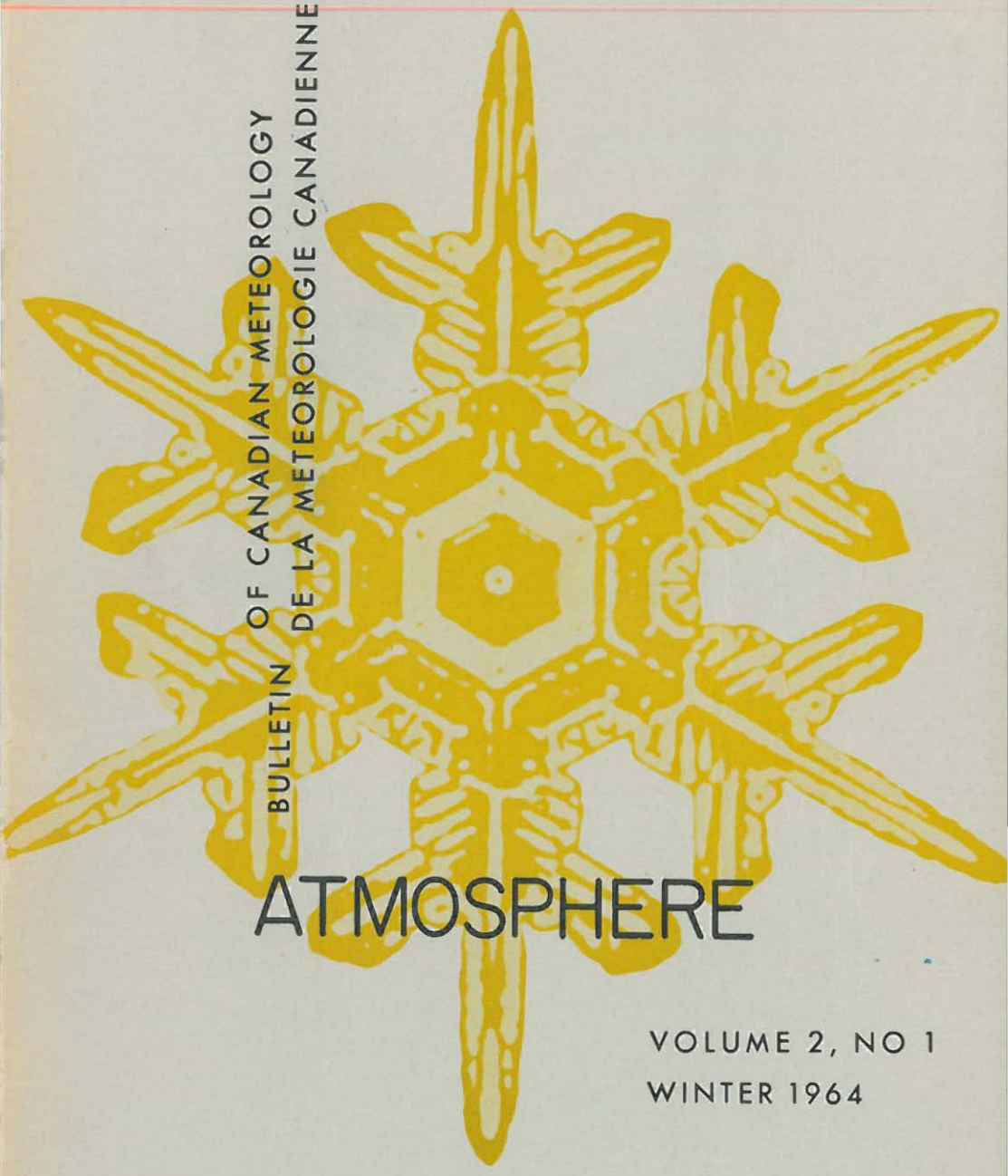

BULLETIN OF CANADIAN METEOROLOGY
DE LA METEOROLOGIE CANADIENNE

ATMOSPHERE

VOLUME 2, NO 1
WINTER 1964

ATMOSPHERE

a publication of the Canadian Branch

Royal Meteorological Society

4 th Issue : March 1964

The Canadian Branch

ROYAL METEOROLOGICAL SOCIETY

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An Editorial

In the last issue we asked for reactions from members of the Canadian Branch - reactions to the idea of a Canadian Bulletin, to its present format and to the contents of the first three issues.

The response to this appeal has been less than satisfactory - in fact, it is almost non-existant. If there had been an avalanche of communications we would have included a " letters" section in this issue. Instead, we will include in this Editorial some of the comments contained in a letter from one of our members - an American meteorologist who became a member of the Canadian Branch while he was studying in Canada. He is now back in his own country, and writes inter alia :

" Rather than be counted among the indifferent, I will answer your appeal for comments in regard to ATMOSPHERE. First of all, I think the idea of a bulletin of Canadian meteorological endeavors is fine. I have enjoyed the first three issues immensely, and I hope very much that the bulletin is continued.

I honestly feel that if Canadians' major research efforts continue to be published in the Royal and American Meteorological Societies' publications, the stature of the Canadian meteorologist will remain obscure.

It seems to me that there are enough weather problems and weather research in Canada today that are unique to Canada to justify a "Canadian Journal of Meteorology" devoted to scientific reports on those problems and results of that research. I am sure that most Canadian readers in time will tire of a bulletin consisting exclusively of editorials, reports of meetings , other Canadian Centers' activities, and reviews of other nations' work. A little of this goes a long way and tends to become sterile and somewhat stereotyped quickly. The most interesting thing about Vol. 1, No. 1 of ATMOSPHERE , aside from it being the first of a new publication, was the article " Arctic Winter." That article, though interesting to a meteorologist anywhere, certainly belongs in a Canadian Journal ."

Any comments ?

Editorial

Dans notre dernier numéro , nous demandions aux membres de la section canadienne , leur opinion et leurs critiques, favorables ou non, sur le format et le contenu de notre brochure.

Notre appel est tombé dans le vide. Si par hasard nous avions reçu une avalanche de lettres, nous les aurions publiées dans ce numéro. Nous en sommes réduits à publier quelques commentaires dans cet éditorial. Celui-çi nous vient d'un confrère américain, un météorologue qui s'est joint à notre société lors de ses études au Canada. Il est maintenant retourné chez lui, et voici quelques extraits de sa lettre.

> " Comme je ne veux pas être accusé d'indifférence, je vous envoie mes commentaires sur votre brochure ATMOSPHERE. Je dois d'abord vous dire que la publication d'une brochure consacrée aux problêmes des météorologues canadiens est une entreprise louable. Les trois premiers numeros étaient très intéressants et je lui souhaite longue vie.
>
> Je crois sincèrement que si les canadiens continuent de publier leurs communications dans les bulletins des Royal et American Meteorological Societies, l'essor et l'envergure de leurs recherches ne seront jamais reconnus. Les météorologues canadiens seront toujours de grands méconnus et leurs contributions à l'avancement de la science seront perdues dans l'anonymat.
>
> Il me semble qu'il existe en ce moment au Canada assez de problèmes propres à ce pays, et que la recherche qui y est faite sur une grande échelle justifieraient l'existence d'une revue canadienne de météorologie consacrée aux communications de recherche pure et appliquée, aux résultats d'études et même aux recherches en cours. Je suis d'avis, qu'avec le temps, la plupart des lecteurs canadiens délaisseront une brochure consacrée exclusivement à un éditorial, aux compte-rendus des assemblées, aux activités de nos confrères des autres centres et aux résumés des travaux des météorologues étrangers. Cette formule s'avère plutôt stérile à la longue.
>
> Le fait saillant du premier numéro d'ATMOSPHERE, à part bien entendu, qu'une nouvelle publication est toujours un évènement digne d'être souligné, fut l'article "l'Hiver arctique". Cet article d'un vif intérêt pour tous les météorologues du monde, serait le genre tout indiqué pour remplir les pages d'une revue canadienne de météorologie".

Nous invitons nos lecteurs à nous faire parvenir leurs commentaires.

OCTOBER 1963 WEATHER

by

D. E. McClellan

Central Analysis Office
Canadian Meteorological Service

Residents of western Canada were generally well satisfied with the summer and early fall weather of 1963. A combination of early season rainfall and a warm growing and harvesting season yielded bumper crops. To the east of the Great Lakes summer seemed of short duration, as a cool August was follwed by a cool September. Then came October, and Eastern Canada experienced a dramatic change with temperatures soaring to record high values at many localities.

The autumn rainy season arrived early in British Columbia. Successive October storms , which lashed the coast, brought heavy rains and mild temperatures to that region. From the Rocky Mountains eastward to Newfoundland, across southern Canada, the entire area was marked by sunny and warm weather. The chart of temperature departure from normal for North America is shown in Figure 1. Southern Manitoba experienced a record extreme of 14 degrees above normal. Prairie flowers bloomed in October, with the first killing frosts occuring about the 19th in Alberta and not until the 27th in Manitoba. Ontario too experienced record-breaking warm weather. Despite the usual autumn cooling, at a few places in northern Ontario, October proved to be a milder month than September. Farther east in the Maritimes and Newfoundland, the month started out on the cool side but the western heat wave spread eastward under a record - breaking amount of sunshine.

The 1000 to 700 mb thickness departure implies the approximate temperature regime. This thickness departure, for the northern hemisphere, is shown in Figure 2. The close correspondence of the thickness anomaly with the temperature anomaly over North America is apparent. A second major anomaly is seen in the unusually cold thickness over the Lena River valley of eastern Siberia. A close examination of the daily charts shows that air masses from the polar region flowed southward across Siberia in almost continuous fashion after September 26th. This cold thrust was in response to a large high latitude ridge over Scandinavia and European U.S.S.R. The intensity of the Siberian anomaly suggested an examination of temperatures in the polar regions; this seemed particularly appropriate in view of reports of "worst ice conditions ever experienced" in the supply of the Canadian Arctic weather stations. However, the thickness for the layer 1000 to 700 mb over the Arctic Ocean during the latter half of September did not differ from the mean of the past 5 years. It would appear that antecedent arctic conditions played no significant role in the future events.

Contrasting with the extremely cold air flowing from Siberia towards northern Japan , hot moist air associated with typhoons from the southwestern Pacific streamed northward to the south of Japan. The confluence of these two air streams very gradually produced a single marked jet stream across the central Pacific by the end of the first week of October . With some cyclogenesis in the central Pacific adding cyclonic vorticity, and then through the Rossby-effect of the earth's rotation, this strong stream curved gently northward to a flat ridge near the upper Mackenzie; again the stream curved slowly southward toward Newfoundland and then northward again

to reinforce the ridge conditions over northern Europe. The pattern had now become self-perpetuating since this European ridge promoted further cold outbreaks across Siberia.

By mid-month , normal radiational effects tended to result in even colder air masses in Siberia, which in turn increased the temperature contrasts and the zonal flow across the Pacific. In response to the higher wind speeds, the North American ridge aloft shifted slightly eastward. Associated with this eastward shift of the mean ridge aloft, surface temperatures soared in central Canada. In the Atlantic sector the downstream trough also advanced eastward, while the Scandinavian ridge increased in amplitude. A crude check of hemispheric zonal winds was made by computing the height difference for the month at 500 mb between 60°N and 45° ; this showed the zonal wind to be about 10% above the October average.

Charts for sea level and 500 mb for October 23rd, when the heat wave was at its height, are shown in Figures 3 and 4. Particularly noteworthy are the strong southwesterlies across British Columbia, contributing to the lifting of moisture-laden Pacific air masses over the coastal mountains The storm track was typically from the Lower Mackenzie across to Hudson Bay to Labrador, leaving southern Canada in the warm air. Hurricane Ginny was puttering over the Gulf Stream off the Carolina coast , far removed from the westerly stream.

The trend towards a stronger and still stronger jet appears to have sown the seeds for its own destruction. The jet structure for the North American and Atlantic regions for October 25, 28 and 31 is shown schematically in Figure 5. Of particular interest is the extremely strong flow, on the 25th, across Labrador where winds at 300 mb were of the order of 170 knots; the isotherms at this time were almost parallel to the contours. Subsequently , as shown on October 28th, a closed Low developed over the central Atlantic and the marked High north of the British Isles began to move westward. In sympathy with this retrogression at high latitudes, the westerly stream across North America became depressed and it resulted in the absorption of hurricane Ginny into the westerly stream aloft. A complete breakdown of the zonal pattern, into large scale eddies, was accomplished by the end of the month.

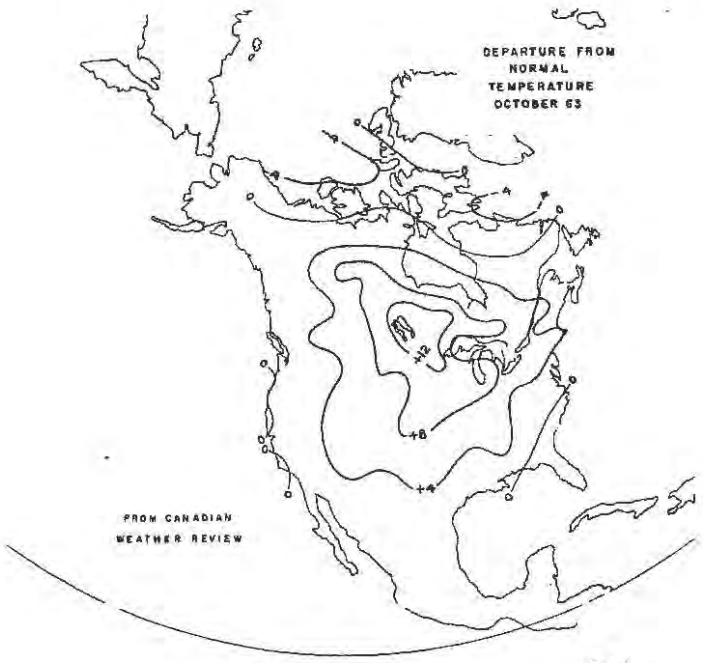


Fig. I

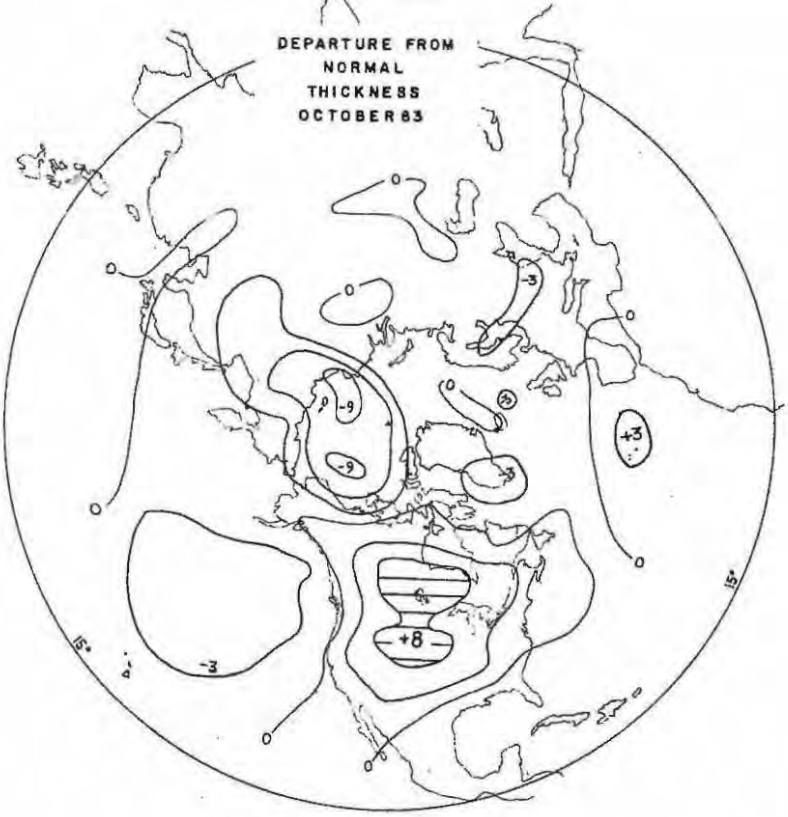

DEPARTURE FROM
NORMAL
THICKNESS
OCTOBER 83
0
-3
-9
-9
+3
+8
-3
15°

Fig. 2


SEA LEVEL PRESSURE
OCT 23 0000 GMT
1020
1030
H
1020
1020
1010
1000
990
L
1020
1030
H
1010
H
1020
15°

Fig. 3

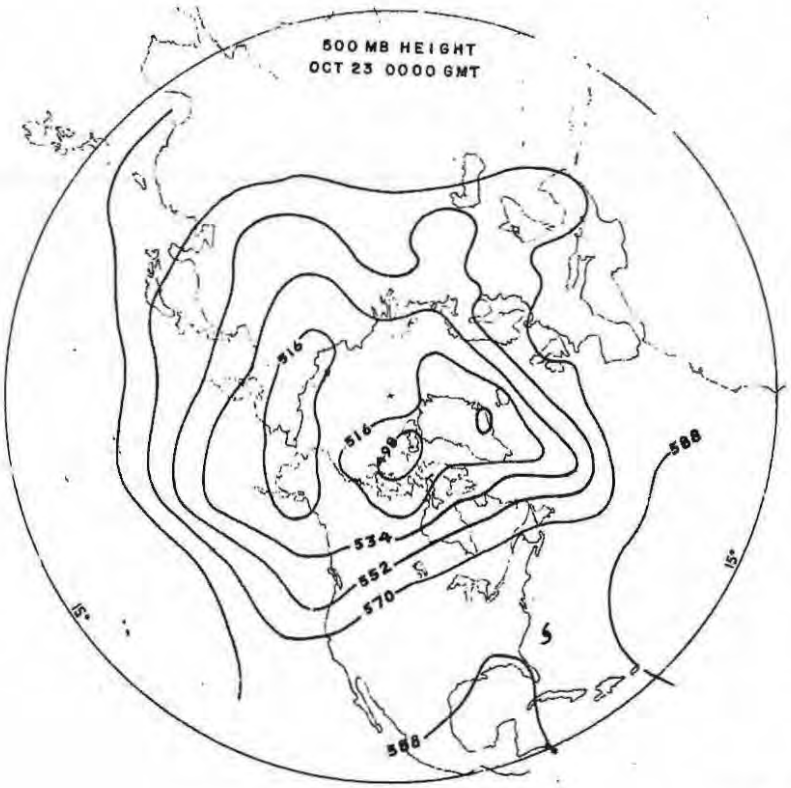

500 MB HEIGHT
OCT 23 0000 GMT
516
516
498
534
552
570
588
588
15°
15°
S

Fig. 4

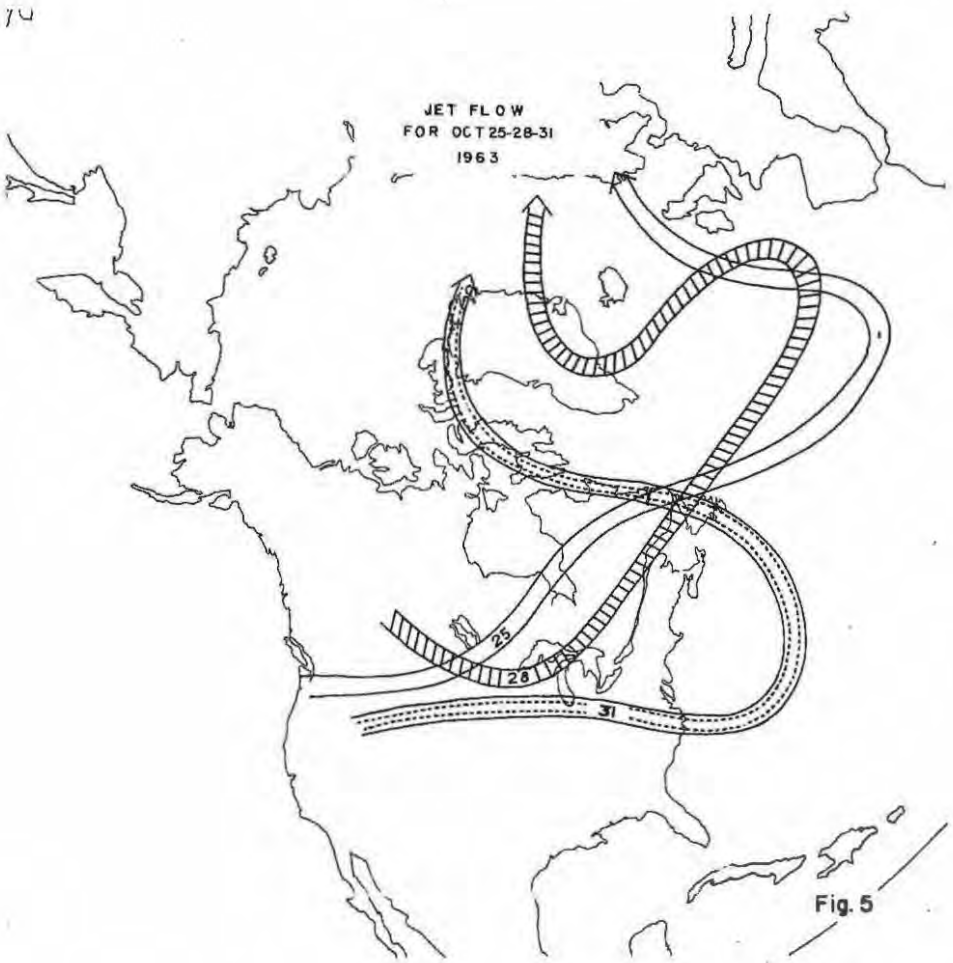

JET FLOW
FOR OCT 25-28-31
1963
25
28
31

Fig. 5

PERFECT GREY CUP WEATHER 1963

by

R. Anderson
Central Analysis Office
Canadian Meteorological Service

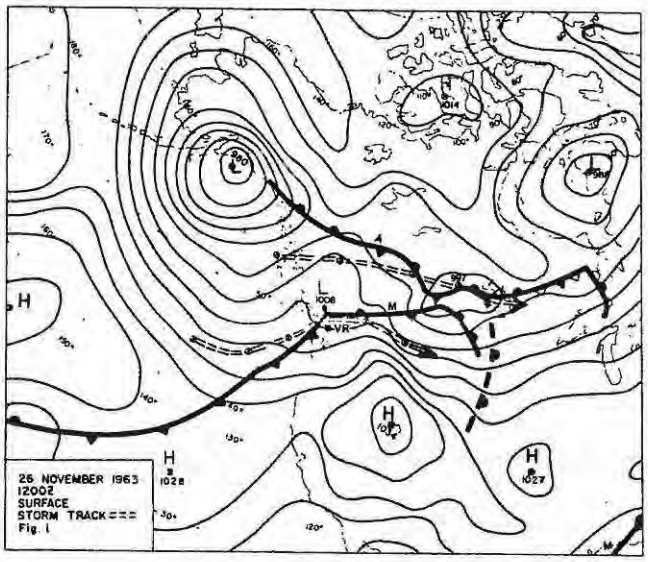
A tropospheric flow pattern was established by mid-November 1963, which was to persist well into January 1964. The broad-scale flow pattern during this period had a trough over the western and central Pacific, a ridge over the eastern Pacific and western North America, and a trough over eastern North America. The main cyclonic activity was therefore in the east-central Pacific and on the east coast of North America.

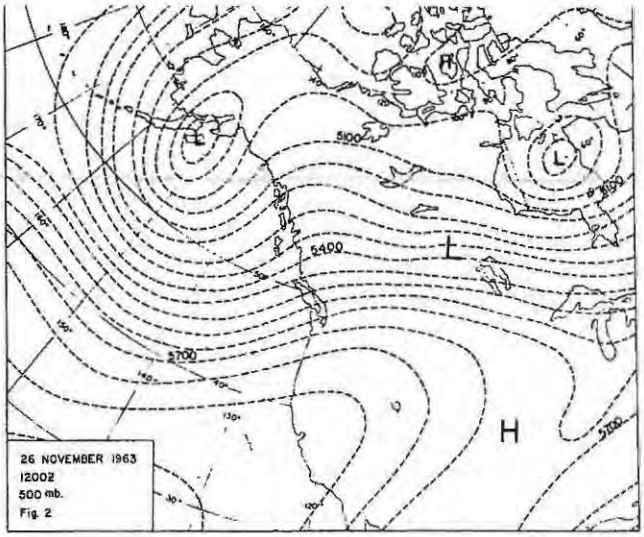
Waves from the Pacific moved regularly northeastward across the British Columbia coast, southeastward across the prairies into south-eastern U.S.A., and then deepened and moved northeastward along the east coast. The result was to give mostly warm and wet weather to British Columbia , mainly mild weather to the prairies, and cold weather to Ontario and Quebec, and stormy weather to the Maritimes.

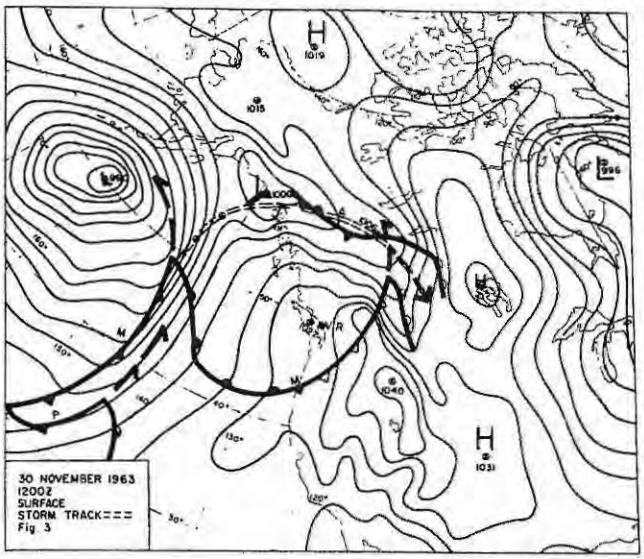
From mid-November to near the end of the month, frontal waves moved regularly across southern British Columbia, with copious rainfall. The surface and 500 mb charts for November 26 (Figs. 1 and 2) illustrate the general weather pattern for British Columbia during this period.

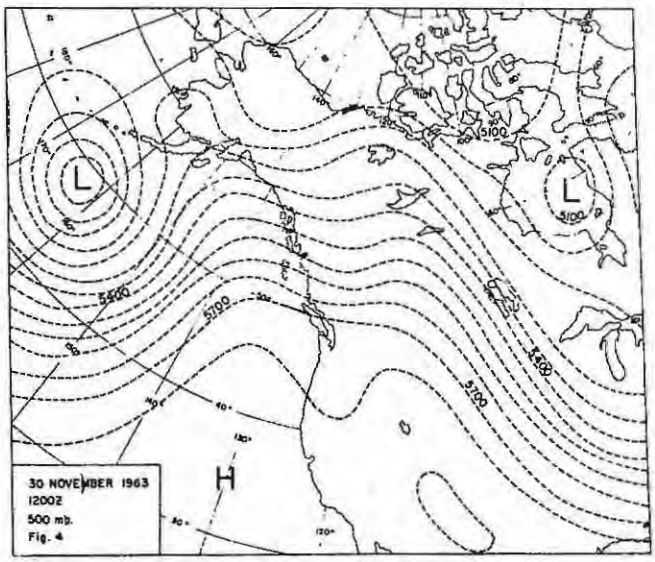
About November 26th the storms began to deepen and intensify farther west in the Pacific. This led to a more meridional flow aloft and a building of the ridge over the eastern Pacific and British Columbia. The storm track shifted to northern British Columbia and no rain fell at Vancouver from November 27th until the end of the month.

The charts for November 30th (Figures 3 and 4) show the weather pattern prevailing on "Grey Cup" day. As can be seen, apart from the storm track being over northern British Columbia, Vancouver was also in the ridge of high pressure between two waves. The football game was played under sunny skies and with above normal temperatures. It did not matter that this pattern led to dense fog on the following day.




26 NOVEMBER 1963
1200Z
500 mb.
Fig. 2


30 NOVEMBER 1963
1200Z
SURFACE
STORM TRACK===
Fig. 3


30 NOVEMBER 1963
1200Z
500 mb.
Fig. 4

A REVIEW

"The Present Status of Long-Range Forecasting in the World". - Report of a Working Group of the Commission for Aerology. Prepared by J.M. Craddock, H. Flohn (Chairman) , and J. Namias. Tech. Note No. 48, W.M.O., Geneva, 1962 , X + 23 pp. Sw.Fr. 4.

This Technical Note is the revised report of a Working Group on Methods of Long-Range Forecasting, established by the WMO Commission for Aerology with the following terms of reference :

(a) To examine and report on current experimental methods of long-range weather forecasting ; i.e. , for periods of one week or longer.

(b) To determine what additional exchanges of meteorological data are desirable to assist existing experiments and to promote the establishment of new experiments.

The Secretary -General of WMO forwarded to Members and non-Members a "Questionaire on long-range forecasting" with the term "long-range" being restricted to a period of five days or more . This questionaire revealed that fifteen countries prepare long-range forecasts in the sense defined. The Note contains detailed tables of the forecasts covering one month issued b y eight services and forecasts covering one to two weeks issued by eleven services. Seasonal forecasts for middle latitudes are issued only by the U.S.A. and the Federal Republic of Germany.

For the monthly forecasts, those of five countries are quantitative while only the U.S.S.R. supplies quantitative indications in the forecasts covering one to two weeks. The Working Group considers it most desirable that all services making long-range forecasts make them available in a form precise enough to allow of verification.

Long-range forecasting by purely dynamical means does not exist at present, but fundamental research in the dynamics of the general circulation should eventually indicate whether or not purely dynamical methods are applicable to the long-range forecasting problem. At the moment highly simplified models are being constructed in order to understand the gross characteristics of the general circulation. Then, more specific questions regarding the details of the evolutions can be asked , but before this can be done considerable progress will have to be made in understanding the mechanism of the contributory physical processes.

Experimental forecasts using dynamical-empirical methods were prepared for periods up to 40 -70 days during the period 1952 - 58 in the U.S.S.R. In the U.S.A., dynamical-empirical methods have been in use since 1958 as an aid in the preparation of the five-day forecasts. These methods have also been tried out to assist in forecasting 30-day mean circulation patterns but have met with less success.

In the extrapolation method the shifting of anomalies is considered in both the U.S.A. and the Federal Republic of Germany. In the U.S.S.R. a modified form is used in which the events are classified into natural synoptic periods and seasons. A period lasts about 6 days. This method is little known outside the U.S.S.R. Extrapolation forward with respect to time of dominant periods is also used in some services. Elaborate mathematical methods are not necessary - it is sufficient to draw pressure curves for different points and to look for periodicities "by sight". A statistical investigation has to be made to determine whether the periodicity can be extrapolated. Periodicities of 10 - 12 and 20 - 30 days are observed in the

North Atlantic -Europe-Asia region and are rare in North America, while periods of several years are world-wide.

Long-range forecasts by pure analogy have been tried in the past but the results have usually been disappointing.

Modern statistical methods are being tried and the present trend is toward multiple correlations. Experiments are under way in the U.S.A., East Germany and the Federal Republic. The method of analogy is applied to a limited extent to produce a population of analogues which agree with the current situation only in a few important respects. The subsequent developments are then examined and further criteria introduced if necessary. This method is applied by France, the Federal Republic, East Germany, Turkey, the U.K. and the U.S.S.R.

The least pretentious method is the application of pure climatological probabilities and the persistence tendency. Most services use this as a control in testing the values of any proposed forecasting method.

In many services a combination of methods is used and any method specified as used in any one service can be considered to be given considerable weight.

The influence of the state of the surface of the ground, the sea surface and the sun are taken into account in an indirect way.

In the field of international cooperation the Report singles out the importance of the exchange of scientific papers. For observational material, it recommends the exchange of mean values for sixths of a month along the lines of the present distribution of monthly CLIMAT reports. In addition the values of mean pressure and mean height of isobaric surfaces at stations should be abandoned in favour of values at grid points . The Report concludes with emphasis on the point that efforts should be made on an international basis to obtain a usable model of the system : general circulation and its anomalies inclusive of the extra atmospheric marginal and initial conditions.

NOTE -

The U.K. Meteorological Office introduced on December 1, 1963 , a 30-day forecast based on the population of analogues method. Using a high-speed computer, numerical comparisons of the synoptic sequence of the past month are made with the same months in a type calendar going back to 1873. In addition the temperature anomaly pattern over most of the northern hemisphere is examined. Usually from two to four months similar to the past month are found and the sequels are then examined. In the absence of uniformity, additional arguments are used to establish what weighting should be given to the various indications.

D. E. Page

REPORTS FROM CENTRES

Report of the Toronto Centre

October 30, 1963 :

At the second meeting of the session , held in the attractive modern auditorium of the Ontario Water Resources Commission, two participants in the provision of technical assistance in meteorology by Canada to Nigeria gave a fascinating account of their experience.

Morley Thomas, Operations Superintendent of the climatological division of the Canadian Meteorological Service, and B.S.V. Cudbird, in charge of data processing for the same group, gave a running account of the preliminary survey of the problem and of the final supervision of the installation of a punched card program : this was directed in the first instance to meeting the need for watershed rainfall measurements on the Niger River. Excellent slides by both, and a complete travelogue on 8 mm colour movie by Mr . Cudbird, were received with a high level of interest by the 125 Fellows and friends present.

F.B. Muller

December 12, 1963:

After those present were welcomed by the Chairman, Dr. Munn , the speaker was introduced by Professor A. Brewer. In his opening remarks, the speaker, Dr. R. List , noted that in spite of the title of his paper , there have not been many recent advances in hail theories. He reviewed the historical theories, beginning back in the eighteenth century and ending with the general theory of Das, published in 1962.

The major point of Professor List's paper was that no single theory could explain all cases of hail formation . Perhaps when all the parameters - roughness; shape, size, density, aerodynamic factors, structure, etc. - could be incorporated, a truly general theory could be formulated . He felt that theories that required restrictive cloud models were foredoomed. He stated that his earlier work on thin sections, etched surfaces, radar reflectivity and growth in wind tunnels would provide some questions that any successful hail theory would have to solve.

After a spirited question period, the thanks of those present were offered to the speaker by Mr. J.D. Holland.

January 30, 1964:

Professor Svenn Orvig spoke to the Toronto Centre on January 30th, choosing as his subject, the Heat Balance of the Arctic. As a special pre-meeting warm-up, Professor Orvig also participated in an afternoon discussion that considered the micrometeorology of snow and ice surfaces.

Perhaps 95% of Canada is covered by snow and ice in winter. The energy exchanges at these surfaces is therefore of more than academic interest to Canadians, having application to hydrology, agriculture, engineering, glaciology, air pollution, and synoptic meteorology. Professor Orvig described the work of a group at McGill University in the climatological estimation of the magnitude of radiation, convection, evaporation and horizontal advection over the Arctic Ocean. The audience was made aware of the many uncertainties in the analysis but also of the good final agreement that was achieved. Professor Orvig's visit to Toronto has led to renewed interest in the Arctic and hopefully he has stimulated some Fellows to undertake fundamental research on the effect of snow and ice surfaces on the behaviour of the atmosphere.

November 7,1963

Mr. Horace P. Wilson , officer in charge of the Long Range High Level Aviation Forecast Centre of the Canadian Meteorological Service , and lately in charge of the Arctic Meteorology Group in Edmonton, Alberta, was the speaker at the second meeting of the session held in the Physics Building at McGill University. He had taken as his subject " Surface Airflow in the Arctic".

He had found that the work of R. Frost (Q.J.R. Met. Soc., 74, 1948, p.316) could be applied to account for the apparently anomalous surface winds experienced from time to time in the Arctic. According to Frost, near the surface the coefficient of eddy diffusion could be represented by a power law where the index was a function of thermal stability only. That the roughness parameter and the geostrophic wind speed contributed little in comparison in relating surface and gradient winds was supported by the Arctic data. Further, the veer observed between the surface and geostrophic wind over land and sea agreed well with what would be deduced from Frost's theoretical work.

However , it appeared from the work of W.W. Dickey (J. Met. 18, 1961, p.790.) that a complete explanation of many of the anomalies might lie in the study of airflow around as well as over arbitrarily shaped barriers under specified thermal structure of the ambient air.

The discourse stimulated a spirited discussion, which ranged over a variety of related topics from the operation of Dines anemometers to the drift of sea ice. A useful point that emerged was that the anemometer at O.W.S. Papa is probably over-exposed.

G. Shimizu

December 3,1963

For its third meeting of the session, the Montreal Centre welcomed another visit from Dr. W.L. Godson, Superintendent of Research in the Canadian Meteorological Service .

Dr. Godson had taken as his subject the 26-month periodicity which had recently been discovered in meteorological data. The field of the discovery was the equatorial stratosphere where wind speeds had been found to be subject to a cycle through zero involving a complete change of direction in 26 months. If the Krakatao eruption had occurred a year earlier or later than it did the world would have known "Krakatao westerlies" instead of "Krakatao easterlies" for 80 years. The discovery was very recent - indeed only in 1954 a learned authority had concluded that the only true period on earth was the annual one - and was a peaceful outcome of atomic testing in the Pacific. The phenomenon had a peak at about 20 mb, increased with latitude and was invariant to longitude.

Evidence was now accruing that the 26-month period showed up in such different fields as in a series of sea-water temperatures for the years 1922 - 38, temperatures at 200 and 500 mb, precipitation in the U.S.A., and in tree rings. Under his direction a critical examination of meteorological data in general was being conducted in Toronto, and there was some indication that at high latitudes a 22-month period was emerging.

A solution to the problem was being sought with vigour. Radiation feedback was being investigated as a possible cause. 26-months was the 5th harmonic of the 11 -year cycle, and it could be that the effect was one of beats.

Dr. Godson spoke, answered questions - and speculated - for nearly two hours. Towards the end of a meeting in which attention was closely held and the passage of time unnoticed except for the McGill chimes, Dr. Godson made some remark about people being likely to fall asleep, but this was wide of the mark - those whose inclination might have been to dose off after the introductory remarks had had their attention held throughout.

In calling for a vote of thanks Prof. Hitschfeld hoped that the 26 - month cycle might be the maximum before Dr. Godson addressed the Centre again.

J. L. G.

January 14, 1964

The first meeting of the Centre in the new year took the form of a dinner honouring Dean F. K. Hare, a past Vice-President of the R. M. S. for Canada, on the occasion of his impending return to Britain. Dr. Hare will take up the professorship of geography at his Alma Mater, University of London, after a period of nineteen years on the faculty of McGill University. This is not the place to dwell on Dean Hare's internationally lauded contributions to the twin disciplines of meteorology and geography, but it was brought out during the evening that a feature of his tenure at McGill had been his ability to draw differing disciplines together with fruitful results.

Professor Hitschfeld, the Centre Chairman, presided over the gathering of 80 Fellows and their ladies at the Faculty Club of McGill University and presented Dean Hare as guest speaker.

Dean Hare concerned himself with the financial aspects of science. He reviewed the postwar upsurge in financial support available for scientific research and the greatly increased affluence of scientific personnel, and he posed the question "Do we deserve it ? "

There were signs of public and governmental opposition to spiralling research costs, presaging a trend towards a more critical evaluation of scientific programs on both the operational and research sides. He went on to suggest that future estimates of needs in a given scientific field will be less likely to come from within the discipline but will emerge as the result of critical assessments by an inter-disciplinary committee. Thus the narrow criterion of demonstrable usefulness will play an increasingly important part in determining the degree of public support for any given program.

After an expression of appreciation of Fellows by Mr. Hutchon, Vice-President of the Branch, the Chairman , with perhaps an inspired foresight, presented Dean Hare with a snowstick as a memento of the occasion. Its length represented the maximum accumulation of snow recorded at McGill Observatory during Dean Hare's sojourn in Montreal : it was pointed out that in the U. K. it might serve a useful twin purpose as a walking stick and for probing a London fog.

P. Carlson

February 24, 1964

The fifth meeting of the Montreal Centre of the current session was held , as usual, in the Physics Building of McGill University. The Chairman, Professor Walter Hitschfeld , introduced a colleague, Dr. H. I. Schiff, Professor of Chemistry at McGill who spoke on the chemistry of ozone.

The main address was prefaced by Professor Boville, who briefly reviewed the atmospheric distribution of ozone. There were seasonal and vertical variations of ozone, with a maximum concentration at about 15 km above the surface. He pointed out that ozone was not only the important energy source in the stratosphere, but also could be used as an indicator of atmospheric motions, especially vertical motion in the lower stratosphere.

Professor Schiff explained the chemical reactions leading to the formation of ozone in the upper atmosphere, all of which were initiated by the absorption of ultra-violet solar radiation. Ozone was formed in reactions involving dissociated oxygen , and then suffered decomposition in other reactions with the dissociated oxygen. The observed ozone maxima could, at least roughly, be explained as the result of equilibrium between the reactions creating and those destroying the ozone.

Professor Schiff had worked in his laboratory on these gas reactions. His was a new chemistry, in which 'titration' referred to a measurement of gaseous rather than liquid strengths. Ozone concentrations in the atmosphere are dependent on reaction rates and he had made it his purpose to measure these. Since there are several reactions going on at the same time, it is essential to disentangle them. Various methods are used; the speaker illustrated this by an ingenious procedure (developed in his studies) of making pure monatomic oxygen in an environment of inactive nitrogen through the dissociation of nitric oxide (NO). He was able to demonstrate this procedure by means of an apparatus in which the vanishing of a coloured gas discharge indicated the completion of the dissociation of the NO. In some cases, measurement of the lengths of the coloured discharges, combined with a knowledge of the flow rates, allows the reaction constants to be estimated.

In his experiments, Professor Schiff was working with gases at a pressure of about 1 mb in order to obtain long mean free paths which slow down reaction rates to measurable values and yet keep wall effects to a minimum. Fortuitously these pressures correspond to those at which the same reactions are thought to proceed in the atmosphere.

His results differed widely from those obtained in the 1930's, which were the main ones used by meteorologists in interpreting ozone phenomena in the atmosphere. He tended to explain his disagreement with the earlier workers in terms of the effects of traces of water vapour ; after water vapour and other impurities are removed, consistent and reproducible results are obtained. Since there was now reasonable agreement between his measurements and those currently obtained by other methods elsewhere, he felt the time was right to reconsider ozone mechanisms in the atmosphere. The new laboratory-determined reaction constants should be fed back into the atmosphere in a new, and hopefully more successful, attempt to interpret observed phenomena.

J. L. G.

ANNOUNCEMENT

Royal Meteorological Society, Canadian Branch
National Meteorological Congress, Halifax, June 11-12, 1964

The National Meteorological Congress will be held this year at Dalhousie University, Halifax, N. S. , on June 11 and 12. The Canadian Association of Physicists will hold its annual meeting at Dalhousie during the same period, and a joint session is planned for June 11.

Accommodation for all participants will be available in the University at a cost of $ 6.00 per day for room and breakfast. Registration forms will be sent out in March.

Following the established custom, the Annual Meeting of the Royal Meteorological Society, Canadian Branch, will be held during the Congress.

All Fellows who wish to present papers at the meeting should forward titles and abstracts as quickly as possible to H.M. Hutchon, Regional Administration Building, Montreal International Airport, Dorval, Que. A formal programme will be published in the next issue of Atmosphere, and authors will have an opportunity to extend or amplify their abstracts before that time.

A FAREWELL TO DR. McTAGGART-COWAN

Establishment of the P.D. McTaggart-Cowan Science Award Fund was announced on January 10,1964 by J.R. Baldwin, Deputy Minister of Transport, at a dinner tendered by Canada's weathermen.

Among the prominent guests were : J.W. Osmun, Deputy Chief, U.S. Weather Bureau, Washington; Dr. Thomas Malone, Director of Research, Travelers Insurance Company, Hartford, Connecticut : Col. A.F.Merewether, Manager Weather Services, American Airlines, New York ; Dr. W.E. Van Steenburgh , Deputy Minister, Mines and Technical Surveys, Ottawa; J.L. Rood, Director Flight Operations , Trans Canada Airlines, Montreal; Air Vice-Marshal de Niverville, Ottawa; Dr. J. Tuzo Wilson, Director, Institute of Earth Sciences, University of Toronto ; G.G.E. Steele, Secretary of the Treasury Board, Ottawa.

The former Director of the Meteorological Service of Canada recently resigned his Government post to accept the presidency of the new Simon Fraser University being built at Burnaby, B.C.

Highlight of the farewell dinner in Hart House was the announcement that contributions to the McTaggart-Cowan Science Award Fund had reached almost $ 6,000 . The fund was generously supported by members of his staff from all parts of Canada and his friends in education and Government.

The fund will be administered by Simon Fraser University to provide awards to students in the physical sciences to foster an interest in Meteorology.

Dr. McTaggart-Cowan graduated from the University of British Columbia in 1933 with honours in mathematics and physics. A Rhodes scholar , he attended Oxford University and joined the Canadian Meteorological Service in 1936.

Dr. McTaggart-Cowan was largely responsible for developing trans-atlantic weather forecast services prior to and during the early days of World War II when he was stationed in Newfoundland. From 1942 to 1945 he was in charge of the meteorological office at Dorval airport, Quebec where he organized weather facilities in the Royal Air Force Ferry Command.

In 1946 Dr. McTaggart-Cowan moved to Meteorological Headquarters in Toronto and in 1959 was appointed Director of the Meteorological Branch.