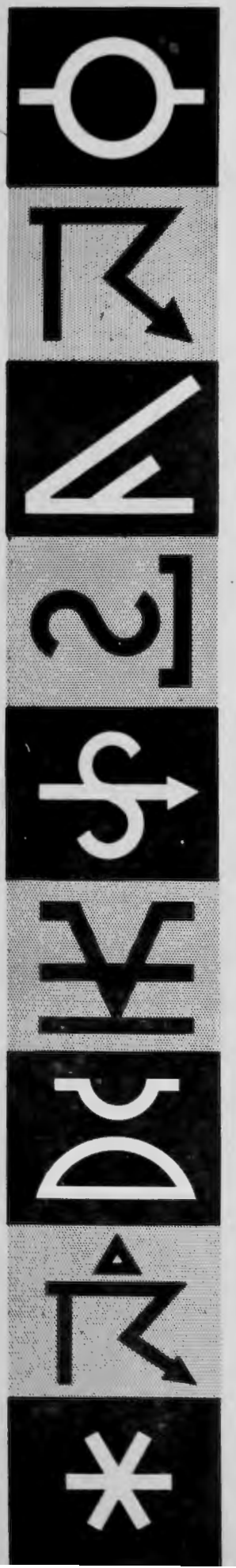

ZEPHYR

MAY 1976 MAI

Environment Canada
Environnement Canada

Atmospheric Environment
Environnement atmosphérique

ISSN 0381-3169

ZEPHYR

MAY 1976 MAI

Published Under Authority of the
Assistant Deputy Minister
Atmospheric Environment Service

Publié avec l'autorité du
Sous-ministre adjoint
Service de l'environnement atmosphérique

editor/la rédactrice: B.M. Brent

FOREST FIRE RAINFALL ENHANCEMENT EXPERIMENT
YELLOWKNIFE, N.W.T.

Beginning 27 June, scientists of the Cloud Physics Research Division, in co-operation with the Flight Research Laboratory of the National Aeronautical Establishment and the Canadian Forestry Service will be undertaking a 3 week rainfall enhancement experiment based at Yellowknife, N.W.T.

This experiment is part of a joint program designed to determine the potential of using rainfall enhancement to suppress large forest fires. Each year, large forest fires (in excess of 500 acres) burn 1.8 million acres of forest or approximately 90% of the total forest acreage burned annually. To date, conventional ground and airborne firefighting techniques have been largely unsuccessful in combating these forest fires which typically burn for 5-21 days. Annual forest firefighting costs in Canada are approximately $50 million and it is not unusual for fire fighting costs for large fires to exceed $100,000 daily.

The experiment at Yellowknife is the continuation of similar experimental studies carried out in 1975 at Yellowknife. This current phase is designed to assess whether there is a reasonable probability of obtaining useable amounts of rainfall at the ground by seeding clouds which normally would not rain. Towards this end, intensive observations are being made of the microphysical structure of the cloud prior to, during, and after seeding the cloud with silver iodide. An NAE Twin Otter aircraft equipped to undertake cloud physics observations selects a cloud for investigation and performs initial observational penetrations. Shortly thereafter an NAE T-33 aircraft penetrates the cloud at seeding level dispensing silver iodide (via end-burning pyrotechnic flares) while obtaining turbulence measurements. The Twin Otter then returns to observe the cloud microphysical structure and changes following seeding.

In 1975, particular emphasis was put on observing the initial ice crystal formation and growth processes at the seeding level. Although only four suitable cloud cases were available for study, the observations indicated that substantial numbers of ice crystals formed and grew rapidly following cloud seeding. While these observations are subject to further confirmation, it appears that it was possible to initiate a precipitation growth process in the clouds seeded. The task ahead is to determine whether this ice crystal formation can lead to an efficient precipitation growth process and ultimately to useable amounts of precipitation on the ground.

Consequently, emphasis during the 1976 field experiment will be put on investigating the growth of precipitation in cloud and the processes which affect its traverse between cloud and ground. The NAE Twin Otter aircraft will again perform initial penetrations at seeding level, but will then descend to lower elevations to observe the growth of precipitation particles. An NAE Beechcraft will fly below cloud base to monitor the occurrence and intensity of rain falling from the cloud system.

While a great deal can be learned in this manner from direct physical observations, it is unlikely that seeding an expected population of approximately 10 clouds will prove conclusively that the technique is viable. Should the 1976 experiments prove encouraging the next phase would involve a randomized statistical cloud seeding experiment.

EXPERIENCE DE PROVOCATION ARTIFICIELLE DE PRECIPITATIONS POUR PROTEGER LES FORETS CONTRE LE FEU YELLOWKNIFE (T.N.-O.)

A compter du 27 juin, des chercheurs de la Division de la recherche sur la physique des nuages, en collaboration avec le laboratoire de recherches en vol de l'Etablissement aéronautique national et le Service canadien des forêts, entreprendront, à Yellowknife (T.N.-O.), un programme de provocation artificielle de précipitations d'une durée de trois semaines.

Cette expérience fait partie d'un programme conjoint destiné à déterminer la possibilité d'utiliser la provocation artificielle de précipitations pour supprimer les incendies de forêt de grande étendue. Chaque année, en effet, d'importants incendies de forêt (plus de 500 acres) détruisent 1.8 million d'acres de forêt, soit environ 90% de la superficie totale des forêts détruites annuellement par le feu. Jusqu'à ce jour, les techniques courantes de lutte contre le feu, appliquées au sol et en vol, n'ont guère réussi à combattre ce genre d'incendies qui brûlent d'ordinaire durant une période de 5 à 21 jours. Le coût annuel des travaux de lutte contre les incendies de forêt au Canada est d'environ 50 millions de dollars, et il en coûte très souvent 100 000 $ par jour pour combattre de grands incendies.

L'expérience effectuée à Yellowknife fait suite à des études expérimentales analogues menées en 1975 au même endroit. La phase actuelle vise à déterminer s'il existe d'assez bonnes probabilités d'obtenir des quantités utilisables de pluie au sol en ensemençant des nuages qui, normalement, ne se transformeraient pas en pluie. A cet effet, on effectue des observations intensives de la structure microphysique des nuages avant, pendant et après l'ensemencement à l'iodure d'argent. Un Twin Otter de l'EAN, équipé pour faire des observations de physique des nuages, effectue les premières pénétrations d'observation dans un nuage choisi. Peu après, un appareil T-33 de l'EAN pénètre dans le nuage, au niveau de l'ensemencement, et y diffuse l'iodure d'argent (par des pièces d'artifice qui brûlent à une extrémité) tout en mesurant la turbulence. L'appareil Twin Otter retourne ensuite observer la structure microphysique du nuage et le changement survenu à la suite de l'ensemencement.

En 1975, on a surtout mis l'accent sur l'observation des processus de formation et de croissance des cristaux de glace au niveau de l'ensemencement. Même s'il n'y avait que quatre cas de nuages convenant aux fins de l'étude, les observations indiquent qu'un grand nombre de cristaux de glace se sont formés et se sont rapidement développés à la suite de l'ensemencement des nuages. Bien que ces observations n'aient pas encore été confirmées, il semble qu'il ait été possible de provoquer un processus de croissance d'un phénomène de précipitation dans les nuages ensemencés. Il reste maintenant à déterminer si la formation de cristaux de glace peut entraîner un processus satisfaisant de croissance et produire des quantités utilisables de précipitations au sol.

Par conséquent, l'expérience pratique menée en 1976 portera surtout sur l'étude de la croissance des précipitations dans les nuages et des processus qui influent sur leur trajet entre les nuages et le sol. L'appareil Twin Otter de l'EAN effectuera de nouveau les premières observations au niveau de l'ensemencement, mais il descendra ensuite à des altitudes inférieures pour observer la croissance des particules de précipitations. Un appareil Beechcraft de l'EAN volera au-dessous de la base des nuages pour surveiller l'apparition de la pluie provenant du système nuageux et en déterminer l'intensité.

Il y a beaucoup à apprendre de ces observations physiques directes, mais il est peu probable que le fait d'ensemencer environ dix nuages puisse prouver d'une manière concluante que la technique est viable. Si les expériences de 1976 s'avèrent encourageantes, la prochaine phase consistera en une expérience d'ensemencement de nuages choisis au hasard.

AMELIA EARHART MEDAL

AWARDED TO MARGARET LITTLEWOOD SECRETARY TO REGIONAL DIRECTOR AES WESTERN REGION

Through the years many articles have been written about Margaret Littlewood, our Senior Secretary in Western Region. Again in April 1976, articles appeared in the Toronto Sun, the Toronto Star, two articles in the Edmonton Journal etc.

Here are the facts . . . . . .

A native of Toronto, Margaret found a job with the T. Eaton Co. upon completion of school and was involved with Eaton's catelogue mail order business.

One of Margaret's close friends named Marion Gillies had an illustrious father who founded and operated Gillies Flying Service at Barker Field in Toronto.

Mr. Gillies enthusiasm for aviation rubbed off on Marion and Margaret and in order to publicize the Gillies Flying Service, both girls were given flying lessons. This was in 1938 and both girls not only qualified for their Private Pilot Licenses but went on to Commercial and Instructor ratings and served as flying instructors at the school. Having learned to fly in a Piper Cub Margaret taught flying in a wide range of single engine aircraft including Piper Cubs, Gypsy Moths, Aeroncas, Reid Ramblers etc. This activity terminated in late 1942 when gasoline rationing curtailed activities at private flying schools during World War 2.

By this time Margaret had the real flying bug and sought employment in some capacity associated with aviation. She applied to all ten Air Observer Schools (AOS) which were operating in Canada as part of the British Commonwealth Air Training Plan in World War 2. Nine schools rejected Margaret on the grounds that a woman just wouldn't be suitable in their operations. However the General Manager of No. 2 AOS Edmonton, Capt. W.R. "Wop" May phoned Margaret to discuss her qualifications and offered her a job as Link Trainer Instructor. Margaret gleefully accepted the job and headed West full of wonderment at what a Link Trainer would look like.

Margaret's role at No. 2 AOS was the provision of Link Trainer instruction for radio range procedures and advanced instrument flying. She trained pilots of the AOS, other pilots who were enroute overseas with the Allied Forces and CPA pilots (CPA leased some time at the school). A total of more than 140 pilots received Link instruction from Margaret.

Subsequent to the war Margaret took a position as secretary with the Post Office Department. Still bent on flying she completed her training for the ultimate – the Public Transport Pilot Licence – at the Edmonton Flying Club. She says she just wanted to prove to herself that she could do it, and became the third woman ever to hold this license.

Amelia Earhart was the first president of the International Organization of Licensed Women Pilots called The Ninety-Nines Inc. The name is derived from the number of charter members who founded the organization in 1929. This organization offers Amelia Earhart Medals in recognition of outstanding achievement in aviation and also sponsors scholarship awards for advanced flight training or specialized courses in aviation.

On April 21, 1976 at a luncheon in Toronto the Eastern Canada Section Ninety-Nines Inc. honoured Margaret for her pioneering in aviation and in particular for her contributions to aviation during World War 2 when she worked for "Wop" May as Link Trainer Instructor at the AOS. She was the first and only woman Link Trainer Instructor in Canadian history. Margaret was presented with the Amelia Earhart Medallion for her achievements.

We in the Western Region are proud of our Margaret's achievements. Before leaving for Toronto to accept the honour, AES Senior Managers presented Margaret with a floral arrangement (carnations) as a send-off. The event was a buffet dinner hosted by Gwen and George Legg. Special guests for the evening included Larry Campbell, Director General of Field Services, Commodore Doug Learoyd, Regional Director of the PSC with wife Joyce, and Mrs. Ruth (Kelly) Symons, Environment Canada's Area Personnel Manager and her new husband Bart.

Margaret moved up to Meteorology in 1961 and has served as Secretary to the Regional Meteorologist/Regional Director in the Western Region, the position which she presently holds. She is still aviation minded and has agreed to donate to the Western Aviation Museum her log books, press clippings and souvenirs such as the propeller off the Piper Cub 40 she learned to fly (the propeller now houses a clock in her Mother's suburban Toronto home).

Margaret Littlewood Displays Medal after Presentation.
Margaret Littlewood montre la médaille après la présentation.

Photo Courtesy of/La photo est une gracieuseté Norm Scudellari

Amelia Earhart Medal.
La médaille Amelia Earhart.

Photo Edmonton Journal

LICHENS AND AIR QUALITY

By Marlene Phillips and Keith Puckett

Lichens have long been known for their paucity in urban and industrial areas. As long ago as 1866 Nylander noticed the absence of lichens from the Paris Botanical Gardens and attributed this to the quality of the air. Since then, numerous studies have indicated a distinct correlation between lichen distribution patterns and air pollution levels, with sulphur dioxide (SO_2) considered to be the main toxic agent. Because lichens are very efficient in absorbing nutrients from the atmosphere or from rain water, they are also excellent indicators of heavy metal pollution.

The Atmospheric Chemistry, Criteria and Standards Division is taking advantage of these properties of lichens in three separate projects.

The first is the Saint John Ecosystem Study in which lichens are being used to assess the effects of changing air quality in and around Saint John, New Brunswick. Of particular concern is the impact of a new industrial development being planned for the Lorneville peninsula approximately ten miles south-west of the city of Saint John on the Bay of Fundy. The current distribution and abundance of lichen species is being mapped to indicate areas of poor, intermediate or good air quality and will be maintained over a number of years to detect any changes as a result of further industrialization. In addition, several permanent plots have been selected for collection and analysis of a number of species for sulphur and four heavy metals: nickel, vanadium, lead and chromium. Sulphur, nickel and vanadium are indicators of air pollution from the combustion or refining of oil; lead is a good indicator of automotive pollution; while chromium is associated with the combustion of coal. Analyses have already been completed for samples collected in 1974 and 1975 and will be repeated for samples collected in September 1976 after the Coleson Cove power plant has been operational for about 8 months.

The second project which is presently being initiated is the collection and chemical analysis of lichens from remote areas. The purpose of this exercise is to obtain information about background levels of heavy metals and sulphur in lichens especially from Arctic regions. Such large-scale geographical surveys of metal loadings have been extensively carried out in Fennoscandinavia but have been initiated in Canada only recently. This survey will support the already existing data by providing information about further areas subject to long-range global atmospheric pollution. It is anticipated that AES personnel stationed in these regions along with other Arctic investigators will participate in the collection of samples for analysis.

The third project is based upon the concern that increased atmospheric pollution may have a detrimental effect upon Arctic vegetation and in particular lichens which are of vital importance in this ecosystem. Air pollution has already resulted in substantial damage to lichen ranges which are important reindeer pastures in Scandinavia. It is possible that the increased industrial activity in the Canadian Arctic may have a similar effect. Indeed research done under contract to Laurentian University, Sudbury has indicated that the most abundant lichen species in the Mackenzie Valley, N.W.T. an area of high potential in terms of industrialization were also the most sensitive to sulphur dioxide. Hence investigation of the meteorological conditions which are most conducive to lichen damage by air pollution in the Mackenzie Valley is being continued this summer under contract to the University of Guelph as part of an ongoing study to define air quality criteria for these vegetation types. An additional facet of the northern environment, i.e. the stabilization of the permafrost by the insulative properties of the lichen mats is also being studied to determine the consequences of large-scale destruction of this vegetation by air pollution.

Laboratory studies have determined short term threshold concentrations of SO_2 which will not affect photosynthesis, membrane permeability or pigments. These have been tentatively defined at 1.5 ppm for 1 hr., 0.76 ppm for 3 hrs. and 0.21 ppm for 24 hours. However, continuing research at AES may necessitate the updating of these values, as investigations proceed. As a result of these studies in Arctic and sub-Arctic regions air quality criteria will be defined for Arctic vegetation under the prevailing environmental conditions.

LE TEMPS QU'IL FAIT SUR MON PAYS

Par Hélène Gignac

Il pleut, il mouille;
C'est la fête à la grenouille!

(Chanson enfantine)

"Parler de la pluie et du beau temps" signifie, dans le langage courant, dire des banalités. L'on ne saurait cependant reprocher à tous les écrivains qui se sont fortement inspirés de ces thèmes d'avoir parlé en vain. Je m'attarderai particulièrement, dans cet article, à l'un des phénomènes du temps dont la seule allusion au mot fait trembler bien des gens. Pourtant, la pluie n'a pas que de mauvais côtés. Elle n'en a pas moins, depuis que le monde est monde, été affublée des plus vils qualificatifs. Ne dit-on pas "ennuyeux comme la pluie"?

Loin de moi la pensée de lui dédier un Hymne à la joie. Même si tel était le cas, je ne serais pas la première (les Amérindiens n'avaient-ils pas des danses de la pluie!). Je me rangerais plutôt du côté des poètes dont le lyrisme est fortement empreint de mélancolie:

Il pleure dans mon coeur
Comme il pleut sur la ville. . .
Verlaine

Les Canadiens français l'évoquent d'une façon tout à fait particulière. Leur vocabulaire relatif à la pluie et à ses phénomènes avant-coureurs est riche en couleurs et en symbolisme.

Lorsque le temps est à la pluie, l'on dit que le temps *se morpionne.* Et, bien sûr, s'il pleut, l'on *s'abrille.*

Il pleut par intermittence? Alors il *mouillasse.* Et il *mouille* si la pluie tombe à grosses gouttes. De là nous proviennent les expressions populaires suivantes:

il mouille à seaux (prononcé à siaux);
il mouille à verse.

La pluie s'accompagne souvent d'autres phénomènes. Selon le type de précipitations, il arrive qu'il *vente, éclaire* et *tonne.*

La pluie peut être *verglaçante* ou se métamorphoser en "sorcière". L'on retrouve aussi, dans certaines régions, le terme "tourniquette" pour désigner une petite tornade.

L'été, si le temps le permet, il nous est même permis de voir des "châlins".

Il existe d'autres phénomènes météorologiques aux termes évocateurs. On doit cette bonne habitude au pouvoir divin qu'on leur attribuait. Les aurores boréales, dénommées, selon les régions, "marionnettes" ou "clairons", signifiaient l'entrée massive de plusieurs des nôtres au Paradis puisque le ciel craquait. On les disait aussi annonciatrices de grand vent.

Il nous faut maintenant se quitter puisque le temps *s'amollit.* Doit-on déduire de la richesse des termes que les "tristes" phénomènes météorologiques ont engendrée, qu'elle n'est due qu'aux longues heures de répit passées à attendre que la pluie cesse?

GIANT WINDMILL FARMS SEEN AS POWER SOURCE OF FUTURE

By Ros Oberlyn

Farms of giant windmills backed up by hydro-electric power could supply the west with at least 40 per cent of its energy needs within 20 years, says a U.S. university professor who has spent five years researching wind power.

Dr. Wendell Hewson, chairman of the department of atmospheric sciences at Oregon State University, told a crowd of about 175 people at a public lecture Thursday that wind power, environmentally safe and "available as long as earth is habitable," could be the future energy source.

The energy would come from wind power farms. A typical site would have 16 125-foot towers with 200-foot blades to catch the wind. Hydro-electric power would supplement the generators during periods of low wind or high use.

There is one generator of this type now operating in Sandusky, Ohio.

Although his research is based in Washington and Oregon, Hewson said his findings apply to B.C. where a mountainous terrain and consistent winds of 10 to 40 mph would produce "substantial reservoirs of wind power."

Large-scale generators cause no air, water or noise pollution, he said. The units can be built to suit present needs, then expanded as more power is required. And windmill sites can double as grazing or farm land.

Two disadvantages of the machines are their size, which might create what he called "visual pollution," and the possibility of interference with television reception.

And the generators would have to be combined with a second source of energy,

such as hydro power or oil, when the winds die.

Hewson said there is 20 times as much energy in wind available to man than in hydro power.

"If we could tap one 10-millionth of the energy in the atmosphere, it would equal the power of 10,000 large nuclear or fossil fuelled plants."

The cost of wind power would be less than that of nuclear power, he said. Although the initial cost of each generator is high – a University of Hawaii study estimated $50,000 – Hewson said the machines would pay for themselves in less than a year and would remain in operation for from 30 to 40 years.

Then why isn't the government promoting its development? "I think wind power is too simple a source," Hewson said after the lecture. "People think there must be something wrong with it.

"The great strength of nuclear power is that there has been no other option."

*Dr. Wendell Hewson was a member of the staff of AES from 1938-1948 – at the time of his departure he was head of the research branch.

VOLUNTEER WEATHER OBSERVERS IN ONTARIO AWARDED HONOUR FOR SERVICE TO CLIMATOLOGY

Awards to volunteer climatological observers in the Ontario Region for outstanding contributions to climatology in Canada were announced to-day by Mr. D.K. Smith, Regional Director for the Atmospheric Environment Service.

The following names were selected for the awards which this year consist of books with inscribed book plates and decorative desk barometers.

Mrs. Sharon Stevenson	–	Vineland Station
Mr. George Hambleton	–	Dalhousie Mills
Staff	–	West Side No. 2 Fire Station, Welland
Mr. W.C. Cross and Staff	–	Water Pollution Control Plant, Peterborough
Mr. Harvey Pearson	–	Tottenham Pearson

HOMMAGE AUX OBSERVATEURS METEOROLOGISTES BENEVOLES DE L'ONTARIO

POUR LEURS SERVICES EN CLIMATOLOGIE

M. D.K. Smith, directeur régional du Service de l'Environnement atmosphérique, a désigné aujourd'hui les observateurs climatologistes bénévoles de la région de l'Ontario qui ont remporté des prix pour leur contribution éminente à la climatologie du Canada.

Les lauréats, dont voici la liste, reçoivent cette année des livres ornés d'ex-libris et des baromètres de bureau:

Mme Sharon Stevenson	–	Vineland Station
M. George Hambleton	–	Dalhousie Mills
Personnel	–	Poste de pompiers n° 2 (côté ouest), à Welland
M. W. C. Cross et son personnel	–	Installation de lutte contre la pollution des eaux, à Peterborough
M. Harvey Pearson	–	Tottenham Pearson

NOTHING NEW UNDER THE SUN! ! !

General concern with air pollution control is so recent in this country that many do not realize that it is a city problem of ancient standing. John Evelyn of England published in 1661 a pungent pamphlet on the topic, with the title page *FUMIFUGIUM: or The Inconvenience of the AER, and SMOAKE of LONDON DISSIPATED together With some REMEDIES humbly proposed By John Evelyn Esq.; To His Sacred MAJESTIE, and To the Parliament now Assembled.*

The following excerpt is typical of the style of the essay:

> The City of *London* resembles the face rather of *Mount Etna,* the *Court of Vulcan, Stromboli,* or the Suburbs of *Hell,* than an Assembly of Rational Creatures, and the Imperial seat of our incomparable *Monarch.* For when in all other places the *Aer* is most Serene and Pure, it is here Ecclipsed with such a Cloud of Sulphure, as the Sun itself, which gives day to all the World besides, is hardly able to penetrate and impart it here; and the weary *Traveller,* at many Miles distance, sooner smells, than sees the City to which he repairs.

Other citizens have written of smog in other cities at other times, less eloquently perhaps but with equal dissatisfaction.

WILLIAM EDGAR KNOWLES MIDDLETON

By W.R. Smith

Dr. W. E. K. Middleton was awarded an honourary D. Sc. degree by McGill University at the Science and Law Convocation on June 9. This is of particular interest to AES staff since Dr. Middleton was one of the early instrument meteorologists, from 1930 to 1946, and many in the Service will remember him.

Born in Walsall, England, Dr. Middleton came to Canada at an early age and obtained his B. Sc. degree from Saskatchewan in 1927. He earned his Master's degree the following year on a bursary from National Research Council, then worked for a year as research physicist with Gypsum, Lime, and Alabastine Company.

Dr. Middleton published his first book, entitled "Visibility in Meteorology", in 1935; then came his "Meteorological Instruments" in 1941. This book, as enlarged and updated by A.F. Spilhaus, has gone into three editions. On leaving the Meteorological Service in 1946 he joined National Research Council in the optics branch of the Division of Physics, where he specialized in colourimetry. It was during this period that he wrote his book on "Vision Through the Atmosphere"; he also obtained his Doctorate of Science at Boston University.

Since his retirement in 1963 Dr. Middleton has written several books on the history of meteorological instrumentation, notably "A History of the Thermometer and its Use in Meteorology", "The History of the Barometer", and also "A History of the Theories of Rain and Other Forms of Precipitation". Other books include a catalogue of meteorological instruments in the Museum of History and Technology at the Smithsonian Institution; one on "Invention of Meteorological Instruments"; and a history of the Italian Academia del Cimento, which was founded at Florence in 1657.

Visitors to the old Bloor Street quarters may remember the weight barograph in the lobby. This instrument weighed a mercury column rather than measure its height, as is usually done to determine atmospheric pressure. It was designed by Dr. Middleton and constructed in the Instrument Shop.

In gathering material for his historical books since his retirement Dr. Middleton has lived in such places as London and Florence. His home is now in Vancouver.

AMONG THOSE PRESENT

Warren Main, V. Benedictson, J. Fowler, F. Burbidge, D. Boyd, W. Gutzman, B.A. Power, Frances Carson (Sutherland), Patricia Ball (Pow).

WEATHER BALLOONS AND UFO'S

By Kenneth G. McColloch

Many reports of UFO's turn out to be misidentification of weather balloons, usually reported by someone who has never seen one before. I am going to comment on this from the point of view of a weather observer who has been sending up such balloons for nearly twenty years.

When released, weather balloons are approximately seven to nine feet in diameter. They are made either of neoprene or latex. The neoprene ones are a sort of tan color at first, while the latex ones are white. When they are high up, and the balloon fabric is stretched very thin, they all look white. The radiosonde instrument is a small box containing a radio transmitter, battery, switching device, temperature and humidity sensors, etc. This is suspended from the balloon by a cord approximately one hundred feet long. In places where there is a chance of a falling instrument causing injury or property damage, a parachute is added, just below the balloon. Where I live, there is nothing but tundra and lakes in all directions, so we do not use parachutes. As the balloon ascends, it gradually expands, due to the steadily decreasing pressure, until it finally bursts. Then the instrument, which weighs about two pounds, comes down. As the balloon goes up, it is moved by whatever winds it encounters at the different levels, so it moves horizontally in different directions. The instrument itself transmits pressure, temperature and relative humidity data. Information about the winds in the upper atmosphere is obtained by tracking the balloon. In the summer, the balloons we use here ascend to a height of about 100,000 feet. (The pressure is about 10 millibars, compared to the sea level pressure which averages 1013 millibars.) In winter, due to the much colder temperatures aloft, the balloons do not go as high.

In a number of books on Unidentified Flying Objects, I have seen references to balloons that appear to be moving in a direction opposite to that of the surface wind. It is frequently suggested in the text that this is impossible. It is not impossible; in fact, it is quite common. We have this happen here quite regularly, and I have seen it happen at other stations also. Changes in wind directions aloft are caused by a number of factors, one of which is the effect of different air masses. There is nothing impossible about having a southeast wind at the surface, and a northwest wind at ten thousand feet.

The visual appearance of the balloon as it goes up is rather interesting, too. If the balloon is nearly overhead (above 50 degrees elevation, say), and the sky is clear, it can be seen with the naked eye all the way up. When it is about 40,000 feet up it is rather hard to see, as it is receding from the observer, so it appears to be smaller. Somewhat higher up than that, it is expanding (due to the decreasing pressure) faster than it is receding, so it appears to increase in angular size. That is, it begins to look bigger. Under such circumstances we have not infrequently observed visually the balloon bursting at a height in excess of 100,000 feet. Even when it is twenty miles up, a balloon does not appear as a point. It has a disc which is easily seen. A balloon thirty feet in diameter, seen from 100,000 feet away, has an angular diameter of about one minute of arc, or one thirtieth of that of the moon. During daylight flights (in summer, it is daylight for the whole 24 hours here), if I find that the balloon is high enough in the sky, I frequently try to spot it. Usually I can, unless it is too close to the sun or behind a small cloud. The visual effect of a balloon in the process of bursting is also interesting. One observer here was watching a balloon at the moment it burst. At the height where this happened the temperature was very low (about -70 degrees Celsius) and the balloon was as brittle as glass. It suddenly shattered into a billion fragments, which glittered in the sun. One balloon I was watching at the time it burst was about 100,000 feet up. It just split in the middle, along the "equator." The

top half just seemed to sit there, while the bottom half, with the instrument tied to it, started descending rapidly, and fell into the lake a couple of miles away.

Due to strong winds aloft, such as the jet streams, a balloon can be carried a long way from the station that launched it. We have often had balloons carried more than fifty miles away. Once we tracked one to a distance of 140 miles. Sometimes the balloons drift beyond the point where it is possible to track them. Once, when I was stationed at Nitchequon, in the middle of Quebec, we had a combination of a balloon with a slow leak and a trip through the jet stream. Although the signal faded long before the balloon came down, I estimated that it must have crossed half of Quebec, plus the Coast of Labrador, before finally coming down somewhere in the North Atlantic. In a densely populated area (which that region certainly was not) this would have prompted quite a lot of UFO reports.

I do not wish to give the impression that I consider all UFO reports to be explainable as misidentified weather balloons. My purpose here is to provide some information on weather balloons that might be useful to those attempting to assess reports that might be of balloon sightings; some of this information, it appears, has been unavailable to some of these people in the past.

LE TEMPS QU'IL FERA? CONSULTEZ LA NATURE

Tiré du Perspective-La Presse.

PAR HELENE BEDARD ET JACQUES DORION

Un jour, Jean-Bête qui s'était pris pour la lune d'une belle amitié, se promenant un soir la tête basse, arrive auprès d'un puits dans lequel il regarde. Il voit au fond l'image de la lune et croit que l'astre est tombé dans le puits. En toute hâte, il se précipite vers la maison et en rapporte un croc et une corde qu'il fait descendre jusque dans l'eau pour en retirer "la belle". Mais, en remontant, le croc s'engage dans un trou de la maçonnerie et le pauvre Jean-Bête, redoublant d'ardeur, s'imagine que la lune est accrochée. Alors, il tire, et tire tant et tant que la corde se casse et il tombe à la renverse. Les yeux portés vers le ciel, il aperçoit la lune: "Diable, s'écrie Jean-Bête, l'échine me fait mal, mais c'est égal, j'ai remis cette pauvre lune à sa place!"

La Lune et ses secrets

La lune n'a jamais cessé d'intéresser les hommes depuis l'Antiquité, et notre siècle qui a vu tant d'efforts déployés pour que le terrien puisse y mettre le pied en fournit une preuve indéniable. Parce qu'on lui attribuait une influence considérable sur les phénomènes terrestres, la température, les vents et la santé des hommes et des animaux, la lune servait scrupuleusement, semble-t-il, celui qui la choisissait comme guide pour prédire la température:

Quand un quartier de la lune a les
cornes en l'air, c'est du temps
froid

entend-on encore de nos jours.

Déifiée par les peuples primitifs, la lune a également inspiré poètes et chansonniers:

A la pleine lune,
J'irai m'asseoir
Sur la terre
Et j'allumerai un feu d'espoir

La lune peut épouser diverses formes, selon certaines conditions décrites par nos aînés: ainsi, en la fixant durant une quinzaine de secondes, au moment où elle a visité tous ses quartiers – pleine lune –, on y voit apparaître une croix. D'autres, qui jouissent d'une vision plus perçante, y observent un petit bonhomme condammé à scier du bois éternellement – puisque sur terre, il en scia le dimanche – ou un chien avec un homme portant un sac d'avoine sur le dos; de là viendrait l'explication du jappement des chiens lorsque la lune est pleine. Au début du XIXe siècle, la science elle-même alimenta ces croyances populaires au moment où le professeur Gruithhausen, de Munich, déclarait publiquement qu'il avait découvert des preuves irrécusables démontrant que la lune était habitée comme la terre.

Un mythe esquimau explique l'origine de la lune comme suit:

Dans un village de la côte vivaient jadis un homme et sa femme. Ils avaient deux enfants, une fille et un garçon. Quand les enfants furent grands, le garçon s'éprit de sa soeur. Comme il ne cessait de la poursuivre de ses assiduités, elle finit par se réfugier au ciel où elle devint la lune. Depuis lors, le garçon n'a cessé de courir après elle, sous la forme du soleil. Parfois, il la rejoint et réussit à l'étreindre, causant ainsi une éclipse de lune.

Chez les Montagnais du Lac-Saint-Jean et les Algonquins du Témiscamingue, on effectua la "conquête" de la lune ainsi:

Un jour, il (le petit bonhomme) partit pour la classe sans rien dire à sa soeur. Il tirait sur tous les arbres. Un jour sa flèche resta prise dans un arbre. Il voulut aller la chercher et il se souvint de son rêve. Il soufflait sur l'arbre et, chaque fois, l'arbre grandissait. Rendu au bout, il souffla encore et il s'aperçut qu'il était rendu dans la lune.

Le soleil de nuit

Quarante-neuf fois plus petite que la terre, la lune, pour les connaisseurs, est une boule de cristal dans laquelle il suffit de lire attentivement. Voici le "rapport de lecture" de gens de Charlesbourg.

Quand la lune est pétillante (scintillante) c'est signe de froid.
Quand la lune est entourée d'un cercle, c'est signe de neige.
Si le vent a été nord-est toute la journée et que la lune se lève forte (brillante) elle peut réparer le temps.
Quand la lune est embrouillée ou qu'elle a la face sale, c'est signe de mauvais temps.
Lorsque la lune perce à travers les nuages et que ces derniers sont comme des moutons, c'est signe de neige.
Quand la lune se couche rouge, c'est signe de chaleur comme le soleil.
P'tit cerne, gros mauvais temps.
Gros cerne, p'tit mauvais temps.

Cette crédibilité qu'on accordait à la lune touchait d'autres champs que la météorologie et l'homme lui-même discourait sur l'apparition mensuelle de l'astre:

Il a une humeur de porc frais (mauvais humeur) ce doit être le temps de la lune.
A la lune de mai, les marées sont plus hautes.
Le printemps est en retard parce que la lune est en retard, il faut que la pleine lune soit dans le temps de Pâques; si elle est après Pâques, elle est en retard.
Il ne faut pas semer de concombres ni de cornichons avant la lune de mai, et par vent nordet.

Tout un rituel guidait le cultivateur lorsqu'était venu le temps d'accomplir les travaux de la ferme. Souvent, on retardait ou on précipitait certaines besognes, selon que la lune semblait favorable ou non. Pour tirer bon augure de l'astre, on respectait ses phases – cours ou croissant, décours ou décroissant – selon qu'elle était dans son "montant" ou dans son "descendant". Voici des exemples rapportés par nos informateurs:

On "sume" toujours dans le croissant de la lune.
Le bois de chauffage qui est coupé dans le décours de Noël est le meilleur.

Par ailleurs, le "soleil de nuit" tel que baptisé par les Montagnais, exerçait une influence directe sur les humains et les animaux:

Trois jours avant la pleine lune, si une femme enceinte a des douleurs, ce sera une fille, trois jours après, ce sera un garçon.
Quand la lune va en décroissant et qu'on se coupe les cheveux ou les ongles, ces derniers vont repousser moins vite.
Pour une personne qui souffre d'eczéma, la démangeaison est plus forte au plein de la lune qu'en tout autre temps.
Si les oeufs couvés éclosent dans le plein de la lune, les poulets sont plus forts.
Quand on tue les animaux dans le croissant, la viande se garde mieux.
Les animaux en "rabette" (en chaleur), il faut les accoupler dans le montant de la lune.

ICE RECONNAISSANCE RETURNS FROM SUCCESSFUL MAY ARCTIC ROUND ROBIN

A routine Ice Reconnaissance Round Robin in the Arctic took place May 10–15 inclusive using Nordair Limited Electra CF-NAY. Daily flights averaged a little over ten hours with overnight stops being made at Frobisher, Thule, Resolute, Inuvik and Frobisher. Some 13,500 miles were covered in total.

This operational Round Robin was different from previous ones in that three special observers were carried, Mr. W.J.H. Stuart, Director, and Capt. J.A. Gallant, Deputy Director, Fleet Systems Canadian Coast Guard, and Mr. B. Legris, Executive Assistant to the Deputy Minister of Environment Canada. W.F. Ganong, ACID, and T.B. Kilpatrick, ACIR, accompanied the mission and acted as hosts for the special observers. Ice forecaster Terry Mullane, Operations Supervisor from the Ice Central was also on board preparing for the production of the Long Range Ice Outlook for the shipping season.

This reconnaissance was particularly successful in that all went according to schedule with all remote sensors working throughout the trip. At the end, Torben Andersen, the Ice Reconnaissance Field Manager was complimented on a "most successful mission."

At Thule, the special observers and hosts were greeted on arrival by the Base Commander and senior staff following which a discussion was held on mutual U.S./Danish/Canadian interests in Ice Reconnaissance over Davis Strait and Baffin Bay.

(Left to right) Torben Andersen, Ice Reconnaissance Field Manager aboard CF-NAY briefing, B. Legris, W.J.H. Stuart, J.A. Gallant and Terry Mullane on Ice Patrol Activities for the day.
(De g. à d.) A bord du CF-NAY, Torben Andersen, chef de la section de l'observation sur place des glaces, énumère à B. Legris, W.J.H. Stuart, J.A. Gallant et Terry Mullane les activités de surveillance des glaces pour la journée.

Ice Branch Photo/La photo est une gracieuseté de la direction des glaces.

CENTRAL REGION ACTIVITIES

Aurora Snow Festival – Churchill

The Churchill Town Centre Complex was officially opened on April 23, coinciding with the Aurora Snow Festival.

A major weather display was mounted for this occasion; graphics on a multi-screen, a radiosonde balloon suspended from the ceiling, an ozonesonde hooked up to test equipment, and a seismology chart showing the Guatemala earthquake. A series of homemade meteorological instruments, a limited number of current instruments and an up-to-date public forecast and map were displayed and educational material was distributed.

The balloon and the instruments particularly attracted the children, and the adults asked many interested questions about the satellite photo display.

Following the opening, the display – at the request of the librarian, was turned over to the library of the high school which is associated with the complex. It remained in place for several days to allow the grade school classes to visit it.

This first major weather display in Churchill was considered to be a highly successful exercise and a good deal of credit is due Mr. E.A. Favelle, the OIC of Churchill Weather Office, who organized and established the exhibition.

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Manitoba Schools Science Symposium

The University of Manitoba was host to the Manitoba Schools Science Symposium from May 7-9 inclusive and the Prairie Weather Office participated by setting up a meteorological display. The local chapter of the Canadian Meteorological Society presented a prize for the best earth science exhibit.

The display, as mounted by Messrs. Anderson and Hunter, consisted of a climat board and a tipping rain gauge set up at the entrance to the display and around the room other instruments were set up on modules, weather pictures, weather reports and forecasts were exhibited on a multi-screen and a selection of educational weather pamphlets were available for distribution. "Weather Has Gone Metric" and the "Metric Wallet Card" proved to be especially popular.

As at most displays the Climat Board generated the greatest interest with the instruments a close second.

These displays seem to excite a great deal of interest among school children and this level of interest could well be a most important factor in our efforts at continuing public education.

PERSONNEL

The following have accepted positions as a result of competitions:
Les personnes suivantes ont accepté ces postes après concours:

75–DOE–TOR–CC–178	Duty Forecaster MT–4 Halifax METOC Centre R.J. Daigle
76–DOE–TOR–INV–48	Acquisitions Assistant CR–4 Administration – Library Miss V.M. Gilchrist
76–DOE–WPNA–CC–007	Officer-in-Charge EG–ESS 4 Fort Reliance, N.W.T. O. Werenka
76–DOE–WPNA–CC–007	Officer-in-Charge EG-ESS 4 Cape Parry, N.W.T. K. Oliver
76–DOE–WPNA–WC–4240	EG-ESS 5 Inuvik, N.W.T. K. Haslam
76–DOE–WPNA–WC–4215	Technician EG-ESS 5 Inuvik Weather Office, N.W.T. W. Kern

The following transfers took place:
Les transferts suivants ont été effectués:

M.P.C. Regan	FROM: De Halifax METOC Centre TO: A CFOCS Chilliwack
H.A. Austin	FROM: De CFB Cold Lake TO: A CF School of Met., Winnipeg
B.K. Wong	FROM: De CFB Winnipeg TO: A Arctic Weather Centre
B.A. Misanchuk	FROM: De CFB Winnipeg TO: A Newfoundland Weather Office
M.A. Liptak	FROM: De Trout Lake TO: A Calgary
B.A. Bain	FROM: De Mould Bay TO: A Alberta Hail Project

W. Cowan	FROM: De Inuvik, N.W.T. TO: A Municipal Airport Weather Office, Edmonton, Alberta
J. Buchanan	FROM: De Fort Nelson, B.C. TO: A Arctic Weather Centre

The following are on temporary duty or special assignment:
Les personnes suivantes occupent temporairement ces emplois ou sont en stages spéciaux:

M.H. Wilson	TO: A Forestry Program EG–ESS 6 Whitehorse, Y.T.
J. Wilson	TO: A Forestry Program EG–ESS 6 Fort Smith, N.W.T.
D. Gilbert	TO: A AGRO–MET Project EG–ESS 6

Recent Graduates of TCTI:
Nouveaux diplômés de TCTI:

B. Johnston	TO: A Hudson Bay
G. Thalhauser	TO: A Gimli
H. Ryzmarchuk	TO: A Cree Lake
P. Raczinski	TO: A Broadview

Recent Graduates from the Meteorologist (B.Sc.) Course No. 32:
Nouveaux diplômés du bac en météorologie (cours n^{o} 32):

B.W. Boughton	TO: A CFB Portage la Prairie
C. Fliss	TO: A CFB Winnipeg
D. Grimes	TO: A CFB Winnipeg
K. MacDonald	TO: A CFB Winnipeg
T. Goos	TO: A 22 NRWC North Bay
G. Ord	TO: A 22 NRWC North Bay
G. Lines	TO: A CFB Shearwater
N. McLennon	TO: A CFB Cold Lake
B.T. Shannon	TO: A CFB Cold Lake
K. Spring	TO: A CFB Summerside

Recent M. Sc. University Graduates:
Nouveaux diplômés, niveau maîtrise:

University of Alberta	Posting
P.R. Scholfield	ACAD, HQ
C. Lelievre	Arctic Weather Centre
A. Saulesleja	Arctic Weather Centre

University of Toronto	Posting
P. Dubreuil	Bureau de prévisions du Québec
R. Laurence	Arctic Weather Centre
R. Morris	Arctic Weather Centre
R. Verret	ACAD, HQ

McGill University	Posting
F.J. Conway	ARMD, HQ
E.J. Kirkwood	CMCD
J.C. McLeod	Arctic Weather Centre

Inventory B – University of British Columbia	Posting
Y. Durocher	Bureau de prévisions du Québec

Separation
Démissions:

D. Fournier	Resigned
C. Forth	Resigned
A. Andriet	Resigned
J. Martin	Resigned
W.H. Sinclair	Retired
J.D.M. Marcotte	Resigned
S.K. Lally	Resigned
M.E.G. Lalande	Resigned

TRIVIA

THE RHYME OF THE RAIN MACHINE

Said Jeremy Jonathan Joseph Jones,
"The weather is far too dry,
So I reckon I'll have to stir my bones
And try the effect of concussive tones
Upon the lazy sky."

So Jeremy Jonathan Joseph went
Away to the nearest town:
And there his money was quickly spent
For queer contraptions all intent
To make the rain come down.

There were cannon, and mortars, and lots of shells,
And dynamite by the ton;
With a gas balloon and a chime of bells
And various other mystic spells
To overcloud the sun.

The day was fair and the sky was bright,
And never a cloud was seen;
When Jeremy Jonathan set alight
His biggest fuse and screwed up tight
The joints of the rain machine.

He fired a shot, and barely two,
When the sky began to pale;
The third one brought a heavy dew,
But at the fourth tornadoes blew,
With thunder, rain and hail.

It rained all night and another day,
And then for a week or more;
It flooded the farm in a scandalous way,
And drowned poor Jeremy, sad to say,
Who couldn't stop the pour.

O! Jeremy Jonathan Joseph Jones,
Your farm was fair to see;
But now a lake lies over its stones,
From whose dark bosom horrific moans
Are heard nocturnallee.

To check the flood you started, I've heard
All efforts were in vain;
Until the Bureau at Toronto stirred,
And stopped the storm with a single word,
By just predicting – Rain!

–F.W. Clarke, *Chemist.*

Expression	Signification ou équivalent
Atriqué comme la chienne à Jacques	Vêtu sans goût
Faire du bien à quelqu'un	Aider quelqu'un
Prendre une fouille	Tomber brutalement
Sauver du temps	Gagner quelques minutes de plus
Il n'a pas fait ça pour mal faire	Il n'a pas fait ça pour vous importuner
C'est un type bien en vue	C'est une personnalité appréciée de tous
Je suis dans le trou	Je suis ruiné
Il a la twist	Il sait comment s'y prendre
Il est bien checké	Il est bien mis
Il est tiré à 4 épingles	Il est habillé d'une façon recherchée

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Worry about the future doesn't improve the future – it merely spoils the present.

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Responsibility may make a person better, and sooner than does anything else.

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We are bent by hard work and broke without it.

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A promising dream will never be developed by oversleeping.

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The oldest, shortest words – "yes" and "no" – are those which require the most thought.

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Sometimes you have to go out on a limb; that's where the fruit is.

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There's nothing like a rough sea to make a traveller look like his passport picture.

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There is always an easy solution to every human problem – neat, plausible and wrong.

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Les proverbes québécois

"Laissons péter le renard."
Attendons les événements.

"Autant en emporte le vent."
Tout s'oublie avec le temps.

"La faim fait sortir le loup du bois."
La nécessité oblige à agir.

"A cheval donné, on ne regarde pas la dent."
Il ne faut pas rechigner sur un don.

"Le rossignol ne fait pas le printemps."
Un seul indice ne prouve pas le fait.

"Il faut semer pour récoltēr."
Il faut travailler pour réussir.

"On ne peut pas faire sortir du sang d'un navet."
Ça ne sert à rien de vouloir l'impossible.

Buzz Word Vocabulary

(Interpretive commercial harmonies)

0	Subordinated	0	multiphasic	0	debenture
1	computerized	1	executive	1	dividends
2	encumbered	2	precommital	2	parameter
3	projected	3	regulatory	3	revenues
4	additive	4	transmittal	4	preclusion
5	moderated	5	fractional	5	conglomerate
6	modified	6	liability	6	imputation
7	restructured	7	residual	7	sector
8	recapitalized	8	investment	8	issue
9	quantitized	9	flexible	9	subsidiary

PAAALM PLANTING CEREMONY IN RESOLUTE!

Some meteorologists really believe that their command can defy nature itself! That seemed to be the attitude of Bill Ganong, Director of the Ice Branch, as he supervised the dedication of a paaalm tree for the beautification of Ice Observer residence in Resolute, N.W.T. during a recent northern expedition. Having made sure the plant was carefully serviced and provided with a woolly attendant, Bill assured the rest of the team that the elements could not kill the tree since it is of a special hardy strain!

From left to right: de g. à d. Tom Kilpatrick, Capt. Bill Stuart, Director of Canadian Coast Guard, Fleet Systems, Bill Ganong and Torben Andersen, Ice Reconnaissance Field Manager.