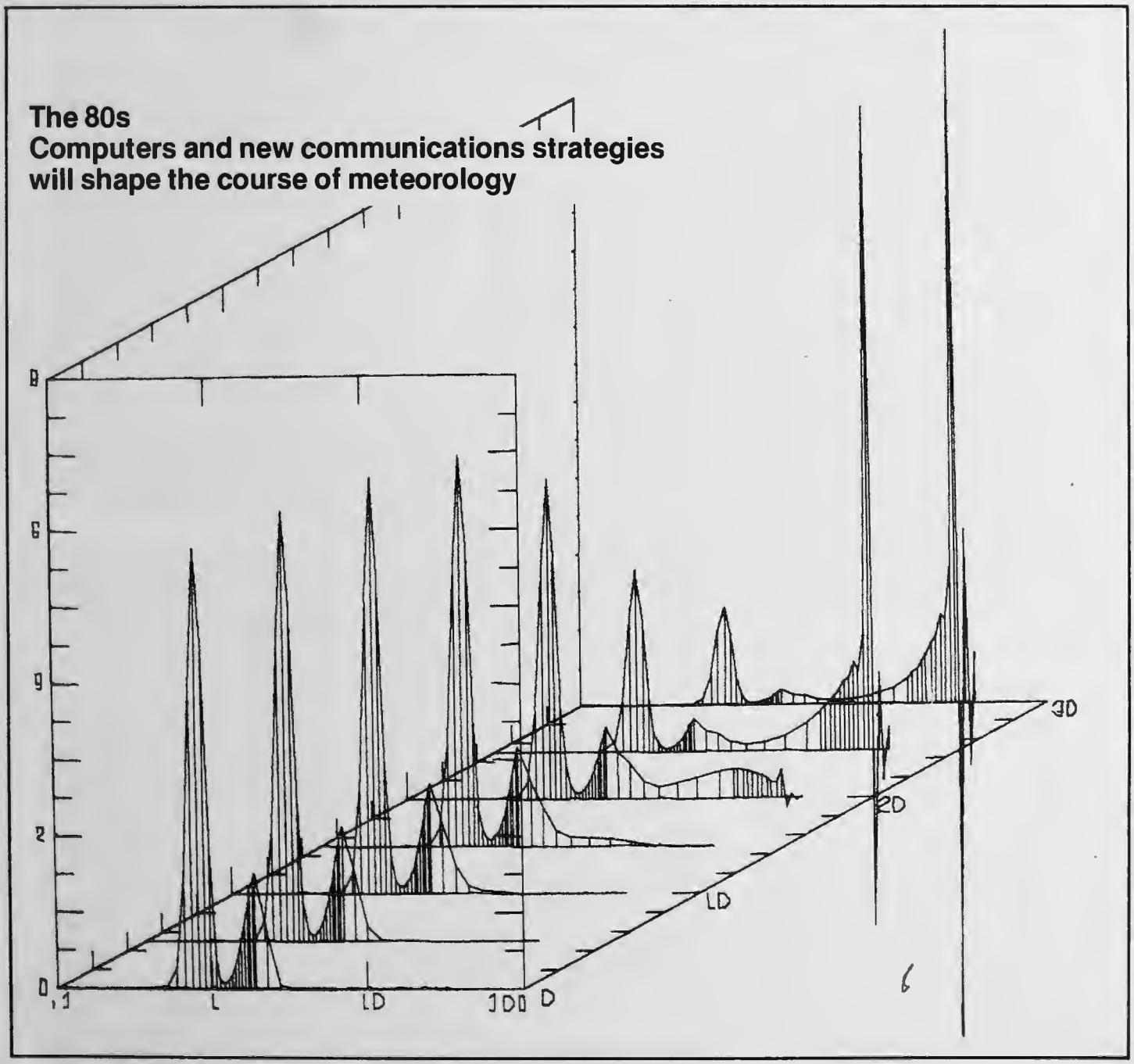
January/February 1980

ZEPHYR

The 80s
Computers and new communications strategies will shape the course of meteorology



Environment Canada
Environnement Canada

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Cover: shows a three-dimensional computer graphic of the effect of collision of different size rain droplets

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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Changes suggested at AES workshop

Changes in services, research and methods of cooperation between foresters and climatologists were suggested at a workshop held in AES Downsview auditorium January 29 and 30.

The workshop, organized by the Canadian Climate Centre (CCC) and the Canadian Forestry Service was part of a series aimed at drawing up a plan for the Canadian Climate Program.

Foresters at the meeting noted that, at present, the climatic data are not readily applied to forestry locations and needs since most weather observations are made for urban and agricultural areas. One solution suggested was to set up more observation stations in the forest, both permanent and temporary, and to develop methods to correlate data collected at existing stations with forestry locations.

The foresters pointed out that they would like to know what data are available, how they could gain access to the data and how data gathered from private firms could be standardized and included in the national network.

It was noted that assessment of forest growth and potential forest fire conditions requires knowledge of soil moisture as well as atmospheric information. Soil moisture often depends more on how long precipitation occurs, rather than total precipitation. Portable radar units were suggested to help gather such specialized precipitation data.

Participants also wanted to know more about how pollution and climatic change affect forests and, in turn, how the cutting and burning of forests affects climate and pollution.

Proceedings covering the general discussions on climate and forestry operations, forestry research, and insect and forest fire control are now being prepared by CCC. □

Ontario College of Art students picketed AES headquarters lightheartedly protesting the lack of snow for their winter carnival. The media loved it.

Students show to protest no snow

Students from Toronto's Ontario College of Art 'picketed' AES Downsview headquarters, February 4, in a mock protest over the lack of snow. They wanted more snow for their winter carnival, scheduled for later that week.

Carrying signs saying the weatherman was unfair to OCA students, and that they wanted a snowjob, the students demonstrated in front of the main entrance of the AES building for about 30 minutes in sub-zero temperatures.

Dr. Warren Godson (right) explains why there isn't a snowball's chance in AES of having snow in time for the winter carnival of the Ontario College of Art. The lack of snow was the reason for this student protest and a godsend for Dr. Godson who wasn't pelted by a single snowball.

Representing the 'weather management' side, Dr. Warren Godson, director general, research directorate, entered into the spirit of the occasion by discussing the weather situation with the students. While he did promise them a bit of snowjob for mid-week, he explained that it wasn't possible to snow them to the extent they desired.

The students were somewhat disgruntled with this 'official' position, but they enthusiastically accepted an invitation to warm up over a cup of coffee in the AES cafeteria. A tour of the AES facilities left them with an understanding of the real capabilities of meteorology. AES employees were, in turn, left with an invitation to join the students at the college's winter carnival.

The 'student protest' was conceived by the Ontario College of Art, with the cooperation of AES management, to publicize the winter carnival. □

NEWS

Robert shares top honors

André Robert, is co-winner of the American Meteorological Society's Second Half Century Award. Dr. Robert, director, Canadian Meteorological Center, shared the award with Frederick Schuman, his American counterpart.

The award, second highest given by the society, is for excellence in the geofluid sciences. It was presented to Dr. Robert in Los Angeles on January 30.

Dr. Robert received the honor for two significant contributions to numerical weather predictions, the basis of AES's forecasting operation.

In 1965, he was the first person to successfully run a mathematical model of the complete meteorological equations required to forecast weather.

A unique feature is the capability of the model to describe conditions at a continuous sequence for various locations.

Events in the atmosphere can be described with a set of mathematical equations which are a function of time and space. However, the equations are complex and even with a computer, short-cuts must be taken to solve them. Before Dr. Robert's innovations, solutions were calculated either by dropping terms from the equations and then solving them for all forecast points or by using all the terms, but solving them only for specific points.

By adopting a different mathematical approach, Dr. Robert developed a method which used all terms and could be applied to both general and specific locations. The method has since been expanded for use in forecasting climate.

In 1969, Dr. Robert also developed a method of computation whereby numerical weather models could be solved almost six times faster. With his method, the time required to calculate a 24-hour forecast is 110-minutes instead of the previous 11 hours of computer time.

Dr. Robert was raised in the region of Trois-Rivières, Québec. He obtained his degrees at the Universities of Laval, Toronto, and McGill. He joined the weather service in 1953, worked for six years as a forecaster before beginning research on numerical models. He was president of the Canadian Meteorological and Oceanographic Society (CMOS) in 1972. □

Godson is new IAMAP head

Dr. Warren Godson, Director General of the Atmospheric Research Directorate, was elected President of the International Association of Meteorology and Atmospheric Physics (IAMAP) during the December 2-15, 1979 general assembly in Canberra, Australia. Dr. Godson has been an active member of the executive committee and taken the offices of secretary and more recently of vice president of IAMAP.

IAMAP is one of seven associations of the International Union of Geodesy and Geophysics (IUGG). It has 10 commissions dealing with radiation, ozone, atmospheric chemistry and global pollution, meteorology of the upper atmosphere, dynamic meteorology, polar meteorology, cloud physics, atmospheric electricity, planetary atmospheres and climate.

President of the IAMAP is Dr. Warren Godson

"This is quite a feather in his cap" commented Fred Page, Head of International Affairs, when hearing of the appointment. It is also quite a feather in Canada's cap, and something AES can be justly proud of. □

Merit awards for icey work

John Comeau and Malcolm McGregor of the AES Ice Reconnaissance Division received merit awards for their role in the rescue of the ice breaker CCGS Franklin by the CCGS Louis S. St. Laurent.

The brief ceremony took place in the AES management committee boardroom, Downsview, on January 7, 1980. Dr. A.E. Collin, assistant deputy minister, presented certificates and cheques to the two ice observers, congratulating them on a job well done.

During the last week of September, 1979, the CCGS Franklin was proceeding toward base at St. John's, Newfoundland when it encountered heavy ice in Viscount Melville Sound. The port screw blade tips were severed by ice and the ship disabled.

The only Canadian vessel capable of assisting the Franklin, the CCGS St. Laurent, with ice observers Comeau and McGregor aboard, set sail to rescue the sister ship. Dome petroleum sent the Kagoriak to stand by in case evacuation was necessary.

Using data from AES ice reconnaissance aircraft flying out of Inuvik and Resolute and from their own observations aboard the ships' helicopters, Messrs. Comeau and McGregor were able to present a floe by floe analysis. Their synthesis of the ice data and advice proved sound, and both vessels were back in open water by the first week of October, even though the St. Laurent itself suffered extensive structural damage while freeing the Franklin. The shortest route back for the damaged ships was toward the west

Mac McGregor (left) and John Comeau (center) receive their merit awards from Dr. Collin.

Late in September, the CCGS Franklin gets stuck in ice (1). The CCGS St. Laurent departs Nanisivik (2) and the Canmar skip Kigoriak leaves mouth of Prince of Wales Strait (3) to undertake rescue. AES ice reconnaissance planes fly support missions out of Inuvik (4) and Resolute (5). Rescue (6) occurs on October 4, while Canmar ship stands by (7). All ships head west to escape ice (8).

even though it meant repairs on the West Coast and a return to base via the Panama Canal.

John Comeau, a native of New Brunswick, joined the AES in 1967 after serving in the Canadian Air Force as a meteorological observer. In 1969 he transferred to the Ice Reconnaissance Division from CMC, Montreal. Mr. Comeau sailed in the CCGS John A. MacDonald when the MacDonald escorted the S.S. Manhattan through the Northwest Passage in 1969.

Mac McGregor, from Ontario started with AES in 1974 and after duty as a presentation technician at Sarnia became an ice observer in June, 1979. The rescue cruise of the CCGS Louis S. St. Laurent was Mr. McGregor's initial experience as a shipboard ice observer. □

Busy retirement for Bill Ganong

When William Ganong retired as director of the AES Ice Branch in 1977 he went to his old family home in Digby, Nova Scotia to put his feet up by the fire, putter around a bit, and generally take life easy — or so he thought.

It didn't turn out that way. Instead, he promptly got involved in community organizations of Digby such as the Admiral Historical Society, the library, and the Board of Trade. He then developed a taste for politics and, in October 1979, was elected mayor of Digby by acclamation. On November 3, 1979, he assumed his new duties, having resigned as president of the Digby Board of Trade.

Mr. Ganong was well known to AES staff during his 35 years' service, and well-liked for his congenial personality. During most of his career with DOE, he was seconded to the Department of National Defense. Prior to retirement, he was director of the Ice Branch for four years.

Now, as always, Mr. Ganong has an open door policy, and plans to make the mayor's office more accessible to everyone.

He faces the same budget constraints he had to wrestle with as an AES manager. "We have lots to do, but limited funds. We'll have to do the best we can with what we've got" he said during an interview. Sounds familiar? □

NEWS

Prairie Weatheradio goes on the air

Dr. Collin presents Saskatchewan MLA Bill Allen with a weather radio

The first prairie Weatheradio Canada station went on the air during opening ceremonies December 6, 1979. The station serves the Regina, Saskatchewan area. Dr. A.E. Collin, assistant deputy minister AES, pointed out advantages of the 24-hour weather broadcasts to the 200 000 residents who live within effective range of the transmitter, a radius of about 65 km.

Located at Lumsden, Sask., the transmitter covers such major centres as Regina and Moose Jaw. The broadcast studio is at the Regina airport weather office.

Bill Allen, MLA for Regina-Rosemont, represented the Province of Saskatchewan on behalf of Hon. Roy Romanow, Minister of Intergovernmental Affairs. Mr. Allen expressed optimism about "improvements in the provision of weather information through Weatheradio Canada, backed up by the use of the radar system being planned." The province had previously expressed concern about withdrawal of forecasters from the Regina office.

Central Region Director Jack Labelle underlined potential benefits to the farm economy to more than 60 people who attended the opening. Dale Henry of the region noted AES will now be better able to reach the public with weather warnings, either directly or through radio and TV stations. He urged them to acquire weather radio receivers.

Guests, many with a direct interest in the Weatheradio operation, included the Mayor of Regina, several MLAs, the media, Saskatchewan deputy ministers of agriculture and highways, the director of the provincial emergency measures organization, the general manager of the Saskatchewan Power Corporation, the Regina police chief, the general manager of Sask-Tel, and the district manager of Pioneer Grain Company.

Art Lamont, project officer for Weatheradio Regina, and Ray O'Brien, officer in charge of Regina Weather Office, followed up the ceremonies they had organized by promoting the new station on Regina radio and TV talk shows.

An encouraging event occured the day after the opening, when one talk show's host wondered what Weatheradio broadcasts sounded like. A listener phoned in and held the phone to his weather radio receiver for all to hear. □

Regina South MLA P. Rousseau, Saskatchewan EMO Director Jim Eaton and Regina police chief Al Huget discuss the opening.

Users, originators exchange ideas

A recent workshop on agriculture and climate provided a useful platform for an exchange of ideas between users and originators of climatic information. They will eventually find their way into the formulation of a Canadian Climate Plan.

The workshop held in Ottawa, November 22-23, 1979, was one of a series to find the needs for climatic data and services by several social sectors. Agriculture, of major importance in the Canadian economy, is highly vulnerable to climatic variability. Co-sponsored by Agriculture Canada and Environment Canada, the workshop discussed and made recommendations on climatic problems and information needs of agriculture.

The more than 70 participants included meteorologists, farmers, pedologists, senior research managers, agrometeorologists, economists, geographers, university professors, private consultants and media representatives.

Four working groups generated recommendations concerning possibilities for improved data, data dissemination, and data use.

Specifically suggested were denser observing networks, more information on variables such as snow and evaporation, earlier availability of data, improved communication of information to users, and efforts to educate users, including farmers, marketing agencies and planners, to ensure that the data are used in decision-making in cases where climate is important.

User feedback presented at the agriculture sector workshop will serve in the formulation of the Canadian Climate Program plans and priorities, thereby shaping much future work of the Canadian Climate Centre. □

The Decade ahead and what it holds for AES

Zephyr staff writer Yolande Baldachin interviewing Dr. Collin on his views of what lies ahead for AES in the 80s.

Zephyr is taking a look at the decade ahead to see what it might hold for AES. In a talk with the man who knows best, we asked Dr. A.E. Collin, Assistant Deputy Minister, for his ideas and comments on the challenges and developments which lie ahead for AES in the 1980s.

Zephyr: This is the beginning of a new decade. However, before saying good-bye to the 1970s, it would be interesting to look back and ask what you thought were the most significant AES developments and programs.

Dr. Collin: There were several developments in the 70s which are extremely important today in the weather service of an industrialized nation. One is the availability of global sensing of weather phenomena from space to just about every nation of the world. The meteorological satellite systems now in place are the most sophisticated and the most important tool now available. The international community is going to look at how it uses those systems as effectively as it can in the next 10 years.

In Canada, there were several developments which I have found most interesting: the first is the tremendously exciting range of activities within AES, which lead from atmospheric research on the one side right through to the provision of information and services to the Canadian users on the other side of the spectrum. Another development is the very recent and very outspoken popular interest in the national weather service which can be reflected politically very quickly.

Zephyr: What do you mean by that, Dr. Collin?

Dr. Collin: For example, when AES wants to increase or decrease its level of service, the popular response can be counted on as happening immediately. I'm thinking here of weather station PAPA, of Whitehorse, of the services in the Arctic and of others.

The third development of the 70s I would like to mention is that, over the last two years, we have embarked upon discussions with the provinces which will lead to more response and more participation as to the level, type, and application of service — which is all very refreshing for AES.

Zephyr: A decade is a long time to an individual. It is, however, a relatively short period to an organization. Plans will need to be implemented early, with possible resulting changes. For people to adjust to any upcoming changes, would you be able to describe, very broadly and as you see them, future trends in store for AES, given the expected changes in science and technology, the economic conditions and the reorientation of social goals?

Dr. Collin: I think we may soon see a clearer definition of the relationship between the provinces and the Government of Canada. The result may be increasing, or decreasing central government, I cannot tell. Nevertheless, I think it will be to the benefit of AES to develop a process by which our discussions with the provinces are undertaken on a somewhat regular basis.

It is totally out of the question to think of AES as providing an exhaustive weather service to all Canadians for all needs. We will certainly continue to provide a standard basis of weather forecasting for the nation.

But, for special requirements such as forestry, agriculture, fishing and aviation, for example, I hope we will be able to work in close cooperation with the provinces to provide services designed specifically for these purposes.

At the same time, I think our relationship with industry will move along a similar path and we will find ourselves working closely with those large development industries, such as the petroleum industries, who require special levels of service.

I think, too, that we will see an increase in competence within the private sector to provide meteorological services. AES is trying to encourage this development, since, as is evident in other countries, the private sector can play a useful role in the provision of certain types of meteorological services.

Another development I see within the next 10 years in AES is the application of new technology and the bearing it will have on the management of the service. We're seeing right now the impact of computer power and the applica-

tion of numerical modelling at the operational level.

Major steps in communication, and especially in computer-assisted communication, are going to lead to very exciting opportunities for AES to deliver weather information, in a spectacular way, right across the country; television, through the medium of Telidon, and satellite communications are two obvious ways.

Zephyr: In the concept you've just outlined, what general assumptions did you make regarding national priorities, resources available, and other important factors?

Dr. Collin: The general assumptions I had considered, and those that AES would be governed by, are that there would be no major new resources available — the budget of the Service is likely to remain the same — and that national priorities will also remain more or less the same in the next few years.

I think that the application of energy sources in the country is going to come under critical review. Weather will become an important parameter in the review of national energy sources.

"The most important resource of AES are the men and women working for the service..."

Zephyr: Meteorology is taking on increasing importance in the decision-making processes of the country. As a result of this trend, do you foresee any major expansion of present services or a provision of new services in the coming decade?

Dr. Collin: I have already mentioned the likely increase in specialized services in several areas. One I would see would be in energy policy-making and an understanding of weather and climate in matters dealing with national energy requirements which are directly related to weather, such as heating, for example.

Another one is the increasing concern with respect to the quality of the atmospheric environment. Some energy policy courses, such as fossil fuels, have very serious environmental connotations.

Others, such as solar energy, wind power, geothermal energy, wave and tidal energy are relatively environmentally clean and should be looked at very seriously. An understanding of atmospheric pollution and potential atmospheric change is already emerging as an important element in energy policy-thinking in most countries.

The application of an understanding of climate, particularly as it applies to the agricultural potential of the country, is also gaining recognition, and I can see AES devoting considerable time and effort to that initiative.

Zephyr: Looking at the AES data base, that is, at the type of weather information collected and analyzed, would you then say that it requires some change and that the 80s would be an opportune time to review it?

Dr. Collin: In looking at the design of the data base over the next 10 years, we will have to bring together a number of major components. We must keep in mind that the 24-hour, 7-days-a-week nature of the service means that we are constantly involved in upgrading the next forecast. Information available to the Service is absolutely essential to that function and to the retirement of our numerical models which contribute to it.

At the present time AES is looking very seriously at the application of satellite sensing and at increasing the installation of meteorological radars in areas of high population density. The coordination of the positioning of our radars and the availability of satellite sensing to the data base are now recognized as major design components of the data base.

Also, we can no longer rely on manned stations throughout the country to provide us with the full data we need. As a result, one obvious solution, and another major component to our data base, is going to be automated recording stations at sea and in the uninhabited areas.

We are moving very effectively towards this; on the West Coast, we have just launched the first of a series of meteorological buoys which will complement the satellite data and our analysis system in Edmonton — which is really quite spectacular when you think about it.

The Service will take full advantage of these automated observation programs. It goes without saying that the most important resource of AES are the men and women of the Service, and that the effective use of that resource is really a most important consideration. I might also add that I think AES is doing a very good job of that at the present time.

Zephyr: Universities are now providing an increasing range of environment and meteorology courses, both at the graduate and the undergraduate levels. What new direction do you see the AES training facilities taking in order to complement university training?

Dr. Collin: Yes, Canadian universities are moving towards more courses and a better preparation for meteorologists. I think this is a very good thing, and AES has encouraged this trend.

At the same time, I cannot see anyone else assuming the responsibility for the technical training of

meteorologists and meteorological technicians over the next few years. We are the only ones who train people how to run weather stations and how to manage weather information systems.

I have commented on what I see as being the increasing technical opportunities open to the Service and the extremely interesting developments that I see in AES over the next few years. We have to make very sure that we're good enough to do that.

Zephyr: Several environmental parameters such as land, sea and air, are inexorably tied together. Would it not be possible to carry out, maybe with the help of computers, a single coordinated prediction program that would encompass all environmental processes? What effect would it have on current research on climatic change?

Dr. Collin: AES has already given a lot of thought to the concept of broadening the forecast service. By using the same information network that we have in place, we could gather, analyze and distribute effectively data on several other environmental parameters dealing with the quality of the atmosphere, with sea state, wave and sea swell, ice at sea, fresh water conditions and others.

In answer to your second question, there is a very direct link between climate and variations in the surface layers of the ocean. In Canada, climate variation is seen as being very important in the management of our agricultural potential and of our fisheries. It is also now being recognized that climate change could in the next five to ten years become an international question as it relates to policies dealing with energy production and conservation, marine navigation and other longer-term human interests.

Zephyr: The Long Range Transport of Air Pollutants (LRTAP) program has taken a giant step in 1979 to become a national environmental priority. Acid rain is now almost a household term. What will the AES role be to respond to this and other air quality concerns of the 80s?

Dr Collin: As you know, the whole problem of acidic precipitation is extremely important, specifically in eastern Canada and the eastern United States. It is recognized that there is not much point in one country proceeding alone on this question, but that both Canada and the US have to move in concert.

I think it is quite clear that the role of AES in the program over the next few years will be to continue to provide the research base upon which the national policies are designed. I can also see the level of activity in AES increasing, not only in the fields of science and research, but also in participation in the federal/provincial and Canada/US negotiating processes.

"...the second development is the very recent and very outspoken popular interest in the national weather service which can be reflected politically very quickly."

Zephyr: Could you comment on AES participation in international research programs? Do you see this type of activity increasing during the next years?

Dr. Collin: The atmospheric sciences are clearly international because of the global nature of the atmosphere. The contributions of the various nations must be brought together; otherwise nations will find themselves working in isolation.

Since much of the research is extremely expensive, there is every reason why international participation in research is a very effective road to follow. Also the benefits that one small nation gains are many times what that nation may be able to contribute to the international science.

In AES, without any question, I see a continuation of our participation internationally in the atmospheric sciences and in the World Climate Program.

I think there are areas where Canada can make an extraordinary contribution in the atmospheric sciences. Already we are providing some very useful work in our modelling, in our stratospheric research and in the general question of the application of numerical modelling to the very difficult forecasting problem which we have in this country, since it is so large. So I count on us being able to move in that direction.

Zephyr: Finally, Dr. Collin, would you comment on the function of AES within the Department of the Environment — do you foresee changes taking place in this relationship or perhaps in our cooperation with other departments?

Dr. Collin: Over the last couple of years, AES has been able to make a contribution within the Department of the Environment which has been of considerable value to the service and to the department.

I think in the future that this contribution will increase in several areas and one of them, of course, is the one I referred to earlier, dealing with the expansion of our technical facilities for the collection, analysis, and distribution of environmental information.

I think, as well, that AES involvement with other departments, such as Defense, Northern Affairs and Transport will contribute directly to the Department of the Environment because it will assist the department in similar constructive and useful interactions.

AES is a large component of the Department of the Environment, and the management and initiatives of AES will continue to have a bearing on the thinking and on the breadth of the department. This will include the technical facilities of the service and will bring focus to the very serious atmospheric environmental problems which are facing the country today. □

AES and how it functions

by J.A.W. McCullough

This is the first of a two-part feature explaining the organization of AES. Part 2 will appear in the next issue of Zephyr.

To many AES staff, especially to those working in the field, the structure of the service, its management and division of responsibilities are poorly understood and somewhat mysterious.

This article is intended to throw some light on the basic services and structure of AES.

AES is headed by a management committee (AMC) responsible for the overall direction of the Service. It is made up of the following members: The assistant deputy minister (chairman), the senior managers of the service and the senior members of the office of the assistant deputy minister (ADM). Decisions are made by the ADM; wherever possible, they are based on a consensus of the remainder of AMC.

Organizationally, AES is divided into these major components:

— Office of the Assistant Deputy Minister
— Atmospheric Research Directorate
— Central Services Directorate
— Field Services Directorate
— Canadian Climate Center
— Administration Branch.

Office of the Assistant Deputy Minister

The *director of the Program Development and Evaluation Branch* is located in Hull along with some of his staff, the remainder being in Downsview. This branch has a variety of responsibilities covering long-term issues in organization, resources, policy, program development, program integration with other elements of the department, and program evaluation. Because of its overview of AES activities, it also coordinates the preparation of a variety of documents for the minister or the deputy minister.

The *liaison meteorologist,* located in Hull, is the principal AES contact on day-to-day administrative matters with the minister's office and other elements of the federal government. In particular, he redirects enquiries to the area best capable of responding to them. Conversely, AES staff keep him advised of major and topical issues as they occur across the country.

The *scientific coordinator* is also in Hull, and functions in the area of scientific programs much as the liaison meteorologist does in administrative ones. As a facilitator, he ensures that all relevant portions of AES are consulted regarding joint scientific ventures with other DOE services and government departments.

The *international co-ordinator* is in Downsview and assists the ADM and other managers with official business with other countries and organizations. A major portion of his time is spent dealing with the World Meteorological Organization (WMO). AES plays a large role in that organization. At present, the ADM is a member of the WMO Executive Committee, and Canada provides chairmen for four of the technical commissions.

The *director general, Program Planning* is a special position, established for a limited period, to address several important issues facing AES in the near future, including long term needs of computers and communications, manpower planning, and training and development.

There are in addition, two positions, both in Downsview, which are not AES staff. The manager of the Information Directorate (AES programs) reports to the director general of the Information Directorate in Ottawa, but is responsible for meeting specific information needs of the ADM of AES. The manager of the Ontario Regional Personnel Office reports to the regional director general of Environment Canada, but serves as the ADM's special advisor on personnel matters across the service.

Atmospheric Research Directorate

We might call this part of our organization the "Canadian National Center for Atmospheric Research". At the moment, except for the Division de Recherche en Prévision Numérique (DRPN) in Montreal, the numerical weather prediction group located beside the Canadian Meteorological Center (CMC), the staff are located in Downsview.

The Directorate has three Branches:

Air Quality and Inter-Environmental Research Branch. The activities of the branch's divisions are reasonably well described by their names: Atmospheric Chemistry, Boundary Layer, Atmospheric Dispersion, and Impact Assessment. This branch interacts closely with other elements of the department, since its areas of concern are directly related to the environmental quality of that part of the atmosphere we occupy or that affects us. Those areas encompass both the physics and chemistry of the atmosphere, and concentrate on the bottom of the troposphere.

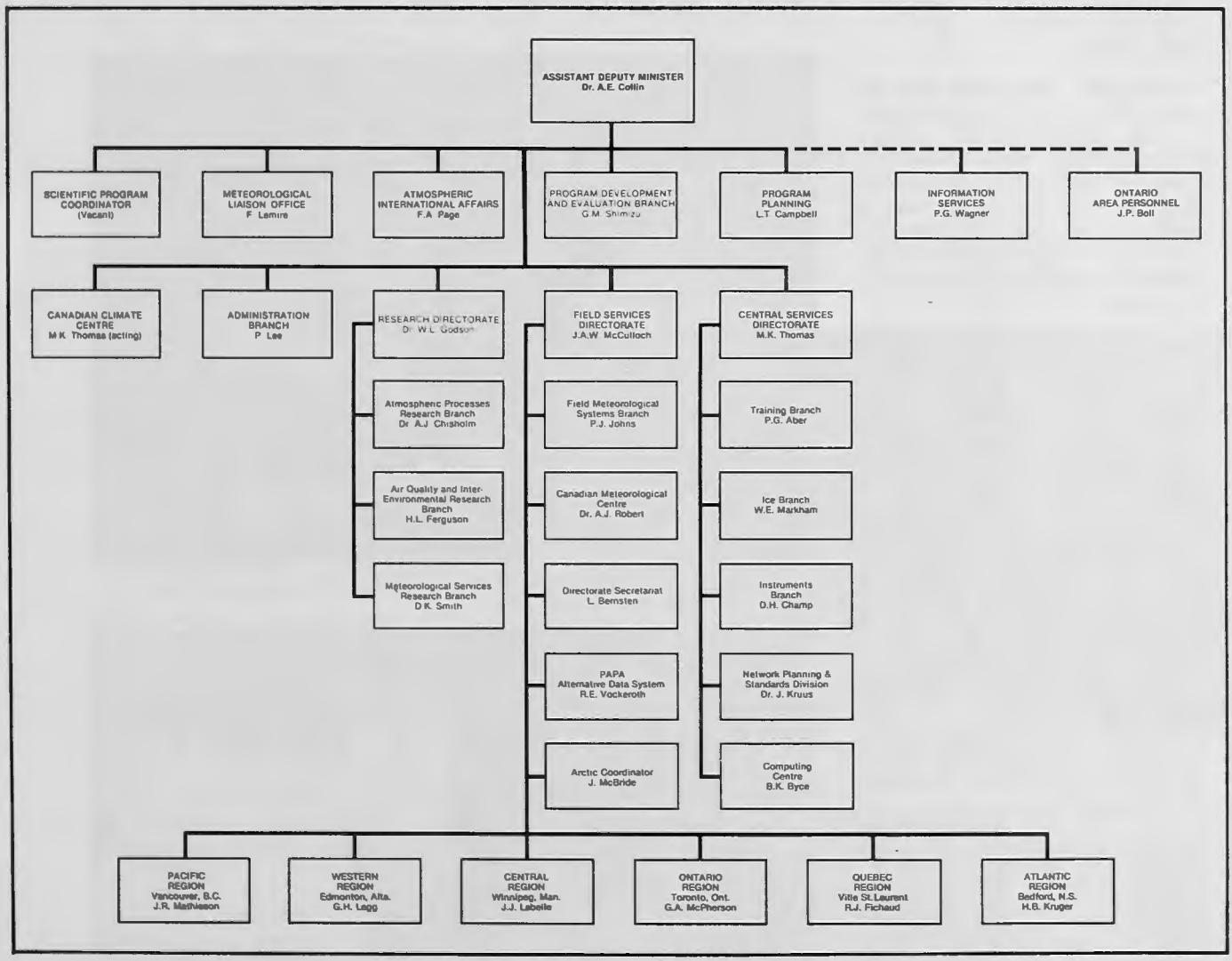
Atmospheric Processes Research Branch. There are two divisions. The Cloud Physics Division remains abreast of all aspects of "cloud physics", including weather modification (a term used to describe precipitation enhancement or suppression), modification of hailstorms and hurricanes and the like.

The Experimental Studies Division

is concerned with the gathering and interpretation of data on such subjects as radiation, composition of the upper atmosphere (especially ozone). Such information is of paramount importance when studying the effects of fluorocarbons or supersonic aircraft on the stratosphere, the possible serious effects on life of energy in portions of the solar spectrum reaching the earth or the application of solar energy.

Meteorological Services Research Branch. One of four divisions is located with CMC in Montreal, and works on numerical weather prediction. In Toronto, the Aerospace Meteorology Division works on satellite meteorology and the application of remotely-sensed data to weather and ice predictions. It also has a small unit working on wind engineering. Also in Toronto, the Forecast Research Division and the System Design Division support forecast operations in the Weather Centers and Ice Central, including development of techniques for prediction of environmental parameters such as sea-state and oilslick motions. □

(J. A. W. McCullough is Director-General, Field Services Directorate)



CHANGING TIMES, CHANGING WOMEN

Nearly everyone these days knows that women no longer work to buy a living room suite, new drapes or an exotic vacation south of the border. Many enter the work force intent on a career that may become a lifetime commitment.

Spurred by feminism, a reorientation of their social goals has had a profound influence on the lives of many women.

Seeking full integration into the social fabric beyond her traditional role as wife or mother, today's career-minded woman is likely to postpone having children at least until she has attained a level of education which would permit her to pursue her career goals, or perhaps even until firmly launched in her career.

The changing role of women in society is also rooted in economics; women may be the sole or main providers for their families, or their contribution may constitute a necessary and integral part of the family income.

"These are at least some of the key factors which motivate women to seek equal opportunities with men in the workplace", explains Joan Masterton, chairwoman of AES's Equal Opportunities for Women (EOW) Co-ordinating Committee.

Principles involved in EOW programs are widely recognized and supported today. However, practical application in the workplace still has some way to go.

Working women still seldom get the same opportunities as men. The reasons for this are many and complex, says Mrs. Masterton. Lack of recognition from managers, insufficient on-the-job training, mentoring and opportunities for advancement on the one hand, and a lack of self-confidence and assertiveness on the other, often prevent women from reaching full potential.

Of course there are others who may lack the education, experience and initiative and — at least to an outside observer — seem quite content to do more conventional jobs often associated with female employees. Still, the fact remains that there are very few women in the middle to upper echelons of the organization.

The federal government has recognized this by establishing the EOW program. Its objective is to ensure that the number of male and female employees in all occupational groups represents adequately the qualifications, interests, and aspirations of both sexes.

Dr. Agneta Burton (ARQA) is a post-doctoral fellow working on a special assignment with AES.

Diane Richardson, Research and Project Support Section, Instruments Branch (AIDR) is wiring a digital display unit.

AES managers gave their support to the program and, as early as May 1977, Zephyr was able to report that an EOW Coordinating Committee had been formed at AES Downsview.

Close to three years have gone by since then, and Zephyr asked Marlene Phillips, past chairwoman of EOW, how the program has progressed and what steps have been taken to attain the objectives set for it.

"We began by analyzing the situation," she replied, "to gain insight and understanding that would allow us to propose solutions."

The committee gathered, tabulated, and updated information related to the number and level of employees within occupational groups, university enrolments and graduations by discipline, the number of applicants, their qualifications and rate of success in government competitions, as well as training and development allocations.

Group profiles were then developed for the technician (EG) and the meteorologist (MT) categories. The Ontario Area Personnel (OAP) developed profiles for other groups along the same lines.

Dr. Phillips and committee members soon realized that women in AES needed help to cross existing hurdles, to develop confidence in themselves, to understand self-advancement and promotion.

As a result, the committee initiated development of several awareness programs including career planning and data stream seminars, noon-hour film presentations, a career interest survey, and a career information centre. Space for a women's section was reserved in the library. All AES recruitment literature was reviewed to reflect women's interests in technical fields.

In addition, the Qualifications Enhancements Program (QEP) was developed for employees to broaden their experience by carrying out short term projects in areas outside of their present job responsibilities.

Interested staff are often seen gathering around the Career Information Centre outside the Downsview cafeteria, or the QEP desk in the library, to check the latest projects posted. "Because of its success and popularity, the program has now become integrated into ongoing AES staff development," says Dr. Phillips.

In August 1979, at the request of the Senior Management Committee of the Department, a Status of Women Committee was established to develop policies which would facilitate attainment of EOW goals, to ensure managers have an input into EOW planning, and to create a mechanism to review and explain results of the programs.

In keeping with this decision, eleven new policies recently received approval from AES Management Committee. Specific directorates or committees were assigned responsibility for each policy. Their effectiveness will be monitored and reviewed annually.

Future plans of the EOW Co-ordinating Committee include creation of a day care centre in or near the AES Downsview facilities (if the need is clearly demonstrated), additional career planning seminars, an OAP orientation package for new employees and others. The committee will monitor Status of Women policies and, in 1982, will evaluate its own progress in attaining the five-year objectives established in the spring of 1977.

While the interests of women working in Downsview are certainly well looked after by an active, competent committee, women must still realize, as Mrs. Masterton puts it, that they will need to market themselves effectively. Unless they acquire the skills, experience, determination and confidence needed when facing an interview panel, they will not obtain coveted jobs traditionally held by men. The old proverb that you can bring a horse to water, but you cannot make him drink applies here as elsewhere. □

Meeting to discuss and review the NO_2 Criteria Digest are (left to right): Doris Bardeau, Dr. Marlene Phillips and Peggy Brymer, all with Atmospheric Chemistry Criteria and Standards Division (ARQA).

AES staff often gather around the EOW Information Centre, a centrally located kiosk where various items dealing with feminism and EOW are posted. Lillian Methven, Field Services Directorate, is intrigued by one of the notices.

DEPARTMENTS

Morley K. Thomas recently appointed Director General of the Canadian Climate Centre, CCDG, Downsview.

Morley Thomas was recently appointed Director General of the Canadian Climate Centre. He will retain responsibility as Director General of Central Services until a replacement is appointed.

Explaining why he accepted this transfer Mr. Thomas says, "The work to be done by both organizations is vital and the decision was difficult. Central Services offers the challenge of bringing a new Downsview computer to an operational state, and of organizing the network planning necessary to keep AES the vital service it has been.

"On the other hand, the Canadian Climate Program, on which many people are working very hard, requires further work to bring new operational programs into being. In the few years which remain before retirement, I decided to return to the scientific area which I enjoy greatly and in which I spent so much of my career." □

A seminar on "Ice Core and Climate Change", at AES Downsview last December 17, provided new and interesting insights into glacier core analysis.

G. Holdsworth of the Snow and Ice Division of the National Hydrological Research Institute (NHRI) was invited by the Canadian Climate Centre to speak about his work with 'weather fossils'. "The study of past climates through the analysis of glacier cores" he said, "has always been an important and fascinating aspect of man's efforts to reconstruct his climatic past."

The NHRI ice core analysis program began in 1975. Its main objective is acquisition and analysis of ice cores from selected glacier sites so as to obtain time-series of climatic parameters. Primary interest is in climatic changes over the last 1 000 to 2 000 years.

The NHRI field program is presently located on Mt. Logan in the Yukon Territory and the Penny Ice Cap in Baffin Island.

Dr. Holdsworth talked about the logistics and difficulties of operations. Reaching the Mt. Logan site is difficult and perilous. All equipment has to be flown to a site 5 300 metres above sea level. Persons working at such altitudes need two to four weeks to acclimatize properly before they can begin work.

Special drilling instruments were fabricated by Carleton University (on contract to Environment Canada) to carry out the core sampling. Proxy data obtained from this program will be compared and correlated with ice core data from the Greenland Ice Sheet, Devon Island, and other sites.

Information gathered is expected to provide greater detail than previous glaciological programs. This should greatly enhance our understanding of droughts, cold, floods and other aspects of the Canadian climate back to the time of earliest exploration. □

Two organizational changes in the Air Quality and Inter-environmental Research Branch (ARQD) have resulted in a transfer of the Air Quality Assessment Section (ARQN) from the Atmospheric Dispersion Division (ARQT), and creation of a new Air Quality Networks and Surveys Section. Both changes became effective January 1, 1980.

ARQN section head Ron Portelli now reports directly to Howard Ferguson, director of ARQD. Among other responsibilities, the section will focus on the transfer of branch technology to AES regions and other users.

Head of the new Air Quality Networks and Surveys Section, still to be appointed, will report to Dr. Ted Turner, chief of the Atmospheric Dispersion Division.

The section will be responsible for the Branch's network operations such as the Canadian Sampling and Precipitation (CANSAP) and the Background Air Pollution Monitoring (BAPMON) networks. It will collect and analyze basic air quality data in support of the Long Range Transport of Air Pollutants program. □

Fifteen Central Region meteorologists participated in a workshop designed to introduce them to the meteorology of air pollution. The workshop was held November 21 and 22, 1979 in Winnipeg.

Fouad Fanaki, Air Quality and Inter-Environmental Research Branch, Downsview, and local Winnipeg meteorologists Hugh Fraser, Chief of Scientific Services, and Einar Einarsson of the Scientific Services Unit served as resource persons.

Air pollution meteorology deals with transport and transfer of pollutants as affected by atmospheric conditions. Techniques discussed should help the participants know where pollution from smokestacks will go, how high such stacks should be, and what the concentration of pollutants in particular ground level locations is as a function of atmospheric conditions.

Participants in the workshop learned of the computer models used to answer such questions, later worked on problems of actual stacks (Inco and Flin Flon) using the computer terminal provided.

The workshop also covered some activities of the Air Quality Branch. Dr. Fanaki showed films of the branch's field operations. □

A small group of meteorologists and technicians from the private sector attended a workshop

January 15th at AES Downsview to familiarize themselves with facsimile products carried on AES communications networks. There is a growing need for this type of information.

Don Scott, head of the Weather Services Division, Field Services Directorate, briefed participants on AES and on procedures with respect to private meteorology.

Dr. Bill Burrows, Professional Development Division, Training Branch, spoke on the format and content of both American and Canadian facsimile products. Later he lectured and conducted a laboratory exercise on the use of charts during the analysis and prediction of motion systems, and weather elements. Several handouts were provided.

Emphasis was on use of the actual charts with little or no technical support required. Very few, if any, private users have the technical support staff that is available in AES forecast offices.

Spurred by the positive response, AES will soon contact universities and industry using facsimile products to define further, and ultimately meet, the need of such workshops. Training Branch will also invite the private sector to participate in refresher workshops offered regularly in Downsview. □

BOOK REVIEW

Pathways of Pollutants in the Atmosphere, Tim Sugden, The Royal Society, London, 1979, 169 pp., illustrated, £13.30.

The record of the proceedings of a Royal Society of London discussion meeting held November 3-4, 1979, the volume contains twelve papers and the discussions.

In the first paper, T.M. Sugden proposes a classification of local, regional and global pollution, based, however, on a rather narrow approach. Two papers deal with stratospheric gases and ozone in particular, three are concerned with problems in atmospheric chemistry.

Perhaps of more interest to meteorologists and non-specialists is the good, short review of greenhouse effects by Houghton, and an article on long-range transport in Europe by Smith and Hunt.

The last three papers in the volume form an interesting group, presenting philosphies on monitoring and controlling air pollution.

The question of pollutant pathways is an important one that should be of general interest to meteorologists. Unfortunately, the collection of papers in this volume deals with only parts of the subject and in a rather uneven way at that.

Reviewed by Gordon A. McBean
Dr. McBean is chief,
Boundary Layer Research Division,
Atmospheric Research Directorate, Downsview □

One course much in demand around AES is the Advanced Programming and Computer Screen Graphics course devised and taught in Downsview by Training Branch. It has been given half a dozen times in the last nine months.

The course outlines a method of problem solving using top-down development and structured programming techniques. It introduces the IBM concept of Chief Programmer Team and makes available to each participant a copy of the preprocessor necessary to implement structured Fortran IV on the computer.

The second part briefly introduces concepts, methods and software packages to implement computer graphics, and produce displays of simple meteorological fields.

Peter Chen, one of three instructors giving this course, was pleased with results and general response they received. "Computer technology is advancing at such a rapid pace we must ensure AES meteorologists and computer scientists keep abreast of the latest developments and services available in the meteorological and scientific research fields" he said.

Participants at the November 5-9, 1979 Advanced Programming and Computer Screen Graphics were: (sitting): Fraser Hunter, CFFC, North Bay, Doug Russell, CFMetoc Centre, Halifax, Serge Dupuis, OWC, Toronto, Connie Koshylanyk, ARWC, Edmonton, Bob Morris, PAWC, Vancouver, Don Bellows, AWC, Halifax, Don Porter, AWC, Halifax. Instructing were (standing): Andy Hanssen, CCAD, Peter Chen, ACEC, and "fearless" course leader Henry Stanski, ACEC.

DEPARTMENTS

PROMOTIONS

M.A. Bouchard (EG-3) U/A Tech. WS2, Mould Bay, N.W.T.
M. Byatt (EG-3) Western Region
D.M. Crosbie (EG-6) Ice Observer, Ice Bch., Downsview, Ont.
M. Danks (MT-6) Sup. Forecaster MWO, Bedford, N.S.
F. Didiodato (EG-3) Western Region
A. Doucette (EG-3) U/A Tech., WS2, Mould Bay, N.W.T.
G. Eddy (CR-1) Records Clerk, Downsview, Ont.
D. Forbes (MT-5) Senior Met. MWO, Bedford, N.S.
J. Glover (LS3) Library Operations, Downsview, Ont.
D. Grimes (MT-5) Senior Met. MWO, Bedford, N.S.
R. Haley (EG-3) Western Region
E.T.M. Hansen (EG-3) U/A Tech. WS2, Hall Beach, N.W.T.
J. Kozlowski (EG-3) U/A Tech. WS2, Eureka, N.W.T.
D. Layton (MT-6) Sup. Forecaster MWO, Bedford, N.S.
L. Lee (EG-3) U/A Tech. WS2, Hall Beach, N.W.T.
K. MacDonald (MT-5) Senior Met. MWO, Bedford, N.S.
J. MacIver (EG-3) U/A Tech. WS2, Coral Harbour, N.W.T.
J. Mayo (EG-3) Western Region
D. Millar (EG-3) Western Region
B.B. Mottus (EG-6) OIC WO4, Grande Prairie, Alta.
J. Pottier (EG-3) U/A Tech. WS2, Mould Bay, N.W.T.
J.A. Ross (EG-3) U/A Tech. WS2, Hall Beach, N.W.T.
S.M. Saddy (FI-2) Regional Finance Office, Vancouver, B.C.
L. Smith (ST-SCY 2) CCC, Downsview, Ont.
D. Sortland (ODIT Meteorologist) CFCC Edmonton
R.G. Stark (MT-7) Reg. Chief Ont. Reg., Toronto, Ontario
C.R. Stock (EG-6) Ice Observer Ice Bch., Downsview, Ont.
M. Stuart (EG-3) U/A Tech. WS2, Resolute, N.W.T.
D. Tomlinson (EG-3) Western Region
S. Vane (ST-SCY 2) Div. Sec., Downsview, Ont.
C. Woodford (EG-3) U/A Tech. WS2, Resolute, N.W.T.

TRANSFERS

A.D. Bell (MT-2) MWO, Bedford, N.S.
C. DiCenzo (MT-3) Met. Services, Downsview, Ont.
C.A. Hayes (ST-SCY-2) Integration & Evaluation Div., Downsview, Ont.
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T.B. Shannon (MT-3) D.Met.Oc. Halifax, N.S.
R.C. Stock (EG-6) ACIR, Downsview, Ont.
N. Vandal (CR-4) Finances, Ville St-Laurent, Que.

RETIREMENTS

E.G. Bryan, WO-4, Dorval, Montreal, P.Q. Dec. 1979
M. Callaghan, WO-4, Dorval, Montreal, P.Q. Dec. 1979
E. Einarsson, Scientific Services, Winnipeg, Man. Dec. 1979
M.A. Ferguson, Forecasting Computers, Toronto, Ont. Dec. 1979
W.L. Gutzman, DOM/CMC, Dorval, P.Q. Dec. 1979
W. Halina, Observational Systems, Toronto, Ont. Dec. 1979
R.D. Hall, Supt. Inspection, Toronto, Ont. Dec. 1979
C.E. Hanson, Pacific Weather Centre, Richmond, B.C. Dec. 1979
F. Healey, Gander Weather Office, Gander, Nfld. Dec. 1979
R. Hollinger, Pacific Weather Centre, Richmond, B.C. Dec. 1979
R.A. Keenan, WO1, Stony Plain, Alta. Dec. 1979
A.H. Lamont, Scientific Services, Winnipeg, Man. Dec. 1979
K. Lee, Pacific Weather Centre, Richmond, B.C. Dec. 1979
H. Lennox, Observational Services, B.C. Dec. 1979
A.R. McFadden, Training Branch, Downsview, Ont. Dec. 1979
M.E. Moffatt, Pacific Weather Centre, Richmond, B.C. Dec. 1979
A.T. Mowat, Superintendent of Station Operations, B.C. Dec. 1979
T. Overton, WS3, Coronation, Alta. Dec. 1979
S. Ramsden, Pacific Weather Centre, Richmond, B.C. Dec. 1979
F.H. Townsend, Aviation Weather Services, B.C. Dec. 1979

DEPARTURES

B. Clark, Pacific Weather Centre, Richmond, B.C.
M. Huot, Met. Station, Cape Dyer, N.W.T.
M. MacNeil, WS2 Mould Bay, N.W.T.
R. Pilling, WS3 Ennadai Lake, N.W.T.
R.K. Smith, WS3 Lansdowne House, Ontario
A.W. Storey, Victoria Weather Office, Sidney, B.C.
B. Winters, WO4 Churchill, Man.

ACTING

J.D.P. Gaudet (EG-3) Tech. Met., Met. Office, Dorval, P.Q.
S. Lapczak (MT-7) Reg. Chief, Ont. Reg., Toronto, Ont.
A. Malinauskas (MT-5) Weatheradio Canada Project, Downsview, Ont.
J.M. St. Hilaire (DA-PR05) Co-ordinator, DSI/CMC, Dorval, P.Q.
G. Wells (MT-6) LRTAP Program, ARQL, Downsview, Ont.