AVALANCHE NEWS NO. 33

JUNE 1990

EDITORIAL NOTE

The intention of AVALANCHE NEWS is to assist communication between persons and organizations engaged in snow avalanche work in Canada. Short articles cover reports of 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.

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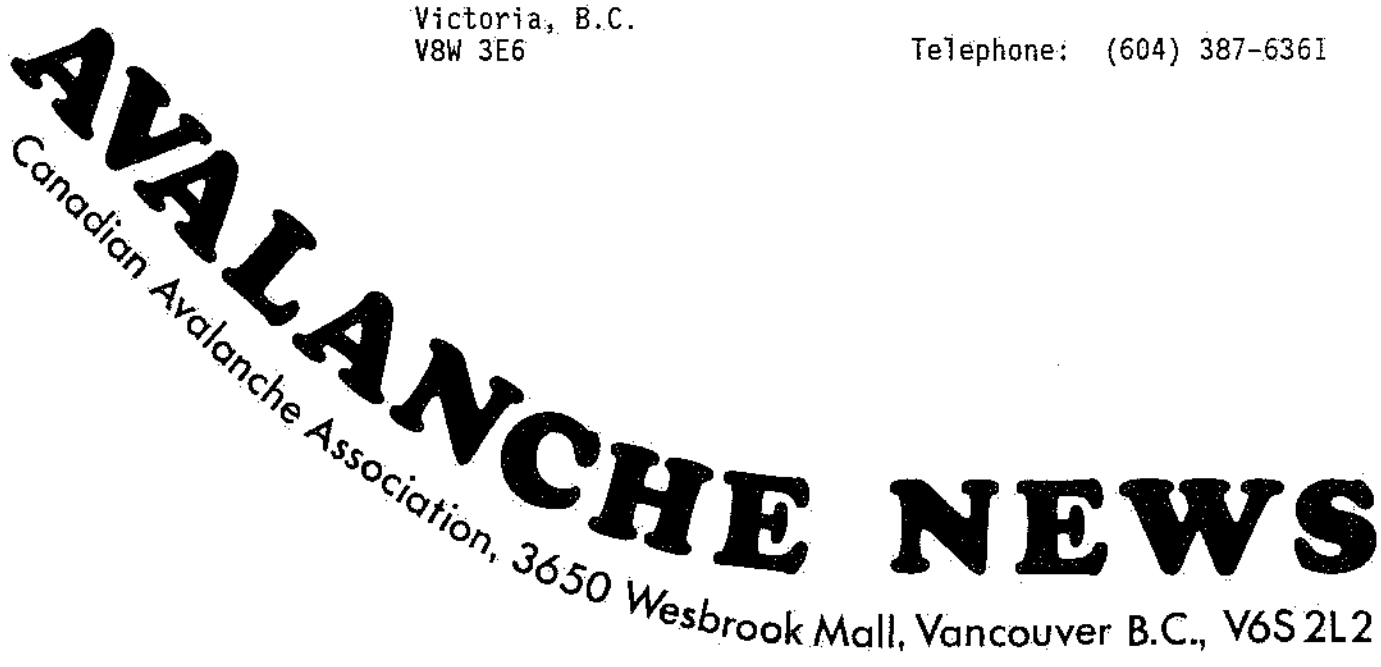

SNOW AND AVALANCHES
WINTER 1989-1990 - WESTERN CANADA

by Peter Schaerer
National Research Council of Canada

Overall it was an average winter. The avalanche activity was concentrated in January and February and light in the other months. The total snowfall was above normal in northern British Columbia, normal in the Columbia Mountains and southern Rocky Mountains and below normal in the southwest of British Columbia. The average temperatures were above normal.

In November the amount of precipitation and the temperatures were above average. The result was rain at the Pacific Coast and deep, well settled snowpacks in the Interior. An unusually stable early winter snowpack existed in the Rocky Mountains. The warm weather continued through December. The storms were deflected to the north bringing deep snow to northern British Columbia and the northern Rocky Mountains and drier conditions in the south. The southwest suffered from a lack of snow. At Christmas the snowpacks in the South Coast Mountains were only around one meter deep above 2000 m, and no snow existed below 1200 m. Prior to the New Year, in all areas the avalanches were rare, small, and confined to slopes that had received wind deposited snow. Surface hoar and facetted crystals formed at spotty locations during the dry periods.

Heavy snow fell in January and February with major storm periods January 5 - 11, January 20 - 31, February 4 - 5, and February 9 - 11. Many areas received record amounts of snowfall for January. The snowfalls were accompanied by strong winds and in January by relatively high temperatures which produced stiff snow slabs. Deep and wide avalanches occurred where the new snow was deposited on weak December surfaces. Often it was difficult to recognize where deep weak layers existed; therefore, some large avalanches came as a surprise. The largest avalanche occurred on February 10, when snow was brought down that had not avalanched during the previous storms.

Arctic air that began to cover Western Canada on February 12, lowered the February temperature to below normal. The snowpacks stabilized rapidly after mid-February.

March and April again were dry and warm. The snowpacks were stable and provided unusually good travel conditions. Small and medium size avalanches occurred occasionally as a result of snowfall, and when the snow began to melt. No large wet spring avalanches were observed.

AVALANCHE INVOLVEMENTS IN CANADA
WINTER 1989-1990

by Paul Anhorn
National Research Council of Canada
Revelstoke, B.C.

The Avalanche Centre of the National Research Council received reports of 33 incidents with persons or equipment caught by avalanches. The reporting period covered October 1, 1989 to April 30, 1990. We suspect that more persons than reported were caught and partially buried in avalanches in Canada; however, we believe that our statistics cover all incidents with serious consequences. As in previous years, incidents of skiers in ski areas involve patrolmen on their control routes. Ski cutting small slopes is a routine control measure and occasionally patrollers take a small ride down. During the time of the avalanche control the slopes in question are closed to the public.

We wish to thank all the people who sent in avalanche involvement reports. Statistics such as those presented here will assist the public and industry in recognizing the need for education and safety measures. The file remains open and additional reports of avalanche encounters of this past winter and during the summer will gladly be received.

Number of Incidents

- 7 incidents involved skiers adjacent to a ski area
- 1 incident involved a snowboarder adjacent to a ski area
- 3 incidents involved skiers in a ski area
- 8 incidents involved skiers in the back country
- 6 incidents involved moving vehicles on a highway
- 2 incidents involved hikers
- 1 incident involved ice climbers
- 1 incident involved snowmobilers in the back country
- 1 incident involved hunters
- 1 incident involved a snowshoer
- 1 incident involved seven persons in two wedge/panel type snowshelters and one snowcave. The fracture propagated through all shelters, with the ensuing avalanche carrying the party down. The people ended up partially buried and not injured.
- 1 incident at a drilling site destroyed a truck

Mountain Ranges

- 7 incidents in the Coast Range
- 17 incidents in the Rocky Mountains
- 8 incidents in the Interior Ranges of B.C.
- 1 incident in the Yukon

Persons Involved

- 31 persons were caught but remained uninjured on the surface
- 2 persons remained on the surface and were injured
- 13 persons were partially buried and not injured
- 2 persons were partially buried and injured
- 3 persons were completely buried and found alive
- 9 persons were completely buried and found dead

One partially buried person had only two feet sticking out of the snow. He was rescued in two minutes, unconscious and blue but revived quickly.

Of the persons who were completely buried and survived:

- Two were found by transceivers. One of them was dug out from 30 cm deep snow within 2 minutes, the other one was buried 2 m deep; it was estimated that he was freed in less than 15 minutes.
- One was found by an object on the surface. The skier, travelling second down an abandoned mining dump pile, became stuck in the flats. A small avalanche buried him from above. As the snow settled above him, he thrust his hand with his skipole towards the surface, indicating his location. A peaked hat formed an airspace and allowed normal breathing. The searchers saw the skipole and dug out the skier from under 1 metre of snow in about seven minutes.

Of the persons who were recovered dead:

- Two were found by organized rescuers using probes;
- Three were found by transceivers;
- Four were found by trained avalanche dogs.

Vehicles

Avalanche powder clouds blinded several drivers who drove off the highway with minor damage to their vehicles. In one incident the vehicle stayed in the ditch for 48 hours due to further avalanche hazard. Subsequent avalanches buried and destroyed the vehicle.

Fatal Accidents

Wawa Bowl

On January 6, 1990 two skiers and one snowboarder were caught in an avalanche in WaWa Bowl close to Sunshine Ski Area in Banff National Park. All three hiked from the top of the T-bar, with the snowboarder on snowshoes. With the snowshoes attached to his back, the snowboarder entered the bowl. The two skiers started their descent at about the same time. An avalanche released and carried all three of them down. The snowboarder, the lowest down the hill of the three, was completely buried. Unfortunately the snowshoes on his back and the board acted as anchors, dragging him deeper into the snow. Both skiers were partially buried and lost their equipment. They searched for their friend briefly

and then went for help. Their descent without skis was very time consuming. They were able to report the accident only two hours later and by that time it was too dark to use a helicopter. The rescuers used a snowcat to access the site. Probelines and random probing were carried out with the help of the snowcat headlights. An avalanche dog brought in from Banff found the victim under 2 m of snow. The victim had been buried for 5 hours and died of suffocation.

Sandcreek

On January 28, 1990 a group of 15 skiers had an encounter with an avalanche at Sandcreek near Fernie, BC. They had already successfully skied the adjacent slopes three times, when an avalanche released onto them. An unknown number of the skiers were caught by the size 3 avalanche. After counting for survivors, they realised that two members were missing and another skier was injured on the surface. The avalanche had split into two gullies. The group, equipped with transceivers, quickly searched the whole 4000 m^2 deposit. One person was found on the upper part of one arm of the deposit, he was buried 2 m deep, but with the large number of shovellers he was uncovered alive. The other victim was found in the lower half of the second gully; he was dug out in 35 minutes from under 2.5 m of snow but had died of suffocation. The avalanche started in steep, open terrain and ended in deep gullies. It was a leeward slope and heavy snowfall with significant wind activity in the days previous to the accident had added 90 cm of snow on top of a surface hoar layer.

Kokanee Glacier

On January 30, 1990 two ski tourers lost their lives in an avalanche at Kokanee Glacier Park, B.C. They were last seen at 9:30 when they separated from a larger group.

After lunch other skiers noticed a fracture line and ski tracks leading into it from above. They skied to the deposit, located the two victims quickly by transceiver, dug them out, and administered CPR. An RCMP dogmaster and a medical doctor were flown to the scene. Additional rescue personnel remained at the helicopter hangar upon learning that the persons were found. The victims were pronounced dead on site; the cause of death was suffocation. It was estimated that they were buried over two hours. One was dug out from 1.3 m, the other one from 2.5 m deep snow. The avalanche started below a steep convex roll in a slight bowl shape and ended abruptly in a small basin with zero degree incline.

Healy Creek

On February 11, 1990 five cross country ski tourers climbed Healy Creek near Sunshine in Banff National Park. One person became tired and turned around. At 1400 hours she encountered a party of two and told them that her friends were on the trail. When these people did not meet the four and saw a fresh avalanche across the trail they performed a

quick search of the deposit, then returned to the parking lot to report the possible accident. Wardens were dispatched and an hour later received confirmation that a party of four was missing. Dogmasters and helicopters were notified immediately. At 17:20 hours the first dogteam reached the avalanche site. Thirty people searched until 22:40 hours and resumed the search the next morning. By now four dogteams were deployed. It became evident that only a large group of searchers could successfully find the victims. The avalanche had filled the whole 120 m wide path, had broken numerous trees and continued 70 m uphill past the valley bottom.

The search continued until 20:00 hours. On February 13, 1990 fifty people continued to search in minus 30 degree temperatures. The rescue site now contained two heated wall tents and facilities for hot food. At 10:00 hours the first victim was located by a dog. The victim's ski tip was close to the surface and this may have assisted the search dog. At noon all of the probers were deployed near the first victim. The second person was found three hours later a short distance away. Search operations continued until dark. On February 14, all personnel were redeployed. At 10:20 hours a search dog indicated a third victim. The subsequent excavation uncovered both remaining persons.

It was an unusually large avalanche. The victims were well into a mature forest, and eating lunch when they were caught.

Golden

On February 22, 1990 a snowshoer on his way to climb a frozen waterfall died in an avalanche near Golden, B.C. The trail to the waterfall started at private property where ice climbers usually park their vehicles and receive advice from the owner. As the snowshoer was ready to leave the owner warned him of the high temperatures. She was mostly concerned about unexpected flash flooding in the narrow canyon. The snowshoer was reported missing by his wife in the evening. A trained avalanche dog found the victim in a 15 m wide deposit under 1.5 m of snow. The V-shaped canyon, one metre wide with 35 deg. side slopes was a perfect terrain trap.

TECHNICAL MEETING OF THE CANADIAN AVALANCHE ASSOCIATION

by Peter Schaerer

The Canadian Avalanche Association held its annual technical, business and social meetings on May 2 and 3, 1990, at the Sandman Inn in Penticton, B.C. Following is a summary of the topics that were discussed at the technical meeting.

Avalanche Research of the National Research Council of Canada

Dave McClung reported about the on-going work which is described under a separate heading in this issue of Avalanche News.

Peter Schaerer informed the audience that the National Research Council plans to discontinue avalanche research by March 1991. At the present time it is uncertain as to who will continue the research, technical information, and educational activities that were carried out by the Avalanche Research Centre of the Research Council. Discussions with other organizations are in progress.

Alberta Avalanche Safety Association

Jack de Bruin, President, informed the audience about the objectives and the work of his Association. The Alberta Avalanche Safety Association meets the demand of the public for information about avalanche hazards. In past years it has organized seminar - workshops at Edmonton and Calgary. The next seminar is planned for November 10, 1990, in Calgary.

In the past three years the Association has made available by recorded telephone messages the avalanche hazard reports of the national and provincial parks in the Rocky Mountains.

The toll free telephone number was called for the following total number of hours:

1987 - 1989:	9 hours
1988 - 1989:	46.6 hours
1989 - 1990:	estimated 75 hours

The service was funded by an Alberta Government grant, membership fees and volunteer work.

Avalanche Information Centre

Chris Stethem proposed that the Canadian Avalanche Association should form and operate an Avalanche Information Centre. The duties of the Centre would be:

a) Education;

- Administration of the training schools of the Canadian Avalanche Association
- Training assistance to small operations
- Updating of technical standards
- Education programs in public schools

b) Exchange of information about snow and avalanche conditions among industries;

c) Information about snow stability and avalanche hazards for the general public. This service would expand the service provided by the Alberta Avalanche Safety Association.

The funding of the Centre is being studied.

Snow Research - University of Calgary

Colin Johnstone and Bruce Jamieson (Department of Civil Engineering, University of Calgary) presented results of their snow and avalanche research projects.

Field observations of slab avalanches in the past few years gave a good correlation between the width of the fracture and the strength of the snow slab.

A new three-year project began in January 1990, in cooperation with Mike Wiegele Helicopter Skiing at Blue River, B.C. The Natural Sciences and Engineering Research Council of Canada has financed the project under a cooperative University - Industry and Development grant. The principal objective is to develop snow stability evaluation tests and techniques. The following studies were initiated in the 1990 winter.

Application of Shear Frames

A comparison of shear frames showed a greater variation of the measurements with the 100 cm^2 frame than with the 250 cm^2 frame. It was concluded that the shear frame must be strong to prevent its deformation.

The rate of loading (when the loading time was greater than two seconds) had little influence on the observed shear strength (shear frame index). The stability factor determined with the shear frame proved to be a useful index for snow stability, but does not give the full answer.

Application of the Rutschblock Test

A variation of techniques for cutting the Rutschblock were investigated:

a) rectangular block with side trenches,

b) triangular block cut with a rope,

c) rectangular block with sides and back cut with a rope.

Variation (c) proved to give the same results as variation (a) but with a considerable saving of time. Variation (b) gave slightly lower values for stability.

A considerable variation of the snow stability was noted when a large number of tests were carried out across a slope.

The future work will include the study of flaws in the snowpack (placing plastic sheets into the snow) and the organization of avalanche occurrence and weather data.

Avalauncher

John Tweedy (Ministry of Transportation and Highways of British Columbia) reported on trials with avalauncher projectiles that contain 2 kg of explosives. The projectiles became ballistically unstable after some distance of flight. The related problems can not be solved satisfactorily as yet. Chris Stethem noted similar problems when 3 kg and 5 kg charges were used for a mining operation.

John Tweedy drew attention to hairline cracks that formed at the loading tray of an avalauncher after long use.

Weather Forecasts

Robin Siggers (Snow Valley Ski Ltd, Fernie), presented a list of information that the Fernie Ski Area received daily through the Castlegar Weather office. The weather maps and forecasts were found to be very useful for the local avalanche hazard forecast.

The Canadian Avalanche Association resolved that the Atmospheric Environment Service be encouraged to continue sending information to avalanche hazard forecasting operations.

The Mountain Weather Forecast generally was rated as good. The predictions of the amount of precipitation and the freezing levels were found to be the weakest points.

Transceiver Frequencies

The attendees of the meeting discussed rescue transceiver frequencies, and concluded that the public should be made aware of the changes that are taking place in Europe. These changes will affect the market of transceivers in North America. In view of the unavoidable change to the 457 kHz frequency (from 2275 Hz), the Canadian Avalanche Association is now encouraging distributors to sell only dual frequency instruments. The distributors should make the buyers aware that the 2275 Hz single frequency will not be compatible with others in future years.

Other Items

Paul Anhorn (National Research Council Canada), Tim Auger (Canadian Parks Service, Banff), Dave Smith (B.C. Ministry of Transportation and Highways), and Rod Pendlebury described the avalanche accidents and rescue operations of the 1989-1990 winter. The accidents are described under a separate heading in this issue of Avalanche News.

A video was shown about the GAZ.EX exploder that was installed in California.

There is a need to develop guidelines for media contacts, but no progress has been made as yet.

AVALANCHE RESEARCH OF THE NATIONAL RESEARCH COUNCIL OF CANADA

by Dave McClung

During 1989-90, the following research tasks were accomplished by the Avalanche Research Centre:

* A non-linear equation was developed to describe slow deformation in alpine snow. The formulation features pressure dependent viscosity. The equation was calibrated using high quality field measurements. The application is for prediction of forces on structures in deep snow covers.

* An early warning system was partially developed. The system features geophones placed in snow or on rock, hard-wired to a datalogger that is connected by radio and modem to a computer. The system provides a warning when avalanches have initiated in remote locations which cannot be reached easily with explosives or gun-fire. The system is operational but it was discovered that geophones are not the correct sensors for this application. They are too susceptible to triggering the system unnecessarily during periods of high radio-wave activity.

* Major sections of a revised Avalanche Handbook were written.

* Snow gliding, snowpack parameters and avalanche occurrence data were collected above the Coquihalla Highway in cooperation with the B.C. Ministry of Transportation and Highways. It was found that gliding correlates with air temperature and avalanche occurrences. It also appears that avalanche control with explosives is very effective when the rate of gliding is fast.

* Time was spent field testing the new International Snow Classification System. It was found that there will be some minor problems introducing the system into Canadian standards.

ANNUAL GENERAL MEETING OF THE CANADIAN AVALANCHE ASSOCIATION

by John Tweedy

Following are the highlights of the business meeting on May 3, 1990 at Penticton, B.C.

As of May 1990, the Association has 117 Active and 26 Associate members.

The following were elected for office next year:

Chris Stethem	President
Walter Schleiss	Vice-President
Dave Smith	Secretary/Treasurer
Tim Auger	Director at Large
Jon Bezzola	Director at Large
Bernie Protsch	Membership Chairman
Niko Weis	Associate Members Representative

A new Association training video hit the market in December, 1989. "Snowprofile Procedures" is available for $50.00 CDN from the National Research Avalanche Centre in Vancouver. The release of "Avalanche Control Procedures" is expected in early fall 1990. The price is presently undetermined. The fall issue of Avalanche News will offer further information.

The active membership approved, in principle, for the Association to begin laying the groundwork for a centrally located Avalanche Information Centre in British Columbia.

The membership approved an increase in annual dues to $40.00 per year for active members and to $100.00 per year for associate members.

A Nominating Committee was struck to oversee officer nominations. Bruce Jameison will chair that committee.

The Association will notify all known retail outlets of avalanche rescue beacons of the change from 2275 Hz frequency to 475 kHz frequency in the near future. This notification is designed to discourage any "dumping" on the Canadian market of the 2275 Hz frequency units as the changeover date draws closer.

CANADIAN AVALANCHE ASSOCIATION TRAINING SCHOOLS

by Peter Schaerer

In the winter of 1989-1990, the Canadian Avalanche Association took full responsibility for the administration of the week long professional avalanche courses which, in previous years, were organized by the British Columbia Institute of Technology and Selkirk College. Holly Lansdowne, on contract with the Avalanche Association, carried out the administrative work from the office of the National Research Council at Revelstoke. Her dedication and

efficient work contributed much to the success of the courses. Paul Anhorn and Peter Schaerer of the Institute for Research in Construction (National Research Council) assisted with the preparation of the papers for the courses and supervised the program. The course curricula, instructors and methods of instruction were the same as in previous years.

In 1989-1990, the Canadian Avalanche Association conducted five courses, and in addition other organizations held five approved courses of equal standard. A set of conditions for approval of courses by the Canadian Avalanche Association was drafted. Interested parties may request a copy of the conditions for privately organized avalanche courses from Peter Schaerer. The total number of course participants has increased to 178 from between 120 and 150 in previous years. The jump is a reflection of the expansion of interest in winter recreation, including skiing at ski areas, helicopter skiing, and back country travel, as well as the needs of industries, mainly highway maintenance.

List of 1989 - 1990 Courses

DATE	LOCATION	TYPE	NUMBER OF PARTICIPANTS
Dec. 4 - 8	Creston, B.C.	Transportation and Industry - Level 1	23
Dec. 2 - 8	Whistler, B.C.	Ski Operations - Level 1	28
Jan. 10 - 17	Whistler, B.C.	Ski Operations - Level 2	22
Jan. 7 - 13	Creston, B.C.	Ski Operations - Level 1	19
Jan. 28 - Feb.3	Mt. Engadine Lodge, Canmore, A.B.	Ski Operations - Level 1	25
Privately Organized Courses:			
Nov. 20 - 24	Meziadin, B.C.	Transportation and Industry - Level 1	18
Jan. 22 - 26	Mistaya Chalet Golden, B.C.	Ski Operations - Level 1	16
Jan. 7 - 13	Mistaya Chalet	Ski Operations - Level 1	9
Feb. 20 - 26	Mistaya Chalet	Ski Operations - Level 1	9
Feb. 20 - 26	Haines Junction, Yukon	Ski Operations - Level 1	9
		TOTAL NUMBER OF PARTICIPANTS	178

The courses at Meziadin were organized by North Coast Road Maintenance Ltd., at Terrace, B.C., the courses at Mistaya Chalet by Mistaya Alpine Tours at Golden, B.C., and the course at Haines Junction by Yukon College.

A planned Refresher Course for Ski Operations - Level 2 could not be held owing to an insufficient number of registrations.

The courses yielded a modest financial profit - the result of the large number of participants.

The number and types of courses planned for the 1990-1991 winter are essentially the same as in previous years. Tentatively the following dates were set:

Transportation and Industry - Level 1

Dec. 3 - 7	Creston, B.C.
Dec. 10 - 14	Creston, B.C.

Ski Operations - Level 1

Dec. 1 - 7	Whistler, B.C.
Jan. 6 - 12	Creston, B.C.
Jan. 27 - Feb. 2	Mt. Engadine Lodge, Canmore, A.B.

Ski Operations - Level 2

Jan. 6 - 13	Lake Louise, A.B.

The brochure describing the courses and containing the registration form will be available in September, 1990.

The Canadian Avalanche Association Training Schools are certified and registered as Private Training Institutions in the Provinces of British Columbia and Alberta. The Association is committed to maintaining the high standards of the courses. It has appointed an Education Committee that supervises the courses and maintains contacts with government and other agencies. This past winter the Education Committee drafted a set of qualifications that must be met by the instructors of the courses. The course instructors approved the list of qualifications at their meeting on May 2, 1990.

Information about the avalanche training schools may be obtained from the following addresses:

Canadian Avalanche Association
Training Schools
P.O. Box 2759
Revelstoke B.C.
V0E 2S0
Telephone: (604) 837-2435

Canadian Avalanche Association
3650 Wesbrook Mall
Vancouver B.C.
V6S 2L2
Telephone: (604) 666-6741

CANADIAN AVALANCHE RESCUE DOG ASSOCIATION

by Rod Pendlebury

The Canadian Avalanche Rescue Dog Association held its annual winter training courses and validations in the Kananaskis area near Canmore, Alberta, January 6 - 13, 1990. Thirteen dog and handler teams and four instructors enjoyed the hospitality of Rudy Kranibitter and his staff at the Mount Engadine Lodge, while training in the surrounding mountains. In an experimental move this year, C.A.R.D.A. directors decided to conduct the AVD 1, AVD 2 and AVD 3 level courses concurrently at the same location. This afforded new dog handlers an opportunity to observe the more experienced dog teams at work, as well as simplifying the logistics of course organization for course coordinator, Duncan Daniels.

Instruction was provided by Cpl. Gordon Burns, R.C.M.P.; Dale Portman, Parks Canada; Hans Fuhrer, Parks Canada; and Rod Pendlebury, C.A.R.D.A. The participants received training and evaluation in avalanche search and rescue using dogs, winter camping, route selection, avalanche hazard evaluation and ski mountaineering. Five dog and handler teams achieved the AVD 1 level certification, and six teams successfully validated at the AVD 2 (P.E.P.) certification level.

C.A.R.D.A. wishes to thank the many sponsors and volunteers who generously contributed their time and services to the course, ensuring its overwhelming success, in particular:

Alberta Provincial Parks
Fortress Mountain Ski Area
Nakiska Ski Area
Lloyd Gallagher, George Field
and the staff of Kananaskis Country
Ribbon Creek Grocery
Big Rock Brewery
Canada Safeway

In the coming winter the Association is organizing a course at Whistler, B.C., December 8 - 16, 1990. Information can be obtained from the Secretary/Treasurer.

C.A.R.D.A. is a non-profit, charitable organization working to develop a network of avalanche search and rescue dog teams in Canada. Donations are tax deductible, and interested persons can support CARDA's efforts and receive their semi-annual newsletter by joining as associate members ($20 per year). Please address correspondence to:

Doug Fenton, Secretary/Treasurer
Canadian Avalanche Rescue Dog Association
25153 - 124th Avenue,
Maple Ridge, B.C.
V2X 4K6

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OBITUARY

PAUL ANHORN

We have lost a good friend and colleague. Paul Anhorn died unexpectedly on May 26, 1990 at Revelstoke.

Paul joined the National Research Council of Canada as a field technician for snow and avalanche research in 1969. In the twenty-one years of his career with avalanche research Paul was responsible for collecting data, analyzing observations, and maintaining scientific research equipment. The work and his dedication often required him to work under hazardous conditions with long hours. Paul was an effective and well-liked instructor of the professional avalanche courses since their initiation in 1971. His openness and helpfulness made him many friends.

Colleagues, friends, and course participants will miss Paul. He will be remembered as one of the pioneers of avalanche work and education in Canada.

Paul is survived by his wife Inge, son Daniel, and daughter Tanya. We express our deepest sympathy to his family.

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Opportunity to Obtain Approval to Teach Ministry of Transportation and Highways Approved Courses

This summer, the Snow Avalanche Section of the Ministry of Transportation and Highways will be developing a list of approved organizations/individuals to teach training courses for the 1990-1991 winter season. These organizations/ individuals will be capable of teaching Ministry standard one and/or three day snow avalanche safety courses, weather observations and quality control training courses.

As part of their contracts with the Ministry, the Road Maintenance Contractors are required to have trained and knowledgeable staff. This training must be obtained from organizations/individuals approved by the Ministry.

Advertisements will appear in early July in various newspapers across British Columbia, including The Vancouver Sun, requesting interested organizations/ individuals to contact Jack Bennetto, Manager, Snow Avalanche Programs, to obtain the Terms of Reference outlining the procedures to be followed to obtain approval.

Those interested in obtaining these Terms of Reference in July are invited to contact Jack at 387-6361, to have their names put on the list for distribution of the information.

A list of approved organizations/individuals will be provided to the Road Maintenance Contractors by the beginning of September.

MOUNTAIN WEATHER SEMINAR

A seminar-workshop on mountain weather forecasting will be held on Tuesday, November 6, 1990 at Vancouver.

A committee that represents the Atmospheric Environment Service, the British Columbia Ministry of Transportation and Highways, and Blackcomb Mountain Ski Area is responsible for the organization. The tentative program includes an analysis of the weather that resulted in avalanche activity in the winter of 1989-1990, and a visit to the forecasting offices of the Pacific Weather Centre (Atmospheric Environment Service.

The cost is $15.00 per participant, payable at the door. Preregistration is required with the:

Canadian Avalanche Association
3650 Wesbrook Mall
Vancouver, B.C.
V6S 2L2

Telephone: (604) 666-6741

The attached form may be used for this purpose.

Information about the meeting location and the program will be mailed to the registered participants.

MEETINGS

International Snow Science Workshop

The International Snow Science Workshop "A Merging of Theory and Practice" will be held at Bigfork, Montana, on October 9-13, 1990. The last Workshop took place at Whistler, B.C. in October 1988.

Information may be obtained from:

ISSW '90 Committee
P.O. Box 372,
Bigfork, Montana
59911 U.S.A.

CIV '90

A conference on Avalanches and Planning of Mountain Territory will be held at Arabba (BL), Italy, on October 9-10 1990. The themes of the conference are methods of locating and mapping avalanche hazard areas and zoning regulations.

Information:

CIV '90
Regione Veneto
Centro Sperimentale Valanghe
e Difesa Idrogeologica
32020 Arabba (BL)
Italy

Other Future Conferences of Interest

May 17-22, 1992

Symposium on Remote Sensing of Snow and Ice, Boulder, CO, U.S.A. (Secretary General, IGS, Lensfield Road, Cambridge CB2 1ER, U.K.)

June 29 - July 3, 1992

Interpraevent 1992: Protection of Habitat against Floods, Debris Flows and Avalanches, Berne, Switzerland (Interpraevent 1992, c/o Bundesamt fur Wasserwirtschaft, Postfach 2743, CH-3001 Bern, Switzerland)

September 1992

Symposium on Snow and Snow-Related Problems (as part of an International Forum on Snow Areas), Nagaoka, Japan. Co-sponsored by the Japanese Society of Snow and Ice and the City of Nagaoka. (Secretary General, IGS, Lensfield Road, Cambridge CB2 1ER, U.K.)

TO: Canadian Avalanche Association
3650 Wesbrook Mall,
Vancouver, B.C.
V6S 2L2

REGISTRATION FOR
MOUNTAIN WEATHER SEMINAR

November 6, 1990
Vancouver B.C.

I wish to register_____person(s).

NAME: _____

ADDRESS:_____

_____

_____

SIGNATURE:_____