AVALANCHE NEWS NO. 38

JUNE 1992

EDITORIAL NOTE

The intention of AVALANCHE NEWS is to assist communication among persons and organizations engaged in snow avalanche work in Canada. Short articles cover accidents, upcoming and past events, new techniques and equipment, publications, personal news, activities of organizations concerned with avalanche safety, education and research.

The editor welcomes and expects contributions; all reasonable comments and discussions will be printed. The articles in AVALANCHE NEWS reflect the views of the authors, and only when it is specifically stated do they represent the opinion of the Canadian Avalanche Association.

No paid advertisements are carried. Suppliers who wish to draw attention to their products should send information to the editor who will publish a note when the equipment has value in avalanche work and safety.

AVALANCHE NEWS will now be issued only two times per year, in June and November. There is no subscription fee. Requests for copies and notifications of change of address should be sent to the publisher.

* PLEASE NOTE: SEE LAST PAGE OF THIS ISSUE REGARDING MAILING LIST OF AVALANCHE NEWS.

Editor: Alan Dennis, Manager
Canadian Avalanche Centre
P. O. Box 2759
Revelstoke, British Columbia
Canada, V0E 2S0
Telephone: (604) 837-2435

Publisher: Jack Bennetto
Manager, Snow Avalanche Programs
Ministry of Transportation and Highways
4C, 940 Blanshard Street
Victoria, British Columbia
Canada, V8W 3E6
Telephone: (604) 387-6931

AVALANCHE NEWS
Canadian Avalanche Association, Revelstoke, British Columbia

SNOW AND AVALANCHES
WINTER 1991-1992, WESTERN CANADA

by Alan Dennis

The winter months of December, January and February were very mild with heavy precipitation to coastal and northern regions but below normal snowfall in the interior and Rockies. In March there was limited storm activity and generally the deeper snowpack gained strength at this time.

The number and size of avalanches were below average. The most noteworthy and widespread cycle started in SW British Columbia and moved NE into west central Alberta during late January and early February. There were some large unusual avalanches on low angle slopes throughout the interior and Rockies.

Surface hoar layers formed in early January, mid-January and mid-February caused persistent problems until mid-March. In most regions spring avalanche conditions started early and the avalanche season was over before normal.

AVALANCHE INVOLVEMENTS IN CANADA
WINTER 1991-1992

by Alan Dennis

Introduction

The Canadian Avalanche Centre (CAC) has now taken on the responsibility of collecting statistics about persons and equipment involved with avalanches. The information provided assists in drawing attention to avalanche hazards and in educating professionals and the public about safety measures. The details of any incident are confidential; the annual summary gives only the information shown below. Additional information may be used for research and education but further details will not be released to the public without permission.

Number of Incidents

The incidents in the winter 1991-1992 may be stratified according to mountain ranges as follows:

8	Coast Range
28	Columbia Mountains
10	Rocky Mountains
Total: 46	reported incidents.

Number of Persons and Objects

The involvements concerned the following number of persons and objects:

- 1 skier in a ski area
- 2 skiers doing avalanche work
- 4 skiers adjacent to ski area
- 34 skiers in back country
- 1 snowboarder in a gravel pit
- 4 snowmobiles
- 2 climbing
- 9 vehicles
- 1 facilities damage, communication line

Sufferings and Damage

- 20 caught in avalanche, remained on surface, uninjured
- 5 caught in avalanche, remained on surface, injured
- 15 caught in avalanche, partially buried, uninjured
- 4 caught in avalanche, partially buried, injured
- 2 caught in avalanche, partially buried, dead
- 4 caught in avalanche, completely buried, uninjured
- 1 caught in avalanche, completely buried, injured
- 2 caught in avalanche, completely buried, dead
- 7 vehicles drove into avalanche, no damage
- 1 vehicle drove into avalanche, partially buried, damage
- 3 snowmobiles drove into avalanche, partially buried, damage

The total estimated property damage was $60,000.

Search Summary

Of persons completely buried and survived, locating the victim was by:

- 2 were found by transceiver
- 1 was located by his voice
- 4 was located by visible equipment, i.e., one reflective tape visible on pack, one hand only exposed

Of persons completely buried and dead, locating the victim was by:

- 1 probing
- 1 dog
- 1 object on surface (indicator for probe)

Accidents with Fatalities

Hudson's Bay Mountain, Smithers, B.C.

On November 27, 1991, about 1700 hours, a size 1 avalanche caused some injuries and loss of equipment to a group of six who were rappelling down an ice climb. About 20 minutes later a second size 1 avalanche swept off the climber nearest the ground (he was rappelling from the lower belay station to the ground). He remained on the surface with minor injuries. Momentarily later the group of three at the lower belay station fell to the bottom. All three were partially buried. The deceased was buried head down and when dug out in 15 minutes could not be revived. The two climbers at the higher belay station rappelled down.

Spindrift was falling down the waterfall ice during the day and the warmest temperature of the day was recorded (in Smithers) one hour before the avalanches.

Thornhill Mountain, Terrace, B.C.

On January 3, 1992, at approximately 1515 hours, two snowmobilers triggered a size 3 hard slab avalanche (400m x 1.2m) that started at 1455 m and ran out to 1280 m. The machines were crossing a slope at a transition point between 27 and 38 degrees. The area is a popular snowmobiling location and the accident was observed by other snowmobilers who initiated the rescue. The victims were found seven and eight hours later by probe line and dog search. The avalanche ran on a 2mm+ thick layer of graupel and partially settled snow with wind deposited snow above.

Mt. Field, Field, B.C.

On February 26, 1992, at 1230 hours an avalanche (size 2.5) caught four climbers near the bottom of an ice climbing route. The avalanche partially buried two of the group and one was killed by suffocation. It took about one half hour to dig out the deceased. The south facing slope above the ice climb had been in direct sun for up to three hours. The climbers had observed smaller sluffs but stayed at the site.

Conclusion

Canadian Avalanche Centre encourages all information about avalanche involvements be submitted on either the short or detailed reporting form available from the Centre.

The cooperation of all groups, agencies and individuals both professional and recreational who have submitted reports is acknowledged gratefully. It is only through their effort that the accident information can be presented. The Avalanche Centre of the National Research Council started to compile involvement reports in 1980. The following is a summary of those reports.

Avalanche Involvements Summary in Canada

YEAR	NUMBER OF INCIDENTS	NUMBER DEAD	SKIER	CLIMBER	SNOWMOBILER	OTHER
1980	28	1	1			
1981	24	9	5	4		
1982	45	4	3			1 rail worker
1983	34	3	2	1		
1984	35	4			4	
1985	35	6	5		1	
1986	28	8	3		4	1 snowshoer
1987	28	7	7			
1988	34	7	6			1 PQ girl guide
1989	45	6	3	1	1	1 person at home
1990	33	9	7	1		1st snowboard
1991	58	11	11			
1992	41	4		2	2	

ANNUAL GENERAL MEETING OF THE CANADIAN AVALANCHE ASSOCIATION

by Dave Smith

The Canadian Avalanche Association (CAA) held its Annual General Meeting (AGM) on May 7, 1992 at Revelstoke, B.C. Following are some of the highlights:

Membership

As of May 1992, the Association has 139 Active, 4 Honourary and 31 Associate members. A total of 18 new members were welcomed at the meeting.
Peter Schaerer, Fred Schleiss and Walter Schleiss were made Honourary members through a special resolution passed by the membership.

Elections

The following officers were elected for 1992/93:

Bruce Jamieson	President
Jon Bezzola	Vice President
Jim Bay	Secretary/treasurer
Bernard Protsch	Chairman, Membership Committee
Dave Skjonsberg	Director at Large
Jack Bennetto	Director at Large
John Burke	Representative, Associate Members

Committee Members

Membership Committee:	Bernard Protsch (Chair), Simon Walker and Peter Kimmel
Education Committee:	Peter Schaerer(Chair), Bruce Allen and Robin Siggers
Technical Committee:	Dave McClung (Chair), Bruce Jamieson, Robert Sayer and John Tweedy
Explosives Committee:	J. Tweedy (Chair), Directors of the Association
Nominating Committee:	Buck Corrigan, Tony Moore (Co-chairmen)
Steering Committee: (Info Exchange)	Jon Bezzola, Dave Skjonsberg, Wayne Flann and Bruce Allen

Avalanche Centre

Although into its second year, the Avalanche Centre officially opened its doors October 5, 1991, and enjoyed a busy and successful season with the administration and operation of the CAA Training Schools, Industry Information Exchange, Public Avalanche Information Bulletin (pilot programme) and other Association activities (membership, public relations, general information, training video and equipment sales, etc.). The Centre staff is composed of Alan Dennis, Centre Manager; Chris Whalley, Technical Officer; Lisa Normandeau, Technical Assistant; and Inge Anhorn, Registrar/bookkeeper. A plan for the organizational structure of the Association and the Centre was presented by the Directors and approved by the membership. It detailed the various responsibilities and duties of directors, committees and Avalanche Centre staff and included a system for financial planning. Emphasis next season will be to increase subscribers and public and corporate support for the varied operations of the Centre, particularly the Information Exchange and the Public Bulletin.

Workers' Compensation Board

The Association has been represented on two levels with respect to Workers' Compensation Board (WCB)-related issues; a formal submission to the WCB Board of Governors as part of the regulatory review process, and various dealings with WCB field officers regarding explosive procedures, regulations and inspections. The WCB is now an associate member of the CAA and a good working relationship has been established between the two organizations.

Motions

Several motions were made and passed by the members:

- To appoint Alan Dennis as the editor of the AVALANCHE NEWS and to reduce the publication of same to a semiannual basis.
- To designate Peter Schaerer as representative of the CAA to the 1992 IKAR conference in Europe.
- To further clarify the transceiver frequency changeover through additional advertising in outdoor magazines, winter sports catalogues, news media and the Public Information Bulletin.

- To enhance public awareness of the Information Bulletin through advertising and more visible display at various posting locations.
- To initiate steps to arrive at common data communication standards for the avalanche industry.
- To hold the next AGM in Revelstoke in the first week in May, 1993.

TECHNICAL MEETING OF CANADIAN AVALANCHE ASSOCIATION

by Peter Schaerer

On May 6 and 7, 1992, the Canadian Avalanche Association held its annual meeting for the exchange of technical knowledge and for social gatherings. The meetings were held at the Community Centre of Revelstoke, British Columbia with approximately 110 persons attending who were either active members, representatives of associate members, or invited guests. They were greeted by Mayor Battersby of the City of Revelstoke. Following is a summary of the topics that were discussed at the meetings.

Canadian Avalanche Centre

Chris Stethem (President), Alan Dennis (Manager), and Chris Whalley (Technical Officer) described the activities of the Centre. The Canadian Avalanche Centre is owned and operated by the Canadian Avalanche Association, but its activities are driven by the industries. The activities involve four operations: training schools; information exchange for industry; public avalanche information board; and association services.

The Training Courses of the winter 1991-1992 are summarized under a separate heading in this issue of **AVALANCHE NEWS**. The number of students in the courses (194 students in 1991-1992) has steadily increased over the past years, although there were annual variations.

The Industry Information Exchange served 42 subscribers (an increase of seven in this past year). Additional subscribers are expected to join. The exchange is a sharing of information among subscribers who individually provide input information and in return receive data and facts from the others. Most subscribers have contacted the Centre by FAX. The users have found the exchange information valuable with respect to their daily snow stability evaluation and in addition it proved to be a learning tool making an avalanche hazard forecaster think about the variation of snow conditions.

A bulletin board that lists the data from remote weather stations is a new feature of the information exchange. It included weather stations operated by the British Columbia Ministry of Transportation and Highways this past winter. The bulletin board with automated database management is still in a stage of development and will probably require the assistance of a major software producer. At this time, the users are encouraged to identify the data files which they wish to obtain on the bulletin board. Potential users at the meeting recommended that the format on bulletin boards be the same as that used in the field.

The Public Avalanche Information Bulletin is a summary of the material received by the industry information exchange (without identifying the individual sources). Bulletins were issued regularly every Thursday between Mid-January and the end of April, and were updated on Friday when changes occurred. The Centre plans to update the bulletin at least twice per week in the coming winter. The bulletin was disseminated as follows:

Distribution		Calls
	1-800-667-1105	533
PC BBS	604-837-4893 (installed late in season)	20
FAX CAC from	837-4624 (13 cooperators x 16)	208

The following cooperators paid towards the service:

BC Forest Service
Carleton Recreational Equipment
Escape Route
GO BC
Hostel Shop
Mountain Equipment Co-op
Mountain Magic
National Search & Rescue Secretariat
Snowpack Outdoor Experiences
University of Calgary - Outdoor Pursuits Centre

Distribution was through the above and also:

Alpine Club of Canada
BC Parks (Nelson)
Canadian Mountain Holidays
Vancouver Sun

The Public Information Bulletin still requires considerable promotion, more cooperators, and additional funding. A promotion by posters is considered.

The Association Services included services to the members of the Canadian Avalanche Association and the sale of training videos and books.

Communication Standards

Jon (Colani) Bezzola (CMH Heli-Skiing) mentioned that the information exchange users had difficulties with applying uniform language and technical terms. There is a need for a working group to list and define simple standard terms for the description of snow and avalanche conditions.

In the discussion it was recommended that technical terms and standard formats be applied with the information exchange and bulletins, but there should be room at the end of the message for comments concerning feelings about the situation.

Weather Services

Ralph Janes of the Atmospheric Environment Service (AES) described changes to weather services. Mainly as a result of dwindling resources, increasing demands for services, and improved technology and means of communication, the Atmospheric Environment Service of Canada plans to decentralize its operations from nine major forecast centres to 25 to 30 smaller forecast/weather centres. Kelowna, which serves the avalanche hazard forecasters in southern British Columbia, will be the first one of the small centres. The Kelowna Centre will be housed at the Campus of Okanagan College and begin its full operation in June 1993 with satellite offices at Kamloops, Castlegar, and Revelstoke.

Partnership with industries is the keyword of weather services in the future. The user groups will be involved in a continuous consultation about their needs and how services can best be provided. Avalanche safety operations are invited to let the Atmospheric Environment Service know what type of products, bulletins, and services are required. The requests may be advanced through the Canadian Avalanche Centre.

Gordon Bonwick described the data network of the British Columbia Ministry of Transportation and Highways (MOTH). Weather and snowpack data are collected at 38 remote stations, transmitted to nine local base stations where avalanche technicians are in charge, then distributed to the headquarters at Victoria, the Atmospheric Environment Service, and the Avalanche Centre Bulletin Board.

Explosives Regulations

Chris Stethem reported on the presentations which he made on behalf of the Canadian Avalanche Association to the Workers' Compensation Board of British Columbia. The Association asked that the regulations concerning the application of explosives be modified to allow pre-arming of hand charges prior to moving to the explosive site. The avalanche industry considers that pre-arming is safe and has proven to be safe, and assembling charges on site would be more hazardous due to the weather and terrain. The Canadian Avalanche Association intends to cooperate fully with the Workers' Compensation Board and its field inspectors in finding a solution. The presentation of the Canadian Avalanche Association included statements from experts in the U.S.A. and Canada.

Alf Klassen, representing the Workers' Compensation Board, outlined the duties of the field officers and praised the cooperation with the industry. He mentioned that the skiing industry generally operates safely and inspectors have issued few orders (violations of safety rules). The orders concerned unsafe equipment, storage, and access.

Operation of Avalauncher

Garry Walton (SEAR) and John Tweedy (MOTH) described problems with avalaunchers.

In Canada, rules for pressure vessels apply to the avalauncher (in contrast to the U.S.A.) and the inspectors of the Gas Safety Branch of the Government of British Columbia have expressed concerns. In the future the pressure vessels of avalaunchers need to be tested and pipes, connectors, and pressure valves be certified. New guns have the necessary certification.

As a result of the avalauncher accident at Whistler in April 1991, the Canadian Avalanche Association was requested to answer four questions (see **AVALANCHE NEWS** No. 37), but they require no changes of the procedure.

Garry Walton has drafted a manual for avalauncher maintenance which will be distributed within the industry for comments. John Tweedy recommended an annual full maintenance for avalaunchers that are used at roads because of the effects of road de-icing chemicals. A video showing the maintenance of avalaunchers by an experienced craftsman will be available in November 1992, through the Canadian Avalanche Centre.

Avalanche Control Artillery

Roger Allen of SSE (a company in the U.K.) described the LOCAT airlauncher for avalanche control. The gun has a calibre of 80 mm and a firing range to 5000 m. It can be used mobile or be installed fixed on a variety of mounts. California Highways has recently ordered the equipment.

SSE in cooperation with Olin Corporation has proposed to build a projectile for recoilless rifles.

Blue River Avalanche Research Project

Bruce Jamieson gave a progress report of the joint research project of the University of Calgary and Mike Wiegele Heli-Skiing. Bruce experimented successfully with a spring-loaded tilt board (spring table) and found a good correlation between the impact force on the board at the failure of a snow sample and the shear strength (measured with a shear frame) in old and new snow. The technique and the limitations still need to be defined.

The influence of the slope incline on the rutschblock rating was determined. It was found that the rutschblock score typically decreases by one step for about every 10 deg. decrease of slope angle. The studies on the variability of the rutschblock ratings across a slope were continued. Generally, higher scores and a greater variability were found at the top of a slope and as a conclusion, rutschblock tests should be carried out further down the slope.

Transceivers

Clair Israelson (Canadian Parks Service) reviewed the studies that resulted in changes of the frequency of rescue transceivers. The Canadian Avalanche Association recommends that from the year 1992 on only dual frequency or 457 kHz units be used. Because numerous single frequency 2275 Hz transceivers are still being used, rescue missions must carry additional instruments that receive on the old frequency.

Nic Seaton of the British Columbia Ministry of Transportation and Highways has evaluated several makes of 457 kHz transceivers with respect to receiving, performance under cold conditions, power use, function, cost, and availability of earphone. On the average all instruments performed well and it was difficult to give a preference.

Bob Sayer (Mike Wiegele Heli-Skiing) explained the induction line search with transceivers (in contrast to the grid search). In the induction line search the transceiver is oriented in the direction of the strongest signal, then the searcher follows the line of the strongest signal to its source. Many people seem to understand the method quickly and found hidden transceivers in a shorter time than with the grid search.

Forms for Test Profiles

Peter Schaerer presented the draft of a form for plotting test snow profiles. The standard full snow profile form has proven to be unsatisfactory for plotting test profiles, as it has insufficient space for comments. It was recommended that the operations consider the special form and the Canadian Avalanche Association makes available standard forms.

Canadian Avalanche Rescue Dog Association (CARDA)

Gordon Burns (RCMP and CARDA) reported on the course for avalanche rescue dogs that was held at Blue River in November 1991. The course was attended by 21 handler-dog teams under good training conditions. CARDA now has validated 26 teams. Courses in 1992-1993 are planned.

Gordon also described the recovery by a dog from an avalanche at Cody Peak at Jackson Hole. A dog found a completely buried skier alive after a burial of 90 minutes, a relatively long time.

Accidents

The case histories of avalanche accidents in the winter 1991-1992 were described (see separate article in **AVALANCHE NEWS**).

CANADIAN AVALANCHE ASSOCIATION TRAINING SCHOOLS

by Alan Dennis

Winter 1991-1992

In the winter of 1991-1992 the Canadian Avalanche Association again organized avalanche courses for professionals. This was the first winter that the Canadian Avalanche Centre was wholly responsible for the administration and logistics of all courses. The contribution of the Education Committee and the instructors in maintaining the high standards of the schools is vital to their success. The considerable contribution of the management and staff of areas where the courses are held is also gratefully acknowledged.

Since BCIT and NRC started to offer technical avalanche courses the schools have established an international reputation. The course material has been adopted by New Zealand and there are an increasing number of students from Europe and USA. The courses make an important contribution to public safety in Canada.

The following courses were held this winter:

DATE	LOCATION	TYPE	NUMBER OF STUDENTS
Dec. 2-6	Creston, BC	Transportation & Industry - Level 1	25
Dec. 9-13	Meziadin, BC	Transportation & Industry - Level 1	14
Nov. 23-29	Blue River, BC	Ski Operations - Level 1	24
Dec. 1-7	Whistler, BC	Ski Operations - Level 1	25
Jan. 13-19	Mistaya, BC	Ski Operations - Level 1	12
Jan. 25-Feb 1	Boulder, BC	Ski Operations - Level 1	10
Feb. 2-8	Engadine, AB	Ski Operations - Level 1	24
Mar. 1-7	Lake Louise, AB	Ski Operations - Level 1	25
Dec. 7-14	Blue River, BC	Ski Operations - Level 2	17
Jan. 12-19	Whistler, BC	Ski Operations - Level 2	18
Total Number of Participants			194

All students successfully completed the courses except three; one on a Ski Operations - Level 1, one on a Transportation & Industry - Level 1 and one on a Ski Operations - Level 2.

Plans for Winter 1991-1992

At a meeting on May 5, 1992, the instructors of the Avalanche Schools reviewed the courses and made plans for the coming winter.

Tentatively the following courses and dates were set:

DATE	LOCATION	TYPE
Nov. 30-Dec. 4	Creston, BC	Transportation & Industry - Level 1
Dec. 7-11	Revelstoke, BC	Transportation & Industry - Level 1
Nov. 28-Dec. 4	Blue River, BC	Ski Operations - Level 1
Dec. 5-11	Whistler, BC	Ski Operations - Level 1
Jan. 3-8	Island Lake, BC	Ski Operations - Level 1
Jan. 17-22	Lake Louise, AB	Ski Operations - Level 1
Jan. 25-31	Mistaya, BC	Ski Operations - Level 1
Dec. 5-12	Blue River, BC	Ski Operations - Level 2
Jan. 9-16	Lake Louise, AB	Ski Operations - Level 2
Dates to be announced		Ski Operations - Level 2 Refresher

Course Brochure

The brochure for the courses of the coming winter should be available in August 1992. It will be distributed to the existing mailing list and may be obtained from the Canadian Avalanche Centre.

WEATHER PRODUCTS

by Chris Whalley

One of the offshoots of the Industry Information Exchange has been the investigation of weather products. In this field we recognize some interests common to the avalanche community as a whole, and see a role for the Canadian Avalanche Centre as a representative and a conduit.

We haven't stumbled on a quick total solution, and have assumed an evolutionary approach instead. High data density, special communications networks, and variations in users' requirements, make it a complex topic. There are different methods of formulating and delivering weather products, and improvements can be entertained, which further encourages a broad focus.

We are brainstorming for ways to enhance one of our primary tools. Things may take shape in stages, and promising options may take time to reveal themselves. Right now there are some basics to get started on.

Existing Weather Products

Beyond consultation with your local briefer, the most available form of weather information is in text products originating from the main weather centres of the Atmospheric Environment Service. They vary from terse data which is automatically updated hourly by computer, to specialized forecasts prepared several times a day by a meteorologist. The most familiar to avalanche crews is the Mountain Weather Forecast (FPCN50), which is an example of the latter type.

Data from remote stations belonging to the B.C. Ministry of Highways is available as a text product through AES. The product, named SXCN33, is an example of one which is updated automatically by computer. It is a plain presentation of the data reported in the previous hour. During the last winter, an overnight history of this data was posted on the Canadian Avalanche Centre's bulletin board. This was done by placing automated calls at intervals and logging a sequence of data. Next winter, we might do some secondary processing.

West Coast station data has just been made available by AES in two new text products, SXCN50 and WBCN9. These consist of plain weather readings from moored buoys and from coastal stations respectively. The buoys are as far as 400 km offshore and the coastal stations are typically lighthouses. We plan to pass these along on our bulletin board next season, thus filling a gap in the Information Exchange, namely to provide coastal subscribers with real-time readings from as far upstream in the weather systems as possible.

Maps are the form of information most valued by users who are knowledgeable enough to make sense of the large-scale weather patterns, and avalanche crews typically fall into this category. Several of the AES weather offices have made a package of maps available on their fax machine via polled transmission in the early morning. A user can use a fax machine to dial the weather office and receive the maps, consisting mainly of the 700mb analysis and the 12hr and 24hr surface prognoses.

Satellite pictures are not readily available, however, the B.C. Ministry of Transportation and Highways have experimented with a system developed by the B.C. Ministry of Forests. Although the visual information was deemed valuable, some streamlining is required for this to become a workable daily tool, mainly to increase the throughput of large graphics files by modem.

Existing Means of Communication

The simplest means of communication is with the bulletin board operated by AES in Vancouver. This consists of a quick and efficient transaction using a telephone modem at 2400 baud. Authorized users are assigned an ID, which triggers their particular package of products. The Canadian Avalanche Centre qualifies for this kind of access, whereas individuals may not.

The broadest range of AES products is accessed via their Anikom 100 satellite link. You receive all text products available to end users, but you have to buy a satellite receiver and pay a subscription fee. Maps are available on a graphics channel, but that subscription fee is significant. Data comes over this link in a stream which requires continuous processing to be usable.

Another way to get weather products is by subscribing to a private weather service. They have links to the data sources such as AES, and they manage the processing and communications. You pay a subscription fee, plus time charges while connected via modem. They are capable of putting together custom products for a development fee.

Pictures can be received direct from the satellites that take them. This requires a combination of radio and computer equipment which is not terribly exotic. The image is displayed on the receiving terminal; distribution would be a separate problem.

An important layer of communications is the network connecting the CAC and the avalanche crews, which is being developed by the Industry Information Exchange. So far there are only a few operations making regular use of modem communications with our bulletin board. We need to increase its use and probably its throughput, because it may be suited for a central role in distributing weather products.

Short-term Evolution

An opportunity presents itself in the special relationship between the Canadian Avalanche Centre and the Atmospheric Environment Service. That relationship focuses on the emplacement of the new Southern Interior Weather Centre which is scheduled to open in Kelowna for the 1993-1994 winter season. AES policy encourages co-operative relationships with their users, allowing them to offer the avalanche community special attention if we can return something of use to them. The network established for the Information Exchange could provide the means of distributing weather products with the minimum overhead for AES, which is of real value to them. Our network could also provide them with new and useful data. Hence, continued development of that network will improve our position.

Specifically, we should make the weather data that subscribers supply to the Exchange as comprehensive as possible, and we should get our bulletin board network well established and widely used. With good weather data from points which are not in their present grid, we have something to offer AES in exchange for special attention in setting up our desired weather service. We might have to make our observation and reporting methods conform to a universal standard. With modem communication established between the Avalanche Centre and our subscribers, we will have an efficient means for distributing weather products, which will benefit both us and AES.

During the coming winter, we will have real-time weather data posted on our bulletin board. There will be Highways remote data as last season, and data from westerly stations including offshore buoys. We encourage you to try using these, and can help set up anyone who is interested. This will exercise our modem communications and allow you to try out these products. If you offer criticisms and suggestions, we can work on adjusting things to suit you better.

Long-term Exploration

The most common wish that I hear from avalanche crews is for graphical products. This is an inherently better way of getting the weather picture, but there are limitations that are on a different scale from those that apply to text. With what is available now, our data network could do a good job of handling text products, but a quantum technical advance would be required before we could handle maps and satellite images. The bottle neck is transmission times via telephone modem. Text files are a few thousand bytes in size, and several can be transmitted in less than a minute at the usual baud rate of 2400. Graphics files, on the other hand, can be over a million bytes in size, and transmission of several of these will take a fraction of an hour, although the times can be made reasonable by running at the higher baud rates available on up-to-date modems. Some of our communication is through radio links which have only been proved out at 1200 baud; to send a series of satellite images for animation would take at least an hour.

For transmitting graphics, faxing sacrifices efficiency and some resolution for ease of operation, but it will have to serve until we can make a breakthrough in data communications. Reducing the file size dramatically would make the most difference. The best way to do that is to radically change encoding method used at the source. For instance, descriptions of curves such as isobars can be transmitted instead of entire maps, and the map is then composed by the receiving computer, using a lot of resident information. If graphical products are truly of interest to us, then we should keep in touch with fundamental developments of this kind.

Satellite information cannot be reduced at the root by any similar approach that I know of, but more superficial methods of speeding file transfers could help significantly. Compression in software could reduce the file size to a third, and the current generation of modems can go ten times faster than the standard 2400 baud.

If you have any interest in working out better weather products for avalanche crews, I encourage you to take part. The CAC will proceed according to feedback from the industry. I will gladly discuss any of this with you.

EDITORSHIP OF AVALANCHE NEWS

by Peter Schaerer

With this issue, No. 38, Alan Dennis takes over as the editor of **AVALANCHE NEWS**. I wish him success in maintaining the objectives and standards of the valued publication and I wish to appeal to the readers and contributors that they support and assist Alan with his task.

AVALANCHE NEWS was first issued in October 1979, when the persons who were engaged in avalanche work in Canada had expressed the wish to be kept informed about new developments and to maintain contact with others of the trade. **AVALANCHE NEWS** has seen three stages of information service during its life. Initially the Canadian Avalanche Committee responded to the needs of the avalanche workers in Canada, consequently, it sponsored and edited the News. The Committee was formed in 1975, with Ron Perla, Geoff Freer, Willi Pfisterer, and Peter Schaerer being the members. It was disbanded in 1981, when the Canadian Avalanche Association was created and assumed the tasks of the Committee including responsibility for the content of **AVALANCHE NEWS**. In 1991, the Canadian Avalanche Association formed the Canadian Avalanche Centre and now one of the tasks of the Manager of the Centre, Alan Dennis, is to assemble and edit **AVALANCHE NEWS**.

When **AVALANCHE NEWS** was established, I agreed to be the editor - and, as it unfolded, the principal writer - because I had closest contacts with the industries and agencies that were concerned with avalanches in Canada and was informed about developments on the international and scientific levels. After 13 years, it is now time for a younger, enthusiastic person to take over. Furthermore, as I have retired from full-time avalanche work, I am no longer able to submit travel expenses claims and to enjoy the numerous contacts which I had through my work with the National Research Council of Canada.

AVALANCHE NEWS could not have been published and distributed without the good offices of the Ministry of Transportation and Highways of British Columbia. the Minister, recognizing that the newsletter greatly assists the avalanche safety in the province, grants its printing and mailing. The readers and the users of avalanche safety technology much appreciate the generous service and hope that the assistance will continue in the future.

AVALANCHE NEWS can meet its objective (keeping avalanche works informed) only with the cooperation of those who are active in avalanche safety and control. I wish to encourage all those involved to submit to the new editor notes about concerns, discoveries, changes in organizations and personnel, new equipment, and informative incidents. With this support **AVALANCHE NEWS** will continue to prosper.

AVALANCHE AWARENESS COURSES

by Alan Dennis

The Canadian Avalanche Centre receives numerous enquiries from individuals and groups who want training at introductory and advanced avalanche awareness courses. These courses are usually for recreational users (including skiers, snowshoers, snowmobilers, climbers) in many parts of western Canada.

As a public service the CAC will expand on the existing list in the Resource Agency List in the **AVALANCHE NEWS**. The purpose of this message is to invite suitably qualified avalanche awareness course leaders to submit their names, course locations, costs and a summary of their experience.

The CAA/CAC does not formally endorse any course however in order for a high standard to be maintained the following criteria must be met:

1. The course leader or sponsoring agency is an active or associate member of the Canadian Avalanche Association (CAA).
2. The course material follows the content of the Introductory or Advanced Avalanche Awareness Manuals (or equivalent) published by the CAA and the Alpine Club of Canada.
3. The course leader has experience in presenting the course material.

The list will be available for next winter and summary information will be included in the poster campaign.

CORONERS LIST

The British Columbia Coroners Service requires an updated list of members of the Canadian Avalanche Association who are qualified to assist in investigating avalanche accidents.

If you are willing to be on the list send a letter informing the Canadian Avalanche Centre. The letter should state your experience relevant to accident types and geographic zone of winter operations where you can assist.

EMPLOYMENT OPPORTUNITY

Snow Study Observer

The Canmore Office of Kananaskis Country is having a competition for a Snow Study Observer position. This position will require the incumbent to be able to evaluate and maintain industry standards for Snow Study and Stability Reports throughout the winter in Kananaskis Country. You would assist in teaching rangers, public and school groups safe winter travel procedures. You would respond to public safety occurrences, when called upon; to run avalanche control missions when required; to assist local ski area staff when appropriate; to assist other local agencies (Government and Private) when necessary; to complete all work as required by immediate supervisor and Public Safety Coordinator.

The position is a wage position, starting at $12.30 per hour. The Commencement Date is November 2, 1992, and the Completion Date is on/or before April 30, 1993.

The minimum requirements for this position are as follows:

1. Assistant Winter Guide with Association of Canadian Mountain Guides.
2. Level II with Canadian Avalanche Association.
3. Blaster's Certificate for Avalanche Control and Helicopter Bombing.
4. Wilderness First Aid Certificate (current).
5. Valid Driver's Licence.
6. Communication Skills and Writing Skills.
7. Teaching Skills (Outdoor Environment included).
8. The ability to work with varied agencies and personnel.
9. Must have the ability to ski all backcountry terrain in all types of snow conditions.

The following requirements would be beneficial:

1. Organized Rescue Experience.
2. Helicopter Flight Rescue Experience.
3. Computer Knowledge.
4. Water Rescue Skills.

The Canmore Office will receive resumes until August 10, 1992. Interviews will be held between August 17 and August 28, 1992. Please send resumes to:

George Field
Kananaskis Country
Box 280
Canmore, Alberta
CANADA T0L 0M0

Telephone: (403) 678-5508, Fax: (403) 678-5505

TRAINING VIDEOS

Avalauncher Maintenance - approx. one hour (will be available this fall)

Sear Search and Rescue Equipment
2818 Bayview Street
Surrey, B.C., V4A 2Z4, CANADA Telephone: (604) 535-2700

Helicopter Bombing (should be available this fall)

Canadian Avalanche Centre
P. O. Box 2759
Revelstoke, B.C.
V0E 2S0, CANADA Telephone: (604) 837-2435

PUBLICATIONS

The following articles by Bruce Jamieson and Colin Johnston are available on request by writing to:

Department of Civil Engineering
The University of Calgary
2500 University Drive, N.W.
Calgary, Alberta
CANADA T2N 1N4

Telephone: (403)220-7479 or Fax: (403) 282-7026

Spring tables and rutschblocks for stability assessment. Presented at the Technical Sessions of the Canadian Avalanche Association, May 1992, 9 p.

A fracture-arrest model for unconfined dry slab avalanches. Canadian Geotechnical Journal 29, 61-66.

Rutschblock technique and interpretation. February 1992, slightly revised May 1992, 3 p.

Shear frames, rutschblocks and slab stability. Presented at the Technical Sessions of the Canadian Avalanche Association, May 1991, 13 p.

In situ tensile tests of snowpack layers. Journal of Glaciology (36)122, 102-106.

PERSONAL NEWS

Peter Schaerer has written elsewhere in this issue that he is no longer editor of AVALANCHE NEWS. Last year he retired from the National Research Council of Canada after a thirty year involvement with avalanche research, education and public safety. He had intended to put his feet up more often but last winter was the busiest course leader and instructor of Avalanche Schools in Canada and New Zealand. The Honourary Membership in the CAA of Peter Schaerer, Walter Schleiss and Fred Schleiss reported in this issue was unanimously approved by the membership at the Annual General Meeting.

AVALANCHE RESOURCE AGENCIES LIST

Please note on your copy of the October 1991 Avalanche Resource Agencies list that on page one, under BANFF NATIONAL PARK, INFORMATION CONCERNING AVALANCHE CONDITIONS:, TAPED MESSAGE ON TELEPHONE: AT BANFF, HAS CHANGED THEIR TELEPHONE NUMBER TO 403-762-1460 from 403-762-3600. Also, the Calgary number is no longer used for avalanche conditions.

CAA QUESTIONNAIRE

The Canadian Avalanche Centre would appreciate receiving comments about the **PUBLIC AVALANCHE INFORMATION BULLETIN** from people in Western Canada or the Pacific Northwest of USA. Answers to the following questions would help develop the Bulletin so it provides good information to the users. Please send your reply with the response required for updating the **AVALANCHE NEWS** mailing list.

1. Did the geographic zones, commentary and frequency of the Bulletin help with your decision making process? What changes do you suggest?

2. Describe your use of the Bulletin? Are you a snowmobiler, ski mountaineer, or a ski tourer? How often were you travelling in avalanche terrain during the winter?

3. Comment on content and frequency of distribution of the **AVALANCHE NEWS**.

4. If a Level 2 refresher course is held would you be interested in attending? Yes or No (Circle one)

IMPORTANT NOTICE TO ALL SUBSCRIBERS OF AVALANCHE NEWS

The mailing list of **AVALANCHE NEWS** is being revised. Readers who wish to continue receiving **AVALANCHE NEWS** must complete and mail the enclosed form to the Publisher (address below).

The names and addresses of those who do not respond will be deleted from the mailing list.

MAIL TO:

Jack Bennetto
Manager, Snow Avalanche Programs
Ministry of Transportation and Highways
4C, 940 Blanshard Street
Victoria, B.C.
Canada V8W 3E6

YOUR MAILING ADDRESS:

_____

_____

_____

_____

_____