ENVIRONMENT CANADA

ATMOSPHERIC SERVICE

ENVIRONNEMENT CANADA

SERVICE ATMOSPHERIQUE

ZEPHYR

SEPTEMBER 1971 SEPTEMBRE

1871

1971

ZEPHYR

SEPTEMBER 1971

Published under Authority of the Assistant Deputy Minister
Atmospheric Environment Service

Editor: B.M. Brent

JOHN PATTERSON M.A. F.R.S.C. 1872–1956

Mr. J. Patterson, M.A., F.R.S.C., Director of the Meteorological Service of Canada 1929–1946.

This is the seventh in a continuing series of biographies of the early Directors of the Atmospheric Environment Service written by Dr. Andrew Thomson.

John Patterson was born of Scottish parents in Oxford County, Ontario, on 3 January 1872, one of a family of thirteen children. He was brought up on his parents' farm and after receiving his early education at the local primary school, two and a half miles from his home, he attended the collegiate institutes at Ingersoll and at Woodstock, Ontario. He subsequently taught in a public school for five years to obtain the means to pursue his studies, intending to become an engineer. He entered the School of Practical Science, now the Faculty of Applied Science and Engineering, at the University of Toronto in 1896, and graduated in 1899 in the three-year course in civil engineering. Finding the courses not enough to occupy his energies, he also registered in the Faculty of Arts, taking the honours course in mathematics and physics, along with his engineering studies. During his fourth college year he was able to devote his whole time to his Arts course so that, when he graduated, he won the Gold Medal in Physics and also the 1851 Exhibition Science Research Scholarship, being the first winner of this scholarship from Toronto. This enabled Patterson to carry on postgraduate study for two years under Sir J.J. Thomson at the Cavendish Laboratory, Cambridge, where he obtained the degrees of B.A. in 1902 and M.A. in 1907.

In 1903, Patterson became Professor of Physics in the University of Allahabad, India, and in 1905 was appointed to one of the newly created posts of Imperial Meteorologist to the Government of India. During this appointment he was actively interested in warnings of cyclones and in the public weather forecasts, which were issued only once per day. The great Indian earthquake of 1905 took place the first morning after Patterson took up his meteorological duties at Simla, and led to the establishment there of a seismograph which he set up and attended.

He returned to his homeland to accept the newly created position of Meteorological Physicist in the Meteorological Service of Canada. During World War 1 Patterson took an active part in the design and operation of the experimental helium extraction plants sponsored by the British Admiralty to obtain helium for lighter-than-air ships. The late Sir John McLennan and Prof. John Satterly were associated with Patterson on this project.

The first plant was erected about four miles from Hamilton close to a natural gas well. With borrowed liquid air equipment, suitably modified, a gas mixture of helium was extracted from the natural gas, but the mixture was only a very small fraction of the total natural gas coming from the well. Subsequently a natural gas well was located in Alberta producing gas with a content of helium, which was much the richest source in the British Empire. Although the first World War was over, the British Admiralty gave approval for the construction of a second helium plant near Calgary. Patterson was placed in charge of its construction and operation until his recall to duty at Toronto in September 1919. Altogether 60,000 cu. ft. of helium mixture, having 60% to 90% pure helium, was extracted with the plant capable of producing 30,000 cu. ft. a month. The British Admiralty closed the Alberta plant in April 1920 on account of the discovery of natural gas wells in Texas, which produced gas in greater quantity with a much higher helium content than the wells in Alberta.

After World War I, Patterson returned to the Meteorological Service, continuing his earlier investigations on the upper atmosphere. He modified the Dines meteorograph for Canadian use to reduce the risk of destruction of the record when the instrument struck the ground. He also developed the Canadian pilot-balloon program and devised a simple procedure for computing the velocity of the upper winds from the flight observations. Patterson was mainly interested in wind and pressure instruments. He will perhaps be best known for the development of the three-cup anemometer which he originated and which, he was able to show, had definite superiority over the four-cup type. He also made intensive studies, along with others, on improving the anemometer by beading the edge of the cup and

changing the shape from a hemisphere to a cone with a straight lip. Later, he developed a satisfactory electromagnetic anemograph for recording wind speed and direction.

Until 35 years ago, 75 percent of the mercury barometers shipped to Canada arrived broken, with the metal parts contaminated by mercury. Shortly after World War I, Dr. Patterson designed a barometer, for manufacture in Canada, which combined the advantages of a Kew Barometer with the portability of the Fortin barometer. This instrument, now known as the Patterson barometer, can be shipped to any weather station in Canada with little risk of breaking. He also developed an almost automatic procedure for filling barometer tubes with pure mercury, a method still in use today, in which the boiling of mercury is eliminated and there is no danger of breaking the barometer tube.

He was appointed Assistant Director of the Canadian Meteorological Service in 1924 and Director in 1929, the title being changed to Controller in 1936. As Director, or Controller, he was responsible for modernizing the Service and encouraging the introduction of the latest developments in all branches of meteorology. He organized meteorological services for Trans-Canada Air Lines and for the Canadian side of trans-Atlantic aviation, and with the outbreak of the Second World War, for the Royal Canadian Air Force. He retired from his official position on 1 December 1946.

Dr. Patterson was on the executive of the Royal Canadian Institute from 1911 to 1939. From 1911 to 1918 he was honorary secretary; a member of the Council from 1918 to 1928 and from 1933 to 1939; second vice-president from 1928 to 1930; first vice-president from 1930 to 1932; and President from 1932 to 1933. During the almost forty years Patterson was on the executive of the Institute, he contributed greatly to its expansion. The Institute had remained fairly static from the time of founding in 1853 until 1910 when the attendance at the public meetings was about thirty or forty, and in bad weather there might not be a dozen. By 1939, despite the financial depression of 1933, the membership had increased to 1,300 with attendance at weekly meetings reaching a thousand.

Patterson was elected a fellow of the Royal Society of Canada in 1918, was its honorary editor from 1928 to 1938 and subsequently was President of Section III of the Society dealing with the physical sciences.

He was elected into Fellowship of the Royal Meteorological Society on November 17, 1920 and on January 19, 1941, he was elected to the very distinguished group of about a dozen meteorologists who at any one time are Honorary Fellows. On this side of the Atlantic, Patterson was elected President of the American Meteorological Society for 1930-1932.

Patterson's wisdom was greatly respected in international meteorology and he represented Canada in numerous conferences and committees. He was President of the Commonwealth Conference on Meteorology in London, England, in 1935, and was President of the W.M.O. Technical Commission in Instruments and Methods of Observation, 1946-1953. From 1940 until 1947 he was honorary professor of meteorology at the University of Toronto.

A very happy event in India for Dr. Patterson was his marriage to Margaret Norris, M.D., born at Staffa, Perth County, Ontario, who had gone out as a Medical Missionary and was in charge of the Seward Hospital of the American Presbyterian Mission at Allahabad. For 50 years Mrs. Patterson created an ideal home life for her husband. They had one son, Arthur J. Patterson, who was born in Toronto.

Patterson belonged to the Presbyterian Church (later the United Church of Canada) and took an active part in the Congregation to which he belonged, carrying out his duties as an office-holder (elder). His religious faith pervaded his daily life and gave him a

quiet tenacity of purpose that carried him triumphantly through frequent periods of delay and disappointment. He was a non-smoker and was strongly opposed to the drinking of alcohol. For a few years prior to the Second World War, he was a member of a Curling Club and devoted the one evening a week he felt he could spare from his office work to playing in a team.

Patterson obtained his greatest pleasure in his work. He loved designing instruments and carrying out his administrative duties. Fortunately, he had a strong constitution so that he was able to work for ten or twelve hours a day for many years without taking sick leave or the authorized annual holiday. After his retirement from official duties, he continued to come to the office daily and carried on his writing and instrument work until six weeks before his death, which occurred on 22 February 1956.

Dr. Patterson made a notable contribution to the advancement of meteorology in Canada and abroad by his untiring energy, his sound judgment and the integrity of his character.

MARGARET PATTERSON – MAGISTRATE

MARGARET PATTERSON
Treated justice with dignity

From the Toronto Telegram July 17, 1971
Nostalgia – George Kidd

Magistrate Margaret Patterson wife of John Patterson Director, of the Canadian Meteorological Service was something of an enigma.

On one hand she won the affection of friends and acquaintances by her warmth, her sincerity and her understanding. She even won the respect of King Edward VII.

On the debit side she was feared by those who came before the bench in Toronto's Women's Court. She was the target of strong controversy from City Council and was finally severely censured by the attorney-general's department.

And then she was fired.

Margaret Norris Patterson was born in South Perth in 1877 and after a distinguished career in medicine she was appointed a magistrate in Toronto, the first woman to hold such a position in Eastern Canada.

Prior to this appointment her star shone brightly. She had graduated in medicine in 1899 and went to Europe for post graduate work. This led her to India where she became superintendent of a hospital for women. There were many touches of brilliance in this period of an active life.

When a bubonic plague ravished the provinces she did what she could and because of this labor of love she was recognized by the reigning monarch.

She was Lord Kitchener's advisor in dealing with a major problem.

"We have to do something about the camp followers," he said.

"We'll dispose of them," she said quietly.

This experience may very well have given her an insight into the women who were eventually to appear before her for trial.

She returned to Canada in 1911 and immediately took up social service work, a task that was very close to her heart and understanding. When the influenza epidemic hit Toronto she worked around the clock, giving lectures twice daily and training over 2,000 nurses.

And then, in 1921, she was appointed a magistrate.

"She has no legal training," said Mayor Tommy Church. He did not like the idea of the city having to pay her $3,500 and also felt that there were already enough magistrates.

But Magistrate Patterson was there and she treated justice with the dignity it merited, if not always with the expected decisions.

The stormy side of her career was beginning.

It was not long before the Trades and Labor Council pointed her out as "a cold-blooded woman." Many individuals who had stood before her in court agreed, but there were many who felt that justice was being well served.

She disposed of cases with a strong knowledge of the law and her court was always orderly. Sometimes it moved leisurely.

"We have lots of time," she commented. "We're always giving it to people here."

These bright touches of humor came at unexpected times and those in court were never quite sure whether to smile, laugh or just pass the whole thing off. Lawyers were seldom comfortable in her presence.

Once, when a young girl seemed to have fainted while appearing before her, the magistrate said;

"You threw yourself down. Now you can pick yourself up."

The girl did.

On another occasion she excluded the press from the court room because a case she was hearing would eventually go before judge and jury.

"I excluded the press only in the interest of British justice, which I try to give to everyone who appears before me," she said.

Not everyone agreed with this statement. One of the greatest sensations that hit her was when she sentenced a man to 10 days because he could not pay a debt of $1.50. She was called to the office of the attorney general and severely reprimanded.

Things then continued along a normal and smooth road until the Case of the Biting Dog landed on page one of the newspapers.

The dog had bitten a boy and the 19 year old owner, who was unemployed and with no money, appeared before Her Worship.

She gave him three alternatives. He could have the dog destroyed, pay a $50 fine or go to jail for 10 days.

"I have no money and I can't have my dog destroyed," he said. "I'll go to jail."

Once again the attorney general intervened.

In November, 1934, Magistrate Patterson was retired from the bench of the Women's Court and appointed a justice of the peace.

"Mrs. Patterson's best work has been done off the bench rather than on it," said Attorney General Arthur Roebuck.

And Mrs. (doctor, magistrate) Patterson replied:

"As you see fit to dismiss me as magistrate I decline to accept the position of justice of the peace."

Several groups protested her dismissal and hailed her reform work and her career in medicine and public service.

They were sorry she was finished but there it was. . . Women's Court was again in the control of a male magistrate. If Women's Lib had been the order of the period there would probably have been protesters.

Or would there have been?

The long, worth-while career of Margaret Patterson, so often clouded by controversy, came to an end in December of 1962 when she died.

ARCTIC PLANNING

The recent Treasury Board approval of funds for expanded meteorological Services in the Arctic, the phased withdrawal of U.S. support from the Joint Arctic Weather Stations (Alert, Eureka, Isachsen, Mould Bay and Resolute) and AES reorganization have resulted in a flurry of planning activity at AES Headquarters. Now underway are: a project to review and make recommendations on AES policy on the numbers and locations of weather observation stations (including MARS) in the Arctic; a project to develop an operational plan for the transfer of responsibility for operation of the Joint Arctic Weather Stations from AES Headquarters to Central Region, and a project to review the allocation to the Regions and Headquarters responsibilities for the administration of meteorological operations in Northern Canada within the context of the new AES organization.

The most important components of the growing interest in Canada's North are the federal priorities placed on the social and economic well-being of native and other northern residents; oil, gas and mineral exploration, development and transportation; air and water transportation; construction engineering; scientific studies and exploration; and environmental control. The meteorological requirements of these activities are beyond the capabilities of existing knowledge and facilities. The satisfaction of these demands will necessitate:

1) A substantial increase in meteorological data from the entire Arctic area;

2) Improved communications for the collection of meteorological data and distribution of meteorological information to users;

3) A modest expansion of the existing forecasting and presentation services;

4) Increased capability, through research and development work, to provide meteorological consultation services;

5) Increased emphasis on the employment of native and other northern residents in first order and climatological stations in the north.

The AES objective is that the various projects will produce recommendations which can be acted upon to bring about the required changes and integration of activities. The current fragmentation and the resulting difficulties in coordination of effort in the Canadian north is no longer appropriate to service needs which have grown vigorously over the past few years.

A.J. CONNOR, DOMINION CLIMATOLOGIST 1911-1950

By M.K. Thomas

In 1950 Mr. A.J. Connor, a meteorologist who for several decades had been in charge of the climatological work at Service Headquarters in Toronto, retired from the service. Throughout his career Mr. Connor's prime responsibilities were in the field of climatology although during his early years in the service he forecasted from time to time as a relief meteorologist and beginning in 1936 he operated and developed the frost warning service in British Columbia. During the final years of his career he was concerned with planning for the use of punched cards and other modern methods of data processing in the Service.

Abraham James Connor was born in County Fermanagh, Northern Ireland on October 28, 1884. His father, who was an Anglican clergyman, emigrated to Canada with his family in 1888. Mr. Connor obtained a degree of Master of Arts from the University of Toronto in 1907 and in June of the same year was employed by the Meteorological Service of Canada.

In the Service of sixty-five years ago it was not easy for the Director to obtain authority and funds to increase the size of his staff, especially by hiring university trained people. Inspection of the annual reports of the Service for a number of years prior to Mr. Connor's employment reveals that submissions seeking permission to hire such a scientist had been made for at least 15 years. In his annual report for 1891-92 Director Carpmael explained how the Meteorological Service was divided into a forecast branch which "engaged in the work of utilizing the observations taken simultaneously over the continent and transmitted by telegraph to Toronto from whence issue storm warnings and weather predictions for Canada" and by the climatology branch which "is employed in the examination, classification and reduction of the observations taken by volunteer observers and others for statistical and climatological purposes". In his report he stated further that although publication of historical and climatological data had been continued annually since 1872 it was now necessary to deal with the comparative climatology of the country and he proposed an authoritative government publication on the climate of Canada. He estimated the work would require three years to complete and recommended the hiring of an assistant "of literary ability and experience having special climatological knowledge" to whom this work could be assigned under his direction. It was to be nearly 15 years before the position was created and Mr. Connor hired in June 1907.

Although Mr. Connor was soon to head up the climatological work in the service there were others at headquarters who had been responsible for the Climatological Branch before he arrived. Mr. R.F. Stupart, who succeeded Mr. Carpmael as director in 1893, was actively interested in climatological studies, and in 1894 had obtained authority to classify Mr. Hugh V. Payne as a "Climatologist" a title which subsequently became "Dominion Climatologist". Mr. Payne had joined the service in October 1875 and had been a Probability Officer and an Inspector before getting his new title. Mr. Payne died in 1911 and Mr. Connor became responsible for the climatological work of the service that year and for many years he was known as the Dominion Climatologist.

During Mr. Connor's early years in the service most of the weather forecasting was done by the Director R.F. (later Sir Frederic) Stupart and his deputy B.C. Webber. The other forecaster was W.D. Allen who became a Lieutenant-Colonel in the Canadian Army and was killed during World War I, while assistants being groomed as forecasters included H.B. Cody and Frank O'Donnell who ultimately was in charge of the Headquarters forecast

office until his retirement in 1946. Professionals at Headquarters included H.V. Payne, his brother F.F. Payne, librarian, W.E.W. Jackson, a magnetician who joined the service in 1904 and served as deputy director from 1929-1936 and John Patterson who joined in 1910 as a physicist and became director from 1929 to 1946.

For the first decade or so of his service Mr. Connor was called upon from time to time to assist in the forecasting work and he never lost his interest in synoptic analysis and forecasting. In the mid 1930's, following requests for frost warning services from the fruit growers in the Okanagan and other valleys in southern interior British Columbia, the Service decided to operate a frost warning service out of Penticton each year and for the last 15 years of his career Mr. Connor spent 2 months each spring at that work.

The initial volume of a comparative climatology in Canada, which was first promoted in 1892 and for which Mr. Connor had been hired in 1907, was published in 1915 as Mr. Connor's report on the *Climate of British Columbia.* Five years later his *Climate of the Prairie Provinces* was published and it is interesting to note that although both reports were typeset and bound, covers were not put on them since it was intended to bind together sets covering the climates of the whole country. During the early 1920's a manuscript for the climate of Ontario was prepared but it was never published and it is uncertain whether or not the manuscripts for Quebec and the Atlantic Provinces were ever completed. During his career, Mr. Connor wrote and published two major studies on the climate of Canada – the first appearing in 1936 as Part J of the Koeppen-Geiger *Handbuch der Klimatologie* while another version of the Climate of Canada was published in the 1948-49 Canada Yearbook.

In addition to his Canada-wide climatological publications, Mr. Connor prepared and published several regional studies. In 1930 he published a temperature and precipitation study of northern Canada and in 1931 his climate of the Prairie Provinces appeared in a special Dominion Bureau of Statistics publication. Drought in Western Canada was the subject of another article in the Canada Yearbook in 1933 and in 1937 he contributed a study on climate and weather for a Department of Mines and Resources publication *Canada's Western Northland.* In 1939 Mr. Connor wrote *The Climate of Manitoba* which was published by the Economic Survey Board of that Province, and in 1947 he wrote the meteorology portion of a government report entitled *Canada, New Northwest.*

Although always interested in the entire field of meteorology Mr. Connor's favourite speciality was undoubtedly agricultural climatology. As early as 1914 a branch at Headquarters had been established to deal with this and although different professionals were hired to be responsible Mr. Connor provided continuity and eventually absorbed responsibility for agricultural climatology and meteorology in his Climatological Section. In 1918 he published a study on the relation of the weather to the yield of wheat in Manitoba which was followed in 1922 by another study on climate and wheat growing. His Precipitation in Canada, published in the 1926 Canada Yearbook and subsequent publications on the climate of the Prairie Provinces with special regard to drought were the result of his interest in Prairie agricultural meteorology The final publication credited to Mr. Connor was the *Frost Free Season in British Columbia* which was published in 1949.

In 1934 Mr. Connor was given professional support in the Climatological Section when C.C. Boughner joined the service. Peter Kerr who commenced duty in 1912 and retired in the early 1950's was Mr. Connor's chief technical assistant for many years. In 1940 when the section moved from 315 Bloor Street West to a nearby building (beginning the exodus from the old headquarters building which was finally completed in 1971) Mr. Connor did not move and Mr. Boughner became responsible for the day to day running of the section. During the early days of World War II Mr. Connor's advice was frequently

sought with regard to the locating of RCAF training air fields in Canada and the orientation of runways at the selected sites. Others still at Headquarters who served with Mr. Connor and Mr. Boughner in the pre-war Climatological Section are Miss Hilda Burtch, who was Mr. Connor's secretary, Andrew Petrie and John Laraway. In addition many senior technical and professional employees of the service can recall brief periods 25 to 35 years ago when between postings, they were temporarily put under Mr. Connor's direction at Headquarters.

Mr. Connor was a Fellow of the Royal Meteorological Society and served as President of the Canadian Branch in 1948-49. After his retirement Mr. Connor continued to reside in Toronto where he died in his 71st year on June 17, 1955.

NUMERICAL FORECASTING WITH TELESCOPING MODELS

The standard grid length used in numerical weather forecast models in North America is 381 km at 60°N on a polar stereographic projection. This is more than adequate for representing the available upper air data, but not for the computation of derivatives. As much as 40% of the errors of numerical forecast models can be attributed to truncation and aliasing errors introduced by the finite difference approximations. To reduce the grid length by one half (which reduces the truncation error by a somewhat larger fraction) unfortunately increases computation time by a factor of eight. A compromise, now gaining wide acceptance, is the telescoping model, in which the numerical model is integrated over a course grid covering about a hemisphere and then repeated over a finer grid only over the area of interest using boundary values from the large scale model.

The telescoping technique has been applied to the C.A.O. operational baroclinic and quantitative precipitation forecast models. The final grid is a 33 x 37 mesh with half the standard grid length covering all of North America except part of Alaska and Mexico. The fine grid baroclinic, surprizingly enough, produces smoother looking forecast charts due to the reduction in small scale noise generated by aliasing. The fine grid QPF, on the other hand, predicts noticeably more detailed patterns of vertical motion and precipitation. It is hoped that the verification statistics now being compiled will warrant the issue of these new products to the field offices.

The telescoping technique has also been applied to the primitive equations model under development by the Dynamic Prediction Research Unit. A one level version has given excellent results. The multi-level version involves some rather formidable boundary conditions, but programming is nearing completion and trial runs are promising. Operational availability of this model must await a larger computer.

NORAD CERTIFICATE OF ACHIEVEMENT

The NORAD Certificate of Achievement was awarded to Mr. D.A.R. Mettam in recognition of his outstanding work while on active duty in the USAF 4th Weather Wing. He was on active duty at Major rank for a three-year period of service, during which time he served at Topsham, Me., Steward AFB, N.Y., and Colorado Springs, Colorado.

Presentation of NORAD Certificate of Achievement to Major Mettam by
Col. L.J. Newland, Commander 4th Weather Wing

MACKENZIE RIVER VALLEY – BEAUFORT SEA CLIMATOLOGICAL STUDY

In an effort to provide Arctic exploration and development and their attendant services with the most meaningful and prompt consultative and applied climatological support while, at the same time, minimizing repetitive analyses and consultation in response to individual demands, a regional approach to studies of northern climate has been adopted. The Mackenzie River Valley – Beaufort Sea region has been selected for initial intensive study. Mr. B.M. Burns, on project assignment to the Climatology Division, commenced this study on September 10. Completion is scheduled for April 1972 with publication by July.

Extensive use will be made of available information. The relative sparcity of climatological data in northern Canada necessitates the use of estimation techniques, including synoptic weather studies, to obtain meaningful probability estimates of extremes of moisture, temperature, winds, and similar elements, as well as duration of critical weather types. The energy exchange, snow cover, wind chill, inversion frequencies and elements which individually or in combination are important in the resolution of heat flow ecology and environmental quality problems will also be treated as completely as data permits.

CLIMATOLOGICAL SERVICES COURSE

Climatological Services Course No. 2 for meteorological technicians began September 13 at ASTS in Ottawa. This is a five-week course of which four weeks will be given in Ottawa and the final week from October 12 to 15 at AES Headquarters in Toronto Nine meteorological technicians from the Regions and Headquarters are taking this course to improve their qualifications in their present positions or for advancement to climatological services specialist jobs in the Regions. The course has been organized by J.E. Parker who, along with G.R. Kendall, has spent two to three weeks at ASTS with the course. ASTS meteorologists are handling most of the lectures, although other Headquarters' Climatology Division meteorologists have participated for short periods.

OURAGANS H.W.

PROJECT HAILSTOP 1971

The Alberta Hail Studies project saw its beginning in 1956 as a program to systematically observe the Alberta hailstorm in order to gain knowledge which would lead to the design and testing of effective hail suppression techniques. This project is sponsored jointly by the Atmospheric Environment Service, the National Research Council and the Research Council of Alberta; scientific support is provided by the McGill Stormy Weather Group under contract to the Atmospheric Environment Service.

Due to the complex nature of the hailstorm, the Alberta Hail Studies project, during the years 1956 to 1969, concentrated its efforts on observing the Alberta hailstorm. A complete and intimate understanding of the hailstorm has not yet been achieved. However, still based on a substantial background, the Alberta Hail Studies project entered a new era in the summer of 1970. "Project Hailstop", an integral part of the Alberta Hail Studies project, began as an experiment to test a new and promising hail suppression technique. A T-33 aircraft from the National Aeronautical Establishment overflies a developing hailstorm cell at about 21,000 ft. while releasing into the storm approximately 10 pyrotechnic flares each containing 50 gms. of silver iodide. These flares fall through the updraft region releasing the silver iodide in the form of trillions of small ice nuclei in a target zone between -5C and -15C. This target zone is pre-determined by estimates of the in-cloud parameters obtained from computer model calculations performed in advance. The artificial ice nuclei released within the updraft are available to form many small competing ice particles rather than the relatively few but large devastating hailstones produced naturally within such storms.

National Aeronautical Establishment T-33 Aircraft with Seed Flare Rack on Underside.

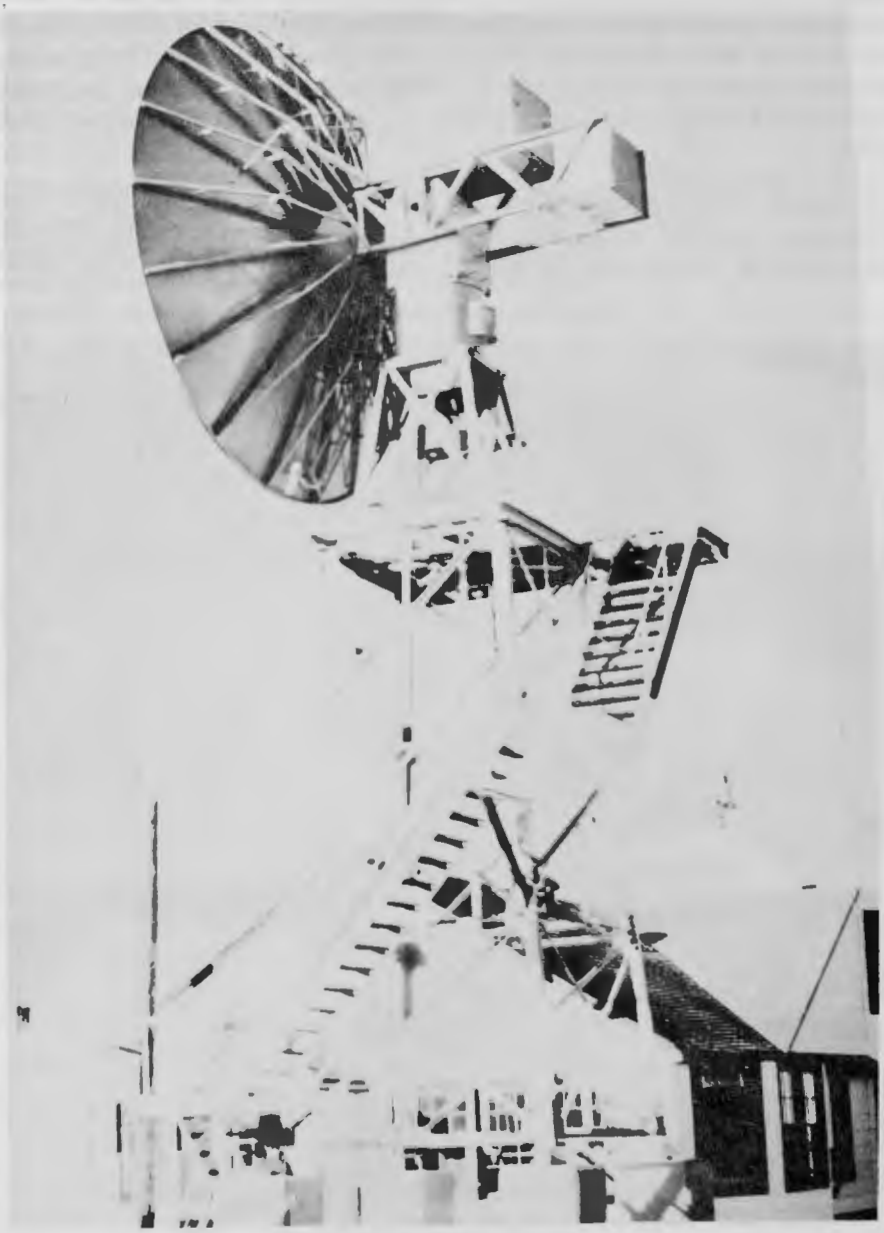
"Project Hailstop 1970" provided a brief initial test which proved that the complex logistics for such a hail suppression experiment could be met. "Project Hailstop" has been continued in 1971 in expanded format. A larger experimental area was used and the peak eight week hail period during June, July and August was designated for the hail suppression experiment. During this period approximately a dozen experiments were performed on hailstorms of various sizes and intensities.

As hailstorms are notoriously variable in their nature and place of occurrence, the evaluation of data from "Project Hailstop" is being performed by studying case by case the physical effects realized on each hailstorm seeded rather than utilizing a statistical evaluation technique. Radar data are studied for changes in the height and reflectivity structure of the storm as well as changes in the cross-polarized component. The visual appearance of the storm exterior is examined using cloud photographs taken from the aircraft and by a time lapse movie camera on the ground. Additionally, the silver content of precipitation samples collected beneath the storm is analyzed. Intensive telephone surveys of the rainfall, maximum hail size, duration, extent and intensity of hailfall in the areas affected are studied to determine changes in the hailfall as well as crop damage, precipitation efficiency of the storm and rain/hail ratios.

Although it takes only seconds for the T-33 air-craft to release a dozen flares, it is many months before even a cursory analysis can be made of the data collected from one seeding experiment in an attempt to answer the question – did the silver iodide suppress hail?

Alberta Hailstorm in Mature Stage.

Even now, this question cannot be answered with any great amount of confidence. However, a radar analysis performed on two storms seeded in 1970 has indicated that seeded and non-seeded storm cells differed both in intensity and structure. The decrease in radar reflectivity and the character of time-height-reflectivity profiles of the seeded cells could be attributed to a decrease in hail size. Due to the characteristic cellular behaviour of the hailstorm and the overlapping of hailfall patterns from adjacent cells it is difficult to determine whether the seeded cells yielded hail smaller than expected. However, an analysis of precipitation samples has indicated that quantities of silver iodide appeared in the rain and hail beneath the seeded cell. Preliminary results from "Project Hailstop 1971" appear to demonstrate that the seeding performed on multi-cellular storms caused a decrease in hail size, but that no decrease in hail size was effected in the seeding of a single-cell steady state storm.



Alberta Hail Studies 10CM Radar at CFB Penhold.

Clearly, much work has yet to be done to untangle the complexity of data obtained by Project Hailstop. However, to date the results are encouraging and will hopefully supply a clear cut and well-documented answer as to whether the droppable silver iodide flare seeding technique is a viable hail suppression method.

POLLUTION DE L'AIR ET METEOROLOGIE A MONTREAL

Depuis que la Ville de Montréal a commencé d'émettre publiquement les données de certains polluants, il est très intéressant de relier les grandes concentrations avec les systèmes météorologiques.

En effet, au printemps 1970, nous obtenions du Service de Santé les concentrations moyennes quotidiennes du bioxyde de souffre (SO_2) et du monoxyde de carbone (CO). Présentement, le même service, englobé dans la Communauté Urbaine de Montréal, nous donne à chaque jour, par téléphone, les tendances du SO_2 pour les dernières vingt-quatre heures d'une station représentative du centre-ville. En tout, il y a un réseau de quatorze stations affecté à la mesure du bioxyde de souffre. La distribution des stations se fait selon une orientation nord-est – sud-ouest et une seconde soit sud-est – nord-ouest. Ces deux lignes d'orientations passent par le centre-ville. Les postes d'échantillonnages ont été aménagés dans des endroits considérés pratiques et peut-être pas toujours représentatifs. Les sources de pollution n'en sont pas moins localisées lorsqu'on trace les roses des vents de pollution.

La météorologie est reconnue pour jouer un rôle clé dans le contrôle de la pollution de l'air. Dans cette optique nous pensons surtout aux prévisions de l'indice de stagnation où pas moins de cinq variables météorologiques en déterminent l'échelle des valeurs. La prévision de la hauteur du mélange des polluants de même que la vitesse moyenne dans cette couche sont d'autant plus importantes lorsqu'il est question de diffusion. De telles prévisions ont déjà été préparées à UL sur une base expérimentale et on peut dire qu'elles s'avèrent satisfaisantes. Il est toutefois important d'apporter quelques correctifs pour le calcul de l'indice de stagnation de Montréal. Cependant quand il est question de la vitesse du vent, le rapport du "PIBAL" est un atout indispensable. Malheureusement la hauteur du mélange ne peut être déterminée que par un profil de températures situé à Maniwaki, c'est-à-dire trop loin et pas très fidèle à la réalité de l' "îlot de chaleur" qu'est le centre-ville de Montréal.

A l'approche des mois d'hiver où le chauffage est à son maximum, nous souhaitons que les météorologistes de UL se familiarisent rapidement avec cette technique américaine de l'évaluation du potentiel de la pollution de l'air au-dessus de Montréal. A part le domaine des prévisions, le mois de février pour les trois dernières années a été scruté de tout côté. L'indice le plus révélateur semble être que pour obtenir un pic maximum quotidien de SO_2, il faut que la ligne maîtresse d'une dorsale de haute pression venant de l'ouest passe Montréal et soit située juste à l'est. Un déplacement moyen de douze noeuds à l'heure a été enregistré dans ce cas.

Ces quelques projets peuvent laisser perplexe un public mal informé mais pour le météorologiste-prévisionniste il sait que certaines configurations météorologiques ne favoriseront pas toujours une dilution des polluants. Donc, un contrôle de régularisation de l'émission devrait être actionné rapidement dans les grands centres urbains en collaboration avec le météorologiste qui peut prévoir des épisodes dangereuses de pollution de l'air.

Jean-Guy Cantin

The following have accepted positions as a result of recent competitions:

Competition 71-MET-CC-24	Meteorology (MT) 5 OIC, Weather Office Churchill, Man. – C.K. Odegaard
Competition 71-MET-CC-27	Meteorology (MT) 7 Scientific Support Officer, Ontario Region, Toronto. – W.D. Wyllie
Competition 71-MET-CC-33	Meteorology (MT) 7 Shift Supervisor Prairie W.C., Winnipeg. – C.D. Henry
Competition 71-MET-CC-18	Meteorology (MT) 4 Acting Appointment Operational Supervisor CFWO, Summerside P.E.I. – W.L. Ranahan
Competition 70-MET-HQ-17	Meteorology (MT) 5 Supervising Forecaster W.O. Edmonton. – D.C. Burnett
Competition 71-MET-CC-19	Meteorology (MT) 7 Shift Supervisor Arctic Weather Central, Edmonton. – R.C. Harvey

The following transfers took place:

J.J.C. Bourque	To CFB Chatham From CFB Bagotville
B.M. Burns	To AES HQ Climatology Division (Mackenzie Valley Climate Study) From Arctic W.C., Edmonton.
D.M. Dixon	To CFB Edmonton From Lahr, Germany.
G.W. Duquette	To METOC Centre Halifax From 22 NRWC North Bay.
T. Koolwine	To CFB Shearwater From MFWC Halifax.
D.A.R. Mettam	To 22 NRWC North Bay From HQ 4th Weather Wing, Colorado Springs, Colo.

Mrs. S.K. Lally	To W.O. Montreal From W.O. Halifax
A.J. O'Doherty	To CFB Bagotville From W.O. Montreal.
L.S. Romaniuk	To AES HQ's Administration Division (Management Development Plan Assignment) From W.O. Regina.
D.W. Shantz	To CAO, Montreal From Prairie W.C., Winnipeg.
W.J. Sowden	To CFB Summerside From CFB Edmonton.
D.W. Strang	To METOC Centre, Halifax From Ice Central, Halifax.
D.J. Webster	To CFHQ Ottawa (Management Development Plan Assignment) From CFB Portage.
G.E. Wells	To CFB Edmonton From W.O., Goose Bay.

M.Sc. Graduates 1971

L. Berntsen	To Pacific W.C., Vancouver From U of Alberta.
H.T. Beal	To Prairie W.C., Winnipeg From U of Toronto.

Education Leave

R.L. Berry	To U of Alberta From 22 NRWC North Bay.
G.D. Lally	To McGill University From MFWC Halifax.
R. Lawford	To McGill University From CAO.
J.E. Percy	To U of Alberta From W.O., Halifax.
P.L.J. Morin	To McGill University From MFWC Halifax.
L.J. Wilson	To U. of Alberta From CFB Cold Lake, Alta.
G.S. Strong	To Memorial U., St. Johns, Nfld. From CFB Shearwater

Larry Romaniuk has been transferred to the Atmospheric Environment Service Headquarters where he will join the Administration Division for a 2 year training program. Mr. Romaniuk arrived from the Regina Weather Office in mid-September where he held the position of Supervising Forecaster during the past 4 years. Other postings have seen him at Winnipeg, Gander, Churchill, Portage la Prairie and Thunder Bay.

The current administrative assignment consists of in-depth training in the Personnel Management area for the first year followed by training in the Financial Management area during the second year.

Mr. R.D. Easto was transferred from Personnel to a position as Budget Analysts in Finance, effective September 1, 1971. As an interim measure, Mr. Stan Westhaver, the R.S.S.O. Moncton, is acting as the Staff Relations Officer for the Atmospheric Environment Service Headquarters for the period September 27 to October 29, 1971.

Miss Jane Fergusson joined the Personnel Administration Section, September 7, 1971 through the Administration Trainee Program sponsored by the Public Service Commission. The program, usually two years in length, places the recent graduate directly into the Administrative work environment. At the end of this training period, an appointment is made to an appropriate occupational group. Miss Fergusson graduated from the University of Toronto with a B.A. degree in Sociology.

TRIVIA

(Halifax Herald – September 24, 1971)

"Rain by any other name is just as wet!"

Atmospheric Mumbo-Jumbo (Mail-Star – September 25, 1971)

They can't leave things alone, can they?

Time was, when we wanted to know the weather, we could call the Weather Office and ask for the weather man.

Then they made it the Dominion Public Weather Office (a bit more difficult to find in the phone book) and the weather men became forecasters – a leg up.

Just when we got accustomed to that, it became the Canadian Meteorologist Service, manned by meteorologists.

Now, says a letter in the mails this week, "the Canadian Meteorological Service, by parliamentary action, has been transferred from the Ministry of Transport to the Department of the Environment and has been renamed 'Atmospheric Environment Service.' Also, in line with this reorganization, the title 'regional meteorologist' has been changed to 'regional director'."

If someone doesn't soon put a stop to Ottawa's passion for the "new wordology" we will be forced to train "explanatorialists" to translate the mumbo-jumbo coming forth in both the official languages.

By any name, it's rain (Winnipeg Tribune – Saturday September 25, 1971

What's in a name? Plenty, apparently.

Remember when a building superintendent was a janitor? And a sanitary engineer was a garbageman? Well, things have changed for the weatherman, too. Henceforth, the powers-that-be have decreed that the weatherman is to be known as an "atmospheric environmentalist." And he doesn't work for the weather service any more; he works for the "atmospheric environment service.

N.B. The Tribune does not intend to change its weather report to the "atmospheric environment" report.

Unusual Requests (Peace River W.O. Alberta)

RCMP requests temperatures and relative humidity and wind for 12.00 p.m. August 6/71. Humidex reading requested, reason: a murder took place in a trailer court at Peace River and they wanted to know if the humidity was high enough to cause discomfort serious enough to trigger this crime. Information requested passed to the RCMP but no opinions made by the weather staff.

The Agony of Executive Failure (Time Magizine – April 13, 1970)

During the expansive 1960s executive promotions came soon and often in a long list of fast-growing U.S. companies. But all too frequently the rising members of the executive suite were hard put to handle their new assignments. "A boom market," says Pittsburgh Executive Recruiter Richard MacQuown, "can camouflage anything, including incompetence." "Now business is slowing down, and the camouflage is harder to keep up. Corporate chiefs increasingly must face the agonizing task of reinvigorating or dismissing failing executives."

The problem is surfacing in some of the biggest corporations. Yet the causes and cures of executive failure often baffle top managers. They are turning to behavioral scientists, who have classified at least three types of failing executives:

1. *The Early Flameout.* Dr. Herbert Klemme, a Psychiatrist at the Menninger Foundation, has found that many men go through a "mid-life-crisis" at about age 35. Just

around then, says Klemme, a man often faces the jolting realization that he cannot accomplish all his early dreams, and, more important, begins to think seriously for the first time about the inevitability of death. Some flameouts simply sink into depression, others start to drink heavily. In any event, their work and their careers suffer.

2. *The Climacteric Man.* Executives in their late 40s or early 50s often begin to perform sloppily in jobs they did well for years. Boredom is one reason. Paul Armer, director of Stanford's computation center, explains another reason with his Paul Principle: "Individuals often become incompetent at a level at which they once performed quite adequately." The executive may feel, rightly or wrongly, that he is undereducated, that he cannot keep up with the complexities of modern business and the talents of younger executives. Typical lament: "I'm too old to learn about this."

3. *The Indecisive Boss.* This executive is so paralyzed by fear of making a mistake that he lets major problems pile up on his desk while he becomes preoccupied with trivia. Charles Bowen Jr., president of the management consulting firm of Booz, Allen & Hamilton, recalls that "one head of marketing for a large corporation spent his first six months almost totally concerned with the decorating of his office. There were things that needed his attention, but he could not face them."

The Empty-Box Ploy. Whatever the cause, the executive who is slipping often betrays himself by telltale signs. He will work long hours, nag his staff about petty details, or replace competent subordinates with yes men. Refusal to take a vacation is an almost certain symptom. Failures are terrified that their shortcomings will be discovered in their absence. Sometimes the failures resort to elaborate – and costly – ruses to cover their traces. In one TV-set manufacturing company, for example, a vice president could not meet his production goals and shipped empty boxes to distributors. When they complained, he insisted it had all be a mistake; by that time, he had managed to finish the sets.

Coping with obsolescent executives, says Wayne M. Hoffman, chairman of Flying Tiger Lines, is "the toughest job of top management." U.S. Business often goes to extraordinary lengths to shield its failures. Next to early retirement with an extra-generous pension, the most common tactic is to move the failure to an impressive-sounding job that has no content. In fact, says Harvard Business Professor Abraham Zaleznik, he is "vice-president of nothing." The man with a lofty title, a high salary and a little to do may seem to be in an enviable position, but few enjoy it. "I have talked to many of them," says David Gleicher, a research executive at Arthur D. Little. "They are dying and they know it."

The Sternest Test. Much more intelligent – and – effective-methods could be used. Menninger's Klemme believes that many early flameouts could be prevented by competent psychological counseling, which few companies offer. Older executives could be reinvigorated by sabbaticals or company-paid refresher courses in subjects that now frighten them (example: computer technology). They could be switched from jobs in which they are getting stale to different but important assignments. A shift need not be downgrading; on the average, a man in middle management today stays in his job only 18 months before moving on.

As a last resort, the most humane method may be simply to fire the man, with an honest explanation of the reason why. "Being fired," says Los Angeles Management Consultant Thomas J. Johnston, "is another part of the executive job" – and the ability to bounce back from dismissal is perhaps the sternest test of executive fiber.

Environment Canada Environnement

Zephyr

Date: 710900

0019973E
ARCH # 2

OTM