AVALANCHE NEWS NO. 35

JULY 1991

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 is issued three times per year, usually in February, June and November. It is typed, printed and mailed through courtesy of the Ministry of Transportation and Highways of British Columbia. The Canadian Avalanche Association gratefully acknowledges this valuable contribution to avalanche safety. Due to work overload of the editor, shortages of staff and financial restrictions it was not possible to produce an issue of AVALANCHE NEWS in February 1991. We apologize to the readers who have missed the regular news.

Contributions and letters to the editor should be mailed to the address of the Canadian Avalanche Association. Requests for copies and notifications of changes of address should be made to the publisher.

Publisher: Jack Bennetto
Manager, Snow Avalanche Programs
Ministry of Transportation and Highways
940 Blanshard Street
Canada, V8W 3E6
Victoria, British Columbia
Telephone: (604) 387-6361

Editor: Peter Schaerer
Canadian Avalanche Association
#103 105 W. Kings Road
North Vancouver, British Columbia
Canada, V7N 2L7
Telephone: (604) 987-3716

AVALANCHE NEWS
Canadian Avalanche Association, Box 2759, Revelstoke, B.C.

SNOW AND AVALANCHES
WINTER 1990-1991, WESTERN CANADA

by Peter Schaerer

The winter of 1990-1991 brought above normal precipitation, deep snowpacks, and close to normal temperatures. Only the South Coast and Vancouver Island reported below normal snowfall. The number and size of avalanches in general were average.

The West of Canada received close to record amounts of precipitation in October, November, and December of 1990. The heavy snowfalls produced deep and well consolidated early winter snowpacks in the Interior of British Columbia and the Rocky Mountains. Even the depth hoar and weak snowpacks that are found in most years in the Rocky Mountains did not form. At the Pacific Coast, the snowpacks were about normal at the end of December.

In January and February, the temperatures varied strongly between extreme cold and above freezing. The cold spells produced weak snow layers at the surface which were responsible for unstable snowpacks when snow fell in February and March. Often the instabilities lingered for two to three weeks, but in general the resulting avalanches involved only snow layers near the surface. Large avalanches initiated on the January and February weaknesses in a few areas with the warming in the spring. In April, the weather was variable; periods of snowfall and high temperatures alternated, but did not produce significant avalanche activity.

AVALANCHE INVOLVEMENTS IN CANADA
WINTER 1990-1991

by Peter Schaerer

As in previous years, the Avalanche Centre of the National Research Council of Canada has collected statistics about persons and equipment involved with avalanches. Avalanche Technicians for highways, ski areas, national parks, provincial parks, and industrial operations, and mountain guides and ski patrollers submitted reports. Their cooperation is acknowledged gratefully. The information which they provided will assist in drawing attention to avalanche hazards and in educating professionals and the public about safety measures.

Following is a summary of the reported involvements of the winter 1990-1991. The Canadian Avalanche Association intends to include the statistics, together with those of other years and details of instructive accidents in a future publication "Avalanche Accidents in Canada IV".

Number of Incidents

The incidents in the winter 1990-1991 may be stratified according to mountain ranges as follows:

27 in the Coast Range
12 in the Columbia Mountains
19 in the Rocky Mountains

Total: 58 reported incidents.

Experience in past years has shown that the actual number of avalanche involvements is about twice the number of reported ones. As a conclusion, probably 100 to 120 avalanche involvements have occurred in Canada in 1990-1991 and this number is close to the average of the past ten years. The non-reported involvements likely have not resulted in serious injury or death, but might include property damage.

Number of Persons and Objects

The involvements concerned the following number of persons and objects:

- 7 skiers carrying out avalanche control work in ski areas
- 5 skiers adjacent to a ski area
- 3 snow boarders on slopes adjacent to ski areas
- 56 skiers in the back country
- 6 persons on foot (ice climbers and prospectors)
- 12 vehicles on roads
- 4 dogs
- 5 incidents with damage to buildings and bridges.

Injuries and Damage:

- 32 persons were caught in avalanches, remained on the surface and were uninjured;
- 2 person remained on the surface of the avalanche and were injured;
- 23 persons were partially buried and not injured; in two instances the persons had only a hand outside the snow;
- 4 persons were partially buried and injured;
- 4 persons were partially buried and found dead;
- 5 persons were completely buried, not injured, and found alive;
- 7 persons were completely buried and found dead;
- 3 dogs were completely buried and found dead;
- 1 dog was partially buried and recovered alive;
- 8 vehicles on roads drove into avalanche deposits and were not damaged;
- 4 vehicles on roads were partially buried and damaged.

The total estimated property damage to buildings, bridge railings, lifts, and vehicles was $40,000.

Of the persons who were completely buried and survived:

- 2 were found by transceivers (burial times 6 and 17 minutes).
- 1 was located by his voice (burial time unknown, but was reported as short).
- 1 was located because a survivor had observed the burial spot and started digging there (burial time approximately 10 minutes).
- 1 was located immediately by a piece of equipment visible at the surface (head buried about 30 seconds).

Of the persons who were completely buried and found dead:

- 5 were found by transceivers (deaths from injuries);
- 1 was found by a probeline after 2.5 hours (death from asphyxiation);
- 1 was found by an object at the surface after 45 minutes (death from asphyxiation).

Accidents with Fatalities

Rummel Lake

On January 20, 1991 two skiers, while climbing as slope on skis, triggered an avalanche near Rummel Lake in Kananaskis Country, Alberta. One skier was completely buried. The other one was partially buried and able to dig out himself. The skiers did not wear transceivers. Another touring party had observed the accident, made a hasty search, did random probing, and called for help.

An organized rescue party arrived by helicopter 80 minutes after the accident, began random probing, and when enough rescuers were on site, organized probe lines. Approximately one hour after the arrival of the organized rescue party, a probe line located the body of the buried skier close to the toe of the avalanche. The victim was buried 1 m deep and had died from suffocation.

The avalanche was a size 2.5, started as a slab of dry, hard snow with an average depth of 0.8 m and ran over a distance of 200 m. The failure plane was a layer of faceted snow grains.

Bugaboos

On 12 March 1991 a group of skiers were caught in an avalanche of size 3.5 at Bugaboo Creek (Purcell Mountains). A group had skied the slope first, and when a second group of a guide and 12 clients entered the slope, a slab avalanche broke above them. Three skiers were not affected, but the avalanche carried the other ten over vertical distances between 200 m and 850 m, leaving some of them partially buried and others completely buried. The survivors and other skiers in the area began a transceiver search immediately. Only the guide, who was partially buried survived the large and long avalanche; the victims appear to have died from injuries.

Blackcomb Glacier

After leaving the boundary of Blackcomb Ski Area, two skiers climbed to the col east of Blackcomb Glacier where they released an avalanche on a rocky, rugged slope. One skier was completely buried under 1 m deep snow, and the other one partially buried and injured. The skiers did not carry transceivers. The survivor located his buried friend from an object on the surface and dug him out within about 45 minutes, but the victim had died from suffocation.

The avalanche was a size 2 and started as a failure of a slab of old and new snow with an average depth of 0.5 m.

Note about Reporting of Involvements

The files of avalanche involvements of past years will be maintained at the office of the Canadian Avalanche Association at Revelstoke. The Canadian Avalanche Association will continue to collect information about avalanche encounters with the intention of publishing annual summaries and case histories. In the future, all reports should be mailed to the address of the Canadian Avalanche Association, Box 2759, Revelstoke, British Columbia, VOE 2SO, and not to the National Research Council.

CANADIAN AVALANCHE CENTRE

by Chris Stethem - President

The Canadian Avalanche Centre officially opens its doors to full-time operation in September 1991. The Centre's office is located in the old National Research Council office above the Post Office in Revelstoke.

The Centre has been made possible through the joint support of our Association, industry supporters and the Canadian, British Columbia and Alberta Governments. The Association would particularly like to acknowledge the start up funding provided by Environment Canada and the National Search and Rescue Secretariat, Go B.C. and Alberta Recreation and Parks.

The three principle functions at the Centre this year will be:

1) The Canadian Avalanche Association Training Schools.
2) The Industry Snow Stability Information Exchange.
3) And providing Public Avalanche Information Bulletins.

The training schools will continue to provide avalanche safety training for professionals and back country enthusiasts. Schools will be offered at a variety of locations in British Columbia and Alberta for ski operations and transportation and industry operations. Inga Anhorn will continue her work as our course administrator. Inga can be contacted at (604) 837-2435.

The Industry Snow Stability Information Exchange pilot project of 1990-91 was a great success with 35 operations in British Columbia and Alberta exchanging information on a daily basis. During the coming year we hope to increase the numbers of participating operations to as many as 65 sites. Potential subscribers should contact Chris Whalley at (604) 837-4425.

At the present time Kel Fenwick is writing a communications and bulletin board program to provide easy exchange for subscribers via computer. A new function of the exchange will be a real time bulletin board of alpine weather station information from British Columbia and Alberta. We would like to thank the British Columbia Ministry of Transportation and Highways for its assistance in getting this function up and running.

The new element of the Centre's operations this year will be the Public Avalanche Information Bulletins. At the Annual General Meeting of the Association in May 1991, the membership approved the start-up of this new and much needed function. Initially the Centre will focus on providing information for the weekend time period. Over the long term we will work towards a daily bulletin.

The public information will include bulletins provided by the Canadian Parks Service for the mountain parks (Banff, Jasper, Yoho, Kootenay, Glacier, Waterton) and bulletins provided by the Centre for the Purcells, North and Central Selkirks, and the South Coast Whistler-Blackcomb area. The data base formed by the Industry Information Exchange will provide the core of information for preparation of the Public Bulletins.

This public information will be available through a 1-800 number in British Columbia based in the centre at Revelstoke and through a 1-800 number in Alberta based with the Alberta Avalanche Safety Association in Edmonton.

In addition to Inga Anhorn and Chris Whalley, the association will be hiring a full time Coordinator to start in September and a seasonal Data Manager-Analyst to start in November. Interviews are currently being held and the successful candidates will be introduced in the fall Avalanche News.

We look forward to a successful 1991-92 winter and hope you will join in providing continuing support for the Canadian Avalanche Centre.

AVALANCHE RESEARCH OF THE NATIONAL RESEARCH COUNCIL OF CANADA

by Peter Schaerer

Initiation

The National Research Council (NRCC), Canada's leading Science and Technology Agency develops knowledge through its own basic and directed research programs. Research programs are selected in response to needs expressed by industries.

A need for snow and avalanche research in Canada was recognized in the years following the Second World War. In 1948 the National Research Council invited Dr. Marcel de Quervain to spend a year in Canada with the task of making recommendations for snow, ice, and avalanche research. Marcel de Quervain was a Senior Scientist at the Federal Institute of Snow and Avalanche Research at Davos, Switzerland and later became its Director. During his study tour in Western Canada, he observed the first snow and ram profile near Rogers Pass. Dr. de Quervain's report to the NRCC included the recommendation that a Canadian Snow and Avalanche Research Centre be established in the future. Marcel de Quervain returned to Canada in 1955 and 1957 for consulting concerning avalanche hazards at the electric transmission line between Kemano and Kitimat.

First Activity

The National Research Council became actively engaged in avalanche research in 1956 when the Department of Public Works of Canada requested its assistance with the organization of avalanche studies at Rogers Pass. In that year, the decision had been made to build the Trans Canada Highway through Rogers Pass in Glacier National Park. In preparation for the obvious avalanche problems at the highway, the Department of Public Works had established a study station under the direction of Noel C. Gardner. The NRCC, through its Snow and Ice Section (headed by Dr. Lorne W. Gold) of the Division of Building Research supplied weather and snow observation equipment, and in 1957 employed Peter Schaerer and seconded him to the station in Glacier National Park. Peter Schaerer's task was to locate and design avalanche control works and to assist with the development of hazard forecasting. In 1960 the avalanche studies and avalanche forecasting became the responsibility of the Canadian Parks Service. The involvement of the National Research Council decreased to an advisory role when the highway was completed in 1962.

The NRCC through its Division of Radio and Electrical Engineering made an additional contribution to avalanche work by developing remote weather stations at Rogers Pass between 1958 and 1968.

Principal Research Phase

Dr. Robert F. Legget, Director of the Division of Building Research (now the Institute of Research in Construction) recognized a continuing need for avalanche information when the highway at Rogers Pass was completed. In 1966, Research Council staff members Peter Schaerer and Keith Everts resumed the avalanche research at Rogers Pass. Priority was given to collecting information that was needed for the solution of engineering problems: speeds, impact pressures and flow depths of avalanches, runout distances, amount of snow contained in avalanches, performance of control works, and snowloads on buildings. In addition, studies of properties of snow significant to the formation of avalanches, for example the shear strength, were carried out when time allowed.

Paul Anhorn replaced Keith Everts as a full-time technician in 1969. Later, Anthony Salway (1975-1979) and David McClung (since 1979) joined the the group as research officers. The permanent staff was assisted by one or two temporary technicians during the winters. The group, now called the Avalanche Research Centre, established its base at Vancouver, where offices of the National Research Council already existed, and maintained field stations at Rogers Pass and at Revelstoke, British Columbia.

First the Centre was able to concentrate on research, but after 1970 it had to respond to a growing demand for technical information by industries, such as mining, ski areas, helicopter skiing, highways, operation of national and provincial parks, railways, electric transmission lines, and pipelines. In 1971 it initiated avalanche courses for planning staff and operational personnel of governments and industries. As the demand from industry increased, Peter Schaerer concentrated his work on technical information exchange and avalanche courses, while Dave McClung was responsible for the research.

Completion and Future

The programs of the National Research Council are reviewed continuously with a critical eye to scientific merit and relevance to Canada's needs. The review in 1990 also had to take into consideration targets set in a government-wide reduction of staff. While the NRCC recognizes that its Avalanche Research Centre serves a need, is well appreciated, and has an international reputation, the work of the centre was no longer in line with the priorities of the Research Council. It was decided that avalanche work should be discontinued and be supported by regional, rather than federal authorities. After lengthy consultations since the beginning of 1990 the responsibilities of the Avalanche Research Centre of the National Research Council have been transferred by April 1, 1991 as follows:

David McClung has obtained a position as a professor with the University of British Columbia at Vancouver. He will teach courses at the Departments of Geography and Civil Engineering and continue his research on avalanches and snow. Presently he is engaged in a project of avalanche hazard forecasting for the Ministry of Transportation and Highways of British Columbia. He plans to continue the field research and will be a source for scientific information about avalanches.

The Canadian Avalanche Association has established the Canadian Avalanche Centre at Revelstoke (see separate feature in this issue of AVALANCHE NEWS). Besides operating an information exchange, the Centre will assume the responsibilities of organizing avalanche courses, developing guidelines for operations, and collecting accident statistics.

Peter Schaerer has retired, but may still assist when problems that concern avalanche control need to be solved.

The NRCC's direct involvement in avalanche work in Canada has ended. At the Annual General Meeting on May 9, 1991, the Canadian Avalanche Association recognized with thanks the significant contribution of the National Research Council of Canada to the high professional standard of avalanche safety in Canada.

CANADIAN AVALANCHE ASSOCIATION
ANNUAL GENERAL MEETING

The Canadian Avalanche Association held its Annual General Meeting on May 9, 1991 at Penticton, British Columbia. The Association has 127 active members, 1 honorary member, and 26 associate members.

The following officers were elected for 1991-1992:

Chris Stethem	President
Jon Bezzola	Vice President
David Smith	Secretary-Treasurer
Bernard Protsch	Chairman Membership Committee
Clair Israelson	Director at Large
David Skjonsberg	Director at Large
Niko Weis	Representative of Associate Members

The Membership Committee consists of Bernard Protsch, Jim Bay, and George Field.

The Canadian Avalanche Association now has a permanent office at Revelstoke, where all the records are maintained.

The members passed several motions:

- To proceed with a pilot project for a public avalanche information exchange;
- To cooperate with the Workers Compensation Board of British Columbia in the development of guidelines and regulations concerning the use of explosives in avalanche control;
- To appoint two members who would act as contact persons with the media;
- To express its thanks to the National Research Council for its support of avalanche work in the past.

CANADIAN AVALANCHE ASSOCIATION
TECHNICAL MEETING

by Peter Schaerer

The Canadian Avalanche Association held its technical, business and social meetings on May 8 and 9, 1991 at the Sandman Inn at Penticton, British Columbia. Approximately 100 active members and representatives of associate members were present. Following is a summary of the discussions of the technical meetings.

Industry Information Exchange

From December 1990 to April 1991, Kel Fenwick and Chris Whalley operated a successful daily information exchange for industry subscribers. Thirty-five participants sent daily reports of weather and snowpack conditions to the centre at Revelstoke, where the information was summarized by regions and made available to the subscribers. The majority of participants preferred to communicate by fax, rather than electronic mail as hoped for. The exchange will be continued in the coming winter.

Public Avalanche Hazard Information

The Canadian Avalanche Association plans to meet a public demand for information about current avalanche hazards. The information received at the Canadian Avalanche Association Information Exchange will be made available in summarized form. As a pilot project, the information initially will cover selected, small areas on specific days (for example weekends).

Representatives of operations that have issued avalanche hazard information in the past presented their experiences at the meeting. Canadian Parks Service began to issue bulletins in 1981 in response to accidents in Banff National Park, and now all Mountain National Parks distribute avalanche hazard information. Kananaskis Country (Alberta Provincial Parks) and the ski areas at Fernie and Blackcomb Mountain also described successful information systems.

The Alberta Avalanche Safety Association at Edmonton has made available recorded telephone messages of the avalanche warnings of the national and provincial parks in the past four winters. The service was a great success. In the winter of 1990-1991, the toll-free number was used for 240 hours (this represents about 5000 calls) and 900 user-paid calls were received. The Alberta Avalanche Safety Association has printed a brochure which explains the terms used in the messages and contains recommendations for action in case of avalanche accidents.

The participants of the meeting discussed at length whether the messages should contain information about snow stability or about avalanche hazards. It was generally agreed that snow stability is more objective, therefore should be used in communications among operations and professionals. In contrast, the public seems to understand the term avalanche hazard better. The best content for bulletins seems be a discussion of stability and a conclusion of what the hazard to skiers and snowmobilers would be.

Roger Atkins introduced the Snowbase Computer Software, an operational tool for avalanche hazard forecasting.

Use of Explosives

Norm Wilson, as a guest speaker, reviewed the history of the application of handcharges in avalanche control. Gary Kreller, an inspector of the Workers Compensation Board of British Columbia explained the explosives regulations, which do not allow the transport of handcharges in a pack to the blasting site over a long distance. In the ensuing discussion it was resolved that the Canadian Avalanche Association should make an application for changes of this regulation.

Remote Weather Stations

Ed Campbell drew attention to the large number of remote weather stations that are now used for snow stability evaluation. The British Columbia Ministry of Transportation and Highways alone has 36 stations. The weather stations operate with a variety of sensors and under severe climate conditions. There is a need for an exchange of information and experiences among users, which could be done best through the Canadian Avalanche Association. The British Columbia Ministry of Transportation and Highways has held workshops for its staff about the maintenance of weather stations and these workshops could be expanded to include other users.

Weather Forecast

Robin Siggers described the arrangements which Fernie Ski area had with the weather office at Castlegar for the FAX transmission of a variation of weather maps and forecasts. This information reduced the duration of discussions by telephone with the forecaster. The Avalanche Association will consider, as a long-term project, making similar services available through the Avalanche Centre.

Avalanche Handbook

Dave McClung reported about the state of the new Avalanche Handbook. The book was re-written completely and will contain more information than the old handbook of the U.S. Forest Service. Avalanche problems at roads, backcountry travel, and data collection have received greater emphasis. The text, which now is ready in draft form was reviewed by experts. Dave still has a wishlist for good photographs that would improve the book. The list can be obtained from and photos should be mailed to Dave McClung (National Research Council, 3650 Wesbrook Mall, Vancouver, British Columbia, V6S 2L2). The publication date of the book is uncertain at this time; probably it will be in 1992.

International Classification of Snow

Dave McClung drew attention to the revised international classification for snow on the ground. The classification system - based on studies of snow metamorphism by Sam Colbeck - applies a basic classification according to grain shape and this may be subdivided into a process-oriented classification. Dave McClung would like to receive comments which he will forward to the International Committee on Snow and Ice.

The comments from the floor during the meeting were in favour of the basic classification. It was pointed out, however, that the detailed, process-oriented classification is too complex and time-consuming for field applications.

Shear Frames, Rutschblocks, and Slab Stability

Bruce Jamieson gave a progress report on the avalanche research project of the University of Calgary and Mike Wiegele Helicopter Skiing at Blue River, British Columbia In this past winter, the studies concentrated on applications of shear frames and rutschblock tests for forecasting of snow stability in a large backcountry area.

Good correlations were found between observed dry slab avalanches and stability factors that were determined with shear frames on the study plot and on slopes. The rutschlock test proved to be a useful index, in association with other observations, for stability evaluation in the backcountry. Its variability, limitations, and critical values were defined in a preliminary base.

Snow Glide Observations

Dave McClung reported on the studies of gliding snow at the Coquihalla Highway. The project was described at the International Snow Science Workshop 1990 at Bigfork.

Lower glide displacements and fewer avalanches were observed in this past winter than in the previous winters. The observations led to the conclusion that glide speed of the snowpack seems to be a better index of avalanche activity than air temperatures.

Social Evening

In the evening of May 8, the Canadian Avalanche Association held a banquet in honour of Peter Schaerer, Fred Schleiss, Walter Schleiss, and Willi Pfisterer. These four members of the Association have pioneered the avalanche safety in Canada and recently have retired from active work.

CANADIAN AVALANCHE ASSOCIATION
TRAINING SCHOOLS

by Peter Schaerer

Winter 1990-1991

In the Winter 1990-1991, the Canadian Avalanche Association again organized week-long avalanche courses for professionals. The training objectives of the Transportation and Industry course were reviewed and modified by de-emphasizing the skills for making snow profile observations and stressing search and rescue work. The training objectives and curriculums of the other courses were not changed from previous years. The Institute for Research in Construction of the National Research Council generously made available office space at Revelstoke for the course administration and Peter Schaerer's time for course development and instruction. Inge Anhorn efficiently carried out the administrative work.

The total number of participants again has grown. In the period 1982-1989 the total number of students per year averaged between 120 and 150. It jumped to 178 in 1989-1990 and to 200 in 1990-1991. A demand for trained winter recreation guides seems to be the best explanation for the strong increase.

The following courses were held:

DATE	LOCATION	TYPE	NUMBER PARTICIPANTS
Dec. 3-7	Creston, B.C.	Transportation and Industry - Level 1	21
Dec. 10-14	Creston, B.C.	Transportation and Industry - Level 1	11
Mar. 4-8	Creston, B.C.	Transportation and Industry - Level 1	18
Dec. 1-7	Whistler, B.C.	Ski Operations Level 1	41
Dec. 9-15	Blue River, B.C.	Ski Operations Level 1	13
Jan. 6-12	Creston, B.C.	Ski Operations Level 1	25
Jan. 13-19	Mistaya Lodge	Ski Operations Level 1	12
Jan. 27 to Mar. 3	Mt. Engadine Lodge, Alberta	Ski Operations Level 1	23
Jan. 6-13	Lake Louise	Ski Operations Level 2	25
Feb. 14 to Mar. 3	Creston	Ski Operations Level 2	11
TOTAL NUMBER OF PARTICIPANTS			200

All Level 1 participants completed the courses successfully. Five students of the Level 2 courses have failed to meet the course requirements.

The course at Blue River was organized by Mike Wiegele Heliskiing and the one at Mistaya Lodge by Mistaya Alpine Tours at Golden, British Columbia.

Plans for Winter 1991-1992

At a meeting on May 7, 1991 the instructors of the avalanche courses reviewed the courses and made plans for the coming winter.

In the future, all courses, including those at private lodges, shall be advertised and organized by the Canadian Avalanche Association. The reason is to make interested persons aware of all courses that are available and to avoid confusion when some courses are cancelled. Tentatively the following courses and dates were set (changes are possible):

DATE	LOCATION	TYPE
Dec. 2-6	Creston, B.C.	Transportation and Industry Level - 1
Dec. 9-13	Meziadin, B.C.	Transportation and Industry Level - 1
Nov. 23-29	Blue River, B.C.	Ski Operations - Level 1
Dec. 1-7	Whistler, B.C.	Ski Operations - Level 1
Jan. 12-18	Mistaya Lodge, B.C.	Ski Operations - Level 1
Jan. 19-25	Ptarmigan Lodge, B.C.	Ski Operations - Level 1
Jan. 26 to Feb. 1	Whistler, B.C.	Ski Operations - Level 1
Dec. 7-14	Blue River, B.C.	Ski Operations - Level 2
Jan. 12-19	Whistler, B.C.	Ski Operations - Level 2

The Canadian Avalanche Association has appointed Janice Johnson for finalizing the course dates and locations, printing the brochure, and preparing the equipment and papers. Janice, who has worked with the avalanche programs of the British Columbia Ministry of Transportation and Highways for many years, will carry out these duties during the summer of 1991 until a full-time manager of the Canadian Avalanche Association will be responsible for the supervision of the courses. Inge Anhorn again will carry out the administrative duties during the Winter 1991-1992.

Course Brochure

The brochure describing the courses of the coming winter is expected to be available near the end of August 1991. It will be mailed to government agencies and organizations who usually have an interest in the avalanche courses, to the members of the Canadian Avalanche Association, and to all those who have requested it.

Brochures and information about the avalanche courses may be obtained from the office of the Canadian Avalanche Association:

P.O. Box 2759
Revelstoke, British Columbia
CANADA, V0E 2S0

Telephone: (604) 837-2435

TWELFTH NATIONAL AVALANCHE SCHOOL

by Rebecca W. Ayers, National Ski Patrol

If you work in or visit snow covered mountains and would like to improve your knowledge of avalanche science, make plans now to attend the Twelfth National Avalanche School, November 7-11, 1991, at the Sheraton Denver West Hotel and Conference Center in Lakewood, Colorado.

The National Avalanche School is a two-phase professional training opportunity that encompasses all aspects of avalanche phenomenon. The school is offered every other year to advance the knowledge of avalanche science among ski patrollers, ski area management, search and rescue specialists, heli-ski operators, U.S. Forest Service and highway department personnel and interested members of the public.

Previous National Avalanche Schools have received consistently favorable reviews, and this school should be no exception. Each phase of the school will incorporate the latest developments in equipment, techniques, and other avalanche-related areas. The 20-member instructional staff will include nationally renowned avalanche experts Knox Williams, Betsy Armstrong, Dick Armstrong, and Norman Wilson, among others.

Phase I consists of five days of lectures, small group workshops geared to different knowledge levels, exhibits, and discussions on avalanche science. Course topics will include mountain meteorology, snowpack characteristics, safe winter travel, avalanche phenomenon, stability evaluation, control fundamentals, snow pits, and rescue. Phase I tuition is U.S. $325. Students who successfully complete the classroom sessions will have an option to sign up for the Phase II three-day field session in which they can apply their knowledge outdoors. Tuition for Phase II is $150.

The National Avalanche Foundation School is sponsored by the National Avalanche Foundation, a nonprofit educational organization administered by the National Ski Patrol. The National Avalanche Foundation participates in scientific studies and promotes research into the problems of snow avalanche protection and safety.

To apply for the school, contact Ms. Frankie Barr, NAS Coordinator, National Ski Patrol, Ski Patrol Building, Suite 100, 133 South Van Gordon Street, Lakewood, Colorado 80228, (303) 988-1398 or (303) 988-1111.

INTERNATIONAL COMMISSION FOR ALPINE RESCUE

by Peter Fuhrmann

The 1990 meeting of the delegates of the International Commission for Alpine Rescue (IKAR) was held on November 8 to 11, at Naturns in the South Tyrol. The Soviet Union was represented for the first time. Following is a report of the Sub-Commission Avalanche, headed by Francois Valla (France).

The enclosed table contains the statistics on Avalanche fatalities for 1989 - 1990. The number of fatalities were less than half of what one expects normally. The lack of snow in many areas of the Alps obviously was the reason. Instead of skiing, people simply hiked.

Looking at international statistics, ski tourers/ski mountaineers and mountaineers without skis still make up the largest percentage of those killed in avalanches. This again indicates how necessary it is to convince these particular groups to carry transceivers. In France alone 18 completely buried victims were found alive with transceivers. In other areas of the Alps, in 65 percent of the accidents where life recoveries could be made those were the ones who were equipped with transceivers. After all these years it is finally fully documented that wearing transceivers and operating them properly does save lives.

Some of the countries reported interesting and educational accidents. Prof. Jaccard presented a case where 6 young Swiss ski mountaineers were travelling to a hut and intending to come back on the same day. On ascent they lost the route and released a 500m x 100m avalanche. All skiers were caught. Two managed to get out of the slide and one travelled back to report the accident. He was later found dead on the trail. The other survivor stayed with the party and continued the hasty search. He also was found dead on the following day. A helicopter rescue was initiated and two dogs uncovered the four buried bodies. A high avalanche hazard had been forecast for elevations over 3200m where the party travelled.

Another accident in the Swiss Alps claimed 7 victims of a youth touring party. The party, travelling off track in difficult terrain, released an avalanche and were buried. On the first day 61 searchers were transported to the slide. Seven transceivers were found, which had been ripped off the victims. They obviously weren't carried properly. On the following day, 110 searchers were on the slide with 12 dogs and probing parties. On the next day, probing was impossible and crews shovelled. By that time 152 persons were working. They worked for another 3 days, until the victims were found. This again indicates strongly that transceivers must be carried properly. One proposal was to carry transceivers in pants properly closed with zippers, as in most accidents, at least pants stayed on the victims. Shirts and jackets usually get ripped off. Proper 3-point harnesses may be sufficient also, if carried under clothing.

Austria:

An accident in Austria was reported where both travellers carried transceivers. Both got into an avalanche. One was able to free himself, found the other transceiver but could not locate the victim as the transceiver had been ripped off the person. The body was recovered later.

Germany:

Two winter mountaineers, one male and one female got caught by an avalanche. The man was knocked out during the descent and woke up with a concussion which left him blind. He sat around for approximately 15 minutes, regained some of his sight and then proceeded with the surface search. He was unsuccessful and returned to the hut where they had come from. At the hut he found the telephone broken; therefore he had to walk all the way back down to the valley. He arrived here during darkness. A rescue pilot, however, flew during the night to the accident site with two dog masters. It took the dogs only three minutes to locate the female victim. She was found head down and both feet spread 1.6 m apart 1 m under the snow. The excavation was most difficult. The doctor who had been flown to the site established still some heart activity with a EKG, but one hour later in the hospital the victim was pronounced dead.

Andre Roch reported an accident that occurred to a party of 15. The leader ordered the party to cross the slope one by one. Apparently this worked for the first five skiers, but then ten of them skied into the slope together and released a major avalanche. Three were killed. A legal suit was the result against the leader of the party. He was freed of all responsibility however, as the party had not followed his distinct orders of crossing the slope one by one.

In another case of an avalanche accident, the leader had not given exact instructions as how to cross a slope. The leader, however, was killed in the avalanche with the party members. The inquiry later established that the leader was guilty of not having performed his function properly, and a charge against his estate was laid.

France reported an accident where a victim was located 30 minutes after being buried under 4 m of snow. The rescue crew who arrived shortly after the accident realized that the snow deposition was very deep; therefore, they worked with exceptionally long probes. The victim was buried between snow blocks and was able to breathe and to move one hand. One of the probes hit his hand and he was able to grab the probe shoving it up and down. Having established the burial depth, the rescue party decided to drive a long descending tunnel to the victim and excavate him in that manner.

The catastrophe of the year took place in July, in the USSR at Lenin peak in the Caucasus. Prof-Sport had organized an international camp with many nations being represented. An earthquake released two avalanches which swept over the high camp at elevation 5100m and flung the camp with nearly all the the 46 participants over a 200 ft. wall to a a broken glacier consisting primarily of seracs. Three survivors were found during the initial search at the campsite. Forty-three climbers members of all nations were missing. The initial search period stretched over ten days. After that a further search period of 26 days took place. Gradually over the 36 days the number of searchers increased to 130.

Dogs, mine detectors and various pieces of equipment were brought in. Towards the end as probing was no longer possible all crews shovelled. The search continued into September and a new metal detector which the Russian army had developed was applied. One hoped that one would pick up crampons or other metal objects. However that search was unsuccessful as well. Towards the end of September the Search was discontinued without making any recoveries.

The IKAR passed a motion that warns against the use of instruments that function only as transmitters for locating avalanche victims. These instruments are less useful during an avalanche accident than transceivers which send and receive signals. IKAR recommends the use of instruments which comply with the Euro norm (457 khz) and allow survivors to immediately locate buried party members. Furthermore, IKAR reminds everyone that avalanche shovels are of primary importance so that those who are buried can be extracted from the snow in as short a period of time as possible.

The maximum and minimum ranges of five makes of transceivers with 457 khz frequency were tested at Andermaltt (Switzerland on April 24 & 25, 1990 and at Bormio (Italy) on October 4th & 5th, 1990. The results may be obtained from the Federal Institute for Snow and Avalanche Research, Weissfluhjoch/Davos, Switzerland.

In 1989 a sub-commission "Avalanche Rescue Dogs" was formed. The Austrian Mountain Rescue Organization has produced guidelines for the training of avalanche rescue dogs and masters. The sub-commission discussed various problems concerning the use of dogs on an avalanche.

I have received from the Vanni Eigenmann Foundations a computer disk covering the avalanche glossary which was established in 7 languages over the past 6 years. Mrs. Eigenmann of the Fondatione International Vanni Eigenmann was the driving force behind the production of the glossary. The text was composed and edited on a microprocessor by Renate Cresta, Italy. The hardware is an Apple MacIntosh SER4MB to be printed on a Laserwriter 2, the software that is required is RagTime 3 for the cover and the titles and the actual text can be transcribed with Filemaker II. I will attempt to have the glossary transcribed and produced and it should be available during this winter season.

PERSONAL NEWS

On March 28, 1991, Fred Schleiss and Walter Schleiss took advantage of an offer for early retirement by the Government of Canada. Both Fred and Walter began working as snow observers for the avalanche study program of the Trans Canada Highway at Rogers Pass in 1959. Later they became Head and Assistant Head respectively of the Snow Research and Avalanche Warning Section of Glacier National Park. Together they have developed the avalanche safety and control work at Rogers Pass to its high standard, which has influenced strongly the quality of the avalanche work in Canada. The manual on snow and weather observations which they compiled for their staff developed into the "Guidelines for Weather, Snowpack, and Avalanche Observations" which now is generally used in all avalanche safety operations.

Dave Skjonsberg now is acting head of the Snow Research and Avalanche Warning Section and responsible for the avalanche safety at Rogers Pass.

Peter Fuhrmann has retired as Alpine Specialist of the Western Region Canadian Parks Service. He is known for developing mountain rescue techniques and helicopter bombing, as well as representing Canada with the International Committee for Alpine Rescue.

Clair Israelson has now assumed the duties of the Public Safety Specialist, Western Region, Canadian Parks Service with base at Banff.

TRAINING VIDEOS

The Canadian Avalanche Association produces and distributes videos for training purposes. The following videos presently are available:

Avalanche Terrain;

- Running time 9 minutes, made from slides; Cost Can. $50.00

- Snow Profile Procedures;
- Running time 9 minutes, made from slides; Cost Can. $50.00

- Avalanche Control, containing Handcharging, Avalauncher, and Cornice Control;
- Running time 45 minutes, made from motion pictures; Can. $90.00

- 7% Goods and Services Tax and 6% Provincial Sales Tax must be added to the cost where applicable.

- An additional video on Helicopter Bombing, made from motion pictures, is in production.

The Canadian Avalanche Association has appointed a committee that supervises the production of videos. The Training Video Committee, chaired by Mike Boissonneault, would be pleased to receive suggestions and comments.

Orders for videos should be sent to the address of the Canadian Avalanche Association (P.O. Box 2759, Revelstoke, British Columbia, V0E 2S0, telephone (604) 837 2435), together with cheque, money order, purchase order, or VISA account. Orders for VHS tapes can be filled immediately. Copies in other systems (PAL, Beta, 3/4 inch) will take about three weeks to produce.

PUBLICATIONS

Proceedings International Snow Science Workshop, 1990

The proceedings of the ISSW, October 9-13, 1990 at Bigfork Montana U.S.A. are available from the ISSW'90 Committee, P.O. Box 372, Bigfork, Montana, 59911.

The publications contains 37 pages and 6 abstracts of poster presentations. They cover a wide range of snow science, avalanche safety and avalanche control.

Copies of the proceedings of International Snow Science Workshop 1988 at Whistler are still available for sale ($25.00) and may be requested from the Canadian Avalanche Association, Box 2750, Revelstoke, B.C., V0E 2S0

D.M. McClung. A model for scaling avalanche speeds. Journal of Glaciology, Volume 36, No. 123, 1990; pg 188-198.

Abstract by the author:

Snow avalanche speeds, run-out distances, and the concepts from dense granular flows are combined in a model for prediction of speeds along the incline. Field measurements indicate that speeds and run-out distances are nearly independent of path steepness once a length is chosen to scale them. The most important feature of the model (and the speed data) is the steep gradient of speeds in the run-out zone. These results emphasize the need for high precision in run-out prediction when construction of defenses are contemplated.

CONFERENCES OF INTEREST

Interpraevent 1992

June 29 to July 3, 1992 at Berne, Switzerland.

The theme of the meeting is the protection against floods, debris flows and avalanches.

Address for information:
Interpreaevent 1991, C/O Bundescamt Fur Wasserwirtschaft, Postfach 2743, Ch-3001 Bern, Switzerland.

International Symposium on Snow and Snow-related Problems

September 14-18, 1992 at Nagaroka, Japan.

The following topics will be open for discussion:
- Physics of snow
- Distribution and changes of snow packs
- Snowfall, blowing snow
- Snow avalanches
- Snow removal and ice control
- Social problems relating to snow
- The role of snow in climate
- Use of snow and ice

Information:

Secretary General, International Glaciological Society, Lensfield Road, Cambridge, CB2 1ER, England.

The International Snow Science Workshop, 1992 will be held at Breckenridge, Colorado in October 1992. Details have not been announced as yet.

EMPLOYMENT

FIELD ASSISTANT - AVALANCHE RESEARCH

The Blue River Avalanche Research Project, which is jointly funded by Mike Wiegele Helicopter Skiing and the Natural Science and Engineering Research Council, is looking for a field person to assist with testing of snowlayers and measurements of slab avalanches. Snow stability evaluations, hazard recognition and good communication skills are essential. The ability to carefully observe and record the results of field tests during successive days in the field is required. Experience with snowmobiles and familiarity with DOS for IBM compatible computers are assets. Applicants must be willing to live in Blue River for approximately 5 days per week from early December to mid April. Monthly salary will range from $1,500. to $2,800. depending on qualifications and experience. Meals will be provided. Interested persons should call for further information or submit a resume to Dr. C.D. Johnston (403) 220-6599 or Bruce Jamieson (403) 220-7479, Dept. of Civil Engineering, FAX (403) 282-7026, University of Calgary, Calgary, Alberta, T2N 1N4.

WEATHER STATION TECHNICIAN

Mike Wiegels Helicopeter Skiing is looking for an experienced Weather Station Technician to install and service two remote weather stations and a repeater. The technician will also collect weather data, prepare and present the weather briefing at the morning guides meeting, observe snow profiles in coordination with the guiding operation and attend the evening guides meeting. Applicants must be willing to work in Blue River 6 days per week. Monthly salary will range from $1,500 to $2,800 depending on qualifications and experience. Staff meals will be provided. Interested persons should call (403) 762-5548. Forward requests for further information or submit resume to Mike Wiegele Helicopter Skiing, Box 249, Banff, Alberta, TOL OCO.

Applicants qualified for both positions listed above may discuss a combined position with Dr. D.C. Johnston and Mr. Mike Wiegele. If the positions are combined, then an assistant will be hired to help with the responsibilities of the Weather Station Technician.

AVALANCHE CONTROL FORECASTER AND ASSISTANT FORECASTER

Mt. Norquay is looking for an Avalanche Control Forecaster and an Assistant Forecaster. Qualifications: CAA Level two certificate, experience in Avalanche Control. Preference would be given to person with experience from the Rocky Mountain area. Send application/resume before August 22, 1991 to:

Don Annett
Ski Norquay
Box 1258
Banff, Alberta
Canada, T0l 0L0

Telephone: (403) 762-4421
Fax: (403) 762-8133

INVITATION TO REGISTER

Ministry of Transportation and Highways

Snow Avalanche Programs

Information regarding the Snow Avalanche Programs training requirements will soon be published in newspapers in the following areas:

Nelson
Kamloops
Terrace
Prince George
Vancouver

Watch for these advertisements if you are interested in submitting a proposal to teach Ministry approved training courses.