

# ZEPHYR

DECEMBER 1972 DECEMBRE

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## FIELD PROGRAM FOR IFYGL ATMOSPHERIC WATER BALANCE PROJECT COMPLETED

On December 10, the data-gathering phase of the IFYGL Atmospheric Water Balance project drew to an exhausting, but highly successful conclusion. This project was one of the largest and most ambitious programs of the Field Year and, because of its newly developed equipment and advanced techniques, has been watched with interest by scientists of many nations. Fraught with problems of logistics, supply and maintenance invariably associated with all large and first-of-a-kind field programs, the project was a success only because of a gigantic team effort covering both sides of the border.

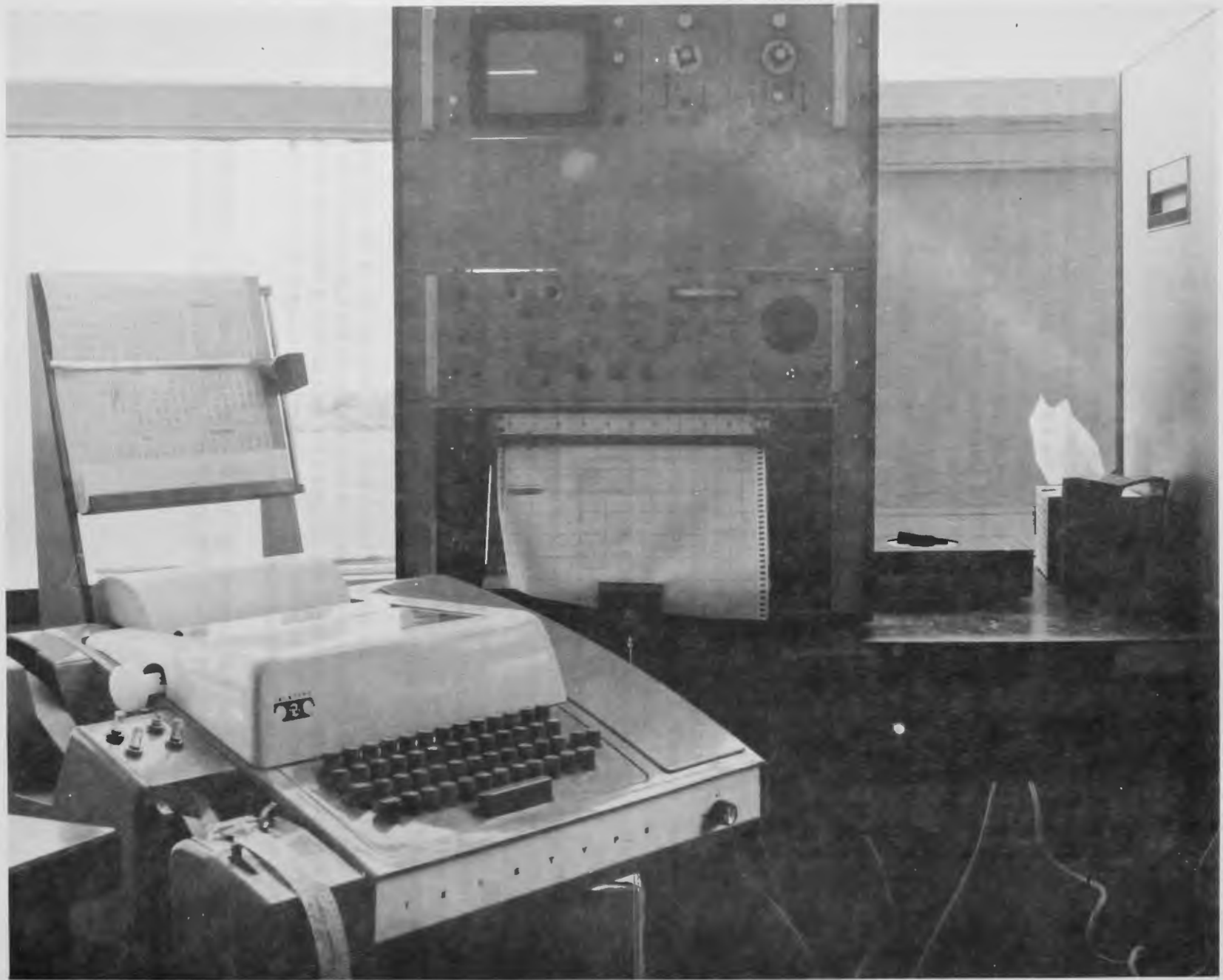
The project was a joint one between the United States National Oceanic and Atmospheric Administration (NOAA) and the Atmospheric Environment Service. It involved the establishment of a special radiosonde network around Lake Ontario between September 15 and December 10. During four periods within those dates, stations were releasing at three-hourly intervals, whereas between the intensive periods, flights were reduced to two each day.

Canadian Project Scientist was H.L. Ferguson. A.M. Miceli was in charge of operations at the Canadian stations. In all, the project required a team effort involving not only the specially trained and highly skilled radiosonde technicians on the stations, but special efforts by staff of the Material Management Division and the Inspection Units of Administration and Instruments Branches respectively. Many others were also deeply involved, and all can be proud of the way a very difficult job was accomplished.

The equipment used in the project represented a new generation. The specially built sondes contained precision components and sampled far more frequently than the regular network instrument. This resulted in such fine detail of the temperature and humidity profiles that the data will be used for research much beyond their primary purpose, the calculation of the heat and water budgets of the atmosphere over the lake. Furthermore, the reliability of wind calculations was greatly enhanced by using the LORAN navigational aid network for positioning the sonde instead of radio-direction finding. An IFYGL technical report on all details of the equipment and operations is currently in preparation.

Figure 1 shows the ground equipment as it was set up at the Scarborough UATS. The data were all recorded in computer-readable form on the tape drive on the right, as well as on the two chart recorders. Figure 2 shows the field station at Presqu'ile Provincial Park. The trailer was rented to hold the ground equipment and to serve as an office for the observer, and the inflation shelter was borrowed from the U.S.A.F.

*Editor's Note:* This item was prepared by J.A.W. McCulloch who was responsible for coordinating the efforts of the various AES components involved, as well as for providing liaison between AES and NOAA.



*Figure 1. Ground Equipment at Scarborough UATS.*



*Figure 2. Field Station at Presqu'île Provincial Park.*

**ENVOLÉE D'ACCOUSTOMANCE –  
DE SEPT-ILES A BLANC SABLON le 11 août 1971**

par Real Franc

Le matin du 11 août 1971, une visite au Bureau Météorologique de Sept-Iles indique que les conditions actuelles du temps et les prévisions laissent entrevoir la possibilité d'entreprendre l'envolée en son entier. Hâvre St-Pierre (GV) et Natashquan (NA) indique vers les 10 heures du matin une amélioration du temps permettant une envolée sans l'aide d'instrument de navigation.

La première partie du voyage fut entreprise à bord d'un avion d'Air Gaspé, Québécois se voyant dans l'impossibilité d'accepter un passager de plus sur son envolée cédulée. Ce changement me permit un arrêt de plus à Rivière au Tonnerre. De Hâvre St-Pierre à Blanc Sablon le voyage devait se faire à l'aide d'un avion type "Otter" volant à vue. Malheureusement une nappe de brouillard sur la basse Côte Nord a retardé, puis annulé le départ m'obligeant à passer la nuit à Hâvre St-Pierre. Le lendemain matin une vérification du temps sur la basse Côte Nord montre peu d'amélioration, le brouillard persiste et les prévisions indiquent peu de changement pour le reste de la journée. Je décidai donc de partir immédiatement pour Natashquan et de revenir à Sept-Iles le lendemain.

J'avais trois (3) buts au départ. Soit de voir:

- I) La topographie
- II) Les difficultés pour les pilotes à l'atterrissage et au décollage
- III) Sonder la qualité des Services de l'Environnement Atmosphérique à ces endroits.

**I) Topographie**

- a) Sept-Iles à Rivière au Tonnerre: Très accidenté. Boisé à 99.99%, très peu d'endroits pour atterrir en cas d'urgence.
- b) Rivière au Tonnerre à Mingan: Boisé à 99.95%. Accidenté. Route étroite en gravier pouvant servir aux atterrissages d'urgence.
- c) Mingan à Hâvre St-Pierre: Moins accidenté. Début de zones marécageuses. Encore très boisé.
- d) Hâvre St-Pierre à Natashquan: Terrain plus ondulé, très rocailleux, beaucoup de marécages. La ligne de montagnes et du bois se déplace graduellement, plus au nord de la Côte. Peu d'endroits pour un atterrissage d'urgence.

**II) Pistes: difficultés à l'atterrissage et au décollage**

- a) Rivière au Tonnerre: Pas d'obstacle majeur. Piste molle; sable et gravier, entourée de dunes de sable. Entretien général: pauvre. Aucune observation météorologique. Absence d'aérogare. Limité à avion type performance de "DC3".

- b) Mingan: Quelques obstacles mineurs. Piste asphaltée mais raboteuse. Aucune observation météorologique. Absence d'aérogare. Avion toute catégorie selon la longueur du décollage.
- c) Hâvre St-Pierre: Obstacle majeur, le village à côté de l'extrémité ouest de la piste. Piste dure, en résidu de minerai concassé d'une grosseur de un à deux pouces. Entretien pauvre. Piste à moins d'un quart de mille du bord de la mer, souvent enveloppée de brouillard. Observations météorologiques disponibles sur place. Aérogare disponible mais délabrée. Avion "F27" opérant avec difficulté vu la longueur de la piste et l'obstacle du village.
- d) Natashquan: Pas d'obstacle majeur. Piste molle par endroit, en sable et gravier. Entretien: bon. Avion "F27" opère avec difficultés vu le manque de fermeté de la piste. La station météorologique est très éloignée et mal située considérant son emplacement sur le bord de la mer et que la piste est éloignée de celle-ci. Absence d'aérogare.

### III) Service Météorologique

- a) Hâvre St-Pierre (GV): Au premier coup d'oeil j'ai compris pourquoi notre service, fourni par des intermédiaires, n'était pas utilisé et peu fiable pour les raisons suivantes:
  - 1<sup>o</sup> Site d'instruments non entretenus et en mauvais état.
  - 2<sup>o</sup> Un bureau malpropre et un manque d'ordre autant sur l'aspect visuel que de l'information disponible.
  - 3<sup>o</sup> Le personnel est peu empressé, non motivé et difficile à comprendre autant en français qu'en anglais: il utilise un jargon local.

Tout ceci n'invite pas à l'utilisation de nos services dû à l'atmosphère de non confiance reflétée par l'environnement local.

- b) Natashquan: La station est propre et bien maintenue. Le personnel est intéressé et accueillant. La station est strictement orientée vers l'observation. Toutefois son utilité est relative pour le pilote, vu l'éloignement de la station de la piste d'atterrissage.

Dans l'ensemble, ce fut un voyage intéressant et instructif, qui m'a fait réaliser l'importance de connaître les facteurs ci-haut mentionnés, pour mieux renseigner et comprendre les pilotes de la basse et moyenne Côte Nord.



*Ville de Sept-Îles avec vue  
sur les Îles*

*Ville vue de la Baie des  
Sept-Îles*



*Ville de Sept-Îles avec vue  
quai chargement du fer*



*Aéroport Sept-Iles avec vue  
sur les Iles*



*Intérieur station météo. NA*

*Piste de NA*





*Aérogare NA*



*Site instrument NA*



*Piste de NA sable et gravier  
avec dune de sable sur les  
cotés*

*Station de météo. NA*



*Rivière au Tonnerre avec vue de l'Aéroport*

*Rivière au Tonnerre et son port*





*Vue de Rivière au Tonnerre  
sur moyenne Côte Nord*

*Avion de QTC et son  
hangar à GV*



*Intérieur station obs. GV*

*Site d'observation météo. GV*



*Piste de Hâvre St-Pierre en  
résidu de Titane*

## OZONESONDE PROGRAM INITIATED AT STONEY PLAIN, ALBERTA

In keeping with the approved strategic plan calling for an eventual five-station ozonesonde network, an ozonesonde program was initiated at the Stoney Plain Upper Air Station in late October using the Brewer/Mast Model 730-7C ozone sensor. The program comprises one ozone ascent per week in conjunction with the regular Wednesday 12 GMT radiosonde flight. Installation of the necessary ground equipment and staff training was provided by a visiting technician from AES Headquarters.

## NAE - AES COOPERATION IN MESO-SCALE AND BOUNDARY LAYER STUDIES

The Atmospheric Research Directorate and the National Aeronautical Establishment (NAE) cooperated in two research studies for the Field Year of the Great Lakes (IFYGL). The NAE T-33 aeroplane with its special instrumentation was used to collect wind, turbulence, temperature and humidity data at levels between 50 and 500 ft. over Lake Ontario and southern Ontario during the fall of 1972.

The NAE T-33 was originally instrumented for turbulence measurements in support of aeronautical research. However, the equipment is very well-suited for measurements of atmospheric turbulence, wind, temperature and humidity. The aeroplane has taken part in numerous meteorological studies in Canada and the United States. These include the Suffield Micro-met Project, the National Centre for Atmospheric Research Lee Wave Programs, National Severe Storms Laboratory, Rough Rider Project, and an incomparision between turbulence measurements by the T-33 and the high power radar system at Wallops Island.

The two AES research studies are in the Boundary Layer Research and the Small Scale Processes Research Divisions. The Boundary Layer Group is studying the vertical fluxes of heat, moisture and momentum over the Lake and adjacent land areas as part of a larger program to improve modelling techniques for the lower atmosphere in both general circulation and numerical weather prediction models. The second study is concerned with the meso-scale variations in wind temperature and humidity and study of their spectra. It is in support of meso-scale prediction research and studies in optimum network design.

The data collected during the flight program will be available to all interested scientists via the IFYGL data bank and is expected to be ready for release early this year.



*T-33 Used in Meso-scale and Boundary Layer Studies.* Photograph Courtesy National Aeronautical Establishment, NRC, Ottawa.



*Close Up of Instrumentation on T-33* Photograph Courtesy National Aeronautical Establishment, NRC, Ottawa.



## TWILIGHT OBSERVATIONS OF TURBIDITY

As the sun goes down below the horizon, the lower part of the earth's atmosphere comes successively into the shadow of the earth while the upper part continues to be directly illuminated. With the decrease in the fraction of the atmosphere illuminated by the direct rays of the sun, the scattering of light by the molecules and other particles composing the atmosphere, gradually decreases. This period of decreasing sky brightness from sunset to night and the corresponding period of increasing brightness from night to sunrise, known respectively as evening twilight and morning twilight, are of great interest from the point of view of studying the physics of the atmosphere.

During the twilight period, the light received from any part of the sky is due (1) to light primarily scattered by molecules illuminated by direct sunlight, (2) to light scattered by large particles also illuminated by direct sunlight and (3) to light multiply scattered by molecules and by large particles. Both (1) and (3) are likely to change gradually, but (2) may change rapidly. Therefore, any rapid change in the intensity observed at the ground when the earth's shadow traverses different levels is likely to be due to a discontinuity in the vertical distribution of large particles. The problem is to study this change in twilight scattering instrumentally.

Photometric measurements of the intensity of the light scattered from the twilight sky, in the direction of the sun's vertical at an angle of 70 deg. from the zenith are made with a photometer, the telescope of which covered a circular field of sky of about 1 deg. in diameter. These measurements are made at the Meteorological Research Station in Woodbridge, Ontario. Observations are made in different spectral regions on cloudless and moonless days from the time when the center of the sun is on the horizon to the time when it is 14 deg. below the horizon. These intensity measurements are then used to derive turbidity and profiles in the atmosphere.

## LUTTE ACTIVE CONTRE LA POLLUTION

De toute part, aujourd'hui, fusent les cris d'alarme contre la menace sans cesse grandissante de la dégradation de l'environnement. Rares cependant sont les exemples d'efforts concrets et de travaux remédiant à cette pénible situation. L'ASSOCIATION PROTECTRICE DES FORETS LAURENTIENNES LTEE publiait récemment une brochure intitulée NETTOYAGE, EMBELLISSEMENT ET CONSERVATION SUR LA COTE NORD, SAISON 1969. La conclusion de ce rapport montre mieux que tout autre texte, la nécessité et l'urgence de poser des gestes concrets pour la réhabilitation de l'environnement.

"Les incendies forestiers, la pollution de l'air et de l'eau, le problème des ordures, la dilapidation rapide de nos richesses naturelles, la destruction inconsidérée de la vie sous toutes ses formes, voilà autant de réalités tragiques qui concourent à rompre l'équilibre de la Nature, équilibre qu'elle a mis des millions d'années à réaliser, et que tout l'argent des Gouvernements ne réussira pas à rétablir sans une sérieuse prise de conscience de la part du public."

“Devant la gravité de la situation, l'Association Protectrice des Forêts Laurentiennes Limitée a pris l'initiative des sensibiliser la population de la Côte Nord à quelques-unes de ces questions qui, de plus en plus, font le désespoir des gouvernants. Les trois opérations, qui ont fait l'objet de ce rapport, auront peut-être contribué à alerter le public de cette région particulièrement favorisée. “Etablir des lois humaines pour faire respecter les lois de la Nature” est une solution extrême, un cataplasme qui ne remplacera jamais la motivation intérieure. C'est à cette conviction personnelle qu'il faut amener le public et ce, par une éducation patiente et bien orchestrée.”

“Tout en poursuivant le travail entrepris en 1969, l'Association Protectrice des Forêts Laurentiennes Limitée se propose d'intensifier son action auprès de la population de son territoire. Sans la collaboration intelligente du public, les sommes dépensées et les efforts consentis seront de l'argent jeté au feu, car si nous nous avisons de calculer le coût total (A.P.F.L., Gouvernement du Québec, Municipalités, compagnies forestières, citoyens, etc.) des trois opérations décrites plus haut, nous atteindrions facilement les cinquante mille dollars (\$50,000.00). Nous devons donc enseigner au public la signification exacte du mot “conservation”, qui ne signifie pas *renoncer à utiliser*, mais *employer rationnellement nos richesses naturelles conformément aux exigences des lois de la nature.*”

## A MIRAGE

By JOHN R. HENDRICKS

A mirage is an optical illusion. A distant object is made to appear displaced from its true position because light waves are bent. An abnormal temperature distribution in the atmosphere causes mirages.

The land around Regina, Saskatchewan is about as flat as you can get anywhere. The picture shown in Figure 2 is taken from the Regina Weather Office and shows how flat the land is.

What about those hills that are shown in Figure 1 along the horizon? They shouldn't be there! The hills are normally over the horizon and are situated about forty miles to the southwest of Regina near the town of Claybank, Saskatchewan.

What has happened is that the light waves have been bent and we are looking around the curve of the earth.

This mirage occurred at Regina, Saskatchewan on the 29th day of August, 1972 in the early morning just after the sun had risen. The previous day had been hot and a new record high temperature was set at 94 degrees. The day of the mirage turned out to be even hotter when the temperature reached 100 degrees and set another record.



*Figure 1.*



*Figure 2.*



*(Figure 2 alternate.)*

Photos Courtesy  
John R. Hendricks

## AES IFYGL STATUS REPORT AS OF DECEMBER 31, 1972

### Shoreline Stations

The six shoreline stations continued to operate throughout December. All data for the first six months of operations have now had a first quality control and have been dumped.

### Atmospheric Water Balance Program

The data collection phase of the Atmospheric Water Balance program ended on December 10. A preliminary review of the data suggested that the project was highly successful.

### Airborne Radiation Thermometer

Due to poor weather conditions that persisted through most of the month only one IFYGL ART Surface Water Temperature survey was carried out over Lake Ontario in December.

All other scheduled AES IFYGL observational programs continued to operate throughout December.



LE VENT

H. W

## SUBMISSION TO JOURNAL OF APPLIED MATHEMATICS

The following paper by F.J. Testa, AES, Toronto, has been approved for submission to the Journal of Applied Mathematics.

### "Congruence Diagonalization and Lie Groups"

A complete parametric representation of the family of congruence transformations that diagonalize a given real, symmetric,  $n \times n$  matrix of rank  $r$  and index  $p$  is developed in terms of fundamental representations of the pseudo-orthogonal Lie group  $O(p, r-p)$  and other real parameters. The result is applied in the proof of a simple diagonalization theorem for positive-definite matrices.

## FAREWELL PARTY FOR K.F. HARRY

A farewell party for K.F. (Ken) Harry was held at the Lulu Belle Gay Nineties Restaurant in Vancouver on the occasion of his departure to take up new duties as Regional Director, Atlantic.

More than seventy Regional AES, CATA, and retired AES Personnel attended the party.

The Harry's were presented with a ship's clock, a foghorn and a sailing tuque for Ken. Both Pat and Ken are sailing enthusiasts.



*Left to Right Helen Lee PRD Secretary, Pat Harry, Ken Harry, Eric Paget*  
(Photo Courtesy of Allan F. McQuarrie)

**PERSONNEL**

December 1972

The following transfers took place:

K.F. Harry	From: Pacific Regional Office To: Atlantic Regional Office
G.H. Legg	From: Central Services Directorate AES Headquarters To: Western Regional Office
D.R. Smith	From: Winnipeg Weather Office To: Arctic Weather Central
R.G. Stark	From: Arctic Weather Central To: Management Development Assignment AES Headquarters
H.C. Belhouse	From: Atmospheric Instrument Branch AES Headquarters To: Pacific Regional Office
M.J. Leduc	From: University of Toronto To: CFB Uplands
F.B. Kerkhoff	From: 1 CAG Baden-Soellingen To: Goose Bay Weather Office
E.T. Hudson	From: Goose Bay Weather Office To: Maritimes Weather Office
M.M. McCulloch	From: Vancouver Weather Office To: Whitehorse Weather Office
W.J. Sowden	From: CFB Summerside To: National Defence Headquarters, Ottawa, Ontario

The following have accepted positions as a result of recent competitions:

72-AES-CC-130	Meteorology MT6 Supervising Forecaster Weather Office Goose Bay, Labrador - F.B. Kerkhoff - A. Leganchuk - B.P. Marois - A. Serna - J.F. Stutchbury
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72-AES-CC-180

Meteorology MT7  
Outdoor Recreation and Tourism Meteorologist  
Central Services Directorate  
AES HQ, Toronto  
- R.B. Crowe

72-AES-CC-191

Meteorology MT7  
Scientific Support Officer  
Atlantic Region  
Moncton, N.B.  
- A.D. O'Neill

#### **KENNETH F. HARRY HEADS UP WEATHER SERVICES IN ATLANTIC REGION**

TORONTO — Kenneth F. Harry has been appointed by the Public Service Commission to the Position of Director of the Atmospheric Environment Service's Atlantic Region, Environment Canada. The appointment was announced recently by J.R.H. Noble, Assistant Deputy Minister of the Atmospheric Environment Service.

Mr. Harry is from the west coast having been raised in Maple Ridge, British Columbia. After graduation from the University of British Columbia in 1942, he joined the Public Service. During the balance of World War II, he served at a number of RCAF establishments in western Canada as a meteorologist.

Mr. Harry received his MA from the University of Toronto in 1949. From 1945 to 1957 he served as a forecaster and then shift supervisor at the Vancouver Weather Office. From 1957 to 1959, he undertook an assignment at the Central Analysis Office in Montreal after which he returned to the west coast. In 1965, Mr. Harry was appointed Superintendent of General Weather Services for the Vancouver (now Pacific) Region of the Atmospheric Environment Service (AES). In this capacity, he was responsible for the provision of weather services to aviation interests and the general public in addition to such weather sensitive areas as the forestry and fishing industries. In his new position Mr. Harry will exercise overall direction of AES programs throughout the Atlantic Region, a large area which consists of the four Atlantic Provinces including Labrador and the adjacent coastal zones.

Mr. Harry has taken up residence in Moncton, N.B. He is married and has two daughters.

### APPOINTMENT

E.M. (Mac) Elsley has been appointed as Head, Meteorological Communications System, reporting to the Chief, Forecasting, Computers and Communications Systems Division of Field Services Directorate.

Mr. Elsley has had a long association with meteorological communications through the responsibility in his former position for identification and coordination of AES requirements for meteorological communications. He carries this responsibility with him to his new position.

S.V.A. Gordon, OIC Prairie Weather Central, was rated third in the competition for the American Meteorological Society's Award for Outstanding Service by a Weather Forecaster.

### RETIREMENT - FRED HUGHES

An informal "Happy Hour" was held in the AES cafeteria, December 19, 1972, in honour of Fred Hughes, Supervisor - Accounts Section on the occasion of his retirement.

Fred was presented with a watch by his associates.



TRIVIA

Request received from small boy – At Hamilton Weather Office.

Dear Men:

I would like one of everything. Could you try to send it as soon as possible?

Michael Gallant  
1389 Hidden Valley  
Burlington, Ontario.

“We trained hard – but it seemed that every time we were beginning to form up in teams, we would be reorganized. I was to learn that later in life we tend to meet any new situation by reorganizing, and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency and demoralization.”

– Petronius Arbiter, 66 A.D.

No woman ever lives long enough to try all the recipes she clips out of newspapers and magazines.

The taxpayer is the only person who doesn't have to pass a civil service exam to work for the government.