



# ZEPHYR

AUGUST 1976 AOÛT



Environment  
Canada

Environnement  
Canada

Atmospheric  
Environment

Environnement  
atmosphérique

## ZEPHYR

AUGUST 1976 AOÛT

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## PRINCE EDWARD ISLAND'S "ARK"

"Here the energy of the wind runs the windmill that pumps the water that waters the garden that grows the carrots that feed the rabbits that fertilize the earthworms that feed the fish along with the carrot tops. And carrots, rabbits and fish all feed the people." Source: National Film Board booklet *The New Alchemists*. The New Alchemy Institute (NAI) of PEI, headed by Dr. John Todd, is experimenting with renewable, inexpensive, non-polluting methods of producing food, habitation and energy on a small scale. John Todd explains what prompted the formation of the New Alchemists: "A number of years ago a few of us, most of whom were scientists, began to explore tentatively the possibility of redesigning and restructuring the vital support elements of communities with the hope of coming more into line with the laws of nature. Once built, such communities would function almost exclusively upon renewable energy sources, particularly the wind, the sun and biofuels . . .

"We sensed, although we were not ready to articulate, that the next major intellectual and social revolution would involve finding ways of replacing the fuel consuming engines and hardware of industrial societies with equivalent processes derived from nature . . ." (Todd, *Pioneering for the 21st Century*, 1975, p. 1).

Environment Canada is sponsoring the project as an Urban Demonstration Project, and NAI is constructing the "Ark" under contract. Land for the project was provided by PEI.

The "Ark" is an experimental, 2,500-square-foot unit with a greenhouse on one end and three fish-growing tanks on the other. It is designed to be even more self-sustaining than its biblical namesake.

The "Ark" will be the most ambitious attempt in a northern climate to combine under one household-sized roof the functions of generating energy, growing food, recycling wastes, and providing shelter. Major components are the 20-kilowatt, three-windmill power plant; three fish ponds (one of 1,800 gallons, two of 10,700 gallons) able to grow tasty summer fish crops in 10 weeks; and the 1,000-square-foot greenhouse that can produce tomatoes year-round, summer harvests of melons, beans and peppers, and winter yields of potatoes, pears, cucumbers and lettuce.

Overall design is based on a much smaller prototype Ark operated last summer on the Institute's Cape Cod farm. The roof above the pond and the greenhouse faces south and slopes at 60 degrees to capture as much sunlight as possible. Reflecting panels mounted below the roof swing downward during the day to deflect sunlight to where it was most needed, and at night they are closed to act as insulation.

The Prince Edward Island "Ark" will be subjected to continuing tests of the steeply pitched roof and wall solar panels, the windmills, the heat-storage abilities of the fish ponds, the ability of rooftop vents to reduce humidity, and water filtration in the fish ponds. NAI scientists will also study, on a long-term basis, the microclimates in and around the building, the flow of energy, the yields of fish and produce, and the overall economic practicality of the "Ark".

The Challenge for Change group within the National Film Board have produced a 28-minute, 16mm colour film showing some experiments of the New Alchemists at Woods Hole, Mass. Write Challenge for Change, P.O. Box 6100, Montreal, Quebec, H3C 3H5. The New Alchemy Institute Headquarters is at P.O. Box 432, Woods Hole, Mass., USA 02543.

## L'ARCHE DE L'ILE-DU-PRINCE-EDOUARD

La brochure de l'Office national du film sur les nouveaux alchimistes parle d'un endroit pour le moins unique: une éolienne y actionne une pompe qui amène l'eau à un jardin où poussent des carottes dont se nourrissent des lapins qui, à leur tour, "engraissent" les vers de terre dont raffolent les poissons. Ces derniers ne dédaignent pas non plus les feuilles de carottes. Enfin, lapins, poissons et carottes alimentent les habitants. L'Institut de l'alchimie nouvelle de l'Île-du-Prince-Édouard, dirigé par M. John Todd, met à l'essai des méthodes renouvelables, peu coûteuses et non polluantes, pouvant fournir, à petite échelle, nourriture, énergie et habitation. John Todd raconte d'où viennent les nouveaux alchimistes. Il y a quelques années, quelques individus, scientifiques pour la plupart, entreprirent de repenser et de restructurer les modes de subsistance des communautés, pour respecter davantage les lois de la nature. Une fois organisées, ces communautés utiliseraient presque exclusivement des sources renouvelables d'énergie, telles le vent, le soleil et les biocombustibles.

Le groupe pressentait, sans pouvoir toutefois le formuler, que la prochaine étape importante de la révolution intellectuelle et sociale consisterait à trouver des substituts naturels aux machines et aux moteurs à carburant des sociétés industrielles (Todd, *Pioneering for the 21st Century*, 1975, p. 1).

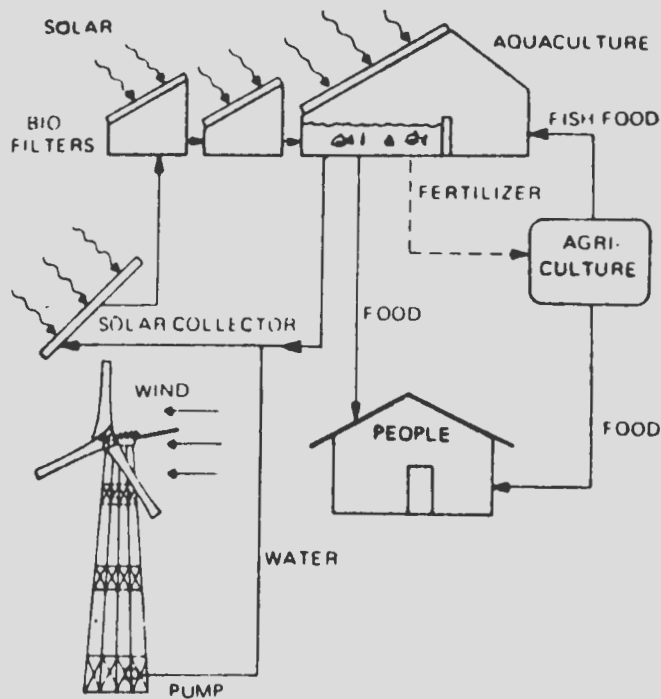
Environnement Canada commandite l'expérience sous forme de projet d'études urbaines alors que l'institut construit "l'Arche" sous contrat. Enfin, l'Île-du-Prince-Édouard fournit le terrain.

L'"Arche" est un ensemble expérimental de 2,500 pieds carrés, équipé d'une serre à une extrémité et de trois bassins piscicoles à l'autre. Elle est conçue pour être plus autonome encore que son homonyme biblique.

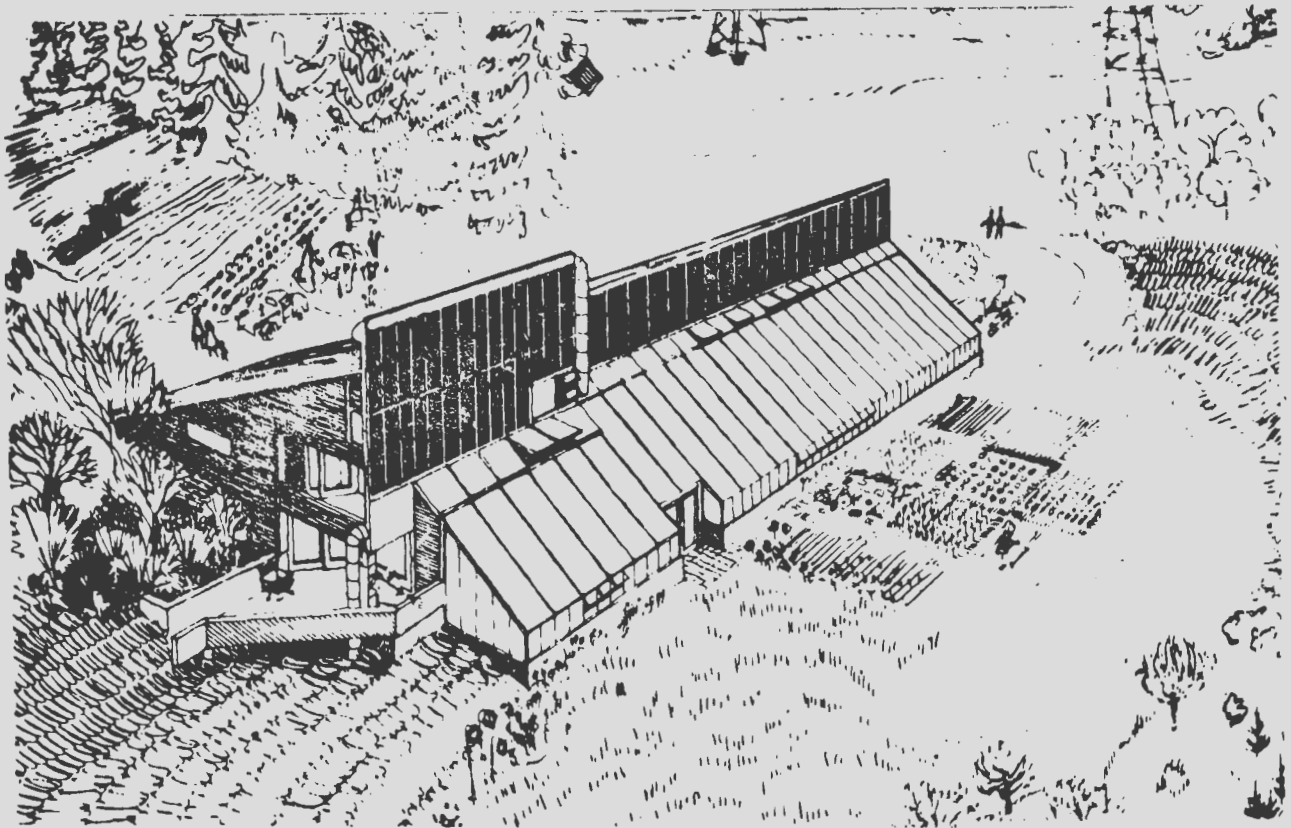
L'"Arche" représente le plus ambitieux des projets tentés sous un climat septentrional. En effet, sous son toit de maison typique, on se logera, on produira de l'énergie, fabriquera sa nourriture et recyclera ses déchets. Parmi ses principales installations se trouvent une génératrice de 20 kilowatts pour les trois éoliennes, trois viviers (le premier de 1,800 gallons et les deux autres de 10,700 gallons) livrant de succulents poissons en dix semaines et une serre de 1,000 pieds carrés où pousseront des tomates à longueur d'année, des melons, des fèves et des poivrons, l'été et des pommes de terre, des poires, des concombres et de la laitue, l'hiver.

Les plans d'ensemble proviennent d'un prototype beaucoup plus petit de l'"Arche", mis à l'essai l'été dernier à la ferme de l'institut, à Cape Cod. Le toit des viviers et de la serre est orienté vers le sud et a une pente de 60 degrés afin de capter le maximum de lumière. Des panneaux réflecteurs montés sous le toit pivotent vers le bas durant le jour et dirigent ainsi les rayons du soleil là où c'est le plus nécessaire. La nuit, ils se rabattent pour servir d'isolants.

L'"Arche" de l'Île-du-Prince-Édouard sera observée de près pour ce qui est de son toit à pente raide, de ses panneaux solaires muraux, de ses éoliennes, de la capacité de ses viviers à emmagasiner la chaleur, de l'efficacité de ses événements à réduire l'humidité et de la filtration de l'eau des viviers. Les scientifiques de l'institut mèneront aussi des études à long terme sur les microclimats intérieurs et extérieurs au bâtiment, le débit de l'énergie, le rendement piscicole, les récoltes et la rentabilité de l'"Arche".



Flow Chart: New Alchemy Institute (Courtesy of Solar Energy Society of Canada.)  
Cyclogramme: New Alchemy Institute (Gracieuseté de la Société canadienne de l'énergie solaire Inc.)



PEI ARK (Courtesy Solar Energy Society of Canada.)  
L'Arche de l'Île-du-Prince-Édouard (Gracieuseté de la Société canadienne de l'énergie solaire Inc.)

Le groupe Société nouvelle de l'office national du film a tourné un film 16mm en couleur de 28 minutes sur certaines expériences réalisées par les nouveaux alchimistes à Woods Hole, au Massachusetts. Pour plus d'information écrivez à: Société nouvelle, C.P. 6100, Montréal (Québec) H3C 3H5. L'adresse de l'administration centrale de l'institut des nouveaux alchimistes est : P.O. Box 432, Woods Hole, Massachusetts U.S.A. 02543.

## AES SUPPORT TO OLYMPICS, 1976

by Brian O'Donnell

A summary of the Meteorological Support Provided by the Atmospheric Environment Service of Environment Canada to the 1976 Olympic Yachting Event held in Kingston, Ontario.

### Background:

In 1972 Kingston was selected as the site for the '76 Olympic Yachting Event primarily because of the excellent sailing conditions over the adjacent waters of Lake Ontario and secondly due to its proximity to Montreal. An annual regatta had been held there since 1968 to prepare Canadian sailors for international competitions. This event became known as C.O.R.K. (Canadian Pre-Olympic Sailing Regatta at Kingston).

Prior to C.O.R.K. 1973, the organizers of the event approached both the Hydrometeorological Division of AES and the Ontario Region for meteorological support in the form of developing a climatological summary of the area and for the provision of weather forecasts for the up-coming regattas. Jim McCulloch (then of Lakes and Marine Application Branch) was instrumental in putting together the first, in what eventually became a series, of climatological publications on the available data in the Kingston area. In addition, through the cooperation of Instruments Branch, he began a local study of the area by erecting a data gathering system on a tower (called the 'Bedford Tower') which was placed each summer in the waters adjacent to where the sailing event would be held. Winds, temperatures and humidities from three levels along with relevant water and wave height data were collected.

The Ontario Region of the AES assigned a meteorologist to go to Kingston during C.O.R.K. 1973 to provide localized forecasts and consultation to the race committee and to become familiar with the terrain induced meso-meteorological effects. During the following three summers (1974, 75, 76) C.O.R.K. evolved from a small group of mostly volunteer help working out of Kingston Yacht Club to an Olympic Regatta centered at a plush new Harbour Site.

By 1974 the yachting community around the world began to focus its attention upon the Kingston Area. Demands for more extensive wind information were fulfilled thanks to the data gathered from the Bedford Tower. So keen was interest in the wind and weather in this area that many countries not only sent teams to compete in C.O.R.K. '74, but also a few had meteorologists accompany their sailors. By C.O.R.K. '75, these "team

meteorologists" had grown in number to six and a special "MET" boat was provided to allow them to take their various instrumentation out onto the water during racing and gather whatever data they wished. Weather information and in particular Bedford Tower data were supplied to them daily from the Kingston Weather Office.

Thus preparation on many fronts had begun for the 1976 Events.

### **Olympic Yachting Event July 13-28, 1976**

In order to provide an adequate service to the Olympic Organizing Committee (COJO), the 45 competing teams and the various team meteorologists, a special weather office (similar to WO4) was established on site at the Olympic Harbour. In addition to a spacious office, COJO provided teletype and facsimile facilities as well as translation, interpretation and duplication services.

Two meteorologists from the Ontario Weather Centre, Mike Hewson and myself (Brian O'Donnell) were assigned the forecast duties while Tom Murphy from the Ontario Regional Headquarters provided technical support and maintained the weather office. Two students, Philip Cadwick and John Terpstra, who were awaiting the commencement of the next Meteorologists course and Upper Air course respectively, also assisted. Of course Gord Hasler, Roy Voak and Bob Jamieson of the Kingston Weather Office, while maintaining their normal duties, jumped in to help whenever possible. The Department of National Defence supplied the main radio communications to and from the various race courses and were stationed both at the Kingston Weather Office and at the Olympic Harbour. They provided a valuable link for updated weather forecasts and issuance of weather warnings as well as the input of hourly weather observations taken by the three Canadian Forces destroyers assigned to security on the water. An extra bonus to us was the availability of another group of D.N.D. staff who were stationed at the Airport Weather Office to provide meteorological support for the helicopter security forces. Their training as meteorological technicians came in handy as they were able to assist with the daily PIBAL ascents and on many occasions plotted tephigrams and surface charts. Not to be forgotten, of course, were Lief Hansen and Guenther Secha of Instruments Branch who maintained the Bedford tower systems and made sure that this essential information was always correct and at our fingertips. Bob Graham, retired Regional Director for Ontario, played an important role as liaison between Team meteorologists and ourselves as well as directing the activities of the "Met-boat".

### **The Forecast Problem**

Anyone who has prepared near-shore boating forecasts or has disseminated them to the users must be acutely aware of the complexity involved. The overall synoptic scale pattern must be forecast and then fine-tuned to include sea state, air trajectory and adjacent terrain. To add to this burden a race committee needs the wind direction to be forecast within  $\pm 10$  degrees while the competitors want the wind speed to be forecast to within 5 knots so that appropriate sails can be taken out to the course. Thus forecasts of winds south to southwest 15 to 25 knots or variable at 5 to 10 knots are not acceptable, rather  $210^{\circ}$ - $230^{\circ}$  at 17 knots or  $040^{\circ}$  veering to  $180^{\circ}$  at 5 knots are required.

In order to tackle this meso-meteorological problem a study of the Bedford Tower wind traces from 1973 to 1975 was undertaken in light of the synoptic conditions. The key question for the Kingston area was when did the Lake Breeze effect come into play and what was its influence upon the synoptic scale. To go into the details of each day will require a full paper which we hope will be produced during the next year.

Although the races did not begin until 1300 hours, the forecasts had to be written, translated, duplicated and distributed by 0800 hours. Between 0800 and 1000 hrs. the teams would be preparing their boats and their initial strategies. Shortly after 1000 hrs. they would begin the 7-mile trek out to the course area. To facilitate this early forecast requirement we began work at 0500 hrs. each day. At 0830 hrs. a briefing was held with the Olympic Race Committee and at 0900 hrs. a general briefing with representatives (usually Met men) from each team. During these briefings a general discussion of the forecast was given along with some outlines of what might happen in cases where two opposing forces (synoptic and lake breeze) were battling for control. Following these briefings an updated forecast was prepared using 1200 GMT data and was transmitted at 1240 hrs. and a weather watch was maintained until the end of racing. An outlook for the next day's racing was prepared in the late afternoon and a debriefing session was attended, when necessary, at 1700 hrs. with the Race Committee.

Our office was available for use by team meteorologists between 0730-1730 hrs. each day to provide them with data for the preparation of their own forecast as well as copies of the Bedford Tower data, at the end of each day.

Not only did their presence result in many interesting discussions, but they in turn would share their ideas and often their data, acquired on the "Met-Boat", with us. The U.S. team was receiving SMS satellite imagery by phone hookup to Washington and was quite generous in sharing these photos with us. These shots were taken every 30 minutes centred on Lake Ontario with a resolution of one kilometer.

#### **Conclusion:**

During the previous sailing olympics held at Kiel, W. Germany, the well-known wind conditions of the area failed to materialize and lighter shifting winds resulted.

Similarly this year at Kingston the traditional southwesterly was not to be. July's weather in southern Ontario was abnormally cool and wet with a record low number of hours of sunshine in the Kingston area. Rather than being under the influence of the Bermuda High which results in a warm southerly flow of unstable air, ideal for lake breezes, July 1976 was characterized by migrating air masses of Arctic origin with cool stable air. On six of the nine race days the winds dropped off during racing from their early morning values.

Rather than enter into a personal evaluation of the forecast service, let me quote from the British Meteorologists thank you note to Mr. Noble:

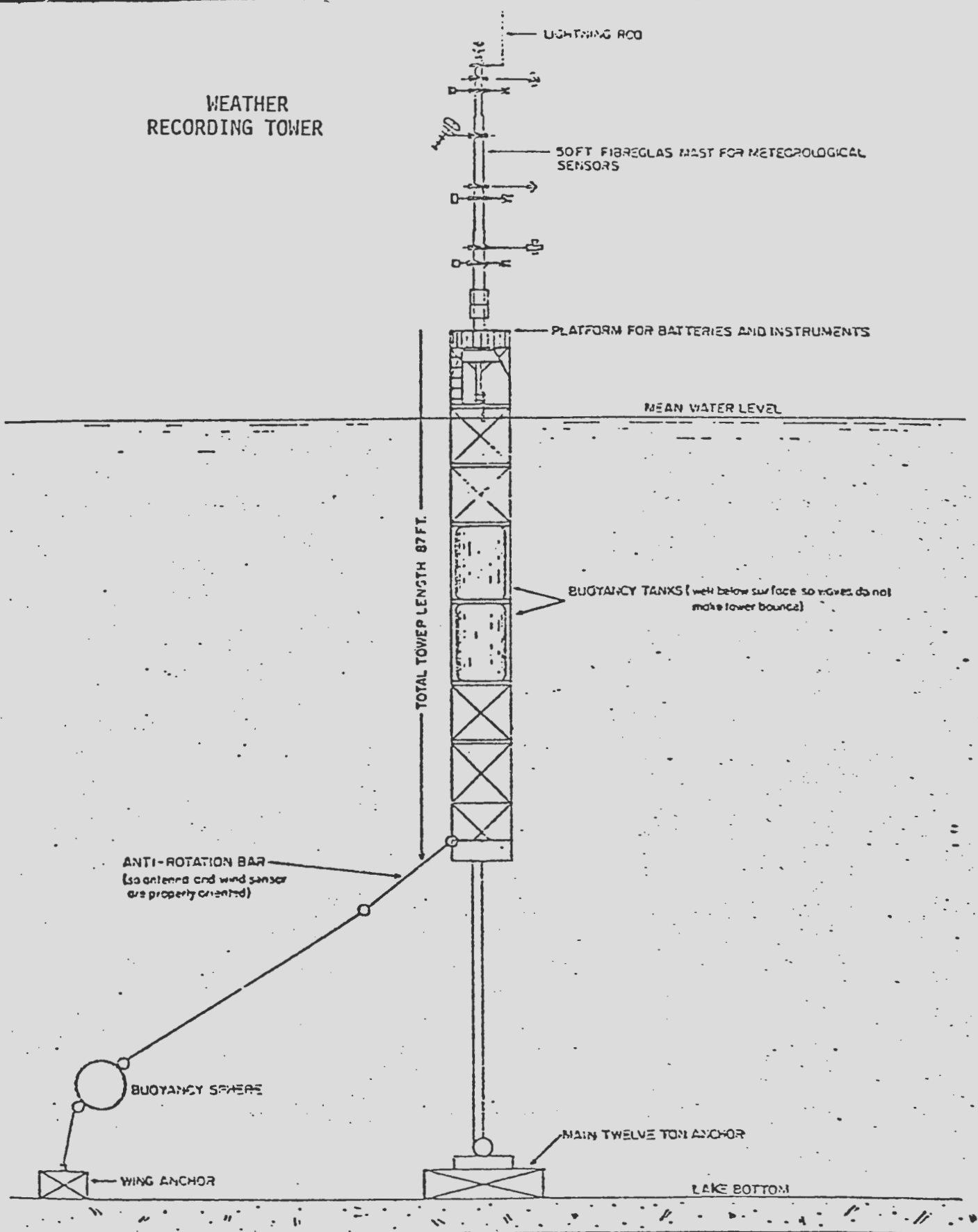
"The arrangements for supplying weather forecasts and information were more comprehensive than any previous Olympics."

P.S. I just purchased a new Laser and have been sailing ever since July in preparation for Russia in 1980!!!

Good Sailing



# WEATHER RECORDING TOWER



Located at 44°06' N 76°35' W

### Registered Meteorologists

Australia	J. Bethwaite
Canada	J. Herfst
France	P. Chavy
Gt. Britain	D. Houghton
Holland	K. Sehat
New Zealand	H. Kingham
Norway	L. Haaland
U.S.A.	R. Mairs

### INDICES ENVIRONNEMENTAUX

Depuis quelques années, M. Herbert Inhaber, du Centre de spéculation sur les perspectives d'avenir d'Environnement Canada, travaille à élaborer un système d'ensemble qui permettrait de déterminer les orientations générales dans le domaine de l'environnement. Son étude tente de décrire l'état réel de l'environnement. Les indices environnementaux permettent de comparer la situation actuelle avec celle que nous aimerions voir ou que nos lois tentent d'établir.

M. Inhaber est l'auteur d'un livre qui explique au profane à quoi servent les indices environnementaux. Son ouvrage, intitulé *Environmental Indices*, est un exposé sérieux bien que teinté d'humour, d'une méthode toute nouvelle pour établir les niveaux de la qualité de l'environnement.

"Trop souvent nous sommes bombardés d'indications contradictoires sur les problèmes de pollution. Un groupe d'environnementalistes proclame que, dans un certain domaine, nous fonçons tout droit vers la catastrophe. Une société ou une municipalité protestent qu'il n'y a rien à craindre et que la situation est même en train de s'améliorer! Une série d'indices simples, bien utilisés, pourrait servir à dissiper un peu de fumée du champ de bataille et par là même, aider à éclaircir le ciel de nos villes en montrant quand et où il importe de prendre des mesures."

Les travaux de M. Inhaber sont le prolongement de ceux de la Fédération nationale de la faune des États-Unis, qui a commencé à établir ses indices de la qualité de l'environnement à la fin des années 1960.

Voici des extraits d'une récente entrevue avec M. Inhaber :

Q. Qu'est-ce qu'un indice environnemental?

R. Un indice environnemental tente de chiffrer l'état de l'environnement. C'est là un concept relativement nouveau, apparu il y a seulement cinq ou dix ans et comparable, par exemple, aux indices et aux indicateurs économiques mis au point depuis une cinquantaine d'années. Tout le monde connaît l'indice des prix à la consommation et le produit national brut. Essentiellement, ces indices recourent à des données numériques pour nous livrer un aperçu de la santé économique du pays. J'ai essayé dans mon livre d'expliquer comment établir des indices analogues pour les facteurs environnementaux, comme la qualité de l'air, de l'eau et de la terre.

Q. Comment le public peut-il participer à votre projet?

R. Le public peut y contribuer de deux manières. Tout d'abord il peut appuyer l'idée, puisque le ministère dépense actuellement 400 millions de dollars et que la population n'a qu'une très vague notion de l'état de l'environnement. Un indice environnemental aurait là son utilité. Le public aura également un rôle à jouer dans la pondération relative des indices. Il pourrait par exemple décider si la qualité de l'air doit avoir la préséance sur la qualité de l'eau.

Q. Dans votre ouvrage, vous mentionnez que le public devrait "en avoir pour son argent". Qu'entendez-vous par là?

R. Le ministère de l'Environnement, comme la plupart des ministères, n'a pas à faire la comptabilité de son rendement. Les rapports d'une société ou d'une industrie sont truffés de tableaux de chiffres qui font état du nombre d'employés, de la construction de nouvelles usines, du mouvement des capitaux, etc. La plupart des gens cependant ne s'intéresseront qu'au solde, qu'au dernier chiffre. Le gouvernement ne dispose d'aucune mesure concrète pour évaluer son rendement ou pour déterminer ce qu'obtient le contribuable en retour de son argent. Des indices nous révéleraient ce que permet de réaliser l'argent dépensé; ils rendraient compte concrètement de l'action gouvernementale.

Q. Pendant que vous cherchiez vos indices, avez-vous fait des découvertes intéressantes?

R. Ce qui m'a le plus surpris, ce n'était pas la valeur de l'indice, mais la pénurie de nos connaissances. Par exemple, on parle beaucoup des terres cultivables qui sont urbanisées. On parle aussi des espèces menacées d'extinction, des plages interdites. Mais dans tous les cas, les données sont sommaires et personne n'a de vue d'ensemble de la question.

Q. Y a-t-il quelques éléments qui portent à l'optimisme?

R. En termes généraux, j'ai découvert que de nombreux aspects de la qualité de l'air s'améliorent ou pour le moins restent constants. Par exemple l'un des étalons de la qualité de l'air est la visibilité aux aéroports. Depuis dix ans, ce facteur s'est maintenu au même niveau.

*Environmental Indices* est distribué par John Wiley & Sons, 22 chemin Worcester, Rexdale (Ontario). \$15.50.

## ENVIRONMENTAL INDICES

For the past few years, Dr. Herbert Inhaber of Environment Canada's Advanced Concepts Centre has been working on establishing a comprehensive system of determining overall trends in the environment. His work attempts to paint a picture of the real state of the environment. Environmental indices compare the actual state of the environment to what is legal or desirable.

Dr. Inhaber has written a book which describes for the layman how these indices may be used. The book, entitled *Environmental Indices*, presents a light-hearted and yet serious account of an innovative method of determining levels of environmental quality.

"All too often we are bombarded with conflicting information on pollution problems. A conservation group claims that in a particular area of concern, we are going to hell in a V-8 powered handbasket. A corporation or municipality says that there's nothing to fear, and that matters may even be getting better . . . A set of simple indices on the environment would serve to clear away some of the smoke of the battlefield. If used judiciously, they could also be used to clear away some of the smoke of our cities, by showing when and where action is needed".

Dr. Inhaber's work expands on the work of the U.S. National Wildlife Federation which started its Environmental Quality Index in the late 1960's.

The following are excerpts from a recent interview with Dr. Inhaber:

Q. What is an environmental index?

A. An environmental index tries to assess the state of the environment in a numerical manner. This is a relatively new concept. Only in the past five or ten years have people thought about it. The closest analogy we have are the economic indices and indicators which have been developed over the past fifty years. Everyone is familiar with the consumer price index and the gross national product. Essentially, these indices take numerical information and give us an idea of what the economic health of the country is. In my book I have attempted to explain how similar indices may be developed for environmental factors. Air, water, land quality are some of these.

Q. How do you see the public becoming involved in your project?

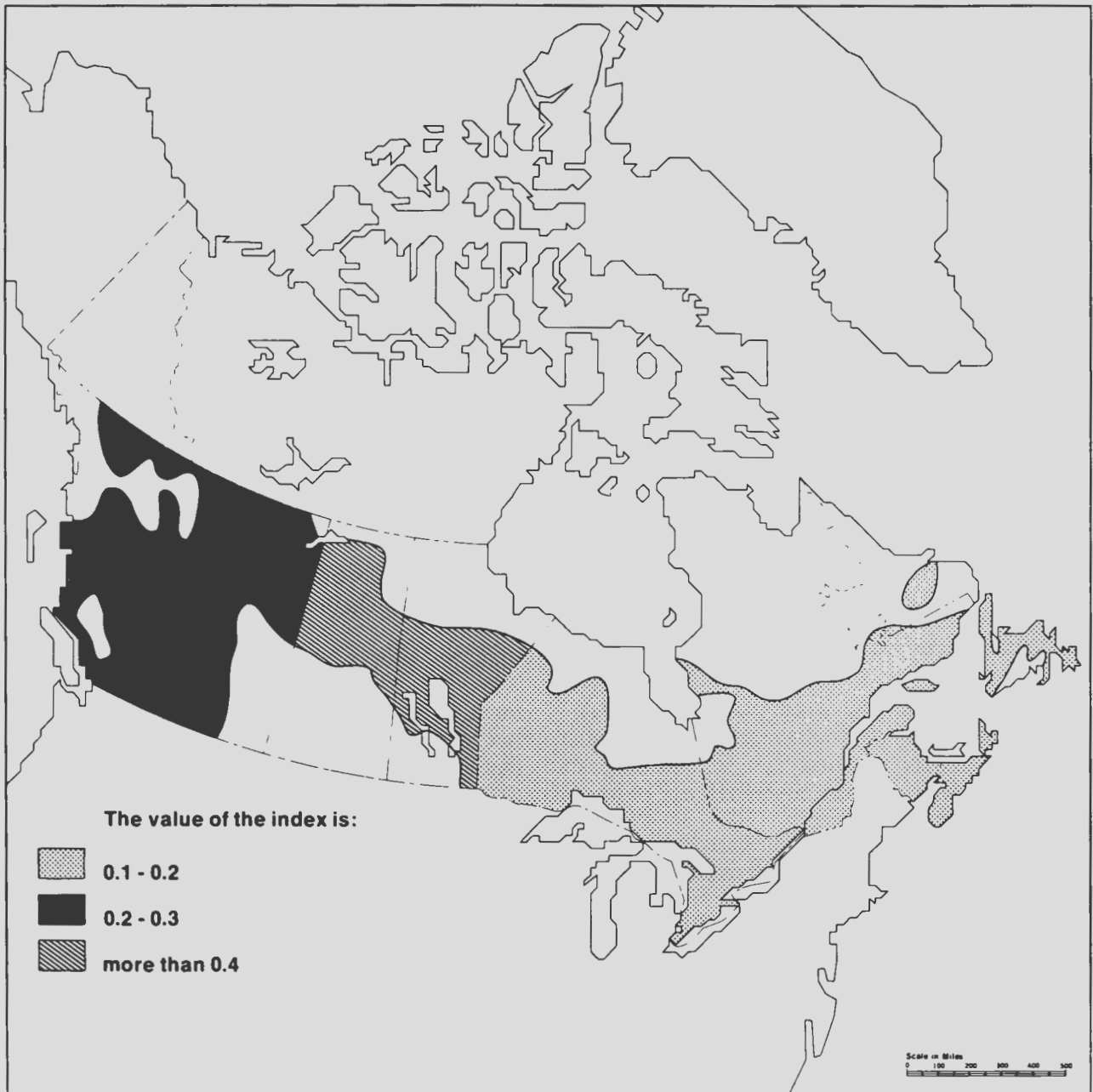
A. The public can have input in two ways. First of all, they can push for the idea, because really we are spending \$400 million in this department and the public has little idea of the state of the environment. An environmental index would help.

The second area the public should have input is in the relative weighting of indices. The public should decide if air quality, for example, is to be weighted more heavily than water quality.

Q. In your book you mention that the public should be getting "its money's worth". What do you mean by this phrase?

A. The Department of the Environment, like most government departments, lacks what is called "a bottom line". If you look at the report of a corporation or an industry you will find tables and tables of figures saying how many people they employ, the new plants they have built, their cash flow and so on. What most people are interested

in is the bottom line . . . especially what colour it is. The government does not have a concise measure of how it is doing or what the taxpayer is getting for his money. Indices would tell us what the money being spent is achieving. This would function as a kind of bottom line.



*Environmental Index: Tree Depletion - 1971.*

- Q. In researching your indices have you come up with any startling discoveries?
- A. Some of the shockers have been not so much the value of the index, but how little we knew. For example, people have been talking about the loss of agricultural land to urban areas. People have been talking about endangered species, about beaches closing down. In each case, the data is sketchy and no one has any idea of the total picture.
- Q. Have there been any optimistic signs?
- A. In terms of trends I did find that many aspects of air quality are getting better or at least staying constant. For example, one gauge of air quality is the visibility at airports. Over the last 10 years this factor has remained constant.

*Environmental Indices* is available for \$15.50 from John Wiley & Sons, 22 Worcester Road, Rexdale, Ontario.

## THE WEATHER STORY

by L.K. McGlenting

Most Canadians had never heard the term "kilopascal" until public weather forecasters began using this SI unit to measure atmospheric pressure earlier this year.

Where did it come from and why have we adopted it as the unit of pressure?

The word itself, pascal (Pa), is named after Blaise Pascal, a French mathematician, physicist, religious philosopher and writer who lived in the 17th century. Studies in geometry, hydrodynamics, and hydrostatic and atmospheric pressure led him to discover what is now known as Pascal's law of pressure.

In 1971 the 14th General Conference of Weights and Measures (CGPM) adopted "pascal" as the SI derived unit of pressure.

Because Canada is converting to SI (International System of Units), it was only logical that this term replace "inches of mercury" or "pounds per square inch" as our pressure measurement unit. Eventually, all countries which have adopted SI will use this same unit.

Normal atmospheric pressure, taken at sea level, is said to measure 101.325 kPa. When atmospheric pressure is used for weather forecasting, the measure is less important than whether the pressure is rising or falling. Rising pressure relates to nice weather, falling pressure portends inclement weather, and a steady pressure usually means no change from the existing conditions.

The kilopascal is equal to one thousand pascals; its explanation is very simple, but it requires a few steps.

When a mass is subjected to the force of gravity it will act on the mass, pulling or drawing it towards the centre of the earth. If we measure the effect of gravity, we will notice that, if we assume that air resistance is nil, the mass will accelerate at the rate of almost ten metres per second during each second. If the mass is stationary at the start of our tests, at the end of the first second of free fall, it will be falling at the rate of ten metres per second (10 m-s). At the end of second number two, it will be falling with a velocity of about 20 m-s: after the third second 30 m-s, and so on. During each second that the force of gravity is acting upon it, the object will increase its velocity by 10 m-s. This value is called "acceleration".

Gravity is a force. The SI unit of force is the newton, and is defined as that force which, when applied to a mass of one kilogram, will accelerate the mass at the rate of one metre per second during each second (1 m-s squared). To experience the feel of a force of one newton, place a mass of 100 g on the palm of your hand; the weight you feel is a force of about one newton (1N). The unit of pressure is the pascal, and it is defined as the pressure exerted over an area of one square metre by a force of one newton evenly distributed over the area. As you can imagine, this is a very small pressure; we therefore prefer to use the kilopascal, which is equal to one thousand pascals.

## LES CAUSES DES FLUCTUATIONS CLIMATIQUES

L'Organisation météorologique mondiale (O.M.M.) vient de publier une déclaration en un rapport technique qui font le point sur les connaissances actuelles en matière de changements climatiques. Cette mise au point rappelle d'abord quelques données de climatologie essentielles mais souvent méconnues et insiste ensuite sur la nécessité d'intensifier les études météorologiques et climatiques.

"On a pu déduire, de diverses sources directes et indirectes, de multiples indications sur les conditions climatiques de la Terre au cours des décennies, des siècles, des millénaires et des ères géologiques passés. Ces indications montrent clairement que les conditions climatiques présentent des variations de diverses durées. On peut donc supposer que cette évolution constante du climat, due à des causes naturelles, continuera dans l'avenir. Cependant, l'évolution à long terme du climat mondial est masquée par des fluctuations de plus courte durée ainsi que par des modifications d'échelle régionale; des conditions exceptionnelles d'humidité ou de chaleur dans une région s'accompagnent souvent de conditions inhabituelles de sécheresse ou de froid dans une autre.

"L'apparition, au cours des dernières années, dans certaines régions, de conditions climatiques exceptionnelles se prolongeant pendant quelques semaines, quelques mois, voire quelques années . . . a donné lieu à certaines hypothèses selon lesquelles il se produirait actuellement, à l'échelle du globe, un changement climatique important . . . Un tel changement à l'échelle du globe peut avoir des causes naturelles, et s'amorcera très vraisemblablement de façon progressive, voire quasi imperceptible. La raison en est que les fluctuations de plus courte durée risquent d'avoir une ampleur telle que les évolutions à long terme pourront passer inaperçues. Ce sont donc ces fluctuations climatiques à court terme, qu'elles aient une origine naturelle ou qu'elles résultent d'activités de l'homme, qu'il est urgent d'étudier plus avant."

La déclaration souligne, à cet égard, que "en dépit des progrès remarquables accomplis dans le domaine de la technique, le bien-être économique et social de l'homme dépend dans une très large mesure du climat. La production alimentaire, en particulier, est fortement influencée par les variations du climat, comme l'a prouvé la diminution des réserves mondiales de blé au cours des dernières années. Cette dépendance envers le climat revêt une importance d'autant plus grande en fonction de la demande d'une population en expansion. Mais ce n'est pas seulement dans le domaine de la production alimentaire que l'homme dépend du climat. Les inondations, la sécheresse et les températures extrêmes perturbent gravement les communautés urbaines, compromettent les activités agricoles, industrielles et commerciales et freinent le développement économique et social".

Après avoir envisagé les variations climatiques ayant des causes naturelles mal définies, l'O.M.M. soulève le problème, également très préoccupant, des variations climatiques qui pourraient être imputables aux activités humaines. Ainsi, l'augmentation de la teneur de l'air en gaz carbonique ou en poussière l'introduction dans l'atmosphère de produits chimiques (chlorofluorométhane en particulier) et le dégagement de chaleur dû à l'usage sans cesse croissant des combustibles ou nucléaires "pourraient modifier sensiblement le climat . . . Toutefois, en l'état actuel des connaissances du comportement de l'atmosphère, il n'est pas possible d'évaluer avec précision l'ampleur de tels changements."

L'O.M.M. souligne alors que "la poursuite des recherches sur les changements climatiques (à causes naturelles ou humaines), revêt une importance primordiale." Seules de telles études pourront donner quelque espoir de prévoir un jour les changements climatiques à court terme et de permettre ainsi aux gouvernements de prendre les mesures nécessaires.

Le rapport technique, établi par un groupe d'experts (1), rappelle d'abord que, depuis deux millions d'années, périodes glaciaires et interglaciaires se succèdent, les premières survenant environ tous les cent mille ans. La dernière période glaciaire que la Terre ait subie s'est achevée il y a seulement huit mille ou dix mille ans. Depuis, les variations climatiques ont été, semble-t-il, d'ampleur très modeste bien que suffisante pour faire avancer ou reculer les glaces des montagnes ou des pôles. Ainsi estime-t-on de 1550 à 1850 (après Jésus-Christ) — période appelée couramment le "petit âge glaciaire" — la température moyenne aurait pu être inférieure de 1°C à 2°C aux moyennes actuelles. Un léger réchauffement (de l'ordre de 1°C) est ensuite survenu, surtout sensible de 1900 à 1950. Mais, comme ce réchauffement est distribué irrégulièrement, il n'est pas certain que nous ne soyons pas encore dans le "petit âge glaciaire".

### Périodes glaciaires et interglaciaires

"La tendance de l'évolution climatique qui a caractérisé la première moitié du vingtième siècle semble, de façon générale, s'être inversée depuis lors, tout au moins dans l'hémisphère Nord. Les températures ont baissé, en particulier dans l'Arctique et dans la partie de l'Atlantique qui entoure l'Arctique (plusieurs degrés Celsius dans certaines zones), tandis que le volume des glaces de mer augmentait à nouveau. Il semblerait que la circulation de l'atmosphère au-dessus de l'hémisphère Nord soit revenue à un régime analogue à celui qui régnait vers la fin du dix-neuvième siècle, avec, dans de nombreuses régions, une tendance à une plus grande variabilité des conditions météorologiques. Il se pourrait cependant que, depuis quelques années, ce processus ait tendance à se ralentir, voire à s'inverser à nouveau."

Le rapport note aussi que, "au cours des quelques dernières années, il s'est produit de graves sécheresses, notamment dans la zone sahélienne d'Afrique, des décalages



de la ceinture de mousson des tropiques et diverses situations exceptionnelles dans d'autres régions du globe. Il est difficile de dire dans quelle mesure ces manifestations sont liées les unes aux autres et sont l'expression d'un changement cohérent et systématique du climat du globe. Quoiqu'il en soit, elles illustrent la variabilité parfois considérable du climat sur des échelles de temps d'un mois, d'une année ou d'une décennie".

Les experts de l'O.M.M. rappellent, avec la modestie propre aux météorologistes, que "nous n'avons encore qu'une notion rudimentaire des causes des fluctuations climatiques."

"De nombreuses explications physiques ont été avancées. La difficulté est de déterminer si, et dans quelle mesure, chacun des mécanismes proposés est à l'origine des fluctuations observées. La mise au point de modèles numériques reproduisant l'ensemble du système climatique avec suffisamment de vérité, ce qui n'est pas encore acquis, est considérée comme un moyen indispensable (mais pas nécessairement suffisant) pour pouvoir évaluer avec exactitude les causes des fluctuations climatiques, étant entendu que l'importance relative de chacune d'elles varie en fonction de l'échelle de temps considérée."

### **Dans deux cents ans?**

Pour illustrer les difficultés à établir des modèles numériques valables, le rapport rappelle que les variations climatiques peuvent naître aussi bien des interactions des différents facteurs d'un "système climatique" ou d'influences extérieures à la Terre (l'énergie solaire est-elle toujours constante?) que de phénomènes terrestres (telles les éruptions volcaniques émettrices de poussières) ou que, éventuellement, des activités humaines. En outre, remarquent les experts de l'O.M.M., "il serait peu réaliste de considérer isolément chacun des mécanismes responsables des fluctuations climatiques. Il convient, au contraire, de les replacer tous dans un contexte physique général si nous voulons parvenir à comprendre réellement les fluctuations climatiques. Or nous ne possédons encore qu'une notion très imprécise de tous les mécanismes qui sont en jeu et nous ignorons même dans quel contexte physique général il convient de les faire entrer". Les modèles actuels ne sont donc pas assez perfectionnés pour permettre la prévision de l'évolution du climat.

Quelle pourra être l'évolution du climat pendant les cent ou deux cents prochaines années? Les experts de l'O.M.M. se gardent bien de répondre à une telle question. Selon les divers éléments qu'on met en avant, on peut aussi bien prédire un lent retour à un régime glaciaire qu'un réchauffement général du climat mondial. Et, en l'état actuel des connaissances, on ne peut même pas dire si l'on pourra, un jour, prévoir l'évolution du climat à partir de lois physiques ou de déductions statistiques. Tout ce qu'on peut dire pour le moment, c'est qu'il est probable que "le réchauffement interglaciaire qui règne depuis quelque huit mille années aboutira finalement à un régime glaciaire plus froid. Ce changement peut s'amorcer d'ici un certain nombre de siècles ou de millénaires". Il ne faut pas exclure, cependant, la "probabilité très faible que le climat se refroidisse beaucoup plus rapidement . . ." à moins que les activités humaines, notamment l'augmentation de la teneur en gaz carbonique, ne produisent "durant les deux cents prochaines années, un réchauffement général du climat mondial". Celui-ci "pourrait aboutir à la disparition totale des glaces [de mer] arctiques, ce qui constituerait une situation exceptionnelle sans précédent depuis des millions d'années".

Quoiqu'il en soit, la pression démographique rend les hommes d'aujourd'hui de plus en plus vulnérables aux variations du temps et des climats. Le rapport de l'O.M.M. recommande donc de mettre sur pied "des programmes de surveillance des processus naturels et artificiels qui sont à l'origine de la variabilité du climat, de façon, en particulier,

à pouvoir évaluer suffisamment à l'avance tout risque de variation importante. Un programme de surveillance de ce type est en cours d'élaboration dans le cadre du système mondial de surveillance de l'environnement (GEMS). Parmi les paramètres qui font l'objet de cette surveillance, on peut citer les éléments suivants: (a) gaz carbonique; (b) nature et transmissibilité de particules d'aérosols d'origine volcanique dans la stratosphère, particulièrement dans les régions polaires; (c) quantité de gaz présents à l'état de traces (par exemple oxydes d'azote, anhydride sulfureux, chlorofluorométhane, etc.) et d'aérosols dans les basses couches de la troposphère; (d) étendue de la neige et de la glace, albédo, à la surface; (e) modification de l'albédo de la surface sur terre et en mer, notamment en ce qui concerne les différents types d'utilisation des sols, les changements de végétation, la pollution des océans et la productivité biologique des océans. Une importance particulière doit être accordée à la nécessité de surveiller les éventuelles petites variations du rayonnement solaire extra-terrestre, principalement dans le visible et au voisinage de l'ultraviolet."

Seule la compréhension de la variabilité climatique à court terme (dix à trente ans) et de l'influence de celle-ci sur les activités humaines (agriculture, transport, chauffage, etc.) permettront de prendre des décisions judicieuses pour faire face aux caprices de plus ou moins longue durée de la météorologie.

### SOME TIPS ON DATA STREAM

By R.E. Jackson

Data STREAM is the Public Service Commission's acronym for the Data System for Training, Research, Employment, and Appraisal of Manpower. The Data STREAM staffing system is part and parcel of a revised concept in the delegation of staffing authority from the P.S.C. to all federal government departments. When the new Instrument of Delegation of Staffing Authority is signed by the Deputy Minister of Environment Canada, it will fall to this Department, as it does presently to all other departments, to use Data STREAM as the mandatory staffing procedure for all vacancies in the Executive, Scientific and Professional, Administrative and Foreign Service, and Technical categories. What this means is that even now, all positions in these categories in other departments are being staffed almost exclusively by the Data STREAM process. It also means that A.E.S. employees who are not participating fully in the system may be eliminating themselves from consideration for interesting promotional and career opportunities in other areas.

The purpose of this article is not to extol the virtues of Data STREAM. As a staffing tool, it can only be effective if the store of information that is inventoried in the system is current and properly presented. However, as the use of Data STREAM has been imposed by the P.S.C., it becomes the responsibility of employees to ensure that the information on their personal printouts is of the highest possible quality. Accordingly, there are two areas which deserve attention. The first involves the effect that use of the Data STREAM staffing process can have on you as an employee. The second area concerns the manner in which you can best approach the presentation of yourself as a potential candidate for vacancies that may prove to be of interest to you in the pursuit of career goals.

### How does it affect me?

It is usually the posting of the white form, Notice of Right to Appeal, that announces to employees that a competition by Data STREAM has just been completed. Often, questions arise concerning the proper interpretation of the information provided on the form. One of the most frequently posed questions is: "How do I know whether or not I have the right of appeal in this competition?"

The Appeal Notice is comprised of information on the position to be filled and also states the name(s) of the proposed appointee(s). Usually the competition number, which is located in the upper right-hand corner of the notice, gives information about the method of selecting the winning candidate. The designation "INV" in the competition number represents "inventory" or Data STREAM. The designator "WC" indicating "without competition" also implies that a review was conducted of potentially qualified applicants in Data STREAM which resulted in the identification of no employee who is better qualified than the appointee, in the department's opinion, of course.

The Appeal Notice has two areas which refer to the area of competition for the selection process (Box 14), and to the qualifications required for *consideration* for appointment (Box 15).

Box 14 designates the geographical area, the part of the Public Service, and the salary range or the employee category and group in which you must be employed in order to be eligible for consideration. Treat Box 14 as though it were the "Open to" clause on a competition poster. If you fall within the stipulated area of competition, you have the right of appeal, no matter what is printed in Box 15 regarding the qualifications required. This is a point which is often misunderstood. If you could have applied on a closed competition for the same position, you have the right of appeal. This does not mean, of course, that you will, or are obliged to, exercise that right.

When you have established whether or not the right of appeal legally concerns you as an employee, you can turn to Box 15 for a statement of the qualifications required. Remember that nothing which may be printed in Box 15 restricts your *right* of appeal in any way. But also note that the qualifications listed in Box 15 usually give a firm picture of what is expected of potential candidates. Hence, you should be certain that you can meet such expectations before pursuing a course of action which may lead to the registering of an appeal.

Space restrictions prevent the detailing here of individual examples that would help you interpret some of the statements of qualifications that may appear in Box 15. Instead, we draw your attention to the name of the Responsible Staffing Officer whose name and telephone number are printed at the bottom of the notice. You are urged to contact the person named if you have any questions pertaining to an appeal notice. The staffing officer should be in a position to give you detailed information about the position. You will also be made aware of your own status with respect to the selection process, including whether or not your name appeared in the Data STREAM search. If it did, you are entitled to know why you were not given further consideration. If your name did not appear, you will have the opportunity to discuss this fact with the Staffing Officer. With the information provided, you will be in a much better situation to analyse the reasons why you were not considered, and, if you still feel strongly about the matter, to plan a rational course of action.

### How should I present myself to Data STREAM?

The first thing to remember in listing your qualifications under the heading of "Demonstrated Skills" is that you are not applying for your present position. Data STREAM is all too commonly thought of as a system for stereotyping employees in their present career path. On the contrary, Data STREAM offers employees the opportunity to go beyond a simple indication of what *experience* they possess. The "latent skill" feature of the system offers a vehicle for presenting areas in which you have developed some *expertise*, and it will do this in terms that the system can reproduce on your printout.

If you have been upgrading your skills, or if you have acquired significant skills that are not called for in your present job, you should give consideration to listing those qualifications as latent skills. This feature of the system is explained on page 11 of the new (green) Data STREAM guide which was recently distributed to all employees in the categories involved. The option of listing latent skills is particularly valuable for employees, who, having independently pursued academic, professional, or technical credential or training, would be suited for appointment to other occupational groups and categories. By advertising your latent skills in the terms of the Data STREAM vocabulary, you are automatically protecting your right to be considered for positions in which the exercise of those or similar skills is a requirement. You should also realize that your printout will reflect a more accurate picture of you as an individual, and hence may invite a closer look at your qualifications.

Also mentioned on pages 11 and 12 of the new guide is the provision for employees to file a resumé with Data STREAM. The importance of this is so obvious that it does not need elaboration. For those who may be reticent about using the latent skill feature, the resumé permits you to expand on the skills you have listed, and thereby to present an accurate picture of your ability in any of the areas you have indicated. The resumé should also contain a full listing of training courses, etc.

The main thing to keep in mind when approaching the task of announcing your qualifications through Data STREAM is that if you're out of sight, you're out of mind, and out of luck.

For further information on Data STREAM, please get in touch with your regional DOE Staffing Unit.

## **RETIREMENT OF HUMPHREY J. HARRIS**

Humphrey J. Harris, Meteorological Technician at the Victoria International Airport Weather Office, is retiring effective September 24, 1976, after 25 years of employment with the Atmospheric Environment Service.

Humphrey was born in London, England, but came to Canada at the age of fourteen and spent his youth on a homestead in Alberta's Peace River district. During the war years he served in the Merchant Marine, returning to marry Rosina Fitchett in Vancouver during the spring of '46. Humphrey joined the Met Service at Vancouver in 1951, spending five years in Prince George and seven years at Victoria Gonzales before being transferred to the Victoria International Airport in 1963.

To mark the occasion of Humphrey's retirement, fellow employees have arranged a dinner to be held at the Sidney Travelodge, 2280 Beacon Ave., Sidney, commencing at 7:30 p.m. on Friday, September 24.

Friends and colleagues are invited to join in wishing Humphrey and Rose a long and happy retirement.

## **S.E. WOLFE THESIS AWARD**

The S.E. Wolfe Thesis Award of the Association of Professional Engineers, Ontario, has been won by Ulrich W. Rentoch, P. Eng., for his thesis "Design of an Electronic Control System for Photographic Tracking of Freely Falling Hailstone Models".

In order to be registered in Ontario members of the APEO are required to write a thesis. The Board of Examiners chooses the thesis which attains the highest marks based on presentation, technical content, etc., and submits it to the Council (APEO).

On the basis of performance according to terms of reference, Ulrich W. Rentoch, P. Eng., has been awarded the S.E. Wolfe Thesis Award.

PERSONNEL

The following have accepted positions as a result of competitions:  
Les personnes suivantes ont accepté ces postes après concours:

75-DOE-TOR-CC-368	Chief, Network Standards Division MT 8 Central Services Directorate, AES HQ H.B. Kruger
75-DOE-WIN-CC-547	Regional Electronics Technician EL 4 Central Region C. Hines
75-DOE-WIN-CC-557	Officer-in-Charge EG-ESS 4 Cree Lake M. Lassi
76-DOE-WIN-CC-500	Presentation Technician EG-ESS 6 Winnipeg R.A. Cook
76-DOE-WIN-CC-520	Officer-in-Charge MT 8 Prairie Weather Centre M. Balshaw
76-DOE-WIN-CC-525	Presentation Technician EG-ESS 5 Churchill L. Funnell
76-DOE-WIN-CC-526	Officer-in-Charge EG-ESS 4 Armstrong A. Linton
76-DOE-WIN-CC-528	Officer-in-Charge EG-ESS 7 Eureka R.K. Smith
76-DOE-WIN-CC-531	Presentation Technician EG-ESS 5 Churchill C. Allan
DOE-WPNA-CC-108	Scientific Services Meteorologist MT 6 Western Regional Office L.S. Meeres

**The following transfers took place:  
Les transferts suivants ont été effectués:**

D.A. Crossly

From: De Hall Beach (OIC)  
To: A Quebec Region EG-ESS 6

D.J. Webster, Head, Public Weather Services is going on Continuous French Language Training reporting September 20, 1976.

A.H. Campbell, MT 7, will be acting in the position of Head, Public Weather Services, Atmospheric Environment Service Headquarters.

**Separations:  
Démissions et retraites:**

L.F. White

Retired July 1976

B. Morrow

Resigned  
Central Region

R.C. Quinney

Resigned August 13, 1976  
Western Region

K. Salter

Resigned August 21, 1976  
Western Region

**TRIVIA**

**Philosopher:**

Sometime, when you're feeling important,  
Sometime, when your ego's in bloom,  
Sometime, when you take it for granted  
You're the best qualified in the room.  
Sometime when you feel that your going  
Would leave an unfillable hole,  
Just follow this simple instruction  
And see how it humbles your soul:  
Take a bucket, and fill it with water,  
Put your hand in it, up to the wrist,  
Pull it out, and the hole that's remaining,  
Is a measure of how you'll be missed.  
You can splash all you please when you enter,  
You can stir up the water galore,  
But stop, and you'll find in a minute,  
That it looks quite the same as before.  
The moral in this quaint example,  
Is to do just the best that you can.  
Be proud of yourself, but remember,  
There is no indispensable man!

Expression	Signification ou Equivalent
Partir pour la gloire	Vouloir atteindre un résultat inespéré.
Ne fais pas le coq	Ne fait pas le prétentieux.
Sage comme une image	Sage et même terne.
Tu vas avoir du trouble	Tu vas avoir des problèmes.
Ouvrir l'oeil	Observer.
O.K. mon pot	D'accord, mon ami.
J'ai autre chose en vue	J'ai d'autres projets.
Elle a de la façon	Elle est gentille et hospitalière.
Il casse son français	Il parle avec un accent.
Je suis en moyen	J'ai de l'argent.
Il est un peu fantasse	Il est prétentieux.
C'est simple comme bonjour	C'est très simple.

### IS IT TROO ABOUT THE SIOUX?

by Mickey Porter

The English language, as those of us who speak it know, is ridiculously easy, and mastering it is no trick at all.

Our spelling is standardized, our pronunciation is standardized, and anybody with enough linguistic savvy to know that he "threw" a ball is likewise aware that it "snew" last night.

Not long ago I was in Sault Ste. Marie, Mich., and became interested in the pronunciation of the first word — it's SOO, of course — and furthermore, I wondered what a Sault might be.

Possibly I'm the last person to find this out, but at any rate I did learn that the St. Mary River had unnavigable rapids; the Old French words for rapids was sault, pronounced soo; so the early French settlers named the town after the rapids of the river.

Now the general area is known as the Soo.

But the worst of it is that this intelligence prompted me to produce the following orthoepical, orthographical, paronomastical poem:



You'd have to say he was at fault  
If some poor boob should call it Salt,  
All unaware 'twas proper to  
Pronounce it like the Indian, Sioux.  
But how is anyone to know,  
The dopey French pronounce it so?  
In English, if we'd spell the word  
The way it properly is heard,  
We'd know exactly what to do  
We'd spell it  
S-o, as in to,  
Or sue, as in rue,  
Or snu, as in gnu  
Or sieu, as in lieu,

Or soup, as in coup,  
Or soo, as in woo,  
Or sew, as in hew,  
Or seue, as in queue,  
Or soe, as in shoe,  
Or swo, as in two,  
Or soue, as in moue,  
Or sough, as in slough,  
Or soux, as in roux,  
Or sous, as in rendezvous,  
Or sout, as in ragout,  
Or sou, as in you.  
See it's trioux – English is the  
simplest language in the world.

### ADJURATIONS ET CONJURATIONS DU TEMPS

Pronostication nouvelle,  
Des anciens laboureurs m'appelle;  
Je fus de Dieu transmise aux vieux,  
Qui m'ont approuvée en tous lieux,  
Comme je dirai mots à mots;  
Les anciens ne sont pas sots.  
Achète-moi quand m'auras vue,  
Pour mieux en être convaincu  
Je te donne cette doctrine,  
Qui te vaudra d'or une mine,  
Bien hardiment sur moi te fonde,  
Car je dure autant que le monde,  
Aussi je veux bien avertir,  
Que point ne te voudrais mentir.

### LES PROPHETIES DE PYTHAGORAS

L'automne fait le printemps.  
Quand on a un bel automne, il en est de  
même pour le printemps, et vice versa.

Baromètre Naturel.  
Un pot rempli de sable humide sur lequel repose une  
pomme de pin. Les écailles s'écartent ou se contractent  
selon que le temps est beau ou mauvais.

## PROVERBES

Quand la fumée descend à terre au lieu de s'élever, cela annonce de la pluie.

Pour faire cesser la pluie, on place dans le jardin ou dans le champ une hache le taillant en haut.

La première chute de neige annonce de la neige permanente un mois plus tard.

Lorsque le sifflet des locomotives de chemin de fer s'entend mal, comme s'il était étouffé, c'est un signe de beau temps.

## APOLOGY TO A TREE

(Vadsei Flader)

I am going to cut you down -  
..... Why?  
Six years ago, when first I came,  
Yet not first, for I had known  
This place two times before,  
The ground was bare and brown,  
Except for dandelions all yellow.

So I dug down deep into the clay,  
Broke it, pulverized and shredded it,  
Mixed in peat  
Added sand  
Compost, grass  
and Black dirt.

Then, tenderly, I planted you,  
Roots all spread, standing straight,  
Watered, staked, trimmed, admired.  
And you grew . . .  
Too well . . . . .  
They say . . . . .

And so I am about to cut you down  
..... your shade?  
They do not want your shade. For  
They have air conditioners which cost  
Only three or four or ten hundred.

..... The wind?  
Yes you cut down the wind, but  
It does not matter. For they have  
Water and it costs only ten or twenty.

..... Your leaves?  
The children do not need to rustle  
In them. For they have rugs and  
Indoor/Outdoor, and it costs only  
Half or One or Two thousand.

The birds?

They are so noisy, and so dirty,  
And they have plastic ones, and they cost  
Only three or five or seven.

..... Your fruit?

It falls, it spoils the grass,  
It sprouts, and must be cut,  
And it must be sprayed and  
The spray is stinky, So you see

.....  
I must, I must cut you down.

    Forgive them  
    They do not know.

A day comes, is already here  
When water fails, When winds  
Blow strong, When sun beats hot,  
When grass withers, birds flee,  
Fires burn and eyes smart.

    But forgive me not  
    For I know, and  
    I love you.

And yet I will cut you down.

.....  
.....  
No. I will not cut you  
down, completely, to destroy you.  
I will only cripple you,  
Make them think you are a bush.

.....  
Then, one day, when I am gone,  
When they are gone, you will arise  
And glorify the sky for wiser eyes.  
For in your heart you are a tree  
And that is as it ought to be.