

# THE BRITISH ARMY KANG YISSAY EXPEDITION 1998



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## Headquarters Land Command

Erskine Barracks Wilton Salisbury Wiltshire SP2 0AG

Telephone: (01722) 436790

Military Network Salisbury (733) 2790

Fax : (01722) 436800

Military Network Salisbury (733) 2800



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## BRITISH ARMY KANG YISSAY EXPEDITION 1998 - POST-EXPEDITION REPORT

### INTRODUCTION

1. General. The British Army Kang Yissay Expedition 1998 was a mountaineering expedition to the KANG YISSAY massif in the Indian Himalaya carried out between 21 Jun - 26 Jul 98.
2. Aim. The expedition aimed to make the first British ascent of the North East Ridge of KANG YISSAY I, a 6400 metre mountain in the Ladakh region of Northern India, and to conduct a mountaineering exploration of the three subsidiary peaks within the same massif. The planned style of climbing was lightweight and alpine in nature, without the use of high-altitude porters or fixed ropes. A scientific project devised in conjunction with the Royal Defence Medical College and University Hospital Wales was carried out during the climb.
3. Endorsements. The expedition was endorsed by both the Mount Everest Foundation and the Joint Services Expedition Trust, and was one of the British Mountaineering Council's Approved expeditions for 1998.
4. Expedition summary.
  - a. The team flew from London to Delhi on 21 Jun 98. Three days were spent in Delhi securing the release of our equipment from the customs authorities and conducting necessary administration with the Indian Mountaineering Federation (IMF); this included the attachment of a Liaison Officer from the Indian Army. An internal flight was taken to Leh in Ladakh on 25 Jun.
  - b. The approach from Leh to Base Camp took place over seven days from 27 Jun using ponies for load carrying. The expedition took an unmapped and little-used route between the Stok and Matho Kangri massifs. A description of the Approach Phase is at Annex A.
  - c. Base Camp was occupied between 3 - 13 Jul, during which time three separate attempts were made on two summits and exploration of the South and East glaciers



carried out. A description of the Mountaineering Phase is at Annex B. Return to the roadhead took 2 days.

d. Four days were spent in Leh negotiating with the expedition agent, carrying out equipment husbandry and making arrangements for onward travel.

e. Jeeps were hired on 18 Jul for the two day journey from Leh to Manali, and a further day down to Shimla. Trains were taken from Shimla, and the team arrived back in Delhi on 23 Jul 98. The Expedition Leader and Liaison Officer reported back to the IMF on 24 Jul. The team flew from Delhi to London on 26 Jul 98.

5. Achievements. Two summit attempts were made on KANG YISSAY I. At the first attempt, using the North East Ridge, the climbers were forced to retreat 200m from the summit; on the second attempt, using the South ridge, they retreated just 40m from the summit. An attempt was made on the North Ridge of the unclimbed KANG YISSAY III, with the climbers retreating 200m from the summit. A comprehensive exploration of routes on both KANG YISSAY III and IV was made from both the South and East glaciers of the massif.

## PARTICIPATION

6. The team consisted of eight personnel, balanced in terms of rank, age and previous experience. A nominal roll, with relevant responsibilities, is at Annex C.

## PLANNING

7. Research. Research to find a suitable objective was carried out at the Alpine Club and the Royal Geographical Society. A list of sources is at Annex D. Once the objective was decided personal contact was made with the leaders of two previous expeditions.

8. In-country contacts (details of all useful contacts are at Annex E).

a. British High Commission (BHC). BHC New Delhi were faxed in Jun 97 to confirm the current administrative procedures for expeditions involving Government servants. Regular telephone contact was maintained thereafter.

b. Expedition Agent. Following recommendations from previous expeditions and after some competitive tendering, Rimo Expeditions were appointed as the expedition agent. The Managing Director, Chewang Motup, and his staff in Delhi and Ladakh, proved to be flexible, informative, highly efficient and very well connected.

***Recommendation: It is recommended that Rimo Expeditions are included in the British High Commission list of recommended agents.***

c. Indian Mountaineering Federation (IMF). The IMF were contacted by fax in Jun 97 and a provisional booking of the peak agreed in Aug 97. Formal booking and payment of the Peak royalty was made in Nov 97. Regular and protracted correspondence continued with the IMF until the day before the expedition left for India on matters such as permission for the import of freight and for the issue of 'X' Mountaineering visas.

***Recommendation: It is recommended that the IMF are contacted and the application submitted with full payment as early as possible.***

9. Visas. The issue of the correct visas proved difficult, and some detail on the procedures and pitfalls may prove useful to future expeditions:

a. Mountaineering expeditions are required to apply to the IMF for permission to be issued 'X' Mountaineering visas; ordinary Tourist visas are not acceptable. The IMF apply to the Indian Ministry of Home Affairs for permission, and the letter of permission is sent to the Indian High Commission in London who will issue the visas. The time delay incurred by this process is, however, extreme. In our case numerous hasteners were sent to the IMF, but despite the eventual intervention of our agent the expedition received permission to have the visas issued late on the last working day before departure. It was only through the persistence and doggedness of a London-based team member who was able to travel to the Indian High Commission that we managed to have the visas issued before they closed.

b. Should these visas not have been issued in London the fallback recommended by the IMF was to arrive in India with Tourist visas and convert them in Delhi. We were advised on arrival that this procedure would have taken several days.

c. A specific complaint was raised with the Director of the IMF on return to Delhi concerning the uncertainty of receiving X visas in time. Ours were received on the last possible day despite ten months advance notification, but the Director admitted that some expeditions had failed to receive them before arrival despite applying two years in advance. He assured us that the question of whether expeditions should require these visas, and how their issue could be made more efficient, was raised regularly with the Indian Ministry of Home Affairs.

***Recommendation: It is recommended that every effort be made to secure the necessary X visas before arriving in India.***

## LOGISTICS

10. Clothing/Equipment. Most clothing and equipment used was personal. The shortfall, largely tentage and some items of climbing equipment, was drawn from Service sources. All group equipment and the majority of personal equipment was packed into 16 x 60 litre plastic drums (supply details are at Annex E). These proved to be robust and weatherproof, excellent for expedition use. A full list of equipment is at Annex F.

### 11. Movement.

a. International flights. The KLM group booking service was used, combining a competitive air fare with the facility to change ticketed names up to one month before departure without penalty if needed.

#### b. Internal movement.

(1) Delhi - Ladakh. Flights with Indian Airlines were pre-booked through our agent. It should be noted that the Delhi - Leh road is blocked by snow on the high passes for most of the year and rarely opens before mid-July. Flying is therefore the only option for most of the year.

(2) Ladakh - Shimla. Hired jeeps.

(3) Shimla - Delhi. Narrow and Broad gauge train.

### 12. International Freight.

a. Outward. The bulk of the expedition freight was despatched unaccompanied one month before the expedition arrived in Delhi (freight company details are at Annex E). Unfortunately, our freight was wrongly classified by Indian Customs. Three days were

spent with the agent and a locally-recruited clearance agent in securing it's release. Despite the kind intervention of the British High Commission on our behalf a high demarrage charge was incurred.

b. Return. On advice from the agent all equipment was taken back as Excess Accompanied Baggage. Unfortunately we were quoted the wrong rate for this, and the correct rate demanded at the airport was some five times higher than expected. After long negotiation KLM agreed to waive two thirds of the total, but the charges were still exceedingly high.

***Recommendation: It is recommended that either:***

***(1) An excess luggage deal is negotiated with the carrying airline; or***

***(2) Professional advice is taken on how to import unaccompanied freight without incurring punitive charges.***

13. Internal freight. All the expedition freight was carried accompanied on the flight from Delhi to Leh for a nominal charge negotiated on-the-spot by the Liaison Officer. All the drums returned to Delhi by air with the Liaison Officer at the end of the Mountaineering Phase, allowing the rest of the team to travel back overland with minimal luggage.

14. Communications. The procedures for importing radio equipment into India are complex and time-consuming, and an early decision was made not to do this. The IMF have recently acquired a limited number of Yaesu hand-held radios for hire at what they describe as a nominal charge. This was confirmed on arrival as US\$50 per set for one month's hire, and the decision was made not to hire them. In retrospect this was a mistake. Communications on the mountain would have been extremely useful and a possible lifesaver. Its absence was a contributory factor to the retreat of at least one summit bid.

## SCIENTIFIC PROJECT

15. A scientific project to investigate the absorption kinetics of glucose at increasing altitude was carried out during the expedition by a Volunteer member of the team whose civilian career is as a medical research scientist. The project was devised in conjunction with the Professor of Military Medicine at the Royal Defence Medical College. A preliminary assessment of the results has indicated that there may be some significant findings, and publication in the relevant medical press will be sought. A description of the project is at Annex G.

## ENVIRONMENTAL POLICY

16. The expedition conformed to a strict environmental policy drawn from the BMC Environmental Guidelines, the Kathmandu Declaration and the UIAA Ethical Code (with which all team members were made familiar). The policy is reproduced at Annex H.

## INSURANCE

17. An expedition insurance policy was taken out with Christchurch Insurance Brokers Ltd to cover personnel and equipment.

## FINANCE

18. The expedition was financed by a mixture of commercial sponsorship, Service public and non-public funds and individual contributions. Financial details are set out at Annex I.

## CONCLUSION

19. The expedition failed to make the first British ascent of the North East Ridge of KANG YISSAY I. However, the two summit attempts on the main peak and the additional attempt on KANG YISSAY III provided superb high altitude mountaineering experience, the first experience of climbing in the Greater Ranges for four of the eight expedition members. The exploration of the South and East glaciers was successfully completed and potential routes identified. A successful science project was completed which will add to the medical knowledge of high-altitude medicine. This information will be made available through additional reports to be sent to the Alpine club, the Royal Geographical Society, the British Mountaineering Council and the Mount Everest Foundation and subsequent articles submitted to the civilian and Service mountaineering and medical press.



D PENRY  
Maj  
Expedition Leader

### Annexes:

- A. Approach route.
- B. Mountaineering phase.
- C. Expedition nominal roll.
- D. Research sources.
- E. Useful Contacts.
- F. Equipment list.
- G. Scientific project.
- H. Environmental policy.
- I. Financial summary.

### Distribution:

Mount Everest Foundation (4 copies)  
EDS Defence Limited  
Mountain Equipment (Peaco Group Ltd)

## THE APPROACH ROUTE

### GENERAL

1. The common approach to the Kang Yissay massif is the well-trodden seven day trek from Leh down the Markha valley. We chose instead to take a little-used alternative route of the same length from Stok, passing between the Stok Kangri and Matho Kangri massifs and crossing two passes of just under

5000m in height to emerge at Sumdo. Here we rejoined the steep main trail from Martselang to the Kongmaru La, the third - and at 5200m the highest - pass on the route. This drops to the Nimaling Plains, the site of our Base Camp. The Plains are at 5000m, making for a relatively high Base Camp on a 6400m mountain.

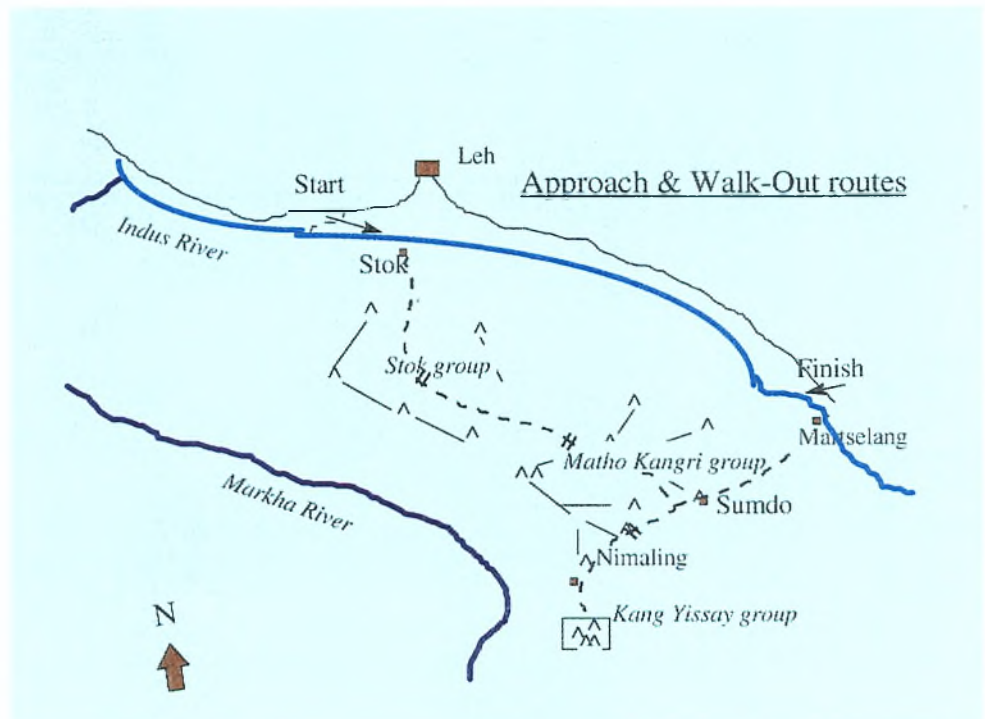
Although this high site gave us ready access to both the North and East glaciers, two team members did not acclimatise well and were

unable to go higher during the expedition. The Nimaling Plains are renowned for receiving heavy snowfall, but we had only to contend with light snow flurries on two of the ten days we were in occupation.

2. Notes on a similar approach made by Ratty's expedition 3 years ago were used as a guide (see Annex D). However, the route taken by our party - using the local knowledge of our pony

men - proved to be different, probably paralleling Ratty's route but further to the east. This approach was attractive and, except for a small group heading to Stok Kangri Base Camp on the first day, empty of other parties until we rejoined the main trail at Sumdo. Overnight camp areas were scarce but well-defined, often located on summer pasture areas alongside herders settlements. The three high passes on the route provided good acclimatisation for a mountaineering approach, although the ruggedness of the country and rapid initial gain in height from Stok should not be underestimated: one team member who was not acclimatising well

was forced to descend temporarily before the first pass, and another suffered heat exhaustion during the crossing of the second pass.



Ponies carry drums on the approach



## ROUTE DESCRIPTION

3. Stok - Sumdo. The roadhead is a few hundred metres past Stok Palace, where the jeep road becomes a wide pony track. The route at this stage is the normal way to Stok Kangri Base Camp with a camping area some 3 hours up the trail. We branched West the following day



Sgt Jones makes a 'sporting' river crossing

to follow an ascending valley that split southwards to the second night's camp. The following morning we crossed a second pass. Camping at the end of this short day was on a spectacular plateau at 4300m, flat enough for our Liaison Officer to organise a GB vs. India cricket match, convincingly won on this occasion by the tourists. The fourth day's trek used very narrow trails; one of our ponies miraculously survived a 400m fall on steep scree during this stage. The plastic drums proved their worth as none of the equipment was damaged, but the incident confirmed our pony men's dislike of the drums as baggage containers. Two days of difficult negotiation resulted in our agreeing to repack half of the equipment and food into locally purchased sacks, with the four most experienced ponies continuing to carry two drums each. The

remaining empty drums were left in Sumdo for later collection.

4. Sumdo - Nimaling. A full day's trek up a progressively narrowing trail and into a steep-sided valley involved dozens of increasingly sporting river crossings. The trail led us to a cold and wet camp at 4700m, less than an hour below the Kongmaru La. The early morning view from this pass onto the Nimaling Plain was spectacular, the middle ground dominated by the Kang Yissay cirque, the far skyline by the jagged teeth of the Karakoram stretching westwards into Pakistan. After more than a year of studying notes and photographs from previous expeditions this was the first opportunity to see things for ourselves, so despite the unsettled weather and some cloud cover we spent time at this vantage point familiarising ourselves with the North and



Viewing the mountain from the Kongmaru La

East faces of our mountain. From the pass the route dropped sharply into a valley used by some expeditions as a Base Camp site. We were keen to establish ourselves higher to obviate the need for an Advance Base, so spent an hour crossing a ridge below the North Face to establish Base Camp on a sheltered site at 4900m on the outflow river from both the North and East glaciers.



Base Camp

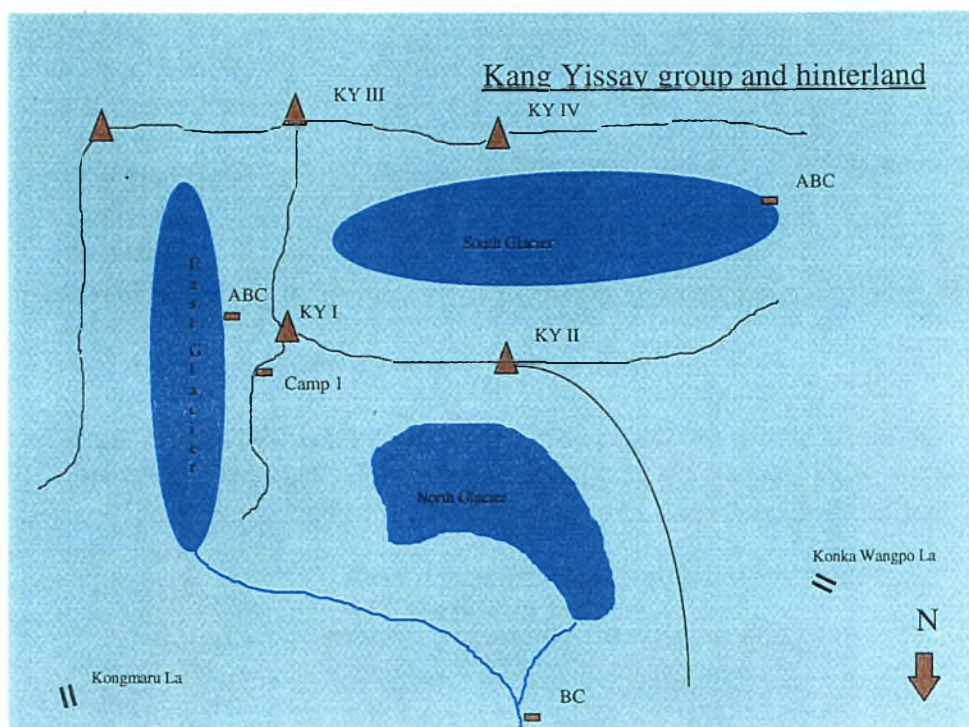
5. Nimaling - Martselang. On return at the end of the Mountaineering Phase, our fit and well-acclimatised team completed the return walk to the roadhead at Martselang in just two days via the Kongmaru La.



## MOUNTAINEERING PHASE

### DESCRIPTION

1. Kang Yissay (also spelt Kang Yaze on some maps) is a massif of four individual peaks linked by ridges above at least three glaciers, arranged in an open horseshoe. Approaching from the north up the Markha Valley or east over the Kongmaru La the compact North Glacier and sweeping North Face are dominant, rising to Kang Yissay I (6400m) on the eastern side and Kang Yissay II (6100m) to the west, both peaks linked by a long ridge.



2. The East Glacier and moraines give ready access to this side of the massif, starting with the outfall river that runs past the Base Camp location. The glacier gives the fastest access to the South Ridge of Kang Yissay I which drops to a col and becomes the North Ridge of Kang Yissay III.

3. The West Ridge of Kang Yissay III drops sharply to a col before rising over mixed ground to Kang Yissay IV and a long, gradually descending summit ridge which drops away to the open end of the South Glacier.

4. Much of the ground below the snow line consists of the loose brown shale so characteristic of Ladakh, mixed with moraine and often in unstable condition. Once above the snow line the conditions become reassuringly alpine in nature.

### NE Ridge of Kang Yissay I



### ATTEMPT ON THE NE RIDGE OF KANG YISSAY I

5. Our first day above Base Camp was spent on a reconnaissance of the North Glacier. The glacier is easily approached up the outfall stream running beside Base Camp and by obvious moraines. We carried equipment and food to a dump on the furthest moraine under two snow gullies (identified by Ratty as possible ascent lines to the North West Ridge) before sorting out equipment and clothing for a reconnaissance of the glacier as high as the soft snow conditions that late in the day would allow. The glacier ascends to a bergschrund below the sweeping North Face. On its true right flank it rises to a 45 - 50° slope to gain the North East Ridge, and in common with most previous expeditions we opted to take this route the following morning.

6. Well before dawn a team of four - Duncan Penry, Rhys Jones, Rob Smyth and Craig Currie - ascended to the gear dump, then climbed roped as two pairs to some large crevasses and onto what turned out to be a steep ice face leading to the North East Ridge. We were forced to move fast as the position of the face meant an early and rapid deterioration of conditions in the morning sun and we were not happy about its stability. Nevertheless, this section was steep and hard enough for us to pitch it in three places

**Duncan Penry and Craig Currie ascend to the NE Ridge**



**Breaking trail below Camp 1**



until we reached soft, poor snow overlaying holes in the ice just before achieving the relative security of the ridge.

7. Several hours of gruelling trail-breaking in the snow up the ridge followed. The camp position used by previous expeditions at 5600m was not obvious (during the descent the probable area used was identified, but it would have needed a great deal of work to prepare tent platforms). We continued to a more obvious and attractive position at 5800m where the ridge emerges into a mushroom-shaped plateau above some seracs. Camp I was established here.

**Rhys Jones and Rob Smyth below Camp 1, with the N Face beyond**



8. Altitude and exhaustion took its toll on two members of the team, and only Duncan and Rhys left Camp I at 0230 the next morning. After crossing the plateau and weaving around large blocks of avalanche debris, we moved together to make a traverse of what had become the North East

**Rhys Jones descending across the N E Face**



Face, moving towards an ascending line of rocks which seemed to offer a secure route to the summit. Dawn broke as we reached the rocks, giving us our first proper view of the way we had come and the route ahead. The face we had traversed was steep - about 60° - and rotten, falling away to ice cliffs below. Looking up it was clear that we were threatened by slab avalanche, and a large cornice was evident above sections of windslab still waiting to come down. With the clear sky the sun would soon rise directly onto the face, increasing the risk markedly. We ascended one pitch to 6200m to fully test the conditions, but then made the decision to descend. We pitched back across the North East Face, Rhys

catching some air time on the way, then descended back to Camp I.

9. The descent route retreated along the line of ascent as far as the beginning of the North East Ridge, then used the scree slopes to the east to reach the outfall stream from the East Glacier, which was followed to Base Camp.

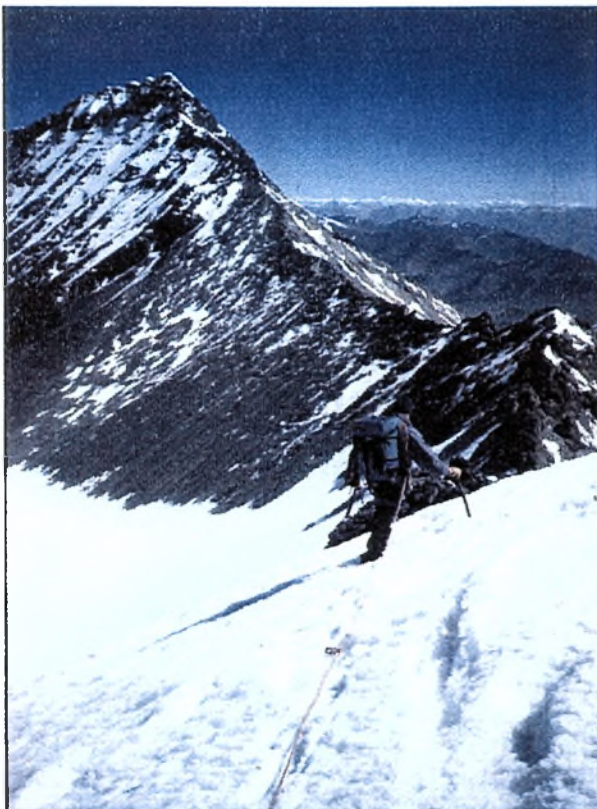
## **Recommendations/Observations:**

- a. The North East Ridge seen from Base Camp is in fact a narrow North East Face. The face is steep, hard ice prone to avalanche and cornice collapse. It became clear during the ascent why this route is little-used. It is recommended that a large quantity of ice protection is taken on the route.**
- b. By ascending the line of rocks for another 100m or so it is possible that we may have found a route onto the mixed ground of the South Ridge.**

## **EXPLORATION OF THE SOUTH GLACIER AND NORTH RIDGE OF KANG YISSAY III**

10. This attempt involved the same team of four, accompanied by the Liaison Officer and Pasang Sherpa, a member of the camp staff acting as a climbing member. Four ponies were used to carry loads around the Kang Yissay massif to the South Glacier. The route ascends from Base Camp to the ridge falling from Kang Yissay II and then to the obvious col marked on some maps as the Konka Wangpo La. A poor path descends then traverses scree slopes around Kang Yissay II. At one point the path had been swept away by landslide, and it took a great deal of persuading for the pony men to agree to join in rebuilding it before leading the ponies over the washed-out section. Rough ground prevented the ponies from being used on the whole route, and a difficult load carry was needed to move all the equipment over the moraine wall to the South Glacier. An Advance Base Camp (ABC) was established here. A brief reconnaissance was made along the glacier before last light.

11. Rhys Jones was not feeling well and returned to Base Camp later the following morning. The remaining four left ABC at 0230, ascending glacial moraine and then a well-frozen, uncomplicated glacier to the headwall forming the South Ridge of Kang Yissay I and the



**Rob Smyth descends from the high point on the N Ridge of Kang Yissay III. The S Ridge of Kang Yissay I is directly ahead**



**Rob Smyth at the start of the N Ridge of Kang Yissay III. The unnamed peak behind sits at the head of the E Glacier**

North Ridge of Kang Yissay III. Craig Currie, accompanied by the Liaison Officer, descended before first light with altitude problems. Duncan Penry and Rob Smyth then roped up and made a steep but straightforward ascent over an easy bergschrund and up to the mixed ground of the ridge. Pasang Sherpa took an independent line further towards Kang Yissay III. The ridge offered classic alpine mixed climbing as we followed it south, emerging on a sharp snow ridge leading to the summit of Kang Yissay III. The ridge dropped off without a break on either side to the glacier floors below. Although the start of the ridge offered firm and reliable cramponing, conditions deteriorated rapidly after a few hundred metres or so with snow sloughing off to each side. Protection was negligible. Some 200m from a summit estimated at approximately 6150m the decision was made to turn back.

### ***Recommendations/Observations:***

- a. Fastest progress on the glacier is made by using the central moraines for ascent and descent.***
- b. Ratty describes a possible route from this glacier onto the ridge connecting Kang Yissay I and II on what he calls the South Rib. The ground on this side of the massif is loose and broken, and while it is possible that a scrambling ascent may be made to the ridge we could not recognise an obvious feature such as he describes.***
- c. Access to the start of the long summit ridge of Kang Yissay IV appears to be possible by either of two snow gullies near the snout of the true left bank of the glacier. The summit ridge is very long, certainly over 1km, dropping after the summit to a snow col before the relatively short ascent to Kang Yissay III. This would make a long but superb high altitude traverse.***

### **ATTEMPT ON THE SOUTH RIDGE OF KANG YISSAY I**

12. An afternoon was spent carrying equipment to an ABC at 5400m on the East Glacier. This section of the glacier is covered by loose moraine, interspersed with snow tongues coming from the lower East Face of Kang Yissay I. The camp was established on a small patch of flat snow beside a long scree slope leading to mixed ground and the South Ridge. It was occupied the next day by Duncan Penry, Andy Holman, Rhys Jones and Rob Smyth.

13. At 0045 on an unsettled morning Rhys and Rob began the climb up the scree slope. An hour later Duncan and Andy were ready to move but worried by the weather, which was worsening rapidly. They decided against climbing, the decision influenced by what, judging from the movement of the headtorches on the scree, seemed to be the retreat of the first pair. In fact Rhys and Rob continued, taking a line through large blocks and then loose shale. The cloud, which had appeared thick and unstable at the start, was now seen to be only a thin layer, and it continued to rise steadily during the day. Apart from a number of small snowfields, none more than 4 metres wide, the scree slope extended all the way to the ridgeline, but the climbers took a diagonal line southwards over 45° snow slopes to achieve the 6200 metre point on the ridge at 0815.

14. The South Ridge was narrow, with a small cornice to the East and a rocky platform on the West side. There were occasional gendarmes which at first were easily negotiated, but they became bigger, more frequent and more difficult to turn or climb as the pair ascended. The final gendarme was found to be part of a large buttress which extended south from the summit. A short reconnaissance was made on the West side of the summit block but no easier access was found. Faced with a greater degree of technical difficulty than expected, uncertain belays and unstable weather, and an unmatched skill level within the pairing, the reluctant decision was made to descend.

### ***Recommendations/Observations:***

- a. From the summit block, a short traverse on the West side gives access to a snow gully, approximately 15 metres in length, which ends in a choke of what appears to be hard water ice.***
- b. There are many route options on the buttress, and further to the right two or three gullies may give access to the summit. This would mean traversing across snow slopes on the East side, which is commonly in poor condition.***

**EXPEDITION NOMINAL ROLL**

Ser	Rank/Name	Responsibilities
(1)	(2)	(3)
1.	Duncan Penry	Expedition Leader
2.	Andy R Holman	Deputy Leader
3.	Dutch Van Spall	Diarist
4.	Reg Marshall	Medical equipment/BC Manager
5.	Ian Weatherstone	Equipment Manager
6.	Rhys Jones	Product reports
7.	Rob Smyth	Photography
8.	Craig Currie	Science Officer

**RESEARCH SOURCES**

1. Bruzy, A, *Kang Yissay expedition 1988*, Himalayan Journal, Vol 47, 1989/90, pp191-92.
2. Jenkins, MG, Exercise Indian Apogee: Military Survey mountaineering and exploration expedition to India 4 Jul - 4 Aug 95, unpublished post-exercise report, 23 Aug 95.
3. India: A Travel Survival Kit, Lonely Planet, 6 edn, 1996.
4. Loram, C, *Leh and trekking in Ladakh*, Trailblazer Publications, 1996
5. Pania, D, *Ladakh 1988*, Indian Mountaineer, Vol 27, 1991, pp 40-44.
6. Ratty, M, Kang Yissay Expedition Report 1995, Mount Everest Foundation Report Reference 95/31.

**USEFUL CONTACTS**

Ser	Organisation/Company	Address	Telephone	Fax	Email
(a)	(b)	(c)	(d)	(e)	
1.	Defence Section British High Commission	Shantipath Chanakyapuri New Delhi 110 021	91 11 6872161 ext 2406	91 11 6114603 91 11 6872882	
2.	Indian Mountaineering Federation	6 Benito Juarez Road, Anand Niketan New Delhi 110 021	91 11 4671211 91 11 4677935	91 11 6883412	
3.	Rimo Expeditions	B5/6 Vasant Kunj New Delhi 110 070	91 11 6136568	91 11 689 8710	rimo@ giasdl01. vsnl.net.in
4.	Rexham Harcostar  (plastic drums)	Windover Road Huntindon Cams PE18 7EE	01480 52323		
5.	Wilson & Co  (unaccompanied air freight)	Unit 5-6 Parkway Trading Estate Cranford Lane Hounslow Middx TW5 9QA	0181 814 7033	0181 814 7089	

## EQUIPMENT LIST

### PERSONAL CLOTHING

Casual clothing	Boots (trekking)
Thermal underwear	Boots (climbing)
Salopettes	Contact/Inner gloves
Mid-layer	Outer gloves/mitts
Fleece	Balaclava/warm hat
Jacket	Helmet (climbing)
Socks	Gaiters

### PERSONAL EQUIPMENT

Harness	Penknife/Leatherman
Personal climbing hardware	Rucksack
Crampons	Sleeping bag
Ice axe	Bivvy Bag
Ice hammer	Insulation mat
Headtorch	Sunhat
Flask	Suncream, Sunblock, Lip-salve
Water bottle	Personal medical kit
Pee bottle	Washing kit
Ski poles	Walkman/tapes/SW radio
Goggles	Books/games
Sunglasses	Passport/ID card
Spoon	Wallet with cash and credit cards
Mug	Camera/film

### GROUP EQUIPMENT

Tents	Cooksets x 4
Ropes	Cylume/Snaplight
Ice axes	Paracord x 100m
Pitons	Tape black
Jumars	Tape luminous
Slings x 20	Washing liquid
Snow shovels x 4	Batteries (50 x AA)
Candles	Int Corps flag
PIEPS/Ortovox	Union Jack
Cookers x 4	Maps/guides
Toilet paper	Disposable lighters



## SCIENTIFIC PROJECT

1. General. Dr Craig Currie joined the expedition as the Science Officer and conducted a medical research project during the team's time at high altitude. An Army Research Project Proposal was prepared and submitted in consultation with the Professor of Military Medicine at The Royal Hospital, Haslar and the Department of Medicine at University Hospital, Wales. During our screening interview by the Mount Everest Foundation Dr Currie was questioned closely by Dr Mike Searle, a high-altitude medicine specialist. Dr Searle was enthusiastic about the project and satisfied that the relatively simple methodology could withstand the rigours of expeditionary life.
2. Equipment and finance. The project was cheap and practical to administer. State-of-the-art meters to measure blood sugar levels were loaned to the expedition by Medisense, who also made a financial contribution towards Dr Currie's costs.
3. Terms of Reference. During altitude training metabolic changes occur to compensate for increased exertion under conditions of reduced oxygen (hypoxia). At altitude, it is possible that carbohydrates are either absorbed or metabolised at differing rates to those seen under 'normal' conditions. The study aimed to assess fasting, time to peak and integrated glucose absorption, measured using the area under the absorption curve, following a standard Oral Glucose tolerance Test and a complex carbohydrate meal tolerance test at varying degrees of altitude, all other factors being constant. The Terms of Reference for the study were to:
  - a. Monitor and describe the pre- and post - prandial carbohydrate metabolism at low, mid and high altitude on a military exercise to climb a 6400 metre peak in the Indian Himalayas.
  - b. Examine possible reasons for any evident changes (for example, previous high altitude experience).
  - c. Formulate and disseminate recommendations about the most appropriate carbohydrate content of foodstuffs for high altitude work and training.
3. Scientific background.
  - a. Exposure to high altitude leads to weight loss, and is a function of absolute altitude and duration of exposure<sup>1</sup>. Good nutrition is vital in combating this effect<sup>2</sup>. Because of the difficulties of experimentation at these altitudes, very little is understood about the absorption kinetics and metabolism of carbohydrate at altitude.
  - b. At high altitude, relatively low oxygen concentration results in various physiological adaptations<sup>3,4</sup>. These include increased haemoglobin synthesis, increased red-cell mass, and the increased use of anaerobic metabolic pathways. Changes in regional blood-flow to the upper gastrointestinal (GI) tract may result in critical alteration in the absorption and

<sup>1</sup> Pulfrey SM, Jones PJ. Energy expenditure and requirement while climbing above 6000m, *Journal of Applied Physiology* 1996; 81:1306-11.

<sup>2</sup> Kayser B. Nutrition and energetics of exercise and altitude. Theory and possible practical implications. *Sports Medicine* 1994; 17: 309-24.

<sup>3</sup> Favier, R, et al. Hormonal and metabolic adjustments during exercise in hypoxia or normoxia in highland natives. *Journal of Applied Physiology* 1996; 80: 632-7.

<sup>4</sup> De Angelis C, et al. Effect of acute exposure to hypoxia on electrolytes and water metabolism regulatory hormones. *Aviation, Space and Environmental Medicine* 1996; 67: 746-50.

metabolism of both complex and simple carbohydrates<sup>5</sup> in a physiological environment where energy requirements are significantly raised<sup>6</sup>. This is probably due to a number of adaptive changes to carbohydrate metabolism, but changes in gut permeability<sup>7</sup> and insulin metabolism<sup>8</sup> have already been demonstrated. This may manifest as altered glucose kinetics following a standard oral glucose tolerance test (OGTT). These changes may potentially have a profound effect on exercise tolerance and exhaustion threshold, and more appropriate nutrition could result in better muscular and physiological efficiency.

#### 4. Plan of Work.

a. Subjects. All team members participated in the study. A selection of the team visited the University Hospital of Wales before departure for biochemical measurements and the measurement of exercise tolerance using a standard maximal cycle ergometer test with incremental resistance.

b. Methods.

(1) Measurements were taken from 8 volunteers on their ascent from an acclimatised altitude.

(2) Following overnight fast, a standard OGTT was conducted involving the consumption of 75ml of glucose solution.

(3) Blood glucose concentration was measured at  $t-30$ ,  $t+15$ ,  $t+30$ ,  $t+60$ ,  $t+90$  and  $t+120$  using a standard portable meter manufactured by Medisense UK, and standard electrochemical testing strips. Blood was taken by piercing the finger with a lancet in the manner used for diabetic monitoring.



**Sgt Jones lances his finger**

5. Publication. Publication will be sought in the appropriate medical press following analysis of the results.

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<sup>5</sup> Holden JE, et al. Enhanced cardiac metabolism of plasma glucose in high-latitude natives: adaption against chronic hypoxia. *Journal of Applied Physiology* 1995; 79: 222-8.

<sup>6</sup> Askew EW. Environmental and physical stress and energy requirements. *American Journal of Clinical Nutrition* 1995; 61 (supplement): 631s - 637s.

<sup>7</sup> Dinmore AJ, et al. Intestinal carbohydrate absorption and permeability at high altitude. *Journal of Applied Physiology* 1994; 76: 1903-7.

<sup>8</sup> Kolesnyk IUM, et al. The effect of intermittent hypoxic training on pancreatic endocrine function in animals with diabetes mellitus. [Ukrainian] *Fiziologichnyi Zhurnal* 1994; 40: 87-95.

## ENVIRONMENTAL POLICY

### GENERAL

1. Expeditions can make a significant impact on the environment through which they pass unless they pursue a policy designed to minimise the damage they cause. The sheer weight of numbers walking and camping within a fragile mountain ecosystem, and the large amount of waste produced, means that environmental issues require careful planning and management. It is therefore essential that expeditions identify how they intend to minimise the damage they cause and include this as an integral part of the planning, training and execution of the expedition. This policy describes how this will be achieved on the British Army Kang Yissay Expedition.

### RESPONSIBILITIES

2. While environmental care is the responsibility of every member of the expedition (see the Code Of Conduct below) one member will be given specific responsibility for environmental matters. He will be responsible for:

- a. Giving environmental advice and instruction to expedition members camp staff and porters. Due consideration must be given to cultural and social tradition in doing this.
- b. Ensuring familiarity with all the regulations imposed by the Government of India and Indian Mountaineering Federation and researching the expedition area to identify environmental issues specific to the expedition area.
- c. Siting toilets, ablution and water collection areas. During the approach and recovery this will be a daily requirement.
- d. Bringing points of concern on environmental issues to the attention of the Expedition Leader and/or the Guide or Sirdar as appropriate.

### ENVIRONMENTAL CODE OF CONDUCT

3. All expedition members are to abide by the following environmental Code Of Conduct:

- a. Education of porters and camp staff. Education and guidance is to be provided to porters and camp staff on environmental issues where appropriate.
- b. Protection of flora and fauna. Flora and fauna, particularly crops and trees, are not to be damaged or disturbed. Sites of geological or other scientific interest are to be respected. Cuttings, seeds and roots must not be taken.
- c. Litter. Do not drop litter. Porters are to be discouraged from dropping litter.
- d. Camp waste. All metal waste, such as tins, will be crushed and carried out. Packaging materials will be collected and burnt.
- e. Toilets. Toilet areas should be used wherever possible. Where toilet facilities are not available excrement must be disposed of in a sanitary manner, such as by burying or disposal in deep crevasses at least 30m away from water supplies, paths or climbing routes. All used toilet paper must be burned.

- f. Cleaning camp areas. During the approach and recovery, camp areas will be cleaned thoroughly of all litter before departure. Non-biodegradable litter will be packaged and carried.
- g. Water contamination. Pollutants such as detergents will not be used in streams and springs. Unnecessary pollution of the snowpack will be avoided.
- h. Deforestation. No open fires will be made. Porters will be discouraged from using open fires by the Guide/Sirdar on our behalf. Kerosene cooking facilities will be provided.
- i. Erosion. Paths will be followed where they are available, and unnecessary shortcuts avoided. No unnecessary waymarks will be left.
- j. Fixed equipment. The expedition will respect climbing traditions in ethical matters such as the use of chalk, piton and bolts. All fixed equipment will be stripped from the mountain.

**FINANCIAL SUMMARY**

Ser	INCOME	AMOUNT (£)	EXPENDITURE	AMOUNT (£)
(a)	(b)	(c)	(d)	(e)
1.	Personal contributions	4000	International flights	3442
2.	Service grants	2007	Internal flights	581
3.	Non-public funds	5100	IMF peak royalty	1091
4.	Commercial sponsorship	5200	Equipment	1178
5.			Insurance	568
6.			Freight	1495
7.			Agency charge	4233
8.			Assorted costs	781
9.			In- country costs	2938
10.				
11.	<b>TOTAL</b>	<b>16307</b>	<b>TOTAL</b>	<b>16307</b>