July/August 1984

ZEPHYR

Meteorology in Western Canada

Environment Canada Environnement Canada

Canada

NEWS

Pacific region changes

After 42 years with the weather service, the last 10 as director, AES Pacific Region, Jack Mathieson has retired. Appointed to succeed him is Dr. Kirk Dawson, who for the past four years has been director of Computing and Communications Services Branch. Both of these events took place in June. Full reports on these happenings as well as on several other senior appointments and retirements will be given in the next issue.

Pacific forecasts extended

Last September, AES extended its Marine Forecasts and Warnings out to 200 nautical miles off the coast of British Columbia. Environment Canada's previous marine weather services had been provided for the coastal areas from the Strait of Juan de Fuca in the south to the Queen Charlotte Islands in the north.

The extended area stretches from latitude 46 degrees North to latitude 55 degrees North and includes the two large sea mount regions, Explorer, off Vancouver Island, and Bowie, off the Queen Charlotte Islands. Formerly, this offshore region was forecast from San Francisco and later from the North West Ocean Services Centre at Seattle, Washington. However, according to Gary Wells at the Pacific Weather Centre, as an issue of sovereignty, AES claimed responsibility to forecast weather and issue warnings for the Explorer and Bowie regions and the Canadian position was accepted by the United States.

Forecasts for the extended area include information about wind speed and direction and visibility. Data is gathered by the Pacific Weather Office from satellites, ships of opportunity, the Automated Shipboard Aerological Program (ASAP), and stationary and drifting buoys equipped with sensors. Forecasts are issued three times daily and relayed to marine users by Weatheradio Canada and the Coast Guard.

Mr. Wells added that the possibility of providing information about the length of waves is currently being investigated and may soon be added to the service.

Zephyr Highlights

Cover: The satellite receiving dish with its specially designed emblem, located in front of the Pacific Weather Centre, Vancouver, provides a fitting symbol both for the new weather satellite facility and for this first special Western Canada issue of Zephyr.

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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Environment Canada / Environnement Canada

Atmospheric Environment Service / Service de l'environnement atmosphérique

New weather radar opens

An official Weather Radar opening ceremony for Vulcan, Alta. was held in early March with Dr. Andrew Macpherson, Regional Director General, Environment Canada, delivering the inauguration speech, due to a last minute cancellation by Environment Minister, Hon. Charles Caccia.

Other departmental representatives consisted of Bev Burns, Gene Prozny, Ted Wilson, Ron Santo, Dave Burnett, Dennis Greenling, Jim Steele, Amanda Keeling and Anne Marie Downey. Off-duty Calgary staff members Jim Edwards and Keith Rogers also attended with their wives. The Federal-Public Building in Calgary once again provided the ideal location for ceremonial activities. The crowd was not large but there was a good turnout of media representatives and representatives of provincial government agencies. Mr. Harvey Andres, MP for Calgary Centre, was also in attendance.

The large Western Region display was featured as a back-drop for the ceremony. The smaller weatheradio display was in operation, along with a back-lighted automatic slide show covering the installation stages at the Vulcan transmitter site. A computer communications terminal was also demonstrated with a telephone accoustic coupler providing a reliable connection to the Regional Mini-computer in Edmonton.

The radar display was recorded at the Calgary Weather Office and played on a 60 cm monitor for the opening. An active tornado outbreak sequence was provided by Trevor White in Training Branch and this also was viewed with interest by attendees.

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Guest editorial

Zephyr has asked for my thoughts as I retire after 42 years in the Atmospheric Environment Service or the Canadian Meteorological Service as we were named for most of my career — and which is still more easily understood by most of the public.

My main thought is of the people I have been so fortunate to work with and of the varied user groups we serve.

I find it difficult to talk generally about weather and climate in Western Canada. Meteorology is basically the same discipline in all parts of Canada and in all areas of the globe.

Nevertheless, Western Canada is meteorologically interesting from at least three points of view. We are located in an area where cold Arctic air interacts with warmer air masses from the Pacific. We are confronted by the data sparsity of both the Arctic and Pacific areas.

Finally, there is the influence on weather and climate of the land-sea boundary of the Pacific coast and of the mountains which extend from Alaska down the coast of western North America.

Meteorology will always be challenging. We will never fully understand the behaviour of the atmosphere, so a career in meteorology will always be interesting, sometimes frustrating but often very rewarding. Who can ask for more?

Salutations on publishing this first Western Canada issue.

Jack Mathieson

(con't from page 2)

In spite of relatively short notice and a weekend date, the ceremony provided a smooth and enthusiastic start for Southern Alberta radar coverage. All three TV networks covered the opening on their evening newscasts and radio, TV, and newspaper attention continued through the following week. Radar coverage for Southern Alberta has been talked about for more than twenty years. Over one million Canadians will benefit from improved forecasts, newscasts and warnings as this new tool is put to work at the Alberta Weather Centre and at the Lethbridge and Calgary Weather Offices.

Dave Burnett
Weather Services, Edmonton

The new Vulcan weather radar station near Calgary, Alta.

Growing Degree Days: In Canada, plant growth occurs above a temperature of 5°C. Below this temperature, plants remain dormant. Growing degree days are the number of days per year where the average daily temperature is above 5°C. This information, which is available from Environment Canada, can assist farmers in determining the crops most suitable for their specific location.

Haze: Fine dust or fine particles of industrial air pollution dispersed through portions of the atmosphere. Individually these particles are invisible to the naked eye, but collectively they can reduce visibility.

Central Region: late new flashes

A successful Central Region Fire Weather committee seminar was hosted in Winnipeg by AES involving three provinces, the Canadian Forestry Service (Edmonton) and the Canadian Institute of Forest Fire Control . . . negotiated the funding by Agriculture Manitoba of Farm Weather code-a-phones at three locations for implementation June 1, 1984, AES to provide products and weather information . . . a mesoscale information processing project initiated for Summer 84 in southern Manitoba using supplementary real time data provided by Environment 2000 employment program . . . radar data base management and display system project underway, allowing forecasters automatic access to up to six simultaneous cathode ray tube images from seven radar sites, includes zooming, lapsing, background manipulation, level selection . . . a new lightning detection display system for strike data from Manitoba, Saskatchewan and Northwestern Ontario forestry centres now operational . . . High Arctic Weather Stations planning trip completed May 4 — 14, 1984, included Central Region AES, Transport Canada, Director of Medical Services, National Health plus

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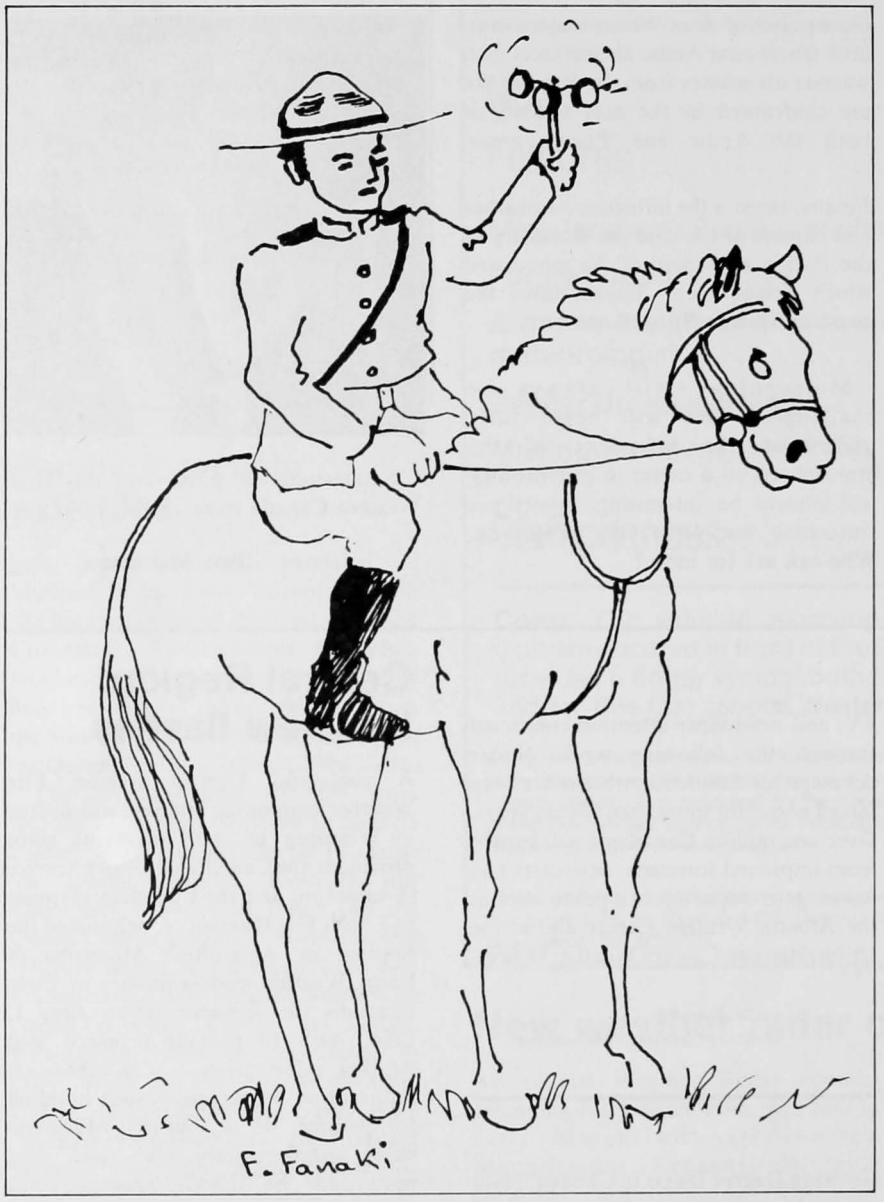
Regina celebrates 100 years of weather observing



NWMP — "The Northern Weather Monitoring Police?"

December marked the centennial of weather observations at Regina, Sask. One hundred years ago the Northwest Mounted Police (NWMP) began recording daily temperature and precipitation values from their barracks in the Northwest Territories seat of government called Regina. The police barracks are located 3½ kilometres west of the city centre.

The NWMP force was commissioned in 1873 to bring law and order to the Northwest Territory of Canada, and barracks were established in Regina in 1882. The first NWMP weather observer was S/Sgt. W.C. Asprey. A number of other officers took part in the weather observing program in ensuing years. In 1904, S/Sgt. W.A. Cunning became the official recorder of weather information, and continued in this capacity until December 1931.

The weather observing program was transferred to the Regina Flying Club in January, 1932 to better support the weather requirements of the burgeoning aviation industry. This new location was one kilometre south of the former police observing site.

Until September 1937, the main weather elements recorded were temperature and precipitation, although on occasion wind speed and direction, visibility and other weather parameters were recorded.

In October 1937, responsibility for weather observations was taken over by the Meteorological Service of Canada. At this time the observing program was expanded to include all those other weather elements necessary to constitute a full synoptic report. In May 1938, the program was further expanded to encompass a 24-hour weather watch.

Three of the four original weather observers became meteorologists during World War II and stayed with the Meteorological Service until retiring in the 1970's. They were Earling A. Anderson, Donald S. McGeary, Hugh Cameron, and A.R. Dahl.

For the last twenty-three years, the official weather observations have been conducted from the Weather Office at the present Regina Airport Terminal building. For the past ten years, the program has been administered by Environment Canada.

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members of AES Personnel, Training and Weather Services branches . . . Winnipeg replacement radar site tenders closed and construction started for completion by early Fall . . . minisonde summer programs at Saskatoon and Winnipeg established in concert with anticipated Department of National Defence Portage la Prairie startup . . . preliminary discussions with Manitoba government and Public Service Commission on initiatives for northern native employment, including proposed Berens River observing program . . . National Communications System regional computer prototype now operating with software evaluation project underway.

Snow: Precipitation in the form of white or translucent ice crystals, usually of branched six-sided or star-like form, that often interlock to form large flakes.

(cont'd from page 4)

Thanks to the early meteorological observations by the NWMP, Regina has one of the longest records of any Prairie location. It continues to supply a vital part of the data available for design and operation in many weather dependent activities, and in Saskatchewan the most prominent of these are agriculture and water management. The development of new crops and farming practices for example must be carefully attuned to the heat, light and moisture available; and farmers look for weather reports for their day-to-day operations. Similarily, design and operation of water management schemes on the dry Prairies demand a detailed knowledge of past precipitation averages and extremes; and in times of flood forecasts are a critical factor. Today the definition of climate itself has taken on a new importance as meteorologists probe climate change, and few stations on the Prairies can match Regina's usefulness in this regard.

Over the years, the meteorological program at the Airport site has greatly expanded as it has adapted to the needs of those requiring weather services. In meeting those needs, Environment Canada relies heavily on the dedication of its weather observers as did the Northwest Mounted Police one hundred years ago.

Visibility: The horizontal distance at which objects may be seen clearly. Environment Canada provides low visibility warnings when weather obscures visibility to less than one kilometre.

Weather Advisories: Bulletins issued by Environment Canada for actual or expected weather conditions which may cause general inconvenience or concern. Freezing drizzle, drifting or blowing snow, and fog are conditions that may be mentioned.

Weather Radar: Radar is used by Environment Canada's weather service to locate precipitation within a 200 km range. Radar stations are located near many local weather offices, and may also be used to detect thunderstorms and study hail formation.

Ever since the first international experiments began several years ago, the Automated Shipboard Aerological Program (ASAP) has been very much a Pacific venture. Now, for the first time ASAP is being tested on the North Atlantic. The containerized upper air system, a copy of the original, currently aboard the Japanese car carrier MV Friendship, was recently shipped via AES Downsview to Halifax, N.S. The picture (left) shows Jack Mathieson, retiring regional director, AES Pacific Region and ASAP project leader, standing on a platform behind the AES cafeteria giving a briefing to AES staff. His talk was followed by demonstration soundings and weather balloon launches. The ASAP container is now aboard the CP Ambassador and will be at the disposal of the British Meteorological Office until mid-December. The picture (right) shows many members of the longstanding "ASAP" team (both Canadian and American) when they met at the National Center for Atmospheric Research (NCAR), Boulder, Colorado. They are, left to right, Jack Mathieson; Vin Lally, Manager, Global Atmospheric Measurements Program, NCAR, Boulder; Bob Vockeroth, Director, Special project PAPA, AES, Downsview; Warren Keenan, Chief System Engineer, NOAA, Research and Development, Silver Spring, Maryland; Gordon McBean, Research Scientist, AES, Institute of Ocean Sciences, Sidney, B.C. and ASAP R&D Manager; Sig Stenlund, Engineer, Atmospheric Technology Division, NCAR, Boulder; Kirk Dawson, newly appointed Regional Director, AES, Pacific Region; Hal Cole, NCAR ASAP Project Manager, NCAR Boulder; Jack Tefft, Administrator, Global Atmospheric Measurements Program, NCAR, Boulder; Dave Phillips, Chief, Data Acquisition, AES, Pacific Region and ASAP Operations Manager.

Minister opens Pacific satellite station

On February 28, 1984, about 80 people gathered at the Pacific Weather Centre to officially open the centre's new weather satellite receiving station. This was a milestone event in the history of AES and Environment Minister Charles Caccia was there to cut the ribbon.

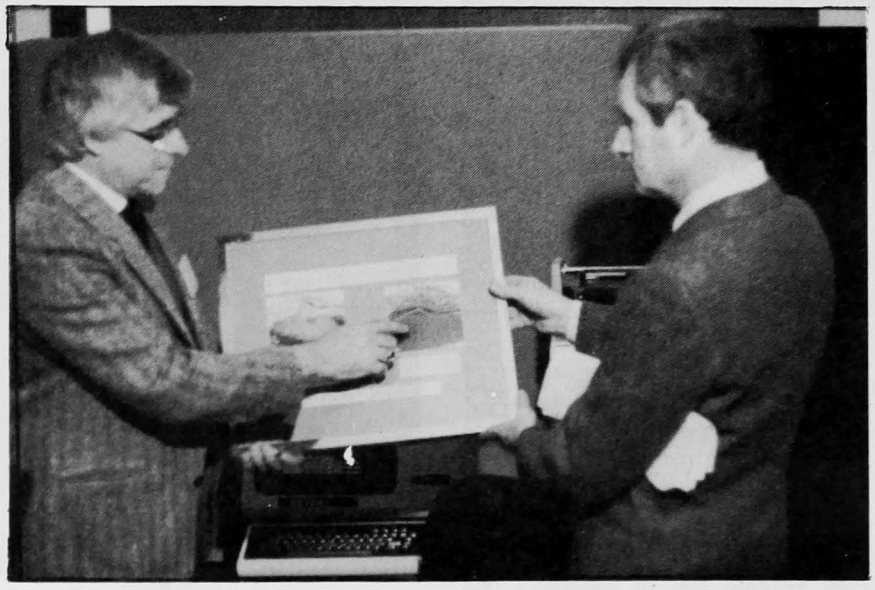
It was to be a morning affair, and plans were laid to hold the ceremony outdoors on the patio beside the antenna dish, unfortunately (with the help of satellite data) rain was forecast for the morning of the 28th. The plan was changed and the proceedings re-assigned to the auditorium on the second floor of the building inside. The hall was equipped with all the hardware and software needed to demonstrate the new technology and a room nearby was set up as a reception area.

And sure enough, it rained! The Minister arrived with his wife at 9:30 am and they were met by Jack Mathieson, Director, AES Pacific Region, who briefed them about the program. The set piece of the ceremony was in fact a speech by the Minister, after which he would cut the ribbon and press a button to activate the visual screens.

Among the people present were representatives of the U.S. National Weather Service, of the Fishermen and Allied Workers Association, and members of the media. AES personnel present included Gary Wells, head of the Pacific Weather Centre, and a number of others despite the fact that this was the busiest time of the forecasting day.

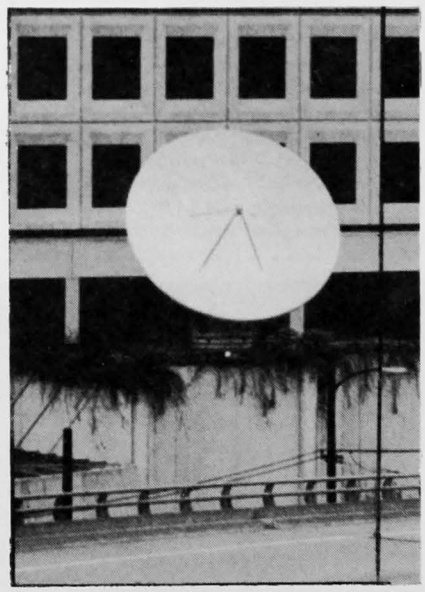
The Minister began by expressing his pleasure in opening "a unique scientific facility which demonstrates Canadian leadership in an area of high technology." The new facility receives signals from the geostationary weather satellite (GOES-West) located above the equator at 135 degrees west longitude, which covers the Pacific Ocean and western North America. The signals from the other satellite, GOES-East, are received at a station in Toronto.

Continuing his speech, the Minister pointed out that Environment Canada had pledged that an effective, progressive weather forecasting service would be developed for British Columbia and that



Gary Wells, head of the Pacific Weather Centre, points out aspects of the display panel presented to Environment Minister Charles Caccia.

the objective had been met by the installation of "four separate but related weather observing systems." These were drifting buoys armed with sensing instruments in the North Pacific; automatic weather stations at remote sites on the west coast; the Automated Shipboard Aerological Program (ASAP) "which was developed with our colleagues in the United States and is now attracting attention and support of many countries around the world;" and finally, "this new satellite readout station."



For two years the white satellite tracking dish has been a familiar sight to motorists passing the Airport Square building in south Vancouver. Besides housing the newly opened satellite receiving centre, the tall rectangular edifice also contains the Pacific Weather Centre.

The Minister ended his speech by saying that "the Vancouver system is in the forefront of satellite display equipment. It will let our staff see the weather as it happens. This will greatly enhance the weather services' capability to deliver up to date and more accurate weather forecasts which will benefit people throughout this region." He also mentioned that the new facility had been built by MacDonald Detwiler and Associates, a Canadian company with headquarters in Richmond B.C.

Gary Wells now presented the Minister with a plaque to commemorate the occasion. The plaque was rectangular, framed and glassed, and divided into left and right panels. The left panel contained a black and white satellite picture representing the "old" technology and the right panel representing all the new technology contained a color-enhanced satellite picture overlaid with two meteorological fields received daily from the Canadian Meteorological Centre in Montreal.

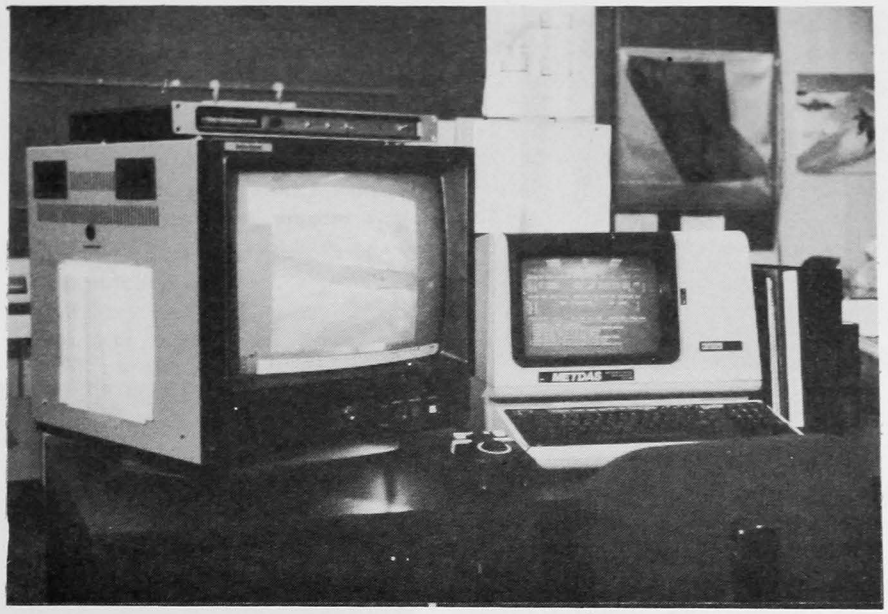
After accepting the plaque, the Minister cut the ribbon and declared the satellite station officially open. When the moment came to press the starting button, Mr. Caccia joked as if about to launch a ship with a champagne bottle, "I hope this thing works." But there was no problem! The Minister pressed the button and pictures popped up on visual screens.

The guests milled around the displays and there were rapid questions and explanations. Somebody wanted to know what was so unique about this new facility. The answer was: Most North American weather centres receive satellite data as a fixed product processed and distributed by autonomous satellite receiving stations. But in Vancouver it is different. Signals from the satellite 36 000 km above the earth are received directly by the weather centre. The facility's weather forecasters can see the weather happening right before their eyes and can with various software programs and hand-operated controls extract from the visuals whatever information they are seeking.

The Minister spent some time with the crowd quizzing AES personnel about the scope and significance of the system. Perhaps its outstanding feature was its adaptability. Knobs were twisted, color patterns changed like a kaleidoscope, cloud formations came to life and their movements accelerated forwards or backwards until they swirled like "weather fingerprints" high above the vast North Pacific. Some of the laymen present tried to grasp the meaning of it all. A few imagined "tunes" being played on a meteorological electronic "moog".

The demonstration was of particular interest to members of the fishing industry. The high seas of the Pacific, beyond the range of weather radar and other land-based weather sensing devices, are as Jack Mathieson rightly put it, "data sparse". The AES regional director explained that observing the atmosphere from space, upstream from North America, is certainly going to increase the observational data. "We have attempted to develop the Pacific Weather Centre as a centre of excellence in satellite meteorology," he added.

The Pacific Weather Centre's new satellite facility is rich with development opportunities. Gary Wells and John Spagnol of the Pacific Weather Centre and Pat King of the Aerospace Meteorology Division at Downsview have published a paper entitled "Satellite Applications to Nowcasting and Very Short Range Forecasting in Canada" which outlines immediate and future developments of the system.

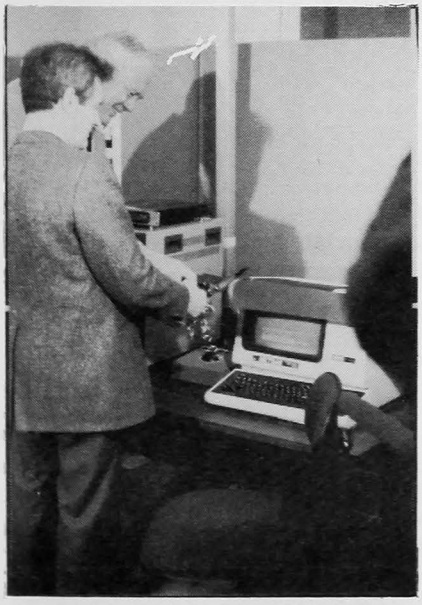


Some of the digital data display screens shown during opening of the Pacific satellite data receiving centre.

Concluding the ceremonies, the Minister went on a tour of the building. It was a busy time of day for AES personnel, but the Minister managed to stop and talk to many of them on his rounds.

It seems that the official opening of the facility was a milestone event in the history of AES and left behind a spirit of encouragement and exciting technological prospects for the future.

by Jack Gubbins



Environment Minister Charles Caccia and retiring AES regional director Jack Mathieson take part in a joint ribbon cutting ceremony at the official opening of the GOES satellite system in Vancouver.

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pH: The pH scale, whose values run from 0 to 14, expresses alkalinity or acidity. From pH 7 down to pH 0 indicates acidity, with pH 5 ten times as acid as pH 6, pH 4 ten times as acid as pH 5 and so on. Naturality is pH 7 and values above 7 indicate alkalinity.

Probability of Precipitation (POP): A term used in Environment Canada weather forecasts that gives the numeric chance of rain, snow or other precipitation in increments on 10 percent, from zero (no precipitation expected) to 100 (precipitation a certainty).

Relative Humidity: The ratio of the amount of water vapour actually in the air compared to the amount of water vapor the air can hold at that particular temperature and humidity. At 100% relative humidity, the air is completely saturated with moisture.

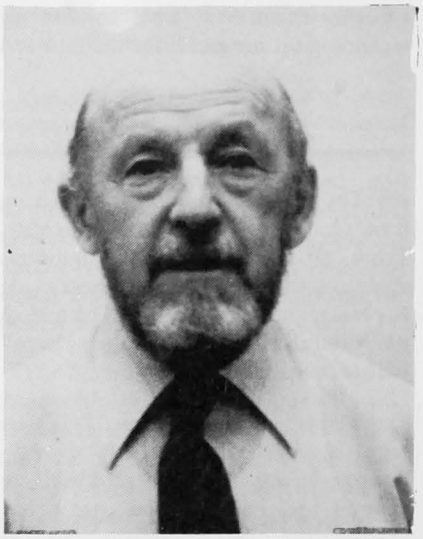
FUTURE FORUM

The opening by Environment Minister Charles Caccia of AES's new weather satellite facility at the Pacific Weather Centre prompted us to ask this future-oriented question of a cross section of *involved* AES employees:

"A new GOES Satellite System has recently been installed in the Pacific Weather Centre. What impact do you think satellite imagery has on weather analysis and forecasting and will have in the future?"

John Paschold

Before the advent of satellite imagery, when ship reports were sparse or non-existent, Pacific frontal systems would often move in on the coast, with very little advance indication. That has changed. No longer are forecasters caught "off-guard". Certainly, assessing intensities of systems, and timing them, still causes problems, but these I expect will become fewer as forecasters and analysts become more adept at satellite interpretation. From a purely presentation point of view we find satellite pictures a great asset in briefing trans-Pacific flights for answering public enquiries as to future weather (particularly in agriculture) and, quite frankly, to check on the credibility of forecasts.



John Paschold
OIC Vancouver Weather Office

Heather Auld

It is difficult to imagine forecasting without the use of satellite information. For Pacific Region, satellite imagery is indespensible and may represent the only source of reliable data on incoming systems from the Pacific Ocean. Using the various images received by our satellite system, the forecaster can both prepare short-term forecasts and "space truth" the analysis and subsequent performance of the numerical models.

In the future, it is hoped that satellite information can be fed directly into the numerical models. Satellite sensing will probably become more theoretically oriented. Satellite information may be merged with other mesoscale data networks in an attempt to develop atmospheric models that describe smaller scales of motion.

Heather Auld
Meteorologist

Gary Wells

Gary Wells
OIC Pacific Weather Centre

The geostationary satellite has been referred to internationally as the "weather warning" satellite. The importance of the new facility lies not only in the quality and frequency of the data, but also in the fact that this data is provided immediately to the operational forecaster. We can now look at the weather in various forms, as it happens, and in areas where previously there was no data.

For example, short-term forecasts and warnings are becoming more specific and timely with these improvements having impacts on *all* economic and safety sectors, from forest fire control to aviation safety. The wealth of new data will have input to and provide assessment of the initial analyses of Numerical Weather Prediction.

The future seems limitless. Already such developments as forecasting severe thunderstorms and lightning and producing forecast satellite images 24 hours into the future are nearing completion.

Claire Lauzé

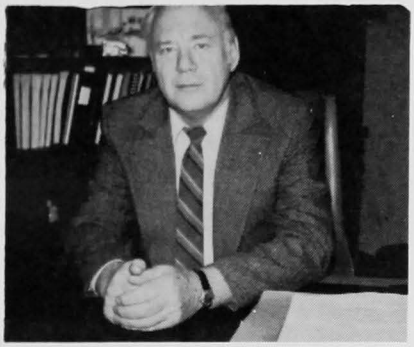
Satellite imagery is essential in the Pacific Region due to a lack of weather observations over the Pacific. The new Satellite System at the Weather Centre greatly facilitates the analysis of data provided by the GOES Satellite and will complement information already available to improve short and long term forecasts.

Satellite pictures allow forecasters to position weather systems more accurately, which results in better short term forecasts. In the near future, long term forecasts are expected to improve as well. Due to more powerful computers, the quality of the numerical guidance will increase.

Claire Lauzé
Meteorologist

Satellite imagery will contribute not only to forecasting but also to adjacent areas such as training and briefing. If continuous effort is made to educate the media, satellite imagery will also lead to better use and understanding of the forecasts by the general public.

Jack Mathieson



Jack Mathieson
Regional Director

I have spent over 40 years with Canada's Weather Service and my judgement is that during that period, the most significant advances in meteorology have been the development of Numerical Weather Prediction models and the capability for remote sensing of the atmosphere. Satellite imagery is an advanced form of remote sensing and is a very important observing technique, particularly over data sparse areas such as the world's oceans. Exciting opportunities lie ahead as we learn to make optimum use of satellite data by enhancing, animating, correlating satellite imagery with other fields and bogussing satellite data into NWP models.

John Spagnol

John Spagnol
Satellite development meteorologist

Meteorology has long been a science but before satellites, weather forecasting was its dismal offshoot. The meteorologist's scientific and technical knowledge could not replace the "gut feeling" of the mariner, pilot or weather forecaster.

The satellites with their unique view changed all that. The weather forecaster could actually see!

With the satellite facility, we now have the tools to comprehensively study the earth's atmosphere — the real thing — as it unfolds. The entire earth and its atmosphere is "in the laboratory". Operational weather forecasting has now reached the modern age. Visions of the future are bounded only by the imagination of meteorological science fiction writers. In the end, we may find the weather is forecastable after all.

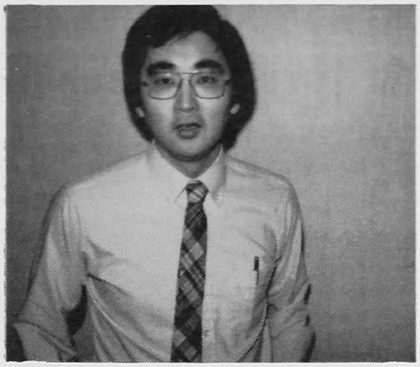
Dave Phillips

Dave Phillips
Regional Chief, Data Acquisition

It is difficult to assess the immediate and long term impact of the new GOES Satellite System on weather analysis and forecasts. There can be no doubt that forecasters and presentation technicians have gained an exceptional tool which helps them better understand atmospheric processes over the North Pacific, a vast data sparse area. The impact will be a better understanding of what is going on over the Pacific, undoubtedly translating into better analyses and forecasts. Most important, it will mean better weather services.

Mert Horita

Looking at meteorological satellite images, the immediate impact is the sense of the overwhelming complexity of the weather. The perception from satellite images can be likened to groping in a darkened room and suddenly a light is turned on. The room is somewhat as we imagined but the intricacies of shapes,



Mert Horita
Senior development meteorologist

colors and detail are very different. Add the complexity of movement and one can realize the impact of satellite images on meteorologists.

The impacts of satellite images to weather analysis and forecasting are numerous. Putting these tools into the hands of the "on-line" duty forecaster will provide more accurate and useful forecasts and warnings.

High (Anticyclone): A region of the atmospheric that has relatively high *atmospheric pressure.* The highest pressure is at the centre of this feature. Winds blow around a high pressure area in a clockwise direction. High pressure areas are larger than lows, often hundreds of kilometres across. Highs are associated with fair weather. (See *Low).*

Humidex: A combination of air temperature and humidity which provides a comfort index. Humidity is combined with temperatures since the higher the humidity at a given temperature, the warmer one feels. A humidex of 20 — 29°C is considered confortable, while figures over 40 are very unpleasant.

Ice Pellets: Very small transparent or translucent pellets of ice. They are spherical or irregular and usually bounce when hitting hard ground, making a sound on impact. They may be frozen rain drops, or pellets of snow encased in a thin layer of ice. These are usually formed by snow falling through a warm layer of air.

A day in the life of a . . .

Severe weather meteorologist

This bank of radar screens at the Ontario Weather Centre forms the basis of most successful severe weather forecasting.

It was a day of severe thunderstorms, hail, funnel clouds and tornadoes . . . a day the severe weather meteorologist would not soon forget.

That particular day (May 2, 1983) was chosen because it shows this severe weather expert at his busiest and allows us to zero in on the myriad meteorological and technical details he sometimes has to deal with in a single weather day.

The events took place in Ontario and centre round an anonymous severe weather meteorologist (SWM) a young, married, specially-trained meteorologist with lots of enthusiasm for the job and no mean gift as a weather raconteur.

The story also involves the SWM's colleagues, a small group of meteorologists and technicians with great esprit de corps who occupy a corner of the weather centre where the walls are plastered with charts, tephigrams, big and small weather maps and radar displays.

Normally the SWM begins his day at 9:00 am by reviewing what happened in yesterday's weather. A variety of information has piled up: from satellite imagery, weather maps to teletype print-outs. He studies all the available data, including historical and prognostic charts, and predicts the likelihood of air mass instability in the Ontario Weather Centre's area of responsibility. At 10:00 am new data arrives from the upper air stations setting the stage for the SWM to firmly project the kind of weather his region may expect that day.

On arrival at the weather centre on this particular day conditions for spectacularly stormy weather were already evident. Two dozen tornadoes associated with a cold front had already been reported in the Mississippi Valley. For now, Southern Ontario was in bright sunshine. The SWM's analysis indicated that a squall line would develop ahead of the approaching cold front and there was the threat of a squall line moving right across the province.

Although professionals, meteorologists take great personal interest in unusual weather phenomena. At 10:30 am Detroit radar showed a rapidly developing line of thunderstorms with tops almost 10 km high. The centre began to buzz with informed opinions. At 11:00 am Exeter radar picked up the squall line and at noon the Windsor weather office phoned in a report of hail and funnel clouds west of Detroit. Momentarily centre staff left their desks to dash in and observe the Exeter screen.

"I'll bet this storm knocks out the Exeter radar," the SWM exclaimed. Heads turned. If the severe weather person spoke this way, the storm would obviously produce considerable damage.

A SWM juggles very complicated data. The data are spread out over a large land area, but also includes a large portion of the tephigram. In so vast a volume of atmosphere, all sorts of meteorological events occur, some predictable, some ambiguous, and some unexpected. The worse the weather, the greater the complications. From all his data, the SWM must predict where and when storms will strike and issue severe weather watches and warnings to the public in advance of the storm.

On this day, the SWM issued his first weather watch at 11:30 am. It took in a broad area including Lake Huron, Lake St. Clair and Lake Erie. It added a proviso that the watch might be extended to include the whole of southern Ontario. This proved accurate. Moving fairly uniformly at 50 km an hour, the squall line moved violently across the province right to the Ottawa valley.

The SWM does not rely on technology for all his weather information. AES has recruited a large network of volunteer weather watchers. At 2:15 pm, the weather centre received its first weather watcher report — a tornado at Walpole Island. Reports of other tornadoes soon followed, as well as reports of hail and 100 km per hour winds.

At 12:55 pm the squall line appeared on the Woodbridge radar screen. AES personnel dropped in to watch the show. This was too much for the SWM. Herding them all out again, he grumbled, "We need a little elbow room around here."

At 2:30 pm the Exeter radar *was* knocked out of service. The SWM issued severe weather watches for all counties in the path of the oncoming storm. London Weather Office reported hail, and there were reports of hail and heavy winds west and north of Toronto. Kitchener reported a funnel cloud and another funnel cloud was reported over Lake Ontario just off Scarborough. The SWM had already issued tornado warnings for the Niagara-Toronto area — and for the Peterborough area.

(cont'd on page 11)

(cont'd from page 10)

The storm moved relentlessly eastward. At 4:05 pm, it reached Kingston and Renfrew, then left the region. The SWM remained at his post. (He will be home late for supper that evening). Around 6:00 pm a second squall line with hail developed north of Toronto. This line moved rapidly into eastern Ontario and disappeared when surface temperatures declined after sunset.

As daylight began to fade, the SWM reviewed his day. There had been three strong tornadoes with great damage, three tornado touchdowns with no reported damage, and numerous violent storms. Total damage was later estimated at over $30 000 000.

The SWM was quite pleased with his performance. Most of the areas hit by storms had received his weather watches one to three hours in advance and his weather warnings half an hour or so before damage occurred. Information phoned in from the Windsor weather office had been very timely in prompting the SWM to issue his first weather watch and a phoned-in report of funnel clouds near Windsor was a key factor in getting the SWM to mention the risk of tornadoes. This happened only half an hour ahead of the devastating Walpole Island and Reece's Corners tornadoes.

The May 2, 1983 outbreak of severe weather was the most widespread in Southern Ontario since the Sarnia tornado in May, 1953. It was a day the SWM would not soon forget.

Picture shows the mature funnel of a tornado that narrowly missed Regina, Sask. some years ago.

Low (Depression): A region of the atmosphere that has relatively low *atmospheric pressure*. The lowest pressure is at the centre of this feature. Winds flow around a low pressure area in a counter-clockwise direction. Lows are usually associated with stormy weather.

Severe storms in Saskatchewan

A number of funnel clouds and tornadoes were reported in southeastern Saskatchewan during the afternoon of May 12, 1984. The majority of sightings were near the Trans-Canada Highway. The tornadoes were associated with a single thunderstorm cell that tracked slowly southeastward through the area for more than two hours.

Damage was not extensive, although there were reports of damage to a few farms, one quite severe. The town of Whitewood received damage to several buildings and its water treatment plant.

First reports of severe weather were received at about 1600 CST. Several other confirming reports were received from volunteer watchers and the public in the ensuing two hours. Prairie Weather Centre responded with a severe weather warning at 1630 CST.

Meteorologically this occurrence was a rare "cool air mass" event, associated with a single isolated thunderstorm. Prior stability and dynamic assessment did not provide evidence that thunderstorms were likely to occur, let alone a severe development. As such, it was nearly impossible to predict such a mesoscale storm event in advance with current systems.

Busiest Ontario storm season

1983 was the most active severe storm season in recent years producing over one hundred damaging storms in Ontario including 34 tornadoes. Total damage could well exceed $75 million.

A cool spring across Ontario resulted in an unusually late start to the severe weather season. Then, as if to make up for lost time, came May 2 when severe thunderstorms and tornadoes cut a 150 km wide swath from Lake St. Clair northeasterwards to the Ottawa River Valley resulting in tens of millions of dollars damage. However, the rest of May and the first half of June were very quiet again.

Then for 12 weeks, from mid-June until mid-September, Ontario was hot and severe weather was frequent. Several items are worthy of note. The first week of July saw damaging tornadoes at Orillia and Haliburton. During the period from July 17 to July 23 almost daily occurrences of tornadoes, wind damage and hail were reported in Southwestern Ontario. An early morning outbreak on August 1 caused widespread damage. August 8 brought some of the largest hailstones ever recorded in Ontario. Damage to crops and property was reported all over Southern Ontario.

1983 was the busiest summer since the beginning of the Weather Watch/ Warning Program in Ontario in 1978. The Ontario Weather Centre issued a total of 236 severe weather messages to the public between 7 March and 13 October 1983. 108 calls were received from Weather Watchers during the 1983 season as compared to only 56 the year before. The two most active days of the summer, May 2 and August 8, together produced 37 calls. During a very active summer, about 75% of all severe storms were preceded by a severe weather message from the Weather Centre and on average these messages were issued 2½ hours before the occurrence of these storms. Considering the nature of thunderstorms this is a highly satisfactory record. With the on-going support of all watchers the Ontario Weather Centre will continue to provide timely warning of these dangerous storms during 1984.

Excerpts from an AES Ontario Region letter to 2 000 volunteer weather watchers in the Province.

Marine Warning: Marine warnings, prepared by Environment Canada, are broadcast on Weatheradio, Coast Guard marine radio and some commercial radio stations when actual or expected weather conditions may endanger lives and property. Warnings are issued specifically for hurricanes, storm and gale force winds and for freezing spray.

Zephyr Breezes (West) * * *

André Lachapelle, supervisor at the Alberta Weather Centre won't necessarily get a grandstand seat at the Los Angeles Olympic Games, not even for his favourite sports of swimming and equestrian jumping. But he'll be doing something equally exciting. He is one of only four non-U.S. meteorologists to be posted to the L.A. weather office for special duties during the games.

The non-U.S. contingent is made up of two Canadian and two French meteorologists. The other Canadian is Monique Loiselle, Scientific Services, AES Ontario region. Main reason for choosing these four is their bilingualism. French and English are the two official languages of the Olympics.

André, a native of Montreal who has worked nearly a dozen years in the west, is leaving early for special on-the-spot training. He will be briefed on such local weather conditions as smog, liable to cause breathing difficulties for athletes or heat waves to which this area is prone in August. Like all the other meteorologists, André will obtain meteorological data from automated instruments relayed by satellite every 20 minutes and among other things will prepare bulletins for local users via low powered AM radio.

André is happy to return to California and work with U.S. meteorologists. (He has been there before as a tourist). This is because he has been designated head of weather services for the 1988 Winter Olympics in Calgary and feels that his L.A. contacts and experience will be invaluable for the Canadian-based event. "I am thrilled to be chosen to represent AES at the 1984 games. It's a once in a lifetime opportunity," he adds.

★ ★ ★ ★

Bob Barrett who supervises weather radar operations in AES Central Region and knows that many farmers depend heavily on radar-produced forecasts for their knowledge of sudden severe weather occurrences, goes "back to the soil" every October during his three-week vacation.

For the past seven or eight years he has headed for a large sugar beet farm near his native Portage la Prairie and drives a truck or operates harvesting equipment for up to 18 hours a day.

Bob hopes that he will be able to do this job during cool, sunny Prairie weather. He cautions that beet harvesting is weather dependent and must be suspended the moment precipitation threatens. Even while at work, he is constantly aware of AES. The farm manager's tractor, equipped with a Weatheradio Canada receiver, relays a continuous stream of farm and general weather forecasts from the Prairie Weather Centre in Winnipeg.

Why does Bob do this exacting work? He says he takes the "beet retreat" because it is a complete change of pace. "Besides, I like getting my feet muddy," he adds.

★ ★ ★ ★

"Some guy from New York was passing through southern Alberta and saw me doing the weather," well-known Edmonton TV "weatherman" Bill Matheson recently told the Canadian Press wire service.

Apparently, the "discovery" was made a decade or so ago while Matheson was working as an AES presentation technician in Lethbridge, Alta.

Soon Matheson was in the Big Apple working as a TV weatherman for the ABC network station WABC.

He returned to Canada in 1976 and is now known as Edmonton's "most ebullient weatherman."

According to the Canadian Press write-up, he is a "tremendous performer" who uses colorful, sometimes dramatic language, to tell the weather story on station CITV: low pressure systems come "battering in" from the Pacific. Cloud formations "skedaddle" off the map and "that dread of all meteorological phenomena, the Siberian high is — dum de dum dum — moving in." He also uses terms like "Idaho high" and "mother low" even though such expressions aren't in the meteorological manual.

Presentation technicians wherever you may be, be prepared for that visit by the talent scout from New York!

We received a note about the Grande Prairie, Alberta Information Fair a while ago in which AES participated. A demonstration of a taped weather information line was the main feature at the AES booth and this was of particular interest to local farmers, the Highway Patrol and the Alberta Motor Association.

The AES booth at Grande Prairie Information Fair.

The most unusual discovery for us was the fact that Grande Prairie has a very active hot air balloon association. We contacted OIC Brian Motus after we read that a member of the association had stopped by at the booth to ask if the weather office could address them on weather services available to balloonists.

Motus said there are more than a dozen serious hot air balloonists in the city and Grande Prairie has several times been the centre for regional and national balloon rallies. Moreover the city was to be the site of national championships June 30 — July 3, 1984. Taking part would be balloonists from all over Canada, from the United States and from the United Kingdom.

According to Motus, AES was planning to keep in touch with the balloonists and supply them with specialized weather information.

★ ★ ★ ★

Spencer Silver, base meteorological instructor at the Canadian Forces Base, Portage la Prairie, Manitoba has some remarkable talents including the ability to teach himself French for his current job in a matter of months and a scholarly bent as an amateur historian.

Zephyr Breezes (West) * * *

One of Mr. Silver's priorities is the remarkable weather story of the huge D-Day landings by allied forces, including the 3rd Canadian Division in Normandy, France just 40 years ago. Our historian's researches show that the Supreme Commander, General Eisenhower, placed his confidence for the all-important D-Day weather forecast in a certain Group Captain Snagg of the Royal Air Force. Despite much evidence to the contrary, Snagg predicted a week in advance that a long spell of bad weather would clear and that the cross-channel invasion could take place June 5. Eisenhower took Snagg's advice and placed the troops aboard the invasion barges. The weather took a few hours longer than expected to improve and as is well-known the gigantic "Operation Overlord" was launched on June 6, 1944.

In addition to quoting several major books on the subject, Mr. Silver points out that his own father took part in the Normandy campaign.

★ ★ ★ ★

Al Janzen, OIC at Kindersley, Sask. has been honored by the community by receiving a "Sound Citizen Award" from local radio station CKKR.

Born in Hudson Bay Station, Sask. Al has been running the Kindersley weather office for the past three years. He says that the town of 5 000 inhabitants is a very "go-ahead" place. For example, the municipality managed to secure the International Youth Baseball Tournament scheduled for July 18 — 29 this year. Since players would be arriving from all parts of the continent as well as from overseas, the town also managed to secure permission from the Department of Transport to upgrade the municipal airport and extend the runway by some 1 500 metres. The town council next approached Environment Canada and requested that the downtown weather office be moved to new premises at the airport. AES agreed and the new office should be functioning in time for the baseball tournament.

Al praises the community mindedness of towns like Kindersley and neighboring Rosetown and says it is typical of their esprit de corps to honor townspeople through programs like the Sound Citizen Award.

Al has also received a certificate of congratulations signed by Bill McKnight, M.P. for Kindersley-Lloydminster.

★ ★ ★ ★

Editing these western Breezes certainly brings new insights. Apparently, there's a list of names for Pacific as well as Caribbean-North Atlantic hurricanes/tropical cyclones. In both cases, the system is identical. For each year there is a roster of 21 names, alternating male-female. For example, the first three east coast hurricane names for 1984 are: Arthur, Bertha and Caesar and the corresponding west coast hurricane/cyclone names are Alma, Boris and Christina. According to Gary Wells, chief Pacific Weather Centre, tropical cyclones rarely hit the B.C. coast. AES keeps an eye on them, however, as they approach Hawaii, picking them up on satellite pictures. By the time storms reach B.C. they are little more than low pressure centres.

We're told that the list of names get used up faster in the Pacific than in the Atlantic, because hurricanes are a commoner occurrence in the West than in the East. Some years there are only five or six Atlantic hurricanes whereas the number of Pacific storms could more than double that figure. By the way, hurricanes on the Asian side of the Pacific are called typhoons.

★ ★ ★ ★

It's curious the way people taking weather courses tend to write poems of praise about them. A scout in the Pacific Weather Centre recently came across the following written by student Josie Holmsborg and dedicated to instructor Tom Perry, both of Norvan (Vancouver) Power Squadron:

Living on the West Coast, instead of on the plain
I decided to take the weather course to know if it would rain.

We learned so many new words and just to name a few
There was radiation, insolation and a point called "dew".

There was convection, reflection, advection and lapse rate,
Sublimation, precipitation and air that saturates.

Cold fronts, warm fronts, kilopascals, millibars,
Barometer, psychrometer, isotherms and isobars.

Hawaiian highs, Aleutian lows, monsoons and troposphere,
Horse latitudes, the doldrums, stratosphere and atmosphere.

Cirrus clouds, cumulus clouds and strato cumulus,
It's really very easy, so what is all the fuss?

There's adiabatic cooling and sub polar lows,
Inversion, conversion and heaven only knows.

Learning terminology has driven me insane,
'Cause all I wanted to know, Tom, IS IT GOING TO RAIN?'

Making ourselves useful

by Ian Lougheed

We are living in a time of rapid technological change which concerns all of us at AES. Many of our technical skills are being overrun by "creeping automation". Tasks formerly requiring a technician are now being done automatically. This trend is bound to continue. It is already affecting upper air stations in particular. During the last few years, upper air stations have seen a 50% cut in personnel. During the next ten years, we upper air technicians may be replaced by such items as containerized mini-sondes and helium-filled balloons. The fate of the dinosaurs seems to loom ahead of us. How can we avoid this dilemma?

The answer is clear. We must make ourselves useful to AES in other ways. Since the introduction of the Aerological Data Reduction System (ADRES) in 1982, staff at upper air stations across

(cont'd on page 14)

(cont'd from page 13)

Canada have been performing associated duties such as geomagnetism, seismology and surface weather observations to fill a surplus of about 60 hours a month over and above strictly upper air duties. A priority for upper air technicians has been to cog this surplus time into other parts of the AES machinery. Most efficiently, until very recently, at the WS2 in Fort Nelson, we upper air technicians filled in at the nearby WO4 primarily as surface observers. As we will see, we can do other things with these 60 hours.

We thought why not go further? If we are performing well in one area why not involve ourselves in the briefing process too? Some of us have already been trained in this task. Paired initially with more experienced technicians, as our standard of presentation improves, we would pull regularly scheduled shifts of our own. This way our training would not be wasted and our careers enhanced.

My suggestion implies that AES management affords us the opportunity to develop and apply our abilities. This is, in fact, what is happening at Fort Nelson. To give a personal example, I have just completed training with the inspection branch designed to familiarize me with servicing the requirements of climate stations.

It is projected that I will be able to assist with servicing the vast northeast quadrant of B.C. without diminishing upper air resources, necessitating overtime or importing temporary technicians. The people I report to in Pacific Region Data Acquisition Division, will be responsible for overall coordination and evaluation of this project.

Given sufficient notice to priorize programs, Upper Air can give weather or climate services 60 hours a month of straight time help at *no extra cost.*

There are problems to be worked out, of course. Upper air technicians not trained to presentation standards must do a disproportionate number of morning flights beginning at 2:30 am to take up the slack of absent associates. If this discourages some it will motivate others. There will also be some confusion to overcome in terms of standard shift schedules.

It is to the advantage of both AES and upper air technicians to iron-out these difficulties and to cooperate with a view to making upper air technicians as useful as possible.

It is everyone's interest to make himself useful to the taxpayers of Canada. Management has indicated that every possible training opportunity will be given upper air people to develop needed skills and to apply them as required to the identified needs of the department. Change and flexibility, together with confidence in management, will go far to ensuring that we continue to provide a responsible and useful function.

Mr. Lougheed is an upper air technician at Fort Nelson, B.C.

Environment Canada to build new aircraft hangars

Environment Canada's ice surveillance services in the far north will be improved with the construction of two aircraft hangars which will permit overnight parking of specialized aircraft in the Arctic, Environment Minister Charles Caccia, and Minister of National Defence Jean-Jacques Blais have announced.

"Our expanded ice program will provide improved service to shipping and oil drilling platforms. This will not only help to ensure safer and more efficient off-shore operations, but also to protect the fragile Arctic environment from damaging spills," said Mr. Caccia.

The Department of National Defence will also be using the hangars to service its aircraft, and will be contributing approximately $1.5 million towards the total cost of $5 million required to construct the facilities.

Arctic ice surveillance is carried out by aircraft which report on the condition of floating sea ice. Environment Canada's Atmospheric Environment Service uses these data to produce forecasts of changes in ice conditions and movement.

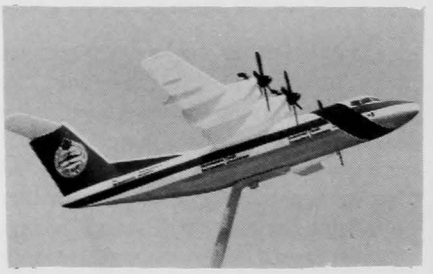
The new hangars will provide sufficient Canadian facilities to enable ice-surveying aircraft to operate year-round. At present, Environment Canada is barely able to offer full ice forecasting services from mid-June to November.

This program is part of a major expansion of ice services in the Arctic, which will bring better service to the far north and also provide much-needed employment.

The hangars will be built in the Northwest Territories, at Resolute Bay and Inuvik. At present, Frobisher Bay has the only hangar in the Canadian Arctic capable of servicing the ice-reconnaissance aircraft. The new hangars will provide facilities for Environment Canada's two based Lockheed Electra aircraft and the new de Havilland Dash-7.

Construction of the hangars will start this year and be completed by the fall of 1985. Materials to build the Resolute hangar will be shipped from Montreal this summer, while those for the Inuvik hangar will be tucked north on the Dempster highway.

The hangars will be constructed by Stuart Olson Industrial Contractors Ltd. of Edmonton, which also built the Wardair Hangar at the Lester B. Pearson International Airport in Toronto. The operation of the hangars will be contracted out to a commercial service and they will be available to general aviation when not in use by the funding Departments.



Chinook (Santa Ana, Foehn Winds): The relatively warm, dry, gusty winds that occasionally blow over the lee of mountain ranges exposed to a strong prevailing cross wind. Moist air is forced up the mountains and brings cloud and precipitation to the *windward* side. The air, once saturated, will gain heat through *condensation* as it continues to rise. As the warm air passes over the summit further warming occurs as it is forced down the *leeward* side of the mountains. A chinook can cause a temperature rise of as much as 20°C in a few minutes.

STAFF CHANGES

Promotions/ Appointments

W.L. Godson (EX-3) Senior Science Advisor to AES, SSAA, Downsview, Ont.
I.D. Rutherford (EX-3) Director General, ARDG, Downsview, Ont.
H.L. Ferguson (EX-3) Director General, CCDG, Downsview, Ont.
D.K. Dawson (EX-2) Director General, PAED, Vancouver, B.C.
M.L. Phillips (SM) Chief, ARQM, Downsview, Ont.
C. Laprise (EG-6) Pres. Tech., WO4, Ottawa, Ont.
R. Morrow (EG-6) Pres. Tech., WO4, Sault Ste. Marie, Ont.
L. Weir (EG-6) Pres. Tech., WO4, Pearson Int'l. Airport, Toronto, Ont.
A. Radecki (EG-5) Pres. Tech., WO4, Sudbury, Ont.
D. Long (EG-5) Pres. Tech., WO4, Sault Ste. Marie, Ont.
A. Li (CS-2) Programmer Analyst, ARMA, Downsview, Ont.
M. Dubé (EG-3) U/A Tech., WS1, Maniwaki, P.Q.
A. Cotnoir (MT-4) Senior Instructor, TCTI, Cornwall, Ont.
M. Sarcevich (EG-5) Pres. Tech., WO4, Sudbury, Ont.
D. Young (EG-3) Climate Quality Control Tech., SSD, Pearson Int'l. Airport, Ont.
D. Thibodeau (EG-2) Met. Tech., WS3, Cape Dyer, N.W.T.
J. Groves (CR-4) Clerk, PAEAF, Vancouver, B.C.
S. Kowalczyk (EL-6) Standards Officer Electronics, ACSM, Downsview, Ont.
G. Wakelin (EL-7) Head, Maintenance Standards, ACSM, Downsview, Ont.
T. Drozdz (EG-6) Field Installation Tech., ACSM, Downsview, Ont.
V. Jelinek (EG-7) Standards Officer Basic Systems, ACSM, Downsview, Ont.
L.R. MacNeil (SCY-3) Secretary, CCRD, Downsview, Ont.
R. McCumsey (EG-6) OIC, WO4, Fort St. John, B.C.
M.A. Krawchuk (CS-2) Analyst/ Programmer Computer System, ACSL, Downsview, Ont.
D. Kuiper (EG-6) OIC, WS3, Fort Reliance, N.W.T.
B. McNaughton (EG-2) Met. Tech., WS3, Cape Parry, N.W.T.
G. Vermette (EG-5) Pres. Tech., WO4, Edmonton Municipal Airport, Alta.
L. Moore (Scy-2) Secretary, WAED, Edmonton, Alta.
E. Semchuk (CM-5) Communicator, WC1, Edmonton, Alta.
P. Kociuba (MT-7) Meteorologist, WAED, Edmonton, Alta.
M. Morneau (EG-6) Met. Tech., QAEOI, St. Laurent, P.Q.
J. Michaud (CM-6) Communicator, QAEM, St. Laurent, P.Q.
T.L. O'Connor (OCE-3) Word Processor, ACTS, Downsview, Ont.
J. Beal (EG-1) Met. Tech., WS3, Fort Reliance, N.W.T.
M. Geryland (MT-2) Meteorologist, ARWC, Edmonton, Alta.
M. Lambert (EG-2) Met. Tech., WS3, Slave Lake, Alta.
J. MacPhee (EG-5) Pres. Tech., WO4, Calgary, Alta.
S. Morgan (EG-2) Met. Tech., ARWC, Edmonton, Alta.

Temporary or Acting Positions

R.J. Vet (PC-2) Physical scientist, ARQM, Downsview, Ont.
J. Jenkins (DA-PRO-5) Comp. Controller, ACPO, Downsview, Ont.
C.L. Blackwood (EG-6) Inspector, WO4, St. John's, Nfld.
P.J. Pender (SM) A/Director, ARQD, Downsview, Ont.
K.M. Currie (AS-1) Admin. Officer, AFSA, Downsview, Ont.
C.B. Adamson (SM) Chief, Program Planning Dev., APEC, Downsview, Ont.
D.D. Watson (EG-8) Superintendent Inspection Services, PAEOI, Vancouver, B.C.
P. Greenwood (EG-6) Surface Inspector, PAEOI, Vancouver, B.C.
M. Harrison (CR-3) Clerk, WC1, Edmonton, Alta.
K. Dumaresq (CR-3) Clerk, WC1, Edmonton, Alta.
S. Watson (CR-3) Clerk, WC1, Edmonton, Alta.
S. Hornath (CR-3) Clerk, WC1, Edmonton, Ata.
B. Vink (SCY-1) Secretary, ARQD, Downsview, Ont.
N. Cutler (MT-6) Chief, General Weather Serv., OAEW, Toronto, Ont.
G. Brien (EG-5) Pres. Tech., WO4, Sherbrooke, P.Q.
C. Hoogerbrug (CR-4) Clerk, ACSD, Downsview, Ont.
C. Girard (MT-7) Meteorologist, CMCON, Dorval, P.Q.
M. Danks (MT-6) Meteorologist, MAED, Bedford, N.S.
I. Fung Fook (OCE-2) Word Processor, LLO, Downsview, Ont.
J.P. Bernard (EG-6) Pres. Tech., QAEW, Québec, P.Q.
R. Crawshaw (EG-6) Pres. Tech., QAEW, Rotation WO4 Quebec Region.
R. Déry (EG-6) Pres. Tech., QAEW, Québec, P.Q.
J.Y. Rancourt (EG-6) Pres. Tech., QAEW, Rotation WO4, Quebec Region.
F. Gélinas (EG-6) OIC, WS1, Maniwaki, P.Q.
G. Coulombe (EG-5) OIC, WS2, Nitchequon, P.Q.

Transfers

W. Wilkinson (EG-2) Met. Tech., Vancouver, B.C.
K. Perry (EG-2) Met. Tech., Vancouver, B.C.
W. Scott (EG-2) Met. Tech., Vancouver, B.C.
P. Fichaud (EG-2) Met. Tech., QAEOO, Dorval, P.Q.
A. Langlais (EG-3) U/A Tech., WS2, Frobisher Bay, N.W.T.
D. Jacob (MT-3) Meteorologist, QAEM, St. Laurent, P.Q.
B. Duguay (EG-3) U/A Tech., WS1, Sable Island, N.S.
S. Pailer (EG-3) U/A Tech., WAED, Edmonton, Alta.
T. Chen (MT-2) Meteorologist, Bedford, N.S.
G. Julien (MT-2) Meteorologist, ALWC, Edmonton, Alta.
P. Pommainville (MT-2) Meteorologist, ALWC, Edmonton, Alta.
W. Whittaker (EG-2) Met. Tech., WO4, Sudbury, Ont.
A.W. Morrison (MT-3) Meteorologist, METOC, Halifax, N.S.
D. Langevin (EG-2) Met. Tech., QAEOO, Dorval, P.Q.
B. Proctor (MT-2) Meteorologist, PWC, Vancouver, B.C.
M. LeBlanc (MT-6) Meteorologist, APEC, MOP Assignment, Downsview, Ont.
J. Burrows (EG-2) Met. Tech., PAEOO, Vancouver, B.C.
D. Millar (EG-5) Pres. Tech., WC1, Edmonton, Alta.
P. Dubreuil (MT-6) Meteorologist, QAEM, St. Laurent, P.Q.
G. Deaudelin (MT-2) Meteorologist, QAEM, St. Laurent, P.Q.

STAFF CHANGES

J.J. Rousseau (MT-2) Meteorologist, QAEM, St. Laurent, P.Q.
J.F. Fortin (CS-1) Programmer, QAEM, St. Laurent, P.Q.
R. Bouffard (CS-1) Programmer, QAEM, St. Laurent, P.Q.
A. Henry (EG-4) U/A Tech., WS1, Maniwaki, P.Q.
A. Langlais (EG-3) U/A Tech., WS1, Inukjuak, P.Q.
J. Lesieur (EG-2) Met. Tech., QAEOO, Mirabel, P.Q.
D. Etkin (MT-6) Meteorologist, CCAI, Downsview, Ont.
K.A. MacDonald (MT-6) Meteorologist, ARMF, Downsview, Ont.
T.B. Shannon (MT-6) Meteorologist, ACET, Downsview, Ont.
S. Ricketts (MT-6) Meteorologist, ACET, Downsview, Ont.
S. Lewis (EG-4) U/A Tech., WS3, Edson, Alta.
D. Shantz (MT-6) Meteorologist, CMCON, Dorval, P.Q.
M.G. Roberge (MT-2) Meteorologist, CFWO, Greenwood, N.S.
S. MacPherson (MT-2) Meteorologist, CFWO, Comox, B.C.
J. How (EG-2) Met. Tech., WS3, Cape St. James, B.C.
G. Lunn (EG-2) Met. Tech., WS3, Cape St. James, B.C.
I. Morrison (EG-2) Met. Tech., WS3, Revelstoke, B.C.
J. Barron (EG-2) Met. Tech., WS3, Hope, B.C.
R.L. Drouillard (MT-5) Meteorologist, PAEM, Vancouver, B.C.
G. Rockwell (EG-4) Met. Tech., WO1, Gander, Nfld.
J. Morissette (MT-2) Meteorologist, QAEM, St-Laurent, P.Q.
P. Vaillancourt (MT-2) Meteorologist, QAEM, St-Laurent, P.Q.
R. Perron (MT-2) Meteorologist, QAEM, St-Laurent, P.Q.
D. Harvey (EG-4) U/A Tech., WS1, Maniwaki, P.Q.
M. Malépart (EG-3) U/A Tech., WS2, Nitchequon, P.Q.
M. Larocque (EG-1) Met. Tech., WS3, Cape Dyer, N.W.T.
L. Dalphond (EG-1) Met. Tech., WS3, Clyde, N.W.T.

Secondment

W. Jardine, WAED, Edmonton, Alta. Feb. 1984.
H. Quinn, SSD, Pearson Int'l. Airport, Toronto, Ont. March 1984.
A. Louden, ACSL, Downsview, Ont. Feb. 1984.
G. Giles, ACSS, Downsview, Ont. Feb. 1984.
J.S. McLernon, ARQM, Downsview, Ont. April 1984.
F. Hunt, ACSS, Downsview, Ont. June 1984.
J.R. Mathieson, PAED, Vancouver, B.C. June 1984.
G.A. McKay, CCAD, Downsview, Ont. July 1984.
W.E. Markham, ACIX, Downsview, Ont. July 1984.

Retirements

M. Suzaki, PAED, Vancouver, B.C.
R.V. Bowkett, APEC, Downsview, Ont., French Training.
Y. Gervais, WS1, Kuujjuak, P.Q.

Leave of Absence

M.E. Still, ARQM, Downsview, Ont. to OAED.
P. Ducharme, QAES, St. Laurent, P.Q. to Québec, P.Q.
R. Gilbert, QAES, St. Laurent, P.Q. to ARQM, Downsview, Ont.

Departures

F. Landry WO4, Ottawa, Ont. to CMC, Montreal, P.Q.
B. Weiss Finance, WAED, Edmonton, Alta. to CFS, Edmonton, Alta.
T. Eliopoulos CMC, Dorval, P.Q.
I. Garand WO4, Sept-Iles, P.Q.
G. Julien ALWC, Edmonton, Alta.
J. Carignan QAEM, St. Laurent, P.Q.
D. Tomlinson WO4, Inuvik, N.W.T.
R. Sanheim WS3, Lytton, B.C.
D. Fulcher WS3, Vancouver Harbour, B.C.
D. Poirier PWC, Vancouver B.C. to METOC Centre, Halifax, N.S.

Coming to terms with the weather

Weather: State of the atmosphere with respect to heat or cold, wetness or dryness, calm or storm, clearness or cloudiness, also weather is the meteorological day-to-day variations of the atmosphere. It includes temperature, pressure, humidity, clouds, wind, precipitation and fog.

Blizzard: Severe storm lasting six or more hours. It is characterized by low temperatures, strong winds and poor visibility due to blowing snow. True blizzard conditions are most common on the prairies of Canada and the United States.

Hail: Precipitation in the form of lumps of ice — individual ice crystals coated with layers of ice — mainly in association with thunderstorms. Hail size usually ranges from the size of a small pea to the size of cherries but has been observed as large as oranges.

Hurricane (Typhoon, Tropical Cyclones, Willy-Willies): Topical storms with wind speeds of 65 knots (120 km/h) up to 240 knots (460 km/h) that can be thousands of square kilometers in size. Such systems usually have a lifetime of several days.

Squall: Strong wind which starts suddenly, lasts a few minutes and drops off quickly. Squalls are generally associated with severe thunderstorms.

Tornado (Twister, Cyclone): Tornado appears as a violent funnel-shaped wind vortex in the low atmosphere with upward spiralling winds of high speeds — spawned by severe thunderstorms. The tornado usually appears from a bulge in the base of a cumulonimbus cloud. It has a typical width of tens to hundreds of metres and a lifespan of minutes to hours.

Weather Warnings: Announcements separate from and supplementary to routine forecasts issued to warn of weather conditions that may endanger lives, property and the welfare of the general public. Warnings are broadcast by the media, on the Weatheradio Canada system and by the Coast Guard. They are issued for snowstorms, blizzards, heavy blowing snow, heavy rains, frost, cold waves, freezing rain, severe thunderstorms and strong winds — according to thresholds established for local and regional public needs. In Vancouver a warning might be issued for an expected snowfall of five centimetres or more but in Montreal a warning could only be issued for 15 centimetres or more of snow.

Wind Chill Factor: This is a single number combining the chilling effect of wind and low temperature. At a wind chill factor of 1625 exposed flesh freezes. At 2300 many outdoor activities are dangerous.