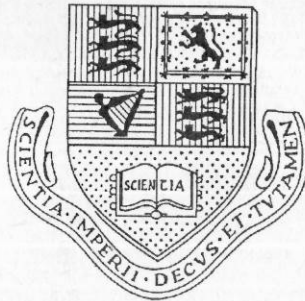


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CAVING CLUB

CANADA EXPEDITION 1986

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INTRODUCTION

Imperial College Caving Club mounted an expedition to Western Canada from late June to early September 1986.

Once in the field, the 8 members were joined by a varying number of Canadians, and, during the 9 weeks of the expedition, the joint team visited 9 areas. After 6 members returned to the UK, 2 members stayed in Canada for a further 2 weeks, and visited 2 more areas. In all, 8 caves of note were found, and 3 others significantly extended. The future potential of at least 4 of the areas is good.

GENERAL EXPEDITION LOG

On the 24th June 1986, the 8 members left Britain for Canada. Arriving in Calgary some 18 hours later the same day, we met Chas Yonge, who installed us in a cheap motel for the night. The following day was used to sort out transport, maps, and provisions.

At the University of Calgary, we met Jon Rollins, an expatriate caver, and by the evening we were camped off the Icefields Parkway, ready for our first objective.

The first trip, into the Brazeau River valley, served as a fairly easy initiation into Rockies backpacking, and helped sort out our ideas on food and insects, as well as giving us 200m of mainly new cave.

We returned to Calgary on the 2nd of July and, after a brief reprovisioning stop, moved on to the Crowsnest Pass area down by the border. We went to Crowsnest, one of the earliest and most important Canadian caving areas, to meet members of the Alberta Speleological Society at their annual Andy Good Plateau meet. Despite heavy snow cover, some significant exploration was done, and we made many contacts, including Steve Worthington, and especially Ian MacKenzie, whose hospitality we stretched to, if not beyond, the limit on many occasions.

We then returned to Calgary for 2 days of research at the excellent facilities of the U of C. We then moved to Jasper with Chas, Jon, and Dave Thompson. The following morning we started the 2 day walk-in to Alnus Creek. This area had been originally recced by Dave, and had been identified as one of the expedition's main objectives before leaving London. The most significant find of our time spent in this majestic location was Mad Dog Cave, one of a series of 8 sinks along a high limestone bench.

After exhausting our leads and food supplies, we returned to Jasper on the 19th for a well earned rest.

Due to the unusually bad snow conditions, we were unsure of what we would face on the trip to our next objective, Mt. Sir Alexander. Ian was able to introduce us to a pilot who kindly flew two members over this area, as well as many others of interest. It was confirmed that the Mt. Sir Alexander area was thickly covered with snow.

To save time, it was decided to split into two groups to have a quick look at two areas recommended by the ASS. One group went to scout a col near Arctomys Cave, whilst the others went to Monkman Pass. Both groups came back empty handed.

Regrouping in Jasper on the 25th, we picked up Chas and went to the Fang Cave area, the third objective of the expedition. As well as spending some time in Fang Cave itself, we followed the limestone along a series of ridges to a snowed out area which is a good lead for a warmer year.

Although we had not had any massive discoveries, we had accumulated a reasonable amount of passage, and had many more leads to follow. Splitting again into two groups, we looked at two of ACRMSE's areas; Goat Valley, and the Far Karst at Small River. our trips revealed several new discoveries, including a predominantly vertical, if short, cave in the former area, and the pushing of a 'terminal' choke at the latter. After a quick reallocation of resources we returned to both areas, and pushed our leads to yield 750m of passage in 5 days.

It was now 12th August, and with 2 weeks to go, we decided to go to the Queen Charlotte Islands to follow up the preliminary work done by Ian Mackenzie and Ron Lacelle in 1984. These scenic islands provided an excellent relaxing end to the expedition, and the 100m of passage we found there was appreciated almost as much as the sunny beaches and bountiful salmon fishing.

We returned to Calgary via Jasper, and then 6 of us returned as planned, leaving 2 members to spend a further 2 weeks in the Dezaiko and Boccock Peak areas.

CANADA'S LONGEST AND DEEPEST

The longest and deepest caves in Canada as of October 1986. Compiled by Ian McKenzie.

	<u>Longest</u>
1. Castleguard Cave	18646m
2. Yorkshire Pot	8643m
3. Gargantua	5940m
4. Nakimu Caves	5790m
5. Thanksgiving Cave	5461m
6. Arch Cave	3770m
7. Arctomys Cave	3496m
8. Windy Link Pot	3310m
9. Fang Cave	2845m
10. Cadomin Cave	2791m

	<u>Deepest</u>
1. Arctomys Cave	536m (-523, +13)
2. Castleguard Cave	387m (-12, +375)
3. Yorkshire Pot	384m
4. Thanksgiving Cave	356m
5. Glory 'Ole	313m
6. Arch Cave	302m
7. Q5	301m
8. Close to the Edge	294m
9. Gargantua	286m
10. Nakimu Caves	270m

EXPEDITION MEMBERS

UK members:

Chris Birkhead
Tim Flack
Dewi Lloyd
Harry Lock
Neill Pattinson
Simon Seward
Mark Turnbull
Dave Wilson

Canadian members most closely involved:

Ian Mackenzie	(Jasper)
Jon Rollins	(Calgary)
Dave Thompson	(Banff)
Chas Yonge	(Calgary)

Associated Canadians:

Tom Barton	(Calgary/US)
Bill Macdonald	(Calgary)
Tich Morris	(Vancouver)
Duncan Morris	(Vancouver)
Pete Norris	(Vancouver)
Randy Spahl	(Calgary)
Steve Worthington	(Crowsnest)

THE FLIGHT

As the flight to Calgary was the single largest expense of the trip, we spent some time trying to locate a good deal. The cheapest by far was £365 each, from a small shop in Earl's Court. Once the deposit had been paid, however, the proprietor showed little concern in actually obtaining the tickets until a couple of days before we were due to leave, by which time his 'bargain' price had increased by £20 each. This was still a pretty good deal compared to most other places, so we were not too bothered. The flight was not particularly direct, as it was by Continental Airlines, via Houston. The helpful travel agent told us this was no real problem, as visas were not required for passengers in transit to non-American destinations.

On arrival at Gatwick, the 'slightly' heavy rucksacks were checked in, we were again assured that lack of visas was no problem, and we boarded the flight. This proved excellent preparation for the weeks to come, as even the food at Alnus Creek ("A whole Mars bar each for lunch today, lads, and lets see if we can't reboil those teabags one more time") was a feast by comparison with the meagre fare on this flight. The smarmy Flight Service Manager oozed around the plane like an unpleasant smell, and his coven of not-quite Caledonian girls seemed to get their only pleasure from disturbing you when you tried to sleep, ignoring you when you were awake, and dishing out soft drink portions so small it's a wonder they didn't evaporate before reaching your mouth. Never mind, we thought, it can't get any worse.

We finally arrived at Houston. Immigration there seemed horrified at our lack of visas, eyeing us as if we were a band of commie revolutionaries just slipped across the border. Our assurances that our sole desire was to leave their wonderful country as soon as possible were to no avail, as we were obviously a group of madmen bent on undermining the American Way, etc. Our passports were taken and a courier was sent for *immediately*, to escort us to our flight, though how one courier could hope to control a crazed band like us, we could only wonder. Given said courier was an employee of the great Continental Airlines, it was no real surprise that 45 minutes later found us still in Immigration, sans courier, and cracking the then topical Space Shuttle jokes, etc., partly to pass the time, but mainly to irritate the natives.

Eventually, we were told to go "straight down that corridor, and keep on going till you get to your departure gate". This we did, marching neatly

over a 'Do not cross this line' line on the floor, much to the surprise, not to say chagrin of the obese security guard who was guarding it (obviously a really important job). Gun in hand, he ordered us to "Hold it right there boys, back up against that wall."

We were then kept against the wall for a further few minutes until someone managed to convince the retarded oaf of our non-psychopathic status. We were beginning to dislike Houston.

In the couple of minutes left before the delayed (by us / Immigration) flight departed, we witnessed one of the world famed Continental baggage handlers hurling our rucksacs as hard as possible across the cargo hold of our 727.

The rest of the flight was better, the stewardesses being quite a step up from the transatlantic crew, and the food was in slightly larger portions. We finally arrived in Calgary to be informed that yet another microcephalic Continental employee (where do they get them from) had 'mislaidd' six of our passports, and that they were almost certainly in Houston. The airport staff here were much more helpful than the Houston crew, and after a long 2 hour wait, during which it appeared the airport was closing for the night, and all were leaving except us, the Immigration officer was about to let us go without our passports when they were finally found, in the locker next to the one where the others had been.

It turned out that Chas Yonge, who we had erroneously told to expect us the following night, was in the airport by chance, dropping off a relative, and had, again by chance, been recognised by Chris, who had never met him. He had also hired our van for us a day early, and was so able to provide transport to our motel for the evening. Our first bit of good luck had occurred.

For our return journey, we managed to get the lack of visas sorted out at the Calgary end, much more amicably, and also took the precaution of taking plenty of food to eat, which is apparently against the rules, as well as a sizeable quantity of Duty Free to drink on the journey which is definitely against the rules. This was done on the grounds that there was little that could be done to us once airborne, and they couldn't deport us on landing, since we were on our way home anyway. This journey was somewhat more pleasant.

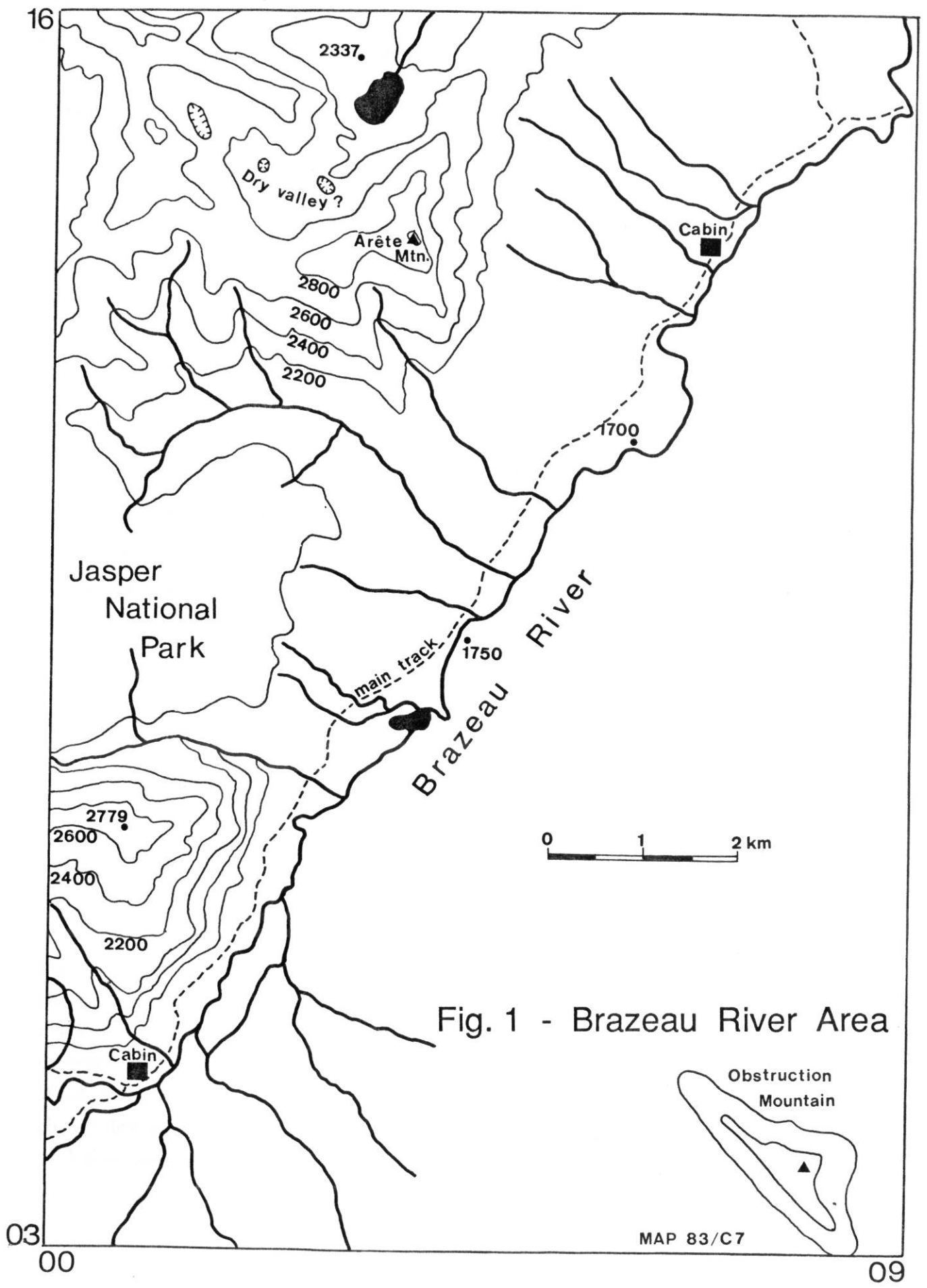


Fig. 1 - Brazeau River Area

BRAZEAU RIVER

Maps : **1:50,000**
83 C/3 **Columbia Icefields**
83 C/7 **Job Creek**

Being just inside the boundary of the Jasper National Park, there are maintained trails into the area via Nigel Pass or Poboktan Pass. The total walk-in is 33km, which takes 9 hours with heavy packs. The Nigel Pass trail leaves the Icefields Parkway 8km south of Sunwapta Pass, the Banff-Jasper. It begins with a 1.5km walk along an abandoned section of the old highway, and then, after crossing Nigel Creek, a gradual ascent along the east bank of the creek gains the pass at 2202m, marked by a cairn. Beyond Nigel Pass, the scenery changes to an area of barren mountains of limestone and shale. In late June, the area was virtually snow-free. The trail then descends abruptly to the gravel flats of the Brazeau headwaters, and is followed NE to the confluence 3km east of the 5km long Brazeau Lake, where the rivers combine at 1700m to flow NE in a broad channel. Wherever the trail crosses the river, there are well-constructed wooden bridges. Near the confluence is a locked warden's cabin (009048), and here the campsite was first established (008046), before moving 2km downstream (018058) to the springs below Brazeau Cave. The trail continues downstream on the west bank, while on the east bank, the map shows a seismic line that could provide access.

To the west of the river, the main peaks, barren and treeless, are Mt. Aztec, Mt. Olympus, and Arete Mountain, while to the east are Obstruction Mountain (2800m), and Longview Mountain (2700m). The limestone mountain immediately above Brazeau Cave has tiers of cliffs separated by terraces and scree slopes. Attempts to traverse high on the flanks of the mountain in search of further cave entrances were stopped by the impenetrability of its east and north sides. The area lower down towards the river is forested. On the map there appear to be two closed depressions NW of Arete Mountain, and, further east, in the White Goat Wilderness, around Job Lake, is a promising karst area with a number of closed depressions, that was nearly visited by the ACRMSE team in 1983, and has been confirmed as being of interest by park wardens who have been there.

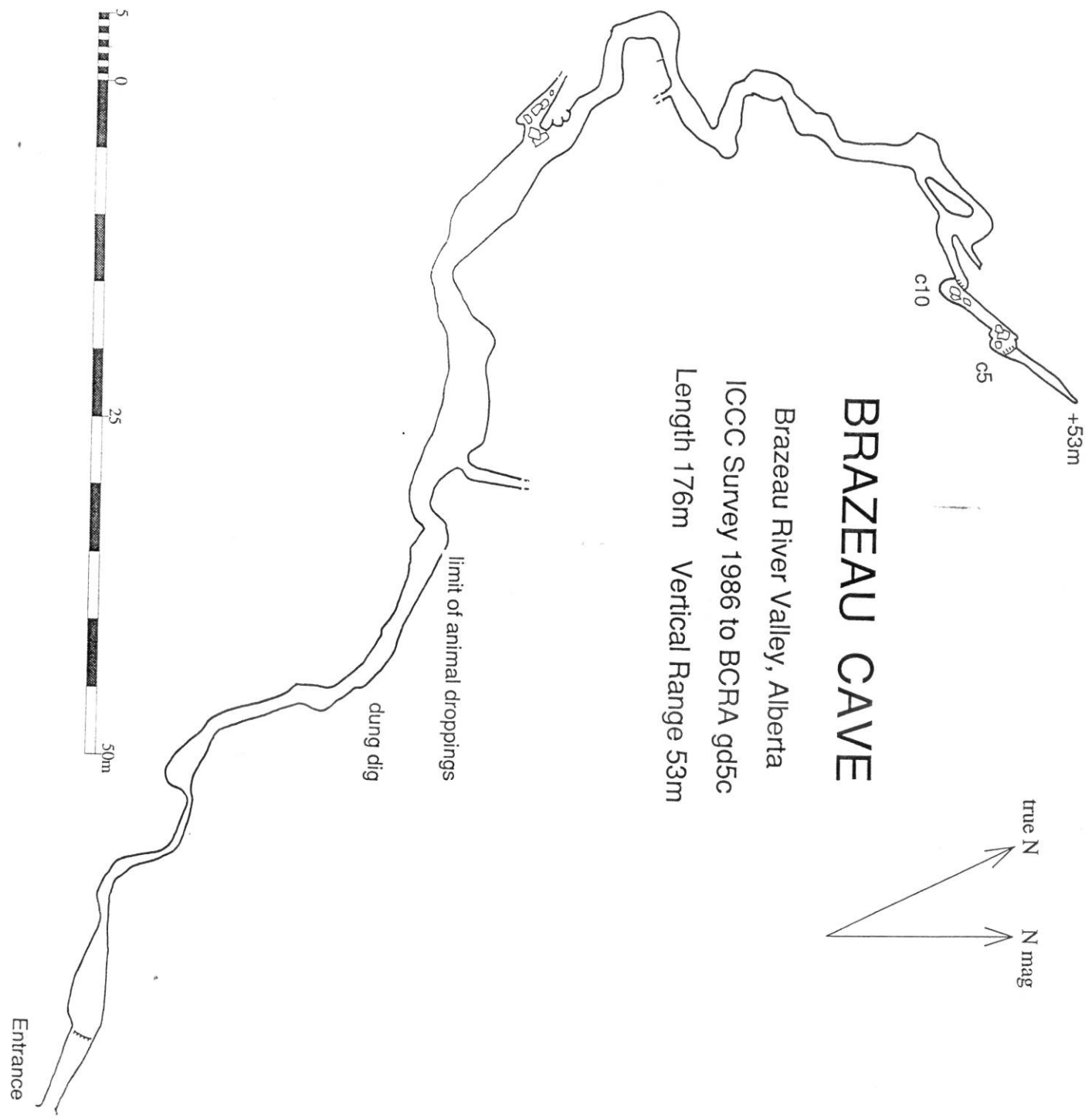


Fig. 2

BRAZEAU LOG

During our first day in Calgary, we stocked up on food and suchlike, sorted out licences and insurance for the van, met Jon Rollins, the lanky speedwalker who was to be our guide for the first trip, and headed off west to the Icefields Parkway to camp at Wilcox Creek, about an hours drive from the Nigel Pass stopping area.

Day 1

The next morning, we experienced our first, and last real problem with the van, when it refused to start. Jon soon fixed this after a bit of manipulation of the massive engine, and we were on our way.

After leaving the van, the walk itself proved to be very scenic, a nice gentle incline up to Nigel Pass, followed by a somewhat steeper decline, and a quick river crossing via a snow bridge to join the main trail towards Brazeau Lake. This part, though horizontal, proved to be quite a slog, and we were glad to reach our first camp.

Our estimates of how much food to take into the field had proved to be a little below the mark, especially as far as teabags, coffee, milk powder, etc. were concerned, it took us a few more trips before we got things really sorted out.

Day 2

Dave stayed in camp due to blisters from the day before, whilst the others went scouting for caves, and an advance campsite. Once all were back at camp, we decided to move to a site nearer the main object, Brazeau Cave. We struck camp and moved that evening, camping about 10 minutes from Brazeau cave.

Day 3

Dave, Dewi went scouting to the NE of Arete Mountain, following up a few distant visual leads from the day before, but after slogging up the scree gulleys, these all turned out to be frost pockets or shadows.

Work was started in Brazeau Cave to dig through the choke of animal droppings in the entrance crawl, eventually a flat-out crawl was cleared through them, and a survey made of the cave to a point where climbing skills were required to continue further.

Time being short on this trip, it was decided over dinner that Dewi and Dave would go for a midnight trip to push the climb, although Dewi, being

a NWCC member, found this quite normal. Dewi duly pushed up two short pitches to where the way on ceased.

Tim suffered the expedition's one and only case of real illness, either due to foreign food bacteria, or the inhalation of large quantities of the choking dust from the animal droppings. After treatment with Stemetil, he stabilised, and was recovered, if a little weak the next day

Day 4

The survey of Brazeau cave was completed in the morning, and we started the walk-out about noon. It was quite a leisurely trip, due to Tim's condition, and we stopped for the night about half-way to the road

Day 5

A quick hack was made back to the van, then down to Canmore for a bit of R&R with the 'authentic English Pub' serving a less than mediocre pint of John Smiths for £2. We decided we had better get used to local beer.

We later discovered that Brazeau Cave had been found in 1974, and explored to the point where the dried droppings, through which we had dug, had blocked further progress.

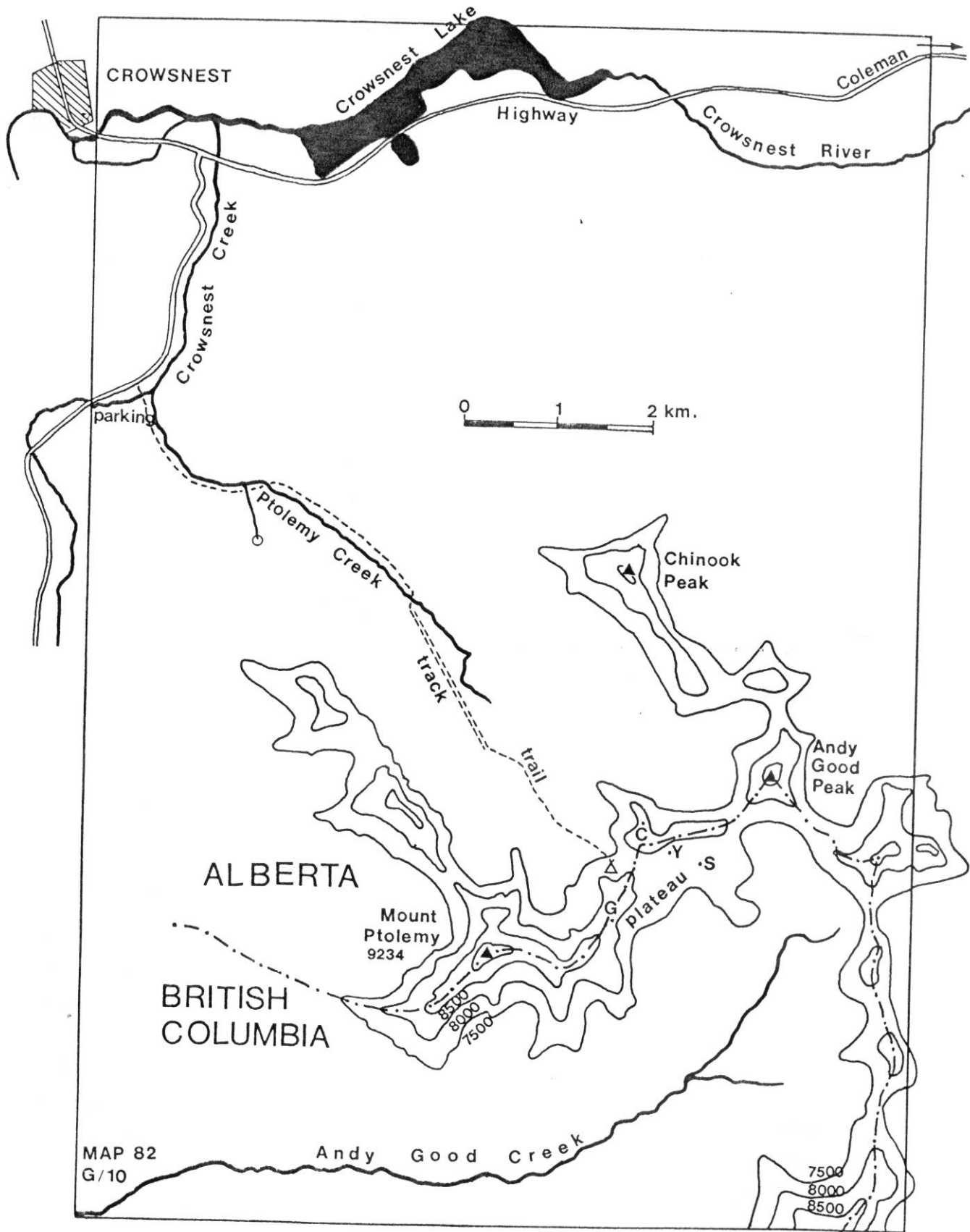


Fig. 3 - Crowsnest Area

CROWSNEST PASS

Maps : 1:50,000
82 G/10 Crowsnest

This area, in the Flathead Range, is reached by driving west from Coleman on Highway 3, and then up a gravel road to Crowsnest Creek. The vehicle must be left fairly soon, and a walk along a poor road, only drivable in a good 4x4, through the forest crosses the fast flowing Ptolemy Creek at 7 fords, before the snowy col comes into view in the distance. After the fords a straight section leads to the roadhead, and the final part of the walk-in is very steeply uphill on a rough path to a campsite just above the treeline, immediately below Mt.Ptolemy (2813m).

The caves are all situated above, on the Andy Good Plateau, an extensive area of Alpine karst, surrounded by jagged peaks, and with abundant shakeholes. The plateau is reached by climbing up to and beyond the col at 2430m (730919) situated just on the Alberta/British Columbia border. Initially developed by MacMaster University cavers in the 1960's, this is now a well established Canadian caving area, the main systems being Yorkshire, Derbyshire, and Mendip Pots, Shorty's Cave, Cleft Cave, Back Door Cave, and Gargantua. Despite the ease of access, and frequency of tourist visits (eg. by British Army cavers), the area still has very great potential, with over 100 leads in Yorkshire Pot alone.

CROWSNEST LOG

We drove south from Calgary on the Foothills Highway (Kananaskis county) via Macleod, and called in on Steve Worthington and Jane Mulkewich, who briefed us on the Crowsnest Pass meet. We then drove to a campground, packed our gear, and slept in preparation for the walk-in.

Day 1

We parked at the end of the road and set off up the track. Some of the fords could be avoided by the use of treacherous log bridges, but the widest, waist deep one could not. We hacked up to the campsite, pitched out tents, and waited for the main Canadian contingent to arrive.

Day 2

We set off up to the plateau, and Chas located the entrance of Yorkshire Pot, marked by a cairn and shovel. Two hours later, after Simon, Mark, Dave and Harry had dug down through the snow for 4 metres, the rock of the entrance climb was finally located. They pushed down towards a new series of pitches, but ended up descending a series of very loose scree/pitches, after missing the traverse across Scree Pitch. Meanwhile, Chris, Tim, Dewi, Neill, Chas and Bill McDonald had dug out Shorty's Cave. They started surveying from the pendulum pitch, and rigged some new pitches, turning back at the top of a small drop, due to general cold in the party.

Day 3

Dave, Neill, Tim and Harry walked down for a day off and a few beers, returning the following day, minus Dave who had to nip off to Cranbrook, about 4 hours drive away, to get the van's wipers fixed. Simon, Randy Spahl and Ian McKenzie made a trip to the undescended Crowbar Pitch in Yorkshire Pot, so called because of a metallic ringing sound heard when rocks were dropped down the pitch upon its discovery, causing the finders to believe there was known passage at the bottom. This pitch was descended to a floor at 25m, from where a small rift led off. Further progress was halted at an awkward climb down. No crowbar was found, causing some puzzlement to the party until, on exiting, Simon struck a small flake, making the crowbar-like sound.

Chas and Steve Worthington rigged the final drop in Shorty's and found themselves at the end of the "F" survey in Yorkshire Pot; the elusive connection had been made at last. They exited from Yorkshire Pot, the first through-trip.

Day 4

Dewi, Chas and Steve visited the "P" survey in Yorkshire Pot after a 12yr absence, and found 200m of varied passage.

Day 5

Shorty's cave was detackled from Yorkshire Pot by the rest of the Imperial team. We walked out the next day and returned to Calgary.

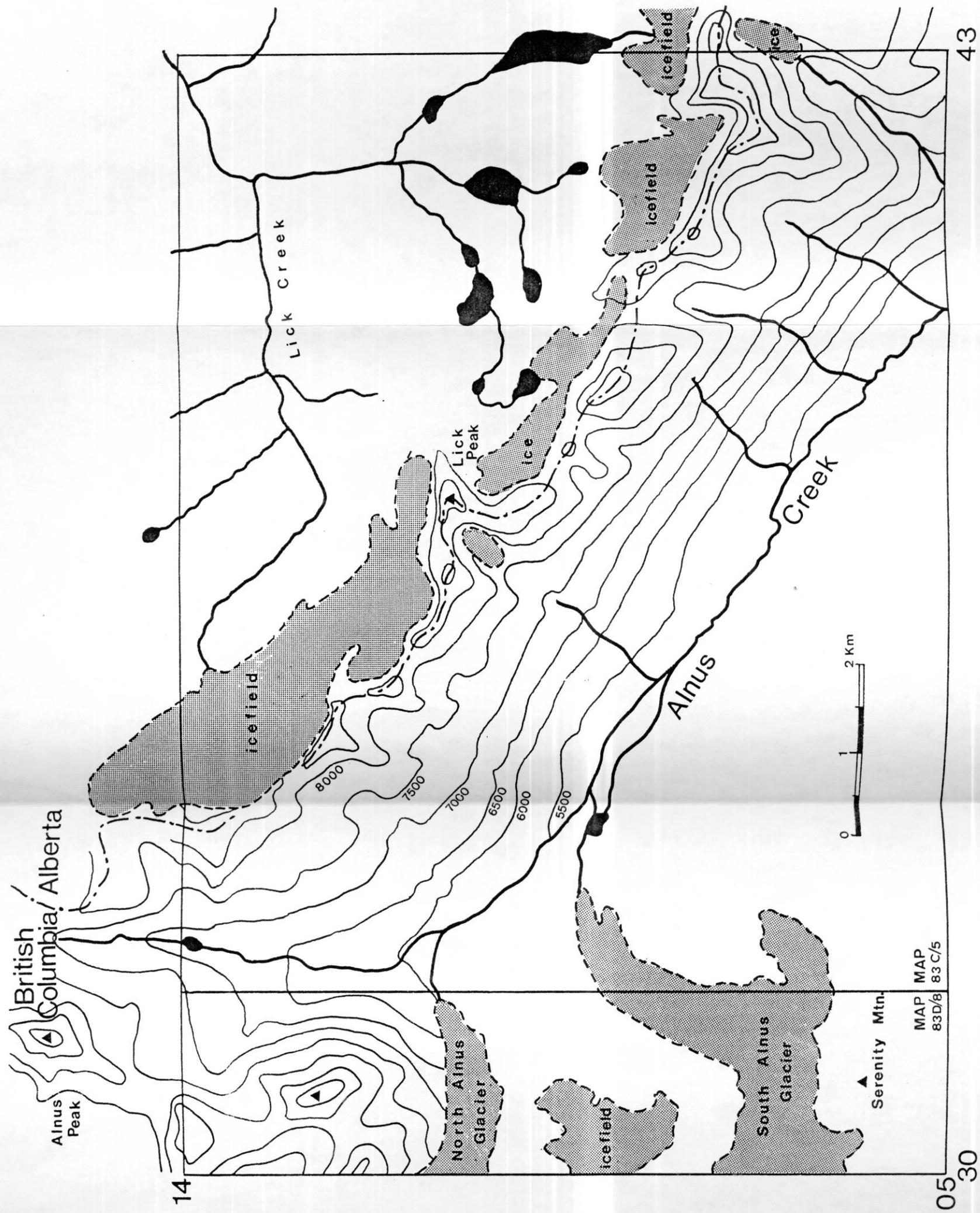


Fig. 4 - Alnus Creek Area

ALNUS CREEK

Maps : **1:50,000**
84 C/5 **Fortress Lake**
83 C/12 **Athabasca Falls**
83 D/8 **Athabasca Pass**

This area lies in the Hamber Provincial Park of British Columbia, just outside of the Jasper National Park. It had perhaps not been visited since the turn of the century, and is chiefly populated by grizzly bears, several of which were encountered. Alnus Creek joins Wood River and flows east into Fortress Lake, which is 10km long, and lies at 1336m asl., which in turn feeds eastward into the Athabasca River. There is a small fishing camp at the eastern end of the lake.

Dave Thompson, a caver based in Banff, had visited the area originally, and noted the potential. He had returned with others during the winter to take a closer look, but due to time and weather problems, there was still much to do here.

The route in followed was to drive from Highway 93B (the Athabasca Falls loop road) as far SW as Moab Lake, where large boulders purposely block the last 10km of the road, which forms the first part of a 40km walk-in. After the fire road ends, at a warden's cabin, a good horse trail leads SW along the N bank of the Whirlpool River. First Simon Creek, and then the Middle Whirlpool River are crossed, beyond which is a cabin and designated campsite. From this campsite, the main Whirlpool River is crossed with care, using the shallows and gravel flats that exist in this area between the braided channels. Once over, a steep forested valley opposite provides a strenuous bushwhack, before emerging from the forest onto an extensive scree field. A large unmarked lake is traversed on its SW side, and then a steep ascent, initially on scree and then on snow gains a snowy col at 2470m (310144) between the avalanche prone upper slopes of Alnus Peak (2976m), and Mt. Ross Cox (2999m). On the return, the lower col between Alnus Peak and Divergence Peak (2800m) was used instead, but this proved more strenuous due to a much longer journey in thigh-deep snow. Once over the col, a descent is made to the high Alpine meadows above, and to the north of Alnus Creek, directly opposite the Alnus Glaciers flowing off the Hooker Icefield. An alternative route, followed on the way out by 2 members, is from the Highway via Fryatt

Creek, and over Lick Peak (2877m) to the ridge immediately above the corries and meadows.

The area, at roughly 2000m, is one of spectacular and beautiful mountain scenery, with extensive views which include the Columbia Icefields to the south. Above the trees, the meadows run the length of the valley. The feature of interest is above, where the boundary between steeply dipping limestone and underlying shale/quartzite units is revealed in a series of corries, at 2300m, above the meadows, some of which still contain small ice accumulations.

Below the treeline, towards the base of the valley, the bushwhacking can become horrendous, as Dave Thompson had discovered on his first attempt to reach the area from Fortress Lake.

ALNUS CREEK LOG

On this reconnaissance we were joined by Chas Yonge, Jon Rollins, and, with his detailed knowledge of the area, Dave Thompson, all of whom had visited the area on skis in the previous winter's epic preliminary trip.

Day 1

A day's walk, making good progress (about 22km) on the track to a camp at Middle Forks, the latter part of the trail being extremely wet, due to unusually high water levels.

Day 2

The first task was a memorable crossing of the main Whirlpool River, this being chest deep, swift, and extremely cold. The walk up to the col started as a bushwhack up through trees, and after 400m we emerged on an extensive scree field above the treeline. Continuing along the steep scree we passed an unmarked lake before ascending the final 700m to the col, and our first view of Alnus Creek; a rapid descent on ice, snow, scree, and mud followed. We camped down in the valley next to a stream about 1km from the snowfield, just upstream of a point where the whole stream was captured by the sink which had been the object of the winter trip.

Day 3

Simon, Mark and Chris surveyed the cave that took all the water from the stream, a simple sink/resurgence system, independent of the sinks down-valley, whilst to provide surface control, Harry and Dave W. surveyed the associated dry valley above, and its inlets. The survey team found it impossible to progress beyond the previous far point, due to water levels, but as this is not far from the resurgence, there is little scope for any significant extension. Tim, Neill, Dave T. and Chas went for a reconnaissance of the meadows on the north side of the valley to examine sinks that Chas and Dave T. had found on their previous visit. They also encountered a bear. The meadows area, a line of 9 sinks in small glacial side valleys looked promising, and so it was agreed to move camp up onto the meadows to allow further investigation of these sinks. The sink resurgence height difference was about 550m.

Day 4

Camp was moved to a position below sink 6, near a terminal moraine, with a stunning view of the North and South Alnus glaciers on the south side of the valley. The rest of the day was spent investigating sinks 4,5,5a, and 6. The first three sinks looked good, but there was far too much snow to allow entry. That evening, with a little engineering, it was possible to divert much of the water around sink 6 to allow a drier entry, as well as boosting the campsite's water supply, as nobody relished the thought of a icy bath coming from the snowfield not far above. Simon went in first and emerged through the snow, about 20 minutes later, after finding a previously buried drier entrance. He had been stopped by a constriction, which looked likely to yield to a bit of hammer work.

Day 5

The next day Chas and Dave W. returned to the sink intent on passing the obstacle. Chris, Neill, and Dewi started digging out sink 4, which was buried under 3m of snow, Jon went to sink 5. Mark, Tim, and Harry investigated sinks 1, 1a, and 2 while Dave T. and Simon walked down to the resurgence pool in the valley bottom to the east. Sinks 1 and 2 were no-go, and a small amount of passage was found in sink 1a. The main success was at sink 6, which, after removal of the constriction, went for 150m in a rift passage to a low crawl in 1m of icy water.

Day 6

Heavy snow overnight meant a late start, the first surveying party for sink 6, Harry, Neill, and Tim not going down until 11am. The weather brightened during the afternoon and the fresh snow started melting. In the evening Mark, Chris and Dewi went down sink 6 to continue surveying and push downstream. Whilst the other two finished surveying, Mark passed the wet crawl and found a 30m deep steeply sloping passage, the 'Wass Rift', leading to another passage which just got too small as the water cut down into the rift.

Day 7

Due to heavy rain most of the night and the next day a trip was not possible until 5pm when Neill, Tim, Dave W. and Dave T. went to take photographs, and Chris, Harry, and Simon went to complete surveying and make a final attempt to push the excessively tight rift at the furthest point. Unfortunately they were not successful and left the stream cascading tantalisingly onwards. With all leads now checked out it was decided to walk out the next day.

Day 8

Chas and Dave T. went out via Fryatt Creek while the rest of us headed out back down the Whirlpool route, initially via the slightly lower col which proved much heavier going, although crossing the Whirlpool River on gravel flats lower down, nearer the Middle Forks campground proved less hair-raising than the previous route. Once on the fire road, a quick pace was easily maintained. The 42km walk out took from 9am to 11pm; it was a long day, and we just missed getting the beers in as well.

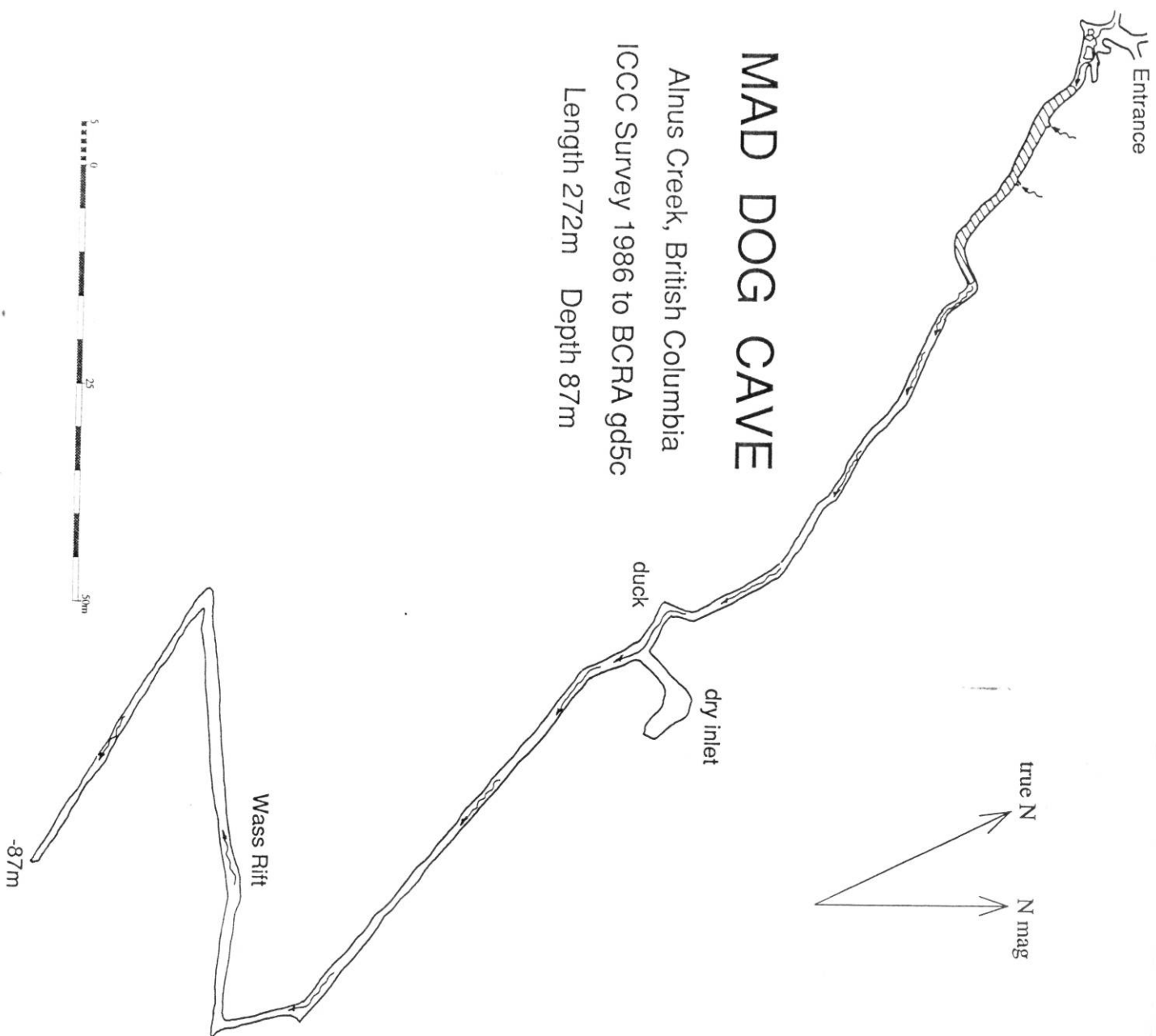
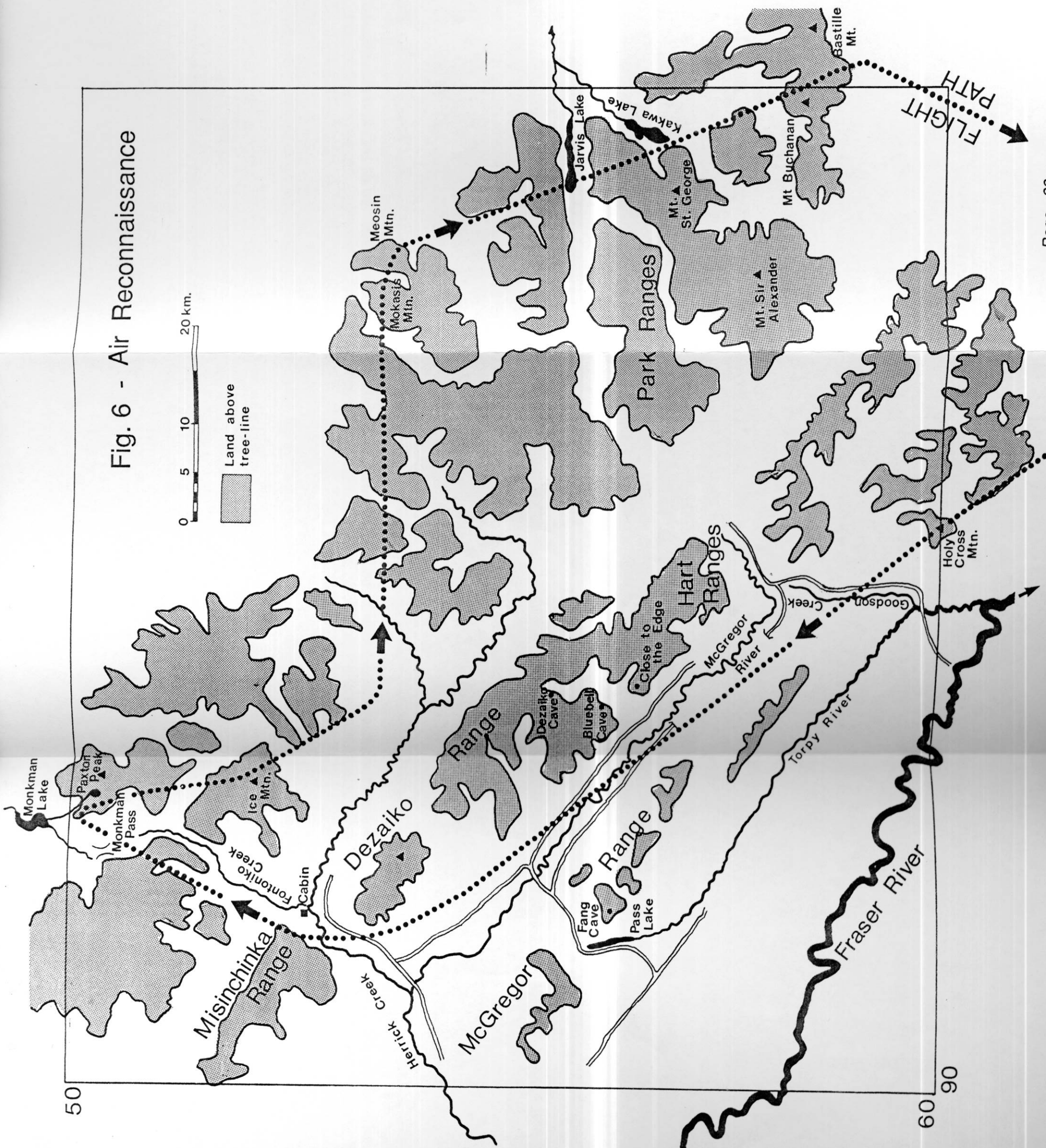


Fig. 5

Fig. 6 - Air Reconnaissance



AIR RECONNAISSANCE

It was suggested that a flight over various areas would be a good way of checking leads, and assessing geology, road existence and nature of terrain (whether forest, open etc). Contacts in Jasper introduced us to Werner Heine, a local pilot, who became interested in our proposals for a reconnaissance flight in his small Cessna, and offered just to charge us for fuel.

The five-hour flight started from Jasper airfield, with superb views as we passed Mount Robson. (at 3854m the highest peak in the Canadian Rockies). and landed at McBride to refuel. From McBride, we flew NW down the Fraser River Valley, passing Holy Cross Mountain (2107m), composed of non-karstic plateau surfaces, then continued N up the Torpy River and Goodson Creek, observing a good road on the E side of Goodson Creek. We then flew NW down the Macgregor River, and noted the existence of roads on both the N and S sides of the valley. To the south, the Macgregor Ranges (1788m-1918m) were flown past, and this ridge, which contains Fang Cave, was seen to be composed of vertical or steeply dipping units, and though no features were identified from the air, the area looked quite promising. To the N on the Dezaiko Range, despite a good covering of snow, limestone beds were clearly evident dipping 40° SW. We then passed above the Macgregor suspension bridge, and turned N up Herrick Creek. The NW end of the Dezaiko ranges was seen to be composed of beds dipping an average 30° SW, though this varied rapidly reaching 60°, in mixed geology with not much obvious limestone. Continuing, we passed over the SE end of the Misinchinka Ranges (1811m). Here there was a varying quantity of limestone visible, in more complex structures than before, generally dipping 35° SW. Though outcrop was reduced by much snow, it appeared that there could be relatively easy access along the ridge. Drainage did however, appear to be mainly on the surface. The existence of a good track on the east side of Herrick Creek was confirmed. We then continued NE up Fontoniko Creek to Monkman Pass and Paxton Peak to look over the area of our main lead. This shaft, which had looked so prominent on the black and white air photos did not now look as promising. It was situated in a shallow depression, fairly marshy with brownish vegetation. The surrounding rock was certainly limestone, with small irregular cliffs and ridges. There were also a series of lakes scattered in this high ice sculpted limestone terrain. We then flew SE, past Ice Mountain, and then across the northern heads of a series of

unnamed, forested, trailless valleys. Here there were no particularly promising areas of exposed limestone. We then headed towards Picture Mountain and Mokasis Mountain (2202m), at 1800m, the closed depressions and intermittent streams that were indicated on the map (at 690169 and 687167) were unfortunately clearly features of glacial erosion, and the surrounding bedrock looked very much like quartzite, so we then continued SE over a 1800m plateau N of Netim and Etim Mountains. This had looked quite promising on the map, and now appeared to be an area of interbedded quartzite and limestone, with a fair number of closed depressions, but with most having lakes in them. Passing Jarvis Lakes we flew over the valley of Moon River, a promising lead at an obvious sink, already spotted and 'claimed' by Jasper cavers. We finally reached the plateau, at 1980m, between Bear, Buchanan, Wallbridge and Bastille Mountains. Chas Yonge had spotted this area from air photographs, and had identified several karst features. Unfortunately this promising high plateau was entirely snow covered. Two possible resurgences were spotted on the SW corner of the plateau. Finally we returned to Jasper via McBride.

The flight had been useful in ruling out some areas due to excessive snow cover, looking at some new areas that were quite promising, and flying areas with known leads to assess how accessible they would be. As a result, a team was sent in to attempt to walk to Monkman Pass, and, later on, the Fang Cave ridge was walked. Arranging a flight is undoubtedly a good idea for any future party .

ARCTOMYS RECCE

Chris, Dewi, Mark and Tim went on a short trip to check out a possible lead identified by the ASS near a snowy col in the Arctomys Cave area. After a long hike along the marshy flats of the mosquito-infested Resplendent Creek, and a deep crossing of the creek itself opposite Arctomys Valley, their objective was found to be snowbound. A further day's scouting of the nearby area revealed nothing, and they returned to Jasper.

MONKMAN PASS

After borrowing an Indian style canoe from Don Rumpel of Jasper, Simon, Dave and Harry set off to check out the possible sink at Monkman Pass. The first day was taken up getting the van's wipers fixed again, this time at Prince George, and after locating the correct logging road, a camp was made on the roadside by Herrick Creek for the night.

The next day we set off across the river, from the furthest point upstream accessible from the road. The access to the river was via a short gully cutting through the steep bank, just over a mile downstream from the old logger's cabin, from where the trail to Monkman Pass was marked on the maps.

Having been reliably informed of the 'millpond' nature of the river, we set out energetically, hoping to make some upstream progress, but after a couple of minutes of fierce effort whilst humming Hawaii Five-0 themes, we were surprised to look up and find ourselves only about 10 feet from the bank, and slightly downstream of our starting position. We eventually landed somewhat downstream on the flats on the other side, and carried the canoe to a safe place.

We started out for the cabin, only a mile distant; two hours later we reached it, the intervening forest being atrociously dense, and liberally supplied with head high Devil's Club.

From the cabin, a long search failed to locate any evidence of the trail we had expected, and as our target was about 20km distant, and at least initially through similar forest to that which we had just passed, we had no choice but to return. Carrying the canoe some distance upstream over the flats made the return somewhat easier.

GOAT VALLEY

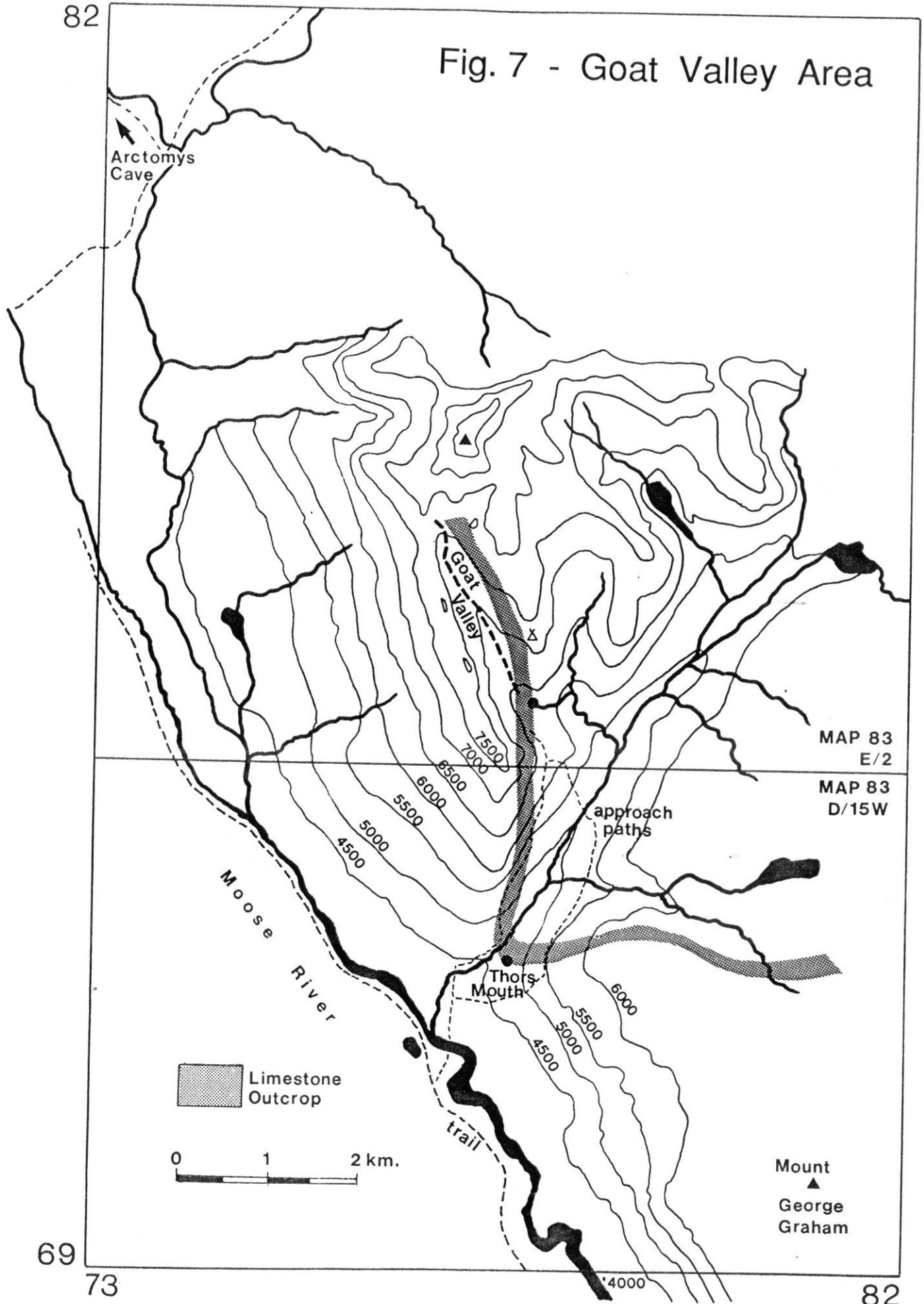
Maps : **1:50,000**
83 D/15W **Rainbow**
83 E/2 **Resplendent Creek**

Situated in the Mount Robson Provincial Park of British Columbia, this area is reached from Highway 16 by first following the Moose River Trail. This leaves the Highway 3km SE of Moose Lake, near where the Moose River issues from Rainbow Canyon and joins the Fraser River at 1060m. The well-maintained trail is followed for 6km, first over a small shoulder, and then along the west bank of the river, until drawing level with an obvious forested valley on the opposite (east) side of the river, conveniently where the river is braided into two channels, at an altitude of 1250m. The river here is wide, relatively shallow, around waist height, and slow moving, and a committing crossing can be made with care. The nearest major peaks are Mt.McNaughton (2905m) and Mt.George Graham (2576m). A relatively easy walk through the forest, which is cut by many channels where the valley river meets the Moose river, leads to the Thor's Mouth sink and resurgence, separated by a short dry valley, and the remainder of the route is steeply uphill through thick deadfall bush, and across steep vegetated stone shoots to reach the shoulder (781736) that lies at the southern end of Goat Valley. The total walk in time varied between 6 and 8 hours, with an elevation gain of about 1000m.

Goat Valley, at about 2000m, is a 2km long high level dry valley, with a scree filled floor. On the west side are inaccessible ramparts of shale and limestone rising to 2300m, but on the east side is an extensive area of steeply dipping karst pavement composed of the pinkish, speleogenic, Mural Limestone. The rocky valley is deserted apart from the usual hoary marmots, and the odd eponymous white mountain goat. The campsite used was at 777750. The valley is very imposing, and from the north end, there are fine views of Mount Robson to the west. The potential here for cave development is good, with the only obvious resurgence far below in the Moose River.

82

Fig. 7 - Goat Valley Area



MAP 83
E/2

MAP 83
D/15W

Limestone
Outcrop

0 1 2 km.

Mount
▲
George
Graham

69

73

82

CHARTREUSE POT

Goat Valley, British Columbia

ICCC Survey 1986 to BCRA gd5c

by D Wilson & H Lock

Length 88m Depth 47m

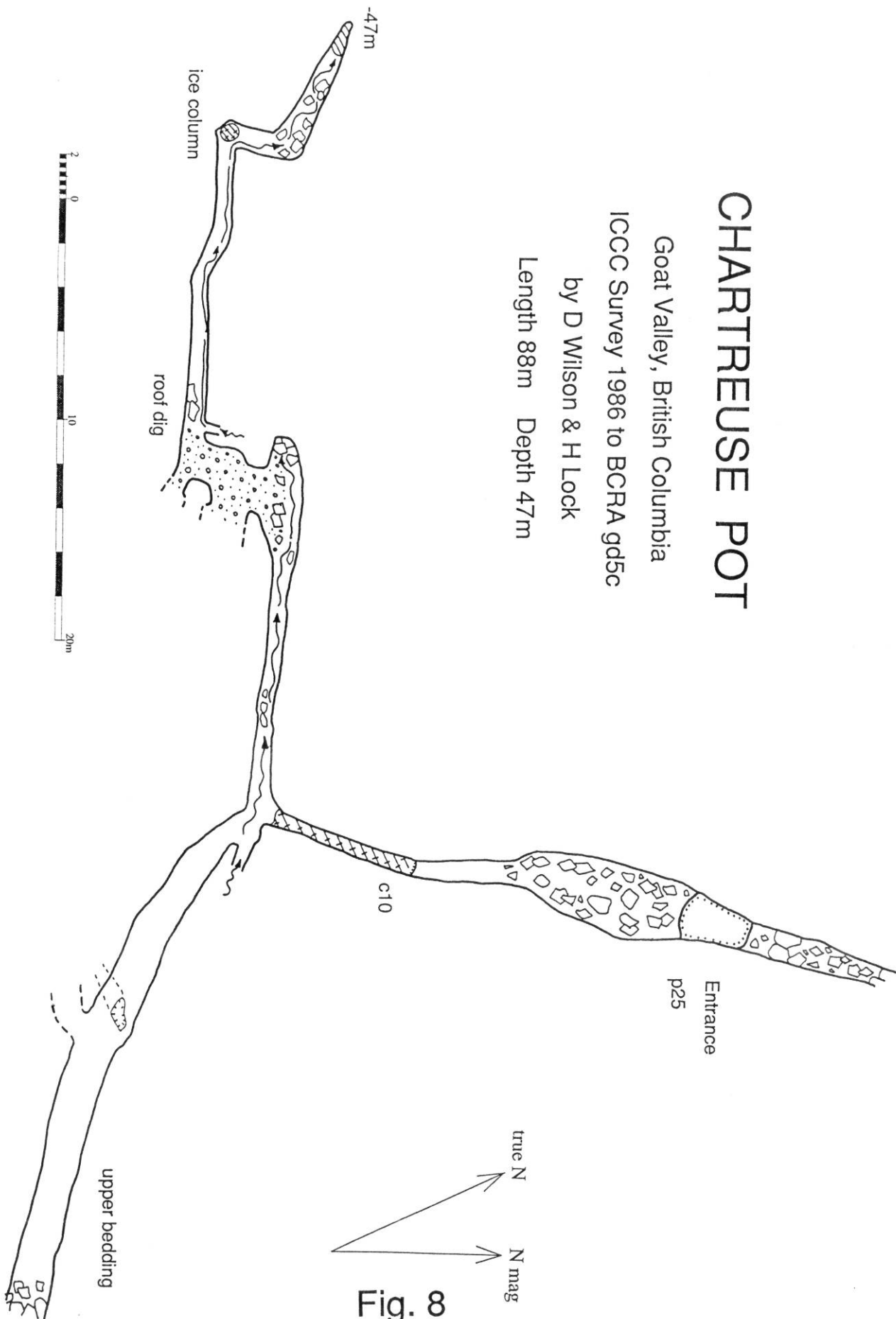
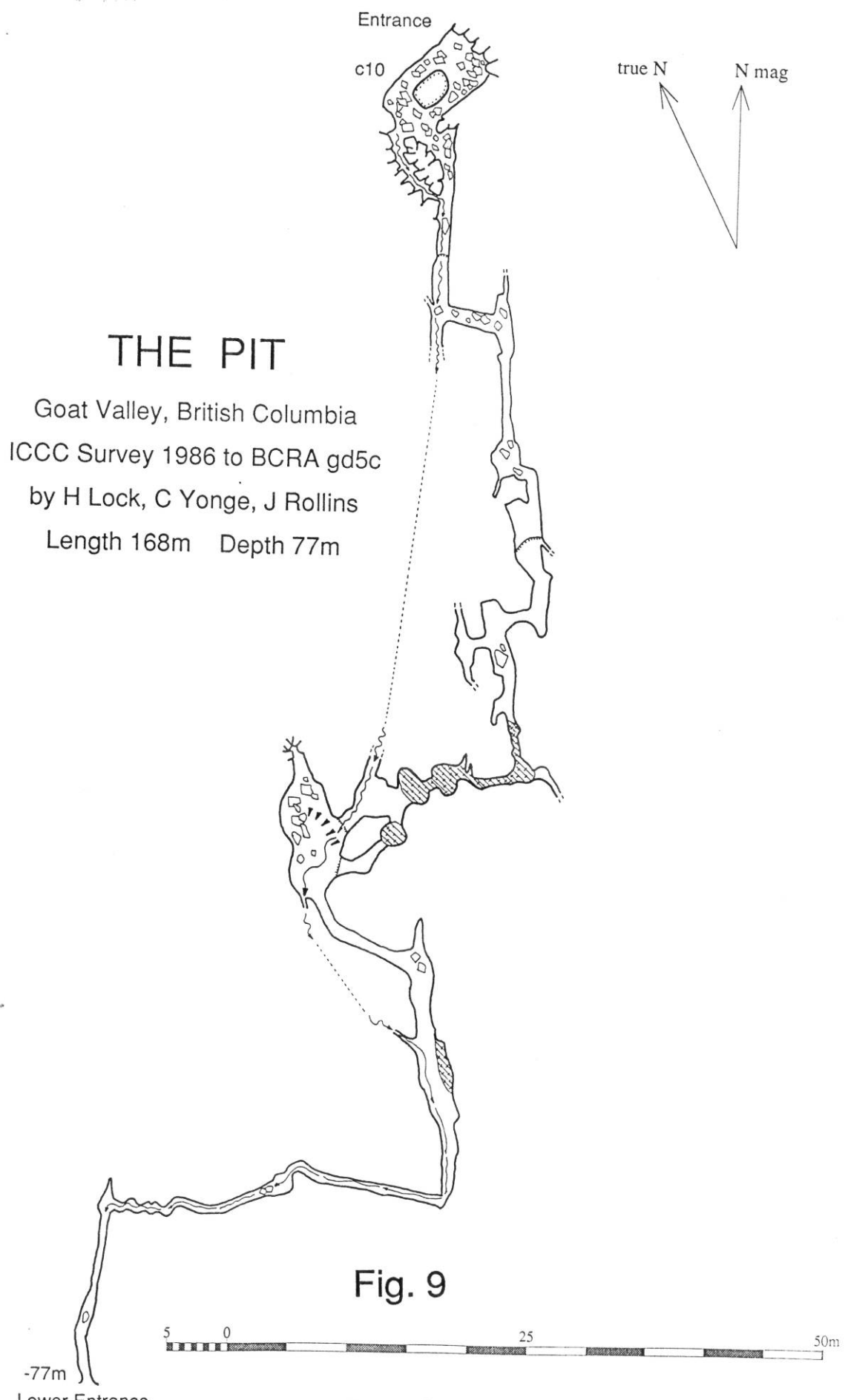


Fig. 8



THE PIT

Goat Valley, British Columbia
 ICCS Survey 1986 to BCRA gd5c
 by H Lock, C Yonge, J Rollins
 Length 168m Depth 77m

Fig. 9

-77m
 Lower Entrance

Entrance
c10

THE PIT

N-S Section

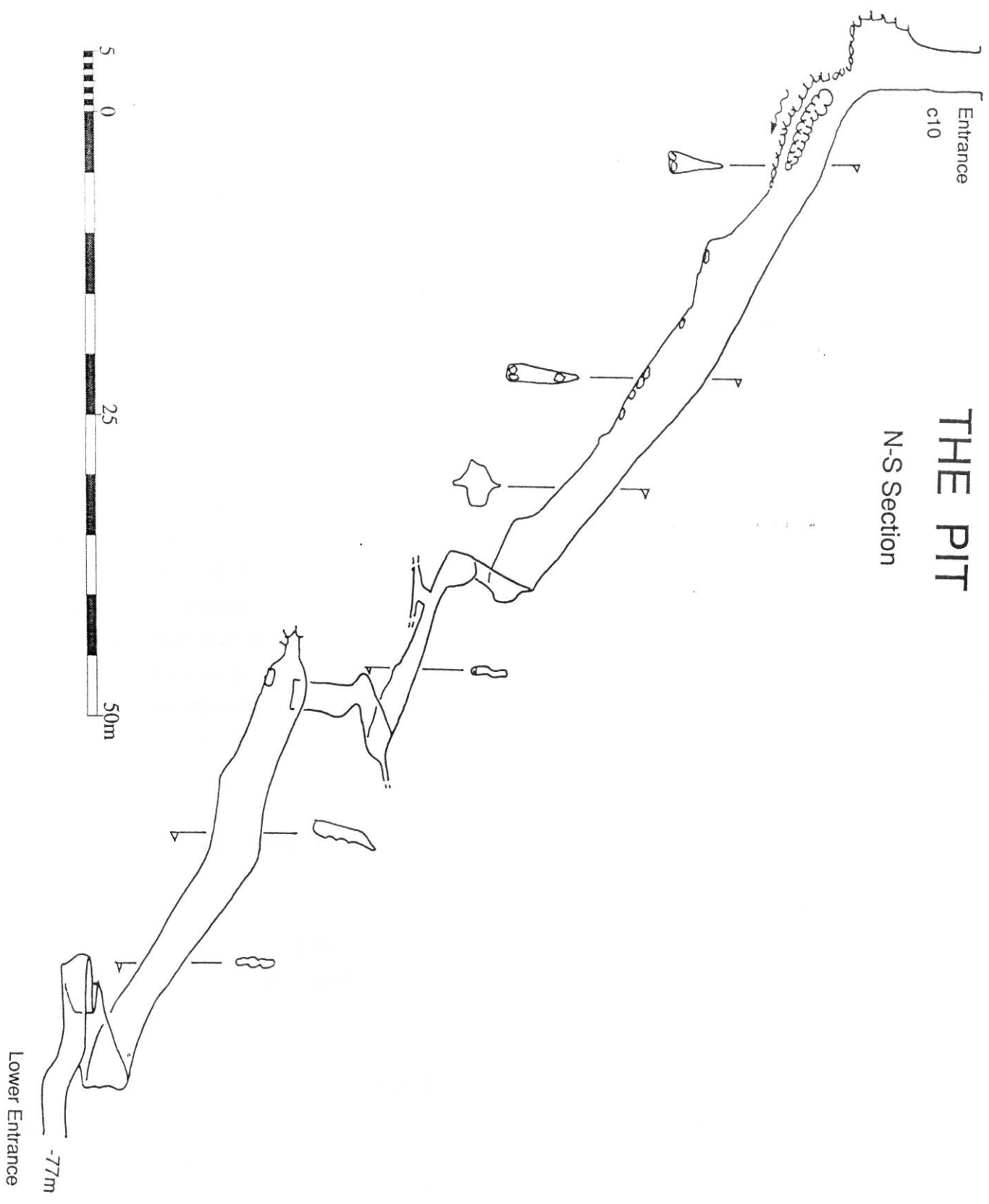


Fig. 10

GOAT VALLEY I

Day 1

The group walked in from Highway 16 along the Moose River Trail, fording the river opposite the Thor's Mouth valley. From here it was a short bushwhack up the valley to Thor's Mouth, the resurgence noted by ACRMSE, but having very little potential since the stream only sinks a short distance up the dry valley- a talus cave. An examination was made of 4 small holes in the dry valley between the sink and resurgence and then a move was made towards the main objective. After steep, strenuous bushwhacking through closely spaced trees and much deadfall, the team was benighted at the foot of a steep scree slope.

Day 2

The following day they reached the dry valley and immediately started looking for sinks in the fine steep limestone pavement. An icy shaft with a pitch of 25m and a 10m climb on ice was descended, using a combination of ropes, descenders and ice axe, and bottomed at -40m, hence causing the initial, mistaken belief that this was Calvados, a pot found by ACRMSE 3 years previously. The hole was later named Chartreuse Pot. From a gravel floored icy chamber at the foot of the pitch, various sloping bedding plane passages led off, all ending in constrictions. Three other surface holes quickly closed down or choked. Apart from Calvados, the Lake Sink and Rift, all the ACRMSE holes were checked out and confirmed. They returned to the camp lower down.

Day 3

Return to the highway and thence to Jasper, deciding the area definitely warranted another visit.

GOAT VALLEY II

Day 1

A team of 6 reentered the area a few days after the previous trip, with digging gear (crowbar, etc.).

Day 2

We discovered our mistake re. Calvados. Dave and Harry descended Chartreuse Pot, and, after about 2 hours, managed to remove enough

slabs from the roof to pass the downstream constriction. They pushed on another 15m to a definite conclusion, just past a beautiful ice column. Chas, Neill, Dave T. and Jon located the true Calvados. Jon found The Pit below the Lake sink, and a cave near it that was surveyed by Chas, Neill, Dave T. and Jon until it popped back out at the surface. The small Lake Sink was investigated and found not to go, but a classic vadose canyon cave was found a short distance below. This was examined, as were various other blocked rifts. Chas and Jon descended The Pit, and pushed it. The group also had a go at digging Calvados, which was blocked at the entrance with ice, unlike 1983. As it was the most active time of the Perseid meteor shower, bivvying out round the campfire was well worthwhile, the night air proving too cold for the mosquitos.

Day 3

Dave and Neill dug for 2 hours at bottom of a cave further up the valley, which was later surveyed by Chas, Jon, and Harry. A rift was found, blocked, but with the sound of water beyond an impossible constriction. Following downhill down the same joint, Meteor Rift was found, a 60m long rift cave explored by Dave and Neill, and surveyed by Harry and Neill to a forbidding green sump pool. The upstream section of the cave was dug out by Dave and then explored and surveyed by Chas to a blockage. After further investigation in the vadose canyon cave below the lake sink, Chas pushed it to a conclusion. Harry, Chas and Jon surveyed 150m into The Pit until it also emerged back out on the surface lower down the hillside.

Day 4

Harry and Dave surveyed and photographed Chartreuse Pot. Neill tried more work at Calvados, but to no avail. They returned to camp, ate and hiked back out to the Moose River. They found the river was up so had to go a little downstream to find a realistic crossing point. Camp was made by the river. Overnight an impressive electrical storm was witnessed.

Day 5

The group left by the Moose River Trail to Highway 16 and hitched back to Jasper.

SMALL RIVER I

Day 1

The team of five (Chris Birkhead, Tim Flack, Dewi Lloyd, Mark Turnbull and Chas Yonge), drove from Jasper east along Highway 16 to the Small River turn-off. They managed to drive a further 11km along the logging road before a washed out bridge prevented further progress by vehicle, and the remaining 7km along the road was walked. At the 18km roadside post, the well-marked path to the Small River Top Area, climbing 800m, was taken. The group accidentally deviated from the path, resulting in a steep, loose traverse along the bottom of limestone cliffs to the NE of the river. However, a number of springs were noted in this area. When the glacial moraines came into view, the party turned west, over the moraines and river, to the Far Karst campsite near the meadows' dig and stream. The total walk-in time was 6 hours.

Day 2

Chas, Dewi, and Chris spent the day working on the Meadows Dig in the Far Karst, while Tim and Mark went over to the F1 Resurgence cave. They went as far as the second chamber, and, searching for a lead, found a strongly draughting boulder choke. This was negotiated, and led to a small chamber. Here, a still stronger draught issued from a constricted, very wet passage. Instead they followed a muddy crawl on the left that led to a high passage, and a climb up a loose slope into a large vertical rift. This was followed to a small vertical squeeze into a constricted rift, which quickly became too tight. They returned to the first chamber, and dropped down through a hole in the floor into a series of small chambers, from which the only way on was a tight, flaggy hole. Returning to the second main chamber, they made a careful search for further leads. Nothing more was found, however. They then went to look at the streamway, off the first chamber, and followed the strong current in ever-increasing depth of very cold water to a sump, where they turned back. The sound of rushing water beyond suggested that the sump was only short, and certainly worth pushing. After a rewarding day they returned to camp to find that Chris, Dewi, and Chas were still hard at work on the dig.

Day 3

Chris and Mark surveyed the previous day's findings in F1, whilst Chas, Dewi, and Tim went to work on the Meadows Dig, without much

success. After the evening meal, the group went for a walk in the Far Karst, towards the glacier, and an undescended shaft was spotted.

Day 4

Mark and Chas went to push the tight, flaggy lead in F1. Use of a crowbar opened the way on to a further 50m of small passage, but lack of time and the increasingly tight nature of the passage forced them to turn back. The whole party then walked out back to the car, and returned to Jasper. On the walk out, a number of holes in the cliffs to the west of the river were spotted.

SMALL RIVER II

A return trip to this area (by Chris Birkhead, Tim Flack, Dewi Lloyd, Simon Seward and Mark Turnbull) was considered worthwhile;

1. To make a systematic investigation of the Far Karst Area
2. To follow up the three leads in F1
 - i)the tight, flaggy passage
 - ii)the sump in the main streamway
 - iii)the strongly draughting wet passage
3. To push the ACRMSE lead in Grot 'Ole
4. To examine the springs noted on the walk-in
5. To descend the shaft spotted on the previous trip
6. To continue the Meadows Dig
7. To investigate the holes spotted in the cliff above the river on the previous walk-out

Day 1

The walk-in was similar to the previous visit, except that two black bears were disturbed on the logging road, and animal trails along the river bank were followed during the latter part of the walk, past F1, to reach the previous campsite in failing light.

Day 2

Simon and Mark went to push the F1 leads. Wearing borrowed wetsuits, they pushed the sump to find a further 30m of stream passage. Progress was blocked by a waterfall issuing from a small opening in the wall. Thoroughly cold by now, they returned to the cave entrance, changed

F1 RESURGENCE CAVE

Small River, British Columbia

Extensions surveyed by ICCC 1986

Original survey ACRMSE 1983

Original Length 270m, New Length 570m

Lower Chamber extensions not shown

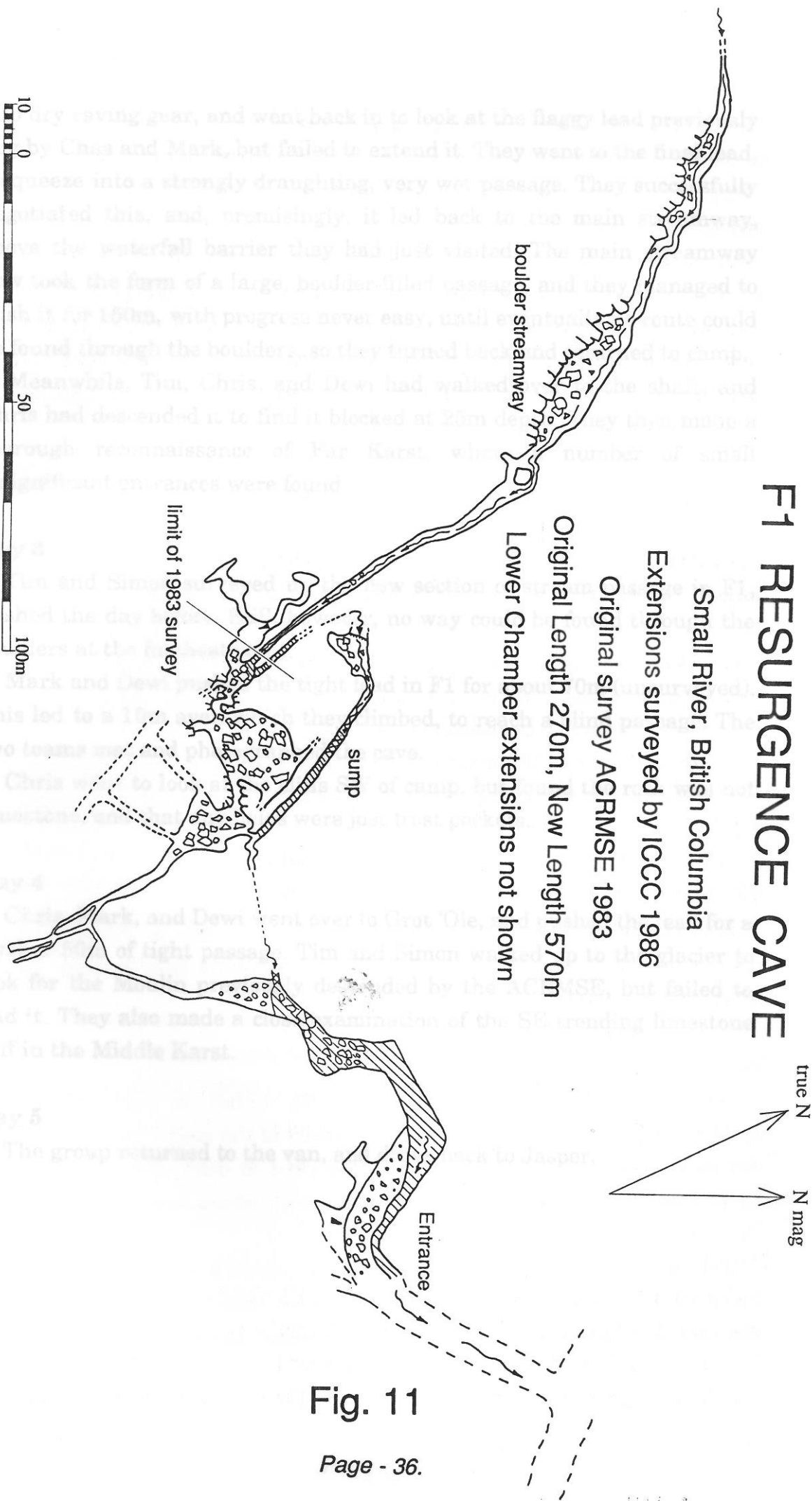


Fig. 11

into dry caving gear, and went back in to look at the flaggy lead previously dug by Chas and Mark, but failed to extend it. They went to the final lead, a squeeze into a strongly draughting, very wet passage. They successfully negotiated this, and, promisingly, it led back to the main streamway, above the waterfall barrier they had just visited. The main streamway now took the form of a large, boulder-filled passage, and they managed to push it for 150m, with progress never easy, until eventually no route could be found through the boulders, so they turned back and returned to camp.

Meanwhile, Tim, Chris, and Dewi had walked over to the shaft, and Chris had descended it to find it blocked at 25m depth. They then made a thorough reconnaissance of Far Karst, where a number of small insignificant entrances were found.

Day 3

Tim and Simon surveyed up the new section of stream passage in F1, pushed the day before. Still, however, no way could be found through the boulders at the furthest point.

Mark and Dewi pushed the tight lead in F1 for about 70m (unsurveyed). This led to a 10m aven which they climbed, to reach a blind passage. The two teams met and photographed the cave.

Chris went to look at the cliffs SW of camp, but found the rock was not limestone, and that any holes were just frost pockets.

Day 4

Chris, Mark, and Dewi went over to Grot 'Ole, and pushed the lead for a further 50m of tight passage. Tim and Simon walked up to the glacier to look for the Moulin previously descended by the ACRMSE, but failed to find it. They also made a close examination of the SE trending limestone cliff in the Middle Karst.

Day 5

The group returned to the van, and drove back to Jasper.

FANG CAVE

Maps : 1:50,000
93 I/3 Gleason Creek

The Fang Cave area is situated in the SE end of the McGregor Range, between the McGregor and Torpy rivers, and east of Pass Lake. The eponymous limestone fang is quite clearly visible from the main gravel logging road. Close to a large layby on the NW side of this road, about 6km from the McGregor River, a short spur leads to the start of a good trail, chopped and waymarked by a 'local' hiking club. Walking in this area is extremely difficult below the main treeline, and without this trail, the access to the Fang area would be much more strenuous. The trail leads steeply uphill for about 3/4 of an hour to Fang Cave itself, from where a further 1/2 hour gains the much more open country of the terraced alpine meadows, where camp can be made close to a good water supply. From the meadows, there is an excellent view of the Fang, and the surrounding light-grey vertically bedded limestone ridges. The main ridge is around 1750m high, leading SE from the camp area.

Fang Cave is situated where a large stream passes through the limestone ridge. On the map, this is marked as an intermittent stream.

FANG CAVE LOG

After stocking up with provisions at the supermarket in Prince George, we drove into the area and camped by the roadside near a large layby, used by logging trucks for load checking.

Day 1

Harry and Simon bushwhacked steeply uphill to some entrances spotted high up on the cliffs, to the north-east of the road. These all turned out to be frost pockets. Returning to the road at dusk, the easiest route down was following a stream back to the road, where camp was made for the night.

The others walked up the trail to the meadows a short distance above Fang Cave, where a camp was established. A thick mist and unpleasant weather soon descended and stopped any further exploration that day.

Day 2

Dewi and Chris visited Tooth Decave, which had been previously explored by Ian McKenzie. Dave and Chas went on a quick recce trip, starting northwards, and then making a large clockwise circle back to camp. Mark and Tim checked out the mountain to the NE of camp. Harry and Simon walked up to join the others. In the evening, Dave and Harry walked up to the col behind camp, for a quick look at the geology, first pursued by thick mist rolling up-valley, then engulfed in a hailstorm, finally reaching the col just as a snowstorm hit. Such was common evening weather in the area.

Day 3

Harry, Chas, Dave and Neill went into Fang Cave by the Middle Entrance, hoping to push a lead left from a previous exploration. Unfortunately, the water level was too high for the previous limit to be reached, but the trip was good fun as a purely tourist one. Tooth Decave was surveyed.

Day 4

A walk eastward along the main ridge, which was composed of vertically bedded limestone, saw quite a few very promising areas. A premature termination to the trip was caused by heavy snow, and the presence of a Grizzly cub, whose mother could not have been far away. A second trip was made into Fang by Dave, Dewi, and Mark, mainly for photographic purposes.

Day 5

A gentle walk down to the road was followed by a rather noisy van drive back to Jasper. This problem was solved the next day with the addition of 10 pints of oil to the engine.

QUEEN CHARLOTTE ISLANDS

Maps : 1:250,000 (BC Government)

103 B-C Moresby Island

103 F(+J,K) Graham Island

1:50,000

103 F/1E Skidegate Channel

103 B/13E,14W Louise Island

The caving potential of the Queen Charlotte Islands was first suggested by Derek Ford. The only previous visit was by Ian Mackenzie and Ron Lacelle of Jasper, to the Deena Creek area of Moresby Island.

We decided that a visit to the Islands would provide a welcome relief from 8 weeks of bushwhacking in the Rockies, yield some caves, and be likely to provide an enjoyable end to the expedition.

An archipelago of 150 islands, representing the tops of a submerged ridge, lie between 50 and 150km from the mainland. The main islands are Graham Island in the north, and Moresby Island in the south. Moresby Island, the 'Canadian Galapagos' rising to 1100m, crossed by three bands of limestone, is the area of principal speleological interest. The country is mainly undulating forested hills, with some attractive scenery in the intricate coastline. On the east side of the islands is the broad but shallow storm-prone Hecate Strait, but to the west, facing the Pacific Ocean, the land shelves steeply downward.

This being a classic example of a temperate coastal rain forest, virtually all the solid geology is masked.

The main species are Western Hemlock, Western Red Cedar, Sitka Spruce and Cypress, and Yellow Cedar.

The main industry is logging. The 2 principal companies being Macmillan Bloedel Ltd. and Crown Forest Coast Wood Products (also Western Forest Products Ltd). Macmillan Bloedel restricts its active operations to the northern island, thus our main contact was with Crown Forest. These companies, and associated service industries, provide the main source of employment on the islands. The local economy is heavily reliant on the continued activity of the logging companies, though this is threatened by an increasing number of conservationists intent on preserving the islands as a "natural wilderness".

The islands have a population of about 6000, including a number of Haida Indians, some living in specially protected reserves. A permit is

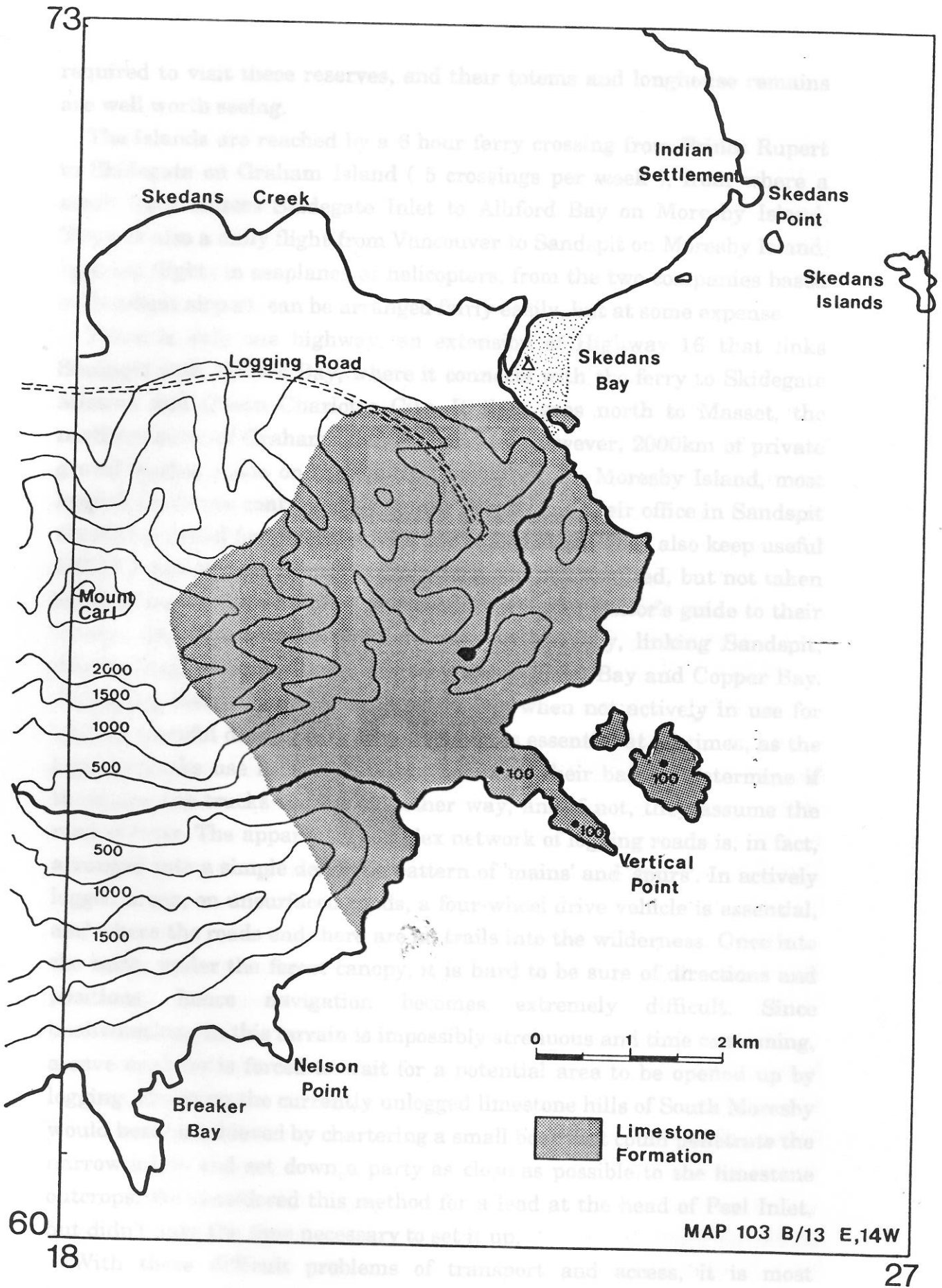


Fig. 12 - Louise Island

required to visit these reserves, and their totems and longhouse remains are well worth seeing.

The islands are reached by a 6 hour ferry crossing from Prince Rupert to Skidegate on Graham Island (5 crossings per week), from where a small ferry crosses Skidegate Inlet to Alliford Bay on Moresby Island. There is also a daily flight from Vancouver to Sandspit on Moresby Island. Internal flights in seaplanes or helicopters, from the two companies based at Sandspit airport, can be arranged fairly easily, but at some expense.

There is only one highway, an extension of Highway 16 that links Sandspit with Alliford Bay, where it connects with the ferry to Skidegate Mission and Queen Charlotte City. It then goes north to Masset, the northern point of Graham Island. There are, however, 2000km of private gravel logging roads on the Queen Charlottes. On Moresby Island, most logging roads are controlled by Crown Forest, and their office in Sandspit should be visited for general advice and information. They also keep useful 1:5000 maps of their licence areas, which can be consulted, but not taken away or copied. Crown Forest also produce a useful visitor's guide to their forests. There is a main circular route on Moresby, linking Sandspit, Alliford Bay, Mosquito Lake, Moresby Camp, Gray Bay and Copper Bay. Generally, the roads are open to public use when not actively in use for logging. Careful driving with headlights on is essential at all times, as the logging trucks use radio communication with their base to determine if there are any trucks coming the other way, and if not, they assume the road is clear. The apparently complex network of logging roads is, in fact, arranged into a simple dendritic pattern of 'mains' and 'spurs'. In actively logged areas, on unsurfaced roads, a four-wheel drive vehicle is essential, and where the roads end there are no trails into the wilderness. Once into the bush, under the forest canopy, it is hard to be sure of directions and positions, hence navigation becomes extremely difficult. Since bushwhacking in this terrain is impossibly strenuous and time consuming, a cave explorer is forced to wait for a potential area to be opened up by logging. Reaching the currently unlogged limestone hills of South Moresby would best be achieved by chartering a small boat that could penetrate the narrow inlets and set down a party as close as possible to the limestone outcrops. We considered this method for a lead at the head of Peel Inlet, but didn't have the time necessary to set it up.

With these difficult problems of transport and access, it is most important to seek local advice and help. Local contacts on the Queen Charlottes yielded information on cave entrances, up to date information

on accessibility, and free journeys by boat and in four wheel drive vehicles in search of caves. The loggers are by no means the mercenary ogres that some city dwelling conservationists would make them out to be; they are hospitable and ready to help a party who gain their interest by explaining their intentions. On Moresby Island, there are established campsites at Gray Bay and Mosquito Lake. Supplies are available at the new supermarket in Sandspit.

Most of the time was spent in the Deena Creek/Mosquito Lake area, and the east coast of Louise Island was also visited. Mosquito Lake runs NE/SW for its 5km length, and is only 30m asl. The forested limestone ridge (400m), in between here and Deena Creek, was reconnoitred for caves. This area is overlooked by Mount Moresby (1127m) and Mosquito Mountain (1006m).

Louise Island was reached by boat from Moresby Camp, down the Gillat Arm to Beattie Anchorage, then by four wheel drive on a logging road around the north of the island, alongside Cumshewa Inlet, to a drop off about 45 minutes downhill bushwhack to Skedans Bay. A boat was then used to explore the coast around Skedans Bay (225692), Limestone Islands (245650), and Vertical Point (235645), and to penetrate a short distance into the interior and walk over hills 150m high.

QUEEN CHARLOTTE ISLANDS LOG

After the two day drive from Jasper on Highway 16, we caught the ferry from Prince Rupert to Skidegate on North Moresby, and camped by the roadside about 3 miles away.

The next day, we caught the local ferry to Alliford Bay, and contacted the Gould family at Sandspit, whose name we had been given by Ian McKenzie.

After an overnight camp, we headed into the Deena Creek area. After a tour of the logging area, conducted by Doug Gould, including a visit to a massive fallen Spruce, we drove on 'slightly' overgrown old logging roads, parked, and then followed a ribboned trail to gain another old road, and walked up the caving area.

The first cave, in a large tree-trunk filled shakehole to the right of the track, was explored by Chris and Harry to a constriction. It began as a large boulder filled rift, leading on to a narrow twisting canyon which headed steeply down.

The rest of the group fanned out to cover the area further up the track on the left hand (upslope) side. Several promising shakeholes were located.

After dropping Harry and Tim off at Mosquito Lake, we returned to the area to push and survey the finds. Harry and Tim finally emerged at the Deena Creek parking site after an epic bushwhack, during which no leads were found, as the previously logged area they had set out to examine had regrown sufficiently densely to cover any entrances, as well as making progress extremely difficult.

It was felt a rest was in order, and so we set off for a few days on Louise Island. After driving to Moresby Camp, we were ferried across to Beattie Anchorage by Doug in his boat. There we were joined by Ian Gould, and we met some loggers who gave us a lift in a couple of 4x4s to the north coast of the island, above Skedans Bay.

The couple of miles down to the bay were made more troublesome by the lack of non-local visibility than by the bush, which was not too dense. The sudden crashing emergence of our group of 9 from the bush onto the beach seemed to surprise a couple of groups of sea canoeists, who had quite reasonably assumed they would have the beach to themselves. We camped on the edge of the beach, close to a freshwater stream.

The next day, Doug arrived in his boat, and he and Ian ferried various groups of people to Limestone Island and Vertical Point for quick searches, which all proved in vain. A few quick trips to the local Haida Indian site were made, to examine the long-abandoned longhouses and totem poles. After showing us the basics of salmon fishing, Doug left us his gear, and returned with Ian to work.

The next day was spent relaxing on the beach, observing the wildlife, which seems to include quite a few Bald Eagles, and catching salmon to supplement the expedition diet. We hacked up to the road for about 6pm, to meet Doug and the van to take us back to the logging camp, where an offer of large quantities of 'surplus' cakes from the logging camp kitchen was gratefully accepted. A further boat shuttle service in the fading sunlight took us back to a camp at Moresby Camp.

The next day we returned to North Moresby, had a quick drive round, and caught the overnight ferry back to the mainland. Leaving Prince Rupert at about 11, we blasted back to Jasper, and dragged Ian out of bed (again) to join us for pizzas and beer at about 1am, followed by a kip on his floor (again). We returned to Calgary the next day.

DEZAIKO

Maps : 1:50,000
93 I/3 Gleason Creek

Access to this area is relatively easy, with a logging road to the start of the walk up alongside Hedrick Creek. Progress is initially good, on a fisherman's track (leading to Hedrick Lake), and then, after crossing the creek on a ropeway, a trail is followed steeply up through thick forest to the plateau. A problem with the campsite is the absence of any water supply other than snow patches.

Above Close to the Edge is an extensive karstic plateau. Ten conical depressions are all plugged with the widespread frost shattered limestone scree. The main potential for finding caves lies in the impressively steep, high surrounding cliffs to the north and south, where, as at Close to the Edge, major exfoliation cracks could be exploited by water and, at depth, run into cave systems that lead back into the mountain.

DEZAIKO LOG

Chris and Harry hitched from Calgary to Prince George, staying overnight with Ian Mackenzie in Jasper. As arranged, they collected a hired Chevrolet stationwagon, and then attempted to drive that night into the Dezaiko area, partly on rough logging roads. Unfortunately a fractured exhaust prevented arrival that night. The next day, having carried out an emergency repair on the exhaust, they continued the journey, and met the other members of that weekend's visit to Close to the Edge. Ian Mackenzie was joined by Dave Thompson and, from Vancouver, Tich and Duncan Morris, and Peter Norris.

A 5 hour walk, initially gentle but, after the ropeway across Hedrick Creek, steeply uphill, along a trail that had been partially slashed, and marked with ribbons, led up to the plateau, immediately above the shaft of Close to the Edge.

The next day the Canadians set off to begin rigging the shaft. The shaft was eventually bottomed at -260m, and consisted of two 130m drops separated by a broad ledge where the rope was rebelayed. The landing was in a large circular gravel floored chamber, from where a short section of canyon led to a further 30m pitch, at the base of which a boulder blockage prevented further progress, though water could be heard falling

below. Meanwhile Chris and Harry had walked east over the karstic plateau above, investigating a number of choked shakeholes amongst the widespread frost-shattered debris. The mountain scenery, and steep cliffs surrounding the plateau were very impressive. That evening, Chas, Jon, Dave Chase and Randy Spahl arrived after a long non-stop journey from a wedding in distant Calgary. Late that night, the Close to the Edge bottoming team began to return with their news. Early next morning, those who had arrived the previous evening set off down the shaft. Chris and Harry, representing the 'Brit team', had been placed at the end of the queue to bottom the cave, and now, since time was short, it was decided that Harry alone would have the opportunity to go down. As soon as all had got back to the surface, we struck camp and waked quickly back down to the road for the journey to Prince George and on to Bocock.

CAVE DESCRIPTION

From the campsite, a short walk downhill leads to the edge of the cliff. A 15m abseil gains a sloping grassy ledge, along which one traverses east for 50m to reach the obvious cave entrance. The large opening appears at first to be a massive exfoliation crack, but becomes more cave like with distance down the shaft. The entrance was first seen from the air during a helicopter reconnaissance in 1985. Full credit for the discovery and exploration of this hole must go to Ian Mackenzie. For further information, see the comprehensive write-up by Ian McKenzie in 'Canadian Caver'. The shaft is the deepest in Anglo-America, with undoubtably the longest pitches; the pot itself is currently the 8th deepest in Canada.

BOCOCK PEAK

This area is situated in the Peace River District of British Columbia, south of the eastward arm of the large Williston Lake, where the famous W. A. Bennett Dam was constructed in 1968. To the north are the jagged peaks of the Wolverine Ranges. The Bocock Peak is approached from where a forestry road meets Carbon Creek. Eleven Mile Creek is followed upstream through thick forest to a final climb up above the treeline to the Bocock area. The peaks around Bocock are gently rounded in nature, with spruce-clad ridges between flat grassy meadows. In fact the area around Bocock Peak and its unnamed neighbour bears a great similarity to the scenery of the Yorkshire Dales' 'Three Peaks'. The main feature of interest is the large depression or 'polje' on the grassy bench immediately below the east side of Bocock Peak. At the centre of the depression, the Yorkshire analogy can be extended underground in the White Hole, the major system explored in 1984 by ACRMSE. This cave consists of vadose rifts linking pitches, with significant fossil development. The second largest sink in the area is Bocock Lesser Sink. There are also many minor shafts and sinks, most blocked or closing down rapidly. Porcupines and marmots are the most common wildlife in the area.

The full account of the previous explorations is in ACRMSE.

The district field geologist, Andy Legun, a friend of Chas Yonge, had offered some free helicopter time to enable a group to fly in to Bocock Peak. The team naturally accepted this generous offer. Having looked at air photos, in combination with available geological maps (esp. those in ACRMSE), a number of promising sites were identified, to be looked at during a surface reconnaissance. There were also two leads in the White Hole; the Schwarzchild Limit, which on later constructed survey, once speleogenesis had been worked out, ACRMSE had suggested was the natural way on; and the bottom of the White Dwarf Series where excavating in collapse could yield entry to older system. Also an attempt was made to push the promising Bocock Lesser Sink. Other shafts and sinks, which had been blocked with snow in 1984 would now be clear, this late in the season. Having walked out from Dezaiko and Close to the Edge, the team drove overnight, via Prince George, to Hudson Hope, losing tentpoles and Karrimats out of the back of the car via a missing rear windscreen, before a difficult night drive along logging roads to a bivouac at the helicopter landing area. The next day we were met by the helicopter, and Andy Legun arrived by road to arrange the flights. We flew

the 40km up Eleven Mile Creek to the White Hole depression in just 5 minutes, proving once more that helispelunking is the best method of cave exploration in the Canadian Rockies.

Camp was established close to Bock Lesser Sink, and over the next 3 days, 3 pushing trips resulted in extending it by a hard won 45m of tight rift.

A trip into the White Hole visited the Schwarzschild Limit, and the low choked crawl below it; in both cases the way on was found to be too tight. In the White Dwarf Series, the Singularity and the Neutron Collapse were descended and found impossibly blocked with boulders. There were a number of minor shafts near the campsite that had previously (1984) been blocked with snow. These were between 5 and 10m deep, and, unfortunately, all were found to be choked, despite efforts to dig them out.

Dave Chase and Dave Thompson went north to check out Moose Hole (noted in 1984 by ACRMSE, but not pushed since it was occupied by a dying moose). They also went downhill NW to investigate a feature picked out on air photos. Unfortunately Moose Hole did not go and the other feature was just a flat marshy area.

One day was used to make a full reconnaissance of the Short straw ridge, to the SW. A few small holes were located, but nothing of significance. In the White Hole depression, a number of soil and stream water samples were taken for later isotopic analysis by Chas.

We were collected by the helicopter, and then began the drive out. Unfortunately, the tyres proved insufficient for the rough road, and soon we had a puncture of a rear tyre. Finding the spare to be of a slimline 'get you home' type, we placed it on the less loaded front of the car, hoping to avoid further problems. This tyre predictably blew out about 10 miles later, leaving us no choice but to continue driving, first on the flat tyre, and then on the ever-deforming rim, until we finally reached the main road and called a breakdown truck. We then drove back to Prince George, took a coach to Jasper, and then hitched back to Calgary for the flight home

TRANSPORT AND ACCESS

Air

We initially flew from Gatwick to Calgary, Alberta with Continental Airlines via Houston and Dallas. The flight was spartan, but there were no restrictions on baggage weight. While in Jasper, we arranged a cheap fixed wing flight with a local pilot (see flight account, p.22). A Bell 4-seater helicopter was used in Bocock. "Helispelunking" is undoubtedly the best method of reaching remote areas in the Rockies.

Road

An 8-seater Dodge minibus was hired in Calgary for the duration of the expedition. The total hire charge for this powerful 6 litre V8 vehicle that provided excellent service was £860, including the mileage charge for around 7000 miles. The total fuel cost was also reasonable, at around £500, although this was due more to the price of petrol, about 16p/litre, than the fuel consumption of the van, which was about 7mpg. Petrol was somewhat more expensive in British Columbia, due to the sales tax there. On highways, progress was usually very fast. Highways 1 "The Trans-Canadian Highway ", and 93 "The Icefields Parkway", were frequently used between Calgary, Banff, and Jasper. Prince George and Prince Rupert were reached via Highway 16 "The Yellowhead Highway".

In the national parks, many good tracks into the wilderness are blocked by boulders; a deliberate move to prevent 4WD usage. Outside the national park areas, however, gravel logging roads were often used, to get within a day's walk of an objective. These are usually well maintained, and, apart from on the Queen Charlottes, there are no restrictions on public use.

For the visit to Dezaiko and Bocock at the end of the expedition, a Chevrolet station wagon was hired in Prince George, predictably this did not stand up long to hard use on logging roads, and the exhaust, front wheels, and rear windscreen were destroyed, at considerable cost.

Boat

The ferry from Prince Rupert to Skidegate, Queen Charlottes, cost £85, and took approximately 6 hours. Advance booking is advisable in holiday periods. A small ferry operates between Skidegate (Graham Island) and Alliford Bay (Moresby Island) at hourly intervals. A "Canadian" open canoe, together with paddles and lifejackets, was borrowed from Don Rumpel in Jasper, to cross Herrick Creek during the attempt to reach Monkman Pass. While on the Queen Charlottes, Doug Gould generously transported the team in his boat to Louise Island, and around the various limestone islands.

Backpacking

In an effort to minimise environmental damage Parks Canada maintain well defined trails with conveniently spaced designated camping areas. For off-path work, a back country permit is available at the park office. The wardens were usually very experienced and interested in our activities, and keen to hear of our routes and bear sightings. Bushwhacking can be very slow work, and is usually worse in British Columbia than Alberta, due to the higher rainfall, and associated plants such as 'Devil's Club', an extremely spiky shrub, which are particularly unpleasant. On one occasion a group was forced to retreat after 2 hours of bushwhacking gained only 1 mile. Deadfall and thick slide alder on steep avalanche slopes were two other restrictions. On several occasions rivers were forded, this required no special equipment apart from a supporting stick. It is a must, however, during river crossings, to undo rucksack waist belts and chest harnesses in case of accident. Once above the treeline, walking usually became more pleasant, as in the alpine meadows of Alnus Creek and Fang Ridge.

TOPOGRAPHICAL MAPS AND AIR PHOTOGRAPHS

Canada House, Trafalgar Square, London is a useful source of free road and tourist maps and guides for initial planning.

The maps generally used for detailed work were National Topographic system 1:50,000 and 1:250,000 sheets. Based on air photos, with little ground control, the maps are remarkably good, although crags and cliffs are hardly ever shown, and recent logging roads may be omitted. Trails are usually shown, but may not be correctly positioned.

These maps are published by, and available from, the Department of Energy, Mines and Resources in Ottawa, Ontario, and locally from Park information bureaux. Stanfords, Covent Garden, London and McCarta, King's Cross, London, do not stock them, but can order them from Canada, although this takes time.

It is far easier to stop at Calgary or Edmonton University, and take advantage of the helpful library staff to consult maps and air photos, and use the stereoscopes provided.

In Calgary, the Institute of Sedimentary and Petroleum Geology (ISPG), near the University, sells both the National Topographic and geological maps. Geological information on the areas visited is generally scant, with the occasional partly useful memoir or 1:250,000 map.

Unpublished "classified" up to date information may be found in the Geological Survey Open Files which can also be consulted at the ISPG.

CAMPING EQUIPMENT

Tents

Two Ultimate Horizon-F 3-person tents were taken, lightweight and compact when packed, but sufficiently spacious when pitched. The tents had nylon inners and flysheets, which caused some minor condensation problems. Teknix wax was used to weatherproof the new tents before leaving the UK, so they were generally water resistant, except when the inner and outer came into contact (due to awkward pitching, or weight of snow, the latter being due to the relatively poor ability of the tents to shed snow). Generally, however, the Horizon F is an ideal tent for this kind of expedition. In addition, one Ultimate Tramp-2 2 person tent was taken. This was 2 years old, had previously been used on expedition, and continued to perform well in Canada, until its poles were lost at the end of the expedition. Two 3-person tents and one 2-person tent provided for maximum flexibility when splitting into smaller groups

Sleeping Bags

Hollofil 3-4 season bags were mainly used, though 1 down bag was taken. When necessary, these were supplemented by wearing thermal gear. Everyone used 4 season Karrimats.

Stoves

2 Coleman Peak 1 petrol stoves were used on the first few trips, until they became unnecessary because of growing expertise at lighting conventional wood fires, and the considerable advantages of these fires. The stoves were often still used in town camp sites, where open fires were less practical. These stoves proved to be quick, hot, reliable and safe.

Rucksacks

The following were taken: 4 Berghaus AB Expedition, 1 Karrimor Jaguar S85, 2 Karrimor Jaguar VII (old style), 1 Berghaus Cyclops Zappelli. There were no problems, apart from expected wear and tear, although the sacks under 80 litres were not really ideal for the loads carried. Each model had minor advantages and disadvantages; most of the sacks had some problems, especially with very heavy loads, owing to manufacturing or design fault.

Miscellaneous

Insect repellent is essential (see MEDICAL REPORT), and a mosquito net for the tent door is a good idea. A bow saw for wood is essential. Leather boots quickly become worn out by the continual wet/dry cycle, not to mention caving, and plastic boots are certainly worth considering, Koflach boots being used by some of the Canadians. Pliers and Swiss Army knives proved extremely useful for minor repair work, as did a couple of adjustable spanners, intended primarily for underground use, which were used to remove the remains of one of the van's rear shocks which had pulled apart, pivoted forwards, and dug itself into the highway whilst we were travelling at about 60mph.

CAVING EQUIPMENT

Oversuits

Troll and TSA suits were found to be adequate, though the unusually sharp cave walls were particularly rough on them. The new Troll design is good, but the material used seems more prone to catching on sharp rock and tearing than that used 2-3 years previously.

Thermals

2 or 3 layers of Tog 24 'Alaska' thermals were most commonly worn, and those who took Helly Hansen salopettes found them excellent for caving, walking, sleeping, or just lounging around the campfire. Thermal inner gloves were very useful under PVC 'Glovelies', especially with cave temperatures around freezing. Survival Aids headovers were really useful below ground for neck and head warming, and above ground as mosquito shields. It was noted that Polypropylene thermal gear (headovers, inner socks, etc.) is not ideal for drying near a large campfire.

Footwear

Wellies were really too bulky and heavy to be carried in to an area, so usually either walking boots (in common with the Canadians) or trainers were used. This practice effectively destroyed a pair of trainers, or severely damaged a pair of boots during the expedition. Whilst providing less foot protection than boots, training shoes are cheaper, are warm even in icy water if wetsocks are worn, can be worn around camp if not too

destroyed, and you don't have to walk 40km per day in them. They are not ideal for extended trips, but are quite usable for exploration work.

Lighting

Though giving a bright light, carbide is relatively heavy, and in an environmentally sensitive area, one is expected to carry waste out and back to town. If you want to use carbide, either bring it from the UK or arrange in advance to pick some up when you arrive in Canada as it's not easily obtained. The electric component of the Petzl Laser headset was commonly used, and was very good. Teknalites were good as a second light when surveying to illuminate the instruments, but were not too reliable. Every member took a Petzl Zoom headtorch; these were satisfactory, though rather easily damaged if used underground. Duracell 1289 flat cells were not found to be readily available, except at the Mountain Equipment Co-Op in Calgary. The Zoom was good for helmetless scouting trips as well as for general use.

Vertical gear

We took 350m of 9mm Beal/Lyon SRT rope, 20m of 9mm Bluewater, and 40m of 8mm Edelrid (for SRT/handline/slings). As it turned out, this was about the right amount. Rope is not cheap in Canada. The durability and lightweight nature of 9mm rope made it ideal for a lightweight reconnaissance style expedition such as this. The 9mm was excellent in all respects- except when the Canadians used it like 11.5mm Bluewater. Rope was also used for the bear hang. Standard SRT kits were used, trimmed down as much as possible to save weight. Discretion should be used when bolting Canadian caves.

Typically, on a trip to investigate a lead, the 8 UK members took 4-6 oversuits, thermal sets, helmets and lights, about 1-200m of rope, 2-4 SRT kits, and 1 bolt kit. This usually resulted in 1 or 2 groups underground, and 1 or 2 on reconnaissance. Equipment taken on each foray into the wilderness depended very much on particular circumstances, eg. the expectation of caves, length of stay in an area, and length of the walk in.

FOOD

One of the benefits of an expedition to North America is that you can be reasonably sure of obtaining a wide variety of familiar foods (and some not so familiar). The best policy was found to be to stock up with non-perishable goods in the supermarkets to be found in any Canadian city or large town, and to supplement these, as and when required, usually just before a walk into an area.

Be warned that beer, etc. has to be bought from a government liquor store, a hangover from prohibition days, and is not available at the supermarket. It is also illegal to drink in public places, ie. picnic sites, etc.

Whilst in the field, it was found convenient to cook communally, rather than in tent groups. Most meals were cooked in large pots, over an open fire, as this saved the weight of stoves and fuel in packs. On official campsites, the Coleman Peak 1 petrol stoves were more practical. The 'white gas' fuel is widely available in general stores, as is methylated spirits ('methyl hydrate') for Trangia stoves.

Breakfasts consisted of DIY instant muesli, made up from the various ingredients (oats, milk powder, banana chips, granola, etc.), which can be weighed out from supermarket bulk bins. For a change, a variety of very solid but somewhat tasteless rye breads were sometimes combined with sliced meats, jam, or honey etc.

Sardines and trail snacks (peanuts, etc), combined with 'granola' cereal bars or Mars bars, sufficed for lunches and cave food.

For evening meals, pasta, rice and 'Ichiban' noodles are all widely available, as are tomato pastes and soup mixes. Canned goods, such as tuna, chicken, turkey and corned beef, are reasonably cheap, and add interest, and protein, to evening meals. Various dried beans and lentils were also used, although these were less convenient and popular than tinned meat. Colmans soup and casserole mixes proved invaluable to give flavour to otherwise bland meals. The only perishable food taken on most trips was one onion per day.

The importance of cooking and storing food some distance away from the tents was always borne in mind. A "bear hang" (a sack of food suspended in a tree) was usually organised at each campsite.

The major problem with the food was physically carrying enough to keep body and soul together, especially on the longer hikes; certainly, the Canadians ate less than we did while on the trail, simply to keep the weight in their packs down.

MEDICAL REPORT

As we were spending much of our time 1 or 2 days walk from a highway, a great emphasis was placed on self sufficiency. Mountain rescue is free in Canada, although there is no organised cave rescue in the Rockies. As has been shown in the past, the authorities can handle underground incidents, but it will always take time.

At an early stage, working on the basis of eight people in the field for 9 weeks, comprehensive medical kits, based on those suggested in "*Expedition Medicine, a Planning Guide*" by Dr.R.N.Illingworth, were assembled.

The expedition team did not include a doctor, placing certain limitations on the equipment taken, but there were four qualified first aiders, 2 of whom had completed a course in Mountain First Aid. In the field, kits were varied according to size of party and their time away. Medical kits were never left out simply to save pack weight or bulk. As in previous years, the Imperial College Health Centre staff were very helpful, and advised us on medical aspects, suggesting a range of broad spectrum multi-purpose drugs, rather than specific ones. Their policy was to recommend drugs that would normally be taken only with a doctor present, but accepting that intelligent and careful use of the drugs was much better than simply not taking them. With their support, we approached several pharmaceutical manufacturers for material sponsorship. Favourable replies were received from most companies asked to donate drugs and dressings.

Thanks are due to the following companies:

Allen and Hanburys Ltd
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Janssen Pharmaceuticals Ltd
May and Baker Pharmaceuticals
The Wellcome Foundation Ltd
Winthrop Laboratories
Boots the Chemists (5% discount)

Manufacturers of dressings, eg. Smith and Nephew, Robert Bailey and Sons, were not approached through lack of time. When requesting medical supplies, companies usually reply to the initial letter saying: "Yes, but we need approval from a registered General Practitioner". It was found to save time and postage to include that approval in the first place. Generally, where they were offered, we took the smallest units manufactured. With such a generous response from the companies, there was, some unavoidable duplication of drugs, especially analgesics and antibiotics.

Drugs were repackaged (and clearly marked) where necessary, to reduce quantities taken or avoid taking glass bottles. Any drugs not obtained free, and last minute requirements, were bought on private prescription. The College Health Centre also provided, free of charge, several items that they did not require. Most medical supplies are readily available in Canadian towns, and so the kits were restocked there when depleted.

We were fortunate in having very few injuries or medical complaints, most being irritating rather than harmful.

The most common problem was insect bites, mainly mosquitoes, black fly, and deerfly ("B52's"). Depending on individual physiology, some members were constantly troubled, while others seemed largely unaffected. Antihistamine tablets (Piriton) and sting relief cream were used to relieve itching and allow people to get a comfortable night's sleep. A variety of insect repellents, based on diethyl toluamide (DEET) were used for temporary protection against mosquito bites only, black fly and deer fly being relatively undeterred by these preparations. Appropriate clothing, especially 'Headovers' for protecting the neck and head, was more certain prevention.

Self-adhesive moleskin was useful in protection against blisters, while non-adherent dressings were used on serious blisters. For minor skin infections and irritations, a variety of hydrocortisone and anti fungal preparations were used. Sunburn and heat bumps were treated with calamine cream. Pain relief balm was applied in the case of strained muscles.

There was only one case of nausea, on the first trip of the expedition, possibly due to inhalation of dry mammal droppings when caving. This was successfully dealt with by Stemetil/Prochlorperazine.

Due to the pure nature of the stream water, there were no stomach upsets or diarrhea ('Beaver Fever') during the whole expedition. Water

purifying and sterilising equipment (H²OK and Puritabs) was taken but not used. We generally avoided drinking from low level, slow moving rivers, although even after drinking water white with glacial rock flour there were no ill effects.

Medical kit contents: actual quantities taken not given, since open to variation.

Analgesics :

Moderate to severe pain

"Temgesic" (sublingual) buprenorphine 0.2mg Tablets

Mild to moderate pain

Codeine Phosphate 30mg Tablets

"Panadol" paracetamol 500mg Tablets

Antispasmodics :

Severe nausea, vomiting

"Stemetil" Prochlorperazine maleate 5mg Tablets

"Stemetil" 5mg Suppositories

Mild nausea, vomiting, gastro-intestinal disorders

"Maxolon" Metoclopramide hydrochloride 10mg Tablets

Chronic diarrhoea

"Imodium" loperamide hydrochloride 2mg Capsules

Topical Corticosteroids

Severe inflammatory skin disorders

"Dermovate" clobetasol propionate 0.05% wmb 25g Cream/Tube

"Synalar" fluocinolone acetonide 0.025% wmb 30g

Mild inflammatory skin disorders

"Efcortelan" 1% Hydrocortisone 50g Cream/Tube

Acid indigestion

"Actal" alexitol sodium Tablets

Bronchodilators

Severe/acute asthma

"Ventolin" 100 ug dose salbutamol inhaler unit

Acute anaphylaxis

"Adrenaline" injection 1/1000 1ml Ampoules

Antiseptic throat preparation

"Tyrozets" 5mg benzocaine, 1mg tyrothricin Lozenges

Anti-fungal preparation

"Daktarin" miconazole nitrate 2% wmb Twin pack:30g cream,30g powder

Anti-infective skin preparation

"Cicatrín" neomycin sulphate 0.5%, bacitracin zinc 250 units/g, cysteine 0.2%, glycine 1%, threonine 0.1% 50g dusting powder

Antibiotics

Tetracycline Broad spectrum, exacerbations of chronic bronchitis.

"Imperacin" oxytetracycline dihydrate 250mg Tablets

Ampicillin Broad spectrum Penicillin. especially urinary tract infections, ear infection, chronic bronchitis, food poisoning

"Penbritin" ampicillin 250mg (as trihydrate) Capsules

"Magnapen" ampicillin 250mg (as trihydrate)

Flucloxacillin (penicillinase-resistant penicillin) 250mg (as sodium salt) Capsules

Co-trimoxazole. A mixture of sulphamethoxazole 5 parts/ trimethoprim 1 part. Urinary tract infections, exacerbations of chronic bronchitis, food poisoning, bone and joint infections, sinusitis

"Septrin" co-trimoxazole 480mg Tablets

Antihistamine

"Piriton" chlorpheniramine maleate 4mg Tablets

Skin irritation, insect bites, sunburn

"Caladryl" diphenhydromine hydrochloride 1%, calamine 8%, camphor 0.1%, wmb 42g Cream/Tube

Systemic Nasal Decongestant

"Actifed" pseudoephedrine hydrochloride 60mg, triprolidine hydrochloride 2.5mg Tablets

Antiseptic preparations

Minor skin infections

"Cetavlex" cetrímide 0.5% wmb 50g Tube/Cream

Skin disinfection, wound cleansing

"Savlodil" chlorhexidine gluconate 0.25%, cetrímide 0.5% (sterile) 25ml Sachet/Solution

"Medi-Swab" injection swabs

Eye, Ear, Nose preparations

Eye, ear inflammation, nasal allergy

"Betnesol" betamethasone sodium phosphate 0.1% 10ml drops

Eye infection

"Chlormycetin" chloramphenicol 1% ointment 4g Tube

Sting relief cream 14g tube

Pain Relief 35g Tube/Cream,

Insect Repellant

Various UK and Canadian brands, with common active ingredient:

Diethyltoluamide (DEET).

Miscellaneous

2ml plastic syringes and needles, Thermometer, Scissors Assorted safety pins, Paper clips, Sellotape, Tweezers, Plastic glove, Micropore surgical tape 2.5cmx5m, Large wound dressing BPC No.15, Medium wound dressing BPC No.14, Small wound dressing BPC No.13, Ass'd fabric plasters, 10x10cm Melolin non-adherent dressings, 5x5cm Melolin non-adherent dressings, Sterile gauze swabs BP 7.5x7.5cm packets of 5, Sterile non-woven triangular bandage 88x124cm, Crepe Bandage BP 10cm, Sterile Cotton Wool balls, Conforming bandage BP Type A "Crix" 7.5cmx3.5m, Cotton wool buds, Adhesive bandage, Sterile eye pad BPC No.16, Tubigrip Size C, Fabric dressing strip 3.8cmx1m. The kits were packed in plastic tubs

Medical bibliography:

"*Medical Equipment for Caving Expeditions*" Lyons, T. (1984) Trans. BCRA "Cave Sci." v.11 no.3 (171-174)

"*Expedition Medicine, a Planning Guide*" Dr. R.N. Illingworth. Published by Brathay Exploration Group, Ambleside, Cumbria.

"*British National Formulary (BNF)*" published yearly by the British Medical Association and Pharmaceutical Society of Great Britain

"*Mountain First Aid*" notes prepared by Dr. Ieuan Jones of Bangor Hospital for the course (same title) held yearly at Plas y Brenin National Centre for Mountain Activities, North Wales.

SURVEYING

Surveys were carried out to BCRA Grade 5c. Suunto compasses and clinometers were used, along with open reel 30m Fibron tapes. The instruments were hired from the Royal Geographical Society, and the tapes were donated by Rabone Chesterman Ltd. Survey pads were obtained at discount from Cornwall Mining Services. Their "Rite in the Rain" paper performed very well, and is recommended. All the equipment survived intact during the expedition, although 1 tape was destroyed when it was chewed by a porcupine in Bocock

FURTHER COPIES of this report may be obtained from:

Imperial College Caving Club

Imperial College Union

Prince Consort Road

London

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