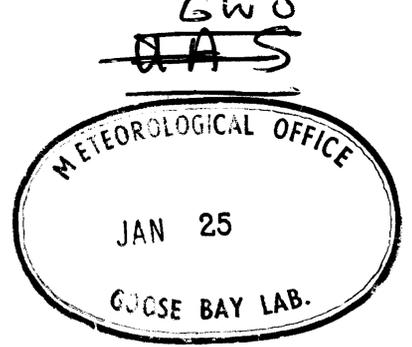


**MONTHLY REPORT
OF THE
CANADIAN
METEOROLOGICAL SERVICE
NOVEMBER 1970**



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ITEM 1

ALL-CANADIAN TAKEOVER OF J.A.W.S

In accordance with a Canada/U.S. agreement, withdrawal of U.S. support of the Joint Arctic Weather Stations, and replacement by an equivalent increase in Canadian support, is now under way. As of 26 November 1970, on departure of the last of the U.S. staff, the meteorological station at Alert, N.W.T., became the first of the Joint Arctic Weather Stations to be completely manned by Canadians.

The Joint Arctic Weather Station program, initiated jointly by Canada and the United States in 1947, involved five stations in the Canadian Arctic Archipelago. Subsequently Canada increased its share in the operation and support of these stations to include the provision of sealift and airlift in the 1950s, and communications equipment and electrical power plants and their maintenance in the 1960s.

Canadian staff will replace the U.S. share of the staff at the remaining Joint Weather Stations within two years - Mould Bay and Isachsen in 1971, Resolute and Eureka by 31 October 1972. On a similar schedule Canada will also undertake provision of supplies, parts and equipment formerly provided by the U.S.



JOINT ARCTIC WEATHER STATION AT ISACHSEN

ITEM 2

ICRSRAS WORKING GROUP ON WATER RESOURCES

Preliminary planning is being carried out by the Water Resources Working Group of the Interdepartmental Committee on Resource Satellites and Remote Airborne Sensing (ICRSRAS) for the possible testing of an Earth Resources Technology Satellite ground platform. This platform will be purchased by DEMR next year and the Canadian Meteorological Service has been asked to supply suitable meteorological sensors to interface with the facility which will probably be located in the Ottawa area. The first Earth Resources Satellite is expected to be launched in the spring of 1972. It is hoped that automatic stations may eventually be developed for numerous IHD Benchmark Basins across Canada, most of which are in remote locations. Close consultation with the CMS Instrument Division will be necessary to ensure optimum development of the system. Mr. H.L. Ferguson of the Climatology Division represents the CMS on the Water Resources Working Group.

ITEM 3

INTERNATIONAL BIOLOGICAL PROGRAM

The creation of "Ecological Reserves" in all parts of Canada is an objective of the International Biological Program. Twenty such reserves now exist in British Columbia, and legislation is underway of being considered in other provinces to ensure that vital biological resources are not unwittingly destroyed. The several hundred reserves planned for all parts of Canada will provide a valuable legacy as well as a valuable basis for research.

The atmospheric environment of the reserves must be carefully monitored. Since the reserves will be continued over long periods of time, this monitoring offers an excellent opportunity to get "benchmark" quality climatological information, i.e. information which is now, unfortunately, lacking. Mr. G.A. McKay attended the planning meeting of the CCIBP concern of this problem and is obtaining details on reserve locations and proposed research programs.

ITEM 4

CLIMATOLOGICAL STATION OPENED AT WATERTON, ALTA.

Waterton Park, Alberta, now has an official climatological station which will take daily weather reports and phone them in to the Lethbridge

Weather Office each morning during the winter and twice daily during the summer. The climatological station located behind the Park Transport office was equipped by the Canadian Meteorological Service with maximum and minimum thermometers and a snow gauge.

In the past the nearest reporting station was Pincher Creek, but due to the considerable variations in terrain between Pincher Creek and the Waterton townsite frequent unusual weather was not reported. The addition of this station to our network promises some interesting information.

ITEM 5

WMO W/G ON ATMOSPHERIC POLLUTION AND ATMOSPHERIC CHEMISTRY

Dr. R.E. Munn has recently been appointed Chairman of the WMO W/G on Atmospheric Pollution and Atmospheric Chemistry. This W/G reports to the Commission on Atmospheric Sciences and its major task in the next year is to prepare a WMO Technical Note on meteorological forecasting of air pollution and air pollution potential.

ITEM 6

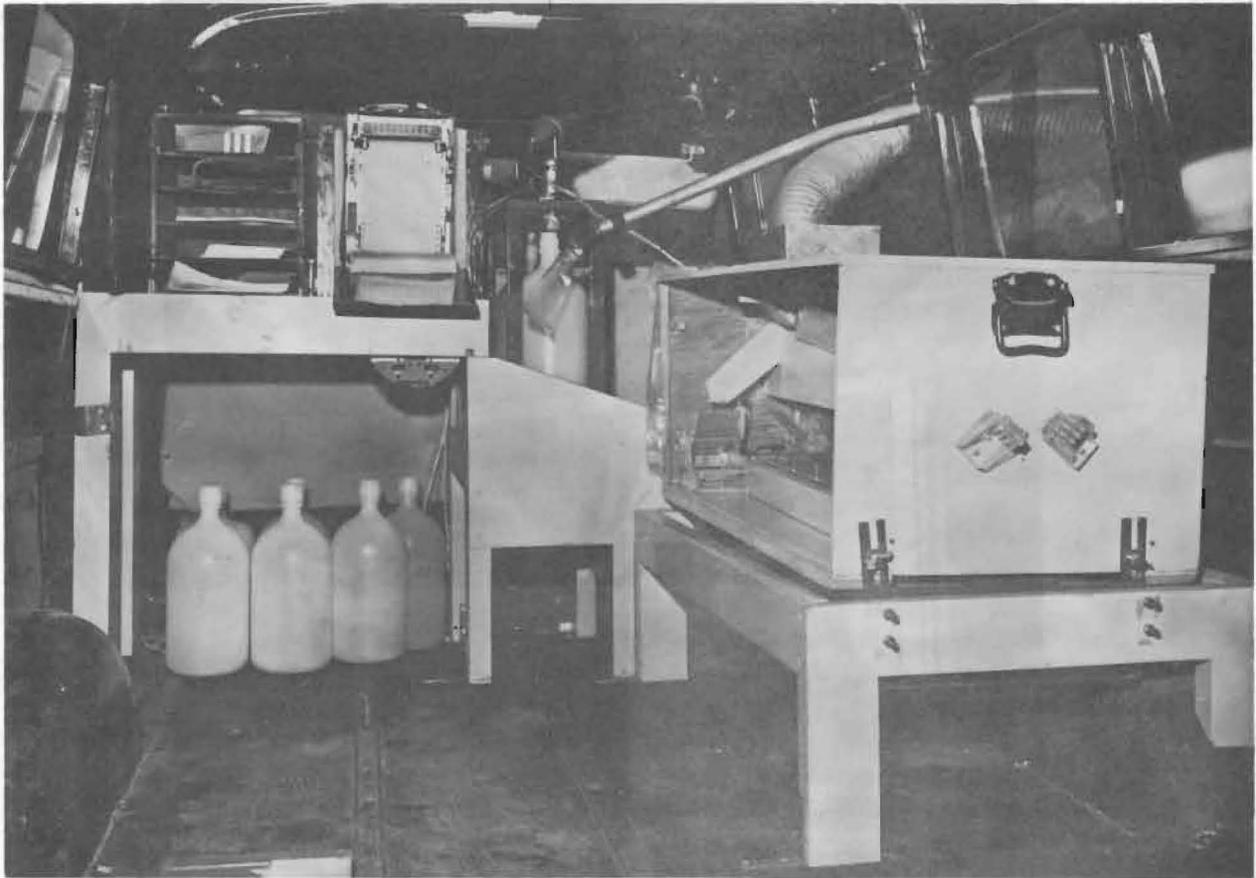
ALBERTA HAIL PROJECT - 1970

The Alberta Hail Project, begun in 1956 to study the causes and workings of hailstorms with a view toward their modification, continued its investigations this past summer from CFB Penhold in Central Alberta. This project is supported jointly by the Research Council of Alberta, the National Research Council, and the Canadian Meteorological Service with scientific assistance provided by McGill University. Additional technical support was supplied this past summer by the National Aeronautical Establishment in the form of a T-33 Aircraft and crew.

The NAE aircraft was involved specifically in a program to test a recently developed cloud seeding delivery technique. During the test period, 6 July to 5 August, this aircraft was dispatched from CFB Namao to seed newly developing hailstorm cells on the basis of radar observations taken from CFB Penhold. This task was accomplished by overflying the developing storm while ejecting into it from above approximately a dozen silver iodide pyrotechnic flares. The hypothesis on which this cloud seeding technique is based is to make available large quantities of artificial ice nuclei within the developing hailstorm updraft at temperatures between -5 and -15C. These artificial ice nuclei are thus available to form many small competing ice particles rather than the relatively few but large devastating hailstones

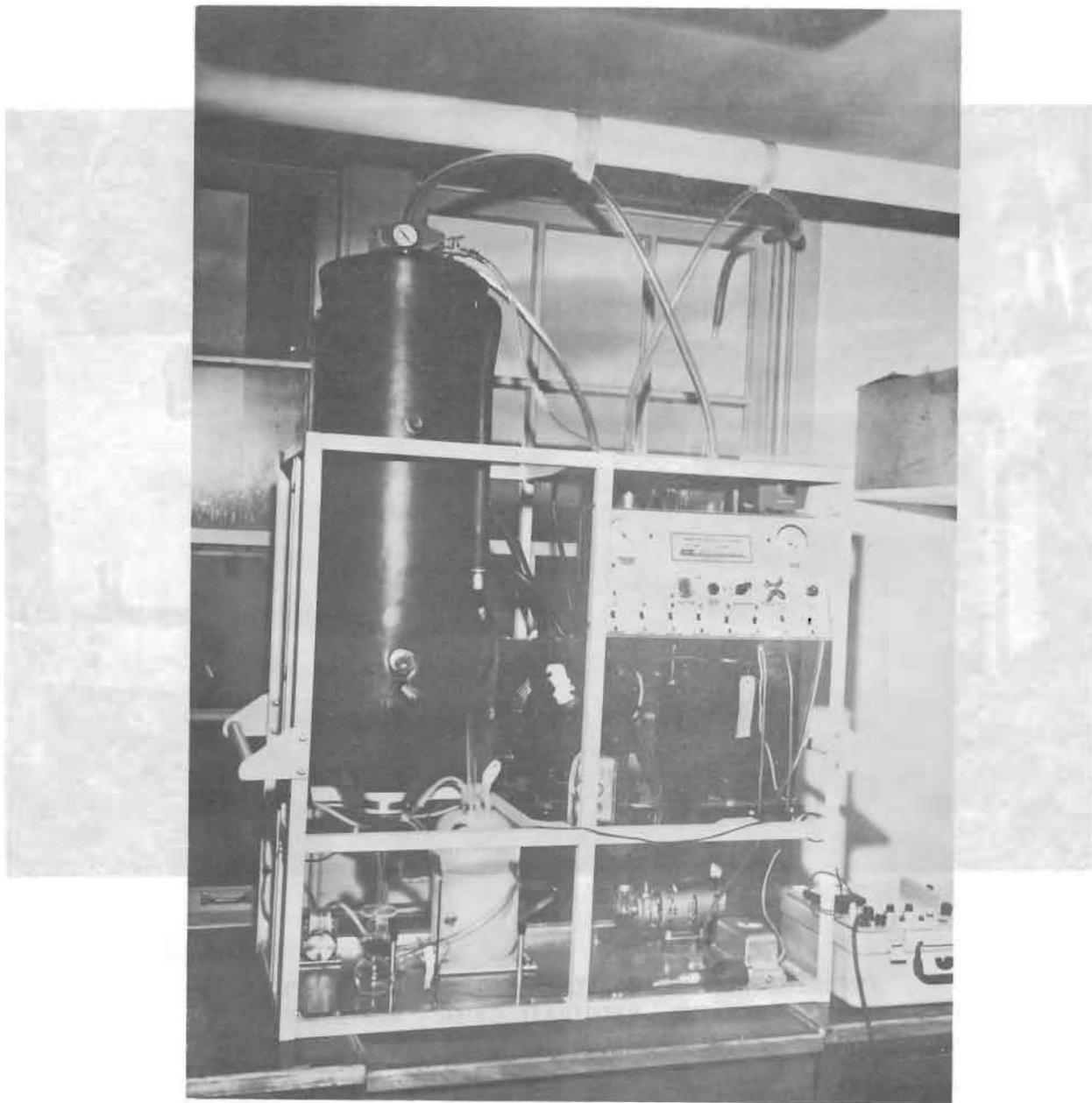


ALBERTA HAIL 10CM WEATHER RADAR AND FIELD PROJECT
HEADQUARTERS BUILDING AT C.F.B. PENHOLD
(Courtesy Radio & E.E. Division, N.R.C.)



INTERIOR VIEW OF MOBILE PRECIPITATION SAMPLING
VEHICLE SHOWING RAIN/HAIL GAUGE AND RECORDER
(Courtesy of Alberta Govt.)

NEAR ICE NUCLEI COUNTER USED TO DETERMINE
CONCENTRATION OF NATURALLY OCCURRING ICE
NUCLEI
(Courtesy of Alberta Govt.)



NCAR ICE NUCLEI COUNTER USED TO DETERMINE
CONCENTRATION OF NATURALLY OCCURRING ICE
NUCLEI

(Courtesy of Alberta Govt.)

produced naturally in such storms.

Following ejection, the pyrotechnic flares undergo free fall into a significant updraft aimed at achieving a release of silver iodide at temperatures between -15C and -5C. This requires prior knowledge of the in-cloud temperatures and vertical velocities in order to determine the aircraft flight altitude for seeding purposes. Estimates of the required temperatures and vertical velocities were obtained by running an adiabatic convection model on the Research Council of Alberta PDP-9 computer. This model was also used as a forecast tool to obtain maximum storm tops and estimate maximum hailstone sizes.

The evaluation technique proposed for this cloud seeding test is that of studying case by case the physical effects realized on each hailstorm seeded rather than a statistical verification. Radar measurements will be studied for changes in the height and reflectivity structure of the storm as well as changes in the character of the cross-polarized component. Changes in the storm exterior will be examined using cloud photographs taken by the aircraft and by a time lapse camera on the ground. Additionally, the ice nucleating properties of the storm precipitation and its silver content as sampled at the ground will be analyzed. Intensive surveys of the rainfall, maximum hail size, duration, extent and intensity of hailfall in the areas affected will be studied to determine changes effected on the hailfall as well as the crop damage, precipitation efficiency of the storm and rain/hail ratios. Although each of these parameters will be studied for changes at a time coincident with and following the seeding effect, evidence will be sought in particular for reproducible changes. Obtaining a complete set of observations requires that strict conditions be imposed on the character, location and movement of the hailstorm to be seeded. This is necessary due to the problems of logistics and communications met in placing the aircraft and mobile precipitation and photocrews in advantageous locations to observe the hailstorm. During this past summer, a total of three cloud seeding tests were performed on hailstorms and the data obtained are currently undergoing intensive analysis. Presently, plans are under way for an expanded cloud seeding test program for the forthcoming summer to provide additional data for evaluation purposes.

ITEM 7

LONG-RANGE R & D PLANNING

The Forecast Research Section has undertaken a study on the current status of meteorological science and technology and expected advances over the next few years. Based on this study alternative advanced methodologies that can be introduced into the operational forecasting system will be examined in order to establish a framework of long-range planning for the Section's R & D program.

Preliminary results of the first phase of the study tends to confirm, as would be expected, that over the next several years it should be possible to develop an advanced integrated, increasingly computerized approach to the operations of the forecast system. The role of the central office (CAO) in the production of forecast parameters is a major area that will require study, as will the development of objective methods for use in forecast offices to turn out an increasing variety of short-range forecast products.

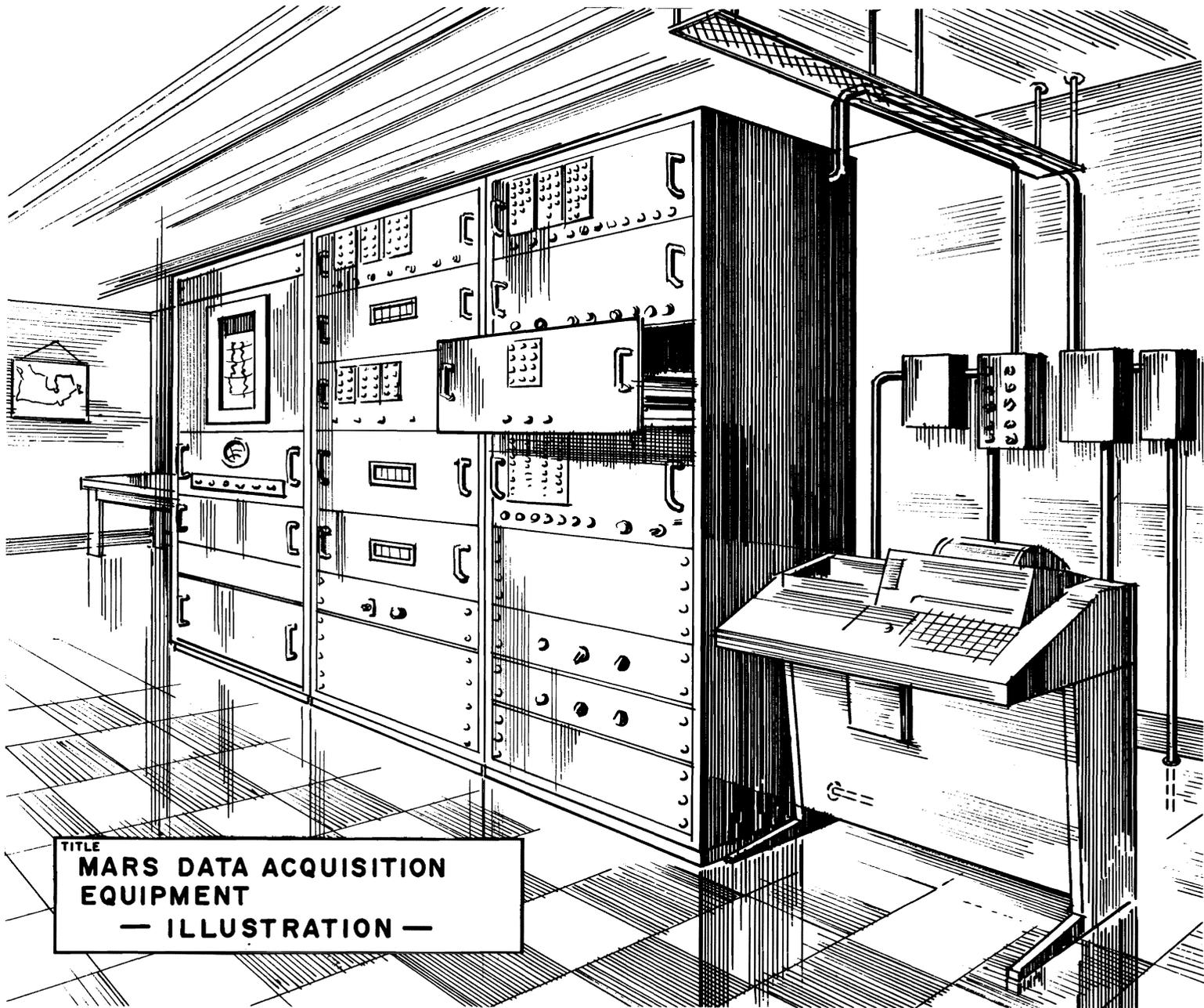
ITEM 8

MALTON MESO-METEOROLOGICAL NETWORK

The Canadian Meteorological Service over recent years has built up a network of fourteen closely spaced autographic weather stations separated from each other by about four or five miles and centred roughly over Toronto International Airport at Malton. Four of these stations are connected by teletype and are fully automatic. Action is now under way to make all the output from this network accessible to computer processing as well as for manual analysis. The network is a research facility of the Forecast Research Section and is providing data which is required:

- (a) For empirical studies of meso-scale meteorology and circulation.
- (b) In support of theoretical modelling on this scale.

As a result of this work, useful information may be obtained on whether close-in observations can provide operationally useful short-range forecasts with detailed local variations and if so what procedures can be developed to provide them. This type of forecast would be of particular interest for ceiling and visibility predictions at airports as well as for warnings of strong winds, occurrence and location of heavier rain, etc., based in part on radar observations. However, not sufficient empirical or theoretical knowledge is available at present on meteorological processes on such a small scale, and it is for this reason that the Forecast Research Section is operating and upgrading this facility as a research tool. Results obtained will, of course, have application in a general way for local forecasting elsewhere in Canada.



TITLE
**MARS DATA ACQUISITION
EQUIPMENT**
— ILLUSTRATION —

ITEM 9

ACTIVITIES RECENTES DU SERVICE METEOROLOGIQUE
DANS LA REGION DU QUEBEC

Ca bouge de plus en plus au Québec. Les préparatifs pour l'atelier professionnel au bureau de Montréal vont de bon train et l'on s'attend à ce que la nouvelle salle de conférence à UL soit prête à temps pour les colloques et les travaux pratiques de l'atelier.

Un technicien de UL, Rai King, ira prochainement travailler, avec joie et ardeur, à Sault-Ste-Marie dans la région de l'Ontario, comme technicien de présentation.

Au bureau régional des changements de personnel sont présentement dans le vent avec deux concours pour les postes de Chef Inspecteur et d'Agent Portuaire tandis que notre Inspecteur en Altitude, W.R. Little, débutera dans ses nouvelles fonctions dans la section PWIA, à Ottawa, incessamment.

En Province, le processus de dotation de personnel pour plusieurs postes de présentation à Val d'Or, à Sherbrooke et à St-Hubert est présentement en marche et l'on s'attend à voir bientôt de nouveaux visages à ces stations.

ITEM 10

DATA STREAM - VOCABULARY REVIEW

The Public Service Commission has set up various occupational teams to carry out a review of the vocabulary used in Data Stream. The Meteorological team (MT & EGSS) has started with a review of the over 9,000 words suggested on the forms submitted by employees. Suggested changes to the vocabulary are submitted to the P.S.C. who are to coordinate all changes with the other teams so as to avoid conflict.

The present schedule would have the new vocabulary book being written towards the end of April. In May it would be distributed throughout the Public Service. The following six months would be spent in gathering field comments and opinions as to its suitability prior to it being sanctioned for official use.

Meanwhile, the Meteorological vocabulary review team invite suggestions from all personnel. These suggestions should be addressed to one of the following members of the Meteorological team:

*RB
W
J
P
M
H*

K.H. Clark - CFB Uplands
S.F. Lucas - Headquarters, Toronto
B. Brent - Headquarters, Toronto
R. Fichaud - R. Met., Quebec Region
R. Stoutjesdyck - Central Analysis Office

ITEM 11

PERSONNEL

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

Competition 70-MET-HQ-17 - Meteorology MT5
Supervising Forecaster
Weather Office, Edmonton
- W.D. Gilmour

Competition 70-PTAH-74 - Meteorology MT7
Scientific Support Officer
Western Regional Hqts.
Edmonton
- D.B. Fraser

Competition 70-PTAH-75 - Meteorology MT5
Supervising Forecaster
Weather Office, Regina
- J.R. Hendricks

The following transfers took place:

W.J. Crowley - To R&T Training Section, Toronto
From CFB Portage

R.L. Jones - To Ice Central, Halifax
From Canadian Forces, Europe

M. Shewel - To W.O. Gander
From W.O. Winnipeg

New York Academy of Sciences

Dr. D.P. McIntyre, Chief of the Research and Training Division, Canadian Meteorological Service, was elected a Fellow of the New York Academy of Sciences. About 75 persons are nominated annually for this honour from the total membership of about 26,000.

Agroclimatology Unit, Climatology Division

Dr. R.A. Treidl took over his position as Head of the Agroclimatology Unit, Climatology Division, in late November. Two of the functions of this new unit are to provide liaison with the Canada Department of Agriculture and to provide support for scientific support units in all regions on agroclimatological problems.

Post-Doctorate Fellow

Dr. M.C. Subba Rao has joined the Cloud Physics Group as a Post-Doctorate Fellow under the aegis of the N.R.C. Dr. Subba Rao's Doctorate is in Cloud Dynamics and his tenure of duty is one year with our service commencing November 1, 1970.