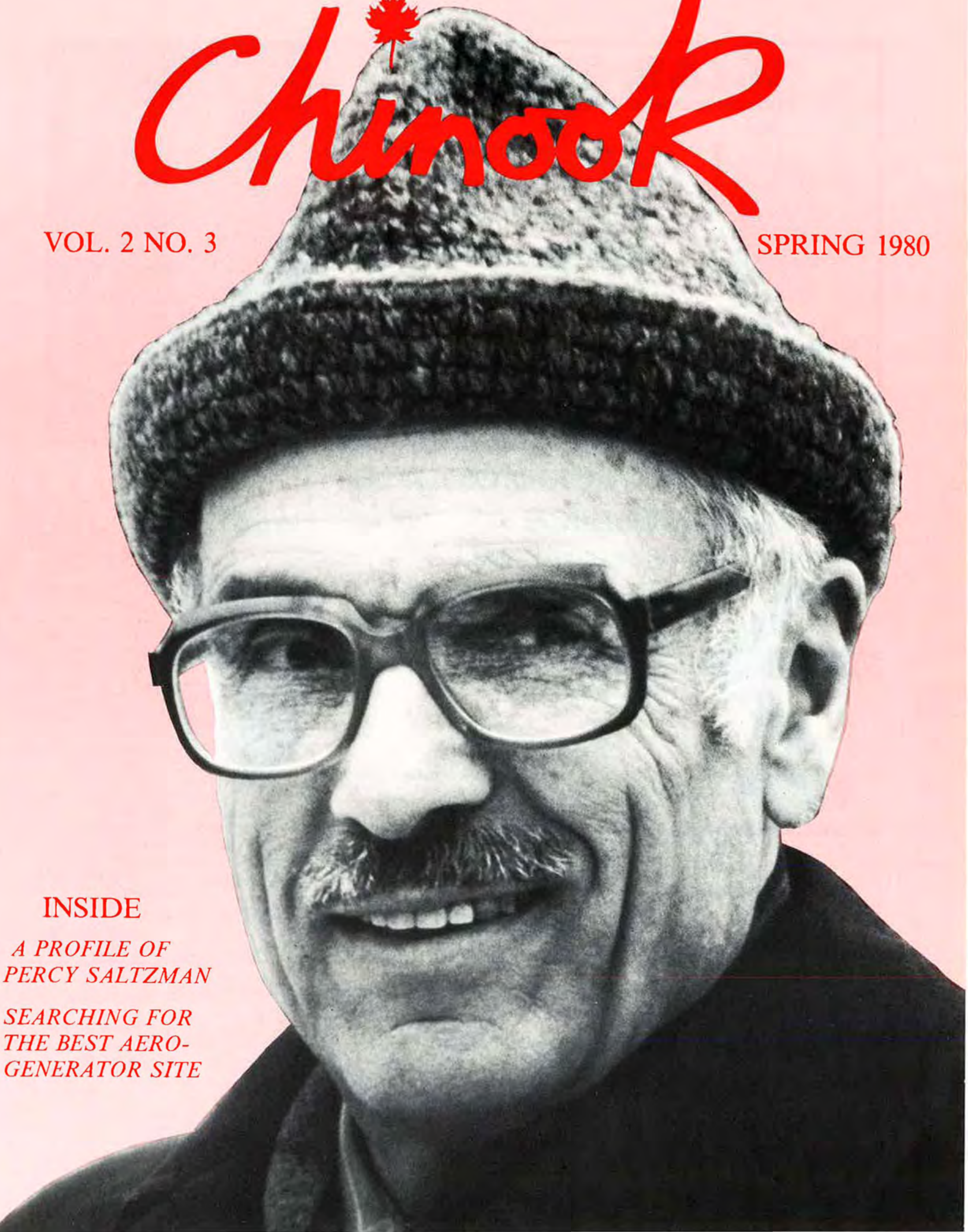
Chinook

VOL. 2 NO. 3 SPRING 1980



INSIDE

- *A PROFILE OF PERCY SALTZMAN*
- *SEARCHING FOR THE BEST AERO-GENERATOR SITE*

IN THE NEXT ISSUE . . .

WEATHER STUDIES FOR OFF-SHORE DRILLING by Dr. R.H. Goodman, Esso Resources Canada Ltd.

THE BEHAVIOUR OF SMOKE PLUMES by Dr. F. Fanaki, Atmospheric Environment Service.

THE HURRICANE MACHINE, contributed by David Greening and Ian Kroll.

. . AND MORE

DON'T MISS IT

SUBSCRIPTION ORDER

Please enter my subscription to CHINOOK

for

- ☐ **one year (4 issues) $ 6.00**
- ☐ **two years (8 issues) $11.00**
- ☐ **three years (12 issues) $16.00**

Name____ please print

Address______________________________________

______________________________ Postal Code ______ Enclosed is $________

Mail to CHINOOK, P.O.Box 427, Brampton, Ont. L6V 2L4.

This is a ☐ NEW order; a ☐ subscription RENEWAL

Rates outside Canada and U.S. 1 yr. $7.50; 2 yrs. $14.00; 3 yrs. $20.50

Chinook Spring 1980 Volume 2 Number 3

Articles

Departments

Editor Michael J. Newark
Publisher Weather Enterprises, PO Box 427, Brampton, Ontario, L6V 2L4
Associate Editor Claude Labine.
Historical Research Peter Elms, Madeline Elms

ISSN 0705-4572

Printed and produced in Canada and published quarterly by Weather Enterprises. Registered in Ottawa as second class mail, registration number 4508. Subscription rates in Canada and U.S.A. for one year $6.00, for two years $11.00, and for three years $16.00. All other countries the rates are $7.50, $14.00, and $20.50 respectively.

CBC

THE COVER

Percy Saltzman, in his day, was foremost among Canada's best known weathercasters. He was made famous by his daily CBC TV appearances, and by his CFRB radio weather commentaries. The photograph on the cover, taken at age 65, captures him in a little more pensive attitude than during his chalk-swinging, anything goes, TV days.

A viewer once wrote to him saying "I don't like the weather, but my cat watches you." On another occasion, Eric Nielson, MP for the Yukon, objected in Parliament that by showing very cold temperatures in the Yukon, Percy was giving the Territory a bad name. Scott Somerville, a regular contributor to ***Chinook***, recalls that as a boy, his punishment for being bad was to be sent to bed early and not being allowed to watch Percy Saltzman on TV.

SAW "EDMONTON CHINOOK" FROM THE AIR

The "chinook" cold front situation described in Keith Hage's article (***Chinook***, Winter 1980) remains vivid in my mind after all this time. On the afternoon of January 15th., 1967, I flew on Air Canada from Vancouver to Calgary. Over the Rockies the pilot announced the expected arrival weather: — brisk westerly winds, temperatures in the thirties (°F). As we descended over the foothills the full panoply of the lee-wave cloud system spread before us, rotor clouds, lenticular clouds, all as perfect as in a classroom model. A photo in a million but my camera was in my baggage.

However, directly through the city of Calgary, plowing up the lee-wave symmetry, lay the snow-filled wedge of the cold front (photographed later by Mr. Hedlund). Needless to say, we landed at Calgary airport, towards the north, in near blizzard conditions.

Ted Walker
Victoria, B.C.

ENJOYED "EDMONTON CHINOOK" PICTURES

Congratulations on another fine issue of ***Chinook*** (Winter 1980). I'm proud to have a copy of each issue, and without fail, I've found some item of particular interest in each. The pictures by Mr. Hedlund are incredible to an Easterner — I would really enjoy seeing such a phenomenon myself. If I never do, thanks for the pictures.

E.R. Flewelling, Principal
Thistletown Collegiate Institute
Rexdale, Ont.

CLIMATOLOGICAL INFORMATION DIFFICULT TO OBTAIN

I have always been interested in Canadian weather and I like the format of ***Chinook***. I also subscribe to *Weatherwise* which publishes a map of the U.S. showing temperature and precipitation departures from normal. I think it would be of great value if you could print maps such as this for Canada. Climatological information for Canada is not easily obtained here, and even if you only used one or two pages each quarter, that would be very helpful.

Miles G. Schumacher
Des Moines, Iowa, USA.

SEARCHING FOR THE BEST AEROGENERATOR SITE

by Mark Ockwell

Use of the wind as a source of renewable, available energy has provided a testbed for countless tinkerers and scientists alike over the centuries. Devices capable of extracting such energy have been designed and applied to the task, often with widely varying results, but the presence of oil as a cheaper and more convenient energy source has prevented wider application of wind systems.

The present world oil supply and demand situation has created a climate where alternative energy forms are being considered, with a subsequent resurgence of interest in the wind as a viable alternative. As a result, inventors and aerodynamic designers are once again plying their craft, creating updated, high efficiency wind energy conversion systems to meet an expanding market demand. The increased demand for new and better hardware has created a similar need for improved understanding of wind behaviour in the field, in order to maximize the utility of a wind installation.

The reliability of the wind as a motive force is extremely variable due to changes of momentum with time, location, and turbulence. The momentum of an airstream (which is related to the amount of work that it can do) is dependent upon the mass and velocity of the air. Changes in air velocity are caused, in turn, either by objects introduced into the path of the air stream, or by differences in topography. There exists a need, then, to provide a means of interpreting the effect of the earth's surface features in detail, in order to establish the probable wind behaviour over it and thereby optimize a windmill location. Once the relationships between the wind and the underlying surface of a region are known, wind machines can be placed so as to exploit areas of local high winds. Conversely, zones of wind stagnation or extreme turbulence can be avoided, thus eliminating periods of poor machine performance and unnecessary stresses on components.

Such an interpretive study method has been developed using computer analysis of topography to derive terrain variables which may have an appreciable impact upon an airstream. This technique was originated by Professor Hardy Granberg of the McGill University Sub-Arctic Research Centre to predict permafrost occurrence in the area of Schefferville, Quebec. The thesis used was that: (a), permafrost develops in cold regions where there is a lessening of the insulating snow cover during the winter, and (b), such a decrease in snow accumulation will usually occur as a result of increased wind velocity inhibiting snow settling. The technique involves the use of terrain analysis to predict snow pack depletion and growth, and hence can be used to map wind variability due to topography.

Topographic map spot heights (A), extracted on a square grid (with co-ordinates I, J), are used to calculate a number of variables such as surface slope, change in slope, and surface convexity/concavity. Each variable is derived for each of the eight principal compass (wind) directions. Surface slope and slope change (see equations 1 and 2) can be easily visualized and are easily measured in the field. The effect of these variables in modifying an airstream depends upon the slope angle, the net length of the sloping surface and its orientation into the prevailing wind, and the surface texture. Terrain convexity is a topographical measurement which indicates the elevation of a point in relationship to its surroundings. In effect it represents either a bump (convexity) which is an obstruction to the airstream, or a hollow (concavity) in the slope.

For a north to south slope as an example, the variables can be calculated as follows:

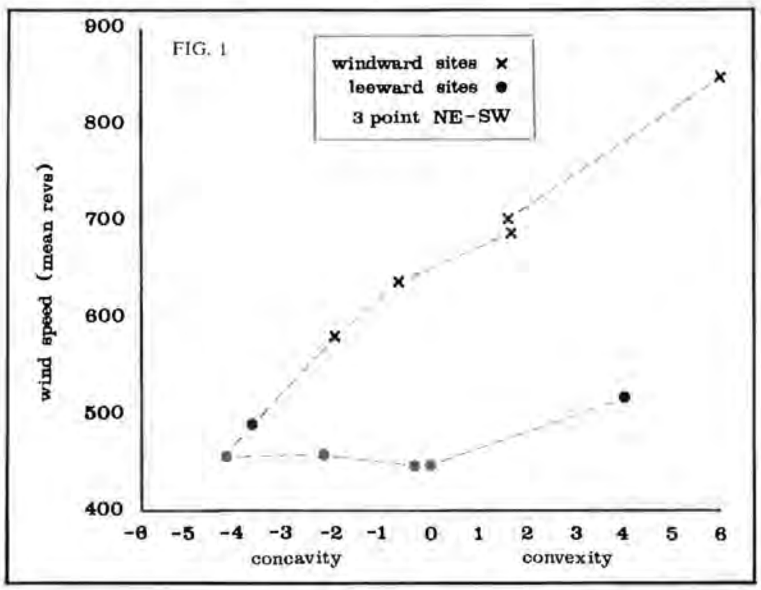
$$\text{Slope } (S) = A(I+1,J) - A(I-1,J) \quad (1)$$

$$\text{Slope change } (\Delta S) = [A(I+1,J) - A(I,J)] - [A(I,J) - A(I-1,J)] \quad (2)$$

$$\text{Convexity } (B) = A(I,J) - [(A(I-1,J)+A(I+1,J))/3] \quad (3)$$

An examination of equation 3 reveals that if the averaged height of some grid point (I,J), and its two neighboring points (the quantity in square brackets) is greater than the height of the point, then the quantity B is negative, or concave. If the averaged height is the same as for the point, then B=0, or has neutral convexity. If the averaged height is smaller than at the point, then B is positive, or convex. This calculation can be extended to take into account as many neighboring points as desired. Naturally, the more points that are taken into consideration, the better the ability to detect small variations in the terrain. Once each of the variables has been calculated for each grid point, contour maps of them can be drawn.

When the terrain in any given area has been analyzed, and the variables calculated and contoured, the next step is to correlate the wind behaviour observed there for a period of time. In 1979 such a series of wind speed sampling runs were undertaken during a three month period at a test-site in Scarborough, Ontario. As a means of recording wind flow, a simple cup-type recording anemometer was developed which kept cost to a minimum without sacrificing accuracy. Some of the data derived from this field work is plotted in Figures 1 and 2. From Figure 1, it is apparent that wind velocity reached a peak at the maximum convex point on the upwind slope, with a rapid decrease to the lee of this hillcrest. Figure 2 is a plot of all the anemometer sites along the same hill, and for which values of surface convexity and wind speed have been compared.



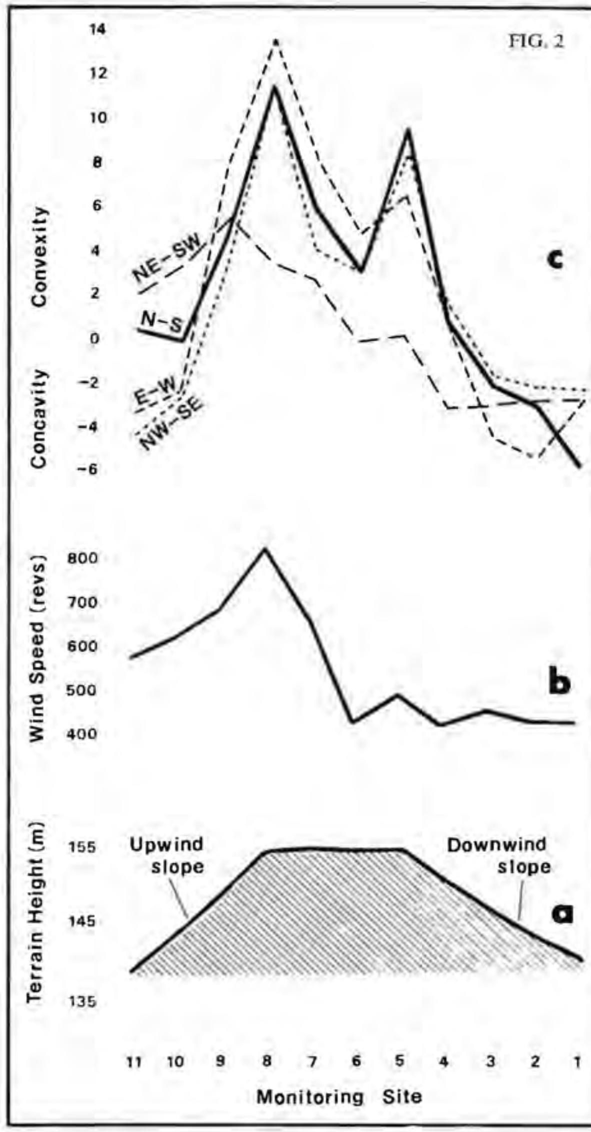


FIG. 1 THE RELATIONSHIP BETWEEN WINDSPEED AND CONVEXITY. This sampling result was chosen as being typical of the way in which windspeed reaches a peak at the maximum convex point on an upwind slope.

PHOTO. MARK OCKWELL checks his home made anemometers which have been ingeniously constructed from aluminum wire struts, surplus mechanical counters, plastic plumbing and cups molded from plastic drink containers.

FIG. 2 THE RESULT OF AN 8 HOUR WINDSPEED SAMPLING RUN (with readings taken every 15 minutes) at the Scarborough test-site.
(a) Shows the cross-section profile of the hill (parallel to the mean wind direction) and the locations of eleven monitoring sites.
(b) Shows the mean windspeed (measured in terms of anemometer revolutions) at each location.
(c) Shows the calculated convexity (a three point mean) of the topography for several principal compass directions. The curves are similar because the hill is man-made and symmetrical. The point of interest is the degree of correlation between the high windspeeds and large convexity values at the windward anemometer sites.

Again the wind speeds showed a similar correlation between high convexity and high speed along the windward anemometer sites.

These results suggest that it is possible to calibrate a particular location and to take a scientific approach to siting an aerogenerator. It is of course of primary importance to have a definitive long term record of wind direction frequencies and velocity characteristics. In this regard, wind records are available from the Atmospheric Environment Service which provide general information about the wind regime of a region. Another factor yet to be mentioned is the impact which buildings, trees and other landscaping features have upon the airflow. Through slight modification, calculation of the variables of slope, change in slope, and convexity can be made to incorporate these non-topographic items.

The value of this approach to aerogenerator siting is twofold. Firstly, the mathematics are simple to apply. Secondly, measurement of the wind at the proposed site is straightforward, accurate, and most important, inexpensive.

There is room for further work of course. It is believed for example, that measurement of vertical wind profiles would yield definitive data relating surface wind speeds to those found higher up within the boundary layer airstream. It is also to be hoped that by employing a method such as has been described, the siting of aerogenerators in remote areas could be achieved using only remote sensing techniques and local wind data.

I know not why the world has changed
To something dark and dreary,
And everything is now arranged
To make a fellow weary.
The Weather Man — I fear he
Has much to do with it, for, sure,
The air is not the same:
It chokes you when it is impure,
When pure it makes you lame.
With windows closed you are asthmatic;
Open, neuralgic or sciatic.

Venable Strigg.
(pseudonym for Ambrose Bierce,
19th., century American humorist)

by Simon M. Kevan

Few people claim that they are unaffected by the weather, in fact, the common usage of the expression "feeling under the weather" suggests quite the opposite. This belief, that weather affects our health and welfare, is by no means new. One can trace its origins back as long ago as to the times of the ancient Greeks. Hippocrates, the father of medicine, believed so strongly in medical biometeorological relationships that he devoted a major portion of one of his most famous discourses to this subject matter. He stated in no uncertain terms that all physicians must be versed in the important role that the atmospheric environment plays upon man's life processes.

Throughout the ensuing Greek, Roman and Renaissance periods, physicians remained aware of the effects of meteorological conditions upon health. In keeping with the Hippocratic tradition, many of North America's earliest medical practioners attempted to determine the nature of the New World's medical biometeorological relationships. This tradition was so prevalent that, during the early 1800's, the United States Army Medical Department required their surgeons at outlying military posts to keep records of weather and disease conditions. Thus, though few realize it, the United States Weather Bureau was conceived by the medical community.

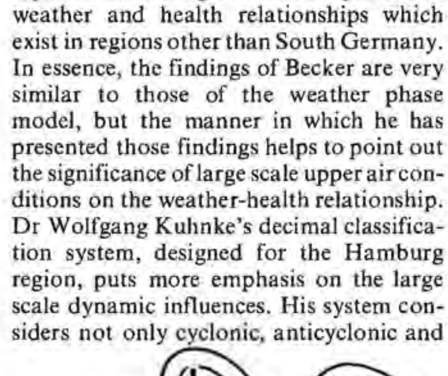
As the settlers and railroadmen opened up the country it soon became evident that there were therapeutic merits to climates of different regions of the land. Climatotherapy became the rage and numerous spas and resort communities were developed. Advances in the various fields of medicine diverted the medical community's attention, and consequently interest in medical biometetorology started to wane. During the 1930's and 1940's a valiant attempt was made by William F. Petersen of the University of Illinois, Ellsworth Huntington of Yale University and Clarence A. Mills of the University of Cincinatti, to revitalize interest in matters of weather and health. Although their theories and findings gained widespread popular acclaim, the medical community tended to ignore their work. With battles around the globe from the tropics to the polar regions, as well as high in the sky, the Second World War brought about a great deal of research activity in matters relating to heat, cold, and altitude adaptation. Considerable progress was made, and research in these particular aspects of weather and health remains active in North America. Unfortunately, interest in other, more general, aspects of weather and health has dwindled almost to the point where it is academically non-existent.

In Europe, especially Germany, the story is quite different. There, the academic community has actively supported research concerning the effects of weather upon the psychological, physiological and pathological conditions of man. Undoubtedly there are a whole host or reasons as to why this should be the case, but two important factors must be given credit. In the first place there are, and always have been, many more active and dynamic biometeorological research workers in Europe. Secondly, their approach is more comprehensive, and inevitably has proved to be more rewarding than the approach taken in North America. American and Canadian researchers have tended, and in many cases still try, to correlate the incidence of specific health conditions with specific weather factors; e.g., heart attacks vs daily temperatures, barometric pressures, or values of relative humidity. The results of such studies have not been too encouraging, and in spite of what popular opinion and medical experience appears to suggest, few significant relationships have been discovered. German research workers, on the other hand, realizing that such rudimentary techniques of analysis have tended to lead nowhere, have developed way of relating more general weather conditions to specific medical problems. Their results, as we will see, have been much more encouraging. They have in fact found statistically significant relationships between weather and health.

Perhaps the best known of the techniques developed in Germany is the Bad Töltzer weather phase model. This scheme, which was developed by the late Drs. Han Ungeheuer and Helmuth Brezowsky of the Deutscher Wetterdienst (German Weather Bureau), is shown in Figure 1. As can be seen, it uses a simplified version of the Bjerknes cyclone model. It presumes that mid-latitude weather can be catagorized into six main weather conditions (weather phases). Phases 1 and 2 are considered to take place when a region is under the influence of a high pressure centre. Phase 1 is the colder sector of the anticyclone, Phase 2 is warmer sector. Phase 3, which is divided into two sub-catagories, represents those conditions which exist several hours prior to the passage of a warm front. The two sub-divisions are necessary in southern Germany where the system was conceived, because at this time Foehn (chinook) winds are common. These foehn conditions are quite unlike those which would normally take place, and so they are designated Phase 3f. Phase 4 occurs with the passage of the warm front, and Phase 5 conditions exists from the time of the passage of the passage of the warm front to the time of the passage of the cold front. Phase 6 also can be divided into two sub-categories, namely 6Z, the period immediately after the passage of a cold front, and 6, the condition prior to the full development of the anticyclonal weather when low level atmospheric temperature inversions can be quite common.

After years of painstaking work, during which the research teams had correlated vast volumes of medical and weather data, the relationships indicated in the table have been shown to exist. All in all, it appears that high pressure weather conditions are associated with beneficial states of health and welfare, while low pressure weather conditions are not. Of all the weather conditions, it would appear that those associated with Phase 4, (warm front conditions), are the least conducive for a sense of well-being.

The Bad Tölzer weather phase model is not the only scheme which has been developed in Germany. Variant forms of it, such as Dr. Friedrich Becker's "Konigsteiner" scheme and Dr. Karl Daubert's "Tubinger" scheme, have been developed in order to give a clearer picture of weather and health relationships which exist in regions other than South Germany. In essence, the findings of Becker are very similar to those of the weather phase model, but the manner in which he has presented those findings helps to point out the significance of large scale upper air conditions on the weather-health relationship. Dr Wolfgang Kuhnke's decimal classification system, designed for the Hamburg region, puts more emphasis on the large scale dynamic influences. His system considers not only cyclonic, anticyclonic and frontal conditions, but also global atmospheric flow patterns, upper and lower air mass conditions as well as equivalent air temperature values. The permutations and combinations of weather conditions which exist using his system, are, to say the least, staggering. It is certainly not a practical system to put into operation without having had a long tradition of background research.



MEDICAL PROBLEM	WEATHER PHASES 6	6_z	5	4	$3\&3_f$	2	1
General Complaints	L			VH		L	L
Migraines			VH				
Asthma				VH	VL	VL	L
Epilepsy	L	VH			H		
Strokes	L	H	H	VH	VH	VL	VL
Thrombosis	L		L	VH		VL	VL
Angina			H				
Gastritis			L	H			
Post Operative Bleeding				VH		L	L
Diabetes	VL		VL	VH	L	L	VL
Accidents				VH	H		VL

FIG. 1. THE BAD TÖLTZER WEATHER PHASE MODEL, and the incidence of medical problems associated with each phase (adapted from Kugler, 1972). VL = Incidence of 10+% below expectation, L = 5 to 10% below, H = 5 to 10% above, VH = 10+% above.

Clearly, the Europeans, especially the Germans, take the study of medical biometeorology seriously. In fact, they believe in its importance to such a degree that the Deutscher Wetterdienst has a well established medical meteorological division. One of the functions of this division is to produce daily medical meteorological forecasts. These forecasts, which are issued through the Essen, Frankfurt and Munich offices provide comments concerning the general weather conditions, the degree of biotropy (weather influence) and the types of medical conditions which could be affected by the weather. These forecasts are relayed by Telex and can be received (for a moderate fee) by medical institutions and practioners.

It would be wrong to give the impression that the German medical community has accepted this service with open arms. There is still a considerable amount of reservation about the matter. Nonetheless, it is gaining more recognition. One suspects that it is the physician whose interests are more pragmatic than academic, who is exhibiting an interest in the service. After all, it must be admitted that there is little academic justification for the existence of the relationships which have been found.

Even if North American weather services took a serious interest in the general aspects of medical biometeorology, it would be a long time before they could produce medical weather forecasts. First, appropriate meteorological criteria would have to be determined for the various regions of the continent. Then, great quantities of medical data would have to be collected and analysed in order to determine the significance of the weather and health relationships. This would be no easy task because it must be remembered that not only do conditions of health and welfare change with the seasons, but they also change with days of the week and with holiday periods. Inevitably, progress in medical biometeorology will be slow. In view of the difficulties and cost perhaps one of the hardest tasks of all will be to justify the research, although the practical applications and benefits seem obvious. Medical meteorological forecasts whether we do or do not understand why they work, are of considerable worth; however, one does have to recognize, and try to guard against, the possible abuse of this knowledge.

A PROFILE OF PERCY SALTZMAN

What has become of Percy Saltzman, once foremost among Canada's best known weathercasters, and the first person to be seen live on Canadian television? Today he lives modestly in semi-retirement in Toronto, caring for his wife Rose, a stroke victim, and taking delight in the achievements of his son Paul, a film maker, and son Earl, a computer system designer. At 65 his wit, salty humour and ebullient style have not forsaken him, although his health has suffered somewhat lately.

For more than twenty years, beginning September 8th, 1952, the official opening of the CBC's English T.V. service, Percy's name was synonymous with the weather. His face became familiar in homes from Fort William, Ontario (now Thunder Bay) to Montreal, Quebec. His skill as an interviewer was recognized and first used on CBC's *Tabloid* show, then nationally as co-host on the CTV program *Canada AM*, then finally on a program called *Free for All* aired by CITY TV in Toronto. For many years he could also be heard each evening on Canada's largest radio station, CFRB, in Toronto. It was there that he stunned host Bill Deegan, the announcer with the deep brown voice, with a joke about cold weather which was developing across the prairies.

Saltzman, (deadpan): "Bill, I feel sorry for the donkey riders in Saskatchewan."

Deegan, (after an eloquently silent hesitation): "Donkey riders? In Saskatchewan?"

Saltzman: "Yes, it's so cold out there, they're going to be frozen to their asses!"

Percy entered the weather business more because he was looking for a good job rather than because of a particular interest in the subject itself. Actually he had planned to become a doctor. After completing his pre-med courses at U.B.C. in Vancouver with very high marks, he moved to Montreal in 1934 to attend McGill University. His courses in medicine didn't work out too well, so he dropped out, and in 1935 met and married Rose who was working in the dress trade. For a while during the Depression era, he worked in a factory operating a sewing machine. He quickly found another job as a linotype operator in Toronto and moved there on April 30, 1937, a date vividly impressed in his memory because it was the day of the Chicago Steel Massacre. In 1943, he heard from a fellow worker about the government's urgent requirement for weather forecasters. Leaving his $15 a week printing job, he became a wartime meteorological officer with the British Commonwealth Air Training Program (BCATP), the big push to train aviators for the war effort.

The young man who had been born one of four children to a Jewish family in Winnipeg, who went to public school in Neudorf, Saskatchewan, then to Vancouver seeking opportunity, finally had come full circle to a job which would lead him into the spotlight as a celebrity. At first sight, this task of forecasting the weather for air training flights, briefing aircrew, and teaching meteorology to student pilots seems an unlikely vehicle to propel anyone onto the screens of a million home television sets. But, when asked about how he came to be Canada's first T.V. weatherman Percy replied that his experience in presenting the weather provided him with the germ of an idea how to put it across to the viewer. He drafted a proposal for the CBC, went down to their studio for a try-out, and found himself hired to present a seven minute weathercast on a puppet show called *Let's See*. This was a program designed as a billboard for the remainder of the evening's activities, and was broadcast at 6:45 p.m. Prior to the official opening of the English TV service, the CBC had aired intermittent trial broadcasts, and because the notorious Boyd gang was at large, "Wanted" posters were aired as part of the trials. "On September the 8th., 1952" said Percy, "when *Let's See* came on the air just before the opening ceremony, and mine was the first live face to be broadcast, the people at home remarked that at last the gang had been caught."

Percy's evening activities caused a certain amount of friction with his regular employers, the Canadian Meteorological Service. As he puts it, "they didn't quite like the idea of an official weather forecaster mixed in with the puppets, so I understand they bitched heavily behind the scenes." After six months however, the CBC began putting news on the air, and started their first public affairs program called *Tabloid* which included a two or three minute time slot for the weather. This was the show which changed Percy Saltzman from a weatherman to a show business personality, and finally led to his involvement with ACTRA and a showdown due to his stand on the americanization of Canadian entertainment. Never one to mince his words, he was quoted publicly in the early 1970's as saying that the biggest single agency for the americanization of the Canadian people was the CBC. In a somewhat bizzare turn of events, Percy claims that a window cleaner, who had been working one day at the CBC offices, called to say that he had overheard certain uncomplimentary remarks being made about Percy by CBC executives.

Preceding this feud though, were twenty good years of nightly weather and interview spots on *Tabloid*. Percy was sometimes called upon to add padding (when guests failed to arrive for example), and was expected to spin out whatever he had to do for any length of time. Producer Ross McLean, as a gag, decided one night to see just how long Percy could ad-lib. Unbeknown to the victim, it was announced to the viewers that "tonight ladies and gentlemen, we are going to let Saltzman run-on until he slobbers to a drought." Percy did his weather, then began looking around for his closing cue, only to see grinning faces. He quickly realized what was happening, and luckily was able to fall back on some reading he had been doing about satellites (a novelty at that time). Using his well known blackboard scribble, he began expounding on rockets, trajectories, G-forces and orbital speeds. After ten minutes he was just beginning to enjoy himself and could have gone on for twenty. "They finally got fed-up," he said "and then they took me off because they had other things to do. So it sort of backfired on the guys, but it was lucky for me because if I had dried up and looked embarrassed, they would have had the big hee-haw in proving to the whole world that Saltzman could run dry."

Searching for a way to neatly cut-off the weather, he developed his well known signature of flipping his chalk stick into the air and then catching it. At the end of one program, the producer cut away just before Percy had time to catch the chalk, then the next evening, began the weather with the

continued p. 42

PHOTOS. **Top left,** instructor Percy Saltzman (front row, centre), poses with a graduating BCATP meteorology class in 1945. **Top right,** his famous TV flip of the chalk. **Below,** Percy muses in front of his weather-board after completing a report during the early days of television in Canada.

CBC

CBC

CBC

J.V. SKEFFINGTON

Top left. Percy Saltzman makes a spectacle of himself during a 1957 interview with Jayne Mansfield on the CBC program *Tabloid.* **Top right.** A Saltzman caricature drawn by CBC viewer J. V. Skeffington in 1953. **Left.** "A sexy forecaster" was the comment of the viewer who snapped this picture of Saltzman clowning on screen in 1955.

Cont'd from p. 40

chalk falling into his hands. The Saltzman style was rapid delivery, colorful words and wit. His blackboard became an instant chaos of chalk lines, and it was said the he finished his program with more chalk dust in the cuffs of his pants than on the board.

How About That was a science demonstration program that Percy developed and which ran for two seasons (1954 to 1956). He spent every spare hour in his basement dreaming up projects for the show. "Once, while standing in front of the demonstration table, live before the camera mind you, with a Van de Graaff generator working up a good static charge, I'm too close, not realizing my penis is right opposite the metal there. The next thing I knew, I got a heavy charge right through it. And on camera, you know, you can't do anything. I didn't let the public know, but I sure got a charge out of them that I didn't want." Another embarrassment was the trick of allowing atmospheric pressure peel a banana. First, the skin of a banana is just barely separated into three. A piece of burning paper is put into a glass bottle of the right size, and the banana corked into the neck. As the oxygen inside is consumed, atmospheric pressure forces the fruit of the banana into the bottle while the skin peels down the outside of the glass. Said Percy, "I did that trick at home a dozen times. It worked perfectly. I went down to that studio, and there on camera live, do you think that damn thing would peel for me?"

In 1968, Percy decided to retire from the Canadian Meteorological Service and devote himself entirely to his television and radio work. While continuing the weather commentary for which he was renowned, he also conducted interviews and rubbed shoulders with the rich and famous. On the one hand, school children, given weather assignments by their teacher, would place tracing paper over the TV screen to copy his daily weather maps. On the other, viewers could watch him interviewing people such as Jayne Mansfield or Rocky Marcianno.

When a person, who has come to personify the weather as much as Percy Saltzman, retires after thirty years, what then is their attitude towards it? In reply, Percy said "when weather ended for me in 1973, finish! I haven't read a weather journal since, or even subscribed to one. I don't read the forecasts or listen to them particularly, or watch them on the air. If I'm interested in knowing what's happening, I look out the window. All the things I hated people to tell me when I was in the weather business."

Maybe so Percy, perhaps you have forgotten about the elements. But even after seven years of retirement from the TV weather-board, many people still remember you as Mr. Weather.

NEWS AND NOTES

"CHINOOK" PREMIERS AT THE UNIVERSITY OF CALGARY

This thirty-minute film studies the Chinook phenomena — both the conditions which create it and the impact the winds has on people's lives — by the use dramatization of historical scenes, Indian legends, time-lapse photography and film animation. CHINOOK was produced at the University of Calgary in Alberta through the joint efforts of researcher **Dr. Peter Lester,** of the Kananaskis Centre for Environmental Research, and the Department of Communications Media.

It is expected that this film will have both wide general and specific educational appeal. For more information contact Dept. of Communications Media, University of Calgary, 2500 University Dr., N.W. Calgary, Alta., T2N 1N4. (403) 284-5288.

CANADIAN HONORED BY AMERICAN METEOROLOGICAL SOCIETY

A Canadian meteorologist recently shared the American Meteorological Society's (AMS) second highest honor, the Second Half Century Award, with an American colleague.

Dr. André J. Robert, director of Environment Canada's Meteorological Centre in Montréal was cited for "scientific leadership that produced significant benefits to Canadian and US weather services" along with his US colleague, **Dr. Frederick G. Shuman** at the January 30 meeting of AMS in Los Angeles.

Dr. Robert was honored for two significant contributions to the field of numerical weather prediction. In 1965 he became the first person to successfully run a model of the complete meteorological equations required to forecast weather. In 1969, he developed a method of computation which allowed numerical weather models to be solved almost six times faster than previously possible. It reduced the time needed to calculate a 24-hour forecast to one hour and 50 minutes from the previously required eleven hours of computer time.

A meteorologist with Environment Canada's Atmospheric Environment Service, Dr. Robert earned a Ph.D in meteorology from McGill University in 1965. During 1969-72, Dr. Robert was chairman of the Canadian National Scientific Committee for GARP (Global Atmospheric Research Program). He served as president of the Canadian Meteorological Society during 1974-75.

ARCH PUZZLE

by R. G. Stark

8. DOWN ON THE OLD TENTING GROUND

There are several ways to pitch a tent: Use tar, throw, erect, tune. With the camping season here, how many kinds of tents can you find?

Dormant	□□ TENT	A Commandment	TENT □
Scope	□□ TENT	Feeler	TENT □□□□
Design	□□ TENT	Experimental	TENT □□□□□
Omen	□□□ TENT	Herald	□ TENT □□
Capacity	□□□ TENT	Understanding	□□ TENT □
Contrite	□□□□ TENT	Care	□□ TENT □□□
Powerless	□□□□ TENT	Confinement	□□ TENT □□□
Adequate	□□□□□ TENT		

9. CAN YOU LICK THIS ONE?

Eighty years ago, a boy spent 50¢ buying 50 stamps from a Canadian Post Office. If the denominations were ½¢, 3¢ and 5¢, and he bought at least one stamp of each denomination, how many of each did he buy?

10. A QUIZ ON *Chinook*

How is your memory? Here are some questions about articles which have appeared in ***Chinook***. Although the answers will be published next issue, in case you can't wait we have indicated volume/number/page for each.

(a) What is the name of the Ontario town where the Cyclostormograph has been working for more than 60 years? (1/2/19)

(b) What was a "first for a Canadian Court" that arose out of a traffic offence in Sudbury, October 14, 1976? (2/1/4)

(c) What caused the greenish sky of November 8, 1819? (2/1/11)

(d) What is an "Olgyay graph"? (1/4/48-49)

(e) Define the spring slug. (1/4/50)

(f) Honeybees operate in what temperature range? (1/3/32)

(g) Who in the 1870's was the author of a weather journal, and who was his opponent, the author of a weather almanac? (1/2/20-21; 1/3/36-37)

(h) A wind generator on the crest of a hill may be adversely affected by what? (1/2/18)

(i) Who was the professor in the 1880's who worked in the Finance Department of the Canadian Government, who was an eccentric, and who had his name used to describe bombastic weather statements? (1/1/7)

NATURE'S LIVING WEATHER INSTRUMENTS

by Ron Hepworth

The influence of weather and climate on the natural world has fascinated observers of nature for thousands of years. In its unpredictable violence, in its sometimes gentle, subtle, but more often fickle ways, weather has exerted its forceful hand upon the appearance of spring wildflowers, the paths of migrating birds, the abundance of those pesky black flies and mosquitoes and the annual schedules of seedtime and harvest. Who hasn't anticipated the welcomed arrival of spring, especially after a Canadian winter, but little realized the weather an one of the major control devices that not only shapes the environment we live in, but finely tunes the character and response of every living thing.

The study of periodic events in nature and their relationship to weather and climate is called phenology from the Greek —'phaino' — meaning to show or open. One researcher has aptly described plants as "living meteorological instruments that show in their growth response the composite effects of temperature, rainfall, humidity, wind, sunshine, etc." In fact, the timing of certain plant growth phases (phenophases) can be used to accurately discern the differences in climate from region to region or from season to season. Such differences can be monitored over a region, through the use of plant observation networks, in much the same way that meteorological observation networks are used to collect weather data.

The history of phenological networks goes back to 1751, when botanist Carolus Linnaeus established a series of 18 observation sites in several provinces of Sweden for the purpose of showing how each area differed. By the late 1800's, phenological networks were well established in most European countries, often combined with meteorological networks and controlled by the existing government weather services.

In Europe, the largest network was established by the German Weather Bureau in 1936. This network involved about 10,000 cooperative observers (1 observer per 50 km^2) who recorded numerous growth stages of more than 50 plant species including field and fruit crops. The network was re-established in 1952 and today represents one of about 10 networks presently active throughout Europe. Detailed phenophase maps have been published on various plant species, and phenophase data coupled with climatic data is

used in the prediction and control of plant disease and insect pest outbreaks.

In America, there have been a number of smaller networks active at various times since 1850. Networks have tended to be rather short-lived so that the continuity of recorded data is far from complete. A noteable advance was made by A. D. Hopkins in 1918 and 1938 when he defined and expanded a general rule which in part states the following: Phenological events are delayed at the rate of 4 days for each degree of latitude, each 5 degrees of longitude, and each 400 feet of elevation, being later northward, eastward and upward (in spring).

In recent years, approximately 6000 cooperative observers (about 1 per 1500 km^2) have been assisting the U.S. National Weather Service by recording the first leaf opening and several blooming phases of the common purple lilac and two varieties of honeysuckle. Regional networks are presently organized into projects W-48 covering the western states and NE-95 covering the combined north-central and northeastern states. Besides these, statewide projects have been conducted in Wisconsin, Indiana and North Carolina on a number of native species.

Organized phenological networks in Canada had their beginnings around the turn of the century. Through the dedicated interest of Dr. A. H. MacKay, Superintendent of Education for the province of Nova Scotia, an extensive network was set up just prior to 1900 in the public schools of Nova Scotia. The province was divided into 10 regions with up to 450 observing stations reporting. Records included first flowering dates of native plants and trees, spring and autumn dates of bird migration, conditions of ice, snow and frost, some annual farming operations and the first appearance of frogs and snakes. As reported in the Journal of Education for 1903, "there is probably no portion of America with such a large proportion of practical botanists and active observers of nature." With often twice daily observations reported by children on their way to

FIRST FLOWER DATE OF THE COMMON PURPLE LILAC and from school, the accuracy of these reports was highly regarded. Where practical, the students were encouraged to bring proof of their observations to the classroom.

The annual reports listing 100 items were widely circulated, and schedules adopting the Nova Scotia format were published in B.C. by the Natural History Society and introduced into other school systems as far away as Denmark. A writeup of the Nova Scotia project in the *London Times* of 1904 helped publicize their example which was beginning to be copied in some forms in other countries.

Responsibility for the Canadian network was subsequently taken over by the Central Office of the Meteorological Service in Toronto under F. F. Payne and later by E. G. McDougall in 1922. In addition to Nova Scotia, there were at least 56 other reporting stations scattered across the rest of Canada and the Mackenzie Territory. Additional reports were collected from meteorological observers in Manitoba, Ontario and Quebec and from another school project adopted in Saskatchewan. The reporting list included 50 items patterned after the Nova Scotia schedules. The density of observation sites was never sufficient to deduce local averages, but they did provide general indications of spring conditions across Canada.

The systematic recording of phenological data was eventually dropped with the coming of the Second World War, but not entirely ended. The practice is continued today on an individual basis among many a farmer and interested nature lover. Members of natural history clubs and societies have in recent years shown interest in re-establishing regional phenological networks.

A most notable and successful project today exists in Alberta where a network was established in 1973 by C. D. Bird at the University of Calgary. With cooperation of the Federation of Alberta Naturalists, from 120 to 180 volunteer observers have been recording data on 71 plant species from 25 regions of the province. In 1979, the report form was reduced to 12 of the more common species from which growing conditions can be monitored throughout the province during the whole season. Information gathered has proven valuable in defining the phenological zones of the province and in determining the abundance and distribution of many native species within the province.

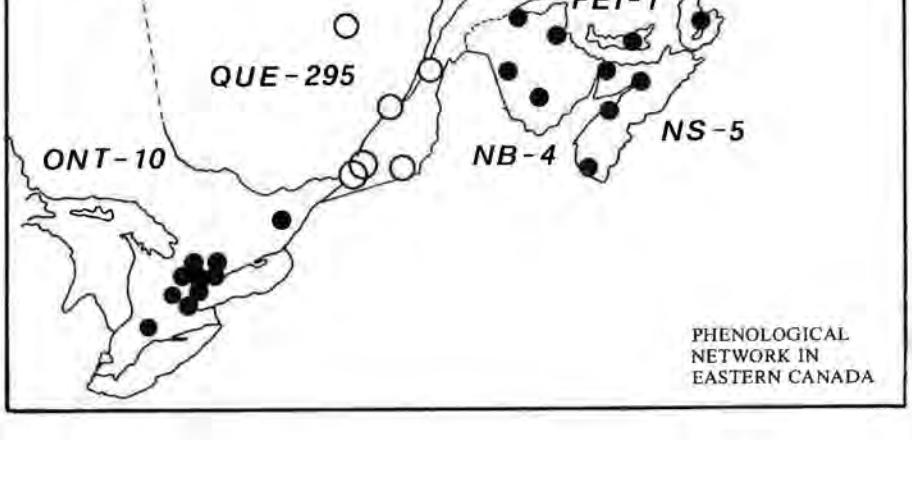
In other provincial projects, a survey of 6 species in Ontario was taken in 1969-70 by the late R. E. Beschel of Queen's University with the cooperation of the Federation of Ontario Naturalists. The project involved some 70 report areas and some preliminary phenophase maps were drawn up for the common dandelion, white trillium and common purple lilac. Other surveys taken in 1975 and 1977 by members of the New Brunswick Federation of Naturalists reported on the flowering dates of 10 to 14 species from 7 areas of that province. In Newfoundland, phenological data from the Avalon Peninsula has been recorded by the Newfoundland Natural History Society since about 1971.

Selected phenological plantings have also been employed in recent years using genetically identical indicator species to form a controlled network. In 1971, the American Northeast Regional Phenology Research Project, NE-69 was introduced into Quebec. With the cooperation of Laval University, almost 300 sites in 12 districts were planted with the lilac cultivar 'Saugeana' (*Red Rothomagensis*) and the two honeysuckle varieties Arnold Red and Zabelli. In addition, 6 "phenological gardens" were established in the province where observations were made on a number of native plants for the purpose of establishing correlations between indicator plants and crop phenology in order to be better able to delineate the agricultural districts of the province.

An additional 6 sites in the maritimes joined the NE-69 network in 1972 and another three sites in Ontario in 1974. The NE-69 project was replaced by NE-95 (Phenology, Weather and Crop Yields in 1975. Regional coordinators for the network are located at the Nappan, N.S., Experimental Farm and the Royal Botanical Gardens in Hamilton, Ontario. Reports are collected and stored in a data bank at the New York State Agricultural Experiment Station in Geneva, N.Y., where phenological studies are presently being carried out in an attempt to correlate corn and wheat yields with dates of lilac phenophases.

Much fundamental research remains to be done in order to more fully understand the effects of weather factors on growing plants. Studies at Ottawa from 1936 to 1960 for example, have shown that some trees begin to grow at temperatures well below the freezing point in early spring. The growing degree-day (base 5°C) is extensively used at present as a phenological unit of growth but it cannot be relied upon in many cases. The growth wave in spring has been displayed using computer and satellite mapping techniques, or modelled using Hopkins' bioclimatic law which involves coordinates of latitude, longitude and elevation, and various correlations to air temperature. All methods have their limitations and progress is often hampered by lack of sufficient phenophase data which can only be obtained through a reliable phenological network. In these times of changing world climate, the science of phenology could play an important part in detecting these changes and in forecasting future changes in plant response.

PHOTO (Opposite page). FIRST FLOWER stage of Bridlewreath Spirea. First flower stage is generally defined as the date when the first few flowers or florets have fully opened and stamens are visible. Photo by the author. **LEFT**, the map of southern Ontario shows the first flower isophanes for Common Purple Lilac (estimated 1969, after R. E. Beschel). **BELOW**, the distribution of some recent 'Saugeana' lilac plantings in eastern Canada is shown by the black dots. Circles show sites of 'phenological gardens' in Quebec province.



TRADE WINDS Edited by Claude Labine

Trade Winds visited the offices and plant of **Athabasca Research Corporation Limited** in order to meet and interview it's president and founder **Mr. T. E. (Ed) Adams.** Located in Edmonton, this company is the only manufacturer of meteorological instruments west of Toronto. Although Athabasca Research is only four years old, it carries with it the many accumulated years of Ed Adams' experience. Originally trained in aeronautical engineering, Mr. Adams has been inventing, designing and manufacturing instruments since 1945. Although he has dealt with many types of instruments, from aircraft instrumentation to oil pipeline monitoring equipment, his main area of interest has been the measurement of environmental parameters, especially those related to meteorology.

"My business is to satisfy the requirements of the scientist" said Mr. Adams, and after visiting his facilities it is quite evident that he is well equipped to do just that. The company, at present, has twenty employees, eighteen of whom are technical staff, so that this group is quite strongly oriented towards research and development. We discussed some of the processes associated with the design and manufacture of instruments, and Mr. Adams admitted that at times, the easiest step was coming up with an idea which will solve the problem. The implementation of the idea however, and its translation into a functional working device requires a lot more time and effort as well as high development costs.

Of all the equipment manufactured by Athabasca, Mr. Adams is very proud of his *Windflo 540* anemometer and the *Scanalog* data acquisition system. Although there are many anemometers on the market today, few can match the aerodynamic characteristics and response of the 540. Ed pointed out that they aimed for top quality when developing this sensor, and that all components were chosen to meet high standards. This commitment to quality was evident in all other instruments manufactured by Athabasca.

In discussing his *Scanalog*, we started talking about some of the general problems in measuring meteorological parameters. "A meteorologist or climatologist today can easily and quickly accumulate box loads of data, but there has to be a way of reducing this flood of numbers to manageable proportions," he said. "The Athabasca *Scanalog* was designed and built with this in mind, since not only does it perform some of the number crunching, but also gives an indication of the reliability of the time sample by calculating

T.E. (Ed) Adams

the standard deviation."

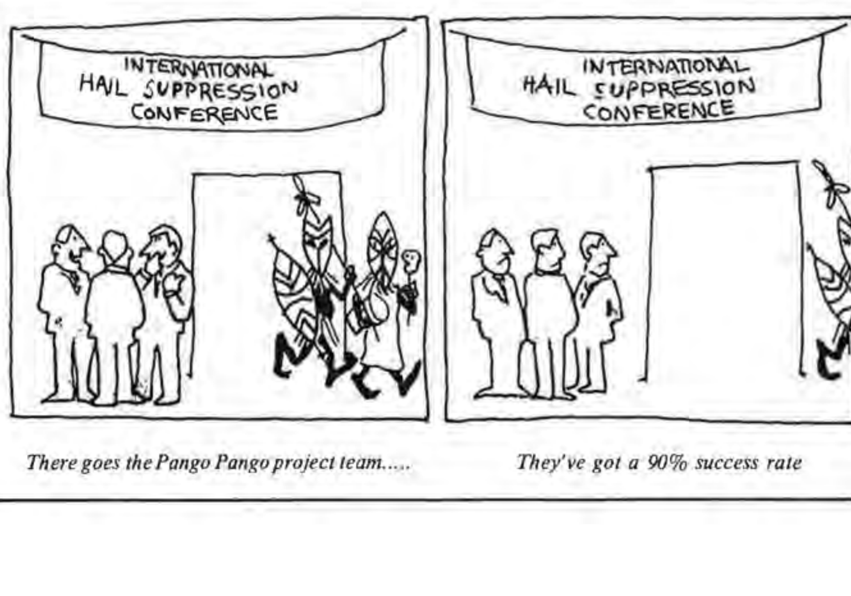
In addition, Athabasca Research manufactures equipment for air pollution monitoring and this instrument package is being extensively used within the oil and gas industry of Alberta. Mr. Adams designed all the sensors for this stack emission monitoring system. Athabasca has also built, for the cities of Edmonton and Vancouver, a precipitation monitoring network with all the raingages tied into a central data acquisition system.

Mr. Adams has always maintained a close association with both university and government research groups. "I've never had any problems in obtaining well qualified university graduates, but there is usually some further training required when a student enters industry" he said. Mr. Adams went on to say that basic "open ended" research belongs with the universities, but that applied research has a better place in industry. "Some of the biggest problems with university trained people are that they have no contract deadlines to meet, no cost estimates to make (and follow), and no budget constraints to deal with. One of the main reasons for this is that the university does not have to produce a total product. They will do the different portions of research quite well but because there is no need for a complete instrument, the training is not quite complete from an industry standpoint. After some experience in industry they are usually quite capable of meeting the time and budget restraints which are a very real part of the weather instrument manufacturer's life." Mr. Adams is quite encouraged by the fact that there are now more students receiving training in industry (in cooperative work programmes for example), while he can also send some of his staff back to university for more advanced education.

Athabasca Research has carried out research development with both federal and provincial governments. In fact, Athabasca has the exclusive licence to manufacture and market an anemometer which was originally designed by the Atmospheric Environment Service but which has since been re-designed and improved upon. This is the *Comprop*, a twin propeller type anemometer which has a nearly perfect cosine response and which can also be used to measure the vertical wind component.

"One of the main problems that continues to go unrecognized in the weather community in Canada", said Mr. Adams, is that the market is much more sensitive to region than population. Obviously, when dealing with urban

continued page 47



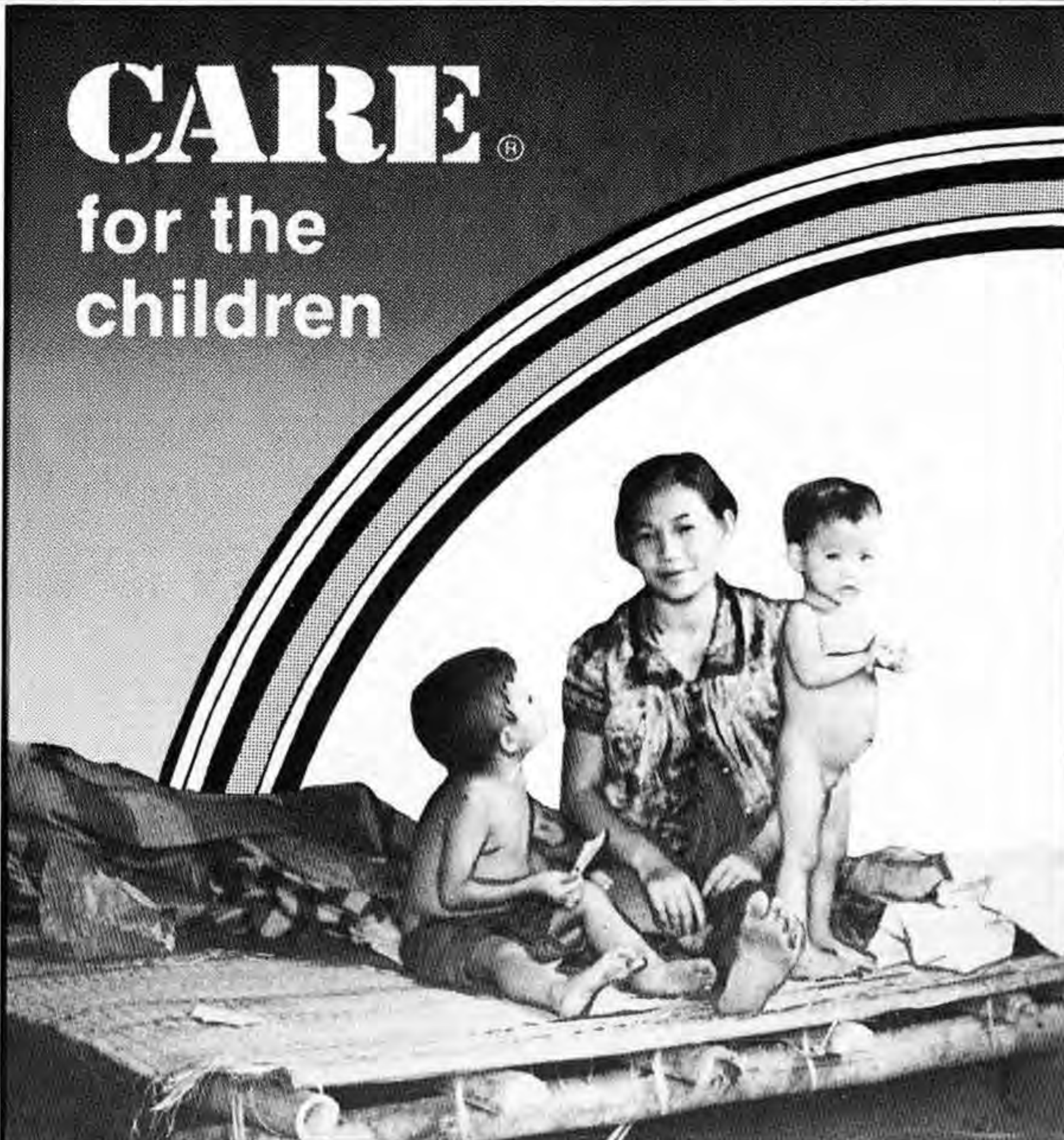
There goes the Pango Pango project team..... *They've got a 90% success rate*

cont'd from p. 46

related modifications of weather, there is a necessity to concentrate our measurements on large population centres. However, we not only have a regional and national interest in measuring weather but a continental responsibility as well. This sensitivity to a local area influences the type of research which needs to be carried out. In Alberta, because of the oil and gas industry, there will be more emphasis placed on monitoring sulphur dioxide and hydrogen sulfide for example, while in the mining areas of northern Manitoba and Ontario, the emphasis would probably shift to heavy metals. Besides these regional requirements, one has to deal with the major problem posed by the inaccessibility of vast areas in a country the size of Canada, and again there is always the old problem of cost. In the past we have tended to deal with areas where we can measure weather conveniently and economically, yet most of the weather which affects Canadians and Americans is formed in these huge desolate areas of the north."

Athabasca Research is continually expanding and Mr. Adams looks forward to pursuing openings in foreign markets in the near future. At the end of our interview, Mr. Adams stated that he welcomed this opportunity for an exchange within the weather business community because there had been no such forum available previously. "Probably because there are so few of us in Canada," he added.

EDITOR'S NOTE: This is a first in a series of business profiles which will appear in *Trade Winds.* If your company would like to take part in this type of exchange please feel free to contact ***Chinook.***


CARE®
for the
children