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CONTENTS

METEOROLOGICAL CONDITIONS IN WINDSOR, ONTARIO DURING THE PASSAGE OF A RIDGE OF HIGH PRESSURE

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1. INTRODUCTION

A special network of meteorological observing stations has been operated in Windsor, Ontario, since November 1967 (Figure 1). Routine monitoring of the data from the network occasionally uncovers material for interesting meteorological case studies. One such case involved the passage of a ridge of high pressure across Southern Ontario on November 25, 1968.

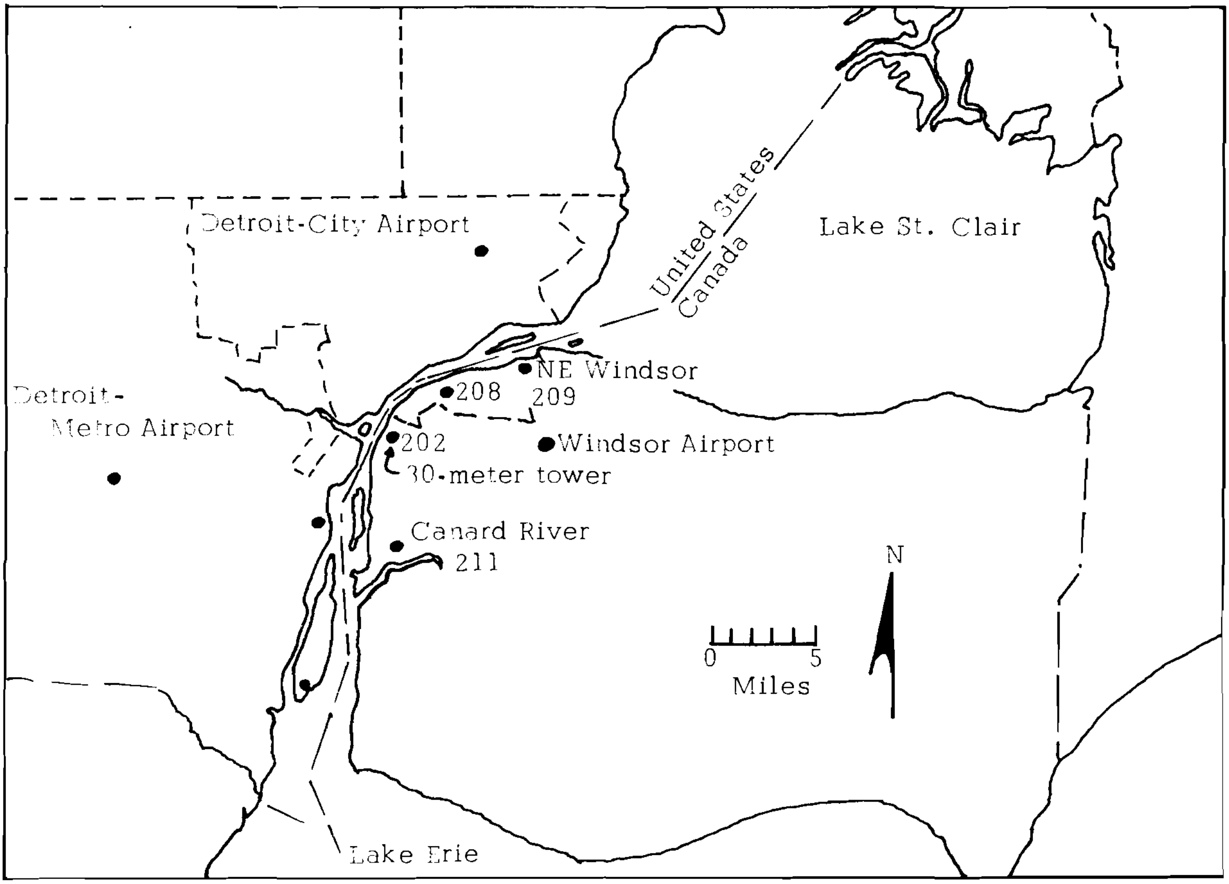

Figure 1. Map of Windsor with Station locations.

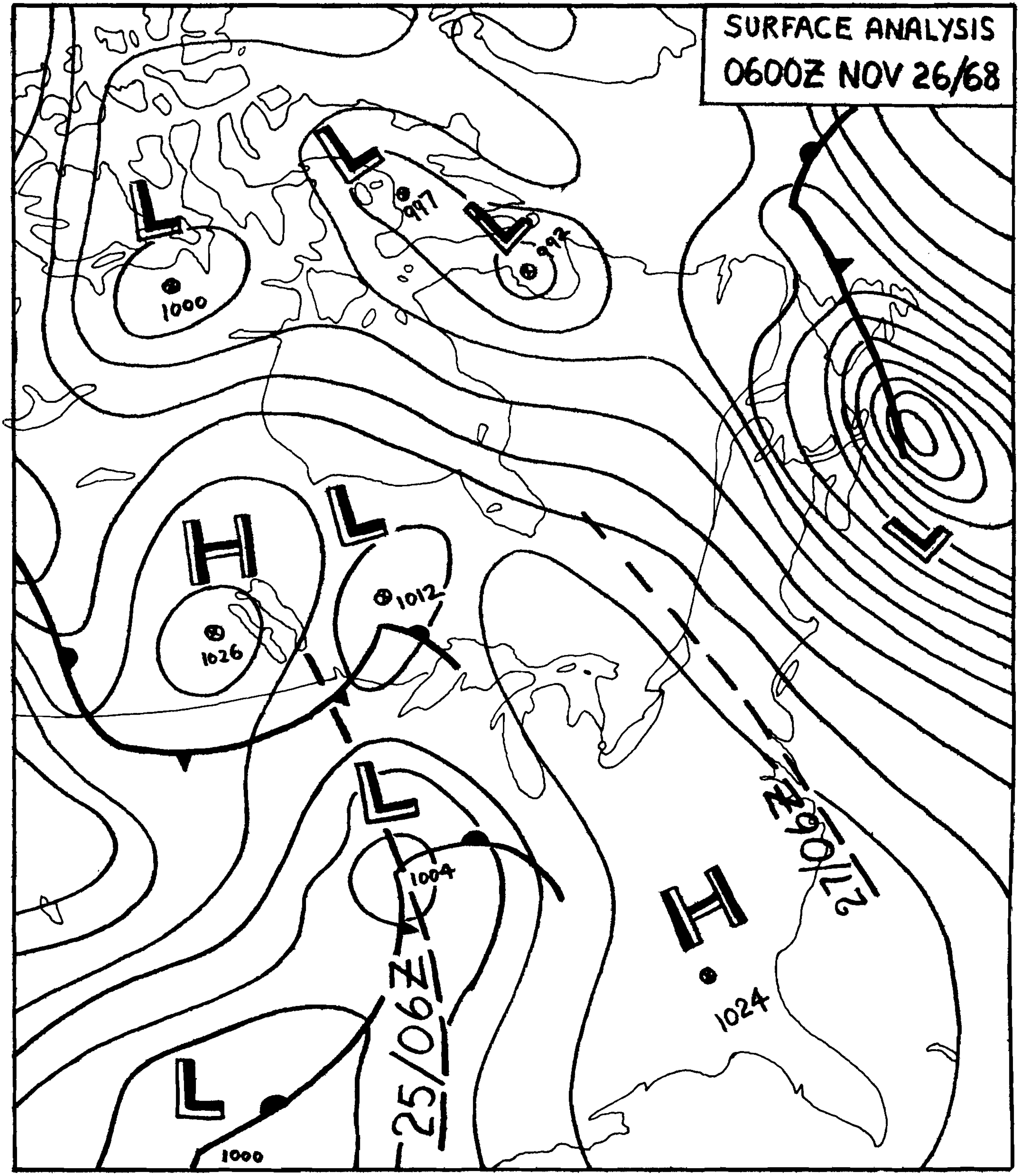

Figure 2. Surface weather map for 26 November, 1968, 0600 GMT.

2. INSTRUMENTATION

The meteorological stations shown in Figure 1 were installed as part of the study of the transboundary flow of air pollution in the Windsor-Detroit area, a study that was requested by the International Joint Commission. Routine measurements of air pollution levels were also made concurrently.

At stations 209 and 211, wind velocities are measured with Bendix Friez Aerovanes at heights of 40 and 30 feet respectively. On a portable 100-foot tower at station 202, winds are measured at 100 and at 20 feet with Bendix Aerovanes; in addition, temperatures are measured with standard aspirated resistance bulb thermometers at heights of 20, 56 and 100 feet. The temperature measuring system records temperature differences between 100 and 20 feet, and between 56 and 20 feet; the ambient temperature at 20 feet is also recorded.

3. SYNOPTIC CONDITIONS

A ridge of high pressure moved across Southern Ontario during the period November 25-27 and Figure 2 shows the surface weather map for 0600 GMT, November 26. The positions of the ridge on November 25 and November 27 are indicated for the same map time.

Hourly weather observations from Windsor Airport on this date are listed in Table 1 below. Sunset at Windsor on November 25 was 1703 EST.

Table 1. WINDSOR AIRPORT HOURLY WEATHER OBSERVATIONS - NOVEMBER 25, 1968

Time	Sky Condition	Temperature/Dew Point (°F)	Wind
1600 EST	40⦶ 280-⦶ 10	40/27	290/08
1700	250-⦶ E280-⦷ 10	38/28	290/06
1800	280-⦶ 10	35/27	250/03
1900	○ 10	34/28	C
2000	○ 10	30/27	100/04
2100	250-⦶ 10	30/27	100/06
2200	E250⊕ 10	29/28	150/06
2300	E250⊕ 10	30/28	160/06
2400	150⦶ E250⊕ 10	32/30	150/06

From the wind shift apparent in these observations, it can be concluded that the ridge passed Windsor between 1800 and 2000 EST.

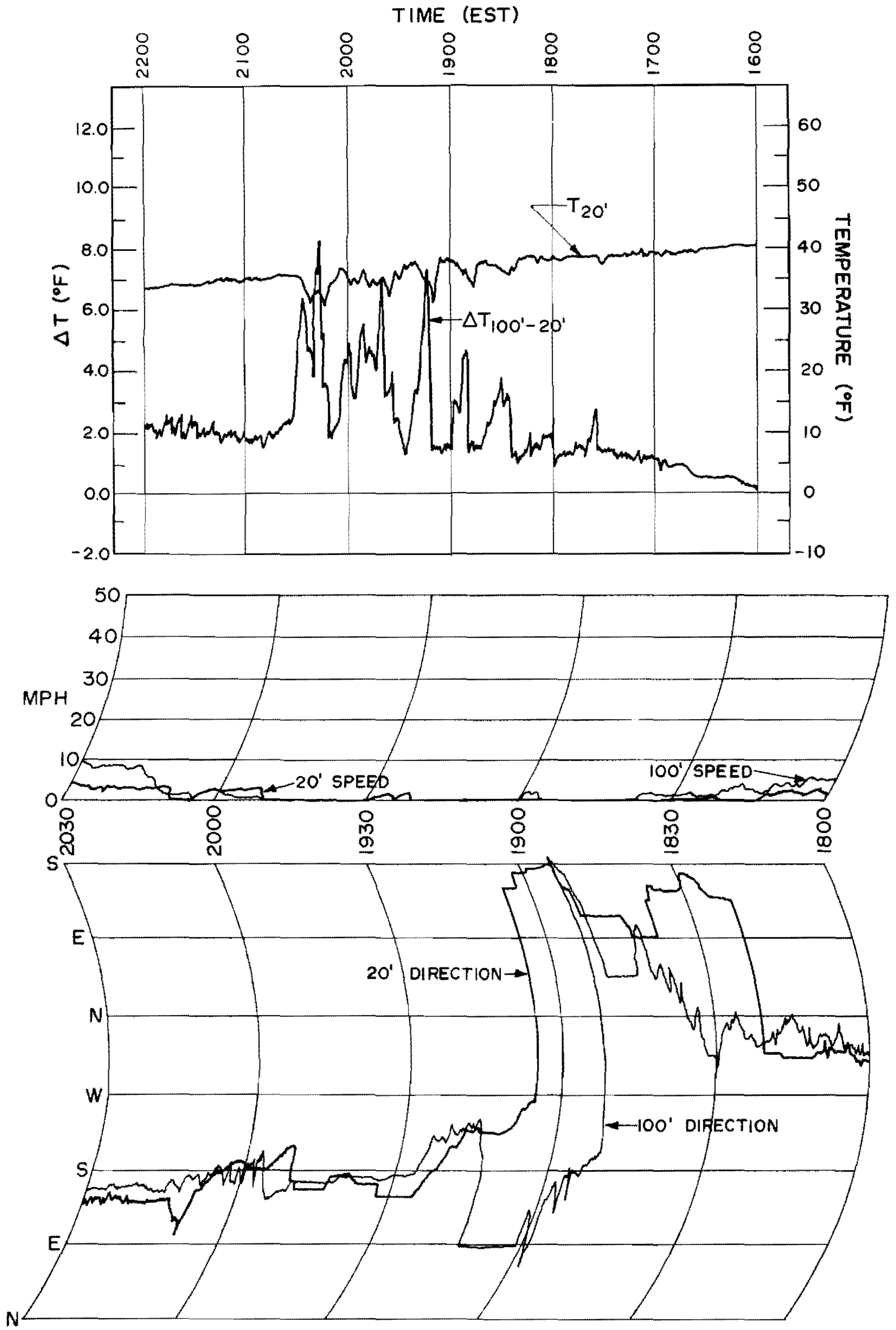

Figure 3. Wind and temperature charts for Windsor, 25 November, 1968.

Table 2 summarizes the data available from the special network of meteorological stations.

Table 2. SPECIAL METEOROLOGICAL OBSERVATIONS, WINDSOR - NOVEMBER 25, 1968

	Station 202				Station 209	Station 211
Time	Wind* 20'	Wind* 100'	Temp* 20'	Temp. Diff* 100-20'	Wind*	Wind*
			(°F)	(F°)		
1400 EST	330/08	340/11	41	-0.6	310/09	320/05
1500	330/08	330/12	41	0.0	300/09	300/04
1600	330/06	330/11	40.5	0.2	300/05	280/05
1700	320/05	320/09	39	1.1	290/07	280/02
1800	C	320/02	38	1.6	320/05	270/01
1900	C	C	37	1.3	C	C
2000	130/01	C	35	3.8	150/04	C
2100	160/02	150/08	34	1.7	140/04	110/02
2200	180/03	180/09	33	2.2	160/04	140/03
2300	170/03	190/11	32	1.8	170/06	140/04
2400	190/03	190/09	33	1.4	160/06	140/04

*Hourly averages centred on the hour

The passage of the ridge can be noted from these data to have occurred between 1800 and 1900 EST. The mild inversion which appears in the observations prior to 1800 deepens and intensifies after 1900 EST. Figure 3 shows the chart records of wind and temperature at Station 202 as the ridge passed through. Instantaneous inversion peaks as large as 7-8°F can be noted; the intensity and duration of the fluctuations in the temperature difference record illustrate the transfer from steady, to non-steady, to steady state conditions occurring with the passage of the ridge.

4. AIR QUALITY

Continuous records of several air pollutants were available from Station 208 during the period of interest. Total Oxidants and Oxides of Nitrogen were measured in separate Model K78 Beckman Analyzers on this date. Averages of these pollutants, smoothed over a sixty-minute period centred on the hour, are given in Table 3.

Table 3. POLLUTION LEVELS - STATION 208, WINDSOR - NOVEMBER 25, 1968

Time (EST)	Total Oxidants (pphm by volume)	Oxides of Nitrogen (pphm by volume)
1700	< 1	< 1
1800	< 1	1
1900	1.5	1.5
2000	4	3.5
2100	3	3
2200	Missing	2.5
2300	Missing	2
2400	Missing	< 1

Data from this table reveal increases in pollution levels which correlate extremely well with the inversion data presented in Table 2; higher pollution levels during the period 1900-2200 EST are a result of the inversion trapping at sampler level, the emissions of Oxides of Nitrogen and of Oxidants.

5. CONCLUSION

As illustrated, the network of special meteorological stations at Windsor can provide useful data for investigating particularly interesting weather situations. The wind pattern and lapse rate regime associated with the passage of a high pressure ridge have been examined and a relationship between increases in pollution levels and the occurrence of a low level inversion has been demonstrated.

TRAINING OF TECHNICIANS AND TECHNOLOGISTS IN CANADA[1]

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1. INTRODUCTION

In 1959 there were 812 Meteorological Technicians in the Meteorological Service of Canada (Table 1). Forty-six per cent were engaged in weather observing duties, forty-three per cent in chart plotting and eleven per cent in minor supervisory duties.

Table 1. Meteorological Technician Establishment

Classification	1959	1970	
EG 8		17	Management (EG 7–8)
7		31	
6		216	Technologist* (EG 3–6)
5	54	205	
4	43	305	
3	334	177	Technician* (EG 1–4)
2	319	139	
1	62	14	
Total	812	1104	

*See Appendix for definition

The training of technicians, at that time, consisted of two or three weeks in a Regional office. How well they were trained depended on how soon they were needed and whether someone was available to train them. There were no facilities for further training. Even worse, there was

1. Paper presented at the Fourth Annual Congress of the CMS, held at the University of Manitoba, Winnipeg, June 17-19, 1970.

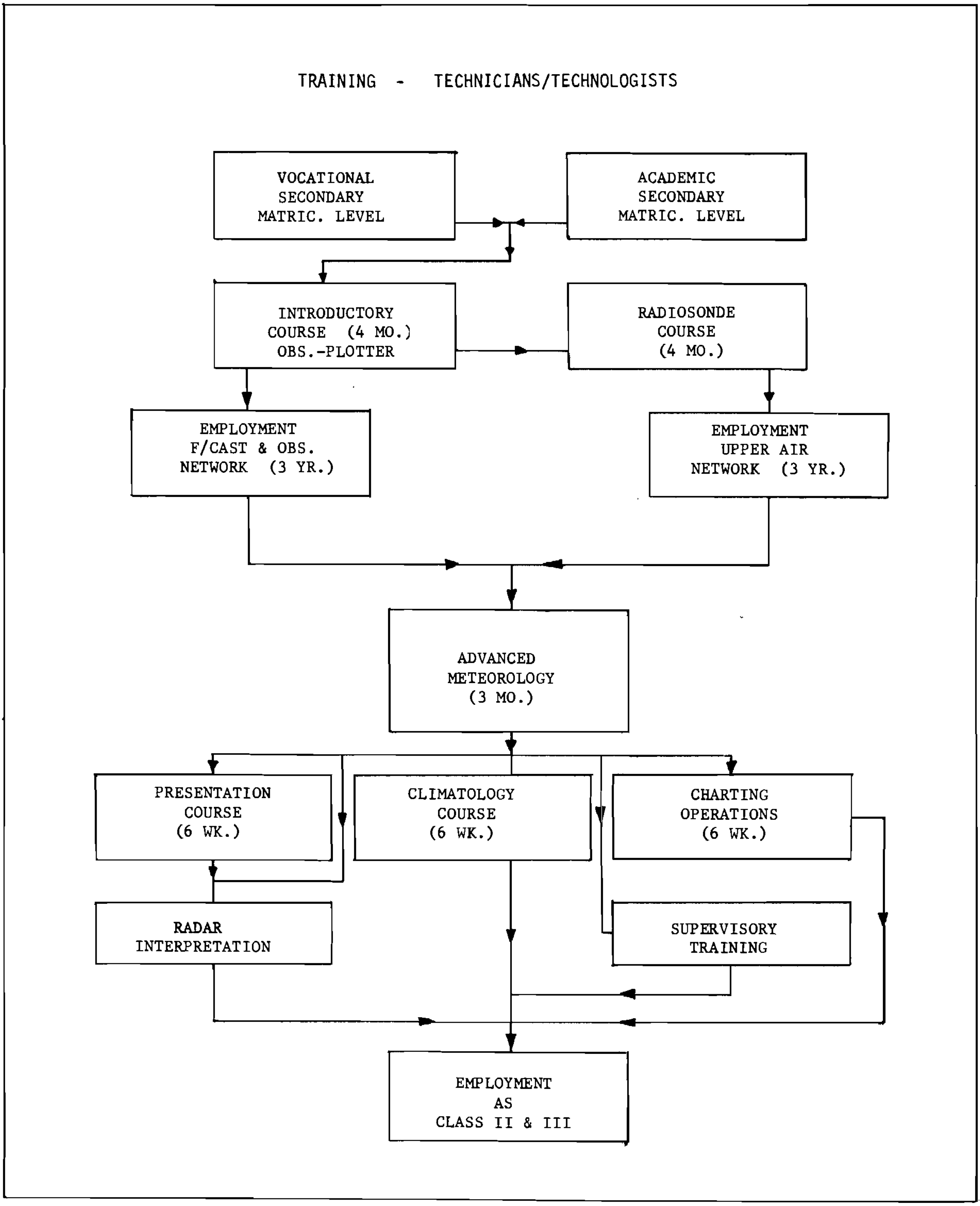
TRAINING - TECHNICIANS/TECHNOLOGISTS
VOCATIONAL SECONDARY MATRIC. LEVEL
ACADEMIC SECONDARY MATRIC. LEVEL
INTRODUCTORY COURSE (4 MO.) OBS.-PLOTTER
RADIOSONDE COURSE (4 MO.)
EMPLOYMENT F/CAST & OBS. NETWORK (3 YR.)
EMPLOYMENT UPPER AIR NETWORK (3 YR.)
ADVANCED METEOROLOGY (3 MO.)
PRESENTATION COURSE (6 WK.)
CLIMATOLOGY COURSE (6 WK.)
CHARTING OPERATIONS (6 WK.)
RADAR INTERPRETATION
SUPERVISORY TRAINING
EMPLOYMENT AS CLASS II & III

Figure 1

no incentive to educate oneself in meteorology, as the career program gave little or no recognition to education or training below the Bachelor's degree level.

The forecaster was a specialist in code interpretations, a supervisor and a consultant for all the technicians' work. Furthermore, he performed all the technological routines connected with charts and tephigrams and the presentation of his forecast. Consequently he was very lucky if he could spend 25 per cent of his time on real professional duties. The forecaster was unwilling to allow the technicians to perform other than the most minor routines. The whole atmosphere discouraged teamwork and the technician experienced no sense of achievement in his work. His career was poor, his pay was poor: ambitious men moved to other jobs. This is the state of events in developing countries at the present time.

To-day there are 1104 technicians and technologists in our Service of which only thirty per cent are at the technician observer/plotter level; sixty-five per cent are engaged at a high technician and technological level and five per cent at a fairly high management level (Table 1). The present career plan overlaps up to the middle of the new professional levels in terms of salary.

These personnel are best described as providing technical services and technical support to the Meteorological Service. They are engaged in jobs such as Weather Observer; Forecast Office Technician;Senior Technician Supervisor;O.I.C. Small Station;Satellite Technician; Pilot Briefer; Research Technician; Observer/Presentation Technician;Radar-Scope Interpreter; Operations Technician (Charting Specialist); Climatologist; Data Processor; Regional Instructor; A.S.T.S. Instructor;Radiosonde Observer; and, Ice Observer.

They hold these positions by virtue of their training and qualifications. When the task to be done is routine, no matter how complex, it is the work of a technician or a technologist and not a Professional Forecaster. The skilled technologist at the Presentation Level can turn out a better product and give better service than the Professional who lacks skilled training in this area.

An Operations Technician in a forecasting team can prepare materials that allow the forecaster to examine many more parameters than he has in the past - before issuing his forecast.

I would like to use a simple example from Engineering. When an engineer designs and plans a building, it is built by the building technologist using technicians of all kinds. These technologists are trained in an institute of technology.

Table 2. Advanced Meteorology Course

Breakdown of Training	Hours
1. Formal classroom instruction	170
2. Laboratory training & seminars	150
Subjects	
1. Theoretical meteorology	90
2. Mathematics	26
3. Physics	30
4. Meteorological projects	24
5. Radar meteorology	20
6. Seminars & library research	39
7. Charting	45
8. Presentation	49

Table 3. Presentation Course - Laboratory Program

Lab Period	Type of Briefing	Flight Time or Distance	Briefing Aid
1	Terminal	6 hr	
2	Terminal	12 hr	Neph Chart
3	Terminal	24 hr	Significant Wx Chart
4	Low	300 mi	Cross Section
5	Low	500 mi	
6	Low	1000 mi	Tafors
7	Medium	1500 mi	Sig. Wx or 3M Chart
8	Medium	2000 mi	Tafors
9	Jet Briefing	1750 mi	Cross Section
10	Jet Briefing	1250 mi	Sig. Wx Chart
11	Jet Briefing	1750 mi	Upper Wind Chart
12	Area Briefing	1 District	Sig. Wx Chart
13	Area Briefing	2 Districts	Cross Section
14	Area Briefing	3 Districts	Sig. Wx Chart
15	Unscheduled	Various	Briefer's Choice
16	Unscheduled	Various	Briefer's Choice

Table 4. Charting Operations Course - Operational Techniques

1. Use of Ferguson geostrophic advection scale
2. Thickness advection charts
3. Vorticity advection charts
4. Vertical motion charts
5. Isallobaric charts
6. Height change charts
7. Surface analysis
8. $T-T_d$ charts (700 mb moisture analysis)
9. Control line chart

2. THE AIR SERVICES TRAINING SCHOOL (A.S.T.S.)

This school was established in 1959 for the training of Air Traffic Controllers; in 1960 a Telecom and Meteorological Faculty was added for the training of new Radio Operators and Meteorological Technicians. All three Faculties receive training in meteorology. At range stations where there are no meteorological personnel, Radio Operators are responsible for taking weather observations. Since 1960 the establishment has expanded and the organization is divided into Basic Training, Advanced Training and Specialized Training (Figure 1).

Policy is such that a course is designed as the need arises. If no facility exists in the subject, our instructors are sent to gain this facility, e.g., our instructors in Radar are sent to the University of Miami to take Professor Heiser's Course in Weather Radar. We continually update our staff as the need arises.

We have an excellent instructor staff consisting of four Professionals, five Specialist Instructors at the Technological level and ten Line Instructors for Basic Training.

We make use of modern training aids such as programmed instruction, student responder systems, slide-tape presentations, film library and video-tape recorders. One of the meteorologists on the A.S.T.S. staff devotes 60 to 70 per cent of his time in the preparation and evaluation of programmed courses and development of teaching systems using the various new media. We have completed a programmed course in elementary meteorology (through International Correspondence Schools, Montreal), but the testing and development is not yet complete. School staff are pleased to discuss this program with interested parties.

The contents of some of our syllabi are given in Tables 2-4; copies of all the syllabi will become available in the future. Our Syllabi are in accordance with Technical Note 50 of WMO (1963) except for minor modifications. For example, we do not teach calculus but we will if there is a need and some practical application.

3. TRAINING OF NON-DEPARTMENTAL PERSONNEL

We have recently been approached by Ontario Hydro, and by Ontario Forestry, in connection with our "User Program" on the possibility of training their technicians in meteorology. We have trained an airline dispatcher in high-level briefings in recent weeks, and he hopes to have his whole staff take the same course. This training will commence when we receive an answer from Government on procedures for charging for this training.

We have the capability at the A.S.T.S. school to train all environmental technicians who have meteorology as a core subject. We could tailor our courses to individual needs without disrupting our existing system. If the technician needs a course at the advanced level, then our only stipulation is that he meet the prerequisites for that course. Pre-course material can be arranged so that students are better prepared. It is difficult to state at this time what a course would cost. Our cost accounting committee favours that cost be on a basis of cost/student-week. This, of course, is tied to the number of students on the course.

When we design a special course, e.g.,for Forestry, and deliver the lectures at their establishment, the cost would be computed by considering design time, consultation fees and travel expenses.

When our programmed courses are fully developed,we propose to offer such a program for sale to outside agencies, such as, Civil Aviation, for use in Ground Schools, and to WMO and CIDA for international training programs. This program will be available in French and in Spanish, if required. The program is designed in five modules in such a way that additional modules on Aviation Meteorology, Agrometeorology, Hydrometeorology, Air Pollution, etc., can be added as required. The program would also be suitable for use in High Schools at the Grade 11-12 level.

REFERENCE

WMO, 1963: The problem of the professional training of meteorological personnel of all grades in the less-developed countries. Tech. Note No. 50,prepared by J. Van Mieghem. WMO - No. 132. TP. 59, Geneva, Switzerland, 75 pp.

APPENDIX

The technologist is the builder and co-ordinator who ensures that jobs are done according to specifications. He supervises individual jobs. The technologist develops and performs the most complex routines from general plans and designs. He must acquire complex skills and a sufficient understanding of the science so that he can anticipate and understand requirements and interpret needs. He would require several years post-secondary school training directed towards current and future applications of modern meteorology. He may work in close contact with the professional or he may work independently in his specialty but performing tasks that free the professional for creative and decision-making functions. The technician is the doer who performs specified routines according to instructions. He acquires these skills through training and experience. When the technology changes, he must be taught new skills and routines. The work of the technician is co-ordinated by the technologist. He is told what to do and how to do it.

PERFORMANCE ORIENTED TRAINING FOR CANADIAN ARMED FORCES METEOROLOGICAL TECHNICIANS*

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1. INTRODUCTION

Performance oriented training is based on two simple questions:

(1) What does the man have to do on the job? and

(2) What do we have to train him to do, so he can perform effectively?

The first question dictates that we must study the job to determine precisely what is wanted. The second question dictates that we must find out how much of this the man already knows, and then train him to do what he does not know. The emphasis is on job performance, and we let him learn by doing. The word "oriented" is also important, because we are not advocating pure performance training, not trying to teach monkeys to fly spacecraft by rote, but merely devising a training system.

The decision to introduce performance oriented training to the Canadian Forces was based on several reasons. Firstly, the integration of the three different service groups, Army, Navy and Air Force, meant that a common system of training had to be found. Secondly, there was a great deal of material in the formal courses which was not actually used on the job. Courses were far too long, too costly and failure rates were unduly high.

The average young man who joins the Meteorological Trade in the Forces has about 10 years of schooling. He is often the drop-out who is fed-up with formal class-room work and wants to be physically busy doing useful work. So what did we do with him? We gave him a course that was

*Paper presented at the Fourth Annual Congress of the CMS, held at the University of Manitoba, Winnipeg, June 17 to 19, 1970.

40% theory, and if he did not get bored and quit then we gave him a three-hour written exam and flunked him out. It is true that those who survived this system were well-educated and became good tradesmen - if they did not quit when they encountered full-time shift work. But change is essential, and while we might wish to retain the old system, we are financially obligated to live with the new one.

2. IDEAL BENEFITS EXPECTED

The benefits to be derived from performance training include:

(a) Immediate Employability - the training is directly related to the job requirements and thus the trained man can be readily put to work on the operational team, without supervision.

(b) Effective Employment - this is obtained because the user knows exactly what the individual knows and can employ him with maximum effectiveness.

(c) On-Job Training - after the man has had a basic course, further training can be given to him by his supervisor on the job, a saving in both time and money.

(d) Progress - career advancement, which in the past was based on written theory-examinations, can be simplified. The OIC now certifies that the man has been qualified for higher grading and higher pay.

(e) No Unnecessary Training - by eliminating and reducing the nice-to-know material from the courses, savings in money, manpower, material and morale have been effected.

(f) Clear Objectives - both the student and the instructor know what is required on the course.

(g) Better Motivation - when the trainees know what is required of them, they work harder.

(h) Practical Testing - the objectives are written in practical terms so that each task has its own test, which can be checked on a simple pass-fail basis. Instead of writing an exam many weeks or even months after the training is given, the man is given an immediate performance check. This further improves motivation and morale.

Thus, there are many benefits. Unfortunately, the ideal system cannot be achieved overnight. Since the job analysis for Canadian Meteorological Technicians was not done scientifically, yet serves as a building keystone, the whole structure is a bit shakey. This defect can and will be corrected.

3. FORMAT OF PERFORMANCE OBJECTIVES

The performance objective format is illustrated in Figure 1. There are three parts - the duty, the conditions, and the standard, which stipulate what the man will be able to do at the end of training; the tools, material and references he will require; and the quality and quantity of the work he is to produce.

1. The student will determine the amount of rainfall.

2. The following are provided:

   a. Partially filled standard rain gauge.
   b. Glass/graduate.

3. Standard - student must empty the contents of the rain gauge into the graduate without spillage, read and record the amount to the nearest 1/100 of an inch. Time - one minute.

Figure 1. - Typical Performance Objective

4. GENERAL RESULTS

The Canadian Forces School of Meteorology at Trenton has worked with this training system for more than two years. Experience has been gained with ten different courses, from the basic recruit level to the top level - the "presenter". Although the workload has increased, the training staff feel that these methods produce good results, and they would not want to go back to the old system.

Experience at the School has shown that there are liabilities as well as benefits. Administrative problems are many, particularly in the area of standards - and the system awards standards an almost divine status. Another problem is the introduction of change. For years we have stressed upon the school instructors that theory is all important, but now we suddenly ask them to be very practical, and the forces of inertia naturally work against us.

5. LIABILITIES OF SYSTEM

The disadvantages found by the School include:

(a) Instructor Ratio - more teachers are required and the ratio may go as high as one to one. Checking of student performance is a time-consuming operation.

(b) Equipment - more equipment is needed. Each student should have his own complete set of instruments to use. These can be supplied readily when the cost is low, but items, such as teletype machines, theodolites and hydrogen generators, are difficult to obtain.

(c) Scheduling - causes difficulties. At times three or more instructors may be needed to work with one class. Not only instructors but instruments and facilities have to be programmed. When there are two or more courses in residence at the School (this happens most of the time) a great deal of time must be spent on planning the utilization of staff and material.

(d) Standards Staff - full-time standards officers are required. Meteorology is undergoing many changes, and procedures and publications become outdated even as they are being developed. There is a continuing requirement for new standards and for amendments to the old ones.

(e) Future Job Limitations - by teaching a man to perform only a specific task we have purposely made him narrow, and not given him the background for other jobs. Later in his career it is necessary to give him more theory so he can progress.

6. ACTUAL BENEFITS ACHIEVED

In contrast to these negative results, the School has, at the same time, arrived at a number of positive conclusions. Better motivation has been obtained from the use of planned performance objectives, realistic training methods, and practical testing. By allowing for staggered graduation dates, the bright students can be assigned to the field early, and more help provided to the slow learners who remain. Homework assignments have been reduced, and this is a further boost in the direction of better motivation. Failure rates have been reduced.

Table 1 shows the before-and-after failure rates for the basic trainees. "OLD" covers ten courses given in the 1963-68 period, and

"NEW",four courses in the years 1968-70. The course prerequisites have not been changed, and the average calibre of the candidates is much the same today as it was five years ago. Thus, the reduction in failures can only be the result of the new system.

Table 1 - Basic course failure rates for Met. Technicians

	OLD	NEW
Average	22.6%	8.8%
Highest	50 %	21 %
Lowest	5 %	0 %

Table 2 shows the reductions in course lengths that have been achieved by use of performance oriented training. These are based on 1969 figures, and will require further adjustments as we progress. The planners in Canadian Forces Headquarters use the figure of $1000 per week per trainee as a rough guide to training costs, so it can be seen that considerable cash savings have been effected.

Table 2 - Reductions in course lengths

	OLD	NEW	
Course Duration - Weeks			
Trade Group 1	16	14.2	Pay Level 3 Pay Level 4
Trade Group 2	11	10	Pay Level 5
Trade Group 3	12	12	Pay Level 6A
Trade Group 4	20	8	Pay Level 6B
Total	59	44.2	
Saving		14.8	

In this day and age of government austerity it is fashionable to award to thrift the high praise once reserved for maidenly virtue, and thus, we can blush with pride. However, the real aim is to produce a better tradesman, and it is felt that the performance oriented system does this. Thus the system seems to be here to stay.

THE NEW HOME OF THE CANADIAN METEOROLOGICAL SERVICE*

At the time of his retirement in 1959, Dr. Andrew Thomson spoke longingly of his vision of the "promised land" - where all Headquarters Divisions would be under one roof. At Dr. Patrick McTaggart-Cowan's retirement dinner in 1964,Mr. Baldwin,then Deputy Minister of Transport, announced approval for the planning of a new Headquarters for the Meteorological Branch. In the following years, the project moved slowly ahead as considerable time was devoted to discussing plans with architects, selecting and gaining approval for the site, obtaining Treasury Board authority and going to tender. Since the construction contract was let in early 1969, work on the new building has generally proceeded on schedule and completion is expected on target in the spring of 1971.

The new Headquarters is a modern four-storey structure, 430 feet by 210 feet with a gross floor area of 340,000 square feet,constructed in a squared-off figure-eight design with two courtyards. The building will be accessible from different levels and the central bays will provide natural light to interior offices and laboratories. The exterior is architectural concrete with sand-blasted and bush-hammered finishes; the same finishes being used in the spacious three-storey high entrance lobby. Tinted windows with sealed double glazing are set in well-recessed frames of dark bronze aluminum and give the building a strong horizontal character. Heating will be by gas and the entire building will be air conditioned at a comfort level of 72 degrees and 50% humidity all year round. Imaginative landscaping, using sculpture in both steel and concrete,fountains and extensive plantings of trees and shrubs,will enhance the natural setting and complement the architectural features of the Headquarters. (See Figures 1, 2 and 3).

The 15-acre site of the new Headquarters is on a fluvial terrace about 600 feet above sea level close to the West Branch of the Don River. Immediately adjacent neighbours are the Aerospace Studies Institute of the University of Toronto on the east and the University of Toronto Press (future printers of ATMOSPHERE starting in 1971) on the north. A little farther to the east are the Connaught Medical Research Laboratories while to the west are York University, only 1 1/4 miles away, and the Meteorological Research Station, at a convenient distance of 4 1/2 miles. The site is on the east side of Dufferin Street facing a developing industrial park about one-third mile south of Steeles Avenue, the present northern boundary of Metropolitan Toronto. The new building is situated approximately 9 miles north of the historic old Headquarters at 315 Bloor Street West.

*Contributed by the Office of the Administrator, Canadian Meteorological Service.

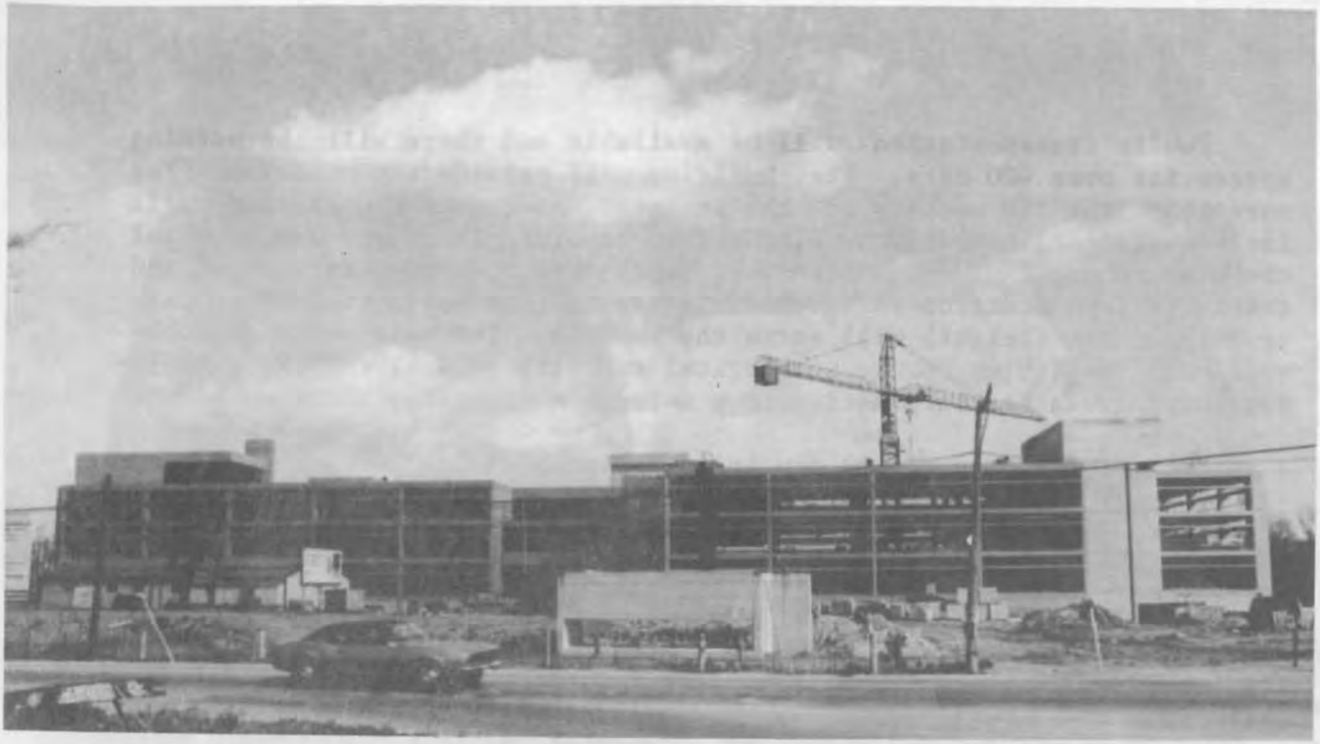

Figure 1. View of new Headquarters Building towards East (October 17, 1970)

Figure 2. View towards Southeast

Public transportation will be available and there will be parking spaces for over 400 cars. The building will provide accommodation for more than the 550 members of the present Headquarters staff and will include offices, boardrooms, classrooms, laboratories,workshops, special computer rooms, library, auditorium, wind tunnel, stores warehouse and cafeteria. In addition to several stairways, four elevators (three passenger and one freight) will serve the building. The main entrance lobby will have facilities for meteorological exhibits as well as displays giving current weather information from automatic observing instruments.

Special features of the new building include:

- a 250 seat auditorium, theatre style stepped-floor design, overall decoration predominantly bronze-orange, equipped with the most modern audio visual equipment, including closed circuit TV, a public address system and facilities for simultaneous interpretation;
- an expanded library and archives with facilities for reading microfilm and microcards;
- an environmental wind tunnel, 32 feet long, housed on the first floor, will have a removable cross section 3 feet square by 6 feet long. The interior of the cross-section will be visible from the top and sides. Boundary-layer studies and instrument testing and calibration will be carried out in a controlled environment within a temperature range of 0 to 30 degrees C, wind speed 0 to 50 mph and relative humidity 20 to 95%;
- laboratories for micrometeorological, ozone and radiation studies with a small observation dome for these latter on the southern roof of the building;
- laboratories for training personnel in maintenance of meteorological instruments and for the development, testing and calibration of instruments;
- a language laboratory;
- office accommodation which follows the modern trend with modular furniture and furnishings blending into an overall colour scheme;accents by a judicious use of plants, prints and room dividers.

The new building will provide a Meteorological Headquarters ranking with the best in the world. All Headquarters activities presently centred in the Toronto area, with the exceptions of those at the Upper Air Training School in Scarborough and at the Research Station near Woodbridge, will be located there. Headquarters staff will, at long last, enjoy a common facility and the frustrations and difficulties which arose through the forced separation of the various components over the past 25 years will hopefully belong to the past.

Work will continue during the winter months to complete the interior of the building. It is expected that all Headquarters units will move into their new accommodation by midsummer 1971. Plans are being made for an official opening in the fall of that year when it is hoped that an international symposium in meteorology will high-light the happy event.

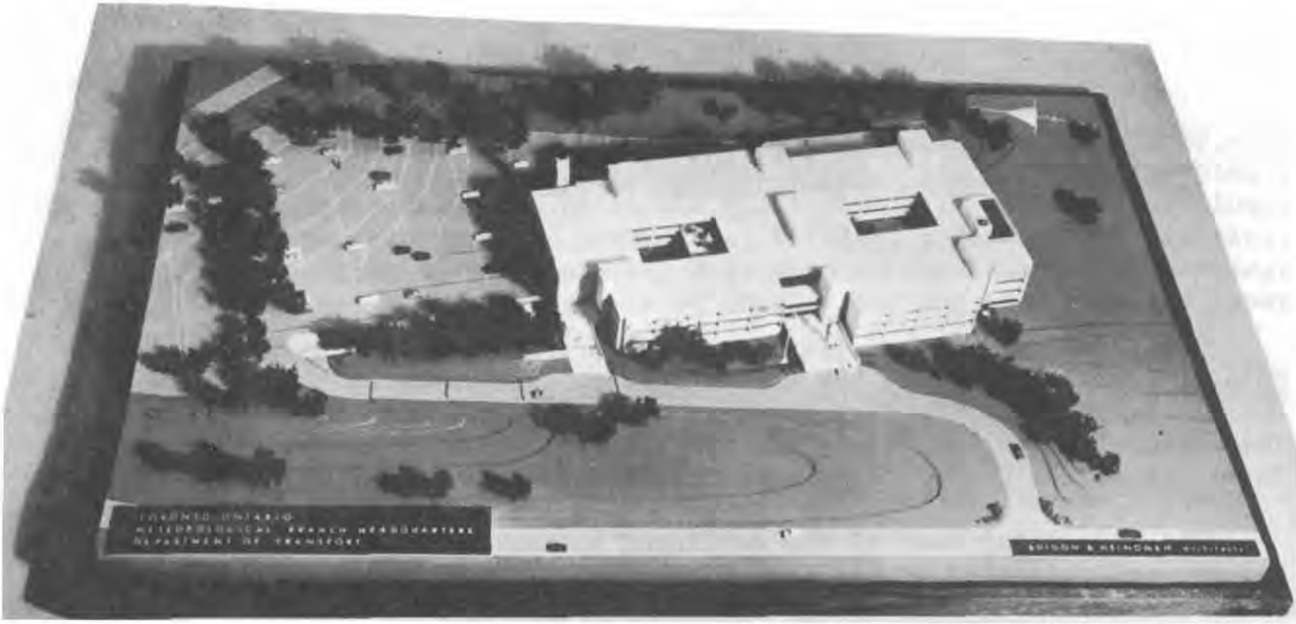

Figure 3. Consulting Architects' model of new building

NEW DEPARTMENTAL HOME FOR THE CANADIAN METEOROLOGICAL SERVICE

Following upon the announcement made in the Throne Speech for the Third (Fall) Session of the 28th Parliament, the Government has decided to move the Canadian Meteorological Service from the Ministry of Transport to a new department dealing with environmental affairs. This new department is based on the Department of Fisheries and Forestry as nucleus with Mr. Jack Davis as Minister, and will bring together all the principal governmental activities bearing on environmental quality.

Other agencies affected are: sections of the Department of National Health and Welfare dealing with air pollution; the water sector of the Department of Energy, Mines and Resources; and the Wildlife Service of the Department of Indian Affairs and Northern Development.

The future course of the Canadian Meteorological Service in the activities of the new department is as yet uncharted (as of November, 1970). No dates for the move have been settled, but a high priority will ensure that it will be effected swiftly.

MEETINGS

SYMPOSIUM ON POLAR METEOROLOGY

W.D. Lawrynuik
Canadian Meteorological Service, Toronto

The Canadian Meteorological Society co-sponsored the Symposium on Polar Meteorology held by the Alaska Science Conference of the AAAS and the American Meteorological Society with the support of the Arctic Institute of North America. The sessions were held at the Geophysical Institute of the University of Alaska, Fairbanks on August 16, 1970.

The increasing need of the developed nations for natural resources has focused attention on the Arctic regions as never before. The Alaska Science Conference of the AAAS held its 21st conference which was billed as "Change In the North! The Physical Environment". The Symposium on Polar Meteorology was part of this conference and fitted very well into the theme.

As expected, there were several interesting papers dealing with the high atmosphere. The dependence of the north on radio communications has led to a natural stress on high altitude observations. However,much more interest centred on the planetary boundary layer and interface phenomena. Special mention should be made of some papers in these fields of study. A paper by Professor Scherdfeger (University of Wisconsin) dealt with wind profiles in the boundary layer over Antarctica. The gently sloping surface produces a sloped inversion layer and hence thermal wind calculations add an important factor to wind spiral solutions. Professor Wendler (University of Alaska) discussed air pollution in Alaska. Ice fog is a major form of pollution in arctic locations such as Fairbanks. The problem is likely to intensify with the expected population growth in northern regions.

Two exciting new projects were outlined at the Symposium. Dr. Barrett (NCAR) presented the ESSA plan designed to acquire the basic data required to study the effect of large-scale human industrial and transport activities on weather and climate. The other project was outlined by Professor Untersteiner of the University of Washington. This will be an arctic ice dynamics experiment designed to gain an understanding of the large scale response of sea ice to its environment.

One unhappy note should be reported. Not a single Canadian paper was presented at this Symposium on Polar Meteorology.

SCOPE

The first meeting of SCOPE* was held in Madrid September 19-20,with 19 scientists in attendance, representing the fields of meteorology, marine ecology,toxicology, nutrition,plant ecology, chemistry, pedology, hydrology, geography, human physiology, biology, genetics and medicine. The two Canadians on SCOPE are Dr. R.E. Munn of the Canadian Meteorological Service and Dr. W. Gallay, chief chemist for the Eddy Pulp and Paper Company.

After considerable discussion, the Committee decided that its principal role was not to initiate research but rather to:

(a) evaluate broad interdisciplinary research programs and identify gaps,

(b) assist in coordination of large intergovernmental and international non-governmental projects,

(c) provide advice on ecological implications of large man-made environmental changes, to such fund-granting agencies as the World Bank.

As an example, there are a number of proposals for global networks of environmental monitoring, including those by WMO, WHO and UNESCO. The Committee felt that it could play a useful role by undertaking an interdisciplinary review of these programs,and it established a Commission on Global Monitoring, which hopefully will hold a Workshop in the summer of 1971 for all intergovernmental and other organizations having an interest in this topic.

SCOPE will seek to promote the formation in each country of an interdisciplinary Environmental Council, which will attempt coordination at the national level. General Assemblies will be held,at which national adherents will be represented, the first one to take place probably in September 1971 in Australia. SCOPE itself will meet next in London, England in January 1971.

*Special Committee on Problems of the Environment

ALBERTA CENTRE

At the September 9, 1970 Annual Meeting of the Alberta Centre of the Canadian Meteorological Society the following were elected as the Executive for 1970-71:

Chairman :	C.E. Thompson Regional Meteorological Office Edmonton	Treasurer :	J. Dublin University of Alberta Edmonton
Secretary:	S.M. Checkwitch Edmonton Weather Office Edmonton	Calgary Member:	R.K. Holbrook Weather Office Calgary

HALIFAX CENTRE

The following members of the Halifax Centre of the Canadian Meteorological Society have been elected to serve as the Executive for 1970-71:

Chairman :	A.P. Beaton Sea Ice Forecast Central
Secretary-Treasurer:	A.D. Gates Maritimes Weather Office

Two fall meetings of the Centre have been held. On September 23, LT(S) Reinhold Winterer of Maritimes Command Headquarters related some of his experiences as a meteorologist with the naval force that went north to the Arctic and to Hudson Bay last summer. On October 20, A.H. Osborne of CFB Shearwater discussed anomalous sea level pressure values recorded at Truro.

MONTREAL CENTRE

APRIL 28, 1970

Dr. G.L. Austin of McGill University spoke on "Ionospheric Meteorology". Ground-based,radio-wave methods for measuring ionospheric winds and scale size of irregularities, and for detecting wave motions in the ionosphere were described; also the possible meteorological implications were discussed briefly.

SEPTEMBER 16, 1970

Prof. James E. McDonald of the University of Arizona spoke on the "Environmental Effects of the Supersonic Transports". In the development of the American SST program a number of fears have arisen concerning the various pollutant effects that may result. While it must be emphasized that figures are very "iffy" at this stage, some preliminary studies, based on fuel consumption projections to the year 1990, and Boeing's emission figures, have led to the fear that the nitric oxide emissions, converted to nitrates in passing through the ozone layer, may lead to a significant increase in the concentration of particulate matter in the troposphere.

OCTOBER 20, 1970

Dr. T.J. Simons of the Canada Centre for Inland Waters gave "An Interpretation of Atmospheric Instability Theory in Terms of Practical Meteorology." Dr. Simons suggested that in order to obtain meaningful results from baroclinic instability studies, traditional normal mode theory must be augmented by considering the development as an initial value problem. Experiments indicate that in addition to wavelength considerations there is a large dependence on the level at which the perturbation is introduced. The development was found to be close to zero when the perturbation was near the jet stream, with the most favourable level roughly in mid-troposphere.

CENTRE DE QUEBEC

Mardi, le 6 octobre 1970, a eu lieu à la Faculté d'Agriculture de l'Université Laval, la première réunion d'information de la Société de Météorologie de Québec pour la saison 1970-71. Le conférencier invité à cette occasion était le Docteur M. Grandtner, professeur d'écologie forestière au département d'Écologie et de Pédologie de l'Université Laval.

Le Docteur Grandtner a traité des "relations climat-végétation au Québec méridional". Après avoir étudié les principaux traits du climat et de ses effets sur la formation des sols, le conférencier a exposé, selon les techniques classiques de la phytosociologie, les associations végétales climaciques de la forêt décidue et mixte du Québec dans le but de dégager les relations qui peuvent exister entre les variables climaciques, la composition floristique, la richesse du sol et la productivité des groupements étudiés, afin de voir quelles sont les possibilités d'aménagement et de mise en valeur de cette portion du territoire québecois.

L'auditoire a vivement apprécié cette présentation qui fut abondamment illustrée de diapositives. Le conférencier fut présenté par le président, Monsieur R. Perrier, et remercié par Monsieur J.-G. Fréchette, vice-président.

CALL FOR PAPERS - FIFTH ANNUAL CONGRESS
- Second Canadian Conference on Micrometeorology

The Fifth Annual Congress and Annual General Meeting of the Canadian Meteorological Society will be held at Macdonald College, P.Q., May 12-14, 1971. On May 12, the Congress will hold joint sessions with the Second Canadian Conference on Micrometeorology which is to be held at the same location, May 10-12, 1971. The theme of the Congress is "Meteorology and the City" and the joint sessions on May 12 will be devoted to invited and contributed papers on this topic. On subsequent days, contributed scientific papers on other aspects of meteorological research will be presented.

Other sessions at the Second Canadian Conference on Micrometeorology are planned on the topics: Methods of Measurement, Air/Water Interactions, Micrometeorology over Snow and Ice, Agrometeorology, Forest Meteorology, Topoclimatology, Mesometeorology, and Theoretical Aspects of Micrometeorology.

Members and others wishing to present papers at these meetings should send titles and definitive abstracts (preferably less than 300 words) as follows: for the Fifth Annual Congress, to the Program Chairman, Dr. C.L. Mateer, Canadian Meteorological Service, 315 Bloor Street West, Toronto 181, Ontario; for the Second Canadian Conference on Micrometeorology, to the Chairman of the Planning Committee, Dr. R.E. Munn (at the same address), no later than February 15, 1971.

Titles and abstracts for the joint sessions on May 12 may be sent to either of the Program Chairmen. Authors whose papers have been accepted for presentation at the meetings will be notified by April 1, 1971.

Information on registration, accommodation, etc., will be provided in due course. Prof. R.H. Douglas of Macdonald College is Arrangement Chairman for both meetings.

SCHEDULED NATIONAL MEETING OF THE AMERICAN WATER RESOURCES ASSOCIATION

June 14-18, 1971

AWRA RESEARCH CONFERENCE - "Planning for Water Quality and Standards". Sponsored by the American Water Resources Association and the University of Wisconsin-Milwaukee, Milwaukee, Wisconsin. Contact: Dr. G. Karadi, General Chairman and Professor, Department of Applied Science and Engineering, University of Wisconsin-Milwaukee, Wisconsin 53201. Tel: (414) 228-4964. (Participation by invitation or by application. Request Application Form from Dr. G. Karadi or the AWRA Headquarters.)

THE 1971 INTERNATIONAL SOLAR ENERGY SOCIETY CONFERENCE

The 1971 conference of the Solar Energy Society will be held May 10-14,1971,at NASA Goddard Space Flight Center, Greenbelt, Maryland, U.S.A., about 15 miles north of Washington, D.C. Fees (in U.S. funds) are $15 for SES members and $20 for nonmembers. There will be a tour of the Goddard Space Flight Center for all interested conference participants.

The program is devoted to the Theme: "Sun's Energy - Resource for Survival". Papers are being solicited in the following areas:

1. Solar Energy vs. Our Atmosphere
   - Pollution
   - Meteorology
   - Survey of World Solar Energy
2. Technology Fallout From The Space Programs
   - Photovoltaics
   - Technology/Education
   - Technology/Industry
   - Future Commercial Power from the Sun
   - Materials
   - Techniques
3. Use of Solar Energy in Sun-rich Areas of the Earth
   - Environmental
   - Sewage Disposal
   - Water Heating and Purification
4. Solar Energy Research
   - Measurements
   - Heat Engines
   - Energy Storage
   - High Temperature
   - Education
   - Economics
5. Solar Energy in Agriculture
   - Productivity
   - Energy Budget
   - Photo Response

A summary of proposed papers should be submitted by Dec. 31, 1970 to:

William R. Cherry, Code 716
NASA-Goddard Space Flight Center
Greenbelt, Maryland 20771, U.S.A.

A draft of proposed papers should be submitted by March 31, 1971 to the same address. Final manuscripts are due at time of meeting.

Further details about the Solar Energy Society, including information on membership, may be obtained by writing:

Solar Energy Society
Smithsonian Radiation Biology Laboratory,
12441 Parklawn Drive
Rockville, Maryland 20852, U.S.A.

CALL FOR PAPERS - FIRST CONFERENCE ON BIOMETEOROLOGY
- TENTH CONFERENCE ON AGRICULTURAL METEOROLOGY

The first National Conference on Biometeorology will be held at the University of Missouri, Columbia, Missouri, on June 9 and 10, 1971 and the Tenth National Conference on Agricultural Meteorology June 10 and 11. On June 10 joint sessions of Biometeorology and Agricultural Meteorology are planned. Abstracts for both meetings are solicited.

Subjects to be covered in the Biometeorology sessions on June 9 are: experimental data on biometeorological mechanisms pertaining to organism-environment interactions;physiological responses of organisms to climate, weather, artificial environments, and other environmental factors; air pollutants and organism responses; optimal human environments; optimal domestic and laboratory animal environments; and, mathematical models of organism-environmental systems.

The joint sessions on June 10, consisting of invited speakers and contributed papers from the Biometeorology and Agricultural Meteorology groups, will focus on unifying concepts and principles for plant, animal and human bio- and agricultural meteorology; training of bio- and agricultural meteorologists; and contributions that bio- and agricultural meteorologists might make to the development of emerging nations.

The Agricultural Meteorology sessions on June 11 will emphasize three major subject areas: energy, gas and water exchange processes for vegetation systems; interaction between meteorological and biological processes in the crop environment;and application of weather and climatic information to interdisciplinary decision making and problem solving.

These latter sessions will continue the practice of having shorter contributions (but well prepared) of 5 minutes duration on the following: important recent findings,unique instrument developments or applications, unexpected problems, etc. The intent to present such material and the title should be made known to the program chairman before 15 May, 1971.

Abstracts for the appropriate conference are to be mailed no later than January 15 to:

Harold D. Johnson
Biometeorology Program Co-Chairman
104 Eckles Hall
University of Missouri
Columbia, Missouri 65201
U.S.A.

Dr. Kenneth Knoerr
Agricultural Meteorology Co-Chairman
School of Forestry
Duke University
Durham, North Carolina 27706
U.S.A.

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NOTES FROM COUNCIL

The following were elected to membership at the September 23, 1970, meeting of Council:

Undergraduate Student Member

Murray Bryson
Gordon Leonard Moore

The following were elected to membership at the October 28, 1970, meeting of Council:

Graduate Student Member

Thomas Alfred Agnew

Undergraduate Student Member

William Werner Plikett

Membership of the Society on October 28, 1970, stands at 622, including 95 student members.

In accordance with the motion passed by the members at the 4th Annual Congress at Winnipeg in 1970, two Standing Committees have been appointed by the Executive Committee. The terms of reference are given below.

STANDING COMMITTEE ON PUBLIC INFORMATION

Terms of Reference

To advise the Executive Committee of the Canadian Meteorological Society on matters, within the concern of the Society, requiring the provision of information to the public in general, or to specific groups. Such studies and reviews may be made on the request of the Executive Committee or on the initiative of the Standing Committee.

STANDING COMMITTEE ON SCIENTIFIC AND PROFESSIONAL MATTERS

Terms of Reference

To study and report to the Executive Committee from time to time on Scientific and Professional matters pertaining to meteorology when directed by the Executive or on the initiative of the Standing Committee itself.

CALL FOR NOMINATIONS

Nominations are requested from members and Centres for the 1970 Society Awards to be presented at the 1971 Annual Meeting. Four awards are open for competition: 1) the President's Prize for an outstanding contribution in the field of meteorology by a member of the Society; 2) the Prize in Applied Meteorology for an outstanding contribution in the field of applied meteorology by a member; 3) the Graduate Student Prize for a contribution of special merit by a graduate student; and 4) the Dr. Andrew Thomson Undergraduate Student Prize for a contribution of special merit by an undergraduate student. The awards will be made on the basis of contributions during the 1970 calendar year. Nominations should reach the Corresponding Secretary not later than March 1, 1971.

1971 LECTURE TOUR

Professor F. Kenneth Hare of the Department of Geography at the University of Toronto has been engaged by the Canadian Meteorological Service to carry out a tour across the country and to speak at Centres of the Society. Professor Hare's topic is "Northern Ecoclimatology". He is also expected to visit most of the major Canadian cities where he will discuss the subject "Applications of Meteorology to Water Resources Technology" with Regional Meteorologists, university and government scientists and officials, and Society members.

Professor Hare's schedule is planned to include a Western tour during February, 1971, followed by an Eastern tour in April.

ATMOSPHERE
INDEX TO VOLUMES 1 TO 6
1963-1968

ROYAL METEOROLOGICAL SOCIETY, CANADIAN BRANCH

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where V is Volume number, N the issue number and p the page number.

Section A: Index of contributions by author
Section B: Subject index for RMS (Canadian Branch) and CMS
Section C: General subject index

Section A: Index of Contributions by Author

Correspondence is indicated by an asterisk.

Section B: Subject Index for RMS (Canadian Branch) and CMS

Section C: General Subject Index

MEETINGS - continued from Page 100

Each abstract should be clear, concise and informative (see p. 470, Bull. Amer. Meteor. Soc., Aug. 1965) as it will be the basis for the acceptance or rejection of a paper. Providing key words will aid scheduling of the paper.

The local arrangements chairman for the conferences is Dr. James D. McQuigg, ESSA, P.O. Box 941, Columbia, Missouri 65201.

EASTERN SNOW CONFERENCE

The 28th Annual Meeting of the E.S.C. will be held in Fredericton, N.B., on February 4-5, 1971.

The Eastern Snow Conference is an international organization in eastern Canada and the northeastern United States concerned with origin precipitation, accumulation, character, melt and runoff of snow from the viewpoints of meteorology, power generation, conservation, engineering, forestry and related fields.

For further information about the 1971 meeting contact:

Mr. G.P. Williams,
President, Eastern Snow Conference,
Division of Building Research,
National Research Council,
Ottawa, Ontario.

INSTRUCTIONS TO AUTHORS

1. Manuscripts shall be submitted in duplicate, typed doubled-spaced on $8\frac{1}{2}$ x 11" bond, with the pages numbered consecutively.

2. Two copies of figures shall be submitted with the manuscript. The originals should be retained by the author until it is established whether or not revisions will be required. A list of the legends for figures shall be typed together on a separate sheet.

3. Authors shall keep in mind when labelling that figures will require reduction to 5" x 8" (full page) or smaller. Photographs shall be glossy prints with good contrast. Other diagrams shall be drawn with pen and ink and be in final form for photographing.

4. Literature citations in the text shall be by author and date. The list of references should be primarily alphabetical by author, and secondly chronological for each author.

5. Units should be abbreviated only if they are accompanied by numerals. For example, 10 km, but several kilometers.

6. Tables shall be prepared on separate pages each with an explanatory title. Only essential vertical and horizontal ruling will be included.

7. Metric Units are preferred.

8. Footnotes to the text should be avoided.

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THE CANADIAN METEOROLOGICAL SOCIETY
La Société Météorologique du Canada

The Canadian Meteorological Society came into being on January 1, 1967, replacing the Canadian Branch of the Royal Meteorological Society, which had been established in 1940. The Society exists for the advancement of Meteorology and membership is open to persons and organizations having an interest in Meteorology. There are local centres of the Society in several of the larger cities of Canada where papers are read and discussions held on subjects of meteorological interest. Atmosphere is the official publication of the Society. Since its founding, the Society has continued the custom begun by the Canadian Branch of the RMS of holding an annual congress each spring, which serves as a National Meteorological Congress.

For further information regarding membership,please write to the Corresponding Secretary, Canadian Meteorological Society, P. O. Box 851, Adelaide Street Post Office, Toronto 210, Ontario.

There are four types of membership - Member, Corporate Member, Graduate Student Member and Undergraduate Student Member. For 1970, the dues are $8.00, $25.00, $2.00 and $1.00, respectively. Atmosphere is distributed free to all types of member. Applications for membership should be accompanied by a cheque made payable at par in Toronto to The Canadian Meteorological Society.