THE POSTWAR GROWTH 1947 – 1970

Administration

When Andrew Thomson became Controller in December 1946, the Meteorological Division Headquarters was organized into a system which was to remain intact until 1971. The new sections and chiefs were – Administration, J.R.H. Noble, succeeded by L.T. Campbell in 1965; Basic Weather, D.C. Archibald; Climatology, A.J. Connor, succeeded by C.C. Boughner in 1949; Forecast, P.D. McTaggart-Cowan, succeeded by F.W. Benum in 1959; Instruments, R.C. Jacobsen, succeeded by H.H. Bindon in 1953, and Research and Training, E.W. Hewson, succeeded by D.P. McIntyre in 1949. At the time of the reorganization, Dr. P.D. McTaggart-Cowan became Deputy Controller, and he became the Service's senior officer upon Dr. Thomson's retirement in September 1959. Earlier, in 1956, Dr. Thomson's title had been changed from Controller to Director when the Division became the Meteorological Branch. In 1964 Dr. McTaggart-Cowan resigned to become the first President of Simon Fraser University in British Columbia, and Mr. J.R.H. Noble became Director. With the reorganization of the Ministry of Transport in 1970, Mr. Noble's title was changed to Administrator, and that of the Branch to the Canadian Meteorological Service.

Although the Headquarters' staff had been organized into sections for many decades, there had never been any field or regional organization within the Service. During wartime, the officers in charge of the main civil and military weather centres were considered to be the senior officers in their respective regions. Soon after the war when the Department began developing the regional concept within the Air Services Branch, regional meteorologists were appointed in each of the six regions. In the Pacific Region at Vancouver, A.R. McCauley served in this capacity until his retirement when he was succeeded by J.L. Knox. At Edmonton, in the Western Region, D.H. Smith was the Regional Meteorologist throughout the period, as was D.M. Robertson for the Central Region at Winnipeg, W.E. Turnbull was the first Ontario Regional Meteorologist at Toronto, and after his death was succeeded by G.L. Pincock. At Montreal, in the Quebec Region, H.M. Hutchon and R.J. Fichaud served, while at Moncton in the Atlantic Region, J.A. Lenahan was followed by H.M. Hutchon and C.E. Stevens.

Within all government departments the administrative details having to do with planning, finance and personnel are routinely handled year after year. Between the late 1950s and 1971, however, several new programs were introduced which taxed the administrative resources of the organization. During the 1950s technical and professional manpower was in short supply, and in an effort to improve the situation within the Service, new classification standards were evolved for meteorologists and technicians which were brought into effect in 1960. A few years later "long-range planning" for 5 to 10 years into the future was introduced on a routine basis and by April 1967 a new scheme of financial management was begun. It was also during the late 1960s that Parliament legislated into force the Public Service Staff Relations Act permitting collective bargaining which necessitated a complete classification revision of all employee groups and categories within the government service. These added projects and programs made a very heavy workload for those in administrative services during the 1960s.

Weather Observing

The cessation of wartime flying training and operations in 1945 meant a slight decrease in the number of weather reporting stations. Several, such as The Pas and Churchill, Man. stations were taken over by the Division from the USAAF. The RCAF continued to operate a few observing stations, but in 1947 the number of first order or synoptic reporting stations had dropped to 217 from 258 in 1945. The need for attention to the civilian observing network was great, and the first assistants given to the new Regional Meteorologists were meteorological inspectors. The basic network of stations on the Canadian mainland was virtually complete, however, and in those postwar years attention turned again to the far North. In 1947 the first of the Joint Arctic Weather Stations, supported by both Canada and the United States, were established at Resolute and Eureka on the Queen Charlotte Islands. Isachsen and Mould Bay were set up in 1948, and finally Alert, on the north coast of Ellesmere Island, less than 500 miles from the North Pole, was established in 1950. Also during the late 1940s a few upper air stations in northern Canada, which had been operated by the USAAF, were taken over by the Division. It was also in this postwar period that the ocean weather ship program was commenced and Canada shared with the United States responsibility for a station in the Atlantic Ocean off the Labrador coast, but in 1950 traded this for full responsibility for station "P" in the Pacific Ocean, some 900 miles west of Vancovuer Island.

After twenty years of hourly surface observations on the half-hour and upper air observations at 03 and 15 GMT, surface observational times were changed in 1955 to the hour, and upper air observations in June 1957 to 00 and 12 GMT. Another significant event in meteorological observing occurred in March 1968 when a meteorological automatic reporting station (MARS) was installed at Gonzales Observatory, Victoria, B.C. This station, which automatically observed temperature, dew point temperature, wind and precipitation, transmitted data to a teletype circuit every 15 minutes and was the first such permanent installation in Canada.

Training

An abundance of both meteorologists and technicians brought training activities within the Service to a standstill immediately after the war. The last wartime type Advanced Course for meteorologists was held during the summer of 1946, and two years were to elapse before organized training was commenced again. In the fall of 1948 the Service and the University of Toronto reinstated the M.A. course in Physics (Meteorology), at the same time the first postwar Intensive Course for B.A. and B.Sc. meteorologists was offered, and both types of courses have been given every year since then. Later McGill University entered the M.Sc. training field and seven Departmental meteorologists graduated from the first course in December 1962, and subsequently a graduate program in meteorology was introduced at the University of Alberta in 1966. Technician training was markedly improved late in the 1950s with the opening of an Air Services Training School in Ottawa. Here all new observers from throughout the country must pass an initial interview course and later may return for advanced and specialized courses.

Forecasts

Since the vast majority of Canada's meteorologists were involved in weather forecasting during the war, it was only natural that attention was first given to revitalizing the public and civil aviation forecasting systems in the fall of 1945. Public weather forecasts for all of Canada east of the Rocky Mountains were still being prepared by a small staff of four meteorologists at Headquarters using methods largely developed by Stupart and Webber before the turn of the century. By 1946, however, regional forecast centres had assumed responsibility for public weather forecasts, new forecast districts and regions had been established and forecasts were issued four times a day instead of two. A new system of marine weather forecasts was also introduced and the storm warning services decentralized. No longer were there to be special forecasts for each scheduled commercial flight, but aviation route forecasts were now issued 12 hours in advance, and those for terminals from 12 to 24 hours ahead.

By the early 1950s the first city weather offices – Hamilton and Victoria, had been established and daily weather maps were being prepared for several newspapers throughout the country. It was also at this time that the Division began providing special services for TV and radio weather programs, and in some cities meteorologists were given the opportunity to participate in them. Two meteorologists, P.P. Saltzman in Toronto and R.A. Hornstein in Halifax, became so successful at TV weather casting that they became regular participants in interview and public affairs programs.

From the beginning of modern operational meteorology in 1937 many weather maps and charts had been plotted and analyzed each day at every office in the preparation of forecasts. To eliminate this duplication throughout the country, a start was made in the late 1940s on establishing a Central Analysis Office. It became operational in 1952, and the transmission of facsimile maps to other weather offices began on a national scale in August 1953. During the late 1950s meteorologists at CAO researched and developed numerical weather prediction methods. A modern "dedicated" computer was acquired, and by 1965 computer prepared prognostic maps which were sent by facsimile to offices across the country, had an order of accuracy equal to those prepared by meteorologists using traditional synoptic methods. More and more of the routine work at the CAO was taken over by the computer, and in August 1970 computer-generated upper level wind and temperature forecasts for aviation replaced the forecasts previously produced by synoptic methods.

As numerical weather forecasting methods were being developed it became apparent that the Canadian weather forecasting service needed modernizing. A new system in which the Central Analysis Offices was responsible for hemispherical analysis and the issuing of prognostic maps, Weather Centrals and Weather Offices for tailoring forecasts to the needs of the local users was introduced in the Maritimes in 1962, in British Columbia in 1963-64, and on the Prairies in 1966-67. At Toronto and Montreal combined Weather Centrals and Weather Offices have been operated over the past decade.

Climatology

Although completely overshadowed by operational meteorology and weather forecasting during World War II, climatological services and applications were being developed and used extensively. It was also during this time that punched card systems for data handling were being developed and meteorologists began to realize that modern statistical theory could be used advantageously with climatological data. The growth of the Meteorological Branch's Climatology Division at Headquarters from 12 people in 1945 to more than 100 in 1960 indicated that planners and designers in government and industry had begun to comprehend the value of such services in their operations and capital investment planning.

In the 1940s all historical and statistical climatological data publications were prepared by clerical methods. In 1950 the Service began using punched cards, and over the next two decades succeeded in bringing modern methods of data processing to its routine and project operations. The historical data periodicals were put on a scheduled basis and series of statistical summaries dealing with temperature, precipitation, humidity, wind, etc., were introduced. A Climatological Atlas of Canada was issued, as well as dozens of publications dealing with the national and regional climates, bibliographies, manuals and guides to the availability of Canadian climatic data and maps.

Applications

The development of climatology during the postwar period was not limited to better routine processing of data and to an increase in the production of climatological publications. A secondment policy was introduced in the late 1940s whereby technical assistance was provided to other government departments through the secondment of meteorologists. For the next twenty years several meteorologists were seconded to other government departments and agencies – Agriculture, Forestry, National Research Council, etc., to work in the various fields of applied meteorology and climatology. Applications

work began in the mid-1950s at Headquarters when a Hydrometeorology unit was established – a consequence of disastrous floods in the preceding decade on the Fraser, the Red and in southern Ontario. Late in the 1960s a gradual change in the secondment policy led to increased capabilities at Headquarters in such fields as air pollution, Arctic climatology, microclimatology, industrial climatology and agricultural climatology, as well as in hydrometeorology. Also, by 1970, a beginning had been made in building up "scientific services" capabilities in the field by the posting of meteorologists to Regional Offices for work in the general applications field.

Research

Meteorological research activities had been set aside but not forgotten during wartime. In the immediate postwar years many operational meteorologists throughout the country found time to carry out various kinds of forecast research on such subjects as the formation of fog, the modification of air masses, the persistence of precipitation, etc. At Headquarters, meteorologists in the Research and Training unit began an analysis program which enabled them to assist field meteorologists in preparing "experience reports" – complete investigations of instances where forecasts had been incorrect. This led to the development and publication of the frontal contour method of analysis and the "three-front model" of the atmosphere by Penner, Crocker and Godson. Another outcome of this work was the beginning of a Central Analysis Office which is more completely described in another paragraph.

The first major international research program after the war was the International Geophysical Year (IGY) in 1958 when many series of special meteorological observations were taken and analysis programs carried out. Other succeeding international research programs in which the Service was involved were the International Hydrological Decade and the International Biological Period, and by 1970 extensive planning was underway for both the International Field Year on the Great Lakes and the Global Atmospheric Research Program.

In 1956, the Meteorological Branch, in collaboration with McGill University and the Alberta Research Council, began a series of hail studies in Alberta. This project, which continued for more than 15 years, provided for considerable research into the meteorological conditions associated with all aspects of hail and hail storms in an attempt to determine whether or not hail suppression measures could be feasible. A second major field research program, the Precipitation Physics Project, saw cloud seeding and associated ground operations carried out in northern Ontario and northern Quebec over a five-year period. A final report published in 1966 offered the opinion that cloud seeding had no apparent effect on precipitation in that part of the country.

In addition, the Meteorological Branch was involved in other smaller field research programs during the 1960s – research into the possible causes of tobacco flecking in Ontario, forest meteorology in the Ottawa valley, air/water interface relationships over the Great Lakes, etc. To facilitate field meteorological research and instrument testing, a 100-acre farm was purchased north of Toronto in the early 1960s, and by 1970 was the site of dozens of testing and research projects.

For the past two decades research has continued in perfecting equipment to measure radiation and ozone and in gaining a better understanding of these parameters. In recent years considerable attention has been given to such synoptic research studies as the relation between precipitation and lake levels, wind shear and better techniques for airport terminal forecasts. During the 1940s and early in the 1950s there was little support for meteorological research at Canadian universities. However, as the Branch obtained more resources to support university research (the grant money for this purpose reached a quarter of a million dollars by 1970), meteorologists at several universities became renowned for their specialties – air/water interface at British Columbia, hail and ozone at Toronto, Arctic meteorology and radar at McGill, etc.

Ice

In recent years the Meteorological Branch has become involved in programs of ice reconnaissance and ice forecasting to support cold weather shipping – in the Arctic in summer, and along the Atlantic coast and the Gulf of St. Lawrence in winter. To provide the best possible advice on current and forecasted ice conditions in navigable waters, aerial ice observing was commenced during 1956-57, and an Ice Forecasting Central was established at Halifax in 1959-60.

Instruments

Meteorological instrumentation work has changed markedly over the past quarter century. In the years following 1945 emphasis was on reconditioning and repairing equipment neglected during wartime, but work was soon undertaken on developing Canadian actinographs and remote reading thermometers, and the conversion of upper air equipment to measure winds as well as pressure, temperature and humidity. During the 1950s complete calibration and testing services for all radiosonde instruments used in Canada were handled within the Service. Also during this time considerable development work was done on ceilometer and transmissometer equipment, and a beginning was made on the task of developing automatic weather observing stations suitable for the Canadian climate. During the 1960s, in addition to maintaining standard meteorological equipment and developing new electronic gear for the regular meteorological observing networks, much work was required for the development and maintenance of numerous types of special equipment for new research projects.

International

Personnel of the Meteorological Branch began to play an increasing role in international meteorology following the war. The first postwar meetings of the ten Technical Commissions of the International Meteorological Organization were held at Toronto during August 1947. At these meetings a start was made in transforming the IMO into the World Meteorological Organization, and the latter came into being on March 23, 1950. Canadian meteorologists have participated in a multitude of WMO activities since that time. A delegation has represented Canada at the WMO Congresses held at four-year intervals, while the Director of the Branch has usually been a member of the WMO Executive Committee. Both Dr. McTaggart-Cowan and Mr. Noble have served as President of Regional Association IV – North and Central America, while C.C. Boughner and K.T. McLeod served terms as Presidents of the Technical Commissions for Climatology and Maritime Meteorology respectively.

Significant contributions have also been made to several developing countries by training meteorologists and students in various aspects of the discipline in Canada. Often, in cooperation with the Department of External Affairs, technical assistance was sent to such countries as Congo, Nigeria, Pakistan, Iran, Libya, etc. Over the two decades Canada has also played an important role in activities of the International Union of Geodesy and Geophysics and its affiliated associations. The 1955 IUGG meetings were held at Toronto and Dr. W.L. Godson has served as Secretary of the International Association of Meteorology and Atmospheric Physics since 1960.

ENVIRONMENT CANADA – 1971

As part of Air Services of the Department of Transport Canada's national meteorological service had grown in the government hierarchy from a Division in 1936 to a Branch in 1956. Early in 1970, with the reorganization of the Department into a new Ministry of Transport, the Branch became the Canadian Meteorological Service, the Director's title was changed to Administrator and he reported directly to the Deputy Minister's office. But the new organization did not last for long. With the passing of the Government Reorganization Bill by Parliament on June 10, 1971, the Department of the Environment was created, and on the following day the Canadian Meteorological Service was transferred to

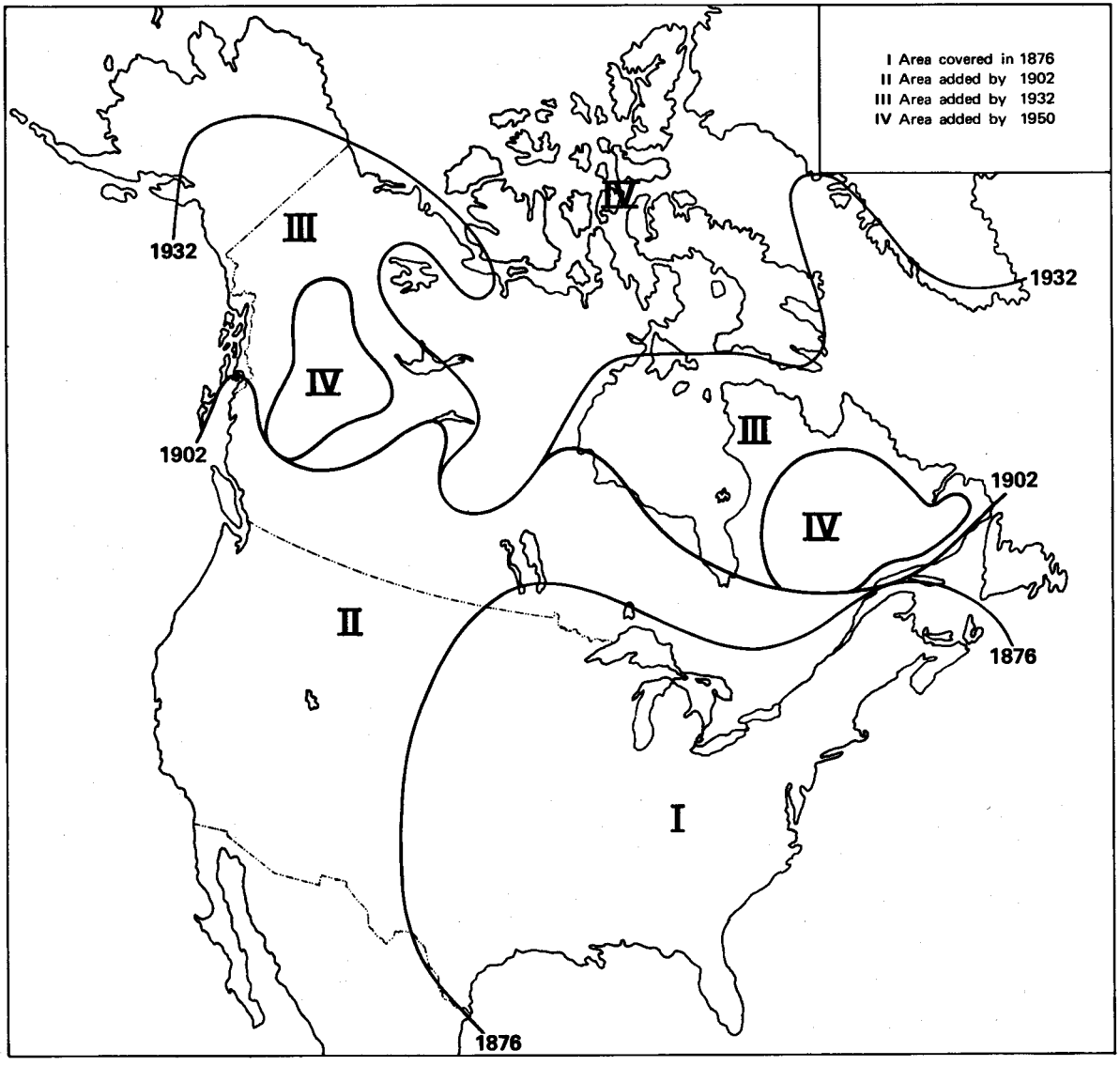
the new Department and became the Atmospheric Environment Service, while the Administrator became an Assistant Deputy Minister of the new Department. Throughout fiscal 1971-72 planning for the necessary reorganization within the Service proceeded, but the centennial year closed with the old organizational framework intact.

However, the Service's Centennial Year was marked by two special events. During the summer months of 1971 the Service began to occupy a new Headquarters building at 4905 Dufferin Street in Metropolitan Toronto's suburban Downsview. By late August most of the Headquarters' staff were reunited in the new building after thirty years of operating out of many different buildings in downtown Toronto – the Headquarters at 315 Bloor Street West had been unable to house all units since wartime. As part of the Centennial celebrations and the opening ceremonies of the new building, an international symposium featuring "A History of Meteorological Challenges" was held for three days immediately preceding the official opening on October 29. Perhaps fortuitously, but certainly forecast, almost perfect summer weather prevailed in Toronto during the week of the celebrations!

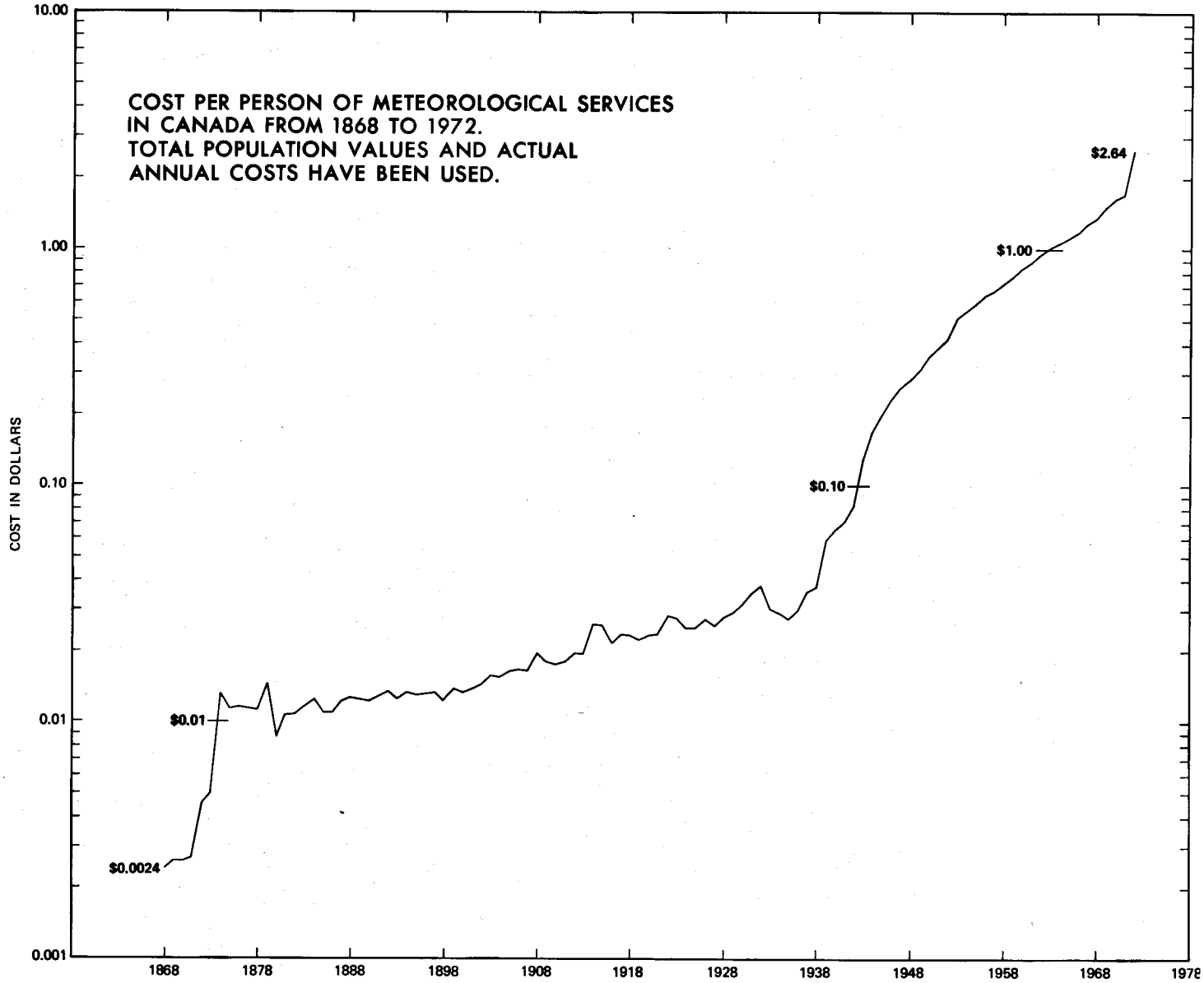
Before concluding this review of activities within Canada's national meteorological service over the past century, attention must be called to the existing, and very necessary, liaison between meteorology and other sciences, and also between meteorology and the economic and environmental life of the country. Historically, this was one of the first Canadian government-sponsored Services. Over the first decades, its meteorologists were Canadian pioneers in the fields of magnetism, seismology, hydrography, astronomy, etc., and provided a time service as well as weather service. As new government departments were organized to provide the other scientific services and when the need for meteorological services to aviation became all-important, the "Meteorological Office" withdrew to concentrate on meteorology. Over the most recent decade, however, meteorologists are again widening their scope of action. Meteorology is the science of the atmosphere; the meteorology of Canada is of great importance to the economy and to the environment. While beginning its second century, the Atmospheric Environment Service, as part of the Department of the Environment, must be prepared to make major contributions, not only in the field of meteorology, but also in aid of the total Canadian environment.

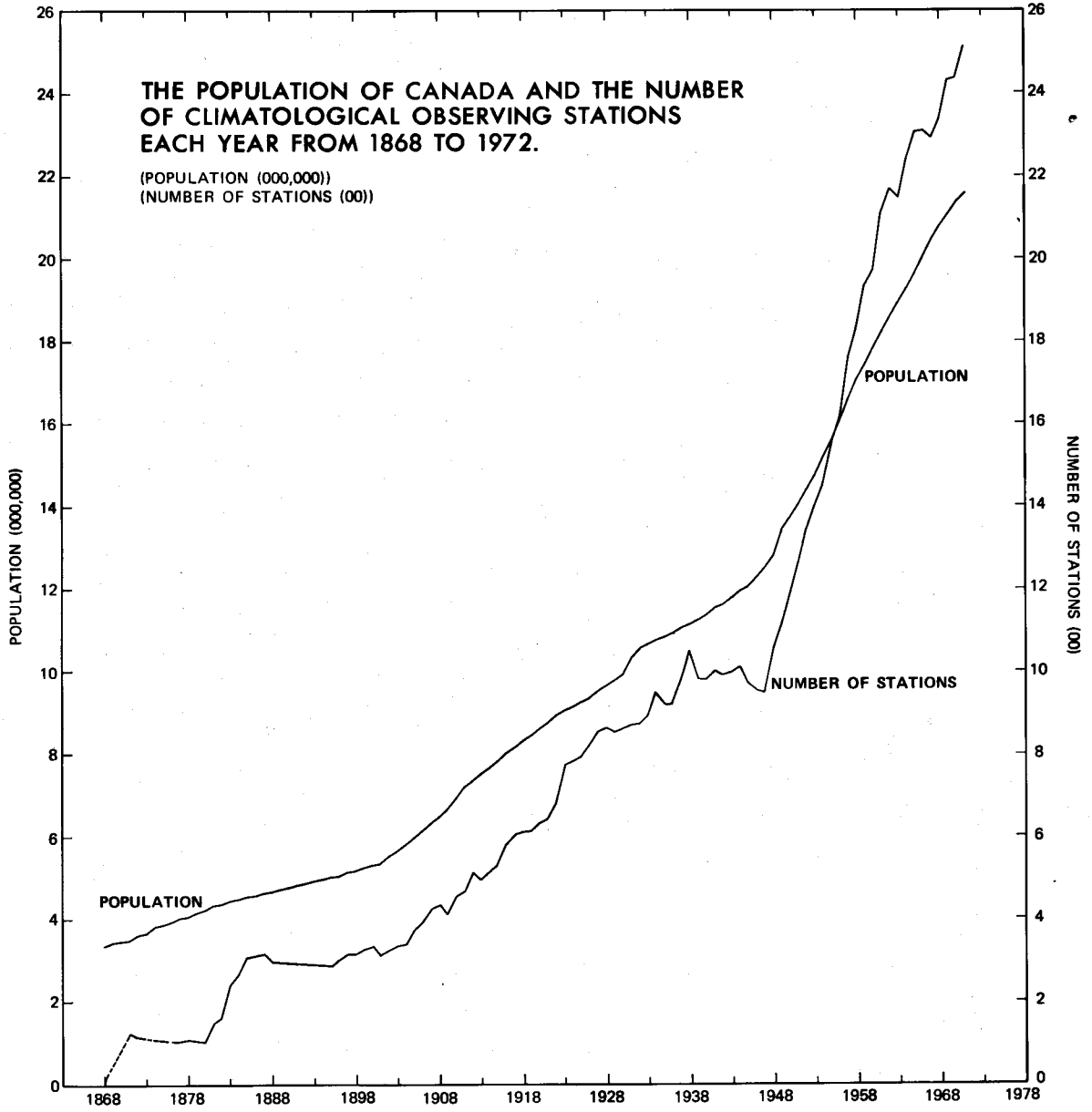
NUMBER OF OBSERVING STATIONS 1871–1971

YEAR	BC	YT	NWT	ALTA	SASK	MAN	ONT	QUE	NB	NS	PEI	NFLD	TOTAL
1871	1	–	0	–	–	1	48	40	8	26	0	2	126
1881	8	–	13	–	–	5	70	15	12	19	3	4	149
1891	19	–	26	–	–	76	165	24	16	17	3	4	350
1901	54	0	54	–	–	37	117	19	12	13	3	8	317
1911	81	2	0	66	59	29	96	26	10	20	3	6	398
1921	138	3	6	88	54	33	135	76	22	29	2	9	595
1931	221	2	21	80	88	36	150	118	20	29	3	9	777
1941	219	6	23	101	98	42	166	120	59	33	3	37	907
1951	241	12	37	135	167	68	306	196	46	56	4	30	1298
1961	393	14	79	289	248	103	406	245	51	79	13	56	1976
1971	467	33	59	410	240	159	430	406	64	87	16	63	2439



RELATIVE AREAS COVERED BY THE CANADIAN DAILY WEATHER MAPS FROM 1876 TO 1972


COST PER PERSON OF METEOROLOGICAL SERVICES
IN CANADA FROM 1868 TO 1972.
TOTAL POPULATION VALUES AND ACTUAL
ANNUAL COSTS HAVE BEEN USED.
COST IN DOLLARS
10.00
1.00
0.10
0.01
0.001
$0.0024
$0.01
$0.10
$1.00
$2.64
1868
1878
1888
1898
1908
1918
1928
1938
1948
1958
1968
1978


THE POPULATION OF CANADA AND THE NUMBER OF CLIMATOLOGICAL OBSERVING STATIONS EACH YEAR FROM 1868 TO 1972.
(POPULATION (000,000))
(NUMBER OF STATIONS (00))
POPULATION (000,000)
NUMBER OF STATIONS (00)
POPULATION
NUMBER OF STATIONS
POPULATION
0
2
4
6
8
10
12
14
16
18
20
22
24
26
1868
1878
1888
1898
1908
1918
1928
1938
1948
1958
1968
1978