modelling the climate. He was treated with derision. I can still remember standing up and saying "Now look chums you better listen to this fellow all over again because I think he is pointing the direction." There were several of us

who took that attitude and that fellow got the support that might have been missing in his own institution. If you listen to some of the young people, they are still trying to cut their spurs and they haven't got the blinkers on. You can see possible future sources and I know of no other way of getting that. You don't get it out of reading the journal because maybe the bright young fellow has yet to convince the journal to publish his screwball ideas.

When you listen to him you can get a feel for what kind of intellect he has. I think the meetings are vital because it is hard for meteorologists to be omniverous. There is grousing about the large annual meetings but certainly the discipline meetings you've got to go to.

I hope that CMOS more and more will permit many specialist meetings co-sponsored with the AMS. This year there are two or three jointly-sponsored specialty meetings. That is something that no other kind of organization can really carry.

**DWP:** Of all the events that you have participated in, is their one that stands out for you?

**McT-C:** I will never forget the arrival of the first trans-Atlantic flight. I received word from Peters that Captain Wilcox in the Caledonian and Harold Gray in his Pan-Am Sikorski Clipper had landed safely. Few people remember that is was a very slim majority in the British House of Commons that agreed to spend the money to do the job. This was 1936-1937. There were a lot of disbelievers.

**DWP:** On both sides of the ocean?

**McT-C:** The key decision came from the British because they had the C-class flying boats and the determination. You see it all started with the determination of the British Government who felt that in order to hold the British Empire together, they would have to fly the mails to all corners of the Empire just to bring them closer together. That was one of these magnificent social decisions. The MPs didn't have a clue how it was going to be done. Most of them knew nothing about aviation but they just felt that the Empire bonds were weakening as a result of the depression and that something dramatic had to be done to pull the Empire together.

The C-class boat was designed to do that. They did some simpler routes down to the colonies in Africa where they were flying tropical weather which was easier. But the star in the coronet was the Atlantic because that was recognized as the toughest and

the most rugged. Once the British decided to go, the U.S. had to. They wouldn't admit that they were seconded to anybody. They didn't want to come to Canada. They were going from Botwood to New York which was fair enough. The British had to end up in Montreal and so Canada was in there both owning a chunk of the territory that people were going to fly over and really having an interest in the western part of the Atlantic. In those days we had one or two statesmen like C.D. Howe who could see beyond tomorrow. The Canadians were involved and Newfoundland had to be because geography had put them where they were. Britain was paying Newfoundland's way. They were bankrupt. The excitement of having accomplished it, I'll never forget.

I think the excitement of creating ICAO and the excitement of the first Ferry flights of the little Hudson bomber are memorable. We knew that the government would continue the flights even if only half of them got there. All of them arrived safely.

When the facsimile network rolled it was also a pretty proud moment. Anytime you are out ahead of the rest of the world it is exciting. The flying of the first meteorological satellites was a big occasion all around the world and knowing the players and having been a little on the inside was tremendous.

Of course Simon Fraser was a challenge. The opening of that was pretty dramatic. We had Lord Lovett who was head of the Fraser Clan and had been the war-time head of the Commandos - a magnificent man, a real leader. We had him for the opening convocation address and he really electrified the audience.

**DWP:** More recently, I suppose your efforts in directing the clean-up of the Chedebucto Bay oil spill are well-remembered.

**McT-C:** Not with any pleasure, but we had a modicum of success.

**DWP:** What role did your on-site meteorological office play in the Chedebucto Bay disaster?

**McT-C:** One of the reasons that we were at least partially successful was that I had a dedicated meteorological office right at my headquarters in the Port Hawkesbury Motel, a twenty-four hour service. I had to know where the oil was moving next because of lot of it was still afloat and moving - driven by the wind and the current. There were three million gallons still in the stern section under a hundred feet of water. We developed the technology of pumping it out but it was a wild stretch of water and we had a big oil barge into which we were pumping. A U.S. Navy salvage vessel that we borrowed from the Navy (Canada had no vessels of this kind) had



to stay out on station. We had the barge anchored with ten inch poly propylene rope and at forty knots that rope started breaking. We were working against time. They had to stay on station until it reached forty knots when they had to drop everything, get off and run.

We had corraled all the ten inch poly propylene in North America because it is normally only made to order for large freighters and they only weave it firm. There was no time to get any woven. We had to scrounge every ship chandler in North America to get the rope we needed.

The pressure was immense and the met office had to keep track of the wind and give me an hour's warning. The pressure was so great the U.S. skipper of the Curb got a heart attack and had to be sent home. In the beginning, we had several hundred soldiers all around the bay working on cleaning up the beaches. You had not only to keep track of them but you had to warn them of any impending weather. If the military decided that it was going to be a fine day, then all the raincoats are left in the barracks. They don't take unnecessary equipment along. If it rained the men got soaked without raincoats and the officers had to take them back to the barracks and no work would get done.

We had a flotilla of World War 2 small landing craft on which we mounted the slick-lickers. They can't stand much on a sea. I wanted them to stay on the job as long as they could but they had to have enough warning to run for cover before they got swamped. There was a lot of pressure on the met office.

**DWP:** What about any significant weather events that you remember?

**McT-C:** The event that all of us in Toronto remember is Hurricane Hazel. That was a wild night.

**DWP:** Was there any criticism directed at the Toronto weather office?

**McT-C:** No, because Fred Turnbull was 100 percent correct but nobody would believe him, that was the problem. The forecasting was right on. As Betty Kennedy says in her book perhaps we should have made more noise to the local media. The public is far more sensitized to local disasters now than they were back then, far more.

No, there was no real flack. You always expect a bit in the newspaper or on the radio, people seeking headlines but there was nothing sustained. The local governments and the police were saying we were told and we did our best but nobody would move.

The police went around door to door in the community that suffered most of the drownings, pleading with people to get out of their houses and move to high ground. They wouldn't go.

When the eye of the hurricane was overhead, the head of TTC phoned Fred Turnbull and said, "Can I put the vehicles back of the road, the hurricane is over?" They just had no comprehension that the hurricane had an eye.

**DWP:** Are there any weather memories from your days at Newfoundland that come to mind?

**McT-C:** In Newfoundland, there were three things that I remember. The first was the period of forty days and forty nights of fog. The pilots nicknamed me McFog.

Shortly after we arrived at Gander, I knew that we had to understand the snow regime. Some true Nipher shields made by Bill Middleton were shipped down. They don't use the true one now, but these were built to the original specifications. I started measuring snow and running snow courses accurately with Nipher-shielded gauges and found that drifting of snow off the airport penetrated the forest for three miles. Previously, I had no idea that there would be that degree of penetration.

The other was that all our meteorological fears about Gander were confirmed. The airport should never have been built there. It should have been built on King's Ridge above Botwood. But when the siting party came out from Britain to look at the prospective sites, it was a hot day and they wouldn't climb up King's Ridge. They never looked at it. We knew we were going to have a lot of snow trouble whereas Botwood had very little snow, was several degrees milder, and had a deep water port. The building material could have been brought within a half mile of the site with no train transport.

**DWP:** Well Dr. McTaggart-Cowan, I've run out of questions and almost out of tape. We have spent five hours together reliving some fascinating Canadian history. You have been very generous with your time sharing your experiences with me so that others could listen to and read about them also. I am simply delighted with what I have on tape. Thank you so very much.