# ZEPHYR

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Page

# METEOROLOGY AND RESEARCH FOR THE FUTURE
# FGGE* – THE GLOBAL WEATHER EXPERIMENT
# WORLD METEOROLOGICAL ORGANIZATION

The World Meteorological Organization (WMO) has launched one of the largest and most complex scientific undertakings ever attempted. Thousands of scientists from virtually every country in the world will be using the most sophisticated tools such as earth satellites, instrumented aircraft, ships, balloons, free-floating ocean buoys, and gigantic high-speed computers to subject the entire atmosphere of the earth and the sea surface to the most intensive surveillance and study ever made. The experiment will last for one full year with two separate periods of two months for special observations in the tropics and southern hemisphere. The purpose of this highly coordinated international effort is to ascertain the attainable limits of weather forecasting and to investigate the mechanisms underlying climatic change. Extending the range of accurate weather forecasts and better understanding of climate variations have enormous economic value.

This vast deployment of scientific and technological research facilities makes it particularly fitting that the theme of World Meteorological Day for the year 1978 should be Meteorology and Research for the Future. That theme is highlighted by what is perhaps the most ambitious, and promising research effort ever undertaken through international scientific cooperation. It is a model of what can be achieved internationally through the application of goodwill and common sense to global problems.

## Meteorology – both public service and science

The research side of meteorology has so far not caught the public eye. Governments and the citizens at large have tended to see meteorology exclusively as a public service. There is, however, an increasing recognition that the science of meteorology must develop further to meet the ever-increasing national needs for extended weather forecasts and warnings to protect life and property and to meet the many other daily requirements for weather information. On the international level this recognition was evidenced by United Nations General Assembly resolutions adopted as far back as 1961 and 1962. These resolutions are the immediate origin of the World Meteorological Organization's major operational activity, the World Weather Watch, and the important research activity, the Global Atmospheric Research Programme (GARP). The success of both of these programmes has made possible the Global Weather Experiment.

## The fundamental problem of meteorology

What then is this gigantic research project involving so many thousands of scientists and their ingenious technological equipment? In order to find out how far ahead the weather can be forecast, meteorologists must obtain a better understanding of the behaviour of the global atmosphere and the physical processes underlying that behaviour. This will enable them to develop improved mathematical-physical models of the atmosphere which will be utilized in the effort of making weather forecasts more reliable and of longer validity. Successful accomplishment of these two formidable tasks will also make it possible

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*FGGE is the acronym for First GARP (Global Atmospheric Research Programme) Global Experiment. GARP is a highly successful joint programme of WMO and the International Council of Scientific Unions (ICSU). The Global Weather Experiment is a major element of the overall programme which, by agreement with ICSU, is a WMO responsibility.

to work toward designing a cost-effective global observing and forecasting system for routine use by the nations of the world, i.e. an even more effective World Weather Watch.

The nub of the problem – and it has not changed significantly in the more than one hundred years of the existence of WMO and its predecessor organization IMO – is how to improve weather forecasts. The fundamental problem about accurately forecasting the weather presents two basic difficulties. The first is to obtain rapidly enormous quantities of precisely observed data covering such elements as atmospheric pressure, temperature, humidity, and wind speed and direction at the earth's surface and at different heights from an adequate global network of observing platforms using different techniques. At the present time there is still a lack of weather observing stations, especially over the oceans and in the southern hemisphere. The second difficulty is to process these enormous quantities of data equally rapidly (otherwise the weather forecast might well be out of date before it appears).

Until recent times practical day-to-day forecasting was done mainly by plotting the weather observations on maps and analysing the major weather systems, i.e. low and high pressure areas. Partly on the basis of theoretical considerations, but also and very largely on the basis of his own experience, the forecaster would determine the future speed and direction of these systems and the extent to which they would intensify or diminish. This would lead him in turn to a forecast of the weather which would be associated with the systems.

**The mathematical revolution in meteorology**

About 60 years ago a British meteorologist, L.F. Richardson, devised a procedure whereby the weather could be predicted with the use of mathematical equations based on well-known physical laws. At the time his procedure smacked of science fiction. It would have required 64,000 mathematicians working with calculating machines day and night throughout the year, processing surface and upper-air data received from 2000 weather stations scattered over the globe. But Richardson was no idle dreamer. He originated what we now call numerical weather prediction. This technique became practicable 25 years later. The American mathematician, John von Neumann was the first to use an electronic computer operated by a team of meteorologists and mathematicians to analyse and predict weather by mathematics and machines.

**The technological revolution: satellites and computers**

The technological revolution which produced high-speed electronic computers also produced artificial earth satellites in the 1950s which opened a new dimension in weather observational capacity. Today in the words of a great Norwegian meteorologist, the late Sverre Petterssen "the principal technological barriers have yielded . . . It has now become possible to keep the whole atmosphere under constant surveillance and to process vast volumes of data on a 'real time' (instantaneous) basis." Without this technological revolution we would not have today's global weather observation scheme known as the World Weather Watch. Nor would it be possible to launch the present Global Weather Experiment.

A major problem facing research meteorologists trying to improve atmospheric prediction models – and hence to obtain better forecasts – is that they do not have a really satisfactory world-wide set of observations with which to test their models. Scientists specify that an ideal data network would be observation stations spaced 500 km apart collecting pressure, temperature, humidity and wind data at different heights up to 30 km. Without such a data set it is not easy to distinguish between those forecast errors which are due to the inadequacies of the models and those caused by the lack of good observations. A good global data set for the whole year and thus covering all the seasons would be invaluable. This is the task of Global Weather Experiment.

**The Experiment and the need for more data**

One thing is clear. In order to improve atmospheric models, the Global Weather Experiment must collect a more complete set of data on the condition of the atmosphere globally than is presently available from existing observational stations.

The build-up year for the Global Experiment began on 1 December 1977. Some of the scientific tools needed for the Experiment such as satellites and the communications and data-processing system will be brought into operation. The preliminary data-collection period started on 1 January 1978. Observations from World Weather Watch stations and satellites in operation will be collected and analysed to enable the data transmission and processing system to be tested. The operational year begins on 1 December 1978 when the basic observing and data processing system goes into full operation. This phase of intense global coverage will last for twelve consecutive months. During that year there will be two special observing periods: 5 January – 5 March, and 1 May – 30 June 1979.

**The Basic Observing System**

The basic observation system during the whole twelve-month period of experiment will of course be WMO's global weather system, the World Weather Watch (WWW). In any 24-hour period WWW collects and transmits to processing centres, standard meteorological observations from the following impressive array of stations and platforms: more than 9200 land stations making surface observations; nearly a thousand stations making upper-air observations; 9 fixed ocean weather ships and some 7400 merchant ships making surface observations only; reconnaissance and commercial aircraft providing more than 3000 reports daily. The Global Experiment will be the first occasion where a truly integrated system of satellites is used to observe the earth's atmosphere. Five geostationary satellites will continuously monitor the equatorial and sub-tropical belts the world around, and a series of polar-orbiting satellites will be used to determine the temperature structure of the atmosphere as well as to provide information on cloudiness and the temperature of the sea.

**Inadequacy of the Basic Observing System**

The enormous masses of observational data collected are nevertheless inadequate for a valid global experiment. The ideal requirements of research meteorologists are for a data set consisting of intensive meteorological observations from the entire globe for a full year. This is impossible for financial reasons alone. As a measure of how expensive this kind of research is, the annual cost of operating one fixed ocean weather ship is about $2 million. An ideal project would call for 200 ships just to cover upper-air observations in the tropics alone. A compromise is necessary between what is scientifically desirable, what is technologically feasible and what is economically attainable.

**Additional Special Observation Systems to attain global coverage**

The scientists managing the experiment have therefore gone ahead with a less perfect but reasonably satisfactory scheme. They will fill the gaps by means of Special Observing Systems. The observational plan includes two specially chosen periods mentioned above, (5 January – 5 March, and 1 May – 30 June 1979). During each of these periods there will be concentrated observational coverage for 30 days.

## MÉTÉOROLOGIE ET RECHERCHES PROSPECTIVES
## LA PEMG* – EXPÉRIENCE MÉTÉOROLOGIQUE MONDIALE
## ORGANISATION MÉTÉOROLOGIQUE MONDIALE

L'Organisation météorologique mondiale (OMM) vient de lancer une entreprise scientifique qui dépasse en ampleur et en complexité toutes celles qui ont été tentées jusqu'ici. Des milliers de spécialistes, représentant pratiquement tous les pays du monde, vont disposer d'un matériel extrêmement élaboré – satellites terrestres, aéronefs spécialement équipés, navires, ballons, bouées flottantes, gigantesques ordinateurs ultra-rapides – pour soumettre toute l'atmosphère terrestre et la surface des mers à une surveillance et à une étude des plus approfondies jamais réalisées. L'expérience doit durer un an; elle comportera deux périodes de deux mois consacrées à des observations spéciales dans les régions tropicales et dans l'hémisphère austral. Le but de cet effort international hautement coordonné est de définir les limites maximales qu'on peut atteindre en matière de prévision météorologique et d'étudier le mécanisme qui détermine les variations climatiques. Prolonger l'échéance de prévisions météorologiques exactes et mieux comprendre les fluctuations du climat offre un intérêt considérable sur le plan économique.

Un tel déploiement de moyens scientifiques et techniques rend particulièrement adéquat le choix du thème "Météorologie et recherches prospectives", retenu pour la Journée météorologique mondiale de 1978, qui reflète bien l'effort de recherche peut-être le plus ambitieux et le plus prometteur qui ait jamais été entrepris grâce à la collaboration de tous les pays du monde. C'est un exemple de ce qui peut être réalisé à l'échelon intenational lorsqu'on aborde avec volonté et bon sens les problèmes mondiaux.

### La météorologie – discipline scientifique et service public

Le grand public ignore encore l'aspect scientifique de la météorologie. Pendant longtemps, les gouvernements comme la population, ont eu tendance à considérer la météorologie uniquement comme un service public. Aujourd'hui, chacun reconnaît la nécessité d'approfondir davantage les connaissances scientifiques en météorologie pour répondre aux besoins nationaux toujours croissants de prévisions à plus longue échéance et d'avis qui protègent la vie et les biens des citoyens, et pour satisfaire les nombreuses autres demandes quotidiennes d'informations météorologiques. Sur le plan international, cette prise de conscience s'est traduite dans les résolutions adoptées dès 1961 et 1962 par l'Assemblée générale des Nations Unies. De ces résolutions découlent directement la principale activité de l'OMM en matière d'exploitation, la Veille météorologique mondiale, et sa principale activité de recherches, le Programme de recherches sur l'Atmosphère globale (GARP). Le succès remporté par ces deux programmes rend aujourd'hui possible la réalisation de l'Expérience météorologique mondiale.

### Le problème fondamental de la météorologie

Quel est donc ce gigantesque projet auquel vont participer des milliers de savants et qui met en oeuvre des moyens techniques exceptionnels? Pour pouvoir déterminer sur quel laps de temps peuvent porter les prévisions, les météorologistes ont besoin de mieux

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*Première Expérience Mondiale du GARP (Programme de recherches sur l'atmosphère globale). Le GARP est un programme conjoint et réussi de l'OMM et du Conseil international des unions scientifiques (CIUS). L'Expérience météorologique mondiale est un élément primordial de ce programme, dont, avec l'accord du CIUS, la responsabilité incombe à l'OMM.

connaître le comportement de l'atmosphère globale et les procesuss physiques qui déterminent ce comportement. En possession de ces renseignements, ils pourront élaborer des modèles mathématiques et physiques plus précis de l'atmosphère, grâce auxquels on s'efforcera d'augmenter la fiabilité et la durée de validité des prévisions météorologiques. La réalisation de ces deux tâches immenses permettra aussi d'entreprendre la conception d'un système mondial plus rentable d'observations et de prévisions, utilisable couramment par tous les pays du monde, c'est-à-dire une Veille météorologique mondiale encore plus efficace.

L'essentiel – et cela n'a pas sensiblement changé depuis plus d'un siècle d'existence de l'OMM et de son prédécesseur l'OMI – est de savoir comment améliorer les prévisions. On se heurte ici à deux difficultés fondamentales majeures. D'une part, il faut obtenir rapidement une somme considérable de données précises d'observation sur la pression atmosphérique, la température, l'humidité, la vitesse et la direction du vent à la surface de la terre et à différentes altitudes, grâce à un réseau mondial adéquat de plates-formes utilisant différentes techniques d'observation. A l'heure actuelle, on ne dispose pas encore d'un nombre suffisant de stations d'observation météorologiques, en particulier au-dessus des océans et dans l'hémisphère austral. D'autre part, il faut traiter, rapidement aussi, ces énormes quantités de données (sinon la prévision risque fort d'être périmée avant même d'être diffusée).

Jusqu'à une date récente, les prévisions quotidiennes courantes étaient obtenues en portant les observations sur des cartes et en analysant les principaux systèmes météorologiques, c'est-à-dire les zones de basse et de haute pression. En s'appuyant sur des considérations théoriques, mais aussi et très largement sur sa propre expérience, le prévisionniste déterminait la vitesse et la direction future de déplacement de ces systèmes ainsi que leur degré d'intensification et d'atténuation. Cela lui permettait enfin de prévoir le temps correspondant à ces systèmes.

**La révolution mathématique**

Il y a une soixantaine d'année, un météorologiste britannique, L.F. Richardson, mettait au point une procédure permettant de prévoir le temps à partir d'équations mathématiques fondées sur des lois physiques connues. A l'époque, cela tenait de la science fiction. Il aurait fallu que 64 000 mathématiciens travaillent jour et nuit, toute l'année, sur des machines à calculer pour traiter les données d'observation en surface et en altitude, communiquées par 2000 stations météorologiques réparties sur tout le globe. Pourtant Richardson n'était pas un rêveur puisqu'il a inventé ce que nous appelons maintenant la prévision numérique du temps. Vingt-cinq ans plus tard le mathématicien américain, John von Neumann, fut le premier à utiliser un ordinateur commandé par une équipe de météorologistes et de mathématiciens pour réaliser l'analyse et la prévision du temps par les mathématiques et la machine.

**La révolution technologique: satellites et ordinateurs**

La révolution technologique qui a produit les calculateurs électroniques ultra-rapides a également fait apparaître, dans les années 50, les satellites terrestres artificiels qui ont donné une dimension nouvelle à la capacité d'observation du temps. Aujourd'hui, pour reprendre les termes du grand météorologiste norvégien, le regretté Sverre Petterssen, "les principales barrières techniques ont cédé . . . Il est devenu possible de garder sous surveillance constante la totalité de l'atmosphère et de procéder au traitement immédiat de quantités immenses de données." Sans cette révolution, le programme global d'observation qu'est la Veille météorologique mondiale n'existerait pas et il n'aurait pas été possible de lancer cette expérience.

Le problème majeur des météorologistes qui cherchent à améliorer les modèles atmosphériques prévisionnels – en vue d'obtenir des prévisions plus fiables – est qu'ils ne disposent pas d'un ensemble vraiment satisfaisant d'observations mondiales avec lesquelles contrôler leurs modèles. D'après les spécialistes, un réseau idéal devrait comporter des stations d'observation distantes de 500 km, receuillant des données relatives à la pression, à la température, à l'humidité et au vent, à différentes altitudes jusqu'à 30 km. En l'absence d'un tel jeu de données, il est difficile de distinguer les erreurs qui résultent de défauts des modèles et celles qui sont dues à la pénurie d'observations exactes. Disposer d'un bon jeu de données globales pour toute l'année, c'est-à-dire couvrant toutes les saisons, présenterait une valeur inestimable. C'est l'objectif de l'Expérience météorologique mondiale.

**L'Expérience et les besoins en données**

Une chose est certaine. Pour améliorer les modèles atmosphériques, l'Expérience météorologique mondiale doit recueillir un ensemble de données sur l'état de l'atmosphère globale plus complet que celui fourni actuellement par les stations d'observation.

L'année de mise en route a commencé le ler décembre 1977. Une partie de l'équipement scientifique prévu, par exemple les satellites et les systèmes de communications et de traitement des données, deviendra opérationnelle. La période préliminaire d'acquisition des données a débuté le ler janvier 1978. Les observations relevées par les stations de la Veille météorologique mondiale et les satellites en exploitation seront rassemblées et analysées pour permettre le contrôle du système de transmission et de traitement des données. L'année opérationnelle commencera le ler décembre 1978, date à laquelle le système de base d'observation et de traitement des données deviendra entièrement opérationnel. Cette phase de couverture globale intensive doit durer 12 mois consécutifs. Elle comportera deux périodes d'observation spéciales, du 5 janvier au 5 mars et du ler mai au 30 juin 1979.

**Le système d'observation de base**

Pendant ces douze mois c'est, bien entendu, la Veille météorologique mondiale (VMM) de l'OMM qui servira de système d'observation de base. Dans toute période de 24 heures, la VMM recueille et transmet aux centres de traitement les observations météorologiques normales provenant d'un impressionnant réseau de stations et de plate-formes: plus de 9200 stations terrestres pour les observations en surface; près d'un millier de stations fournissant des observations en altitude; 9 navires météorologiques océaniques à position fixe et quelque 7400 navires de commerce procédant uniquement à des observations de surface; des aéronefs de reconnaissance ou commerciaux communiquant plus de 3000 rapports d'observation par jour. L'Expérience mondiale donnera pour la première fois l'occasion d'utiliser un système de satellites véritablement intégré pour observer l'atmosphère de la terre. Cinq satellites géostationnaires surveilleront en permanence les ceintures équatoriale et subtropicale autour du globe, tandis qu'une série de satellites à défilement seront employés pour déterminer la structure thermique de l'atmosphère et pour obtenir des renseignements sur la nébulosité et la température de la mer.

**Insuffisance du système d'observation de base**

Les vastes quantités de données ainsi recueillies ne permettent pas, cependant, une Expérience mondiale valable. Dans l'idéal, les météorologistes voudraient disposer d'une gamme de données provenant d'observations météorologiques intensives faites sur la totalité du globe pendant une année complète. Financièrement, c'est impossible. Pour donner une idée du prix de ce type de recherches, rappelons que le coût annuel d'exploitation d'un seul navire météorologique océanique à position fixe s'élève à deux millions de dollars environ. Or, pour bien faire, il faudrait 200 navires, uniquement pour les observations en altitude dans les seules régions tropicales. Il fallait donc trouver un compromis conciliant les besoins scientifiques, les moyens techniques disponibles et les possibilités financières.

**Systèmes d'observation spéciaux supplémentaires pour une couverture globale**

Les spécialistes scientifiques assurant la gestion de l'Expérience ont donc adopté un programme moins complet mais relativement satisfaisant. Les lacunes seront comblées grâce aux systèmes d'observation spéciaux, et le plan d'observation comporte les deux périodes spécialement choisies citées précédemment (5 janvier – 5 mars et ler mai – 30 juin 1979). Il est prévu, au cours de chacune d'elles, une couverture d'observations intensive pendant 30 jours.

## STRATOPROBE IV

by R. H. Hoogerbrug

Recently the Experimental Studies Division of the Atmospheric Environment Service conducted the fourth in a series of stratospheric balloon investigations of the atmosphere. This series consisted of four launches, one by AES, one by Dr. T.A. Clark of the University of Calgary, one by NCAR from Boulder Colorado and one by Dr. Weber from the University of New Hampshire. These launches took place at Yorkton, Saskatchewan in August and September of 1977. The AES effort was a cooperative venture between the Service, Canadian university groups and private industry, with AES providing the payload and the launch itself. The AES team was headed by Wayne Evans abley assisted by Dave Wardle, Jim Kerr, Hans Fast, Rick O'Brien (Australia), Tom McElroy, Bill Gee, Bill Clark, Clive Midwinter, Archie Asbridge, John Bellefleur, Bob Hoogerbrug, Claude Drouin (ACTU), Griff Toole (ACTU) and Brian Gould (U of T). The Canadian Balloon Facility (CBF), operated by the National Research Council for the scientific community, provided the launch services for the entire project.

Seven instrument systems were flown on a modified payload plus one on board camera system. The camera system consisted of a fully automated 16 mm military strike recording camera. The various sensing instruments included an infrared radiometer to measure $HNO_3$, $O_3$ and $CH_4$: a UV scattering spectrophotometer to measure OH and CLO; a UV visual spectrophotometer to measure for $HNO_2$; a UV spectrophotometer measuring for CLO: an infrared Michelson interferometer measuring $CH_4$, HCL, CO, and $H_2O$ and finally a chemical snooper measuring NO and $NO_2$. The instruments were intended primarily to investigate the modification of the stratospheric ozone layer by freons from aersol cans and exhaust gases from supersonic aircraft.

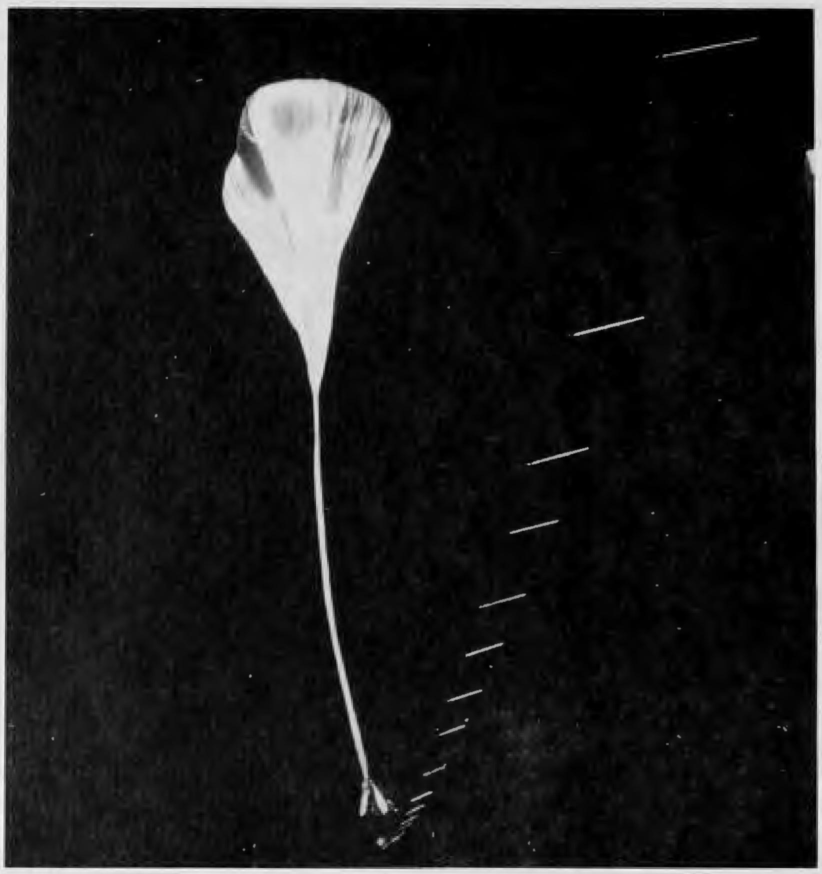
As part of the meteorological support provided by AES for the CBF, an aerological station was set up in an ACTO mobile office. A GMD II was obtained from AIMC and set up by Norm Simon with assistance from the technical staff on hand. This unit functioned well and good results were obtained. Special high altitude aerological balloons (KAYSAM 120G) were employed. The highest ascent attained was 3 mbs on two occasions.



*AES Payload on Launch Vehicle.* / *La charge utile du SEA suspendue au lanceur.*


*AES Payload on "Tiny Tim" the massive launch vehicle at the NCAR Palestine Texas Balloon Facility.*
*Levage de la charge du SEA par Tiny Tim, l'énorme lanceur des installations de lancement de ballons du NCAR de Palestine au Texas.*

*Weighing AES Payload at Palestine Texas NCAR Balloon Facility.*
*Pesage de la charge utile du SEA aux installations de lancement de ballons du NCAR de Palestine au Texas.*



*Balloon and Train just prior to lift off. / Le ballon et le train juste avant le décollage.*

Both these ascents carried a Brewer-Mast ozonesonde as well as the regular radiosonde package. This average burst altitude was 5.97 mbs which was quite good considering that on most ascents an ozonesonde was flown as well.

Mr. John Stutchbury, formerly with ARPD, was the project meteorologist providing forecasts for the launch teams. John used his previous experience at Yorkton plus the 1977 data to conduct an extensive investigation of the super geostrophic wind. The upper air data from Yorkton was combined with other material to aid in the computation of the float and descent vector winds. John also assisted on five balloon launches from Churchill, Manitoba in July, 1977.

In addition to the Yorkton campaign, a cooperative balloon launch was made from CFB Cold Lake in February, 1978, with AES placing two instruments on a payload launched by Dr. Brian Ridley of York University. AES provided some meteorological support by flying a series of rawinsonde/ozonesonde ascents from Primrose Lake. The balloon forecasting for this campaign was done by Mr. Barry Wetter of NRC. Mr. Wetter is a former meteorologist with AES.

In support of international cooperation between the U.S. and Canada, two balloon launches were carried out jointly between AES and NASA. These took place on October 25, 1977 and December 2, 1977 at the NCAR balloon facility at Palestine, Texas. The AES equipment was trucked down to Texas with the payload support team from SED Systems Ltd., of Saskatoon coming separately. Several pieces of equipment were on loan from the CBF to AES to support this effort.

Simultaneously, with the AES launches, two launches by NASA/JSC/University of Michigan were carried out. The first AES flight was airborne for 5½ hours and landed near Gulf-Port, Louisiana. The second flight was airborne for 8 hours and was recovered near Durham, North Carolina. A down range station was set up at the NCAR site in Tuscaloosa, Alabama, with down range tracking and recovery handled from this location. Thirty-three upper air ascents were made, with 28 of these carrying ozonesondes. The highest ascent attained was 2.2 mb using a hypsometersonde, ozonesonde and a Kaysam 120G balloon. The Texas campaign will aid on correlating the Canadian and U.S. results observed over the past few years.

The data obtained from the total AES effort are currently undergoing analysis and the results should be available shortly. This program of stratospheric research within AES will be continuing into the future to further investigate depletions in the ozone layers and the impact of man's activities on the stratosphere.

## COMPUTER APPLICATIONS FOR TECHNICIANS COURSE 78-1

Photo/photographie G.W. (Bill) Kiely

*Shown are the smiling faces of the graduating CAT 78-1. Seated from left to right are students: C.A. Drouin, N.G. McPhail, A.N. Headley, M. Skarparthiotakis, W.G., McKay and R. Schultz; standing from left to right are the instructors: R. Gagnon, T.L. White (Course Director) and J. Bendell.*

This was the 5th Computer Application for Technician course presented by the Technical Training Division of AES Headquarters, with a total of 56 technicians graduating to date. Those technicians appear relaxed now, in actuality they have just completed a very challenging two weeks of full-time classes preceeded by two pre-course packages: an Introduction to Statistical Methods in Meteorology and an Introduction to Computer Applications. During these two weeks in class they learned more about statistics, computer programming applications, and operation of the Hewlett Packard 21MX-E computer system.

The course consisted mainly of meteorological problems which the technicians were required to solve. The degree of difficulty increasing with each passing problem, till all the mandatory problems were completed. For those exceptional students a series of optional problems were available. The simple main aspect of these exercises was their usefulness in meteorology. Examples of these problems, ranging from simple to difficult are: to determine the maximum and minimum values of an array and the manipulation of observed and forecast grids of meteorological data.

A really deserved "Well Done" for these technicians on their graduation of course CAT 78-1 and also to all previous graduates for completing a challenging and interesting course.

## RECYCLING GETS A BOOST AT AES

Chucking paper into the garbage is no longer in style at AES. A paper reclamation scheme, started in early March, aims to capture almost a quarter ton of waste paper per day from the building.

Why save paper? Resource conservation and disposal prevention are the reasons for the program. Paper made from reclaimed waste only takes one third of the energy required to make paper from virgin pulp. Reclaiming a ton of paper saves seventeen trees. (Trees are not growing as fast as they're being harvested.) Each AES employee creates over one half pound of recyclable waste paper per day and this adds up to over a ton per week for the building. That's a ton of waste that can be kept out of landfills and incinerators. Other benefits include revenues from the sale of waste paper and reductions in building maintenance costs.

How does the system work? It's a simple, two-step process, involving no extra work for AES staff. Every employee has a "desk top holder" for waste paper. When on an errand, employees grab the paper from the desk container and deposit it into strategically placed "central floor bins." That's all there is to it!

But the story continues for the paper. Building maintenance staff empty the jute bags from the bins, transferring the paper into plywood boxes downstairs. The paper buyer picks up the boxes, bales it back at the plant and sells it to paper mills which make recycled paper products from it.

Sponsored by the Environmental Protection Service, the program is modeled on successful pilot schemes at three Environment Canada buildings in Ottawa/Hull. JoAnn Opperman, a consultant on contract with EPS was at AES for the month of March to help get the program going. She says the challenge is for people to break the habit of stashing paper into trash baskets. During briefing sessions and individual visits she's been urging people to get addicted to their desk top holders. She recommends moving waste baskets to a new spot under desks so there's less temptation to use them for recyclable paper.

After March the paper reclamation scheme will be monitored by Christine Samardak in Administration at –4948. That's the number to phone for information, to order replacement desk top holders or to report full floor bins. AES staff are reminded that the new reclamation scheme does not affect two existing practices in the building: Those who are taking computer printout and cards to the fourth floor north location for reclamation, should continue to do so because that paper grade commands a higher price on the market; those who send files and certain other confidential documents to the Records Branch for destruction, should still do so too. In other words, the new paper reclamation scheme which segregates a grade of paper called "coloured ledger" is only intercepting high grade paper that would normally go into the garbage.

While every desk top holder has a list of what can and can't be recycled, there are still some contaminants that need clarification. On the other hand, some recyclable paper is still going into wastebaskets. So here are some extra cues:
*Acceptable for recycling:* yellow telephone message slips; AES phone directories with covers removed; tan file folders; all pastel coloured papers except cardboard; white envelopes even though they have labels and glue (but windows must be torn out first); all "dull" photocopies (that's all xerox and IBM and most 3M); "dull" staple-bound magazines with glossy or dark coloured covers removed; staples and paper clips need not be removed. *Not acceptable for recycling:* yellow/brown kraft envelopes; also reproduced maps; facsimile paper; ozalid paper; teletype and telecopy; glossy 3M copies; glued edge reports; chemically treated papers that look shiney; newspapers; glossy magazines.

The key to knowing if a paper is allowed or not is really common sense. During recycling the paper is mashed and dissolved in water. Therefore if it's glossy or plastic it won't dissolve so it's not acceptable. Secondly if it's newsprint, teletype or cardboard the short fibers are different from the long fibered papers being collected here. Glue bound reports are not allowed because that glue melts in the paper pulper and gums up the drains; it doesn't dissolve.

Ms. Opperman says that Ottawa buildings show that 85% of the employees are participating, there is 54% less garbage, and paper sales are bringing in profits. She hopes that AES staff will show that success can be repeated in Toronto. The key is participation by every staff person. "We must dispel the myth that one individual's contribution doesn't matter; environmental protection is the sum of individual contributions."

AES people have suggested some slogans for the program such as "Habits are made to be broken" referring to old trash stash reflexes, or "The job's not done 'til the paperwork is finished."

Staff have also been quick to point out that reducing the amount of waste is the *real* solution to energy and materials conservation. So it's important to share memos and reuse paper that's only printed on one side. In response to many questions about what other action can be taken against garbage, AES staff are urged to:

– save newspapers for scout or service club drives; bundle it up for curbside pickups in certain Metro boroughs or take it to volunteer depots in outlying towns;
– start a backyard compost pile for vegetable scraps and yard trimmings;
– take bottles and cans to depots throughout Metro and environs;
– shop wisely by avoiding overpackaged goods and by buying pop, milk and beer in refillable containers and vegetables/fruits in their own skins;
– repair, donate, share, reuse.

## LATE FLASH

A paper reclamation contest was held at AES for the twenty-four hour period from March 22–23. The purpose of the competition was to publicize the new desk top separation program and to boost staff participation. Here's how the "teams" stacked up:

| STANDING | FLOOR TEAM | POUNDS RECLAIMED | PER CAPITA RECLAIMED |
|---|---|---|---|
| the winner | 2nd north | 370 | 4.56 |
| runner up | 3rd south | 314 | 3.01 |
| third | 4th north | 222 | 1.59 |
| fourth | 3rd north | 54 | 1.10 |
| fifth | 4th south | 112 | 1.04 |
| sixth | 2nd south | 24 | .26 |

TWENTY-FOUR HOUR GRAND TOTAL 1096 POUNDS RECLAIMED!

The grand total of 1096 pounds was over twice as much as the 480 pounds predicted for a normal AES day. (But contest days are not normal – lots of cleaning was being done.) The irony of the team standings is that, given real participation by 2nd floor south, they are really the winners in the true sense of energy and resource conservation – because they generated the least waste! Congratulations AES, for saving 9.4 trees on March 23.

## "CIVILIAN CITATION" PRESENTED TO LAYTON CARTER

On Friday December 16, 1977 at 2.00 pm, in the Council Chambers of the Regional Municipality of Peel in the Bramalea area of the city of Brampton, Judge B. Barry Shapiro and members of the Peel Regional Board of Commissioners of Police presented to Layton Carter, Regional Meteorological Communications Officer, Atlantic Region, Atmospheric Environment Service, a Civilian Citation "in grateful acknowledgement of outstanding service and unselfish assistance rendered to the Peel Regional Police Force and the Community on December 21, 1976."

*Left to Right/de g. à d. : Mayor James Archdekin of Brampton presents citations to Mr. Karl Zeilbauer, a representative for Mr. Lorne Rear, and Mr. Layton Carter of AES.*

Photo Courtesy Peel Regional Police Force.

On that date, Layton Carter was still resident in Bramalea and about 8 pm he accompanied his daughter to the Bramalea Shopping Centre. Having parked the car they were making their way from the parking lot to the Mall when they heard muffled cries of what sounded like a dog – they stopped and listened again but by this time the cries sounded more human and sinister. As Layton started in the direction of these cries, a young couple caught up with them and hearing the cries also, followed – and at this point another man getting out of a car also joined them.

The three men led by Layton ran towards "an orange Volvo" from behind which the cries were coming, to find a man assaulting a woman – he had grasped her by the throat with one hand choking her and at the same time beating her over the head. At the approach of the men the assailant released his victim and ran off . . . . . . followed by Layton and his two backers.

As they reached the man – they surrounded him and without having to lay a hand on him, conducted him to a police station nearby.

All he said, once captured was "Don't take me to the Police." He was found to have a previous record and it was noted that he chose to assault the woman under a street light directly in front of a grocery store! Peculiar!

Due to the quick response and vital concern for this woman's safety, the three men prevented her from sustaining further injury and possibly even death. So often, citizens choose not to become involved in incidents affecting others. Those who do, not only assist the Police in their task, but the entire community.

A few months later Layton Carter was transferred to the Atlantic Region and took up residence in Shubenacadie. A letter of appreciation from the victim followed and reached him in the Maritimes. This all occurred shortly before he was due to leave on holiday. He had planned a holiday with his family at a cottage in Parrsboro, N.S. and after settling in they realized their next door neighbours were driving an orange Volvo with an Ontario license – having so recently left Ontario they were immediately interested and made themselves known. Just to prove once again the real truth in old clichés – "Truth is stranger than fiction" and "its a small world." – Yes!! the family in the orange Volvo *was* from Bramalea and the lady *was* the victim of the assault and Layton Carter was her rescuer. Now top that one!!

## LES ÉNIGMES DE LA NATURE

par E. Yakimiw

CMC INFORMATION

**Le problème des quatre couleurs enfin résolu**

Si vous voulez un jour colorier ou ombrer une carte météorologique, soit manuellement, soit par ordinateur, il se peut que vous soyez amenés à vous demander quel est le nombre minimum de couleurs ou d'ombres que vous pouvez utiliser pour distinguer toutes vos régions. Si vos régions sont nombreuses et moindrement compliquées, la réponse n'est pas évidente. Or, vous devez maintenant savoir – et la preuve en est formelle – qu'il vous faudra au plus quatre couleurs pour colorier toutes vos régions de façon que deux régions adjacentes n'aient pas la même couleur. En effet, ce problème des quatre couleurs, problème mathématique des plus difficiles, a été résolu par K. Appel et W. Haken de l'université d'Illinois.

La preuve a nécessité 10 milliards de décisions logiques et 1200 heures d'ordinateur. Elle fait appel à l'analyse combinatoire, branche mathématique qui s'occupe de la théorie des ensembles et des graphes. En effet, en utilisant le principe de correspondance, il est possible de représenter toute surface plane fermée par un point et la frontière adjacente à deux surfaces par une ligne joignant les deux points. Le résultat donne une sorte de graphe. Appel et Haken ont montré que tous ces graphes contenaient des graphes réductibles. Or la preuve que l'hypothèse des quatre couleurs était vérifiée pour les graphes réductibles avait déjà été établie auparavant. Appel et Haken ont donc démontré que leurs graphes vérifiaient l'hypothèse des quatre couleurs et que toutes les régions d'un plan pouvaient être coloriées avec au plus quatre couleurs sans que deux régions adjacentes aient la même couleur.

Il existe plusieurs problèmes analogues concernant l'espace à deux dimensions qui ont été résolus par la géométrie, la topologie ou d'autres branches des mathématiques.

Par exemple, saviez-vous qu'il ne peut y avoir dans la nature plus de 17 modèles de forme différente de tuiles, de mosaïques ou d'autres objets de ce genre? C'était connu des Anciens, il y a plusieurs millénaires. Pourtant, la preuve formelle a été établie en 1924 par le célèbre mathématicien George Polya qui a utilisé la théorie des groupes.

## A METEOROLOGIST LOOKS AT SOME ASPECTS OF CROP SPRAYING

C.J. Wendell

CFWO CFB Trenton

In Eastern Ontario, particularly in the Counties of Hastings, Prince Edward and the adjoining Counties, Northumberland to the west and Lennox and Addington to the east, a considerable acreage of fruit and vegetables are grown which are quite weather sensitive during certain times of their development if not during the whole of the growing season. In its provision of weather service to the public and to agriculture in particular, the Weather Office at CFB Trenton supplies weather information to some of the fruit growers who number approximately 175 farmers with 3700 acres of orchard producing an annual crop valued at 3.3 million dollars[1] as well as to others in dairy, livestock, cash crop etc.

The fruit and vegetable grower as well as the other farm operators must apply chemicals to their crops in order to control insects, diseases, weeds and crop growth. These chemicals are usually applied in a liquid spray using water as a carrier with the chemical in solution or suspension.

Disease control is usually effected by the application of a fungicide at critical times. Apple scab, the main disease confronting the apple grower develops ascospores during the winter and early spring on the old leaves on the ground that were infected the previous season[2]. Ascospores – similar to small seeds are usually ripe about the time first green apple tissue is expected in the spring i.e., late April to early May.

Rain is necessary for spore discharge and enough rain to wet the surface of the aves will cause the ascospores to be shot into the air where air currents carry them upward into the trees. When these spores land on green foliage or fruit, infection is caused if the tissue stays wet for a number of hours. This infection is a function of both moisture and temperature. At the cooler temperatures, say 1°C the green tissue must remain wet for more than 48 hours in order that the infection take place, while at a temperature of 15°C only 9 hours are required for this Primary Infection[3]. These Primary Infections if uncontrolled, produce spores which result in Secondary infections later in the season requiring a shorter leaf wetness period.

A protective fungicide applied to the developing fruit and other green tissue before a wetting period will prevent a scab infection. If a scab infection has occurred, a fungicide may be applied as an eradicant within certain time limits, but normally at a higher rate of chemical per acre increasing the cost of control. Regular fungicide spray programs usually start near the end of April and continue at regular intervals until late June and through July and August if the period of primary scab infection is not controlled to the end of June. In a dry season some of the protective sprays may be omitted.

Insect control is also accomplished by periodic sprays of insecticides and in many cases both insecticides and fungicides are applied in the same spray. As for the importance of insect control, one researcher claims[2] that the progenies of a single overwintering codling moth, if uncontrolled can destroy about 140 bushels of apples in one season (retail value $1000). The timing of insect sprays are also weather dependant but to a lesser extent than the apple scab sprays. Insect development through various stages is monitored by the Extension Horticulturists as well as some growers so that timely advice can be provided for their control.

Other types of sprays are applied to agricultural crops, for example some fertilizers are applied as a spray to be absorbed through the foliage of the plants. Chemicals can be sprayed to thin the fruit trees, that is, cause some of the fruit to fall in order that the remaining fruit grow to a marketable size. Thinning sprays seem to be very weather sensitive and should be applied during periods of high humidity, nil wind, overcast sky and temperatures in the 21 to 26°C range as these conditions prevent the rapid drying of the liquid spray solution, otherwise there is little time for absorption through the leaves[3].

Weeds are also controlled by the application of chemicals. Some of the many herbicides used in weed control require precipitation within a certain period after their application to activate them. In some cases rain should follow almost immediately for effective control of weeds while some require rain within ten days. A re-spraying of the crop may have to be carried out in a dry season or if a forecast rain does not occur.

**The Sprayer**

Orchard sprays are normally applied by either a hand held high pressure hose or with an air blast mist type sprayer. In the hand held application the trees are "washed" or "hosed-down" with a dilute chemical spray as the spray holding tank is towed through the orchard. This type of machinery requires about four to six hundred gallons of liquid per acre applied under a pressure of about 500 psi which results in water droplets in the 20 to 600 micron range[4].

The air blast mist type sprayer on the other hand applies the same amount of chemical but in a more concentrated form. In many cases amounts as low as twenty gallons of water per acre are applied with the air blast sprayer using a high RPM fan producing air blasts of over 240 km/hr (150 mph) to drive the mist up into the trees to provide the spray coverage. Water droplets in this case are in the 5 to 100 micron range[4] and are much more vulnerable to being carried away by the wind thus wasting spray chemical and contaminating the surrounding environment. On a hot summer day (27°C) as much as half of the water can be lost in the 30 ft travel to the tree top due to evaporation[4].

In one of the protectant sprays for apple scab one half pound of actual chemical (benomyl) is applied per acre on an orchard consisting of 50 trees per acre. At that rate each tree receives 0.16 oz of chemical. Spraying on a hot windy day leaves little for the tree!

**Effects of Rain**

Rain or lack of it has quite an effect on agriculture, it causes the release of apple scab spores and if it persists long enough may result in an infection period. Some apple growers commence their apple scab protectant program near the end of April and continue to spray at weekly intervals until the end of July when sprays are reduced to biweekly for the next two months, a total of twelve to fourteen applications.

These protective sprays may be reduced by a few if accurate forecasts of no rain are made. Based on the 1977 Fruit Production Recommendations (OMAF Pub. 360) and an Agricultural Chemical Wholesale Price List (NM Bartlett Mfg. Co. Ltd., Beamsville Ont.), protectant scab sprays cost from five to over twelve dollars per acre for the fungicide material. If only one quarter of the 3700 acres of apple acreage in the Quinte District were not sprayed one time because of a no rain forecast, a saving of from five to twelve thousand dollars could be realized by the growers. On the other hand, a poor no rain forecast could result in as much as a twelve thousand dollar eradicant spray for the same thousand acres.

Accurate and dependable forecasting can in most years reduce the number of spray applications necessary enough to pay the salaries of a couple of meteorologists.

Other growers require accurate and timely advice on the weather. One grower in Sidney Township claims that an accurate forecast he received and made use of resulted in a considerable cash gain on his part. During the planting season of 1975 he received a forecast that the beginning of a period of wet weather would commence shortly after midnight that night. On this advice he acquired an extra corn planter, some help and planted all his corn as well as his neighbours, finishing well after midnight in the rain. Because of the clay type soil in his area and the subsequent rains, most farmers in the area were unable to plant crops for two weeks.

If corn planting is delayed beyond its optimum date, a yield reduction of as much as 3/4 of a bushel per acre per day results[5]. With many farmers planting an average of 100 acres of corn, the two week delay would have cost this particular farmer over 1000 bushels of corn having a value near $2500.

Hay is another crop which is quite weather sensitive, particularly in June when most is cut, cured and bailed during dry weather. The OMAF Publication 20, Agricultural Statistics for Ontario 1975 shows that the counties of Hastings and Prince Edward has a total of 121 thousand acres in hay with a farm value of over 14 million dollars. With this crop as in fruit spraying an accurate forecast of rain or no rain could help individual farmers harvest this crop at the optimum time. A one percent loss due to wet hay could cost over 100 thousand dollars.

Weather forecasts which are consistantly reasonably accurate and timely are well worth the effort to produce them. Like the plough, the meteorologist can be a useful tool helping the agricultural community to turn over greater profits.

References

1. Warner, John, Ontario Ministry Agriculture and Food, Extension Horticulturist, Smithfield Experimental Farm, personal communication.

2. Childers, Norman, Modern Fruit Science, Horticultural Publications, Rutgers University.

3. Ontario Ministry Agriculture and Food (OMAF) Publication 360, 1977 Fruit Production Recommendations.

4. OMAF Publication 373, Orchard Sprayers.

5. OMAF Publication 13, Corn Production in Ontario.

## CREATION OF AN AIR QUALITY ASSESSMENT SECTION

Over the past few years, EPS, the Provinces and AES Regional SSU's have made steadily increasing demands for ARD assistance with respect to air quality aspects of environmental impact assessments. As a consequence, this activity has now reached the point where it involves a significant number of man-years and the demand is expected to remain high for the foreseeable future. It has therefore been decided to formalize the existence of *a specialist group* within the Air Quality and Inter-Environmental Research Branch to respond to such requests.

Effective November 1, 1977, an Air Quality Assessment Section (designator ARQN) has been created with terms of reference as shown in the attachment. This Section is a subdivision of the Atmospheric Dispersion Division and Mr. R.V. Portelli is acting as Head. Other members of the Section are Dr. C.S. Matthias, A.M. Malkiewicz, D. Bagg and A.J. Arnold. The expert assistance of other Branch personnel will also be provided to the new Section from time to time as required.

## AIR QUALITY ASSESSMENT SECTION
## ATMOSPHERIC DISPERSION DIVISION
## AIR QUALITY AND INTER-ENVIRONMENTAL RESEARCH BRANCH

### TERMS OF REFERENCE

1. To plan, participate in and review air quality impact assessment studies for existing and proposed major development projects as requested by other AES components, EPS, or other governmental agencies.

2. To carry out applied research on atmospheric dispersion of air pollutants and on air pollution potential as necessary for the development and updating of methodologies for environmental impact assessment.

3. To provide a consultation service to AES, other governmental and non-governmental agencies, private industry and the public at large on the practical aspects of air pollution meteorology research.

4. To plan, organize and co-ordinate training courses in air pollution meteorology as required.

## METEOROLOGIST COURSE NO. 34

*Left to Right/de g. à d. : Steve Ricketts, Ken Stewart, Jim Abraham, Cherie Knowles, Amir Shabbar, Ted Lord, and Dave McCulloch.*

Photo/photographie G.W. Kiely

Another page in the diary of Professional Training has been turned. On Thursday the 30th March 1978, seven rookie forecasters graduated from Meteorologist Course 34.

This group met for the first time in August 1977 in a classroom at A.E.S. Downsview. They had been selected from amongst the many applicants from across the country. Classes started immediately and it took quite some time before everyone recovered from the shock that they would not be able to "wing it" through this basic course. However they all finally settled down to many hours of hard work. The instructors kept up a steady flow of assignments and the students almost always met the deadlines (although not without complaint). Class spirit developed quickly as the students assisted each other on the course projects. This comradeship was furthered by the few occasions that they met for a concert or dinner and by the routine relaxation gatherings at the "Lord-Ricketts Manor". Although the course members were often found at 4905 Dufferin long after lectures and labs were over, there was a regular exception. At the A.E.S. Recreation Association curling on Wednesday evening, Steve Ricketts skipped a rink (which included Jim Abraham and which was cheered by the others) to a first place finish in both the regular season play and the play-offs.

The last week of March was a hectic time for all – there were cars and/or stereos to buy, apartments to clean, parties to attend and plans to be made. A luncheon was held on the 30th of March and this was followed by the graduation ceremony in the Auditorium. Mr. J. McCulloch, Regional Director of the Atlantic Region, addressed the class and then presented certificates to the graduates.

After the ceremony, the new meteorologists prepared to leave Downsview for a two week course at the D.N.D. School of Meteorology in Winnipeg. From there they will proceed to their first posting: –

J. Abraham, K. Stewart to Greenwood, N.S.

C. Knowles, T. Lord, S. Ricketts to Summerside, P.E.I.

A. Shabbar to Trenton, Ontario

D. McCulloch to Edmonton, Alberta.

Congratulations Course 34! Good luck and best wishes in your careers as meteorologists.

## FROST WARNING SERVICE FOR OKANAGAN GRAPE AND VEGETABLE GROWERS – 1977

by Dale H. Richier

The frost warning program for the grape and vegetable growers of the Okanagan Valley began September 1, and ran to October 21 last year. Prior to September 1, volunteer observing sites were set up at four locations, Westbank, North Oliver, South Oliver, and Osoyoos. Instrumentation at these sites included a Stevenson screen, minimum, and grass minimum thermometers. Thermographs and grass minimum thermometers were put in service at the Kelowna and Penticton Airports.

The temperature data collected from the volunteer observing sites by the Kelowna and Penticton Weather Offices was forwarded to the frost forecaster in Vancouver daily. The daily climate from Kelowna city along with the airport grass minimums were included in these messages.

The frost warning bulletin issued by the frost forecaster was received near 3 p.m., and was released to the growers through the radio stations in the Okanagan Valley. The bulletin was included as part of the regular evening weather program. It was also carried on BCTV station in Kelowna on their evening weather show.

In contrast to 1976, weather conditions were more like normal last growing season. A good crop of grapes developed and reached harvesting stage in early September. No frost of any significance occurred in September, but some sharp frosts were reported in early October. The frost damage was mainly to the canopy foliage. The shedding of leaves due to frost facilitated the harvest. Harvesting of the grapes and vegetables suffered some minor set backs in September due to wettness. The rainfall at Penticton during September of 34.0 mm was nearly double the normal. Vegetable crops were finished off by frost in the central and northern Okanagan near the middle of September.

The grape horticulturist for the Okanagan, John Vielvoye, says that the fall frost warning service is very useful and is now taken for granted. Our radio broadcasts and the code-a-phone at Kelowna are the main method of picking up the forecast.

The following Table #1, which should have accompanied "Les Prévisions du Quinzième Jour" Par Ron Robinson CMC, in the December, January issue of Zephyr, was unfortunately omitted. Our sincere apologies!

Editor

Le tableau N° 1 qui suit, aurait dû paraître dans l'article de M. Ron Robinson du CMC intitulé "Les prévisions du quinzième jour" publié dans le numéro de décembre – janvier du Zéphyr, mais il a malheureusement été omis. Nous vous prions de nous en excuser!

La rédactrice

**Tableau I**

**Canada – 43 Prévisions à 70 Stations**

**Observées**

| | | TRÈS AU-DESSOUS | AU-DESSOUS | NORMALE | AU-DESSUS | TRÈS AU-DESSUS | |
|---|---|---|---|---|---|---|---|
| PRÉVISION | MB | 236 | 118 | 97 | 66 | 35 | 552 |
| | B | 170 | 163 | 123 | 154 | 131 | 741 |
| | N | 115 | 140 | 160 | 159 | 204 | 778 |
| | A | 64 | 99 | 115 | 138 | 220 | 636 |
| | MA | 21 | 30 | 27 | 72 | 153 | 303 |
| | | 606 | 550 | 522 | 589 | 743 | 3010 |

Nombre de prévisions correctes – 850
Nombre probable de prévisions correctes dû au hasard – 581
Degré de performance = - 11

**Degré de performance régionale**

Atlantique et Ungava -.01
(18 stations)

Québec méridional et C.B. .08
(18 stations)

Ontario – Prairies – Yukon .18
(34 stations)

## AES MIXED CURLING

*First place team for regular season play and winner of the playoffs. Left to Right, Barry Greer (vice), Steve Ricketts (skip), Jim Abraham (second), missing Charlotte Greer (lead).*

Another successful year for AES Mixed Curling came to an end March 15, with the wind-up banquet and presentation of trophies and prizes. The number one team for the season was skipped by Steve Ricketts with Barry Greer (vice), Jim Abraham (second) and Charlotte Greer (lead). They ran away with the two top trophies – first place for the regular season play and winner of the play-offs.

A total of ten teams participated this season on Wednesday's at the Richmond Hill Curling Club. We were most grateful for the support from the dozen spares who turned out, sometimes on very short notice.

The annual bonspiel which was open to all AES employees in the Toronto area was held February 15. The top team was skipped by Bill Hogg with team members Ann Learmonth, Ed Holtzman and Dave Cook. A total of sixteen teams participated. Prizes donated by Sangamo, Heath & Robinson, AES Credit Union, and the Meteorology Toronto Sub-Group added to the success of this event.

See you next year!

## PERSONNEL

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

| | |
|---|---|
| 77–DFE–WIN–CC–554 | Sr. Communicator A/CM7<br>Prairie Weather Centre, Winnipeg<br>A.L. Hines |
| 77–PSTP–140–191 | Chief Observational MT-8<br>Systems Division<br>Field Services Directorate<br>AES Headquarters, Downsview<br>D.W. Colwell |
| 77–PSTP–140–190 | Chief User Requirements Division MT-8<br>Field Services Directorate<br>AES Headquarters, Downsview<br>R.R. Dodds |
| 77–DOE–TOR–CC–291 | Arctic Development MT-5<br>Ice Climatologist<br>Ice Climatology and Applications Division<br>Ottawa<br>D. Mudry |

**The following transfers took place:**
**Les mutations suivantes ont été effectuées:**

| | | |
|---|---|---|
| N. McLennan | From:De<br>To:A | CFB Cold Lake, Alberta MT-3<br>CFWO Shearwater, Nova Scotia |
| D.L. Waugh | From:De<br>To:A | CFWO Moose Jaw, Saskatchewan MT-2<br>CFWO Esquimalt, British Columbia |
| A. Simard | From:De<br>To:A | CFWO Moose Jaw, Saskatchewan MT-2<br>CFWO Trenton, Ontario |
| M.H. Prout | From:De<br>To:A | CFWO Trenton, Ontario MT-3<br>Ontario Weather Centre |
| A. Patoine | From:De<br>To:A | CFB Ottawa<br>Met Training Centre Ottawa |
| R.L. Drouillard | From:De<br>To:A | Regina, Saskatchewan MT-3<br>Atlantic Region |
| M. Shewel | From:De<br>To:A | Resolute, Northwest Territories MT-5<br>Prairie Weather Centre, Winnipeg |

**Separations:**
**Démissions et retraites:**

| | | |
|---|---|---|
| C.J. Schwab | Resigned | Resolute, Northwest Territories |

## TRIVIA

Money will not always bring happiness – the man with three million is no happier than one with two.

**********

The first thing a new dieter learns fast is that what's good is bad.

**********

Courage oftentimes gets credit when our stubbornness should be blamed.

**********

Prescription for a long healthy life: go to bed the same day you got up.

**********

Male pigeon to angered mate: "Now Myrtle, don't blow your coo."

**********

Trying to impress others does – usually in quite the opposite way.

**********

If you drink a glass of milk every day for one thousand two hundred months, we guarantee you'll live to be one hundred.

**********

The supreme accomplishment is to be able to pay one's bills with a smile.

**********

## LOCUTIONS

Carpe diem – "Mets à profit le jour présent." Mots d'Horace qui aime à rappeler que la vie est courte et qu'il faut se hâter d'en jouir.

Cogito, ergo sum – "Je pense, donc je suis." Constation fondamentale de l'existence d'un sujet pensant, sur laquelle Descartes, après avoir révoqué en doute toutes les assertions et tous les raisonnements des philosophes, construit son propre système.

Eurêka! – "J'ai trouvé!" Mot grec devenu proverbial. C'est l'exclamation d'Archimède découvrant tout d'un coup, au bain, la loi de la pesanteur spécifique des corps.

Festina lente – "Hâte-toi lentement." Mots attribués à auguste, selon Suétone: Allez lentement pour arriver plus vite à un travail bien fait.

Honoris causa – "Pour l'honneur." Se dit de grades conferés sans examen et à titre honorifique à des personnages de distinction.

## ART OF METEOROLOGY

It is the science of the pure air and the bright heaven, its thoughts are amidst the loveliness of creation, it leads the mind as well as the eye to the morning mist, the noonday glory and the twilight cloud, to the purple peace of the mountain heaven, to the cloudy repose of the green valley; now expatiating on the silence of stormless aether, now on the rushing of the wings of the wind. It is indeed a knowledge which must be felt to be in its very essence full of the soul of the beautiful.

by John Ruskin 1839

## "WEATHER" IN SHAKESPEARE

A red morn: that ever yet betokened
Wreck to the seamen, tempest to the field,
Sorrow to shepherds, woe unto birds,
Gust and foul flaws to herdsmen and to herds.

Venus and Adonis

For raging winds blow up incessant showers,
And when the rage allays, the rain begins.

Henry IV

Give not a windy night a rainy morrow.

Sonnets

So foul a sky clears not without a storm.

King John

My lord, they say five moons were seen tonight;
Four fixed, and the fifth did whirl about
The other four in wondrous motion.

King John

Rain long foretold, long last;
Short notice, soon will past.

or

Small showers last long,
but sudden storms are short.

Richard III

Therefore the moon, the governor of the floods,
Pale in her anger, washes all the air
That rheumatic diseases do abound.

Midsummer Night's Dream

Men judge by the complexion of the sky
The state and inclination of the day.

Richard II

I pray thee, good Mercutio, let's retire:
The day is hot, the Capulets abroad,
And if we meet, we shall not 'scape a brawl'
For now, these hot days, is the mad blood stirred.

Romeo and Juliet

And more inconstant than the wind, who woos
Even now the frozen bosom of the north;
And being angered, puffs away from thence,
Turning his face to the dew-dropping south.

Romeo and Juliet

Sometimes I'd divide
And burn in many places; on the topmast,
The yards and bowsprit, would I flame
Distinctly, then meet and join.

St. Elmo's fire

The Tempest

And another storm brewing: I hear it sings i'
The wind, yond' same black cloud, yond' huge
one, looks like a foul bumbard that would
shed his liquor ................ Yond' same cloud
Cannot chuse but fall by pailfuls.

The Tempest

The marigold that goes to bed with the sun,
And with him rises, weeping.

Winter's Tale

## LES EXPRESSIONS DIVERSES

| Expression | Signification ou équivalent |
|---|---|
| Ne fais pas le coq | Ne fais pas le prétentieux |
| Tu fouilles dans mes affaires. | Tu te mêles de ce qui ne te regarde pas. |
| Tant qu'il y a de la vie, il y a de l'espoir | Il ne faut jamais désespérer |
| Je suis en moyen | J'ai de l'argent |
| Il est baveux | Il méprise les autres, fait du sarcasme. |
| Une paire de claques | Des caoutchoucs |
| C'est rien qu'un suiveux | Il manque d'initiative |
| Pars pas en peur | Ne t'énerves pas |
| Ca me fait pas un pli | Cela ne me dérange pas |
| Il voit rouge | Il est en colère |
| Il prend le large | Il s'en va |
| Il est marabout ce matin | Il est de mauvaise humeur |