

May/June 1982

ZEPHYR



John Lefroy
and the
Bermuda
Connection



Environnement
Canada

Environnement
Canada

Canada

Weatheradio Canada adds more stations

Plans are rapidly nearing completion for the opening of Weatheradio Canada stations in Ottawa, Quebec City and Saskatoon. The new broadcasting stations providing up-to-the-minute weather reports and forecasts 24 hours a day, seven days a week to people with specific needs for immediate, frequent access to weather information, will begin operating by late summer or fall of 1982. In addition, a fourth Weatheradio station serving Calgary will open in the spring of 1983.

The first of the new Weatheradio Canada stations to open will be Quebec City. A brief inaugural ceremony is being held there on July 8 and Environment Minister John Roberts is scheduled to preside.

AES has applied to the Department of Communications for the assignment of very high frequency spots on the FM band, enabling all four stations to join the existing Weatheradio Canada chain with stations in Vancouver/Victoria, Edmonton, Regina, Winnipeg, Toronto, Montreal, Moncton, Halifax and Gander. The broadcast range from each transmitter is about 60 kilometres.

Zephyr Highlights

News.....	2-6
Features	7-15
ADMA, Governor of Bermuda, salute John Lefroy.....	7
Major new Climate Data package much more than normals ...	8
AES Subcommittee gives "Related Groups" a career boost...	10
Assessing CFCs' impact on the ozone layer and climate ...	13
Book review	15
Staff changes.....	15-16

Cover: John (later General Sir John) Lefroy was head of Canadian meteorology in the 1840s and after several other notable achievements served as Governor of Bermuda 1871-77. The article on page 7 describes ADMA Jim Bruce's visit to Bermuda to receive a Lefroy book.

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.

Please address all correspondence regarding this publication to: *Zephyr*, 4905 Dufferin St., Downsview, Ont., M3H 5T4.

Editor: Gordon Black
(416) 667-4551



Environment Canada	Environnement Canada
Atmospheric Environment Service	Service de l'environnement atmosphérique

Task Force proposals enforced

Several of the 13 recommendations made by the Task Force Report on Weather Services to the Broadcast Media are being implemented as quickly as possible with a view to improving relations with electronic communicators in an age of mushrooming technology and greatly increased public use of meteorological services.

A detailed eight page report was issued March 15 after Environment Minister John Roberts met in Toronto with Mr. Barry Pauley, President of the Radio Television and News Directors' Association, officials from the Atmospheric Environment Service and members of the Task Force.

A recommendation that the two parties cooperate in a study of the collection and distribution of severe weather warnings to the public via the media is underway; a proposal that AES provide probability of

precipitation information on a routine basis in public weather forecasts will start Canada-wide in July and an insistence that AES increase frequency of its regular forecasts from two to four times daily will become operational by the fall. Finally, a suggestion for an ongoing committee to ensure a continuing dialogue between the two components of the task force, has been implemented.

Other task force recommendations include a proposal that special attention be given, with broadcast media participation, to the format, clarity of language and information content of public weather forecasts; that AES install automatic telephone systems and unlisted numbers to provide better media access to weather offices; that AES provide media outlets with a dial-in-capability for weatheradio; that AES review training of presentation technicians in order to improve the quality

of their broadcasts; that Environment Canada consider the negative impact on the media and the public of reducing hours of operation or closing weather offices; that AES provide broadcasters, where feasible, with access to weather radar data, weather satellite imagery and current weather data at both manned and automatic weather stations; that AES offer the media a national TV weather package and national weather summary; that media managers encourage broadcasters to identify all weather information provided by AES as coming from the "National Weather Service of Environment Canada."

The task force began work in September 1981 after being empowered to study all aspects of the weather information service provided by AES to broadcasters and subsequently to the public.

Commenting on the task force report,

Mr. Roberts said that the dialogue between broadcasters and AES set in motion by the task force, must continue. Regarding possible implementation of further recommendations, the minister said he had asked for a review of the resource and policy implications of these recommendations, and was optimistic that ways to implement them would be found.

Chairman of the task force was George McPherson, director, AES Ontario Region. AES members were Francis Bowkett (Field Services Directorate, Downsview), John Cameron (DOE information director, Ottawa), Mac MacLeod (Field Services Directorate, Downsview), and Richard Nelis (Atlantic Weather Centre). Representing the RTNDA were Mike Cleaver (Edmonton) and Al MacKay (Ottawa).

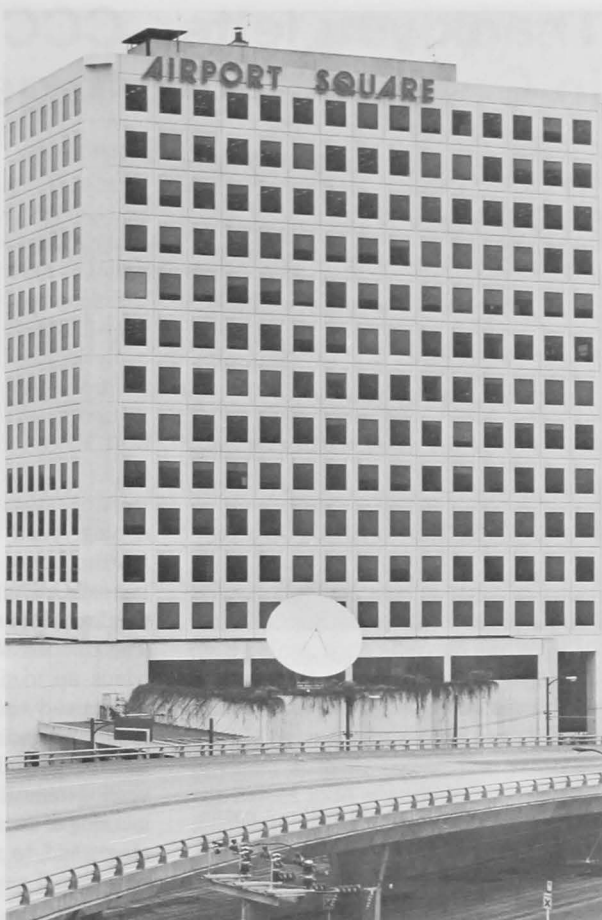
ADMA thanks Ottawa Weather Office for forecasts during Queen's visit

Assistant deputy minister Jim Bruce has congratulated the Ottawa Weather Office for doing an excellent job during the Queen's visit to Ottawa for the proclamation of Canada's new constitution.

In a memorandum to George McPherson, regional director, AES Ontario region, ADMA notes that the Ottawa Weather Office was asked to provide special services to the various organizing committees, the media and the general public. "I was most pleased," wrote Mr. Bruce, "that the special weather forecasts issued four times daily for Ottawa prior to and during the Royal Visit were consistent throughout and proved to be very accurate, perhaps even too much so for the liking of participants and spectators at the rain-soaked proclamation ceremonies on Parliament Hill on Saturday April 17."

ADMA added that the high quality of forecast reflected effective cooperation between the Ottawa Weather Office and the Centre météorologique du Québec which issued the forecasts for national distribution. He also appreciated the fact that extra staff were called in on the big day at the Ottawa office in anticipation of increased requests for weather information.

The appearance of this white disk fronting Airport Square Building in south Vancouver shows that progress is being made towards the opening of the Pacific Weather Centre's GOES Satellite receiving station. Although the first data was processed in late 1981, the full system with capability to receive, enhance, display and animate GOES imagery becomes operational this fall. There will be an official opening ceremony and Environment Minister John Roberts is scheduled to attend. The disk is installed on the patio adjacent to the Pacific Weather Centre, housed on the second floor. AES Pacific Region Headquarters are located on the seventh floor. The new satellite station was built by MacDonald Dettwiler and Associates of Vancouver and forms a major part of the Pacific Area Data System (PADS), using new techniques of weather observing in the northeast Pacific.



Fire chief thanks AES for help in CPR spill

Proof that the assistance of AES Weather Services in an environmental emergency is highly prized, is shown in the following letter, dated March 26, from K.G. Hamilton, fire chief of Medonte Township, Moonstone, Ont. to George McPherson, regional director, Ontario Region:

"During our recent emergency with the Township of Medonte, we had need of exacting weather reports to help in fire and evacuating controls. The CPR No. 405 derailment and resulting fire coupled with a tanker of hydrofluoric acid in the wreck made for a very dangerous situation, both in fire control and removal of the offending car.

I need not elaborate on how accurate

weather reporting depended upon the final outcome of this incident. I cannot speak too highly of your men and the assistance they provided on a 24 hour basis and am fully prepared to state the weather and temperature reports were fully accurate even to advising when snow flurries would start and stop. Temperature played a great part in water relays to the fire scene and as the wreck was in a valley at river level we simply adjusted the reports to suit local conditions and your office report was accurate.

May I offer my sincere thanks for the professional manner in which your service for this emergency was handled."

"Please convey my congratulations to Mr. R. King, the Officer-in-Charge, and to all his staff for a job well done," concluded ADMA.

Please note that due to unforeseeable circumstances we were forced to drop the March-April issue and we bring you instead an enlarged May-June Zephyr.

Thank you letter, CCC display highlight AES role in Ocean Ranger tragedy



Val Swail of AES Hydrometeorology points to trouble spot on Atlantic Weather Centre map forming part of his Ocean Ranger wall display.

AES staff across Canada will not easily forget Valentine's Day 1982. On that wintry Sunday a fierce storm raged off Newfoundland in the oil-rich offshore area called Hibernia. Winds were so strong and waves so high that a rescue operation was impossible, when the Ocean Ranger, the world's biggest exploratory oil rig toppled into the Atlantic with the loss of all 84 aboard.

The causes of the disaster are extremely complex, but as far as the Weather Service goes, a picture is beginning to emerge of a job well-done despite the doomsday scenario.

A month after the tragedy, ADM Jim Bruce received a letter from Maurice Taschereau, administrator of Canada Oil and Gas Lands (COGLA). Department of Energy, Mines and Resources, praising AES for its support and cooperation.

He said that forecasts sent to COGLA by the Newfoundland Weather Office enabled the two other Hibernia rigs, Sedco 706 and Zapata Uglund to be towed to Marystown, Nfld. for inspection. He also thanked Ice Central, AES Atlantic Weather Centre and Atlantic Region Scientific Services for providing meteorological data and forecasts of the storm itself. He described the overall relationship between AES and COGLA as "pleasant and productive."

Before that, Val Swail of the Canadian Climate Centre's Hydrometeorology section had deemed the lessons of the Ocean Ranger disaster to be so important, he began to assemble a wall display on the catastrophe only 36 hours after it happened. The centrepiece is a large surface analysis map issued by Atlantic Weather Centre for February 15, 1982 and showing an enormous low just a few kilometres NW of the Ocean Ranger site. Right beside it is the Newfoundland marine weather forecast for February 14 predicting gales of up to 70 knots, fog, freezing spray and temperatures down to minus 5C. The weather observation logs of the three rigs are also shown on the board. The one for the Ocean Ranger records winds up to 67 knots, waves up to 10 metres and visibility of roughly one kilometre. Spreading his material across two boards, Mr. Swail displayed other revealing items like a satellite picture for the morning of the sinking, wind-wave analysis charts and, to add a popular touch, some sensational newspaper headlines.

Looking at the wall data, it is clear that the worst weather and oceanographic conditions occurred near the Ocean Ranger

with some waves reaching a maximum of 20 metres.

Another part of the display gives general information on the different kinds of oil rigs, operational and experimental. Mr. Swail says that the Canadian Climate Centre is called upon by the manufacturers of some drilling platforms to provide essential meteorological and oceanographic data. For example they calculate maximum wave heights occurring at a particular site once every 100 years. In the case of the Ocean Ranger the figure was 35 metres, a height not reached in February's storm.

Commenting on the display, Mr. Swail said it was important to exhibit material on the disaster at the earliest possible moment. This was because there was intense curiosity about meteorological aspects of the tragedy among AES personnel, petroleum industry employees and the general public. "Obviously AES is playing a vital role in the development of Canada's offshore resources . . . in good times and bad," he added.

The display was scheduled to remain at the CCC until early summer.

Central Region Seminar fosters human contact

The fourth Central Region Supervisor's Seminar was recently held in Winnipeg. Twenty-four supervisors and potential supervisors ranging from an MT-5 to an EG-2 and travelling from as far afield as Alert, N.W.T. to Estevan, Saskatchewan gathered for the occasion.

The seminar was arranged to provide a forum for the exchange of information. A total of thirty-five different speakers addressed the group on a large variety of topics, including future development of AES, Weather Office operations, staffing, staff relations, pay and benefits and human behaviour to name only a few. In any form of communication success is dependent upon feedback, and this, from the field level, was certainly provided by the participants, especially on day two which was

devoted to a dialogue between the Prairie Weather Centre and WO3's and WO4's.

Most importantly the seminar provided an opportunity for field personnel to establish human contact with the individual on the other end of the telephone line or teletype. In a Region which occupies millions of square kilometres, meaningful personal contact is difficult if not impossible to maintain. The value of this personal contact, however, is undisputed.

The comments of one participant summed up the purpose and overall reaction to the seminar: "It seems that our Department is like a good wine, the older we get the better we are. The complete seminar was excellent. I know that this seminar will help me run a better station."

Mother's Day gift led to \$100,000

Because of a Mother's Day gift, AES computer supervisor Marilyn Murphy is \$100,000 richer.

Mrs. Murphy does not buy Wintario (Ontario lottery) tickets herself, so when her 19-year-old son Dan gave her two \$2 tickets as a gift the previous Sunday (May 9) she just tucked them forgetfully into her purse.

At 8:30 a.m. the following Friday she arrived at her Downsview office where she works as supervisor of Data Entry in the Computing Centre. Some co-workers happened to be checking the Thursday draw results in the newspaper and it reminded Mrs. Murphy she still had her tickets in her purse. A colleague offered to check off her numbers with her and it was not long before she realized she had won the big bonanza.

The news spread like wildfire and soon up to a hundred disbelieving people were

Smiling happily with her husband Edward, Marilyn Murphy displays her \$100,000 cheque from Wintario.
(Photo: Wintario)



crowding round her desk. Fifteen minutes later, with her director's permission she was off to the mid-town Toronto Wintario office to pick up her cheque.

Besides Dan, Mrs. Murphy has four other children. She has not made any final decision about what to do with the money, but feels it will certainly come in very handy to help pay for the children's education. And, of course, she plans to

keep on working at her job.

Mrs. Murphy says she was lucky just once before, soon after she was married. She and her husband, Edward, won \$1,000 cash and an all-expense paid trip to New York. The cash helped them pay the down payment on their house. The \$100,000 win comes soon after their 25th wedding anniversary.

Bill Markham given Merit Award for Ice Atlas

For producing the definitive Canadian Ice Atlas, an essential aid in Northern development, Bill Markham, director of AES Ice Branch, has been given a Merit Award.

At the start of an Atmospheric Environment Service Management Committee meeting in Downsview, May 13, ADMA Jim Bruce commended Mr. Markham for his excellent work. He has also received a letter from deputy minister Blair Seaborn, praising him for meritorious service and stating that his innovative approach to ice climatology had resulted in a publication "of significant importance both nationally and internationally."

The full title of the book is "Ice Atlas, Canadian Arctic Waterways." It contains

198 colored ice maps and is available from bookstores and the Department of Supply and Services, Ottawa for \$120.

Mr. Markham first advocated preparation of the Atlas in the early seventies, based on weekly ice charts he had helped to prepare as one of the first forecasters on Canadian icebreakers in the fifties.

When most of his time was taken up by administrative duties, Mr. Markham continued work on the Atlas by switching to evenings and weekends at home. Over a period of several years he abstracted all necessary parameters, developed a digital method for their recording and designed a grid system for data abstraction, examined some 330,000 punch cards used to verify the abstractions done by students and finally ran all information into a computer programmed to plot maps for the Ice Atlas.

The award nomination described the Atlas as "a totally new perspective on ice climatology" and added: "Appearance of this unique Canadian publication is timely in view of the likelihood of oil-and-gas production late in this decade."

Bill Markham (left) receives his Merit Award plaque from ADMA Jim Bruce.



AES views the Finnish alternative

The Finnish option in the area of aerological systems was demonstrated at AES Downsview in March. Three staff members from Vaisala, the prominent electronic instruments company, located in Helsinki, Finland, spent six hours presenting the new MicroCORA upper air system and comparing it with the current AES ADRES system, used in connection with balloon sondes launched mainly from Northern observing stations across Canada.

According to company spokesmen, the big advantage of the Finnish system is that it is portable, can be set up almost anywhere within an hour, and is ideal for projects requiring mobile upper air data. The entire system can be controlled by a single operator with minimum technical training is used along with a new pocket sized radiosonde, weighing only 200 grams.

The MicroCORA system utilizes the worldwide Omega long range, very low frequency navigation system for ships and aircraft in order to compute upper winds. The optional Loran-C navigation system is shorter in range but provides more accurate wind data. According to Pete Bowman of the AES Project Planning and Development Section, the main interest here is the possible use of MicroCORA aboard ships and in environmental emergencies such as hazardous chemical spills. The MicroCORA system is being considered for use in the Automated Shipboard Aerological Program (ASAP).



The first conference of all senior meteorologists in the Canadian Forces Weather Service was held at the Baker Island Conference Centre, CFB Trenton, Ontario March 16-18. Seen, left to right, are the following delegates:

Front row: CWO M. Blais, LCol. J. Wylie (USAF), D. Nowell, Dr. R. Asselin, director of meteorology and oceanography, Col. K. Simonson, (Base Commander, CFB Trenton) D. Pollock, D. Mettam, K. MacDonald, P. Kowal, B. Burns.

Second row: R. Bishop, J. Merric, B. Jelley, H. Austin, C. Bourque, M. Blake, Maj. Hawkes, N. Taylor, D. Craig, R. Armstrong, C. Finlay.

Third row: N. Lumsden, J. Zawatsky, L. Ranahan, G. Reicheld, G. Kierstead, P. Dillistone, MWO M. Champaux, Capt. P. Delannay, CWO J. MacDonald.

Back row: B. Watson, O. Shewchuk, R. Lee, A. Mathus, H. Schmidt, D. Clark, C. Wendell, WO C. MacDonald, MWO St. Pierre, D. Bernachi, D. Sortland.

Not shown in the photo are AES representatives including Phil Aber, Bruce Atfield and Walter Lawrynuik.

Standing proudly under an illustrated plaque signed by the Commanding Officer of 442 Search & Rescue Squadron (Lt. Col. Gordon Diamond) is a group made up of personnel from the Kamloops AES Weather Office and the Kamloops Flight Service Station (FSS). It was awarded in appreciation of services provided to Squadron aircrews, at the busy Kamloops airport, strategically located in the B.C. interior. Left to right are Walter Frymire, Officer-in-Charge, AES; Jim Oliver (FSS); Bob Duffy (AES briefer); Bryan Jensen (AES briefer) and Grant Hewitson (FSS).



Lloyd Berntsen named Training Director



Lloyd Berntsen

After more than 20 years experience in all aspects of meteorology, program development, project planning and management, Lloyd Berntsen has been appointed director, Training Branch, AES.

He takes up the position after spending the past 2 1/2 years in a senior operational capacity: as chief, Office of the Director, Field Services.

Mr. Berntsen joined the old Meteorological Branch of the Department of Transport in 1960 and after gaining experience as a forecaster at RCAF bases in Canada he was seconded for four years to Canadian NATO bases in France and Germany, attaining the military rank of Captain.

Upon returning to Canada, Mr. Berntsen held other operational posts. Between 1972-74 he was an instructor with the training branch, Central Services Directorate. In 1975 he joined the Management Orientation program at AES Downsview and the following year he was appointed head of Project Planning and Development for Field Services Directorate. He then went on to become chief of Program Integration and Evaluation Division and acting director, Program Development and Evaluation Branch.

Mr. Berntsen was born in Surrey, B.C., obtained his B.Sc. in Mathematics and Physics at the University of British Columbia in 1960 and his M.Sc. in Meteorology at the University of Alberta in 1971.

ADMA, Governor of Bermuda, salute John Lefroy

Although very different in size, flora, scenery and economy, Canada and Bermuda have much in common, not the least being the shared memory of a notable scientist, administrator, meteorologist and author.

Among other things John Henry Lefroy is famed for being head of Canadian meteorology in its early years (1841-53), discoverer of the Exact position of the magnetic North Pole (1844) and governor of Bermuda (1871-77).

While running the British government's Magnetic and Meteorological Observatory in Toronto, Lefroy also found time to write a couple of books based on his experiences and a journal, all highly prized by scientific and general historians. He continued writing after leaving Canada and taking up his post as governor of Bermuda.

Last year the Bermuda Historical Society and the Bermuda National Trust decided to issue a limited edition reprint of his two volume book, "Memorials of the Discovery and Early Settlement of the Bermudas," and it seemed appropriate to invite assistant deputy minister Jim Bruce head of AES and Lefroy's modern meteorological equivalent, to go to Bermuda for a special ceremony presided over by the island's present governor, Sir Richard Posnett.

At a presentation ceremony at Government House, February 18, Mr. Bruce received two copies of General Lefroy's Bermuda volumes, printed by the University of Toronto Press. The ADM subsequently presented one set to the National Library of Canada in Ottawa and the other set to Mary Skinner, head of the AES library in Downsview.

Mr. Bruce's visit to Bermuda was the first by a head of the Canadian weather service since Dr. Andrew Thomson, di-

rector of the Canadian Meteorological Service, then part of the Department of Transport, went there in 1958 in search of some Lefroy memorabilia. While in Bermuda, Mr. Bruce also gave a talk on the history of Canadian meteorological services from Lefroy's day to the present to the governor, his staff, members of the Historical society and many others. He also spent considerable time talking about current AES services as well as future developments and he emphasized the meteorological interests that Canada and Bermuda have in common: hurricane tracking, marine weather services and acid rain to name a few.

Lefroy who came to Canada with the rank of Captain, but who later became General Sir John Henry Lefroy, was born

and died in England. His wife, however, was a Toronto girl, daughter of the chief justice of Upper Canada and one of his sons became a well-known Toronto constitutional lawyer.

When Lefroy took over the Toronto observatory, it was one of the first magnetic and meteorological stations in the British Empire. Less than a year after his arrival in the city, he set off on his famous expedition in search of the magnetic North Pole. While on the journey through North West Canada he explored thousands of square kilometres of unknown terrain, and travelled thousands of kilometres on snowshoes and by canoe. In the area of Fort Good Hope and Fort Chipewyan, with just a single aide, he took meteorological and magnetic observations at hourly



This presentation ceremony at Government House in Bermuda shows assistant deputy minister Jim Bruce, fourth from left, receiving a copy of Gen. Lefroy's book from Sir Richard Posnett, Governor of Bermuda, centre. Also in the picture are Air Canada representative Ralph Webber (left), Joyce Hall, deputy president, Bermuda Historical Society and Sir Edwin Leather, former Governor of Bermuda (right). Bermuda News Bureau



Upon returning to Canada Mr. Bruce in turn presented copies of the Lefroy book to the AES Library, Downsview and to the National Library in Ottawa. In a ceremony outside the former, ADMA (left) shows the inscription in one of the books to Mary Skinner, AES chief librarian while Morley Thomas, director general, Canadian Climate Centre, looks on.

intervals for six months, despite the fact that temperatures were sometimes so cold, the mercury froze in his thermometer.

The donation of the Bermuda "Memorials" to the AES library adds to a growing collection of Lefroy works. The library already possesses several prized books,

articles and other documents by and about Lefroy. These include the extremely rare *Diary of a Magnetic Survey of a Portion of the Dominion of Canada* by General Lefroy (published by Longmans, London, 1883) and *In Search of the Magnetic North*, published by MacMillan

in 1955. Both books give detailed accounts of Lefroy's famous expedition as well as other fascinating biographical details.

Assistant head AES librarian Jan Glover says that she is currently attempting to find another copy of the latter, long out of print work for a return presentation to the Bermuda government. She is also looking for a copy of General Lefroy's autobiography, edited by his second wife for private circulation in 1895, five years after Lefroy's death.

Miss Glover who has taken a special interest in the life of the early soldier-scientist, says she hopes to obtain other Lefroy material to add to the library's rare book collection.

As evidence that the Bermuda gift is appreciated Canada-wide as well as within AES, Guy Sylvestre, the national Librarian in Ottawa wrote to Mr. Bruce telling him "I should appreciate it if you would extend the expression of my gratitude to the appropriate authorities for making this fine publication available to us for research in Canada. It is indeed a fine publication." □

Major new Climate Data package much more than normals

Staff at the Canadian Climate Centre have reason to be proud. This March they completed the largest and most comprehensive climate data package ever produced by AES and possibly anywhere else in the world.

The recently published 1951-80 Canadian Climate Normals contain observations from about 2,300 climate stations and include a greatly expanded range of statistics. They now list such factors as percentiles, dacedal and full-period means,

standard deviations, vector mean winds, percentage of possible sunshine, net radiation and rainfall intensity. This means that a station with a full observing program can now generate about 195 tables.

In publication form the normals are appearing as a series of volumes covering such elements as radiation, temperature, degree days, wind and frost. In addition, temperature and precipitation data are being published for six geographic regions of Canada. In keeping with the times, the

same information is also available on microfiche and computer tape.

Why all this intense activity? Early in every decade in many countries meteorological services are busy updating revised normals for a wide variety of meteorological elements—everything from daily maximum temperature to the number of days with snow. AES is no exception. Nowadays climate people prefer to play down the word normals and talk about revising climate statistics.

According to David Phillips, superintendent of the Climatological Development Section, merely updating climate data is not enough. "New users are constantly needing information in different forms, formats and combinations," he says, "so new publications must be produced and new statistics generated to incorporate the needs of these users into the design of future information resources."

Many new factors had to be considered when designing the 1951-80 data package. For example, there is a new generation of computer as well as enhanced and re-converted archives. In addition, new government policies on metrication and bilingualism had to be incorporated. Finally, the increased number of stations (40% more than in the 1941-70 period) had to be taken into account.

The 1951-80 climate data package took three years to plan and prepare, including eighteen months to feed detailed user specifications into the computer. The printed data popped effortlessly out of the computer in a matter of days or weeks. This compares with the 1921-50 Canadian normals, when it took seven years to produce normals for two elements. Although the current package covers a 30-year period, data for some stations actually goes back 140 years.

The new data package also includes more than 10,000 microfiches containing more than 500 million pieces of information. There are also computer tapes for those in the private sector who wish to purchase the data in computer processible form.

In a closely related area, AES has also completed development of its new climatic atlas of Canada. With detailed analysis to begin in 1982, assistance of AES regions will be sought in the examination of local climate elements.

The climate statistics package was launched March 25 at a presentation held in the AES Auditorium, Downsview before an audience of specially invited guests, including ADMA Jim Bruce. David Phillips, gave an illustrated talk on the climate data program showing the tasks of the many people involved and relating the history of Canadian climate normals all the way back to 1921. In addition, Mrs. Jackie Blackburn, superintendent, Climate Archives Section, explained the programming and processing side of the normals operation. Displays of climate

data material were shown in the AES building lobby and sample publications were handed out.

Commenting on the entire package, Mr. Phillips said, "a concerted effort was made to prepare summaries of interest and concern to a wide variety of users and to provide convenient and timely access to all information." He added that requests for these data account for almost 40% of all AES climate requests.

Requests to AES for climate data and information in 1981 numbered about 100,000. The more serious requests came from urban planners, businessmen, lawyers, government personnel, students, physicians, vacationers and agriculturalists. Queries were received by telephone, mail or in person, either at the Downsview-based Climate Centre or at one of six regional AES offices.

With this volume of enquiries, it is no surprise to learn that past weather data is put to a great variety of uses. For example, there are requests from large corporations for climate data for air pollution studies prior to future expansions and large oil companies often request statistics on extreme weather conditions in off shore areas before engaging in drilling. Litigation consumes considerable time to prepare documents submitted for presenting as evidence in court. In criminal cases weather data are often consulted to determine the time of death.

Graduate students frequently write in too. For instance one asked AES for temperature and precipitation records for some dates during the French Revolution. Other enquiries concern health. An arthritis sufferer might write in desperately seeking a place to live with a warm, dry climate. Migraine, asthma and bronchitis patients also seek climate advice as do doctors and public health officials.

Other major users of climate data are government agencies. A government scientist might request climate statistics for a study of forest biomass production or a biologist from the Department of Fisheries and Oceans seek climate data for studying fish stocks in the Gulf of St. Lawrence.

The Climate Centre gets its share of offbeat requests. For example, a small town in Northern Ontario found the clubhouse on its municipal golf course too isolated to be linked up to hydro, so it asked the Climate Centre how it could be supplied with wind power. When the Minnesota Northstars hockey club sued another for failing to make a scheduled game, Gerry Chapleau, Quebec Region climatologist was asked to describe the

Examining new Canadian Climate Normals publications are three of the key people involved, (left to right): Frank Yates, systems analyst, AES computer centre, Jackie Blackburn, supervisor, data base and David Phillips, supt. climatological systems section, Canadian Climate Centre.



weather situation that precipitated the no-show.

In fact there are a wide range of sports and recreation enquiries. The Big Game committee of the Ontario Federation of Anglers and Hunters requested climate information to support their case for an earlier moose season. On the individual level, the president of a large US corporation asked what the climate expectancy was for a planned two-month canoe trip down the Churchill River.

Lastly, there were non-specialist enquiries – anything from braggarts seeking to settle an argument to brides wanting to know the percentage probability of sunshine for their outdoors June wedding reception.

To appreciate what goes into answering these requests, one must consider the steps involved in turning an original

weather observation into a piece of climate information. Today meteorological observations are taken at over 2,300 stations mainly from volunteer observers, plus about 300 AES facilities. Additional data comes from ships and automatic observing stations.

Literally tons of paper containing raw data are mailed annually to one of the six AES regional data processing centres. Here forms are inspected for validity and completeness then monthly means and totals are calculated and checked before being sent to the Canadian Climate Centre (CCC) at Downsview where the documents are registered, inspected and transferred to punch cards.

The data are then subjected to further editing procedures; archive tapes are prepared and merged with previous tapes, then stored in the tape archive. Manu-

script records are filed in the paper archives, but the data are not just stored, they are used to provide climate information services.

Behind this wealth of climate facts and statistics stands the most important resource of all – people. A team of 30 skilled, hardworking Climate Centre personnel spent up to three years collecting, verifying, processing and issuing this vast marathon of normals information.

What will they do for the rest of the decade? There is still a tremendous amount of non-normals archiving and research to be done. Perhaps to some extent their lifestyles will return to “normal”, but deep down they are already contemplating production of the 1961-90 Canadian climate normals. In the coming age of super-computers, super-satellites and super-climate, the results will surely be prodigious. □

AES Subcommittee gives “Related Groups” a career boost



The Subcommittee is seen here in the foyer of the AES building, Downsview, left to right: Larry Stevens, Linda Stirling, Judy Short, Oscar Koren, Jaan Kruus, Chris Upton, Ann Bishop, Mark Trueman.

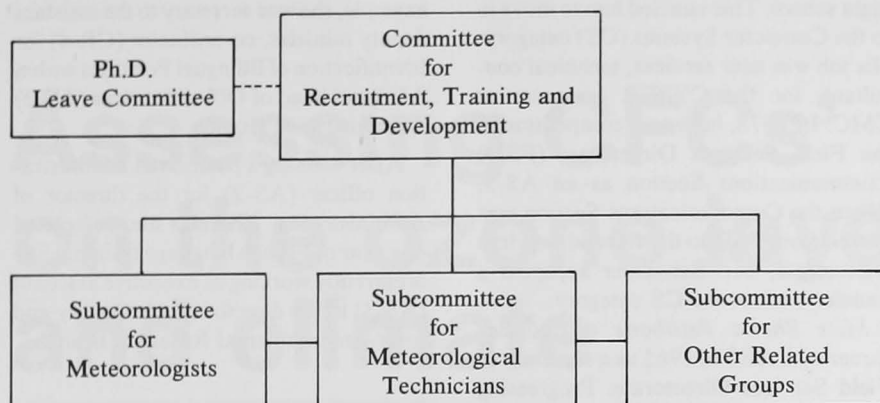
A wide-awake subcommittee is busy promoting career prospects for some 650 AES staff – roughly 30 percent of the work force. Called the “Subcommittee for Recruitment, Training and Development in Related Groups”, its main purpose is to supply information and recommendations to senior managers to help them meet future manpower and training requirements and achieve service objectives.

For the individual, however, it could mean the chance to take educational leave or rotate fairly frequently from one group to another.

The “related groups” include all AES staff except meteorologists, technicians, senior and research managers. (For a complete list of included groups, please see box, page 12.)

Since its formation in March 1980, the subcommittee, reporting to the parent AES Committee on Professional and Technical Recruitment, Training and

FIGURE 1



Organization Chart indicating the structure of the Committees and Subcommittees which are responsible for coordinating Recruitment, Training and Development in A.E.S.

Development (see organization chart) has, among other things, developed a leave policy for related groups, similar to the one in place for meteorological technicians and has prepared recommendations for a revised introductory meteorology training course, intended for people with no meteorological background, and in particular for members of the "related groups".

A major area of interest for the subcommittee has been career development, with the emphasis on mobility among the various groups. These have now been categorized as either administrative or technical and a report has been prepared identifying the skills, training and experience required to advance within these groups. It also identifies the levels at which transfers or promotions can be made. The secretarial, clerical and administrative support, financial information and purchasing groups were studied first, since they made up the largest numbers. The subcommittee made a major recommendation: that a development program in finance, personnel and general administration be set up to allow reciprocal job rotation in the three fields. It also proposed in-house training courses for each category, development of a training schedule and distribution of the report through the Ontario Area Personnel career centre.

Although no definite decision has been made on these recommendations the subcommittee is continuing its work on career development by studying technical area advancement through the communicator, data processing and computer systems groups.

The subcommittee also wants to ensure that its recommendations reach the parent committee efficiently and on time. It aims to provide annual forecasts of staff requirements in the related groups and to update them as required. It will carry out annual reviews of training and development programs for these groups and make further recommendations.

As a means of improving the educational goals of the related groups, the subcommittee will study new educational leave and educational support plans in the light of AES policy and priorities, passing on recommendations to the parent committee. It will also review applications from related-group staff for educational leave, advising them and seeking AES support for their requests.

In general, the subcommittee will set procedures, enabling managers to set their goals and evaluate the effectiveness of training given to their staff. Lastly, it will study and make recommendations on career plans, disseminating available information throughout AES.

Over the coming months, the subcommittee plans to continue work on its career development project. Above all, however, it will seek to obtain approval for all its various recommendations. Once this has been obtained, the subcommittee plans to forge ahead with their implementation.

As part of its work on career development, the subcommittee has drawn up a number of interesting career profiles. As seen from the examples given, individuals wishing to advance in the administration (and foreign service) categories must obtain the level of knowledge required

through training and experience. They must also be flexible and self-motivated. Completion of career profiles for all remaining groups is a top priority. Meanwhile here are some examples showing career development among present and past AES personnel:



Donna Grant

Mrs. Donna Grant joined the Public Service in 1971 while living in the Hull-Ottawa area. She began as a junior clipping clerk, then shortly after became a filing clerk and an indeterminate employee with Environment Canada. In 1972 she was promoted to the Supervisor of Accounts Payable Records Office. She then won a position as statistics clerk with the Official Language Branch and was able to advance to the level of administrative officer. Finally, in 1976 she won an AS-2 position with the DOE library in Hull.

Mrs. Grant and her family moved to Toronto in 1977. Applying for a transfer, she was assigned to a term position with AES as executive assistant to the Director of Air Quality and Inter-Environmental Research Branch. Qualifying as an AS-3, she transferred to her current position as administrative officer, Computing and Communications Services Branch.

Mrs. Judy Short began her career as a secretary with AES in 1974, working in Field Services Directorate and the Training Branch. Changing to the clerical group, she won a CR3 position with Personnel. While there, Mrs. Short held various clerical positions such as clerk/receptionist, staff relations and training assis-

FEATURES



Judy Short

tant and staffing assistant. In 1980 as a CR-4 she became assistant to the coordinator of the Environmental Assessment Review Process section. She is now acting in a position as administrative officer (AS-2) for Administration Branch.



John Schneider

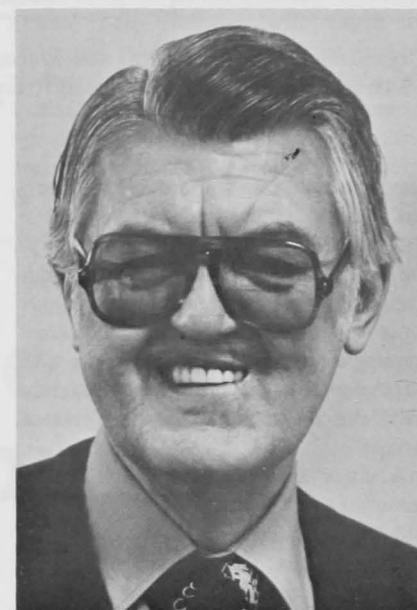
John Schneider joined AES in 1966 as a weather observer technician (EG). In 1969 he won a competition for a data processing operator position (DA) at the Canadian Meteorological Centre (CMC) in Dorval. Over the next six years he progressed in the DA category, and became an operations supervisor at CMC. During this time, Mr. Schneider obtained

a B.Sc. degree in Computer Science at night school. This enabled him to move in to the Computer Systems (CS) category. His job was user services, technical consultant, for the CYBER computer at CMC. In 1978, he won a competition in the Field Services Directorate (FSD) Communications Section as an AS-5. When the Communications Section was moved from FSD to the Central Services Directorate, Mr. Schneider accepted a transfer back to the CS category.

Miss Sheila Pettibone started her career with AES in 1965 as a secretary in Field Services Directorate. Progressing as a secretary, she held positions in Personnel and in Administration Branch. During her career, she took advantage of

temporary and acting assignments. For example, she was secretary to the assistant deputy minister, co-ordinator (CR-4) for Identification of Bilingual Positions within AES and head of Office Services (AS-2) Administration Branch.

After winning a position as administration officer (AS-2) for the director of Administration Branch, she completed one year of French language training. She is currently working as executive assistant (AS-3) to the director of Air Quality and Inter-Environmental Research Branch.



Ernest Greckol

Mr. Ernest Greckol who retired recently from AES, began work in the Climatology Division as a clerk, Grade 1 in 1946. He gradually advanced through the clerical ranks to become an office equipment operator, later merged with the Data Processing (DA) group. From supervisor of equipment operators, he became an administrative services officer (AS) tying in with the expansion of services following installation of computer systems. As the size and complexity of operations expanded, Mr. Greckol was eventually promoted to become computer systems administrator (CS-3). His career was a rare example of someone moving through the clerical group to a computer systems position.

By way of general observation, it should be noted that there is a natural progression from ST to CR and from CR to AS positions in the administrative category. □

The subcommittee members are interested in hearing from the people they represent. If there are any matters related to recruitment, training or career development that you would like the subcommittee to consider, we urge you to let us know.

Just to be sure that you know whether you fit in among the "related groups" here is a complete list of such groups with their identifiers:

- AS – Administrative Support
- CR – Clerical Support
- FI – Financial Information
- ST – Secretarial
- PG – Purchasing
- LS – Library Services
- GS – General Services
- GLT – General Labour and Trade
- DA – Data Processing
- BI – Biologists
- CH – Chemists
- ENG – Engineer
- PC – Physical Scientist
- CM – Communicator
- CS – Computer Systems
- TI – Technical Inspection

The names and telephone numbers of the subcommittee members all located at Downsview are as follows:

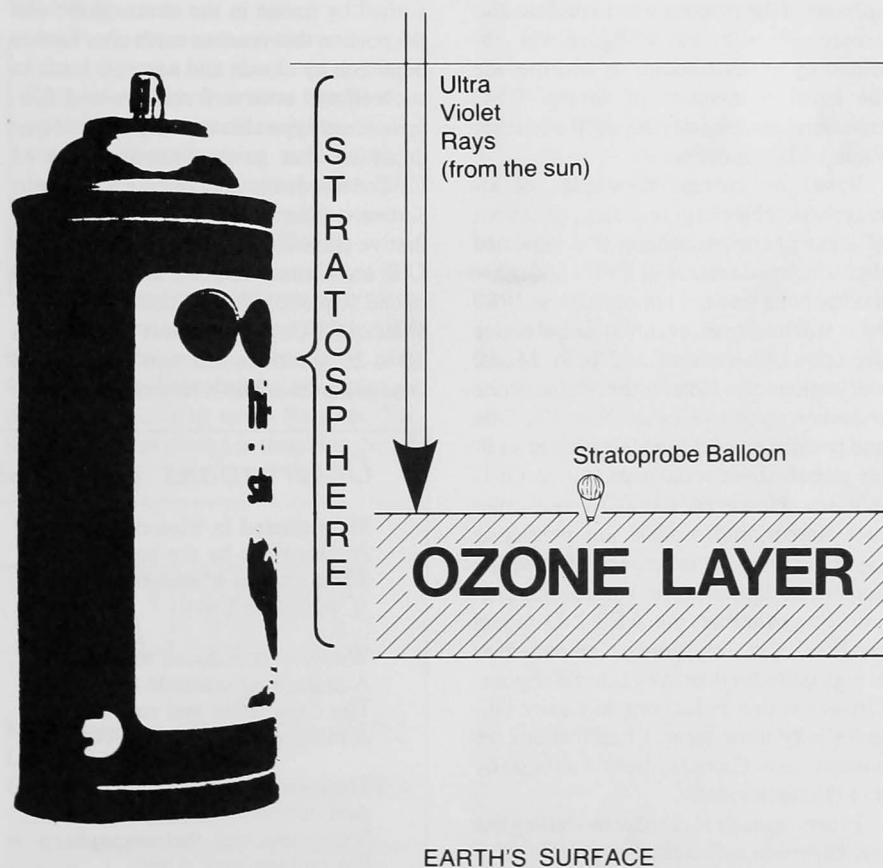
Ann Bishop	667-4515
Oscar Koren	667-4877
Jaen Kruus (Chairman)	667-4615
Judy Short	667-4715
Larry Stevens	667-4649
Linda Stirling	667-4637
Mark Trueman	667-4645
Chris Upton	667-4740

Assessing CFCs' impact on the ozone layer and climate

by R.K.R. Vupputuri

The atmospheric ozone layer located 10 to 50 kilometres above the earth, is vitally important for sustaining life on this planet. Though only a minor constituent of the atmosphere (barely a few parts per million of the stratospheric air), ozone still absorbs most of the ultraviolet radiation from the sun and also the radiation from the earth. Because of these absorption and emission properties, ozone protects human, animal and plant life by preventing harmful ultraviolet (UV-B) radiation reaching the earth and plays a major role in determining the radiation heat balance of the atmosphere which controls earth's climate.

Ozone (O_3) is created naturally through *photodissociation*. (Molecular oxygen (O_2) is split into oxygen atoms O by UV radiation from the sun, but the atomic oxygen later recombines with the oxygen molecules.) There are several ways by which ozone can be destroyed in the atmosphere, some natural, others man-made. This can be done by chemical and photochemical reactions involving hydrogen, nitrogen and chlorine compounds. These are produced in the atmosphere both naturally and by man. Among man-made chemicals posing a potential threat to the ozone layer, chlorine compounds resulting from the industrial release of chlorofluorocarbons (CFCs) into the atmosphere have received most attention in recent years. They have been studied by scientists, environmentalists and politicians in many countries including Canada. Because of some beneficial properties (inert, insoluble in water, chemically non-



A few of the factors involved in assessing CFCs' impact on the ozone layer (including an aerosol spray can) are depicted in this sketch which is not scientifically exact.

reactive and non-flammable) these substances are widely used in refrigeration, as household and industrial solvents and as spray can propellants. Once released into the lower atmosphere the CFCs stay

there until carried upward slowly into the stratosphere by winds and eddies where UV radiation from the sun causes their breakdown and release of active chlorine, a highly effective ozone destroyer.

FEATURES

A suggestion was made by U.S. scientists Molina and Rolland in 1974 that continued emissions of CFCs into the atmosphere could lead to depletion of the ozone layer. This prompted scientists in several countries including Canada to develop numerical simulation models of the atmosphere. It enabled them to predict possible long term effects of CFCs on atmospheric ozone and the environmental consequences.

I will try to bring the CFC-ozone layer question up to date. My assessment is based on the findings of an OECD (Organization for Economic Cooperation and Development) ad hoc experts meeting on modelling of CFCs held in Paris in September 1981 where Canada made a significant contribution by presenting one and two dimensional model results.

The Paris meeting was attended by about 30 delegates representing 17 OECD countries, I represented Canada. The purpose of the meeting was to discuss and debate computer modelling results obtained by various countries and provide the latest assessment of several CFC emission scenarios developed at an earlier Paris ad hoc meeting.

Based on current knowledge of atmospheric chemistry and state of the art of atmospheric modelling, it is expected that continued release of CFCs and other halocarbons into the atmosphere at 1980 rates will lead to an eventual global ozone depletion of between 5 and 10%. Model calculations also indicate that global ozone reduction up to 1980 was about 1%. One and two dimensional models predict similar global ozone reductions due to CFC releases. However, the AES and other two dimensional models are predicting significant variations in long term ozone depletions depending on latitude and season. For example, the AES 2-D model predicts up to 50% more ozone reduction at high latitudes than in equatorial regions. Greater ozone reductions in higher latitudes may have serious implications for nations like Canada, both biologically and climatologically.

Progress made in climate modelling has not advanced sufficiently to permit accurate climate predictions for CFC release. However, the CFCs absorb terrestrial radiation and continued injection of CFCs into the atmosphere can directly warm the surface through an enhanced greenhouse effect. Simple U.S. one dimensional climate models suggest continued release of CFCs will lead to the warming of the earth's surface by about 0.2°C. This

compares with 2°C surface warming if atmospheric CO₂ is doubled.

CFC emissions can also affect surface climate indirectly through depletion of the ozone layer. Because of the strong absorption properties of ozone both in solar and terrestrial radiation, the depletion of the ozone layer cools the earth's surface (via reduced greenhouse effect) and also warms it by allowing more solar radiation to reach the lower atmosphere. Climate model calculations in the U.S. and Canada indicate the cooling and heating effects might cancel each other out for small ozone depletions with no measurable net effect on climate, but not necessarily so for large ozone depletions. For example, model calculations in Canada indicate that a continued 7% per year increase in CFC emissions will lead to a 30% depletion of the ozone layer by the year 2020, with a net surface cooling of about 0.5°C.

Solar UV-B radiation is strongly absorbed by ozone in the stratosphere and the portion that reaches earth after further depletion by clouds and aerosols leads to such effects as severe sunburn and non-melanoma-type skin cancer. Ozone layer depletion due to continued release of CFCs lessens the atmosphere's ability to screen out harmful UV-B radiation. Radiative transfer model calculations in the U.S. and Canada indicate a 5-10% global ozone depletion due to continued emissions of CFCs at 1980 rates will lead to a 10 to 20% surface increase in the UV-B dose at surface. The relationship between

ozone depletion and UV-B increase depends on the latitude, season and original thickness of the ozone layer. At Canadian latitudes the ozone thickness is higher and the UV-B levels are lower, but 2-D model calculations predict both greater ozone depletion and higher UV-B surface doses. It is also estimated that the thinner the ozone layer the faster the UV-B surface dose rate will increase.

The effects of increased UV-B radiation levels on human health are not well understood but it is suggested that a 1% increase in UV-B may result in a 1.5% increase in non-melanoma type skin cancers (among white males) in temperate areas such as Canada compared to 2.8% increase in sub-tropical areas such as the southern U.S.

Despite vast improvements in our knowledge of atmospheric chemistry and modelling, uncertainties remain in predicting long term impacts of CFC releases on atmospheric ozone. By developing one and two dimensional models and actively participating in international meetings, Canada has played a major part in modelling CFC-ozone problems. However, much remains to be done before the possible effects of CFCs on atmospheric ozone and climate can be predicted accurately. □

Dr. Vupputuri is senior research scientist with the Canadian Climate Centre's Numerical Modelling Division.

Observations by Joan Hoyland

We gathered in Victoria
At Gonzales by the bay
The date was March the 29th
A very fateful day

We were introduced to Manobs
And training manuals too
The cloud atlas and supplements
And form two three two two

Those psychrometric tables
And correction charts as well
Barographs and thermographs
But nothing rang a bell

There were dew points and
depressions
Clouds and wind and rain
Our minds rebelled at all of this
We thought we'd go insane

To say nothing of our leader
Who I'm sure we drove quite mad
With our questions and our queries
Were we really all that bad???

And Terry whom we pestered
But who answered very well
Until the time came for his 'ob'
And then he'd run like hell

But now we're on the downward
grade
The course is almost run
On one thing I think we'll all agree
We've had a lot of fun

We're almost trained observers now
And will soon be on a station
Just think they're going to turn us
loose
On our unsuspecting nation

Mrs. Hoyland is a recently trained weather observer, stationed at Princeton, B.C.

BOOK REVIEW

Food, Climate and Man

Edited by Margaret R. Biswas and Asit K. Biswas
John Wiley and Sons, Toronto, 1979
285 pages, clothbound.

guest review by Jack Gubbins

The man in our title is a hungry man. He is also an increasingly populous man. His numbers exceeded four billion back in 1976. If our hungry man doesn't want to become a whole lot hungrier, he must quickly expand agricultural acreage, enrich crop yields, make food storage facilities secure, and improve the global distribution of food. This matter is *urgent*.

Our plight is enveloped in problems. There are problems of climate and weather; of air, water and soil pollution; of soil erosion and desert encroachment; of pest and rodent control. It is ruefully amusing to learn that our farmers must not only grow enough food to feed four billion human beings but must also grow enough to feed four billion rats and mice.

And there are of course all the psychological problems of education, demography, culture and skills training . . . and the eternal problem of man's moral and ethical nature. While solving our agro-ecological problems, will nuclear war overtake us from the rear?

Was it only 70 years ago that Cambridge philosophy expressed the fear that man-

kind was running out of problems to solve?

All the problems here are made to seem endless by a kind of Rubik's cube perplexity inherent in the problems themselves. The problems are all entangled together. Academically, chemistry and psychology are miles apart but in *Food, Climate and Man* they are interactively related. A problem solved in one field crosses a boundary and reappears as a problem in an entirely different field. The nuclear age has taught us the concept of fall-out.

This issue's book review has been contributed by a guest reviewer. Primarily we are seeking reviews by informed AES personnel. If you would like to volunteer, please give Zephyr a call at 416-667-4551.

Food, Climate and Man consists of 10 essays written by two Americans, two Canadians, a Frenchman, an Italian, a Swede, an Austrian and a Russian. The aim of all these essays is simply to put all

the problems in plain view and to mark out some of their interactions.

All 10 essays are written at a level rather higher than newspaper and magazine popularizations of this complicated subject. And yet, the average, fairly well-informed person should be able to read them with ease, even though they are crammed with quickly rattled-off information. The editing is superb. There are some chemical chains in H.E. Landsberg's *The Effects of Man's Activities on Climate* and a mention of von Karman's constant that sent me to the science encyclopedia. But all in all, anybody who can read a science-fiction story can easily read these essays too.

In a fairly happy summation I can affirm that the essays represent the global scale of the problems vividly.

Finally, as an employee of the farm machinery business, your reviewer was downcast to learn in an essay called *Energy and Agriculture* by David Pimental that much farm work can be done more efficiently by hand than by machinery. □

Mr. Gubbins is logistics supervisor, Massey Ferguson Inc., Toronto.

STAFF CHANGES

Promotions/ Appointments

S. Ahmed (DA-PRO-2) Data Processing, ARQA, Downsview, Ont.

G. Black (IS-3) Communications Advisor, ID, Downsview, Ont.

M. Boncza (MT-2) Meteorologist, Prairie Weather Centre, Winnipeg, Man.

T. Carrieres (MT-2) Meteorologist, Prairie Weather Centre, Winnipeg, Man.

N. Chung (EL-4) Elect. Tech. WAE0, Edmonton, Alta.

M. Csizmazia (DA-PRO-3) ARMA, Downsview, Ont.

G. Hamilton (EG-1) Met. Tech. WS4, Cree Lake, Sask.

R. Kleer (EG-3) U/A Tech. WS1, Alert, N.W.T.

M. Lambert (EG-2) Met. Tech. WS3, Jasper, Alta.

H. Le (CS-2) Computer Systems, ARMA, Downsview, Ont.

R. Leitch (RS-1) Research Scientist, ARPP, Downsview, Ont.

J. LeDrew (CR-2) Clerk, AAGD, Downsview, Ont.

K. Leonard (EG-2) Met. Tech. WS2, Sachs Harbour, N.W.T.

R. Lepine (EG-2) Met. Tech. WS3, Cape Perry, N.W.T.

L. Letourneau (SCY-2) Secretary, WAE0, Edmonton, Alta.

D. MacTavish (EG-4) Technician, ARQA, Downsview, Ont.

T. Maruoka (CS-1) Computer Systems, CCAA, Downsview, Ont.

D. McLeod (CR-3) Clerk, ADMIN/AAF, Downsview, Ont.

J. Megyes (CS-1) Computer Systems, CCAA, Downsview, Ont.

STAFF CHANGES

J. Merrick (MT-6) Meteorologist, Shift Supervisor, Atlantic W.C., N.S.

R.A. Miller (MT-8) Meteorologist, AFOO, Downsview, Ont.

J. Parratt (EG-3) U/A Tech. WS1, Eureka, N.W.T.

D. Patrick (MT-5) Meteorologist, Prairie Weather Centre, Winnipeg, Man.

G. Pierson (MT-2) Meteorologist, Prairie Weather Centre, Winnipeg, Man.

S. Shabbar (MT-3) Meteorologist, ARQM, Downsview, Ont.

F. Small (EL-4) Elect. Tech. CAED, Winnipeg, Man.

J.E. Stephen (EG-1) Met. Tech. WS4, Hudson Bay, Sask.

W.J. Whittaker (EG-1) Met. Tech. WS4, Broadview, Sask.

D. Wright (EG-3) U/A Tech. WS1, Hall Beach, N.W.T.

J. Yu (CS-3) Computer Systems, AFFC, Downsview, Ont.

Transfers

E. Adamson (MT-2) Meteorologist, Pacific Weather Centre, Vancouver, B.C.

T. Allan (CR-3) Clerk, LLO, Downsview, Ont.

J. Arbour (EG-6) Pres. Tech. WO4, Windsor, Ont.

R. Bailey (MT-2) Meteorologist, Pacific Weather Centre, Vancouver, B.C.

L. Birmann (SCY-2) Secretary, CCAS, Downsview, Ont.

S. Blackwell (MT-2) Meteorologist, Arctic Weather Centre, Edmonton, Alta.

H. Blome (EG-5) Pres. Tech., Mirabel, P.Q.

D.W. Coleman (MT-2) Meteorologist, Metoc, Halifax, N.S.

L. Curran (FI-2) Financial Officer, AAFA, Downsview, Ont.

G. Deaudelin (MT-2) Meteorologist, Alberta Weather Centre, Edmonton, Alta.

Y. Gendron (MT-2) Meteorologist, Alberta W.C., Edmonton, Alta.

S. Hamilton (EG-2) Met. Tech. WS3, Pincher Creek, Alta.

H. Kagawa (MT-6) Meteorologist, AFON, Downsview, Ont.

J.A.W. McCulloch (EX-3) Director General, ACDG, Downsview, Ont.

R. Morris (MT-6) Meteorologist, CCAI, Downsview, Ont.

L. Pisegna (CR-4) Clerk, CCCA, Downsview, Ont.

D. Poirier (MT-2) Meteorologist, Pacific Weather Centre, Vancouver, B.C.

A. Rahill (MT-2) Meteorologist, Esquimalt, B.C.

W.G. Richards (MT-6) Meteorologist, SSU, MAED, Bedford, N.S.

D.K. Smith (EX-3) Director General, AFDG, Downsview, Ont.

D. Steeves (MT-2) Meteorologist, Alberta Weather Centre, Edmonton, Alta.

H. Thoms (MT-2) Meteorologist, Arctic Weather Centre, Edmonton, Alta.

D. Tolhurst (EG-5) Pres. Tech. WO4, Banff, Alta.

J. Wenden (FI-2) Financial Officer, WAED, Edmonton, Alta.

Temporary or Acting Positions

T. Allsopp (MT-7) Meteorologist, ARMF, Downsview, Ont.

K.A. Bishop (CR-4) Clerk, AFDG/P, Downsview, Ont.

T. Chu (CR-3) Clerk, Pacific Weather Centre, Vancouver, B.C.

G. Eddy (CR-3) Clerk, AAGR, Downsview, Ont.

G. Fenech (MT-8) Meteorologist, Officer-in-Charge, OWC, Toronto Int'l. Airport, Ont.

W. Green (EG-4) Officer-in-Charge, Lytton, B.C.

B.D. Greer (MT-7) IMPAC, ADEC, Downsview, Ont.

A. Hathaway (CM-6) Communicator, Pacific Weather Centre, Vancouver, B.C.

E. Kenny (CM-6) Communicator, Pacific Weather Centre, Vancouver, B.C.

J. Martire (CR-3) Clerk, AFFF, Downsview, Ont.

D. McBain (EG-5) Officer-in-Charge, Vernon, B.C.

D. McDonough (CR-4) Clerk, AAGR, Downsview, Ont.

J. Mills (LS-1) Librarian, AAL, Downsview, Ont.

C. Olsen (EG-5) Officer-in-Charge, Cape St. James, B.C.

S. Pecht (CM-6) Communicator, Pacific Weather Centre, Vancouver, B.C.

R. Petersen (PC-1) ARMA, Downsview, Ont.

C. Pilon (CR-3) Clerk, CCAA, Downsview, Ont.

S. Smith (SCY-2) Secretary, AAG, Downsview, Ont.

Retirements

S. Meeres, WAESH, Edmonton, Alta. February, 1982

J. Ring, CMC, Dorval, Quebec. December 1981

Departures from AES

P. Brymer, ARQA, Downsview, Ont. to Calgary.

A. Hayton, ARQA, Downsview, Ont.

M. Ibrahim, ARQT, Downsview, Ont.

R. Kinsman, WS3, Fort McMurray, Alta. to Transport Canada.

K. Loogman, ADMA, Downsview, Ont. to RDG's Office, Toronto, Ont.

A. Reid, Pacific Weather Centre, Vancouver, B.C.

Leaves of Absence and Secondments

M.I. Darr, AFDH, Downsview, Ont.

R. Stainer, Cape St. James, B.C.

L. Wilson, ARMF, Downsview to ECMWF, Reading, U.K.

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