

EXPEDITION REPORT

Summary

Loughborough Students Andes Expedition involved eight past and present members of Loughborough Students Mountaineering Club, exploring and climbing in the South American Andes during July-November 1989. Six weeks were spent in Bolivia, including three weeks in the southern Cordillera Apolobamba during which numerous ascents were made including the fourth (first British) ascent of Huelancalloc, the sixth (third British) ascent of Cololo, and first British ascents of ten other summits. Three team members then travelled south to the Cordillera del Paine in Patagonia, where their climbs included the first ever ascent of Cerro Negro and a new route on the Trident. This report covers all aspects of the expedition and is split into two parts: (1) Bolivia and (2) Patagonia.



Loughborough Students Andes Expedition was conceived in the late part of 1988 when Students Andes Expedition was conceived in the following on when Steve Hillen started discussing ideas for what to do the following summer with friends with friends in Loughborough Students Mountaineering Club. This club has a good history of individual history of individual members joining expeditions or embarking in Alaska Vamountaineering trips, recent years having seen club members in Alaska, Yosemite, Peruvian Andes, Pakistan Karakoram, Nepal Himalaya amongst other places. However there had not been a major club expedition as such for several years. Initial inquiries (in the bar) confirmed that there was a pool of climbers who would be interested in committing themselves to such an expedition. The next stage was to choose a suitable destination and objectives, so we had to start on some research. We were keen to explore a relatively unknown area, which would give the possibility of first ascents or new routes, and to climb significant mountains as a self-sufficient group, but this had to be balanced with the abilities and experience of the participants. All members would have experience of British and Alpine mountaineering, and some of us had experienced high altitude and serious trekking, but none of us would have done any serious climbing on big mountains.

We decided on South America as a starting point, largely because none of us had been there before, but also because of the Andes' reputation for having an abundance of relatively accessible peaks and fairly reliable weather conditions. The most obvious mountain groups here are the Cordilleras Huayhuash and Blanca in Peru; these undoubtedly have new route possibilities remaining, but all the best peaks have been thoroughly explored by many expeditions. The increasing activities of the Sendero Luminoso guerillas in the Peruvian mountains also acted as a deterrent. However, our attention was caught by a short note in a recent magazine telling of a British expedition just back from the less well-known Cordillera Apolobamba in Bolivia. Contact was made with the leader of that expedition, Mike Smith, who confirmed that the area had distinct potential for a trip like ours, and we followed this up with visits to the Alpine Club library and Royal Geographical Society map room for more detailed research. During the course of this research Steve became inspired by the reports of expeditions to Patagonia, and it was decided to expand our plans to a two-stage trip taking in both Bolivia and Patagonia.

By January 1989 we had sufficient information to state definite objectives, assemble a team, and allocate responsibilities for arranging transport, insurance, equipment, food, medical arrangements, sponsorship etc. Loughborough Students Andes Expedition was under way...

PART 1: BOLIVIA by Mike Shellabear

<u>Members</u>

Ian Burgess	Age 23. Previous experience includes organizing kayak expeditions in the European Alps, and Alpine mountaineering.
Ian Diamond	Age 21. Previous mountaineering experience includes several trips to the Alps.
Steve Hillen	Expedition Leader. Age 23. Has previously organized trekking expeditions to Norway and the Karakoram, and had several Alpine climbing seasons.
David Lister	Age 21. A keen rock-climber and mountaineer, having climbed in Britain, France and Italy.
Kathy Mather	Age 23. Previous experience includes Alpine climbing and back-packing in Norway.
Tim Mather	Age 25. Wide experience including trekking and climbing in Nepal, Operation Raleigh in Pakistan, Alpine climbing, and working as an Outward Bound instructor.
Mike Shellabear	Deputy Leader. Age 25. Has climbed in Britain, French Alps, Dolomites and Nepal Himalaya.
Ian Woolgar	Age 22. Climbing and mountaineering experience in Britain and the Alps.

<u>Objectives</u>

The principal objective of the Bolivian stage of the expedition was stated as being to explore the Pupuya group of mountains at the southern end of the Cordillera Apolobamba, and to climb as many peaks as possible in the area, if possible including some new routes, first ascents or first British ascents. Appendix 1 contains a history of climbing in this range, and a list of reference sources for information. Only three previous expeditions to this area have been recorded in the mountaineering journals, those being by a German Alpine Club team in 1957, and two Japanese teams in 1961 and 1965. According to the available information only the highest of the Pupuya peaks, Huelancalloc, had been climbed more than twice, and none of the peaks had any recorded British ascents. The area had also never been properly surveyed, the only useful maps being sketches made by the 1957 and 1961 expeditions, so it was decided to undertake some simple surveying and produce our own sketch map as well. Paso Osipal was selected as the most suitable area for a base camp as it should be relatively easy to reach and should give good access to both the Pupuya mountains and the Cololo range to the north. Time permitting, it was hoped to also do some climbing in the Cordillera Real and some trekking outside the Apolobamba.

Itinerary

- 19/7–20/7 Arrive at El Alto airport, La Paz, and rendezvous with Bern_{ado} Guarachi of Guarachi-Andes Expediciones agency. Check into _{Hostal} Tambo de Oro.
- 21/7-27/7 Exploring La Paz, visiting British Consulate, Club Andino Boliviano (CAB) and Club de Excursionismo Andinismo y Camping (CEAC), arranging transport, buying food and supplies, etc.
- 23/7 Day-trip to the Muela del Diablo (Devil's Tooth) rock outcrop near La Paz for walking, rock-climbing and general acclimatization.
- 25/7-26/7 Trip to Zongo Pass in the Cordillera Real, including overnight biv_{ouac} at 4800m and climbing a minor peak (5000+ m) just south of Telata, _{for} further altitude acclimatization.
- 28/7 Depart La Paz 1115 in one Toyota Landcruiser and one jeep (both 4WD), carrying 8 expedition members, 2 drivers, one guide and approx. 500 kg equipment. Drive along the edge of Lake Titicaca, then continue north on increasingly poor roads with several breakdowns and other delays. Arrive Ulla Ulla 2030 and bivouac overnight due to the impossibility of navigating across the altiplano at night.
- 29/7 Drive on to Puyo Puyo village, navigating with the aid of borrowed photographs of the mountains and by asking occasional locals (via our guide). Discovered that the road (i.e. track) now continued over Paso Osipal, so it was not necessary to hire llamas and mules for the last section as had been expected. Arrived Paso Osipal 1050, unloaded, asked our driver to return in three weeks (!), and set out to reconnoitre for a suitable site for base camp (BC). Set up BC approx. 2 km south-east of the pass.
- 30/7-17/8 Exploring and climbing in the northern Pupuya and south-western Cololo mountain groups. For the first two days, two pairs made overnight trips to reconnoitre the east and west sides of the Pupuya range, determine possible approaches to mountains and look for suitable routes to attempt. Burgess and Lister climbed Mita and descended south to reach the valleys west of Huelancalloc in one day, and returned over a pass to the west of Mita. To approach any of the further south peaks would require two days walk. Meanwhile, Shellabear and Woolgar found a route over a pass between Iscacuchu and Wellenkamp to the valley north-east of Huelancalloc. However the eastern faces of Huelancalloc and Coruquini were very steep, and approach to the southern and south-eastern peaks was blocked by a long ridge descending from Coruquini, so they returned via a long circuit anticlockwise around the Wellenkamp ridge. From the reconnaissance it was decided to concentrate our efforts on the peaks around BC, as far as Huelancalloc to the south and Cololo to the north. For the next three weeks, teams of two to five people climbed peaks either direct from BC or from bivouac, always leaving at least one person in BC to guard, rest, wash clothes and maintain equipment. Details of climbs are given in the next section.

17/8 Pack up BC, donate surplus food and equipment to local llama-herd^{ers,} and return to Paso Osipal for overnight bivouac.

- 18/8 Collected by our Landcruiser driver 0830 (only half an hour late after three weeks!). Returned direct to La Paz, arrived hotel 1830 for showers, and arrived Eli's Restaurant 2000 for steaks, beers and icecream sundaes (highly recommended!).
- 19/8 Rest day in La Paz for shopping, making arrangements etc.
- 20/8-23/8 Walking the 'Takesi Trail', a recommended pre-Inca route that descends from a 4650m pass in the Cordillera Real to 2100m in the Yungas (the route is described in "Backpacking and Trekking in Peru and Bolivia" by Hilary Bradt, Bradt Publications). We hired transport to San Francisco mine, walked the route at a leisurely pace with two camps and one night in a school, and returned by bus from Chojlla.
- 24/8-27/8 Relaxing and sunbathing at Copacabana on the shore of Lake Titicaca. Travel by scheduled bus (4 hours) and stayed at Hotel Emporada. Good swimming, sunbathing and views, also hired a boat to cruise to the Island of the Sun.
- 28/8 Souvenir hunting in La Paz.
- 29/8 Diamond, K & T Mather, Shellabear and Woolgar fly home from La Paz to London.
- 30/8-31/8 Burgess, Hillen and Lister climb Huayna Potosi (6094m) in the Cordillera Real by the normal (east face) route from Zongo Pass.
- 2/9 Remaining members depart Bolivia.

Details of climbs

This section contains details of the mountains and routes climbed in the Cordillera Apolobamba. Several routes were climbed more than once by different parties, so ascents are listed according to peak in alphabetical order. Heights quoted are as measured by this expedition, taking the accepted height of Cololo as reference. Peaks can be located from the sketch map given in the next section, peak names are as used in the report of the 1957 expedition (see Appendix 1) except where specified otherwise, and routes are marked on the accompanying photographs. Note that the peak names given to us by local shepherds (i.e. Sunchuli and Cunuareya) may well not be correct in any sense, since we had no common tongue and communicated mostly by sign language, but they are used here to prevent confusion over several unnamed mountains.

5465m.
31/7 Burgess and Lister climb south-west from BC to reach north ridge, and ascend this easily (one axe, no crampons) to the summit. Descend south/south-west over soft snow, crevasses and seracs onto mixed ground (Route 1).

17/8 Diamond, Hillen, Shellabear and Woolgar ascend same route from BC, returning same way (3 hours 15 mins total).

Unnamed

Mita

2 summits, both 5375m. The only peak which is not named in any previous report and for which we could not obtain a name

from the local shepherds. No previous recorded ascents, but large cairns were found on both summits. large cairns were found on both summit from the col between Unnamed K. & T. Mather climb south summit from the col between Unnamed

K. & T. Mather climb south summit from gully on the west f_{ace} , and Iscacuchu, via a traverse and loose gully on the west f_{ace} . 31/7Descent to col via east face (easier).

Descent to col via east face (eastern north-south. Rock Hillen and Woolgar traverse mountain north-south. Rock Hillen and Woolgar traverse more to the glacier, followed scrambles led up from the western cwm to the glacier, followed 6/8 scrambles led up from the western. Traverse between summited to a col just below the north summit. Traverse between summited to a col just below the north summit (Route 2).

over soft snow and broken rock (Route 2). over soft snow and broken for Shellabear repeat north-south Burgess, Diamond, Lister and Shellabear repeat north-south 16/8

traverse, same route as 6/8.

3 summits: Central 5665m, South-west 5585m and North- e_{ast} Iscacuchu

- 5585m. Diamond and Hillen climb SW peak by north face. Ascend western Diamond and Hillen climb by poster, initially heavily crevassed side of the large northern glacier, nové 40-45°) Survey 1/8 side of the large northern galaxies and here $40-45^{\circ}$). Summit is a then direct line to final wall (good nevé $40-45^{\circ}$). then direct line to line with side, with a slight dip knife-edge arete, very soft on south side, with a slight dip between two high points (both climbed). Descent by same route, 3 hrs 45 mins from base of glacier to summit (Route 3).
- K. & T. Mather and Shellabear climb NE peak by north-east ridge. From eastern end of northern glacier, ascend obvious 2/8 snow gully (grade I) to gain ridge, follow on variable snow to summit. Descent by same route.
- Burgess and Lister climb central peak by north face. Same approach as 1/8 but branch left to below central summit. Final 3/8 3 rope-lengths up good steep névé with snow-stake belays
- Burgess, Lister and T. Mather traverse SW-NE over all summits. Approach up western edge of northern glacier, traverse under 10/8 rocky section of SW ridge then climb steep ice to gain ridge. Very soft deep snow on several sections of the ridge, and twice had to descend north side to traverse under breaks in the ridge, Descent as for 2/8. 14 hours from BC to BC, an excellent day out (Route 5). [NB this is the same route taken by the 1957 expedition].
- Shellabear and Woolgar traverse NE-SW over all summits. Similar 14/8 route to reverse of 10/8, but including part of the rocky section of SW ridge. Snow conditions much improved since 10/8, 10 hours 30 mins BC to BC (Route 6).
- 5305m. Name as given to us by local shepherds (NB not to be confused with another peak of the same name to the east of the Pupuya group).
- T. Mather and Shellabear climb west flank. Approach from Paso 4/8 Osipal up west side of a moraine buttress to the large glacier, traverse eastwards then up soft snow and through crevasses to a rock/snow ridge leading to the summit. Descent by same route. 3 hours 30 mins BC to summit (Route 7).
- Diamond and Woolgar repeat route of 4/8. 15/8

Cunuareya

5/8

Sunchuli

5370m. Name as given to us by local shepherds.

Burgess, Lister and K. Mather climb NE ridge. Same approach as for Sunchuli as far as the glacier, then up soft snow gully to gain ridge and follow (rock/snow) to summit. Descend scree to the south and regain ascent route. Easy route but excellent viewpoint.

* This is probably the "volcano-shaped" peak climbed by Petroske (see Appendix A)

8/8 Diamond and Hillen repeat route of 5/8. 2 hours 30 mins BC to summit.

Posnansky

5385m. There are actually two separate peaks approximately 1 km apart. We have assumed that the southern (higher) peak is the one called Posnansky by the 1957 expedition, although this is not clear from their description.

7/8 Shellabear and Woolgar climb south-west flank. Same approach as for Cunuareya to the ridge, then scramble north-east up a very broken rock ridge to a minor rock summit (5325m). Descend north-east down steep rocks to reach glacier on north side of ridge. Traverse across good névé towards Posnansky, climb SW flank up a snow ridge and cross crevasses using snow bridges to gain summit. Descent south across glacier direct to reach the original moraine buttress (Route 8).

Huelancalloc

- 4/8 First attempt by Diamond, Hillen and Woolgar abandoned due to heavy snowfall at bivouac.
- 10/8 Diamond, Hillen, Shellabear and Woolgar traverse west to north. From a cave bivouac at 5100m on the northern side of the west ridge, gain the rock ridge and then the hanging glacier that forms the west flank of Huelancalloc. Follow the rock/snow ridge then cross a level crevassed section before climbing steeper (soft) snow to a long lateral crevasse. Cross this via an insecure snow bridge to gain the final slope which eases to the summit plateau (actual summit is a large cornice overhanging the south face). 6 hours from bivouac. Descent by north ridge, turning the rock buttresses on the east side then turning west to reach the bottom of the glacier below the west ridge. 3 hours descent (Route 9). NB Shellabear and Woolgar returned to BC next day via Huelancalloc's north-west col, crossing the snow ridge east of Iscacuchu and descending as for 2/8.

Cololo

5915m.

5805m.

- 7/8 First attempt at west ridge by Burgess, Lister and T. Mather abandoned one rope-length below summit due to bad weather (electric storm).
- 13/8 Burgess, Hillen, Lister, K. & T. Mather climb west ridge. Previous day walk in via Lago Nubi, ascend prominent moraine to a rock bar at 5300m on south side of glacier tongue (west of Cololo) and bivouac on glacier. From bivouac ascend into Cololo's northwest cwm, and steeply up onto the broad shoulder of the west ridge. Climb névé including a short ice pitch for two rope lengths up the exposed final section to the precarious summit. Descent by same route.

Wellenkamp 5185m. No previous recorded ascents, but large cairn found on summit.

- 13/8 Diamond and Shellabear climb north-west ridge. From the Osipal road climb moraine and scree gullies up western flank to gain the north-west ridge. Excellent rock scrambling for 1-2 km along ridge, becoming steep and very loose for final section. Rock summit, 5 hours from road. Descent east to first col, then north down valley and back to road.
- 16/8 K. & T. Mather repeat 13/8 route but include more of the ridge.

t one of these peaks is probably also Petroske's "fin-like" summit (see Appendix A)

Photographs



Photograph 1: Iscacuchu and Mita from the north-west



Photograph 2: 'Unnamed' peak from the west



Photograph 3: Iscacuchu Central from Iscacuchu North-East



Photograph 4: Posnansky and Sunchuli from near base camp



Photograph 5: Huelancalloc from Iscacuchu

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Equipment, food, transport: See appendices.

Bolivia:

The small part of the country that we saw was fascinating for its variety of scenery and the interesting contrast in culture from Britain. The country is generally very under-developed, especially in the more remote areas, and the widespread poverty is very obvious. As obviously 'wealthy' foreigners we were careful to guard our possessions, but never felt threatened at any time. The markets in La Paz are amazing and really have to be experienced (NB eating in the market is cheap but dangerous to health). It would clearly be advantageous to speak Spanish, but (as we have proved) it is quite possible to get by with nothing more than a phrasebook (and good hand signals!).

Help for expeditions:

We made most of our arrangements through a specialist mountaineering agency in La Paz run by Bernado Guarachi (see Appendix for addresses). He speaks Spanish and German, has a good knowledge of some of the mountains (although not our destination), and offers guiding, organized trips, equipment hire and transport hire. We found this agency to be very helpful (e.g. offered us a free lift to the airport) and efficient by South American standards. The Club Andino de Bolivia is the official mountaineering organization, but we could not obtain any help or information from them as they don't seem to be interested. Much more helpful was an 'alternative' club we encountered called CEAC, who were extremely helpful and friendly, and keen to have contact with any visiting mountaineers.

Altitude:

It is very important to acclimatise to the altitude properly, but this is made easier by the fact that La Paz is itself at 3600m. Walking up and down the steep streets definitely got easier as time went on! Our method of spending a week combining preparations in La Paz with trips to higher altitude would seem to be ideal, and although some people suffered a bit on our first night at 4800m we felt well prepared when we got to the mountains.

Cordillera Apolobamba:

Access was easier than expected due to the new road over Paso Osipal. The mountains were much as expected in character, and with the snow line at about 5200m we were able to make base camp in a grassy meadow serviced by glacial steams and still climb local peaks over 5000m within a few hours. It was disappointing to find that the southern Pupuya peaks were not very accessible from our base camp, but there was still plenty of choice.

Weather:

The weather was generally very good. In La Paz it was very warm and bright (sunglasses desirable) during the day but turned cold as soon as the sun set. Similarly in the mountains it was warm at base camp when the sun was shining, but cold in the evenings. Frost every night, but probably no colder than -10 C. For the first week we had clear mornings with cloud rising from the Yungas (forested valleys to the east) every afternoon. Later we had a period of fine settled weather, and we ended by having regular snowfalls in the afternoons. Twice we had big overnight snowfalls (approx. 8 cm), but people were either climbing or walking every day.

Snow conditions:

conditions: Snow conditions on the mountains varied considerably during our time there. Snow conditions on the mountains varied conducte good while all south-facing but generally all north-facing slopes were quite good while all south-facing slopes were deep, unconsolidated and very soft. Several times we caused loud slopes were deep, unconsolidated and very born but we never saw any cracking noises whilst crossing snow-slopes, but we never saw any avalanches. Crampons were always worn on snow, and ski-sticks were very avalationes, orampons were always worth on the frective belays although $i_{Ce_{-}}$ useful. Snow stakes were usually the most effective belays although $i_{Ce_{-}}$ screws were sometimes used.

Wildlife:

Llamas and alpacas were abundant as they were grazed and herded by local farmers in the pastures around base camp. The only other mammals seen were ground squirrels. Condors and other birds of prey were seen several times flying overhead, and they are very impressive.

Takesi Trail:

Highly recommended as an enjoyable walk through a wide variety of ecology and scenery, and as relaxation after being in the mountains. Best to take a tent.

Suggestions for Future Expeditions

There is still good scope for first ascents and new routes in the southern Apolobamba. Immediately east of Cololo and Posnansky is a group of glaciated peaks which are probably unclimbed, and looked to include some impressive faces and ridges. The summits are probably more than one day from the valley, so a high camp on the glacier would probably be required. We also had some distant views across to the group of peaks east of Huelancalloc (at the end of Cavayani's east ridge and 5600m high according to the 1961 Japanese expedition's map) which are apparently still unclimbed and would make a good objective (we had hoped to climb these, but we were too far away). These would probably be best approached from Curva village south of the Pupuya group. On the drive out we caught some glimpses of the southernmost peaks (Acamani, Yanaorco), which looked to have some good technical routes.

Conclusions

Overall the trip was a great success, as we achieved all our stated objectives and had a very enjoyable and satisfying time as well. As always there was the feeling of not having time to do everything that we would have liked to, such as visiting other parts of the country and climbing more of the big peaks in the Cordillera Real, but considering that we organized everything ourselves we managed to make very effective use of our time. The Apolobamba turned out to be much as we had hoped, and pretty ideal for our type of expedition. The Andes do indeed offer lots of accessible peaks, and if you choose the area carefully you can have the place to yourselves and make first ascents.

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(See also Appendices for food, equipment and medical acknowledgements)

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CORDILLERA APOLOBAMBA - HISTORY

by Mike Shellabear

The first well-documented exploration of the Cordillera Apolobamba region was carried out by the Peru-Bolivia Boundary Commission and published by the Royal Geographical Society in 1918 [1]. The map of this survey covers the northern and western-central Apolobamba, and just extends to include Cololo and Huelancalloc in the south. It is useful as a general map, but not detailed enough to be of use for specific mountain routes. Since 1957 a number of expeditions have visited different parts of the Apolobamba and reported their activities in various journals, but due to the lack of any detailed maps or any local collection of information there has in many cases been confusion over the locations, names and heights of climbed peaks. The first thorough survey of Andean ascents was published in the American Alpine Journal (AAJ) in 1962 [2], and updated in 1973 [3] and 1974 [4]. Geoff Tier reviewed the recorded ascents specifically in the Apolobamba in the report of his 1985 expedition [5], and more recently Jill Neate's book on mountaineering in the Andes [6] contains a fairly comprehensive list of ascents. The following paragraphs summarize the climbing activity in the Pupuya group, and the area north of Paso Osipal as far as Cololo.

The first mountaineering expedition to the Apolobamba was a 3-man German Alpine Club (DAV) team led by Werner Karl in 1957 [7,8]. Reference 7 contains a useful map showing the topography of the area and the routes made. This team started in the southern Apolobamba, approaching via Ulla and Puyo Puyo villages, and making a base camp just west of Paso Osipal. From here they ascended a minor summit which they called Punta Lisa (5400m), then traversed Mita (5500m), also known as Levisivita) and Iscacuchu (5650m) from west to east in one day. They also travelled around to the Uya Kaya valley south of Mita, and climbed Huelancalloc (5836m) via a rock rib leading up to the glacier north-west of the summit and then up the north ridge. To the north of Paso Osipal they climbed Posnansky (5450m) by the north ridge, then Cololo (5915m) from the south by a complex route probably finishing up the west ridge and descending the south-east ridge. They subsequently moved north and made several other noteworthy first ascents.

The second expedition was a 7-man Japanese team led by Ichiro Yoshizawa in 1961. Their report in Sangaku (the Japanese Alpine Club journal) [9] is unfortunately only in Japanese, although it does contain a photograph of the main Pupuya ridge from the north-west and a very good sketch map of the entire Pupuya as far north as Cololo. A brief report was also printed in AAJ [10]. They made their base camp further west near Puyo Puyo, and split into two groups. Group A made a camp south-west of Huelancalloc, and from there climbed Canisaya (5750m) via the northwest glacier and a (unspecified) ridge, Cavayani (5700m) by an unspecified route, and Huelancalloc by the west ridge (another team attempted a route from the southwest but failed). Group B made a high camp at 5350m above Lago Canisaya, and from there climbed Acamani (5700m) by the north-west and north-east ridges (topo diagram in ref. 9) with a bivouac on the descent, then Yanaorco (5600m) via a junction of ridges then up the west ridge (as shown on their map). The map (ref. 9) also indicates an ascent of Posnansky, but no mention is made of this in any of the reports.

Another Japanese expedition visited the same area in 1965, this time six members of Asano School Alpine Club led by Junichi Makiguchi. Their reports in Sangaku [11] and AAJ [12] are both in English but contain no map, and several of the peaks they climbed are difficult to identify from their descriptions. The situation is further confused by the two reports quoting different names for what appear to be the same peaks in some cases. What is clear is that they climbed Cololo from the south, probably by a similar route to the first ascent, and that they completed a 4-day south-north traverse of the main Pupuya ridge taking in Acamani, Cavayani, Canisaya, Casarara (5702m) and Huelancalloc. Of the other peaks climbed, Coruquini (5810m) is identified as being just east of Huelancalloc, but no route description is given. Cuchillo I (5655m), listed in ref. 11 as climbed by Miyazaki and Okajima on given. Cuchillo I (5655m), listed in ref. 11 as climbed by Miyazaki and Okajima on probably the same as Chuquillo I (5560m) listed in ref. 12 as being climbed by the probably the same as Chuquillo I (5450m) [12] is north-east of Chuquillo I, and same pair on May 27th. Chuquillo II (5450m) [11] as it was climbed on the same day probably the same peak as Asano (5450m) [11] as it was climbed on the same region as these. Huarin is not located, except that obviously it must be in the same region as these. Huarin is not located, except that obviously it must be in the same region as these. Somewhere south of Huarin.

The next recorded visit to the Pupuya was in 1979, a French Alpine Club expedition led by Bernard Genant [13]. Three of this team attempted Acamani by the south ridge, reaching a high point on the ridge detached from the main peak which they called Acamani Sur (5320m).

The third ascent of Cololo had to wait until 1986 when James Petroske and family from the USA made a base 8 km west of Cololo in a high valley south-east from Lago Khello. They report [14] climbing four unnamed peaks: a 5400m rock peak southwest of base camp; an easy snow peak with a "finlike summit" 4 km south of Cololo by its north-west ridge; a 5580m "volcano-shaped" peak 4 km south-southwest of Cololo by its north-west face; and a 5490m rock peak (the second summit south-west of Cololo) by its southwest ridge from a col. Finally they climbed Cololo, approaching from the south and finishing up the south-east arete.

In August 1988 a UK Yorkshire Ramblers Club expedition [15] led by Michael Smith climbed Cololo by a rock ramp followed by the west ridge, having made base camp by Lago Pauoche, 5 km west of Cololo.Finally in August 1989, Dave Tyson's UK Bath University expedition which was based west of Cololo at the same time that the Loughborough expedition was by Paso Osipal, climbed Cololo by the first ascent of its north ridge.

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APPENDIX B

TRANSPORT AND TRAVEL

by Ian Diamond

Travel to Bolivia

Bolivia is one of the most remote and difficult places to travel to in South America with no direct flights except internal ones within South America. Before making a choice of routing several decisions need to be made, including: time of stopover, level of comfort required, cost, baggage allowances, etc. For our group the main criterion was cost, but other requirements were large baggage allowances and the need by some of the group to stay longer than three months. For this reason we went by two different routings: (i) London - Rio de Janiero/Sao Paulo - La Paz with Varig airline, costing £685 including a specially arranged baggage allowance of 20 kg on the first leg (and effectively all the way to La Paz as it was unlikely to be checked at the changeover); (ii) London - Bogota - Lima - La Paz with Viassa/Lufthansa, which enabled a five month stopover and return flight from Santiago in Chile. The second routing had no real baggage concessions, involved two changes and at £710 cost slightly more than the Varig routing. It also involved more delays and was consequently very tiring. It should also be noted that Lloyd Aero Boliviano and Lufthansa have a pooling agreement which means that you are just as likely to end up on a 2-prop plane as a 737 for the final leg! The easiest way to deal with baggage allowances is to take as much as possible as hand luggage and wear as much weighty stuff as possible, i.e. plastic boots and climbing hardware but not axes (not allowed in passenger compartment). As to quality, the Viassa flight was nothing stunning with little food or drink served. On the Varig flight however food was excellent with hot meals served at mealtimes and free drinks (as much as you want including beer and spirits!).

N.B. Varig flights are best booked through Journey Latin America who are the sole UK concessionary.

<u>Travel in Bolivia</u>

In the capital (La Paz) there are three main modes of public transport: taxis, collectivos (minibuses or cars) and buses. The collectivos travel a fixed route and you can invite others to join you and share the cost (we didn't use taxis or collectivos). Buses are cheap (e.g. 0.40 Bolivianos or about 10p within the city centre) and are very good so long as you know where you are going (you learn quickly). They are also quite entertaining, with superb driving demonstrations of how to cut everyone up and how to get through a gap half the size of your vehicle! Out of towns, buses are the main mode of transport and still quite cheap at about $\pounds 2$ for a 2-3 hour journey. To more popular destinations there are luxury coaches which are quite frequent and fairly cheap, or trains which are infrequent! The cheapest method of travel is to "hitch", the only notable difference being that in Bolivia when you get a lift you pay the driver some money! The most convenient but most expensive method is to hire a vehicle and driver. This greatly increases your chances of getting to your destination, especially if it is unusual.

In Bolivia all modes of transport are quite uncomfortable due to the lack of any decent roads, but it is quite cheap and good fun to get around. It is possible to

hire and drive yourself, but this is probably ill-advised as there are very f_{ew} maps, even less signposts, and the likelihood of breakdown with no RAC or $AA_!$

The best general reference is "The South American Handbook" (edited by _{J.} Brooks), published by Trade and Travel Publications.

APPENDIX C

EQUIPMENT

by Tim Mather

We were a reasonably lightweight, self-sufficient expedition. As there is a wealth of literature on what gear you should and shouldn't have, this appendix simply contains lists of equipment we took and comments which will hopefully be useful to future expedition organizers. The equipment was similar to that taken to the Alps, as we set up a basecamp then climbed peaks from there, bivying for the longer routes.

Personal Kit List

Sleeping bag: 4 season minimum with compression sack. Bivouac bag: Gore-tex. Karrimat/Thermarest: Full length. Sleeping bag liner: Keeps bag clean when using continuously, adds extra insulation. Plastic boots: Climbing. Gaiters: Yeti type are much warmer and more waterproof. Crampons (with spare straps, screws etc.): Step-in type much easier to use. Light weight trekking boots. Rucsac(s): Large, even climbing sacs should have reasonable capacity i.e. 50 l minimum. Ice axe: General alpine type probably better than technical axe. Ice hammer: Technical, short. Harness: Avoid Whillans (did you ever hear the story about twisted testicles?). Helmet: Essential!! Ice screws/pegs: Coordinate quantity between group. Figure of 8 descendeur: Learn how to belay with it! Prusik loops. Karabiners: At least 2 screwgates each, plus clipgates. Water bottle: Sigg type best, or wine bags or PET lemonade bottles. Compass & whistle: For emergency use (as we had no maps anyway). Glacier glasses: Essential. Filter cream and lipsalve: Strong sun can cause horrible noses and lips! Head torch with spare bulbs and batteries (round cell adaptor). Bum bag, money belt: Especially for the cities. Toothbrush, shampoo (if you want), soap: Available in the markets. Camera(s), films, accessories, camera cleaning kit: Very important. Musical instrument: e.g. harmonica, pennywhistle (optional!). Padlock: Try and make all bags lockable. Stuff sacks: Always useful. Photocopies of passport, air ticket and other documents. Passport size photos: At least 4. Photos of family/postcards from home: Good icebreakers with locals. Walkman: If you want to be unsociable. Record facility good for local sounds for slideshows. A good book: For those not on honeymoon!! Swiss army knife. Plastic mug, bowl and spoon: Available in the markets. Vitamin tablets and basic first aid kit.

Ski poles: Telescopic type save space, easier to carry. Small thermometer: Keyring type.

Clothing

Gore-tex waterproofs: Cagoule and overtrousers. Undies: 2 pairs minimum (one is bound to wear out!). Decent socks: Loop-stitch type best, only cheap ones available out there. Decent socks: Loop-stitch type best, only chear and scarves available in market Balaclava: Thin, silk type best; lots of chullo's and scarves available in market Gloves, mitts, sunhat. Towel: Available out there.

Shirt.

Thermal underwear: 2 long-sleeved tops and long-johns.

Pullovers: Available out there.

Fleece/fibrepile jacket and salopettes: Very useful.

Duvet jacket: Certainly makes evenings more comfortable. Duvet jacket: Certainly makes evenings more common basecamp. We had very few occasions to wear them.

<u>Group Kit List</u>

Cooking

5 MSR Whisperlite Internationale multifuel cookers & 1 spares kit. Sigg bottles as fuel containers.

1 have a second second second	(h	ht	in	I o	Dog	for	25 Bols)
1 kerosene pressure stove	(boug	nι	ш	Га	raz	101	20 DOIS)
5 small aluminium pans	("	**	**	11	11	3	Bols)
1 large aluminium pan	("	11	11	11	**	8	Bols)
1x5 litre pressure cooker	("	11	11	**	**	38	Bols)
1 ladle	("	11	11	**	**	2	Bols)
4x10 litre fuel containers	("	**	**	11	**	5	Bols)

2x20 litre fuel containers	(n	11	**	11	11	5 Bols)
4 inners of wine bags as water	ca	rrie	rs.				

Bin liners.

Plastic bags.

5 spare lighters.

Sacks and plastic sheeting (bought in La Paz).

Basecamp

4 x 2-man tents for basecamp. 4mm underlay for all tents. Spare mitts, spare crampon straps. Photocopies of relevant guidebooks/maps. adjustable spanner, carpet tape, insulating tape, araldite, pliers, file Tool kit: hacksaw blades, screwdrivers, jewellers screwdrivers (for cameras) car inner tube (for gaskets/seals).

Sewing kit: cotton, strong thread, large needles, thimble, buttons, safety pins spare 'fastex' buckles, hipbelt buckles.

<u>Climbing Gear</u>

16 snowstakes.
4 deadmen.
10 ice screws.
2 slings with 2 screwgates each.
24 rock pegs.
1 lead rack between the group.
20m x 4mm abseil tatt.
Snow shovels (deadmen converted to attach to ice axes).
8 x 50m kernmantel ropes (9mm).
2 altimeters.
2 sighting compasses (weighted for southern hemisphere).

Comments

Cooking

The MSR cookers were very light and simple. They worked well, considering the quality of the fuel used; however they did require regular cleaning (simple but messy). They ran better on petrol than on kerosene and were successfully used at up to 17,000 ft.

'Big Bertha', the kerosene basecamp cooker bought in La Paz, was used continuously for three weeks with no problems apart from gradually losing pressure, this could be rectified with extra pumping. Big Bertha and two MSR's were used in basecamp, with up to two MSR's out on bivy at any one time. One MSR was always kept as a spare, to be cleaned and maintained in rotation.

We used about 15 litres of kerosene, at 54 centavos/litre, and 15 litres of petrol, at 76 centavos/litre, during the three weeks. This included heating water for washing!! Camping Gaz was available in one shop at 4 bolivianos/canister, in limited supply. Unsure about meths.

Pans, bowls, mugs, spoons, ladles etc. were all available in La Paz markets, but we couldn't find any potato peelers. It is worthwhile taking one with you.

<u>Tents</u>

We took two Ultimate Phazor Domes, one Wild Country Supernova and one Hillerberg Nallo. The Supernova was taken for three people to use in Patagonia. The Nallo was by far the lightest and easiest to put up, with similar space to the Phazor Domes. The Phazor Domes had no method of ventilation once the zip was closed (not actually a problem as we only had two inches of snow at a time). The tool kit and sewing kit were essential and almost all items were used.

Climbing

Ski poles (telescopic) were probably the most useful climbing equipment t_{aken} , Deadmen were attached to ice axes with 'U' bolts to make snow shovels. The snow stakes were made at British Aerospace Training Centre out of sheet t_{int} . They did the job well but were fairly smashed up by the end of the trip. t_{ice} screws were also useful, but the rock was generally too friable for pitons. However some were used and it was worthwhile having a few.

Sighting compasses donated by Silva UK Ltd were essential to the production of a map of the area. Altimeters hired from the RGS allowed us to verify the heights of the peaks. The mirror on the compass was useful for inspecting sunburnt lips a_{nd} noses!!

The only gear failure was a crampon braking, however it was lashed back tog_{ether} and used for the rest of the trip!

Gore-tex bivy bags were kindly loaned by Ken Ledwood and were essential for bivies, as we were snowed upon several times. Everyone used 4 season down sleeping bags of various makes. The sleeping bags treated with Nikwax TX10 were much more resistant to dampness from condensation, especially noticeable when bivying.

Clothing

Fibrepile salopettes were very useful for evenings in basecamp or bivies and were good for climbing. Down duvet jackets were also a must. Mountain Equipment Annapurnas and Rab jackets were used. The Rab jackets were larger, loftier and had a waterproof outer, but were much heavier and bulkier than the Annapurnas. Some duvets were treated with TX10, but the treatment was done in a rush and those duvets consequently took longer to loft up after they had been in a stuff sack, but I still feel it was worthwhile treating them - just take a bit more care over it.

<u>Acknowledgements</u>

Donald Henderson; North Cape - supplied thermal underwear and fibrepile jackets. Ken Rawlinson; Phoenix Mountaineering Ltd - supplied waterproofs and helmets. Dave Kay; Lake Mountain Sports, Penrith - discounts on equipment. Tony Wright; The Outdoor Shop, Milton Keynes - discounts on equipment. Ken Ledwood; KLETS - advice, supply of clothing, loan of bivy bags. Lynne Spink; Kodak - donated Kodak Xtralife KAA alkaline batteries. Marilyn Dixon; Pentax - supply of Pentax monocular. Marilyn Draper; Outdoor Pursuits Services - supply of MSR cookers. Jennifer Peacock; Nikwax - donation of Texnik, TX10, Nikwax. Royal Geographical Society - hire of altimeters. A.L. Wale; Silva UK - donation of sighting compasses. Rab Carrington - supply of down duvet jackets. Decca Bell; Outward Bound Ullswater stores - loan of deadmen and ice hamme^{rs.} Jessops of Leicester - discount on films.

FOOD

by Kathy Mather

Food selection and planning

Initial thoughts for menus were based on several factors:

1. Nutritional content of menus.

Increased metabolism at altitude and the large amount of energy expended through mountaineering causes normal energy expenditure to be approximately doubled, therefore about 5000 kilocalories per day would be the optimum intake. The need for fresh fruit and veg or some other food high in Vitamin C was seen to be very important as this was the only nutrient we might possibly suffer a deficiency of during our 3 weeks in the mountains. One orange per day would have catered for this. An overall balanced diet with a good supply of proteins, carbohydrates and fruit and veg supplied in a wide variety of foods was however seen to be essential on a psychologically motivating basis.

2. Cooking facilities.

Cooking was to be done on MSR Whisperlite stoves both in basecamp and on bivvi. A larger kerosene burning stove which would take a heavier load, e.g. a pressure cooker, was also bought for use in basecamp only. All foods cooked on the MSR's had to be quick and easy to cook, however the pressure cooker would allow for the cooking of dried pulses, rice and pasta with relative ease and speed.

3. Storage of food.

Ground temperature at basecamp would vary between 20 C during the day and -15 C at night. Bad weather was not anticipated and no perishable food was to be used. Therefore the only protection the food needed was a cover to protect it from the frost. Food was therefore stored on a groundsheet and simply covered with plastic sheeting at night. The only foods which suffered were the fresh vegetables which we hadn't expected to last more than a week or two anyway.

4. Availability of food in Bolivia.

It was decided that due to the variety of food available in Bolivia, we would only take food which was donated to us from the UK to Bolivia. Therefore menus were mostly composed of food available in La Paz. See list A.

Food Donated

Many companies were written to to request discount or donations on items such as dried milk, specialist dried meat dishes, rise and shine drinks, instant custard powder and dessert mixes. Donations of food received were: 1. 25 packs of 'boil in the bag' lasagnes from Bernard Matthews Kitchens; 2. 12 bottles of St. Ivel '5 Pints' from St. Ivel Ltd.

All other food was actually purchased in La Paz.

Water

Acting on the advice of other expeditions it was decided to use iodine to purify water. This proved to be very successful. Only very small quantities of iodinewater. This proved to be very successful. Only very ficient to purify 1 litre of were needed. 5 ml of saturated iodine solution was sufficient crystals in a were needed, 5 ml of saturated iodine solution was outrie of water. The saturate was simply made by dissolving iodine crystals in a small superior the iodine was also minimum. quantity of water. The distasting of the water from the iodine was also minimal. The powder drink 'Yupi' available in La Paz was used to disguise the iodine flavour, however some Yupi flavours were actually worse than the iodine; orange was definitely the favourite.

Equipment for cooking

Equipment included MSR stoves and a kerosene cooker. See gear report (Appendix 3). One invaluable piece of equipment was the pressure cooker. It came in very handy for cooking rice, pasta and pulses, which would otherwise have taken much longer to cook. We also bought a washing-up bowl to use for washing dishes, bodies and clothes - it was so much in demand on rest days that 2 would have been a definite advantage. Eating and drinking utensils were also purchased by some of the group, all were readily available in La Paz. 1 litre mugs proved to be excellent for a nice big brew.

List A: Food available in La Paz

Snacks:

Chocolate, variety of dried fruit, variety of nuts, biscuits, sweets.

Carbohydrates:

Noodles, rolled oats, potatoes, rice, pasta, flour, bread.

Vegetables and fruit:

Carrots, cabbage, onions, apples, peppers, garlic, bananas, corn, chillis, papaya, oranges, tangerines, lemons, limes, grapefruit, tomatoes.

Protein:

Nuts, eggs, cheese, dried pulses, peas, tinned fish and meat, corn.

Miscellaneous:

dried soup, dried milk, sugar, powdered drink, coffee, biscuits, salt, peanut butter, sweets, cooking oil, tea bags, margarine, butter, stock cubes, herbs and spices, hot chocolate drink, cornflakes, jam and marmalade.

Table A: Menu for Basecamp days

MEAL	FOOD	QUANTITY	ENERGY
Breakfast:	Porridge	2oz oats,1/2 pt milk,sugar	400 kcal
	Tea	1/2oz sugar	25 kcal
Lunch:	Chapatis & marg.	2oz flour,1/2oz marg.	450 kcal
	Soup	1/2 pt packet mix.	200 kcal
	Biscuits	4oz	300 kcal
	Fruit	4oz	50 kcal
	Drink	1/2 pt	80 kcal
Evening meal:	Curry & rice Chilli & rice Tuna sauce & pasta Cheese sauce & pasta Vegetable stew	} } } See recipes below } }	1200 kcal
Snacks:	Yupi	1 litre	200 kcal
	Sweets	4oz	400 kcal
	Fruit & nuts	2oz	300 kcal
		Total intake	3500 kcal

Extra calories were taken in the form of fruit drinks, sweets, nuts or chapatis.

Table B: Menu for mountain days

MEAL	FOOD	QUANTITY	ENERGY
Breakfast:	As basecamp	(sometimes with hot chocolate)	400/500 kcal
Daytime snacks:	Sweets Chocolate Nuts & raisins Biscuits Fruit Yupi	4oz 4oz 5 2oz 4oz 4oz 1 litre	400 kcal 400 kcal 300 kcal 300 kcal 50 kcal 250 kcal
Evening meal:	Pasta Soup Cheese Biscuits Tea Yupi	3oz 1/2 pt 3oz 4oz 1 pt 1 litre	400 kcal 200 kcal 400 kcal 300 kcal 50 kcal 250 kcal
		Total i	ntake 3500 kcal

Again energy intake was increased with extra snacks.

Evening meals recipes

(Weights per person)

- Curry and rice: 1/2 oz cooking oil, loz onion, loz pepper, loz raisins, 2oz nuts, 1/3pt milk 1/2 oz cooking oil, loz onion, loz pepper, loz raisins, 2oz nuts, 1/3pt milk (dried), 1/2oz flour (thickener), 1/4oz coconut, 3oz rice, curry powder, garlic, salt and pepper.
- 2. Chilli and rice: 1/2oz cooking oil, loz onion, loz pepper, 2oz tomatoes, 3oz kidney beans (soaked and cooked), 1/3pt milk (dried), 1/2oz flour (thickener), 3oz rice, chilli powder, garlic, salt and pepper.
- 3. Cheese sauce, vegetables and pasta: 1/2 pack cheese, 2 pints milk (dried), 2oz flour (thickener),1oz peppers, 2oz carrots, 1oz corn, 3oz pasta, oregano, garlic, salt and pepper.
- 4. Tuna sauce and pasta: As above but tinned tuna replaces cheese.
- 5. Vegetable stew with potatoes: loz onions, 2oz carrots, 2oz peas, 3oz butter beans, 2oz tomatoes, 1 pack soup mix, 6 oz potatoes, oxo, herbs, garlic, salt and pepper.

<u>General Comments</u>

Overall food was good. Weight loss and illness were not a problem on the whole. There were one or two problems with hygiene, we found several 'flies' in among the corn. All dried food bought on the street markets had to be carefully cooked as the people running the stalls quite happily used the gutters as a toilet and there certainly didn't appear to be any evidence of hand-wash basins!!

Storing of food was quite easy as our only perishable foods were the vegetables. Food was simply stored in 'corn' sacks on plastic sheeting and covered with plastic at night to protect it from the frost. It was essential to uncover food during the day though to prevent it from sweating and going mouldy. The only cooking problems were with the dried corn which needed about 3 hours cooking to get it soft enough to eat. Eventually it was just eaten as salted 'popcorn'.

There were some Bolivian foods which we didn't take too well to. The first was the tea which was very weak, even one bag to a cup was not really enough. The second was the dried milk which had real problems dissolving - lumpy tea became very commonplace. Hot chocolate was available but not as good as Cadbury's. Finally chocolate itself was available but it was expensive and certainly didn't taste as good!

Acknowledgements

David Kemp; Bernard Matthews Kitchens - donated 'boil in bag' lasagnes. Geoffrey Thompson; Modus - bought magazine article about trip. Gavin Love; Simmers - supplied biscuits. St. Ivel Foods Ltd - donated '5 Pints'.

D-4

MEDICAL REPORT

by Dave Lister

There was no doctor in the team, so I was arbitrarily chosen to sort out the medical details. I was greatly assisted with advice from Dr. D. Wheeler on all aspects of medical preparation.

Vaccinations

We were advised to be vaccinated against: Yellow fever, typhoid, polio, hepatitis A and tetanus.

Medical Items and Equipment Taken

(for 8 people)

ITEM	QUANTITY	USE
<u>Analgesics</u> Solpadeine Paracetamol Temgesic Difflam Surgam	100 tabs 400 tabs 30 tabs 1 tube 40 tabs	Migraine Mild pain Fractures etc. Sprains Pain and stiffness
<u>Antibiotics</u> Flucloxacillin Zinnat Ciproxin Flagyl	24 tabs 12 tabs 60 tabs 100 tabs	Broad spectrum Antibiotics Dysentry
<u>Night sedative</u> Temazepam	100 tabs	4 hours sleep
<u>Antihistamine</u> Hismanal	60 tabs	Hayfever, bites
<u>Antiholminthic</u> Vermox	40 tabs	Worms
<u>Bronchodilator</u> Ventolin	2 inhalers	Wheeze
<u>Diuretics</u> Fruse mide	50 tabs	Pulmonary oedema
<u>Antacid</u> Aludrox Axid	50 tabs 50 tabs	Indigestion Gastric bleed

Laxative	so taka	Constipation
Senna	50 tabs	
Constipant		Diarrhoea
Immodium	200 tabs	Diarrie
Rehydration Salta		1
Electrolade	100 sachets	Diarrhoea
Steroid		Pulmonary oedema
Dexamethasone	50 tabs	
Eve and Skin Care		
Amethocaine	10 droppers	Eye pain
Genticin eve drops	4 droppers	Eye/ear infection
Genticin	3 tubes	Bacterial skin infection
Daktarin	8 packs	Fungal skin infection
Tanderil	4 tubes	Snow blindness
Betnovate	1 tube	Rashes, sunburn
<u>Throat</u>		
Codeine phosphate	50 tabs	Cougn
Medical Equipment		
Tweezers	1	
Crepe bandages	3	
Cotton wrap	12	
Triangular bandage	s 3	
Gauze	4	
Durapore	6	
Micropore	8	
Tegaderm	8	
Skin closures	40	
Scissors	1	
Thermometer	2	
Mediswabs	40	
Non-absorbent dres	ssings 12	
Aids kit	1	
'Mountaineering Fir	st Aid' manual	
General		
Sun cream		
Multivitamins		
Iodine		Watan tractment
Savlon		Mater treatment
		Disinfectant
<u>Antimalarial</u>		
Avlochlor	Quantity decided	
Paludrin	individually	

<u>Notes</u>

The expedition was remarkably free from illness, the majority of illness that occurred being associated with the high altitude experienced in Bolivia. In order to gain acclimatization the following program was followed:

the subsequent acclimatization climb to 5100m the majority of the party slept poorly and suffered headaches. During the weak. We moved to base camp at 4800m after 7 days by which time most of the party felt fairly good at altitude. Problems encountered were headaches after strenuous exercise and a couple of cases of sore throats with chesty coughs. A tingling sensation in the fingers was reported by several members of the expedition.

Non altitude related problems experienced were an ear infection which cleared up with treatment, also several cases of diarrhoea (or the "Inca quickstep") occurred. The only illness which was experienced in Chile was diarrhoea. Anti-malarial drugs were taken for the necessary period due to the malaria risk in the low-lying areas of Bolivia.

Acknowledgements

The majority of medical equipment was generously donated by the following companies:

Allen and Hanburys Ltd Bayer UK Ltd ICI Pharmaceuticals (UK) Janssen Pharmaceuticals May and Baker Pharmaceuticals Nicholas Laboratories Ltd 3M Health Care Ltd Winthrop (Sterling Health) Wyeth Laboratories Zyma (Dispersa UK Ltd) APPENDIX F

SURVEYING AND MAPPING

by lan Woolgar

Background

Detailed map information for the Apolobamba region we were climbing in was almost non-existant. The Peru-Bolivia Boundary Commission map [for references see Appendix A] just touched the area, but at 1:250,000 scale gave no detailed information. Expedition maps were obtained from the previous German, Japanese and Yorkshire Ramblers Club expeditions. All took the form of sketch maps, with the German and Yorkshire maps providing greater detail and accuracy (these were also more amenable to translation into English!). Using tthe sketch details, a map was compiled to cover the proposed expedition area, with great emphasis being placed on the headings 'sketch map' and 'not to scale'. We knew of a map source in La Paz, the Instituto Geographico Militar (IGM), and hoped to obtain more reliable information during our first week in La Paz.

<u>Mapping in Bolivia</u>

The IGM turned out to be next to useless, with only poor scale and inaccurate maps available for the Apolobamba region at some horrendous cost. Upon arrival in the Apolobamba our sketch map proved to be fairly representative of the terrain we climbed in, and we set a goal to check as many angles between peaks as possible and record glacier, ridge and path details during our climbing sorties.

Equipment

Unable to obtain the latest in satellite surveying aids or bulky laser theodolite equipment, we relied upon two Silva sighting compasses and a primitive compact surveying instrument on loan from the Department of Civil Engineering at Loughborough University.

Surveying

The use of the sighting compasses was arranged so as to enable the measurement of angles relative to magnetic north, to any distinguishable summit, from all summits climbed by the expedition (subject to visibility). The compasses were weighted for use in the southern hemisphere, and we had no information on the variation between grid and magnetic north so this was ignored.

The use of bearings alone to draw up a map of the area is not sufficient to enable the map to be scaled. For this a technique called 'plane table surveying' was employed. Plane table surveying involves setting up a base line of known length, as long as is practicable, and siting a station at each end. From each station bearings are taken to all points to be surveyed, taking particular care with crossreferencing of all points. To plot the map, the base line length is drawn to scale, referencing of all points to each surveyed point are set out from each station end of the line. The intersection of the lines from each end marks the correct location. This technique is most accurate for points perpendicular to the base line, so these were established to scale the map, and the remaining peaks positioned using both the plane table bearings and those taken during climbs.

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Mapping

Upon return to the UK, bearings from each summit were plotted on transparent drawing film, and the plane table results used to scale the map. Once the positions of several peaks had been verified, the transparent bearing sheets were manipulated to establish a 'best fit' compromise for all the peaks surveyed. The map was originally drawn at a scale of 1:10,000 and then reduced to a scale of 1:50,000 to enable digitising, using Lotus Freelance drawing facilities. Once the basic points had been digitised, the detailed map was compiled using sketch information made in Bolivia, and from reference to slides, photos etc. The map for the Cordillera Apolobamba region was compiled using information from the Peru-Bolivia Boundary Commission 1915 map and the German 1957 expedition map.

Money and Finance

by Mike Shellabear

It is difficult to do an accurate costing for the whole expedition since some members took different flights and stayed in South America for longer, leading to different personal costs, whilst several grants were given to the expedition as a whole. However the following costing is intended to give an indication of the approximate costs for this type of expedition (at 1989 rates) and to acknowledge

Exchange rates

Exchange rates varied both with time and for cash/travellers cheques, but approximate average rates for July/August 1989 were:

- $\pounds 1 = US$ 1.64 (cash), US 1.58 (travellers cheques)
- US\$ 1 = 2.80 Bolivianos(Bs) (cash), 2.76 Bs (travellers cheques)

Bolivian currency was used for general shopping, but hotel and travel agent's bills in La Paz were negotiated and paid for in US dollars. Dollars (cash and travellers cheques) are readily changed on the street black market, but exchange rates are only slightly better than in the bureaux d'echange.

Grants

The following major grants were received by the expedition:

British Mountaineering Council (£400) Mount Everest Foundation (£400) Loughborough University of Technology donation (£250) Loughborough University of Technology 'Sir Robert Martin Prize' (£125)

This gives a total of \pounds 1175, or \pounds 147 per person on average. All other costs were met by personal contributions.

Costs

Approximate costs per person for the Bolivia section of the expedition are giv_{e_h} below:

Flight Insurance La Paz hotel (11 nights @ £6.70) Food etc. in La Paz and other towns (20 days @ £4) Transport to Cordillera Apolobamba Food for 3 weeks in mountains Transport to Zongo Transport to Takesi trail and Lake Titicaca	E E E E E E E	685 84 74 80 59 10 10
Transport to Zongo Transport to Takesi trail and Lake Titicaca Souvenirs (typical)	£ £	10 10 60
Photographic film (typical) Total	£ 	40

In addition to this total most people had to spend a significant amount on purchasing additional personal equipment for the trip.

Typical Prices

The following selection of prices give an extra indication of costs to be expected in Bolivia:

Hotel (cheap but very adequate, walking distance fr	om La Paz	
centre, per person per night, shared room)	US	\$ 11.00
Hotel in Copacabana (per person per night, shared i	room) Bs	3.50
Main course meal in La Paz market	Bs	1.50
Slap-up meal at Eli's Restaurant (steak, gateau and	beers) Bs	25.00
Food on La Paz market: bread rolls each	Bs	0.10
cheese per kg	Bs	6.00
teabags per 100	Bs	5.00
dried milk powder, 2 kg tir	n Bs	17.00
Souvenirs in La Paz: 'chullo' woollen hats	Bs	3.00
alpaca pullovers, upwards	from Bs	20.00

APPENDIX H

ADDRESSES

- Bolivian Embassy & Consulate 106 Eaton Square London SW1
- 2. British Embassy & Consulate Av. Arce 2732-2754 La Paz Bolivia
- 3. Club Andino de Bolivia Calle Mexico 1638 Casilla 1346 La Paz Bolivia
- Club de Excursionismo Andinismo y Camping (CEAC) c/o Ian Marr Casilla 3717 La Paz Bolivia
- 5. Bernado Guarachi Andes Expediciones Guarachi Plaza Alonzo de Mendoza Casilla 20886 La Paz Bolivia
- 6. ADDRESS FOR CORRESPONDENCE :

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Part II - PAINE

Sponsored by the MEF, BMC, and Loughborough University

by Steve Hillen



Summary This report details the activities of a team of four climbers during a six week visit to the Torres del Paine park in Chilean Patagonia in October and November 1989. The following ascents were made in Alpine style :

- $\bullet\,$ First ascent of Cerro Negro (2100m) via the NW face / N. ridge
- New route on Trident (1900m) via the NW face
- Repeat ascent of North Tower (2250m) via Col Bich / S. ridge

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1 Introduction

This report details the events of the second part of Loughborough Students Andes Expedition 1989, which commenced as we crossed the Bolivian border into northern Chile in early September 1989. A full report of the preceding 6 weeks activity in the Cordillera Apolobamba in northern Bolivia can be found in part 1 of the report. This part of the report concentrates mainly on activities in the Cordillera del Paine, but information on our month long journey down the length of Chile is included for interest.

The three of the original 8 members of the expedition who had less pressing work commitments had decided to stay on for a further 12 weeks in South America. This made good sense financially as most of the cost of the expedition was taken up with the air fares - actual living expenses were low in comparison.

So, with the normal climbing season in Bolivia drawing to a somewhat earlier than expected close, we headed south into Chile. We planned on spending 6 weeks in the *Cordillera del Paine*, with the main objective of making the first ascent of Cerro Negro, the last unclimbed peak of the main range. We aimed to reach Paine in the last few days of September, a full month before the more usual climbing season, to make best use of the apparently more moderate weather of the Patagonian spring. This left us with almost a month to spend travelling the length of Chile, taking in some peaks on the way.

1.1 Objectives

Our main objective was the first ascent of **Cerro Negro** which was, as far as our research had indicated, the last unclimbed peak in the main Paine range. Secondary objectives were less definate. Before we reached Paine, we planned on venturing into the remote Olvidado valley, which nestles against the icecap, but once we caught sight of the magnificent Towers of Paine, we decided to give the logistical problems of reaching the Olvidado a miss, and join the crowds on the Towers.

1.2 Members

By the time we arrived in Paine, the 3 original members from Loughborough University had been joined by Dave Tyson, fresh from the Bath University Apolobamba Expedition. All of us were recent graduates.



Figure 1: Back row : Dave Lister (21), Dave Tyson (22), and Ian Burgess (23). Kneeling : Steve Hillen (23). Mountain behind is Cerro Negro.

2 Movement

This section details the expedition's movement and travel arrangements from S_{an} . tiago, the capital of Chile, to the Torres del Paine National Park, and back again to Santiago.

2.1 Santiago to Paine

On arrival in Santiago, we booked single flights from Punta Arenas to Santiago with *Ladeco* for our return, and also a 4 day boat trip from Puerto Montt to Punta Arenas for the outward journey.

We left Santiago on 16th September by bus from the Southern Bus Terminal. There were many companies offering fares to Puerto Montt, varying from utter luxury coaches costing US\$25 to still acceptable ones for a mere US\$10. We took the latter, most other seats having been booked by Chileans travelling around for Independence Day (18th Sept.).

Around 20 hours later we arrived in Puerto Montt, and checked in at the Navimag office to confirm the cargo boat journey on 23rd Sept., from Puerto Montt to Punta Arenas, the most southerly city in the world, and the kicking off point for expeditions to Paine. The boat journey was cheap (US\$75) and included food and a cabin for the 4 day trip. Once on board, we were glad that we'd paid a liitle extra for the cabins and not risked the reclining seats in the portacabin strapped onto the deck ! The journey was absolutely fantastic, passing through channels and fjords along the Pacific coastline. It also gave stupendous views of the icecap and mountains - the area that Tilman explored so thoroughly. From the port in the Magellan Straits, a bus was provided into Punta Arenas.

From Punta Arenas, we moved 6 weeks food and all our equipment to Puerto Natales, the nearest town to Paine. The driver of the thrice daily bus didn't bat an eyelid at our vast baggage, and 3 hours later we were in Pueto Natales at a cost of about US\$3 each.

Here, we made contact with Edi Scott, an immensely friendly and helpful Falklander, who has a great knowledge of the Paine area, and likes nothing better than to talk about the climbing in Paine, and recount his wealth of stories. He also speaks perfect English and provides minibus transport to the Paine National Park at a reasonable rate (US\$85 single for up to 6 people). We made the journey to the Park on the 30th Sept., it taking a little over 3 hours. Later in the season a very cheap bus runs to and from the Park, but we were too early for this, and in any case, Edi spent the whole day showing us around the Park, helping us at the Park Administration, and arranging horses for us. He was worth every penny. Edi left us at the refugio at Laguna Amarga, in the capable hands of Juan Toro, one of the Guarda Parque.

2.2 Within Paine

Transport off the roads within Paine is by horse or by foot. We decided that the horses available from Brigitte near the Park HQ were too expensive (US\$32 a day!), and instead arranged for 4 horses from Pepe, who was in charge of the ranch Estancia Cerro Paine, near Laguna Amarga. He was only charging US\$25 a day, but unfortunately because we'd arrived out of season, we had to wait 5 days at Laguna Amarga before he could round up the horses.

By this time, we had already decided that we would like to spend our last 10 days here attempting the North Tower, and in preparation, we made a food and fuel dump under some moraine near the Italian Campamento high in the Rio Ascensio valley (4 hours steep walking from Laguna Armaga).

2.2.1 Cerro Negro area

Eventually Pepe showed up, not especially late by South American standards, with 5 horses, claiming that we needed five as they were weak at this time of year ! Each horse carried around 60 Kg loads, and mule-sacks would have been very useful to keep the loads on the horses.

So at about midday on 4th October, we left Refugio Amarga, and set off along the marked trail on the west side of the Rio Paine. About 4 hours later we stopped for the night at a gauchos' hut. The following morning we climbed high above Lago Paine, following the trail as it took us now westwards. The winds were so high that it seemed that the horses might be unable to make it, but after a long walk along flat boggy plains beyond, we arrived at Refugio Dickson, where we stopped for the night. We left about 10 days worth of food hidden in the roof of the hut, the idea being that if we climbed Negro quickly, we could come back down and move across to the Olvidado, or out past Lago Dickson for a week on the icecap. The next day we followed the trail back southwards towards the Rio Los Perros valley where we planned to make basecamp. Unfortunately, the horses were unable to cross the first major river that we came across, and it was there, just where the trail once again turned westwards that we bade farewell to Pepe.

Two stupendous carries had all our food and equipment in a little clearing two hours walk further up the valley. We pitched tents in a small clearing on the trail that night, unaware that the official campsite was a mere half hour further on. As it happened, our site was absolutely ideal - protected from the winds as we were still within the forest, and with fresh non-glacial water a few yards away. We remained here for 14 days, waiting for the right weather to arrive, and making two attempts on Cerro Negro, the second being successful. On the other days we generally lounged about, baking bread and eating, except for one day where we walked the 3 hours up to the head of the valley to the Paine pass (aka John Garner's pass), which gave fabulous views back to Paine, over Glacier Grey to the glittering icecap, and into the Olvidado valley.

2.2.2 Trident and Dickson area

On 21st October, we carried all our equipment back down to Refugio Dickson, a feat that required a rest day to follow ! We spent the next 2 days investigating the route along the west shore of Lago Dickson, the route via the Rio Del Oro valley into the Olvidado, access to La Proa, a pinnacle between the Olvidado and Dickson, and finally, access to the North Face of the Shield. The amount of jungle-bashing required to get onto the icecap was not encouraging, so we decided to take about 4 days food and camp underneath the N. Face of the Shield.

The walk up (on 25th Oct.) took about 3 hours from Refugio Dickson, starting up the trail towards the Rio Los Perros valley, then following the true right of the rivers that came from the small glacier under the Shield, the going tough through the dense virgin forests. When we arrived, we pitched the tent on the snow, unfortunately the only flat piece of ground, which was also completely exposed to the winds ! A two day storm had us pinned down, until on 27th October, we awoke to a calm silence, and climbed Trident, the peak next to Shield. That same day we descended to the Refugio Dickson, and the following day started the walkout back to Amarga with uncomfortably huge loads.

This followed the same route as the walk-in. We found it impossible to walk for more than about two hours at a time, and introduced lengthy siestas to split the days up. Finally, we reached Refugio Amarga on 29th Oct., unfortunately by a very high variation of the trail.

2.2.3 Rio Ascensio area

On 31st Oct., we set off once more with the minimum amount of gear back up to the Rio Ascensio valley. About 5 hours uphill walking, and some very wet river crossings had us at the Japanese Campamento, a small wooden shack about 1 hour further up than the Italian Campamento, and an excellent base for routes from the upper Ascensio cwm. Being deep in the valley, in the last trees before the glacier, we could spend windy days in comparative comfort, and still be only 90 minutes from the base up the route on North Tower. However, horses can only reach as far as the Italian Campamento, which is why all the larger expeditions had stopped there.

We walked out on the 9th November, the flooded Rio Paine necessitating a long waist deep wade to return once more to Refugio Amarga.

2.3 Paine to Santiago

On the 10th November, Juan Toro gave us a lift back to Puerto Natales, and a fantastic reception in a local restaurant.

We returned to Punta Arenas by bus once more, and then on the morning of the 13th, another bus took us to the airport where a 3 hour flight with Ladeco (US\$140) had us once again in Santiago. This flight passes directly over Paine and Fitzroy, but the weather did not clear until we were further north in the Lake District where we could look down on the volcanos.

2.4 To and from South America

We flew Air Viasa (Venezualan Airlines), from London Heathrow to La Paz via Caracas and Lima, and returned from Santiago via a day's stopover in Caracas to London. It cost us \pounds 750 each, and neither the entertainment, hostesses, nor food were up to much. The saving grace was the VIP lounge in Caracas airport where all the food and drink was free. We did ourselves proud even in the 20 minutes we spent there.



Figure 2: The lower butresses of Cerro Negro from the Olguin glacier

3 Climbing in Paine

Three mountains were successfully climbed during the 6 week stay in the Cordillera del Paine. The three ascents are described as follows.

3.1 Cerro Negro 2100m

Some initial inspection of the north and north-west aspects of Cerro Negro from a variety of vantage points indicated that the most likely route would be on the NW side. This face leads a full 1500m from the lower part of the Olguin Glacier up to the rocky summit block. The main feature of the face was a hanging glacier whose upper reaches led into two mixed gullies, one leading to a notch on the north ridge of the summit block, the other leading to a notch on the west ridge.

Lower down the face, a long deep diagonal snow-filled gully split the first rock buttresses, reaching a point just under the very tip of the hanging glacier. A quick recce up the initial debris fan from the Olguin Glacier, and to the top of this first diagonal gully had us convinced that this was the route, despite the obvious avalanche risk. From the top of this gully, we could see the first pitch of a much steeper and narrower gully which led diagonally back across the NW face, and if it continued, it seemed that it would provide a safer route to the easier snowfields on the higher part of the hanging glacier.

Looking at the figures of a vertical 1600m from basecamp to the summit of Cerro Negro, we decided to get as high as possible with 4 days supplies, snowholing until the weather gave us a chance to go for the summit.

So at 7am on 11th October, we set off from basecamp, the walk through the last of the forests, over several rivers and up onto the moraines taking about 45 minutes. Once along the moraines and onto the lower Olguin Glacier, we struck off back up the initial debris fan and into the first diagonal gully. The snow was very poor, and powder avalanches rumbled down off the hanging glacier above. We stayed on one side of the gully, crossing both rock steps, finally reaching the top. Choosing our moment well, we crossed underneath the wall that was supporting the snout of the hanging glacier above, and still unroped climbed a short vertical section of ice, enclosed at the back of the narrow gully. The continuation gully above led directly into the wide snow gully which led on upwards between two large rocky butresses.

Traversing rightwards some way up this led onto the easier angled snow slopes of the upper part of the hanging glacier. We continued upwards right to the back of the glacier and then traversed further rightwards on very poor snow above the line of the Bergschrund, which split the whole of the back of the glacier.

This led to directly below the third gully that would lead us onto the north ridge. From here, it seemed that the north ridge was more sensible an option than the west, being shorter and easier to reach, albeit steeper. Any ideas of a full frontal assault up the rock buttress directly to the summit were not even worth considering, judging by the looseness of the rock that we had already encountered.

We dug a snowhole about a third of the way up the gully, and had the most miserable bivvy with entrances that kept blocking with avalanche debris and storm-driven spindrift. The snow was also very wet, soaking us through.

On the morning of the 12th, we made an attempt to climb the gully above but were stopped by a steep verglassed rock-bar and wind-lashed spindrift. With all our clothing soaked, we made our way back down to the Olguin Glacier and then to basecamp.



Figure 3: The second gully and snowfields of Cerro Negro

Over the course of the following week, we adopted a new strategy. At midnight each night we got up and if it didn't seem too windy, had breakfast and set off to attempt Negro in one non-stop push. Each time we reached the moraines beneath the Olguin Glacier we were turned back by high winds, and with both food and motivation running low, we adopted a third tactic.

Going to sleep for a couple of hours before setting off made us lethargic, so we decided not to sleep at all, and set off at 10pm, aiming to reach the snowhole by about 5am the following day. Dawn would break soon after, giving us the whole day to attempt the upper part of the third gully and the north ridge.

We spent October 18th eating and drinking as much as possible, and with breakfast in our bellies only an hour after finishing supper, we set off at the planned 10pm.

We reached the moraines to find absolute calm, and set off towards the first gully. The snow was melting quickly, and the rock steps were no longer verglassed. The ice pitch that led into the second gully was also melting and the snow leading up to it seemed rotten. Suddenly, Ian disappeared into a monstrous hole as the snow gave way beneath him. We pulled him out, roped up, and Dave Tyson led the left wall of the gully on rotten ice. The way the place was melting, this route would soon be impossible.

Above, the snow was also melting rapidly, but higher still, at our snowhole, at least all the powdery stuff that had been causing so much trouble as spindrift had disappeared. We reached the snowhole at 4.45 am, and by the time we left half an hour later, the clouds had come down, and the wind had risen.

Ian set off up the rock bar that had stopped us before, climbing rotten ice and ridiculously loose rock with no protection. Fortunately, another section of snow above provided a stake belay. Dave Tyson led the final pitch onto the north ridge. Some massive boulders were dislodged, a fragment of one destroying Dave Lister's helmet.

Once on the ridge, we removed crampons, and set off as two pairs past the first gendarme, just as snow began to fall. After a hard variation on the first pitch which led us onto the steep NE face, we made better progress, having two simulataneous leaders clipping the same gear. The rock was terrible, but two pitches later, we arrived on the massive ledge visible from far below. The fortunate discovery of a ramp which bypassed the blank back wall of the ledge had us in sight of the summit. Pulling up through massive loose blocks left us with one pitch to go. A traverse under an overlap, and then an icy slab led to the summit, a knife edge boulder poised above the void.

We reached the summit at about 12.30 pm on 19th Oct., and stayed for about



Figure 4: The last gully and N. ridge (left skyline) of Negro



Figure 5: Trident from the NW

30 minutes. The weather lifted slightly, giving a fabulous view into the Frances valley, and we set off, taking about 7 abseils to pass the rock-bar in the gully. Downclimbing took us back to the snowhole, and a long plod down, and an abseil over the ice pitch which had by now totally disappeared, left us exhausted on the Olguin glacier, just as night fell. We reached basecamp a little before 10pm. The whisky and celebrations had to wait for the following day !

3.2 Trident 1900m

On 27th October, we left camp under the Shield, and started up the easy snowslopes under the NW aspect of Trident. We followed the wide left hand gully for about an hour, intending to cross to the central gully via a snow ramp. We missed the ramp and had some fun crossing the horribly loose rock above. The central gully led easily to the summit block, which involved one straightforward rock pitch.

Thus we appeared on the final part of the normal route from the Ascensio valley, following the snow ridge to the summit. We were treated to a fantastic day, blue

skies, warm sun, and no wind. The view of the Towers, the Fortress, and Shield w_{a_s} incredible, as was the sight of a condor gliding around us in curiosity.

We abseiled from a stake on our single 50m rope, and just reached the bottom of the summit block by extending the anchor with a long piece of cord. It took less than an hour to run down the slopes that had taken 3 to ascend.

3.3 North Tower 2250m

As for Cerro Negro, we left the Japanese hut a little before daybreak each day and climbed up through the forest onto the highest lateral moraine on the south side of the upper Ascensio cwm. Usually by then we could tell what the day would be like and for about four successive days we turned back, being dicouraged by the winds. During this time, we ferried all our climbing equipment along the moraines and dumped it at the foot of the massive snow gully that leads up to Col Bich, the notch between the North and Central Towers. This was about 90 minutes from the hut, a journey that was not too unpleasant as our loads were subsequently pretty light.

Along the moraines, we passed the American's camp : they had a Bibler erected underneath a monstrous boulder, only 30 minutes from the gully. But although they had the advantage of shorter access and could always tell what the weather was doing, we preferred our relative luxury and pleasant surroundings below in the forest.

On the morning of the 7th Nov, we set off once again. The pre-dawn glow lit our way as we climbed up onto the moraines at around 5.15 am. There seemed to be little wind so we carried on to the gear dump, and then headed on up the 3000 feet of the gully beneath Col Bich.

We arrived on Col Bich at around 10am, being greatly helped on the last 100m of steep mixed ground by a fixed rope left by the Americans two years ago. Given the amount of fresh snow on this section, I think we would have been far too slow without this rope. The rope was removed later that morning by Pete, one of the Yanks.

It was very cold on Col Bich as we set off, climbing in EB's and Dachsteins. Only the first two pitches out of Col Bich are difficult - probably HVS/E1, but we aided it anyway, finding more than enough pegs to pull on. By the time Dave Tyson had led the first, and Dave Lister the second pitch, and the rest of us had followed with heavy sacks, it was already mid-afternoon. We knew we were going too slowly, especially after hearing about 6 hour ascents, up and down. Fortunately, the next 250m (vertically) was along the South Ridge, a very much easier section which could



Figure 6: The North Tower

easily be soloed in good conditions.

We made good time along this, fortunately never deviating too far from the easiest line. The rock was completely plastered with fresh snow, and the occasional snow shower didn't help. But the wind stayed down, and we climbed the last difficult pitch up a curiously weathered granite slab to top out at about 6.30pm. A sudden snowfall quickly obliterated all the holds on the slab beneath us, and as we left, the fickle clouds once again lifted, the sun creating a magnificent brockenspectre. We abseiled and downclimbed, reaching Col Bich at nightfall at about 10.30pm. The ropes had decided to jam at every opportunity. The last man down, Dave Tyson, missed his footing as he crossed back over Col Bich, and still attached to the abseil rope, swung over 3000 feet of abyss. Dave Lister rammed the 6 biscuits he was holding into his mouth, and with his now free hands, grabbed the fast-disappearing ends of the ropes, and together we hauled Tyson back.

Three more torch lit abseils and a 3000 feet bumslide deposited us back on the moraines, and we reached the Japanese hut at about 2am, November 8th.

3.4 Summary of climbing

- First ascent of Cerro Negro via NW face, N ridge (D, 1500m)
- New route on Trident via NW face (PD, 1000m)
- Repeat of normal route on North Tower (TD,500m)

4 Conclusion

Overall, both stages of the trip were very successful : all our stated objectives having been achieved. Chile was a fantastic country to visit, with extremely friendly people, and undoubtedly Paine has some of the most spectacular peaks in the world. Away from the Ascenscio valley, Paine has much still to offer in the way of unclimbed faces and ridges, and if the chance arises, it is well worth the effort of visiting.

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A Food

There is basically no problem in obtaining food in Chile. The country is sufficiently modern to have supermarkets as good as any in the UK. But having said that, the supermarkets in Santiago and the heartland had more variety than those further south. We found the selection of vegetables and fruit less extensive in Punta Arenas and also, there was no sign of tinned meat. We should have bought this in Santiago or Puerto Montt. However, there was a massive selection of cheap tinned fish instead.

We bought virtually all our supplies in the supermarkets of Punta Arenas. The shops in Puerto Natales are much smaller, have far less variety than those in Punta Arenas, and are also more expensive. We bought only our fruit, vegetables and biscuits from here.

High energy sweet things are expensive throughout Chile, so we conducted a chocolate survey to make sure we got the best taste for the money. The only bars worth buying were *Nestle White* and *Trencito*, all the others being foul.

For fuel we used low-octane petrol, obtained from a garage in Puerto Natales. It was not especially clean, but apparently unleaded will soon be available in Chile. Our MSR Whisperlite and X-GK stoves clogged frequently, and much of the time we cooked on wood fires. In each hut in the park was a good wood-burning stove, and elsewhere we used campfires. There is so much dead and bone-dry wood lying around from the wind-damage that we never had to walk more than 50 yards to collect enough for a fire.

Within Paine itself, it is possible to obtain some food. The Guarda Parque will happily supply an expedition with reasonable quantities of bread and eggs during their stay, but they do need good notice. Fresh bread half way into the trip was a good change. Also there is a small store at the Park Administration, but we had no call to use this.

We had no problem keeping the food for 6 weeks - the vegetables would have lasted well over 4 weeks had we not eaten them. We stored the food in hessian sacks in either boxes or inside a tent, and the temperature never really dropped low enough to damage it. Also, we found it unnecessary to purify drinking water.

The following gives a complete list of the items we bought, and also the typical menus that we prepared.

A.1 Shopping list

food	quantity	weight
porridge		18.5 Kg
sugar		9 Kg
milk powder		10 Kg
tea bags	400	1 Kg
coffee	1 tin	0.3 Kg
drinking chocolate	4 jars	1.8 Kg
chocolate bars	100	10 Kg
peanuts		4.5 Kg
raisins		4 Kg
biscuits	83 pkts	12 Kg
drink sachets	100 pkts	3 Kg
bananas	12	1.5 Kg
apples	12	1.5 Kg
oranges	72	7 Kg
flour		12 Kg
baking powder		1 Kg
salt		2 Kg
herbs		
garlic		
black pepper		
curry powder		
chilli powder		
soup pkts	64	5 Kg
pasta		5.7 Kg
cheese		1.5 Kg
pasta and sauce pkts	9 boxes	2.7 Kg
rice		7.5 Kg
cannelloni		0.7 Kg
beef stock	16 cubes	
chicken stock	16 cubes	
tomato puree	17 tins	4.25 Kg
onions		7 Kg
peppers		2 Kg
potatoes		2 Kg
carrots		8 Kg
tuna	6 tins	1.4 Kg
jurel fish	8 tins	3.7 Kg

food	quantity	weight
kidney beans		1.25 Kg
butter beans		1.25 Kg
split peas		1.25 Kg
coconut		0.25 Kg
sultanas		0.75 Kg
lentils		1.25 Kg
sausages	3 tins	1.2 Kg
eggs	24	2 Kg
dried peas		1 Kg
TVP mix	2 pkts	1 Kg
honey		2 Kg
jam		1 Kg
margerine		3 Kg
cooking oil	1 litre	1 Kg
bread		10 Kg
short grain rice		1 Kg
tinned fruit	4 tins	3.4 Kg
condensed milk	4 tins	1.6 Kg
dried apple		1 Kg
fuel - alcohol	2 litres	2 Kg
fuel - petrol	40 litres	35 Kg
VAT 69 whisky	0.75 litre	1 Kg

These weights were calculated on the following assumptions for 4 people.

	100-/1-1
porriage	400g/day
sugar	200 g/day
milk	$200 \mathrm{g/day}$
tea bags	9/day
flour	600 g/day
soup	1/day + extras
biscuits	2pkts/day
pasta	600 g/meal
rice	500g/meal

We underestimated the porridge - 600g/day would be nearer the target.

A.2 Menus

The 200Kg of food as detailed above was organised into the following meals.

Breakfast 42 days of porridge (usually 500g/day) and brews.

Active lunches chocolate bars, raisins (200g/day), biscuits (2 pkts/ day)

Base camp lunches chepatis, bread, bannochs, cheese and soup

Active evening meals 10 meals of 400g pasta, 200g cheese and 1 soup.

Base camp meals A selection of menus was used :

- 5 corned beef hash Jurel fish (no corned beef), tomato puree, onion, potatoes, carrots.
- 7 Tuna shits Tuna/Jurel, 500g pasta, tomato puree, onion, pepper, carrots.
- 5 chilles kidney beans, tomato puree, onion, pepper, 500g rice.
- 5 veggy stews butter beans, split peas, soup, potatoes, carrots, onion.
- 5 curries soup, peanuts, coconut, sultanas, lentils, onion, 500g rice.
- 3 sausage meals sausages, potatoes, eggs.
- 2 veggy burgers TVP, potatoes, carrots, lots of herbs!

Puddings We should have had more !

- 4 puddings of tinned fruit and condensed milk.
- 6 rice puddings
- 6 dried fruit puddings with milk

A.3 Conclusions

We supplemented the shopping list above with extra eggs and bread from Juan Toro, one of the Guarda Parque. As always, we could have eaten more, but you have to draw the line somewhere. The baking of chepatis and bannochs was a good way of passing time at base camp. One suggestion for future trips is to allow for two breakfasts a day. We kept eating ours at midnight, going out to climb, getting turned back, and then having to wait 12 hours until lunchtime. A second breakfast might have motivated us to 'go for it' more often.

In summary, we ate incredibly well for the 6 weeks in the Park, actually gaining weight rather than losing it. For the four of us for the 6 weeks, including fuel, we spent US\$363 in total, which makes it just over US\$2.00 per person per day.

B Weather

We arrived at the park on October 1st 1989, hoping to find a compromise between the short, cold, calm days of winter, and the long, warmer, but usually windy days of summer. By early November the days were indeed longer and warmer, but we suffered from strong winds throughout the stay.

In summary, there were only a couple of perfect days, many very windy ones, and the few calm ones usually coincided with rain and snow falling. Our barometers were virtually useless, as the weather systems moved across so rapidly. The unpredictability of the weather means that you have to 'go for it' as often as possible, as days that start off bad could suddenly turn out excellent ! As long as the winds were low, we found no reason not to climb, and also that in general that winds were stronger in the afternoons. The mountains have a very localized weather system, maybe having 200mph winds on the tops, whereas in the valleys it may be calm, sunny, and hot ! It seemed that once again towards the end of October there was a fine settled spell of about 3 days.

I suppose all you can say is "expect the worst" and you won't be disappointed.

C Finances and expenditure

As with all South America, the only currency worth having is US dollars. Also recommended are American Express travellers cheques as thay can be changed with the minimum of hassle in almost any city.

The currency in Chile is the Peso, and there are two distinct exchange rates available. While we were there, the official one was 285 pesos per dollar, and the black-market one anything up to 337 pesos per dollar. Obviously, we used the latter, operating through some of the many dodgy 'cambios' whose agents pace the streets of Santiago looking for gringos. Unlike any other goods in Chile, it is definately worth bargaining for better rates, and the official black-market rate is published in some of the local newspapers.

Within Paine itself, the Dollar is more valuable than the Peso. We paid for our horses with dollars, and most of the other expenses there are better paid for with Dollars cash.

C.1 Expedition expenditure

This section is complicated by the differing phases of the expedition. Of the original 8 people in Bolivia, only three carried on, but these were joined by a fourth member later in the trip. The costs below concentrate on the expense incurred by each of the 3 members for the Chilean part of the trip only.

C.1.1 Income

This section shows the sponsorship money that we received, which was spent entirely on group purposes within Bolivia and expedition overheads.

MEF grant	£400
BMC grant	£400
Loughborough University	£375
Miscellaneous donations	£25
Total	£1200

C.1.2 Expenses

This section details the major costs of the Chilean part of the expedition, and gives a sum total for both stages of the trip. It is geared to show costs per person.

Flight London - La Paz, Santiago - London	£750
Total expenses within Bolivia (personal)	2100
Sponsorship monoy in Balinia	$\pounds 325$
Process D to t	£150 (x8)
Huayna Potosi expenses (Bolivia)	£15
Travel La Paz - Calama (train)	IICA15
Travel Calama - Santiago (hus)	05\$15
Travel Santiago Buesto Maria	US\$20
Travel Dantiago - Fuerto Montt (bus)	US\$20
Travel Puerto Montt - Punta Arenas (boat)	IIC@7E
Edi Scott van hire	U3013
Food for Paine	US\$85/4
Pepe's horses for 2 days	US\$363/4
Internal flight Punto Arrow a	US\$275/4
Total for Chile	US\$140
US\$1.6061.00	US\$451
0.531.00 = 21.00	1282
Hotel bills, food, trips and spending money	2 202
Insurance from BMC	L208
Grand total for Bolivia and Chil	£125
the per person	£1855

Notes This total includes $\pounds 150$ in sponsorship, resulting in personal contributions of $\pounds 1580 + \pounds 125$ insurance. The final expenditure came very close to our estimates : we allowed US\$7 a day for hotel bills and food, and US\$3 a day for food in the mountains. Most days we just about managed to stay within these estimates. Obviously, the total also includes a fair amount of spending money.

D About Paine

D.1 Obtaining permission

Obtaining permission to climb in the Cordillera del Paine is essential, and must be done at least 6 months before you intend to arrive in the area. Officialdom moves slowly in this area, but at least it moves.

The procedure is as follows. You must write to the Chilean Consulate in London giving full details of the proposed visit ie :

- Purpose of trip
- Area of climbing with peak names if possible
- Full names of the climbers
- Passport numbers of the climbers
- Dates of the trip

It is worth sending a copy of this, in Spanish, to CONAF in Punta Arenas. It may also be worth contacting Mr R. Matheson, the British Consul in Punta Arenas, although we never actually met him while we were there.

On arrival in Punta Arenas, you must report to the Intendencia (Police Station) for clearance. Provided they find a copy of your paperwork, they will issue you with a written permit.

Once in Puerto Natales, you must show this permit to the Governor, and finally when you arrive in the Torres del Paine National Park, you must register with Sr. Santana, at the Park Administration HQ. He will give you the go-ahead, and assign one of his rangers to look after you.

British citizens are given a 90 day tourist visa on entry to Chile.

D.2 Facilities within the park

Within the Park, there are many facilities. To the south side of the mountains run a series of motorable tracks, but elsewhere transport is by horse and foot. There are a number of marked trails, including the Paine circuit, a 7 day trek. All the paths are marked with intermittent red tags, but it is still possible to miss the way. It is worth remembering that the bridge at Pudeto has still not been repaired, and it is not possible to cross to the Frances valley from here.

For accomodation, there are two exceedingly expensive hotels. Fortunately, there are also a series of wooden huts around the park whose use is free to expeditions, but a charge is made for normal tourists. These huts contain excellent wood stoves, and also mice! Unfortunately, the Lago Grey hut has been burnt down. Another advantage that expedition members have over normal tourists is that they can, with permission, camp anywhere and are allowed to have open woodfires.

There are two people that horses can be hired from. One is from Brigitte, who lives near the Administration centre, and charges US\$32 per horse per day. The other is Pepe, who lives on Estancia Cerro Paine, who only charged us US\$25 a day, but may well be increasing the charge soon.

Finally, food can be obtained within the Park. There is a small store at the Administration Centre, with tea, coffee, bread, jam, chocolate etc, but not in any quantity. Also, food can be delivered from Puerto Natales, and eggs and bread may be available form the rangers' wives. The Guarda Parque (rangers) delivered some mail to us during our stay in the Rio Los Perros valley, which was most appreciated, so it is possible to direct mail into the Park.

D.3 Climbing history and research

It is not proposed to give an extensive history of all the climbing that has occurred in Paine, but rather some pointers as to where this information can be found.

The best summary of the peaks, ascents, routes, references, and the history of Paine, is to be found in Jill Neate's 'Mountaineering in the Andes ', available from the Royal Geographical Society. This gives numerous references to articles and summaries within the various Alpine and Andean Journals, which may be found in the Alpine Club Library in London.

Also, a more extensive guide to the area, including topos, is available from the Club Andino de Chile. It is slightly more up to date than the Neate book, and it should be possible to obtain a copy if about US\$6 is sent. The title of the guide is 'Torres del Paine', and its reference number is 72823. However, the most complete and up to date (1987) survey of the Paine group, including the Olvidado and the icecap, was a series of photocopied sheets which we found in the Japanese hut in the Rio Ascensio valley. We still don't know which publication it was copied from, but it's definately Italian, and is Chapter XVII : Gruppo del Paine pp 247-260. It should be possible to locate this in the Alpine Club library.

Our research concentrated initially on the Olvidado valley, but replies from the Andino clubs of Chile and Argentina, as well as Mr Echevarria of the American Alpine Journal indicated that Cerro Negro was the last unclimbed peak of the main range of Paine, and consequently, we changed objectives.

One final source of information on the climbing in the Park is the logbook kept within the park. It was started in about 1976, and has information on many routes and ascents, including some very recent successful ascents of Peineta (Nido Negro del Condores) or the fourth Tower.

A list of useful addresses can be found in a later appendix.

D.4 Future prospects

Attention as always is centred on the Ascensio valley, with the 3 Towers and the East wall of the Fortress being the main attractions. Most of the other peaks of the range have had at most a couple of ascents, with the exception of the more popular Cuernos and Paine Grande. Comparitively few expeditions have visited the Frances valley recently, and there is plenty of scope for second or third ascents from here, especially along the Cathedral wall.

To the NW in the Olvidado, almost all the peaks have been ascended, except for Cerro Ohner or Ohnet, which would be just as easily accessible from the Dickson side, presenting a series of interesting hanging glaciers and ridges that drop into Lago Dickson. There seems at least one straightforward way up via the Rio del Oro valley.

Prospects for first ascents and new traverses on the adjacent section of the icecap seem pretty worked out, with a lot of activity there in the last decade.

E Tour of Chile

This section lists some of the activities that we did during our month long tour of Chile.

We left La Paz in Bolivia on the once a week trian from Oruro to Calama. This was indeed an experience - temperatures dropping to $-10^{\circ}C$ at night, the train barely making 5mph for much of the way, the hoards of smugglers on board, the appalling rolling stock, and last but by no means least, the beaurocracy at the border.

Once in Santiago, we made contact with the local University climbers through the Andino Club. Francisco Vio and his friends invited us along for an attempt on a new winter route on the South Face of Piquencilla (4050m). We unfortunately failed, the depth of the winter snow being a major problem, but had an excellent three days. Following that we spent 2 days ski-ing at Los Lagunillas ski resort, very near Piquencilla, and only an hour or so from Santiago. This was unbelievably cheap $(\pounds 13 \text{ for full board, ski-hire, and lift pass})$, although only 3 runs were open. A day or so later we were in the San Jose de Maipo area, rock climbing on bolted slabs. It was a superb change from rushing around in buses.

Also, the cheap bars in Santiago gave us many a good evening, and the vast icecreams gave us many a good day.

We moved on to Puerto Montt for the Independence day (18th Sept.), but celebrations were a little muted - apparently Santiago is the better bet. From here, we travelled back up to Pucon by bus, and the following day climbed up the 2800m Volcan Villarrica. This is an active volcano, and when the sulphur fumes from the crater occasionally blew away, we could see the lava rushing up and down from a huge cavern far below. This trip was definately a contender for the best day in South America.

The boat journey from Puerto Montt to Punta Arenas has been described in the 'Movement' section of the report, but was excellent value and a superb trip.

Below are a list of hotels that we stayed in on our travels.

- Residencial Londres, Londres 54, Santiago. Some rooms excellent.
- Residencial Paris, Calle Paris, Santiago. Much as Londres.
- Residencial Taqueno, Perez Rosales 114-116, Puerto Montt. OK.
- Private house, Calle Paraguaya 150, Punta Arenas. Excellent and cheap.
- Hotel Austral, Valdivia 955, Puerto Natales. Edi Scott's place. Not as cheap.

The further south we went, the better value private houses seemed to be.

Restaurants abound everywhere, but worthy of note are the fishing cafes at Angelmo near Puerto Montt, and especially recommended is the Don Alvarito, Blanco Encalada 915, in Puerto Natales. We had our celebration meal after leaving the park in here, and even got a lift back to our hotel in the manager's truck !

F Medical

This appendix may be found in Part 1 of the report, but in summary, no major illnesses or accidents occurred on the trip.

G Equipment

A more detailed appendix may be found in Part 1 of the report.

In summary, we had 2 tents with us - a Wild Country Supernova which never ceased to amaze us by standing up to incredible gusts, and a Phoenix Phusion which we did not test so severely.

We took out four 9mm by 50m ropes with us, two of which sustained a little damage.

We also took the equivalent of about 2 leader racks of gear, finding Friends and pegs to be the most useful items. The snowstakes from the Bolivian part of the trip were also very useful as were a couple of titanium ice screws. Rock boots proved useful on the North Tower.

H Acknowledgements

See also the medical and equipment appendices of part 1 of the report.

Grants

Mount Everest Foundation British Mountaineering Council Loughborough University of Technology

Advice

Jerry Gore	Andy Fanshawe
Derek Walker	Nick Banks
Geoff Skerrit	Sue White
Martin Doyle	John Earl
Dick Peart	John Garner
Evelio Echevarria	Steve Read
Federacion de Andinismo de Chile	Edi Scott
Club Andino Bariloche	Juan Toro

Donations and other

Loughborough Students Mountaineering Club The Royal Geographical Society Nestles Frances Gardner Austin Rover Group, Coventry

I Useful addresses

The Alpine Club 118 Eaton Square London SW1W 9AF

British Mountaineering Council Crawford House Precinct Centre Booth Street East Manchester M13 9RZ

Chilean Consulate 12 Devonshire Street London W1 01-580-1023

Federacion Andinismo de Chile Almirante Simpson 77 Casilla 2239 Santiago Chile

CONAF

c/o Direccion Regional de Turismo Waldo Seguel 689 Casilla 106-D Punta Arenas Magallanes Chile

Edi Scott Hotel Austral Valdivia 955 Puerto Natales Magallanes Chile The Expedition Advisory Centre The Royal Geographical Society Kensington Gore London SW7 2AR

Mount Everest Foundation c/o W.H. Ruthven (Hon. Sec.) Gowrie Cardwell Close Warton Preston PR4 1SH

American Alpine Journal The American Alpine Club 113 East 90th Street New York NY 10128-1589 USA

Club Andino Bariloche Casilla de Correo 139 8400 San Carlos de Bariloche Rio Negro The Argentine

Mr R. Matheson British Vice Consul British Embassy 21 de Mayo 1243 Punta Arenas Magallanes Chile

J Maps



Figure 7: Patagonia



Figure 8: Paine (from the unidentified Italian Journal)