

CANADIAN AVALANCHE ASSOCIATION

INDUSTRY TRAINING PROGRAM

EARLY HISTORY

Memoirs

of Peter Schaerer

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INTRODUCTION

The Industry Training Program of the Canadian Avalanche Association, formerly known as Canadian Avalanche Association Training Schools, offers safety education for persons who work in avalanche related industries.

Training workers who are responsible for avalanche safety in industries, for example ski areas, highway operations, railways, mines, and ski guiding is more important in Canada than it is in many other countries. Whereas industrial operations are in neighborhoods and benefit from government-organized observation and warning networks in denser populated countries, in Canada, they are scattered over extensive mountain areas with differing snow conditions. Consequently, a person in charge of snow safety in Canada must be self-reliant in making observations and evaluating the local snow stability and avalanche hazard. Upon completion of a Canadian avalanche course, a participant is expected not only to move safely in the backcountry, but also to make decisions independently and to perform useful in an operation. In order to assist industries and operation staff with this challenge, the Canadian Avalanche Association has developed a training program with a high standard.

My responsibility as a research officer of the National Research Council of Canada (NRCC) was to develop avalanche control and safety measures. In meeting this task and responding to a demand from industries, I initiated the professional avalanche courses in Canada in 1971 and maintained a leading position with their organization and with teaching. I retired in 1991 when the National Research Council discontinued the avalanche research program though I continued teaching in a few courses.

On the suggestion of Phil Hein, who was the avalanche course coordinator of the Canadian Avalanche Association in 1997-2002, I have described with these memoirs the industry courses of 1970-1992. The document is not a complete history, but rather an account of the major events. Several occurrences that are strong in my memory are described in detail, others are mentioned sketchy and I have no recollection of some events. Though files at the Canadian Avalanche Association assisted my memory, some dates and the number of course participants may not be accurate.

INITIAL COURSES

Seminar for Mine Personnel

Historically, avalanche hazards in Canada have affected mining and transportation. Government reports and books mention avalanche accidents at the gold, silver, lead, zinc, and copper mines in British Columbia between 1890 and 1960, but few events were described in detail. The avalanche hazard at mines became apparent drastically when on 18 February 1965 an avalanche destroyed the camp of the Granduc copper mine near Stewart with a loss of 26 lives. The Granduc disaster stimulated a strong concern of the mining industry and of the Department of Mines of British Columbia. The Chief Inspector of Mines J.W. Peck, who became familiar with avalanche problems when he was a mine inspector in the Slocan area, resolved that avalanche disasters at mines must not happen again. This motivation stimulated the avalanche safety training for industries in Canada.

On the request of Peck, Fred Schleiss and I gave a seminar to ten inspectors, safety instructors and managers of mines on 19 February 1970. We held the seminar at Rogers Pass, where Fred was in charge of the avalanche control for the highway through Glacier National Park and I carried out research on the motion and size of avalanches. Fred and I explained in the seminar the formation of avalanches and the observations and analysis required, and we showed the facilities and avalanche paths at Rogers Pass. Three participating mine inspectors who took a strong interest attended the introductory and advanced avalanche courses for industry in later years.

First Courses for Industry in 1971-1972

Because Fred Schleiss and I received additional requests for avalanche courses, we decided that the time had arrived for organizing a formal course for industry. We drafted a program of a five-day course and divided the instructional topics among us, but we needed a third person for instructing search and rescue. Because the national parks of Canada had the best expertise in mountain search and rescue, I requested the Regional Director of Parks Canada to make available a rescue specialist. To our satisfaction, Willi Pfisterer was assigned the task. After working as a snow observer at Rogers Pass in 1966-1968, Willi had become a regional alpine specialist of the national parks with base in Jasper.

We held the five-day course in the first week of December 1971 at Rogers Pass. The office assistant of the National Research Council at Vancouver typed the course notice and mailed it to interested government agencies and industries. There was no fee for attending the course, because the National Research Council and National Parks covered the wages and expenses of the instructors, and the hand-out material was typed and copied free of charge in my office at Vancouver. The hotel at Rogers Pass – Northlander

was the name of the hotel at that time - offered a package of accommodation and meals for the participants and made available the meeting room.

Of the 21 participants, 10 represented mining and railways, 8 were involved with ski areas and ski guiding and 3 were wardens of national parks. The variety of occupational background of the participants stimulated lively discussions during the instructional sessions and during the common meals in the hotel.

The topics of instruction were much the same as they were in later courses. We carried out observations of the weather and snowpack on a study plot according to the manual of the snow observers at Rogers Pass. The snowcat of the Park took the course to Fidelity Mountain for snow observations at the high elevation and Willi practiced searches on avalanche deposits near the highway.

On the request of the participants of the course in December 1971, I organized an advanced course on 28 February - 3 March 1972 at Rogers Pass. A 30-year maximum snowfall in the winter 1971-1972 produced numerous and large avalanches in southern British Columbia, and a large avalanche had blocked the highway at Cougar Creek at the westside of Rogers Pass on the day when the course began. The participating mine inspectors Bill Dudas, Jack Robinson and Ed Sadar drove to the avalanche from the West with the permission of the Park Superintendent and walked across the deposit, and we picked them up on the other side. Brad Geisler, who represented the Canadian Ski Patrol System, came from the East and Adi Smode, a civil engineer from Vancouver, arrived one day later. Other course registrants were unable to attend because they had to deal with avalanches at their own operations. Consequently, only five students attended the first advanced avalanche course, but they received excellent on-site education with the deep snow and the numerous visible large avalanches. Jack Robinson had an opportunity to apply his knowledge immediately after the course when he attended to a fatal avalanche accident at the Giant Mascot Mine near Hope BC (Stethem and Schaerer; 1979; *Avalanche Accidents in Canada I*, pages 69-70). When I visited the accident site a few days later, the local mining staff remarked that Jack Robinson had impressed them with his observations at the avalanche fracture line, though they did not know exactly what he was doing.

In 1971, the demand for industry avalanche courses was strong also in the U.S.A. Therefore the United States Forest Service had organized the first National Avalanche School of five days duration at Reno, Nevada. Reno was chosen because it was central to avalanche areas in the United States and offered meeting facilities and accommodation at a low cost. The course consisted of lectures in an auditorium and seminars in small groups, but no fieldwork. The curriculum stressed avalanche control in ski areas, because avalanche safety of ski areas in national forests was a responsibility of the US Forest Service. The school organizers felt that avalanche safety in the backcountry should be addressed as well, but they had no clear idea on how to instruct it. They invited Hans Gmoser of CMH Heliskiing with three of his guides to attend, but were unsure on how to

fit them into the curriculum. Consequently, Hans and his guides were rather idle and did not make presentations. Several avalanche specialists of the Canadian National Parks took the course, and I was a principal instructor on avalanche terrain and avalanche control. In years following, the U.S. Forest Service continued to organize an annual National Avalanche School until a private organization assumed the responsibility.

Courses in 1972-1973

The numerous and large avalanches in the winter 1971-1972 seemed to stimulate a growing interest in avalanche safety education. Therefore, I organized the following courses at Rogers Pass under the banner of the National Research Council.

20 - 24 November:

Basic avalanche course for transportation and mining industries with 14 participants. They were 7 local national park employees, 3 CP Rail employees, and 4 members of BC Government agencies.

27 November - 1 December:

Basic avalanche course for ski areas with 19 participants including 12 wardens of national parks and 3 patrollers of Schweitzer Basin Ski Area. Schweitzer Basin at Sandpoint, Idaho had sent its patrollers to courses in Canada because the manager was dissatisfied with the U.S. Forest Service and its avalanche courses.

4 - 8 December:

Advanced avalanche course with 21 participants including 11 wardens of national parks. The other 10 participants were ski area personnel or persons with a private interest in avalanche safety.

The large number of participants from national parks demonstrates the strong interest in avalanche safety in the parks. At that time, the national parks maintained the patrols of the ski areas Sunshine, Norquay, Lake Louise, and Marmot and avalanche accidents had occurred adjacent to ski runs and in the backcountry of parks.

There were no set training objectives in the courses of 1972-1973 and in the winter following. The instructors presented lessons on the properties of snow, snow stability, the formation of avalanches, terrain, safety measures, search and rescue, and avalanche control. The students observed and plotted snow profiles, made weather observations at a study plot with equipment provided by the Avalanche Warning staff of Glacier National Park, evaluated terrain, and practiced avalanche search and rescue. The first rescue transceivers (Skadi) had just arrived on the market, but were not in general use. The courses ended without exams, and the students did not receive a certificate, because I felt that certificates were not justified without an evaluation at the end of the course. Besides, the courses and avalanche research kept me too busy for bothering with paper work.

Courses in 1973-1974

The interest in avalanche courses continued to grow in 1973. For the convenience of local participants, I advertised courses at places other than Rogers Pass, but the easy access to course locations and no limits to the number of registrations produced uncontrolled avalanches of participants to the following three courses:

Basic Course at Whistler in November

55 students registered whom included:

- 4 engineers and road foremen of the BC Ministry of Highways
- 5 employees of BC provincial parks
- 5 patrollers of Whistler ski area
- 9 patrollers of other ski areas
- 9 students of the Outdoor Recreation course at Capilano College
- 23 guides and other skiers who were interested in backcountry activities

The staff of the British Columbia Ministry of Highways participated on the urge of Dudley Godfrey. Godfrey was the Regional Highway Manager, had a personal interest in mountaineering and skiing, and was caught in an avalanche on the highway in the Cheakamus Canyon in 1972.

Willi Pfisterer, Ron Perla (Glaciology Division, Department of Environment), Paul Anhorn (National Research Council), Norm Wilson (private avalanche safety consultant) and I were the instructors. Again, Canadian government agencies made available the time and expenses of their staff members, but we paid the expenses of Norm Wilson. The students were charged a fee of \$ 50.00 in order to cover the cost.

Norm Wilson was a leading avalanche forecaster in the USA. He continued instructing with the Canadian courses until 1979 and made significant contributions to the quality of the courses.

Whistler Ski Area was most co-operative by supplying lift tickets and making available a classroom in the restaurant at the Creekside gondola terminal, but we had to vacate the meeting room in the afternoon for the guests. A snowfall in the middle of the week produced unstable snow and an opportunity for the course participants to accompany ski patrollers on control runs, to assist with ski stabilization, and to apply hand charges.

Chris Stethem was a Whistler ski patroller who led a group on a control run. Chris recalls the demonstration of hand charges in front of the students at the GS Ski Run: After lighting the charge, Chris gave it to a student for throwing it into the avalanche slope. The student however threw the charge vertically up into the air. It landed at the feet of the group, everybody retreated in chaos, but the Whistler ski patroller Albert Eagan picked up the lit charge and tossed it into the correct place before it exploded.

Advanced Course at Roger Pass in the first week of December

The 26 participants included 10 employees of the BC Ministry of Highways, 5 mine inspectors of the Province of BC and 2 national park wardens. The other 9 participants represented various government agencies and ski areas.

Basic Course at Jasper, 10-13 December

Willi Pfisterer had organized the course principally for wardens of the national parks. The course included 20 national park wardens, 4 representatives of BC Parks and Highways, 11 ski patrollers and 4 others.

COURSES OF BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

Initiation

The growing demand for avalanche courses in 1973-1974 made it impossible for me to continue their administration. My principal duties as an employee of the National Research Council of Canada were to carry out research on snow and avalanches and to assist industries in solving problems with avalanches, but not to be an administrator.

The relief came when Don McLaurin arranged for the British Columbia Institute of Technology (BCIT) to assume the administrative responsibility through its Industry Services Division. McLaurin had a personal interest in avalanche safety as a skier and he was an instructor at the BCIT. Consequently, the courses became a joint venture of the National Research Council and the BC Institute of Technology under the designation BCIT/NRCC Avalanche Courses. The Canada West Ski Area Association joined as a co-sponsor.

BCIT was responsible for printing and mailing the course brochures, receiving registrations, collecting fees, arranging the meeting rooms, printing the course handouts, and paying the instructors. BCIT issued certificates to the students who had successfully completed a course. My tasks were to determine the location of the courses, to draft the curriculums, to assign the instructors, to compile the course manual and case studies, and to be a course leader. The course fees were low, because BCIT charged only for the on-site expenses, but did not include administrative expenses. The regular grant of the provincial government to the Institute covered the administration overhead cost.

Following are descriptions of the courses that the BCIT had organized in its first years of its involvement.

Refresher Course in 1974

On 12-15 November 1974, 14 experienced avalanche forecasters of ski areas, of national and provincial parks and of BC Highways attended a seminar at Whistler. The participants were required to have basic avalanche training and to be actively engaged in avalanche control. The instructors were Peter Schaerer, Willi Pfisterer and Norm Wilson.

The course had accommodation and a meeting room in the Highland Lodge and carried out field work in the Whistler Ski Area. The participants reviewed the methods of snow and weather observations, solved snow stability problems and discussed case histories. Each participant had to present a case history of an accident or a close-call. Norm Wilson demonstrated the use of hand charges. At an evening session, I proposed that we should discontinue using the ramsonde, which was a standard component of snow profile observations. The representatives of national parks, however, defended the ramsonde in a

hot discussion, but at the end of the debate, we had identified useful applications of the ram profile to everybody's satisfaction.

The refresher course was the first exchange of experience among leading avalanche safety persons in Canada. It stimulated similar meetings later, which eventually led to the formation of the Canadian Avalanche Association.

Operation Courses in 1974-1975

Following the refresher course, a general (introductory) course took place at Whistler on 18-22 November 1974 for persons who were interested in avalanche safety in ski operations. Two further courses were held at Rogers Pass. The first Rogers Pass course on 2-6 December covered applications at highways, railways and mines. The second course on 20 - 24 January was an overflow course for all applications and the class was divided for the fieldwork. The students who were interested in ski operations went ski touring with Norm Wilson, but they suffered from restrictions of access to the backcountry, because the National Park had banned skiing on slopes that were exposed to artillery fire. The non-skiing participants evaluated avalanche paths at the highway.

Again, the courses attracted large numbers of registrations: 45 participants at Whistler and 35 in the first course at Rogers Pass. BCIT charged a fee of \$ 40.00 for the courses. Art Hives, an instructor of the BCIT, was present and gave the instructors hints on the use of the overhead projector and classroom organization.

Courses 1975-1976

BICT organized the following courses:

24-28 November

General course at Rogers Pass with 31 participants including 21 from the BC Ministry of Highways.

1-5 December

General course at Whistler. The 48 participants had a variety of interest and background experiences. 9 participants were with the BC Provincial Emergency Measures and 2 ski patrollers came from Schweitzer Basin.

15-19 December

General course at Jasper with 16 participants including 10 employees of national parks. Willi Pfisterer had organized the course mainly for the benefit of wardens of the National Parks.

19-23 January

General course at Banff with 30 participants.

The course at Banff was for local ski patrollers and backcountry skiers in the Calgary area. The pre-knowledge of the participants varied strongly because of their diverse experience. The fieldwork was at the Sunshine and Lake Louise ski areas, where the national park staff made available the snow and weather study plots and assisted with the search and rescue practices.

DEVELOPMENT OF THE COURSES

Involvement of the British Columbia Ministry of Highways

On 22 January 1974, an avalanche destroyed with a loss of seven lives the North Route Café on the highway between Terrace and Prince Rupert. The disaster prompted the Minister of Highways of British Columbia to appoint a task force with the responsibility of recommending avalanche safety measures on highways. With its report of October 1974, the Task Force recommended that maintenance personnel of highways in avalanche areas should be educated in recognizing avalanche hazards and be trained in safety measures. Subsequently, large numbers of highway managers, road maintenance foremen, and equipment operators began to attend the avalanche courses. As a further measure, the Ministry of Highways created the Snow Avalanche Program under the direction of Geoff Freer. In addition to the week-long avalanche courses of BCIT/NRCC, the Ministry of Highway held two-day long in-house courses for local road maintenance staff, for example at Stewart, Manning Park, Creston, and Revelstoke.

Garry Walton

Garry Walton was a staff member of the BCIT who administrated and coordinated the courses and conducted seminars for the instructors. His dedication to the avalanche courses was above the expectation for a course coordinator. Garry did not carry out his duties in the office at Burnaby only, but he visited the courses and relished the contact with the instructors. The instructors who served with him will remember his powerful words when he told them how to organize the classroom and how to interact with the students. Memorable were the dinners, which Garry organized at the meetings of instructors, in particular those at Creston. In later years, Garry represented the Associate Members as a director of the Canadian Avalanche Association, and today he is still interested in the affairs of the Association and attends the annual meetings.

Grant of the BC Government

In 1976, the Outdoor Recreation Branch of the Government of British Columbia offered to support the avalanche courses with a grant of \$ 30,000 to the BCIT. The grant had to be applied to the development of the courses and not to the operation of them.

Garry Walton, Geoff Freer and Peter Schaerer received the offer of the grant at a meeting in Victoria. The manager of the Outdoor Recreation Branch requested that the avalanche courses be designated as Level 1 and Level 2, rather than general, introductory and advanced courses. We agreed because we considered that the government agency as a donor had the right to choose the names. BCIT used the grant for the development and printing of the course manual and for instructional technique courses.

In 1979, Lands, Parks, and Housing Minister James Chabot announced a new policy on commercial ski guiding and grants for developing practical courses and measures that should improve safety (see *Avalanche News* No.2). Among several organizations on the receiving end, BCIT obtained \$ 23,500 for re-evaluating and upgrading the avalanche courses for practicing professional ski guides and the interested public.

Names of the Courses

The reader may have noticed that the names of the courses had varied. The initial courses were called *basic avalanche courses*, because they simply described the phenomenon, the observations for evaluating avalanche dangers, and safety measures. When the students of the basic course wanted to obtain more information, I organized an *advanced course*. The name, however, suggested a level of knowledge that the participants did not achieve. Consequently in 1974, I named the basic or introductory course *general avalanche course* and the next level *refresher course*. In 1977, with the grant from the Government of British Columbia, the courses became Level 1 and Level 2.

Refresher Courses

The first true refresher course was in November 1974 for experienced avalanche technicians (*page 9*). Later refresher courses of three days duration were for participants who had attended a general or an introductory course. The objectives of the courses were to address problems and questions, which the students had experienced when they had applied the knowledge of the earlier course, and to teach the analysis of the weather and snow observations.

The following refresher courses took place in the winter 1976-1977:

29 November 1 - December

At Rogers Pass for 11 employees of the BC Ministry of Transportation. The accident simulator was set up for the first time and the instructors practiced as role players and endured the hot seat on two days before the course.

1-3 December

At Rogers Pass for 9 national park wardens and 4 ski area staff members.

The early refresher courses evolved into the Level 2 courses with the definition of training objectives in 1977. Later, in recognition that graduates of a Level 2 course could use a refresher after they had worked in the industry, we designated a *Level 3 Course*. BCIT organized a Refresher Level 3 course on 8-10 December 1981 at Creston with six students and the instructors Peter Schaerer, Willi Pfisterer and Herb Bleuer. The participants investigated the snow stability and terrain at Kootenay Pass and worked through stability problems. They seemed to be satisfied with the course. Owing to a lack of interest, however, BCIT organized no further Level 3 courses.

On the request of the course instructors at their spring meeting on 3 May 1989, I drafted training objectives and a schedule for a Refresher Level 3 Course. The course would have cost approximately \$ 400 per student. However, the instructors decided that in the future we should hold seminars for advanced knowledge rather than field courses.

Defining the Training Objectives

With the government grant for the development of avalanche education, BCIT held a think-tank on 17-19 September 1977 for defining the training objectives and the content of the courses. The session at the BCIT was attended by Willi Pfisterer (representing Parks Canada), Geoff Freer (representing highways), Chris Stethem (representing ski areas), Peter Schlunegger (representing mountain guides and helicopter skiing), Peter Schaerer (course coordinator), and Garry Walton. (course administrator). Mal Sharpe of the BCIT was the discussion leader and moderator.

We had intense discussions during the three days. The attendees stated the needs and expectations of the industries and the problems in past courses. Mal summarized them and suggested solutions. At the end of the meeting, we had listed for each user group and Level 1 and Level 2 courses the training objectives, pre-qualifications of the students, types of lessons, guidelines for fieldwork, and exam content. Originally, we had defined three user groups: transportation and industry, ski areas, and travelers in the backcountry, but the discussions revealed that the need for avalanche knowledge is essentially the same for ski area staff and backcountry guides. Therefore, a course named Snow Travel would be applicable to both user groups; the name changed to Ski Operations later.

Noteworthy is the inclusion of the scope of a Level 2 Course for Transportation and Industry. Subsequently, a Level 2 Course for highway, railway and mining personnel was held at Rogers Pass on 28 November – 2 December 1977 with the participation of 14 employees of the BC Ministry of Transportation. Other Level 2 Courses for Transportation and Industry took place on 3-7 March 1980 and in December 1980 at Creston. Regional engineers, district managers and road maintenance foremen of the BC Ministry of Transportation and Highways were the principal participants. The 17 students of the course in March 1980 demonstrated insufficient pre-knowledge for a Level 2 course, because they had not practiced after taking a Level 1 course. Subsequently, we lowered the level of instruction on the third day.

Another Level 2 Course for Transportation and Industry was planned in March 1982, but was cancelled because of insufficient registrations. In the year following, the avalanche course instructors at their meeting in spring resolved that avalanche technicians at highways and in non-skiing industries need the same training and experience as ski area personnel. Consequently, Level 2 Courses for Transportation and Industry were discontinued.

The first Level 2 Courses for Snow Travel were on 6-9 December 1977 at Banff with 11 participants, including 8 CMH Heliski guides, and on 12-16 December 1977 at Whistler with 11 participants.

The courses between 1971 and 1977 contained no student evaluation. The instructors simply passed on their knowledge and the students practiced observations under supervision. BCIT issued certificates that stated attendance of an avalanche course. However, with the definition of the training objectives in 1977, the course leaders resolved that receiving a certificate should rest on an examination. Therefore, the Level 2 Course at the Bugaboo Lodge on 9-15 December 1978 included exams for the first time. The instructors had scheduled the exams on the last course day. In the evening before, however, we discovered that the time of the last day would not allow the evaluation of every student in weather observations, snow profiles, and terrain analysis. As a solution of the jam, the instructors discussed the performance of each student during the week and selected only the weaker students for examination. A few students had to prove their knowledge on terrain and route finding and others had to produce a snow profile. We learned from this experience that the exams in the field must take place on the day before the course ends and the examination on the last day must include short tests in the classroom only.

In 1978, we concluded also that the training objectives could not be met adequately and the students could not be evaluated with 30 to 55 students that had filled courses in the past. Consequently, we established a maximum of 24 students for a Level 1 course and 18 for a Level 2 course. These numbers proved to be right. Once, we increased the number of students to 32 with 4 instructors in a Level 1 course at Whistler. However, the

instructors discovered that the class was too large for knowing and evaluating each student during the week.

On 9-10 September 1986 at Revelstoke, a group of six representatives of industries reviewed the training objectives of the Level 2 Ski Operations course. Mal Sharpe again was the moderator. The group revised the training objectives and assigned priorities to the course topics. At their annual end-of-winter meeting on 6 May 1987, the course instructors made a few revisions and approved the document.

Recognition of the Courses

The BCIT/NRCC avalanche courses soon became a requirement for employment in the industries. This meant that highway avalanche technicians, ski patrollers in charge of avalanche control, ski guides, park wardens, and avalanche course instructors had to have a Level 2 certificate even if they had developed the experience on the job. The course leaders ruled that there would be no grand-fathering and everybody would have to attend a course and to pass an exam in order to receive the certificate. The current instructors of the avalanche courses qualified by instructing in a Level 2 Course and taking the final exam with the students. Experienced mountain guides and park wardens took a three-day long refresher course with an exam under Willi Pfisterer and Peter Schaerer. The refresher courses contained observation techniques and snow stability analysis, but not route finding and rescue because the attendees had adequate practice.

Ruedi Gertsch organized the refresher course for nine ski and mountain guides at the Wheeler Hut in Glacier National Park on 1-3 December 1980. Willi Pfisterer organized a course for eleven national park wardens at Lake Louise on 11-13 February 1981. Both courses were one-time events for experienced senior workers and were not repeated. Later, every guide, park warden, and ski patroller had to take a full Level 2 course.

LOCATIONS AND THEIR COURSES

Requirements

Selecting the locations of courses was a continuous challenge, because a course area should meet the following conditions:

- The terrain must contain avalanche paths and challenging travel routes.
- There must be enough snow on the ground for observations of snow stability and over-snow travel at the time when the course takes place, for example in December.
- An avalanche safety operation, for example a ski area or a highway should provide support and allow observations of avalanche control.

- A large meeting room and accommodation must be available at a reasonable cost.
- The distance between the meeting room and the field study areas should be short.
- The distance of travel to the course location should be reasonable for participants and instructors.

A few locations that met the conditions had courses annually. Other locations were abandoned after one or several years because either the terrain was unsatisfactory, or the travel distances were too long, or the local operator lost interest in cooperating.

Roger Pass

Rogers Pass is well suited for Transportation and Industry courses because numerous avalanche paths that affect the highway allow easy observations, the snow conditions are reliable, and a local highway avalanche control program exists. Rogers Pass, however, was not ideal for ski operation courses because the access to the backcountry is restricted owing to the avalanche control with artillery and the travel distances to open areas are long. Nevertheless, ski operation courses were held because of the central location and the reliable snow.

In December 1979, the manager of the hotel at Rogers Pass evicted a Level 1 Ski Operation Course and accused BCIT for bad behaviour of the students (*page 25*). Subsequently, BCIT banned Rogers Pass for avalanche courses. A new hotel manager re-invited the avalanche courses later, but the courses did not return until the Canadian Avalanche Association had assumed their administration.

Whistler Mountain

Whistler Mountain was a course location every year, because of a strong demand locally and from participants in the Lower Mainland. The ski area provided continuous excellent support by making available lift tickets and a weather study plot, and the ski patrol assisted with rescue practices. In addition, experienced instructors lived in the area.

The disadvantages of Whistler are high cost of accommodation, access to undisturbed backcountry terrain and the weather. Finding untracked snow and challenging terrain became increasingly harder, because the lift-served areas at Whistler and Blackcomb Mountains expanded into the backcountry and more skiers used the slopes beyond the ski area boundaries. The difficulty with the weather relates to the Pacific Coast climate of heavy precipitation, high temperatures, rain, and fog in the alpine area, which often restricted the access to practice areas.

Backcountry Lodges

Lodges that are close to avalanche terrain in the backcountry are favoured because the access to practice areas is short, and snow and weather observations at the lodge relate closely to the conditions in avalanche starting zones. We received numerous requests for holding avalanche courses at lodges, but either the terrain was unsatisfactory, or the lodge owner was not prepared to lend the required support. Preferred were lodges that maintained their own avalanche hazard evaluation with a study plot according to CAA standards and had a manager who was also an avalanche course instructor. A disadvantage of the some backcountry lodges was the capacity of accommodation that often limited the course complement to a maximum of 12 students and 2 instructors. However, the small number of students and the close contact with the instructors together with the ready access to avalanche terrain made lodge courses a great learning experience.

Originally, the lodge owners advertised the courses, collected the fees and paid the instructors and expenses. Later, the BCIT or the CAA organized the courses, took the registrations, made lodge reservations, and collected the fees.

Boulder Hut

The hut of Ptarmigan Tours of Art Twomey and Margie Jamieson near Kimberley was the best and most frequently used backcountry lodge. Art was a leader of industry avalanche courses, and also offered recreational avalanche courses at his cabins. On 23-29 January 1983, he organized the first Level 1 course according to the BCIT/NRCC standards together with Peter Schaerer for 7 students.

The Level 1 Ski Operation courses at the Boulder Hut were repeated annually. For example, the course participants on 2-8 February 1986 included Bart Robinson who was an editor of Equinox Magazine. Subsequently Bart wrote a feature on avalanches and avalanche safety training in the magazine. The course program in 1986 was as follows:

- 2 February: Classroom instruction at the Community Centre at Kimberley.
- 3 February: Helicopter flight from the trailhead at White River to Boulder Hut; snowpack and weather observations at the cabin.
- 4 February: Ski touring with terrain analysis and snow pack observations. A participant was caught in a small avalanche near the lodge. He sprained an ankle because his telemark skis did not release when a tree snagged them.
- 5 February: Snow observations and rescue practice.
- 6 February: Skiing to Ptarmigan Hut at a lower elevation.
- 7 February: Ski touring from Ptarmigan Hut and exam.
- 8 February: Ski out to the trailhead.

Another course on 16–23 January 1988 at the Boulder and Ptarmigan Huts suffered from an unusually shallow snowpack that barely covered the shrubs and logs on the ground.

Mount Assiniboine Lodge

Well-attended Level 1 Ski Operation courses were at Mount Assiniboine for five years. The lodge manager Sepp Renner was a full mountain guide and avalanche course instructor. The students either had accommodation and meals in the Lodge or they could occupy housekeeping cabins. The disadvantages of Assiniboine were a limited number of avalanche paths, unchallenging terrain for route finding and a small meeting room, but the Rocky Mountain conditions allowed for interesting snow stability observations.

26 students had registered in the first course in January 1984 and overcrowded the meeting room, though I am at a loss to explain why BCIT admitted the large number. The number of participants was limited to 20 in the years following. After the courses in January 1988, Sepp Renner discontinued offering the lodge for courses, because opening the lodge and employing staff for a short time in January proved uneconomical. The regular skiing season at Assiniboine begins in March.

Mount Engadine Lodge

Mount Engadine Lodge in the Kananaskis was a Rocky Mountain course location after Assiniboine became unavailable. The lodge was easily accessible by road and had a large meeting room. Alberta Provincial Parks had held an in-house course at Mount Engadine for 11 staff members by applying the BCIT/NRCC curriculum in March 1985. A first BCIT-organized Level 1 Ski Operation course took place on 28 January - 3 February 1989 with 24 students and was repeated in the years 1990, 1991, 1992.

Mistaya Lodge

The lodge near Golden was a location for Level 1 Ski Operation Courses in 1989, 1990, 1991 and 1992 under the course leader Phil Hein, who was a co-owner of the lodge. The lodge allowed accommodation for 12 students only, and similar to Assiniboine, challenging ski touring terrain was in short supply.

Creston BC

The Downtowner Motel at Creston offered a comfortable meeting room and economical accommodation to numerous courses. The field work including daily weather and snow observations was carried out at Kootenay Pass, where the avalanche technicians of the Ministry of Transportation had installed four study plots specifically for the courses. Avalanche paths and avalanches were observable from the highway and touring terrain was accessible from the summit of the highway.

Disadvantages of Creston were the long travel distances for students who did not live in the southeast of British Columbia and the 45 minute-long drive from Creston to the Pass

daily travel in their business vehicles, but Ski Operation students complained. The following list shows the large number of courses at Creston.

- 1979-1980: 1 Transportation and Industry Course Level 1
1 Transportation and Industry Course Level 2
- 1980-1981: 2 Transportation and Industry Courses Level 1
1 Transportation and Industry Course Level 2
2 Ski Operation Courses Level 1
- 1981-1982: 2 Transportation and Industry Courses Level 1
2 Ski Operation Courses Level 1
1 Ski Operation Course Level 2
1 Refresher Ski Operation Course Level 2
- 1982-1983 1 Transportation and Industry Course Level 1
- 1983-1984 No courses were held at Creston and no T&I courses took place anywhere else due to insufficient registrations.
- 1984-1985 3 Transportation and Industry Courses Level 1
- 1985-1986 2 Transportation and Industry Courses Level 1
- 1988-1989 1 Transportation and Industry Course Level 1
- 1989-1990 1 Transportation and Industry Course Level 1
1 Ski Operations Course Level
- 1990-1991: 2 Transportation and Industry Courses
2 Ski Operations Courses Level 1
1 Ski Operations Course Level 2

The numerous Transportation and Industry courses are a reflection of the BC Ministry of Transportation's requirement that highway maintenance personnel in avalanche areas must have training in avalanche safety. Creston was the best location for transportation courses after BCIT had declared taboo Rogers Pass in 1980.

The attendance of all advertised BCIT courses dropped in 1982 and 1983 because of financial restrictions of governments and of the ski industry. For example, the single Level 2 course in 1983 was cancelled due to insufficient registrations. The participation at all the courses increased again in the winter 1984-1985

The courses at Creston were discontinued after 1991 because;

- a) The maintenance of the highway was transferred to a contractor who did not maintain the course snow study plots at the summit of Kootenay Pass;
- b) There were few students from the south-east of British Columbia and the travel distance to Creston was long for others;
- c) The ownership of the Downtowner Motel had changed.

Jasper

Willi Pfisterer had organized avalanche courses at Jasper in December 1973 and December 1975 for the training of National Park wardens. Local ski patrollers and guides attended in addition to the wardens. In January 1981 and January 1982, BCIT organized Level 1 Ski Operation Courses at Jasper with fieldwork at Marmot Basin. For January 1983, BCIT had advertised a Level 1 and a Level 2 course at Jasper, but owing to insufficient snow - skiing was possible only on packed hills - the courses were transferred to Lake Louise. The Level 2 course took place with 9 students and three instructors on 9-15 January at Lake Louise. The Level 1 course began on 16 January.

Lake Louise

Lake Louise proved to be a reliable course location and continues to be used every year. The interest in the courses is strong from residents in Banff, Canmore, Calgary, and Golden. Accommodation and meeting rooms varied between the Lake Louise Inn and the Hostel.

Golden

Golden has the advantage of allowing snow observations in the local Purcell Mountains and of different conditions in the nearby Rocky Mountains and Selkirks. The first course at Golden was a Level 2 that began on 14 December 1980. After three days at Golden, the course moved to the Radium Lodge for the study of different snow and terrain at the Panorama Ski area and in the Paradise Basin. (*page 26*).

Blue River

Blue River in the North Thompson Valley has the advantage of receiving deep snow and having an abundance of avalanche terrain, though the training areas must be accessed by helicopter. A unique feature of using a helicopter was that the course participants landed on the top of mountains, then had to find safe routes downhill through unknown terrain. At other course locations, route finding instruction usually takes place first during a climb.

Mike Wiegele advertised and sponsored a BCIT/NRCC Level 1 Ski Operation Course in his lodge at Blue River in December 1990 with the objective of training the local helicopter skiing staff. In addition, ski guides from Banff were invited to attend. The instructors Peter Schaerer, Bruce Jamieson and Bob Sayer (operations manager of Mike Wiegele) and the 13 students enjoyed excellent cooperation and perfect snow conditions. Helicopter flying time was available as much as we wished.

On 23-29 November 1991, a Level 1 Ski Operation Course took place with 24 students and the three instructors of the previous year. Snowfall during the week blessed the course but it restricted flying by helicopter and consequently the fieldwork. In the same week, the Canadian Avalanche Rescue Dog Association was at the facilities of Mike Wiegele for the training of 21 avalanche dogs.

On 28 November– 4 December 1992, another Level 1 Course was at Blue River and was followed on 5-12 December by a Level 2 Course. Scott Flavelle was the course leader and Peter Schaerer and Colin Zacharias instructors. The helicopter time was tighter than in earlier years, and the course had to leave for fieldwork early in the morning before the guests went skiing, and was picked up after the skiing clients had returned.

On 24-30 January 1993, the University College of the Cariboo at Kamloops held a Level 1 Ski Operation Course for 18 students of the Adventure Guide program. The Canadian Avalanche Association Training Schools made available the instructors, course books and equipment. Colin Zacharias was the course leader, Randy Stevens and Peter Schaerer were full instructors and Ian Stewart-Patterson an assistant instructor. Because there was deep snow in Blue River, the demonstration snow profile on the first day was observed in the Mike Wiegele compound. Previous courses in December had to fly to Mount Saint Anne for the snow profile on the first course day. The University College of the Cariboo continued annual avalanche courses at Blue River.

On 28 November – 4 December 1993 the Canadian Avalanche Association organized another Level 1 Ski Operation course at Blue River under the course leader Phil Hein

Banff

For the convenience of students in the Calgary and Banff areas, the BCIT organized Level 1 Ski Operation Courses at Banff with meeting rooms and accommodation in the Banff Centre. Mount Norquay Ski Area, the Sunshine Ski Area, Lake Louise and Bow Summit were the locations of fieldwork. The National Park wardens at Sunshine assisted by instructing and organizing search and rescue practices.

The first course at Banff was on 5-9 December 1977 for 11 Level 2 participants including 8 guides of CMH Heliskiing. When the course visited the Lake Louise Ski Area, Clair

Israelson, who was the local avalanche hazard forecaster, suggested that we ski stabilize a slope in the Ptarmigan area. On looking down from the top, the course participants felt uneasy about the unfamiliar terrain, had a discussion, and finally decided not to venture into the unknown slope. The incident proves that familiarity with the local terrain and snow conditions is an important consideration in avalanche hazard evaluation.

In January 1978, the BCIT organized at Banff a Level 1 Ski Operation Course on two consecutive weekends for students who were unable to attend during the workweek. Lessons were on the Friday nights, lessons and fieldwork on Saturdays and fieldwork on Sundays. The arrangement was not successful, therefore it was not repeated. One reason was that the students needed time to get into the mood again on the second weekend. Another disadvantage was that snow observations and rescue practices in the ski areas were inconvenient on the busy ski weekends. Another 5-day long Level 1 Ski Operation Course was squeezed between the two course weekends on 15-19 January 1978.

The next course at Banff on 15-19 January 1979 was noteworthy because of very cold weather.

Nelson

A Level 1 Ski Operation course was held at the Whitewater ski area on 5-9 December 1977 with the instructors Geoff Freer, Herb Bleuer, Norm Wilson and Tony Salway. I am uncertain about another course in February 1981.

Rossland

John Tweedy, who was the avalanche technician at the Red Mountain Ski Area, suggested courses at Rossland and promised reliable and interesting snow conditions. Consequently, a Level 1 Course was held on 11-15 December 1978. Herb Bleuer was the course leader and the instructors were Paul Anhorn, Chris Sadlier, Tony Salway with the part-time assistance of Don Vokeroff.

In the same winter, on 22-27 January 1979, a Level 2 Ski Operations Course took place with the instructors Herb Bleuer, Norm Wilson, Geoff Freer, Don Vokeroff and John Tweedy.

Unfortunately, the Rossland courses happened to be in a winter with a low snowpack that offered inadequate opportunities for the evaluation of snow stability and for backcountry touring. Furthermore, we realized that the terrain outside the ski area had few avalanche paths and offered little challenging terrain for travel. Consequently, Rossland was abandoned as an avalanche course location.

Meziadin

In order to meet the training needs of road maintenance personnel in northern British Columbia, North Coast Road Maintenance organized two courses in November 1989 (18 participants) and in January 1990 (20 participants) in its maintenance facility at Meziadin Lake. Paul Anhorn and Mike Zylicz instructed.

The Canadian Avalanche Association organized two subsequent courses at Meziadin on 9-13 December 1991 (Instructors Peter Schaerer and Jack Bennetto) and on 13-17 December 1993 (Instructors Peter Schaerer and Christoph Dietzfelbinger). In addition to road maintenance staff, employees of mining companies at Stewart and BC Hydro attended. The courses accommodated 10 to 15 students. The courses could not have been successful without the assistance of the avalanche technicians of the Ministry of Transportation at Stewart, who supplied the study plot equipment and organized scenarios for rescue practices. Their contributions were much appreciated.

Haines Junction

The Yukon College had organized a Level 1 Ski Operation Course on 20-26 February 1990. Scott Flavelle was the course leader assisted by Hector MacKenzie for nine participants.

I may not be aware of other course locations and may have forgotten other courses.

EQUIPMENT

In the first few years, the students received on loan the equipment for snow profile observations. Paul Anhorn had prepared group boxes that contained eight of each: snow thermometers, rulers, magnifiers, crystal screens, and density samplers. Later, the students were required to bring to the course their own snow observation kits except snow density samplers.

Rescue transceivers arrived on the market in 1972. We realized immediately our responsibility of making sure that every student wore a transceiver on ski trips. However, because the skiing public was slow in using them, BCIT bought several transceivers that the students could rent.

The equipment for snow and weather observations and the preparation of study plots for courses were a continuous concern, problem and hassle. The courses needed well-equipped study plots because making standard observations according to the Guidelines for Weather Snow and Avalanche Observations was a learning objective. Furthermore, the large number of students per course required at least two complete sets of instruments. A few operations, for example the Ministry of Transportation at Kootenay Pass and at Stewart and Ptarmigan Tours supplied the equipment. At Whistler Mountain, a course study plot was available permanently with equipment supplied by the course administration and the equipment was stored there during the summer. At other locations, we had to bring and set up the instruments for every course. Moving the Stevenson Screens and the precipitation gages to and from course locations was a particularly troublesome task.

Simulators had been applied for the training of forest fire fighters, and avalanche technicians of the United States Forest Service had modified a simulator for an avalanche accident. The simulator exercise involved a student who sat in the "hot seat" in front of a screen that displayed an avalanche deposit where an accident had occurred. The student, being in the fictitious position of the accident site commander, had to organize the rescue through radio communication. Role players behind the screen who acted as witness, base rescue leader, ski patrollers, police, helicopter pilot etc threw numerous obstacles into the organization and made the exercise exhausting.

The Snow Avalanche Program of the BC Ministry of Transportation under Geoff Freer had bought a simulator, and Dale Gallagher of the US Forest Service trained the Canadian avalanche course instructors with its use. Martin Madelung of the Snow Avalanche Program set up the simulator in the Level 2 avalanche courses and he and the course instructors acted as role players. The simulator was used for the first time in the T&I Course at Rogers Pass on 28 November – 2 December 1977. In the years following, each student of a Level 2 T&I and Ski Operations course attended a simulator exercise.

We discontinued using the simulator exercises in 1986, because at that time, every operation in avalanche areas had a rescue plan that described the actions in case of an accident. The simulator scenery and activity did not fit into the individual operations and rescue plans and had become unrealistic.

QUALIFICATIONS OF INSTRUCTORS

Professional avalanche courses are successful and accepted by industry only if their quality is high. The most important keys to ensure quality are capable instructors, well-defined training objectives, and a curriculum that meets the objectives.

The BCIT/NRCC/CAA courses proved that a successful instructor must know the instructional topics thoroughly and must have applied the knowledge by working in an operation. This allows an instructor to stand in front of students with the confidence gained by practicing. Instructors who had gained their information mainly through books were less effective. An additional important requirement of instructors is to be able to cooperate with other instructors as a team.

Under the administration of the BCIT, it became mandatory for avalanche course instructors to obtain instructional technique training (IT). The IT courses improved remarkably the quality of presentations in meeting rooms and made the instructors confident when teaching a group in the field. The attendees of the IT courses also found that the training assisted their presentations at meetings, for example at the International Snow Science Workshops.

The grant of the British Columbia Government in 1976 allowed BCIT to hold the first formal IT course at Rogers Pass in October 1977, led by Bert Clarke with the assistance of Garry Walton. The course was two weeks long, because the grant money was plentiful, but only six students attended. They were Chris Stethem, John Tweedy, Peter Kimmel, Rod Pendlebury, Steve Thomas, and Peter Schaerer. Later instructional technique courses were held at the BCIT campus in Burnaby and had a duration of five days.

In addition to the compulsory IT courses, the course instructors attended two-day long seminars at Creston on 1-2 December 1984 and on 23-24 November 1987. The objectives of the seminars were to review the course contents, lesson plans and exams, and to ensure that all instructors teach the same technique.

NOTABLE COURSES

December 1979 at Rogers Pass

In December 1979, a Level 2 Course and, overlapping on the last day, a Level 1 Ski Operation Course were held at Rogers Pass. The meeting room and accommodation were in the hotel, which had received an unfavourable impression of avalanche courses by unruly students of the terrain course in April of the same year. The large number of participants in December overwhelmed the small winter staff of the hotel therefore the desperate hotel manager evicted the Level 1 course. In order to complete the course, the

leader Herb Bleuer obtained permission to use the meeting room in the National Park compound and he arranged accommodation for the students in the Alpine Club Hut.

The hotel management and BCIT exchanged condemnatory letters in the weeks following, and BCIT discontinued holding courses at Rogers Pass.

After starting at Rogers Pass, the Level 2 Course made the planned move to the CMH Bugaboo Lodge on the fifth day. The objective was to expose the students to different snow conditions in the second part of the course. All 15 ski and mountain guide participants completed successfully the exam on 14 December.

14-20 December 1980 at Golden

The Level 2 course in December 1980 was the first course at Golden BC. East Kootenay College made available the meeting room. In the afternoon of the first day, snow profiles were observed on the old ski hill east of town, then we spent two days at Rogers Pass for analyzing snow stability and evaluating terrain. Heavy rain fell during the snow profile observations at the Rogers Pass summit, but we could use the meeting room of the National Park for drying and for discussions.

On the fourth day, the course visited the Lake Louise Ski Area, where the park wardens had prepared a scene of an avalanche accident for the search and rescue practice. The search was shorter than was intended, because the students found the buried items quickly by effective spot probing at the most likely burial sites, rendering unnecessary a probe line.

On the fifth day, the course moved to Radium Junction where Canadian Mountain Holidays, who had begun an operation at Panorama, made available helicopter flights to the Paradise Basin. However, the rain early in the week and low temperatures later had formed a thick crust on the snow pack. There was no ski penetration on the hard surface and the snow stability was very good on every slope. This condition made snow observations, stability analysis and safe route finding too easy and not educational. The snow and weather observations of the exam were held at the Panorama Ski Area.

1983 at Lake Louise

In the winter 1982-1983, there was a Level 2 course at Whistler in December and another one at Lake Louise on 9-15 January. Nine students attended the Lake Louise course. The instructors at Lake Louise were Peter Schaerer, Jeff Boyd and Paul Anhorn. Ron Perla as a guest speaker presented a lesson on the start of avalanches. Heavy snowfalls during the week produced instructive observations of the snow stability but made skiing in the backcountry almost impossible. After the end of the snowfall, the course in three groups

assisted the ski patrol with ski stabilization at the Lookout Chutes. I misinterpreted the directions of the patroller, went into a wrong slope and started an avalanche at the top of a slope that would be unacceptably long for ski stabilization. A Size 2.5 avalanche carried me down and became turbulent on the steep and rocky slope, but by fighting hard, I was on the surface when the snow stopped. I lost a ski pole and my pride.

During the same week, a BCIT avalanche control course took place at Lake Louise. The course released spectacular avalanches with avalauncher fire.

December 1983 at Whistler

The Level 2 course at Whistler in December 1983 included an overnight stay in the Himmelsbach cabin at Russet Lake. After arriving at the cabin at 17:15 hours, the course participants were busy with cooking, eating and bedding and again with housekeeping in the morning. There was no time for an instructional meeting in the evening. Moreover, the cabin was too crowded with 18 students and the instructors Peter Schaerer, Chris Stethem, Herb Bleuer, and Jeff Boyd. Chris slept outside because he did not want to disturb others with his snoring. We decided from this experience that overnight trips are inefficient because much time is wasted on survival.

Avalanche search and rescue used to be an instruction topic of the Level 2 courses and students prepared an accident scene as a learning exercise. An amusing episode happened in the course in December 1983, when the probe line was unable to find the buried doll and pack, and the attending avalanche dog was not interested in searching. The cold weather and cold snow might have discouraged the dog and prevented scent from coming to the surface.

At their meeting in 1984, the course leaders decided to discontinue the search and rescue practice of Level 2 Courses in order to spend more time on snow stability and terrain evaluation. Having attended search and rescue practices, however, became a pre-course requirement for participants.

20-27 January 1986 at Louise West

The Level 2 course at Louise West (Wapta Lake west of Lake Louise) in January 1986 had numerous flaws.

A large number of 28 students inundated the course, whereas Level 2 courses usually had a limit of 18. I had checked the qualifications of the 18 early applicants, but 10 more students registered a few days before the course began, and the course administrator Paddy O'Reilly accepted them without my approval. This disrespect and having to find on short notice two additional instructors put me in a bad frame of mind.

The snow and weather study plot was so unprofessional that it was comical. Being exposed to wind and sun., it did not represent the conditions in the area, the instruments were not ready when the course began, and the thermometers were not accurate.

A day was spent at Rogers Pass, where Fred Schleiss explained the avalanche forecasting operation and the current hazard, and the course participants observed snow profiles at Fidelity Mountain. However, the instructors failed to discuss with the students properly the snow observations and to make conclusions about the stability on the slopes that were skied at the end of the day. The confused students then requested a special session on the next day when each instructor explained his approach to evaluating snow stability.

The instructors were Peter Schaerer (leader), Willi Pfisterer, Herb Bleuer, Jeff Boyd and Clair Israelson. Paddy O'Reilly, who was the course administrator of BCIT, was present. He insisted on using his telemark skis, but being unable to ski in deep snow on steep slopes, he had frequent falls and held up the groups. Willi Pfisterer became so disgusted with the course administrator that he disassociated himself from future courses. Three students failed the course because they lacked experience in backcountry travel.

18-24 January 1987 at Mount Assiniboine

The course had 18 students including six from the Mount Currie Indian Reserve. Clair Israelson (leader), Scott Flavelle and Sepp Renner were the instructors.

On the first evening, a spectacular fire, caused by a break of a propane bottle, consumed the cabin of the park warden near the snow study plot. Though the heat from radiation was strong, the fire did not affect the maximum temperature in the nearby Stevenson Screen. On 23 January, a student was caught in a small avalanche that carried him against trees. He broke his pelvis from the impact at a tree, but recovered well at home.

2-8 March 1987 at Whistler

The Federation of Mountain Clubs of British Columbia sent 14 instructors of its recreation avalanche courses to a special Level 1 Ski Operation course at Whistler. Herb Bleuer (leader), John Hetherington and Peter Schaerer were the instructors. The students displayed a low interest in operational snow and weather observations and professional avalanche work. On 3 March, when a snowfall and rain had caused poor snow stability, the course participants accompanied Whistler ski patrollers on avalanche control runs. This would have been an instructive exercise, but most of the students were reluctant to ski stabilize and to throw hand charges.

24 February – 3 March 1991 at Creston

The demand for Level 2 courses became strong in 1990, because a growing number of helicopter and snowcat ski operations needed guides with a Level 2 avalanche course qualification. 25 students attended a Level 2 course at Lake Louise on 6 – 13 January 1991 with the instructors Chris Stethem, Clair Israelson, and Jim Bay. Five students failed the course because they had inadequate field experience.

A second Level 2 course was organized on short notice at Creston for 11 students. Chris Stethem and Peter Schaerer were the full-time instructors and Bruce Jamieson and John Tweedy assisted part-time. It was a pleasant course because all students came well prepared with experience in backcountry travel, the class was small and the snow allowed instructive observations. The field sessions were at Kootenay Pass and on one day at the Whitewater Skiarea.

END OF BCIT INVOLVEMENT

In 1974, the avalanche courses had become a joint venture of the Division of Building Research of the National Research Council of Canada and Industry Services of the British Columbia Institute of Technology. In 1985, the Canadian Avalanche Association joined as a partner and the division of responsibilities became:

National Research Council (NRCC):	Programs of individual courses
British Columbia Institute of Technology (BCIT):	Administration
Canadian Avalanche Association (CAA):	Standards and training objectives

The Department of Education of the Province of British Columbia had subsidized the avalanche courses indirectly through its regular grants to the BCIT. In 1985, however, the BC Government reduced its funding to schools and colleges, consequently the BCIT had to cut programs and personnel. Garry Walton was among the staff members who were laid off, and the administration of the avalanche courses was transferred to Part-time Studies of the BCIT School of Engineering Technology under Paddy O'Reilly.

In 1986, the BCIT seemed to have lost its incentive. A shortage of personnel impeded the course administration, course books and other handouts were incomplete, and course schedules were not available to the students. Paddy O'Reilly did the best he could but he lacked support. Furthermore, insufficient funds forced BCIT to raise the course fees.

The NRCC and CAA staff searched for other organizations that would administer the courses. For example, Continuing Education of the University of British Columbia expressed an interest, but was unable to obtain funding.

At the annual meeting of the avalanche course instructors on 5 May 1987 at Kelowna, Paddy O'Reilly recommended that the CAA should become the leader of the courses and negotiate a reliable administration with BCIT. The instructors appointed an Education Committee with the members Peter Schaerer, John Hetherington and Janice Johnson and assigned them to negotiate with BCIT.

After writing a request to the President of BCIT for improved services, the Committee met with Doug Svetic, the Vice President for Education of BCIT on 27 July 1987. Mr. Svetic explained that the funding from the Government had changed and the School would have to determine whether a loss due to the avalanche courses could be absorbed. Two weeks later, Paddy O'Reilly informed that BCIT would continue administering the avalanche courses, but would accept only a moderate loss. Paddy and I budgeted the courses and agreed to raise the fee of the Level 1 Ski Operation course.

The BCIT contracted Garry Walton with the task of organizing and administering the avalanche courses in 1987-1988. Garry carried out the work from his home at Surrey, and Eric Morse was his contact at BCIT. Garry purchased slide projectors, overhead projectors and movie projectors, which became the property of the Canadian Avalanche Association for a small price at the end of the winter and served in later courses.

The courses were in limbo at the end of the winter 1988. On 2 August 1988, the Assistant Dean of Engineering of BCIT informed the CAA that the BCIT would not continue its involvement with avalanche courses. The reasons were that the school had suffered considerable financial cuts from the Government and was in the process of re-organization.

ADMINISTRATION BY SELKIRK COLLEGE

After the withdrawal of BCIT in August 1988, the Canadian Avalanche Association considered assuming the administration of the courses. In budgeting, Garry Walton and I concluded that the course fees would have to be 40% higher than in the previous winter without the services of a college.

In September, Selkirk College at Castlegar with a campus at Nelson offered to assume the administration of the courses and the CAA agreed. The College hired Tom van Alstine as the course coordinator. Tom was a former avalanche forecaster of the Whitewater Ski Area near Nelson.

Tom van Alstine carried out his task successfully to the financial benefit of Selkirk College, though at higher course fees. All seven advertised courses in 1988-1989 were full and applicants had to be turned away. The Level 2 course was held in January at Lake Louise with 20 participants under the instructors Chris Stethem (leader), Peter Schaerer, and Clair Israelson. An advertised avalanche control course at Whistler, however, was cancelled owing to an insufficient number of registrations.

ADMINISTRATION BY THE CANADIAN AVALANCHE ASSOCIATION

At their meeting on 3 May 1989 at Vernon, the directors of the Canadian Avalanche Association under President Chris Stethem resolved to assume the administration of the courses without the participation of a college. Consequently, the courses became a joint venture of the Canadian Avalanche Association (CAA) and the National Research Council of Canada (NRCC). The NRCC made available office space free of charge at its Avalanche Research Centre in the Federal Building at Revelstoke, but it entered a contract with the CAA for the recovery of direct expenses for example, telephone calls and printing. The CAA hired Holly Landsdowne as the administrator of the courses and Paul Anhorn, who was a technical officer of the NRCC and an avalanche course leader, supervised her. My involvement, in addition to selecting course locations, assigning instructors and drafting schedules, was to budget the courses and to author the brochure.

The course fees allowed the Level 1 Courses to break even with 21 students. Consequently, a course produced a surplus when a maximum of 24 students registered, and lost money with fewer than 21 students. The instructors were reduced from three to two when less than 18 students had registered, but only experienced instructors would be assigned when two of them had to share the workload.

The Canadian Avalanche Association registered the avalanche courses as a private school with the Government of British Columbia. A performance bond was a requirement for registration and Terry Stewart of Speirs Insurance at Vancouver was most helpful with the bond issue. However, the CAA had to show adequate assets in order to obtain the performance bond. The Association had insufficient cash in 1989 but fortunately, it could claim as adequate assets the audio-video equipment that Garry Walton had transferred to the Association in 1988.

Holly did not want to continue her employment after one winter, because she found stressful the course administration, which included receiving numerous inquiries, registrations, cancellations and complaints. Inge Anhorn became her successor in September 1990 under my supervision. Inge was the wife of Paul Anhorn who had died in May 1990. Inge proved to have a good understanding of the needs of the courses and good relationships with the course applicants and suppliers.

In January 1990, the office of the President of the National Research Council announced that it would discontinue its avalanche research, information and education at the end of March 1991. As a farewell present, the NRCC did not charge the CAA for the office expenses in 1990-1991. Because of a large number of students, no office expenses, and no charges for my time and travel, the courses produced a profit of \$ 34,000 in 1991.

When the National Research Council ended its involvement in 1991, Chris Stethem created the Canadian Avalanche Centre of the Canadian Avalanche Association. The tasks of the Centre were to administer the avalanche courses, to operate an information exchange among industries, to issue information about avalanche hazards, and to serve the members of the Association. The CAA employed Alan Dennis as the manager of the Avalanche Centre and Inge Anhorn as the office assistant. The Centre acquired the office, telephone number, and post office box of the National Research Council. The office moved a year later when Parks Canada needed the space in the building.

COURSE FEES

Like all cost, the course fees increased over the years. Part of the growth reflects the decrease of free services of instructors who used to be paid by their employers and a part is the result of a reduction of funding by government to BCIT. The following list shows the fees that the students had to pay.

1971-1973	Free
1973-1974	\$ 50 for the course at Whistler only Courses at Rogers Pass and Jasper were free
1974-1975	\$ 50 for the refresher course at Whistler \$ 40 for other courses
1976-1977	\$ 70 for all courses
1977-1978	\$ 75 for all courses
1979-1980	\$ 95 for Transportation and Industry, Level 1 and Level 2 \$ 200 for Ski Operations, Level 1 and Level 2
1980-1981	\$ 130 for Transportation and Industry, Level 1 and Level 2 \$ 250 for Ski Operations, Level 1 and Level 2
1981-1982	\$ 250 for Transportation and Industry, Level 1 and Level 2 \$ 350 for Ski Operations Level 1 \$ 400 for Ski Operations Level 2
1982-1983	\$ 250 for Transportation and Industry, Level 1 and Level 2 \$ 350 for Ski Operations Level 1 \$ 400 for Ski Operations Level 2
1983-1984	\$ 250 for Transportation and Industry, Level 1 \$ 400 for Ski Operations Level 1 \$ 465 for Ski Operations Level 2
1986-1987	\$ 275 for Transportation and Industry \$ 425 for Ski Operations Level 1 \$ 475 for Ski Operations Level 2

1987-1988	\$ 275 for Transportation and Industry \$ 475 for Ski Operations Level 1 \$ 475 for Ski Operations Level 2
1988-1989	Administered by Selkirk College \$ 440 for Transportation and Industry \$ 625 for Ski Operations Level 1 \$ 875 for Ski Operations Level 2
1991-1992	Administered by Canadian Avalanche Centre \$ 550 for Transportation and Industry \$ 650 for Ski Operations Level 1 \$ 875 for Ski Operations Level 2

EDUCATION COMMITTEES

The Canadian Avalanche Association has appointed several education committees for specific tasks. In 1982, a committee developed guidelines for teaching avalanche safety to backcountry users. The guidelines were predecessors of the RAC course curriculum. The committee members represented the Canadian Avalanche Association, Canadian Ski Patrol System, Alpine Club of Canada, Alberta Mountain Council and BCIT. The Committee disbanded after it had produced and recommended for application the guidelines.

At their annual meeting on 5 May 1987, the avalanche course instructors appointed a committee with the task of negotiating with the British Columbia Institute of Technology the continuation and the improvement of the administration of the avalanche courses. John Hetherington, Janice Johnson and Peter Schaerer were the committee members.

In 1988, the same education committee began to hold annual meetings with the weather office at Vancouver for discussions about the content of a mountain weather forecast. Peter Xhignesse, who was the avalanche control technician of the Blackcomb Ski Area, joined as a committee member, but he was unable to participate long because he died from cancer in October 1988. Chris Stethem replaced Peter.

In 1989-1990, the Committee members Janice Johnson, Chris Stethem and Peter Schaerer determined the qualifications for avalanche course leaders, full instructors and assistant instructors. The instructors accepted the list of qualifications at their annual end-of-the-winter meeting on 2 Mar 1990.

An education committee was not active for several years after 1990, because there seemed to be no need, and the course leaders made decisions concerning avalanche education at their annual spring meetings.

AVALANCHE TERRAIN COURSES

Terrain courses have attracted a different group of users than the winter operation courses. A need for educating engineering personnel and land development officers arose when the mining industry, BC Hydro and the BC Ministry of Transportation realized that avalanche problems must be recognized and dealt with in the planning stage of facilities. In meeting the need, I organized *Avalanche Terrain Courses* for persons who required the ability to recognize and to evaluate avalanche paths in the summer.

The first course was on 6-7 April 1977 at Rogers Pass for BC Hydro location staff on the request of David Armstrong who was a senior transmission line engineer. The Mica Dam generating station was under construction in that year and the connecting high-voltage transmission line crossed avalanche terrain. Unfortunately, the avalanche terrain course did not prevent the location in an avalanche path of a tower of the transmission line. An avalanche destroyed the tower on 13 February 1979.

In 1978, BCIT began to organize *Avalanche Terrain Courses* of five days duration. The courses took place in April when the students could observe avalanches that had occurred near highways in the winter. The topics of instruction were:

- Formation, movement and types of avalanches
- Recognizing avalanche paths by studying the nature of the terrain
- Recognizing evidence of avalanche activity in forests
- Recognizing other clues
- Introduction to air photo interpretation
- Recognizing avalanche paths from air photos
- Observing and recording of avalanche occurrences

The participants required no pre-course knowledge, consequently their background knowledge varied widely. The course attendees included engineers and geoscientists, who were familiar with the study of air photos and wanted information about the proper location of facilities and of avalanche control methods. Other students required basic instruction on air photo interpretation. One course accommodated power line engineers who had emigrated recently from Hong Kong therefore were unfamiliar with mountain terrain and snow.

The first BCIT Avalanche Terrain Course was at Rogers Pass in 1978 with the instructors Blair Fitzharris, Geoff Freer and Peter Schaerer. Blair Fitzharris, who was a lecturer at the University of Otago in New Zealand, was on sabbatical leave with the National Research Council of Canada. He gave an excellent lesson on the use of air photos, which Geoff and I repeated in later courses.

The next course in April 1979 was again in the hotel at Rogers Pass with Chris Stethem as an assistant instructor. Several participants played pranks in the evenings, for example they wheeled the juke box through the halls of the hotel, to the displeasure of the hotel staff.

Three more courses were held in 1980-1982 in the Sandman Inn and in the Community Centre at Revelstoke. The participants carried out observations of avalanche paths at Rogers Pass and at the Trans Canada Highway west of Revelstoke. The avalanche path at the Clanwilliam Sawmill site was the object of the exam.

No terrain courses took place in 1983 and 1984 because the market had reached saturation and few developments took place in the mountains. For example, BC Hydro, having completed a network of high-voltage transmission lines, had reduced its location staff. BCIT advertised another course in March 1985, but cancelled it when only five students had registered.

The interest resumed when the Forest Service of British Columbia required the identification of potential avalanche terrain with forest harvest plans. Selkirk College, through the Forest Continuing Study Program, responded by organizing a course under the designation *Introduction to Snow Avalanche Mapping* at its campus in Castlegar in 1998. Peter Schaerer, Gordon Bonwick, Marc Deschenes and Doug Kelly were the instructors of 18 students. The course was repeated in 2000 at Nelson, because Nelson offered shorter access to the study sites. Because only 11 students registered for the course in 2000, the instructors were reduced to Peter Schaerer and March Deschenes.

The courses in 1998 and 2000 included highway avalanche technicians, provincial park employees, mountain guides, foresters, and graduate university students. In contrast to the earlier terrain courses, the registrants were required to be knowledgeable of avalanches and safety measures. The mapping courses took place in the fall when the ground was bare of snow, avalanche paths allowed the examination and survey on foot and evidence of past avalanches was visible from damaged vegetation.

In 2001, the Canadian Avalanche Association obtained funding from the Government of Canada for writing guidelines for land use managers and guidelines for risk evaluation in avalanche areas. The project included the development of a curriculum for a course in advanced avalanche hazard mapping. The Canadian Avalanche Association organized an experimental Beta-course in June 2001 and a full course in June 2002 at Revelstoke

RECREATIONAL AVALANCHE COURSES

Backcountry travelers and ski guides had urged the BCIT to organize short courses for them because they believed that the BCIT/NRCC industry courses did not meet their needs. In response, the BCIT organized a need analysis in 1977. Mal Sharpe of BCIT was the moderator at a meeting with Herb Bleuer, Geoff Freer, Don MacLaurin and Peter Schaerer who defined the training objectives and listed the topics of an avalanche course for backcountry recreation.

Following the need analysis, Garry Walton organized a seminar at Vancouver for interested instructors who included instructors of the industry courses and other experienced backcountry skiers. In the winter of 1977-1978, the BCIT held eight courses under the designation *Avalanche Information for Winter Recreation*. The BCIT courses were not a success, mainly because the fee was high. Other organizations, for example the British Columbia Association of Mountaineering Clubs, however, picked up the idea and organized courses later under their own banner.

Backcountry users and guides urged the Canadian Avalanche Association to develop objectives and contents of recreation avalanche courses after the CAA had formed in 1981. Subsequently, the CAA organized a seminar at Lake Louise on 13-14 November 1982 for the development of an introductory course. The result of the seminar was an *Introductory Avalanche Awareness Course Outline (May 1983)* that was recommended for use by persons teaching avalanche awareness courses.

The need for an outline of an advanced course followed quickly. It was developed at a meeting that was organized by the CAA and the Alberta Mountain Council on 4-5 May 1984 at Revelstoke.

CONCLUDING REMARKS

These memoirs describe operational avalanche courses before 1992 and terrain courses in later years. Numerous changes have occurred since I became disengaged from the courses. For example the curriculum of the Level 2 course has changed entirely and courses for sledgers and for avalanche control were added.

The courses have a high standard that is recognized internationally. The continuing high standard is the result of the dedication of the course leaders and instructors who reviewed and improved the course contents annually. I wish to encourage that the high quality and reputation of the courses be maintained.