November/December 1979

ZEPHYR

Environment Canada
Environnement Canada

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Cover picture: Fallen gable from house is mute reminder of the awesome force of Woodstock tornado

Zephyr is a periodical publication for employees of the Atmospheric Environment Service, Environment Canada. It is produced for the Atmospheric Environment Service by the Information Directorate of Environment Canada.

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THE YEAR IN REVIEW

Dr. A. E. Collin,
Assistant Deputy
Minister (AES)

This publication of Zephyr comes at the beginning of a new decade. The seventies have been marked by significant changes for AES. No longer concerned solely with the traditional meteorological services, but reflecting the changes in the social and economic conditions of the decade, AES has assumed responsibility for a wide range of environmental concerns. This trend will continue into the eighties and will present new challenges for the Service.

The past year has been a demanding one for AES. The determination of the government to decrease the public deficit and to increase the efficiency of the public service, together with increasing demands for new services, especially over the Arctic and off-shore areas, were challenges that AES met in a positive way.

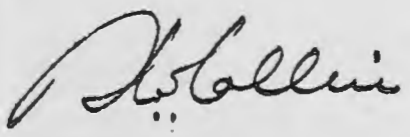
Faced with the new economic climate and rapidly changing technology, early in the year managers at all levels were involved in establishing priorities for AES. Communication and computer systems, data acquisition systems and marketing of AES services were identified as the highest priority areas and will serve as signposts to guide management along the road to further development of the Service.

Long-standing plans to create a Canadian Climate Program took a giant stride toward reaching their objective with the formation of the Canadian Climate Program Planning Board, representing wide participation of other departments, the university community, and the private sector. The first phase culminated with the official opening of the Canadian Climate Centre at AES Downsview in June 1979. Since then, a first and very successful workshop on the carbon dioxide problem was held, and work to formulate a national climate plan is under way.

Public attention was focussed on AES as the long range transport of air pollutants (LRTAP) problem, more popularly known as acid rain, became a prominent issue in Canada and the U.S. This was a result largely of the lead taken by this department and the firm stance adopted by our Minister, The Honorable John Fraser, on this issue.

Weatheradio Canada stations, opened in Toronto, Halifax and Regina this year, went a long way towards improving our direct communication with the public we serve in those areas, and brought the number of weatheradio stations to five. The opening of the Nova Scotia station was particularly noteworthy as it reflected the spirit of federal-provincial cooperation in which the provincial government assumed the responsibility for the installation of repeater stations to extend coverage to most of the province and its offshore fishing areas.

We have all worked towards the achievement of these and other initiatives throughout the year. With a new decade upon us, we will have fresh challenges to face and different areas to explore. I am confident that the Service will respond to these opportunities and I join with you in looking forward to the 1980's. □



Introducing your new ZEPHYR

After a period of transition, caused mainly by staffing and other resource problems, Zephyr has now taken wing again and should, hopefully, land on your desks more regularly than in the past year or so. Although all our problems are not yet over — Zephyr still does not have an editor, for example — we think we have found a way to keep Zephyr alive and, we hope, well, at least for the time being.

We have also given Zephyr a facelift. The design has changed to allow us to carry more information per page than previously, to make the publication more readable, to allow for more effective use of illustrations, to permit a better balance between French and English material and, we hope, to make it more attractive.

The content of Zephyr has been evaluated, with the intent of packing more, and more relevant information into any given number of pages. The basic objectives are to provide information about activities and events within AES, or those taking place outside AES but affecting AES employees, or about AES employees themselves, where unusual or outstanding experiences or achievements, in their professional or personal lives, can be expected to be of wide enough interest to other employees.

Yes, Zephyr has new wings, but we need your help to make it fly. We need your views, comments, suggestions, ideas. Take a moment to write us a note telling us which articles you enjoyed and which you felt were of little or no interest. Let us know what kind of material *you* would like to see in Zephyr.

If you have any specific suggestions or ideas for articles or news items for Zephyr, please drop us a note or give us a call about it. And if you'd like to try your hand at writing a feature article or news story yourself — by all means go to it, we'd like to hear from you. But before you take the time to put your thoughts on paper, check with us. We may not have space for all your contributions, or they may not meet the editorial needs of any given issue. So, ask first, to avoid possible disappointment. The current issue carries a feature article contributed by an AES staffer, and we draw your attention to it. Zephyr is *your* publication — it's up to *you* to keep it that way. □

Sir John Mason of the British Meteorological Office

Visit by British Meteorologist

Sir John Mason, Director-General of the British Meteorological Office, recently spent a day at AES Downsview lecturing on numerical weather prediction and discussing various concerns of mutual interest with AES managers.

Sir John had been invited to come to AES on the occasion of his week-long visit to Toronto to deliver the Andrew Thompson Memorial Lecture at University of Toronto.

More than 200 government and other interested scientists attended his afternoon lecture, which covered progress and plans in numerical weather prediction (NWP) in Britain. Sir John emphasized the acceptance at top gov-

Barney Boville to Geneva

Dr. Barney Boville has left his position as director of the Canadian Climate Center to become a consultant to the Office of the Secretary General of the World Meteorological Organization (WMO) in Geneva. He is now organizing the World Climate Program.

At AES, Barney has directed various research programs on climate, the stratosphere, ozone and radiation, and cloud physics and weather modification. Most recently, he was appointed director of the Canadian Climate Center. □

Peter Scholefield (top left), at the farewell gathering for Barney Boville and his wife, Grace (centre)

ernment levels there that advances in NWP are linked to a marked improvement in weather forecasts.

Future plans include getting down to smaller space and time scales, and solving the forecasting problem with numerical modelling methods and with better and more specialized forecast delivery systems. He also outlined parallel plans to improve and increase the use of satellite and radar data to improve short-term weather forecasts, and touched on the area of climatic forecasting, the main topic of his earlier lecture at the University of Toronto.

Earlier in the day Sir John met with Dr. Collin and AES senior managers to discuss international and long-range planning. He also had informal discussions with several groups of AES scientists and managers on NWP, the new Canadian Climate Program, Air Quality and Inter-Environmental research. □

Central Services Additions

The Central Services Directorate of AES has recently taken two additional organizational units under its wing to help strengthen its role in planning and development of the AES data acquisition and observation activities.

Instruments Branch now reports directly to the director general, Central Services Directorate, although the branch itself has not been reorganized.

A second shift created a reorganized Network Planning and Standards Division (ACNC), which combines under its umbrella the former ACNC group as well as the former Network Planning and Development Section (AFOP) now designated Project Planning and Development Section (ACOP). Combined to effect manpower savings, the new group, headed by recently appointed Dr. Jaan Kruus, is charged with planning future systems for data acquisition networks. □

Newfoundland's New Radar System

Residents of the south coast of Newfoundland now get advance warning of major winter storms, precipitation and tornadoes, thanks to a new radar installation.

Dr. A. E. Collin, assistant deputy minister, officially opened the new radar system on October 17, 1979 in St. John's. Also present at the ceremony were R. H. O'Brien, chief, general weather services, Atlantic Region, and local representatives of the municipal, provincial and federal governments.

The new system, which has its radar scanner at Trepassey (on the southern tip of the Avalon Peninsula), will substantially improve general weather forecasting. With a scanning radius of 300 kilometers, it is the latest component in a new generation of weather forecasting equipment. AES has installed several similar systems at strategic points through the nation.

Dr. Collin said the demand for the data provided by the system will increase with petroleum exploration off the coast of Newfoundland, and eventual production. "It looks like we're just in time in getting this installation in place," he added. □

Finnish Meteorologist On AES Visit

A Finnish meteorologist spent several days at AES last October learning how AES uses radar as a weather forecasting tool.

Mrs. M. Sagborn, a scientist in the radar research group of the Finnish Meteorological Institute, visited the Canadian operation to discuss practical applications of the system with AES experts.

Mrs. Sagborn toured the Satellite Data Laboratory, discussing radar and satellite applications with E. G. Morrissey, chief of the Aerospace Meteorology Division. She also met with C. L. Crozier of the Cloud Physics Research Division before visiting the Woodbridge, Ontario, research facility to see SCEPTRE (System for Constant Elevation, Precipitation, Transmission and Recording) in operation.

Mrs. Sagborn then visited the Quebec Region forecast office to see the operational aspect of the SHARP (Short Range Automated Radar Prediction) installation in a forecast office environment. She met with Dr. Geoffrey Austin of McGill University, where she was given a full tour of the facilities. □

Lunenburg Display At Reunion

About 65,000 people visited a Weatheradio display put up by AES Atlantic Region at the Nova Scotia Fisheries Exhibition and Fishermen's Reunion at Lunenburg last September.

The unusually high interest shown in the exhibit is evidence of the importance of this service to fishermen. The Weatheradio service in this province is operated by AES Atlantic Region from its Bedford offices. A cost-sharing arrangement with the province has made it possible to establish repeater stations through much of Nova Scotia, with resulting coverage extending throughout the mainland and to offshore fishing areas.

The five-day Lunenburg festival celebrates the activities of fishermen and their families. □

Lionel Haughn, AES Atlantic region, discusses Weatheradio exhibit with local fisherman

DERAILMENT AT MISSISSAUGA

Aerial view shows fire-scarred remains of tank cars lying in a tangled mess at Mississauga crossing. Derailment was caused by overheated hot box.

Mississauga, a flourishing borough of Metropolitan Toronto, has now become identified the world over with chemical disaster. Besides expressions of sympathy, the Mississauga disaster received particular attention from many parts of the world for the model evacuation of residents from the areas threatened by deadly chlorine gases.

Nearly a quarter million people were moved out of the area in a calm and orderly manner, and without loss of a single life. And by making a perhaps limited — when measured against the overall organizational effort involved — but by no means insignificant contribution, AES did its share to make it possible.

About midnight on Saturday, November 10, a "hot box" (overheated wheel bearing) on a freight train car is thought to have been the cause of a derailment and a series of propane tank car explosions which threatened to send the contents of a chlorine tank car wafting across the city of Mississauga. With increasing danger of the deadly gas spreading, more and more areas needed to be evacuated, and the tough decisions to make those evacuations were based to a large extent on wind forecasts. Responsibility for making those forecasts fell on AES, which supplemented its normal forecast routines to provide the specialized information needed.

The first request for special wind forecasts came just before noon on Sunday. But Len Hubbert of the Canadian Meteorological Center (CMC) in Montreal had heard the news of Mississauga while still in bed that morning and had already taken action. By the time the request came in, the CMC computer was already calculating a Mississauga wind trajectory forecast. As a result of his foresight, the first predictions were delivered to emergency authorities only an hour and 15 minutes after they requested it.

Shortly after noon of the same day Ted Turner of the Research Directorate, Downsview learned of the need to take on-site measurements of vertical wind and temperature profiles. The mini-sondes and other equipment and supplies to be employed, however, are normally used in research projects where longer lead times are the rule. Some of the required items were therefore not readily available, and much of Sunday was spent scrambling for balloons, helium, vehicles, and other equipment.

Turner and technicians Joe Kovalick and Jim Arnold arrived at the Bell Canada building north of the disaster scene, which served as the command post, at about seven

that evening. By that time, they didn't see much of the fire, but there was some concern about their personal safety, since they had no gas masks.

More problems followed. Power for the equipment had to be established. When that was arranged, a radio receiver failed. Nevertheless, the first balloon was launched about 11 p.m. and the data interpreted on the spot, using a programmable desk calculator they had brought along. The results showed a light northerly flow all the way up.

From then on, the soundings continued about every two hours, or even more often when work was being undertaken on the chlorine tank. At one point efforts to seal the hole in the chlorine tank were stopped when the wind shifted.

As hours turned into days, other AES staff entered the danger zone to continue the balloon soundings and to relieve the tired original crew. Technicians at the site were Steve Melnichuck, Joe Markes, John McLernon, Al Moser, Dwight Brymer, Frank Froude, Al Gallant, Al Purves, and Harold Hosien.

The scientists who coordinated the effort at the site, interpreted the results, and provided advice to disaster command leaders, included Fouad Fanaki, Harold Neumann, Ron Portelli, Jim Young, and Chuck Matthias.

The Ontario Weather Centre had the job of pulling together all the information from the regular observing networks, special wind trajectory forecasts, and mini-sondes in order to produce the specialized forecasts for the disaster area.

Extra forecasters were called in for the purpose. Some volunteered to do the work without pay, but will be paid. Work schedules were juggled to meet extra needs, and the fact that five staff members were themselves among the quarter million evacuated and occupied with the care of their families didn't help.

By Monday, the Ontario Ministry of the Environment, which had responsibility for overall coordination of environmental aspects of the Mississauga disaster, had located staff at the Ontario Weather Centre to help coordinate the flow of information.

Media and public requests for weather information increased as wind direction was recognized as an important factor in the event. On top of everything, the weather centre itself had to prepare for a possible evacuation, should the airport be closed down.

Before the week was over, AES had started the process of learning from its involvement in the disaster and was taking steps to improve its operations.

The computer program used for wind trajectory predictions had shown deficiencies. The program is designed to predict where a particular pocket of air originating at a specific location will be at certain intervals of time. The computer model was originally developed as part of the Long-Range Transport of Air Pollutants program.

Last September, after the Three Mile Island radiation leakage showed the need to have such prediction capabilities on a standby basis, the program was brought to operational readiness at CMC. Mississauga was its first use under emergency conditions.

One shortcoming noted was that the program has a starting point which relies on prognostic data which only occur every twelve hours. With starting points at midnight and noon, accurate emergency information can only be generated twice a day, while the accuracy required at any other time suffers. Also, predicted winds turned out to be about 35 to 40 per cent too strong, and downward adjustments had to be made by hand.

Finally, the program had no provision for fires at the source of an air pocket. The fact that the fire was carrying chlorine up and further away than the computer was able to predict was therefore not accounted for. If the post mortem indicates modifications in the wind trajectory program, then steps will be taken to make the needed corrections.

The problems encountered with the mini-sonde launchings led to another set of recommendations. AES is now discussing plans to keep the items required to undertake balloon soundings packaged at one or several locations, ready for immediate shipment to emergency sites. The package would also include protective devices required for the safety of AES staff.□

Still smoldering, the jumble of charred railcars barred any closer approach, because of deadly chlorine gas escaping from the damaged tanker.

CARBON DIOXIDE ...The Climate Changer

At times, it seems as if AES are working on the scenario for a new disaster film. Take this plot, for example: a gas gets into our atmosphere, causing the earth to heat up, and the climate to change.

The potential consequences make an exciting and frightening story. Rainfall patterns change. The central plains of North America become deserts. Major world food shortages result. Dams and waterways either can no longer cope with the amount of water they have to handle or dry up. Food, water and power supplies to population centres function badly or not at all. Competition for dwindling supplies leads to social unrest, open fighting. Those who survive leave the cities. As the polar ice caps begins to melt, coastal cities are threatened with inundation.

Populations begin to migrate to find more hospitable climes, but come into conflict with those already occupying those areas. Renewed fighting erupts as newcomers battle those who arrived before them for the scarce living spaces left on a changed earth.

Sound far fetched?

We have already taken the first step that could eventually lead us to some such scenario.

The gas released into the atmosphere is carbon dioxide. There it causes changes known as the greenhouse effect: solar energy reaches the earth as visible light but is reradiated back into space at longer wavelengths which are absorbed by atmospheric carbon dioxide (CO_2). Thus, as the level of CO_2 rises, less heat escapes the earth and the atmospheric temperature increases. The process is analogous to the way a greenhouse traps heat.

We now know that the level of CO_2 is increasing and is tied into our increasing use of fossil fuels. What is not known is whether other factors, such as potential induced increasing global cloud cover, will counteract the heating effect.

At best, nothing will happen. At worst, the movie scenario is probably not too far from reality. No one can predict with certainty what will happen. As yet scientists will not rule out potentially serious consequences.

The fact is, that CO_2 levels are continuously increasing because of our dependence on fossil fuels — a process which is probably not reversible. The problem is worldwide, and the World Meteorological Organization (WMO) has asked all nations to participate in its definition and the search for solutions.

Canada has now taken a first step. On August 28-29, 1979, the Climate Planning Board of the Canadian Climate Program hosted a group of Canadian and American scientists in a workshop titled *Energy/Carbon Dioxide Issues and Impacts.* The forty participants came to some interesting conclusions.

The reasons CO_2 is increasing are several: the burning of hydrocarbons, the destruction of forests, the intensive tilling of soil, and cement production. However, the estimated rate of release of CO_2 from these sources is about double the rate at which it is accumulating in the atmosphere. Part of the difference is absorbed by the oceans, but according to current estimates the ability of the oceans to absorb CO_2 does not equal the differential not accounted for.

This discrepancy led some to ask

Gordon McKay of the Canadian Climate Centre (left) discusses an issue with F. Belaire of Energy, Mines and Resources, chairman of the Energy Scenario's working group

whether there is some other sink for CO_2, or whether the current estimate of oceanic absorption is too low. This and similar questions will require further research for the refinement of our understanding of the carbon cycle — that is, the comings and goings of atmospheric CO_2. This knowledge is needed if we are to predict what will happen to our climate.

Much of the discussion at the workshop centered on Canada's role and on the research and actions this nation should be undertaking. It was pointed out that Canada is the custodian of over one-fifth of the estimated world vegetation. Since vegetation plays a major role in removing CO_2 from the atmosphere and, conversely, since its destruction would release massive amounts of CO_2, it was concluded that any comprehensive global analysis of climatic change would be inconclusive without good data about conditions in Canada.

It was also recognized that Canada, through AES, is a world leader in mathematical modelling of the atmosphere, and that such models are necessary for the prediction of climatic changes. Not only was it recommended that this work continue, but that more computer power be obtained for the purpose.

The meeting went on to comment on the changing patterns of hydrocarbon utilization over the globe. Petroleum shortages most likely mean a switch to coal, which produces even more CO_2 per unit of energy obtained. More significantly, such a shift will require a major capital expenditure. Thus, if climatologists conclude that coal-generated energy is incompatible with climatic stability, it will be very difficult to persuade nations to switch to cleaner sources of energy, especially if they have just turned to coal. As one participant asked, "how are we going to convince the world not to use every last lump of coal and drop of oil?"

The energy/CO_2 question is further complicated by demographic and development trends which indicate that most future hydrocarbon consumption will take place in the third world. It will be difficult for developed nations, even if they themselves switch to cleaner sources of power, to dissuade their less developed cousins from burning the almost certainly cheaper fossil fuel. As the workshop pointed out, it is not likely that the third world will ignore the pattern of conspicuous consumption the developed countries have set.

The outlook, then, is not particularly optimistic. Even if climate changes could be accurately predicted, there is no assurance that, on the whole, nations would take actions to prevent or minimize such changes. In view of this, the participants also recommended that Canada study the specific effects it may undergo as a nation as a result of climatic change in order to find ways in which the population could be helped to adapt to it if and when it comes. The workshop urged that those planning policies relating to Canada's economy, energy and resource utilization, and social structure consider potential climatic change and especially CO_2 outputs in their work. □

Barney Boville presents conclusions at his working group on climate models, to the plenary session

The display at the entrance to the CO_2 workshop focussed on the Canadian Climate Program and the CO_2/Energy problem (Photo by Bill Kiely)

TORNADO by Peter Chen

Clean-up was well under way in Oxford Centre, a small southwestern Ontario community near Woodstock, when we arrived there on the grey Wednesday morning of August 8, 1979.

At approximately 6:30 EDT the previous evening severe thunderstorms, associated with a cold front, had moved through southern Ontario. One massive cell in particular had generated several tornadoes.

The most devastating funnel had tracked from the southeastern outskirts of Woodstock southwards towards Lake Erie, wreaking havoc along its 30 kilometre passage.

Oxford Centre was the first of several communities struck by the tornado — a swath of destruction over 700 metres wide was evidence of its passage.

Alain Caillet, Billie Taylor, Bill Kiely, and I, all from AES Downsview, had come to record the damage, to learn what we could about these severe summer storms, and what protective measures might be recommended.

Our observations and photographs will be used for a course the Training Branch will be giving on severe summer weather. They will also aid the Canadian Climate Center in providing advice on how industrial sites may be constructed to withstand tornadoes.

Our first stop that morning was the Ontario Provincial Police station outside Woodstock. This turned out to be a wise decision since we would have had difficulties crossing police roadblocks without the special passes provided.

As we passed the last barrier, the damaged area literally jumped into view. The boundary of the tornado damage was incredibly sharp. The stories we had heard, the pictures we had seen of past tornadoes became very real.

One glance revealed it all: the damage was almost total. A roofless two-storey brick house stood among the debris of its own structure and that of maple and poplar trees. Corrugated metal siding blown from a collapsed barn was wrapped around large standing and fallen tree limbs and trunks.

Projectiles carried by the wind, such as wooden boards and tree branches, were embedded in the rear wooden wall of the building. A row of mature trees was stripped and tops uniformly sheared. Examples of straw embedded in tree trunk bark were easy to find. The tornado had passed to the west, a few hundred meters away.

The view southward from this first site revealed the extent of the damage: broken houses, barns, cars tossed about, fallen tombstones, flattened and stripped corn fields, lawns pitted with scars caused by blown debris, broken, twisted, and uprooted trees, some partially stripped of their bark. It was an awesome picture of destruction. Virtually every building of Oxford Centre was demolished, including churches, the general store, the 100-year old community center, and thirty houses.

People around us were already busy with the clean-up. Despite their activity, it was a quiet scene, the stillness of the morning punctuated occasionally by hammer blows and the buzzing of chainsaws. The drone of aircraft and the chopping sound of helicopter rotors added an irritating discord.

As we talked with a few of the residents, their reactions to the terror of the previous night were mixed. Although no one we spoke to had actually witnessed the "twister", their recollections of the event were vivid and convincing. Feelings of disbelief and amazement were common. They had never thought that "it would happen to us". They also retained a shared impression of the suddenness with which the storm had struck and left, giving virtually no time to be prepared. The sky was clearing by mid-afternoon. Summer was not over. □

AES's Bill Kiely took these photographs showing the havoc wreaked by the Woodstock tornado. Note, in particular, the board driven through the side of a house and the car which was demolished and partially covered by fallen trees and debris

Peter Chen is an instructor in the Professional Development Division of the Training branch at Downsview, Ont.

DEPARTMENTS

Eight employees were present to receive their long service awards. Front row (left to right): R.J.O. Lerou (AIMT), W.D. Lawryniuk, Ontario Region (AFSD), R.J. Waldorf (AFFK), I. Ayoub (ACDG), P.J. Monette (AIET), C.W. Clark (AASGD), A.P. Beaton (ACIR), and D.W. Buss (CCC). Standing in the back row are (left to right): M.K. Thomas, director general (ACSD) and R. Lee, director (AABD), who presented the awards

Thirteen AES employees recently received awards for 25 years of loyal and faithful service. Although only eight of the 13 recipients were able to attend the presentation, well-wishers and fellow employees gathered in the auditorium at AES Downsview for the occasion.

Mr. M. K. Thomas, director general of the Central Services Directorate, delivered a "remember when" type of speech, at which he recalled the major events of 25 years ago as well as the working conditions and facilities of those days.

This year, the 13 employees eligible for awards were: C. W. Clark (Administration Branch), D. W. Buss (Canadian Climate Center), I. Ayoub, R. J. O. Leroux, P. J. Monette and A. P. Beaton (Central Services Directorate), R. J. Waldorf (Field Services Directorate), N. J. Fowler, W. D. Lawryniuk, D. D. Murdoch and H. J. Quinn (Ontario Region), M. Blake and A. M. Gilligham (Department of National Defence). □

Howard L. Ferguson appointed director

Howard L. Ferguson was appointed director, Air Quality and Inter-Environmental Research Branch, Atmospheric Research Directorate. Born in Guelph, he received his BA from the University of Western Ontario, and his MA in physics from the University of Toronto.

He joined the federal public service in 1952 with the Meteorological Branch of the Department of Transport and held several progressively more responsible positions. Prior to his appointment, Mr. Ferguson was the AES scientific program coordinator, providing staff support to the assistant deputy minister on cooperative programs involving other DOE services and government departments. □

Chantal, daughter of Rachel Cabessa, scholarship winner

AES employee Rachel Cabessa has every reason to be proud. Her daughter Chantal, age 19, recently received a $750 Public Service Alliance scholarship, after graduating with an "A" average from Sir Sandford Fleming Secondary School in Toronto.

Chantal is now studying for a Bachelor's degree at the University of Toronto. "She's a good student and works very hard. I'm very happy for her," said Mrs. Cabessa. "Her plans for the future are yet undecided, but she leans toward law or social work" she added.

Mrs. Cabessa is a key punch operator with the data entry section of the Computing Centre (Central Services Directorate), AES Downsview. Born in Morocco, she came to Canada in 1959 and joined AES in 1972. A divorcee, she raised her three daughters single handed, and has done a fine job of it: her oldest is a high school teacher; her second a social planning graduate, and her third, Chantal, a budding lawyer or social worker. □

Charles Taggart retires from AES

Charles Taggart retired from the Atmospheric Environment Service on October 12, 1979 after 16 years of service.

Charlie was known in AES as an expert on satellites, but his reputation extends beyond meteorology to include the Canadian remote sensing community as well. However, satellites were his second career. Before joining AES, he had acquired an international reputation as a military photo interpreter while rising from the rank of private to major during service in the Canadian army.

Charlie and his wife, Irene, have three sons and three daughters. They now live at 6 Beckenham Lane, Rothwell Heights in Ottawa. Those of us who have enjoyed his enthusiasm and humor wish him a long and happy retirement. □

PROMOTIONS/APPOINTMENTS

K. R. Banks (EG-6) Data Acquisition, Vancouver, B.C.
M. L. Beckford (ES-6) Program Development & Evaluation, Hull, Que.
A. L. Borm (FI-2) Winnipeg, Manitoba
J. A. Bruce (EG-5) Coral Harbour, N.W.T.
A. Caillet (MT-5) Training Branch, Downsview, Ont.
J. Chapman (EG-5) Yellowknife, N.W.T.
G. Chartier (EG-6) Frobisher Bay, N.W.T.
D. W. Coleman (MT-2) Pacific Weather Centre, Vancouver, B.C.
D. Crosbie (EG-6) Ice Branch, Downsview, Ont.
P. Ducharme (MT-7) SSU, Ville St. Laurent, Que.
H. R. Ellsworth (EG-7) Maritimes Weather Office, Bedford, N.S.
S. A. Fruno (EG-1) Vancouver, B.C.
B. W. P. Funk (EG-2) Armstrong, Ont.
R. A. Gillis (EG-6) Churchill, Man.
D. Gray (EG-6) Data Acquisition, Whitehorse, Y.T.
A. L. Hines (DA-PRO-6) Winnipeg, Man.
K. N. Hoas (EG-5) Cree Lake, Sask.
R. F. Hopkinson (MT-6) SSU, Regina, Sask.
F. Hunter (MT-5) D.Met.Oc., North Bay, Ont.
M. F. K. Ibrahim (SE-RES-1) Research Branch, Downsview, Ont.
H. Jacura (EG-5) Calgary Weather Office, Alta.
G. Julseth (EG-5) Churchill, Man.
M. G. Kiland (EG-1) Cape St. James, B.C.
D. K. Kocman (EL-5) Ontario Regional HQ, Toronto, Ont.
J. Kruus (PC-5) Central Services, Downsview, Ont.
A. Lachapelle (MT-5) CCC, Downsview, Ont.
Y. Landry (EG-6) Frobisher Bay, N.W.T.
D. K. Langer (EG-6) North Bay, Ont.
A. Lukawesky (EG-6) Data Acquisition, Edmonton, Alta.
S. E. Malone (EG-6) SSU, Fredericton, N.B.
P. Y. Manerikar (EG-1) Cape St. James, B.C.
R. A. McInnes (EG-5) Fort Nelson, B.C.
D. A. Patrick (MT-2) Pacific Weather Centre, Vancouver, B.C.
L. Pepin (ST-2) ADMA's office, Downsview, Ont.
D. J. Phillips (MT-7) Data Acquisition, Vancouver, B.C.
R. Raddatz (MT-5) Prairie Weather Centre, Winnipeg, Man.
G. Rawlings (EG-8) Weather Services Standards, Downsview, Ont.
S. K. Ruecker (EG-1) Cape St. James, B.C.
T. Sawchuk (EG-6) Data Acquisition, Edmonton, Alta.
B. A. Scott (EG-1) Int. Airport, Vancouver, B.C.
D. R. Small (EG-6) Toronto Weather Office, Ont.
J. Steele (EG-5) Fort St. John, B.C.
D. H. Stewart (SX-1) Program Development & Evaluation, Hull, Que.
M. Strange (EG-5) Yellowknife, N.W.T.
R. Tillett (EG-5) International Airport, Edmonton, Alta.
J. C. Van Leeuwen (MT-8) Training Branch, Downsview, Ont.
S. M. Van Rheene (EG-1) Lytton, B.C.
R. Walker (EG-5) Inuvik, N.W.T.
D. J. Webster (MT-8) Program Development & Integration, Downsview, Ont.
L. E. Welsh (MT-2) Pacific Weather Centre, Vancouver, B.C.
D. Wilder (EL-4) Edmonton, Alta.

TRANSFERS

A. D. Bell (MT-2) Maritimes Weather Office, Bedford, N.S.
D. Berg (EG-5) Int. Airport, Edmonton, Alta.
H. P. Biron (MT-2) Quebec Forecast Office, Montreal, Que.
B. Broughton (EG-5) Baker Lake, N.W.T.
E. Chirka (ST-2) Field Services, Downsview, Ont.
W. L. Christian (EG-2) Toronto Weather Office, Ont.
D. K. Clark (MT-2) Maritimes Weather Office, Halifax, N.S.
R. Daoust (EG-3) Maniwaki, Que.
D. L. Dockendorff (MT-5) Central Services, Downsview, Ont.
J. Dublin (MT-6) SSU, Regina, Sask.
R. D'Amours (MT-3) Quebec Forecast Office, Montreal, Que.
R. Fawcett (EG-5) Ice Forecast Central, Downsview, Ont.
H. Higgs (MT-2) Maritime Weather Office, Bedford, N.S.
R. Higgs (MT-2) Maritime Weather Office, Bedford, N.S.
R. M. Huibers (EG-5) Sault Ste. Marie, Ont.
V. Jelnick (EG-7) Central Services, Downsview, Ont.
J. B. Kirkpatrick (EG-6) Toronto Weather Office, Ont.
R. G. Lawford (MT-7) Corporate Planning Group, Ottawa, Ont.
D. D. Lynch (EG-6) Ontario Regional HQ, Toronto, Ont.
J. J. A. MacLean (EG-6) North Bay, Ont.
R. McLaughlin (EG-6) Winnipeg, Man.
R. L. Milo (MT-3) D.Met.Oc., Halifax, N.S.
V. Nespliak (EG-6) Data Acquisition, Edmonton, Alta.
M. Rafique (EG-4) Toronto Island Weather Office, Toronto, Ont.
T. Rauch (EG-5) Saskatoon, Sask.
T. B. Shannon (MT-3) D.Met.Oc., Halifax, N.S.
J. W. Stewart (EG-4) Edmonton, Alta.
G. E. Thompson (EG-6) Int. Airport, Vancouver, B.C.
G. Vigeant (MT-2) Quebec Forecast Office, Montreal, Que.
P. R. Witty (EG-4) Moosonee, Ont.

DEPARTMENTS

TEMPORARY OR ACTING POSITIONS

G. J. M. Fenech (MT-6) MOP, CCC, Downsview, Ont.
P. Galbraith (MT-6) SSU, Fredericton, N.B.
J. Halle (MT-3) SHARP radar project, Ste-Anne-de-Bellevue, Que.
G. Lagasse (GL-VHE-9) Sachs Harbour, N.W.T.
A. J. Malinauskas (MT-5) Weatheradio, Field Services, Downsview, Ont.
E. J. Oja (MT-5) Resolute, N.W.T.
J. Patterson (EG-4) Cambridge Bay, N.W.T.
M. L. Phillips (SE-RES-3) MOP, Research Branch, Downsview, Ont.
L. R. Stevens (ENG-5) MOP, Ont. Regional HQ, Ont.
G. Wells (MT-6) MOP Research Branch, Downsview, Ont.
A. B. Yakeley-Pender (EG-7) ATC Training Course, Toronto, Ont.

RETIREMENTS

B. W. Boville, CCC, Downsview, Ont., Aug. 1979
F. Deveau, Arctic Weather Centre, Edmonton, Alta. July 1979
J. W. Dunlop, Toronto Weather Office, Toronto, Ont., Sept. 1979
J. H. Emflie, SSU, Vancouver, B.C., July 1979
L. T. J. Fontaine, Vancouver Regional Office, B.C., Oct. 1979
W. S. Harley, CCC, Downsview, Ont. Oct. 1979
J. Henderson, Vancouver, B.C., June 1979
A. Ingall, Arctic Weather Centre, Edmonton, Alta., Oct. 1979
S. Kalin, Ontario Regional HQ, Toronto, Ont. Aug. 1979
J. A. McCall, Estevan, Sask., Nov. 1979
A. L. Ringlet, ADMA's office, Hull, Que., Dec. 1979
M. I. Smith, Vancouver Weather Office, B.C., Oct. 1979
C. I. Taggart, Aerospace Meteorology Div., Downsview, Ont., Oct. 1979
V. J. Wadman, Regina, Sask., Nov. 1979
E. Wheeler, Instruments Branch, Downsview, Ont., Aug. 1979

DEPARTURES FROM AES

G. H. Apperly, Atikokan, Ont.
J. Blouin, On leave without pay
F. Calvert, Arctic Weather Centre, Edmonton, Alta.
R. E. Coch, Dease Lake, B.C.
K. Dunstan, Wynyard, Sask.
P. Dutchak, Arctic Weather Centre, Edmonton, Alta.
K. W. Hedley, Estevan Point, B.C.
H. Higdon, Eureka, N.W.T.
C. T. Hillier, Vancouver Harbour, B.C.
D. Howard, Data Acquisition, Edmonton, Alta.
G. W. Hykawy, Resolute, N.W.T.
K. R. James, Vancouver, B.C.
C. A. Krause, Wynyard, Sask.
R. Laberge, Ville St.-Laurent, Que.
M. Lagace, Quebec Forecast Office, Montreal, Que.
B. M. Lawrence, Port Alberni, B.C.
C. Lelièvre, Quebec Forecast Office, Montreal, Que.
W. R. MacDonald, Pacific Weather Centre, B.C.
M. Makal, Fort St. John, B.C.
P. Pinard, Pacific Weather Centre, B.C.
R. W. Postnikoff, Atikokan, Ont.
R. Prior, Eureka, N.W.T.
D. J. Redford, Vancouver Regional Office, B.C.
G. J. Valiani, Vancouver, B.C.
F. Winkler, Hall Beach, N.W.T.
R. Ziolkoski, Resolute, N.W.T.

DECEASED

A. E. Hartwell, Calgary Weather Office, Alta., Oct. 19, 1979
J. Polanski, Grande Prairie, Alta., Nov. 13, 1979
R. Stefanko, Sachs Harbour, N.W.T. Nov. 11, 1979
H. E. Wincents, Prince George, B.C., Nov. 3, 1979

Promotions, appointments, transfers, temporary or acting positions sections provide information on new postings including location. Only temporary or acting positions which involve a change of location are listed. Retirements and departures indicate the last posting.

Abbreviations used are:

MT —	meteorologist
EG —	engineering & scientific support
SE-RES —	research scientist
PC —	physical scientist
ES —	economist, sociologist, or statistician
SX —	senior executive
DA-PRO —	data processing
EL —	electronics technologist
ENG —	engineer
GL-VHE —	general trades
ST —	secretary
FI —	financial officer