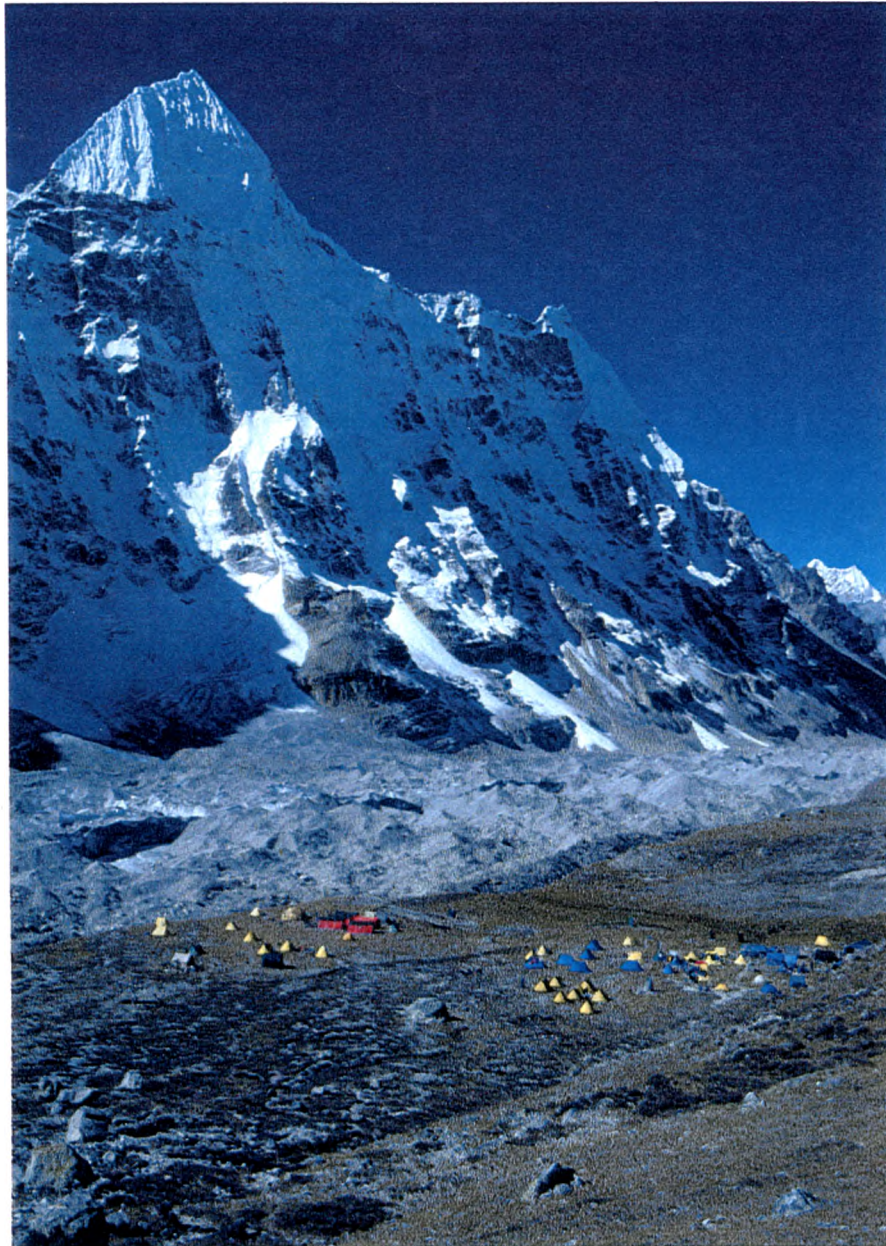


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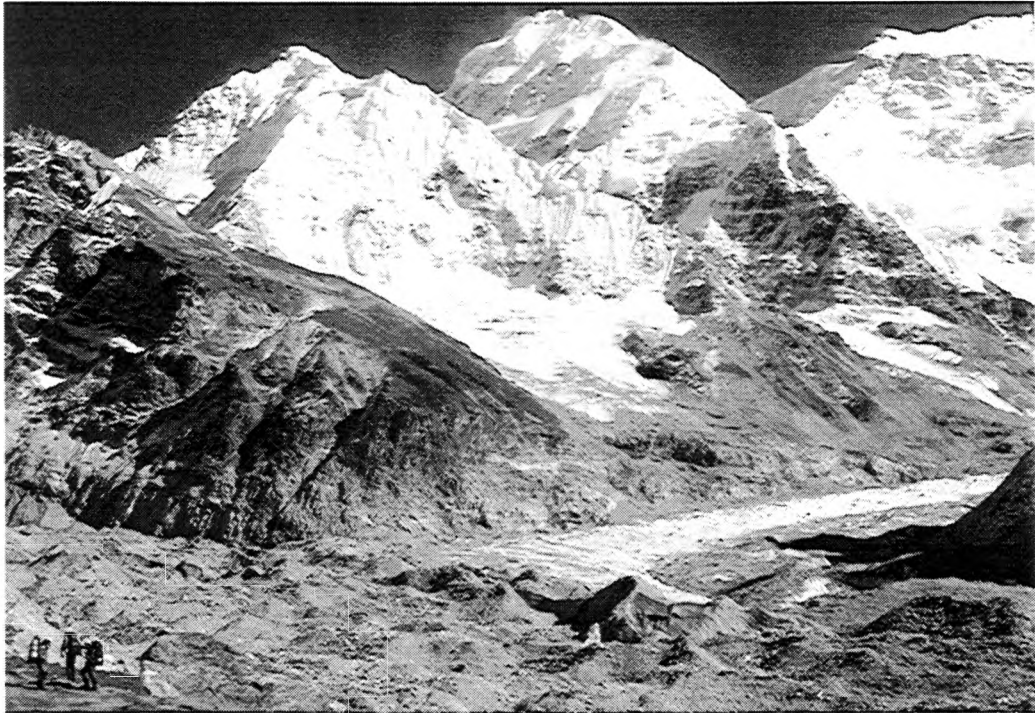
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Kangchenjunga 1998



Medical Expeditions

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What is Medical Expeditions and what is Medex?

Medical Expeditions is a charitable company limited by guarantee. Its aim is to increase, by research and education, knowledge and awareness of altitude related illness.

Medex is a trading company set up to organise treks and expeditions in support of Medical Expeditions.

Expeditions organised to date are:

British Mount Everest Medical Expedition 1994 (B.M.E.M.E.)
Kangchenjunga 1998 (K98)

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Report on the Kangchenjunga 1998 Expedition organised by Medical Expeditions

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Introduction to Medical Expeditions

By Simon Currin

There can be few institutions as curious as Medical Expeditions. A charitable organisation run by enthusiasts with a passion for combining science with adventure. In 1994 its members climbed Everest, Pumori, Lobju East, Island Peak, Pokalde and returned with a wealth of scientific data. The membership worked hard to make it all happen and used their own cash to fund the research programme.

The twin charitable objectives of Medical Expeditions are:

1. Research into the mechanisms of all aspects of altitude related illness.
2. Increasing, by education, awareness of altitude related illness.

In the six years since the charity was founded it has pursued its objectives with zeal. Medical Expeditions has run five courses for doctors at Plas y Brenin in North Wales as well as two for members of the public. These courses, organised by Andrew Pollard, have acquired an excellent reputation both amongst the international panel of speakers and amongst those that come to learn. Much of the work arising from the 1994 Everest Expedition has now been published and presented in journals and at meetings throughout the world. Kangchenjunga 1998 is expected to yield a further crop of papers spanning the spectrum of altitude related illness and physiology.

Despite the many academic and educational successes the most important aspect of Medical Expeditions is the unique human formula. Bringing together adventurers and academics from all backgrounds and giving them the opportunity, in their spare time, to work towards common and exciting goals. The excitement of participating in a major expedition is a powerful attraction and the prospect of doing some good science along the way has proved irresistible to many. Many friendships have been formed and have flourished and this is the greatest success of Medical Expeditions.

I am very happy that the enthusiasm that flowed after Everest '94 is flowing just as freely after Kangchenjunga '98. Plans are already afoot for future projects and I am sure that the next decade will prove a very interesting time for both the charitable works of Medical Expeditions and for its members.

This Report gives the details of its second major venture, Kangchenjunga '98. Once again teams of trekkers, climbers and researchers ventured into a remote corner of the Nepalese Himalayas to study the debilitating effects of altitude on health.

I hope you enjoy reading the many varied personal accounts and I hope that some of the technical detail will be of use to those planning future, similar ventures. Many individuals have contributed to this report and inevitably there is some repetition but each account brings a new perspective. I have, therefore, left many of the contributions unchanged.

Introduction to Kangchenjunga Expedition

By Simon Currin

After the successes of Everest the inevitable question was posed, "Where next?" It seemed certain that there would be a large following from Everest all the time we were being bombarded by new enquiries. Everyone seemed to be brimming with enthusiasm for both the research and the adventure. All we had to do was select the objectives then sit down and make it all happen.

The desire to continue the science meant that we had to find significant altitude and we were all smitten on Nepal. That, at least, narrowed down the target. We were keen, if possible, to combine base camp research activities with an attempt on a major peak as well as some more attainable satellite mountains. The other stipulation was that base camp should be a comfortable experience rather than the austere delights of the Khumbu. The 1994 trip had been to the heart of tourist Nepal and the organisers were keen to get away from the main trade routes and explore pastures new. The Annapurna region was thus discounted.

Having read Boardman's epic book 'Sacred Summits' back in the early 80's I had harboured a desire to go to Kangchenjunga. Apart from this fearsome account of climbing the world's third highest mountain I knew little about the region other than that it lay in the remote eastern corner of Nepal. I mentioned it as a possible objective at one of our open meetings in Langdale and all of a sudden that was it. We were off to Kangchenjunga.

Sally went off to the Alpine Club where she spent ages combing databases, obscure reports and historical publications. She came back wide eyed with enthusiasm with the wonders of Taplejung, Jannu, Ramtang and the Mirgin La. We now had a list of likely climbing objectives but were dismayed to find none of the satellite peaks were listed as Expedition Peaks by His Majesty's Government of Nepal. The good thing was that the North base camp sounded ideal - remote, high, spectacular and, above all, grassy! The fact that we would have to get several tonnes of assorted high tech and delicate equipment to a remote outpost in Nepal did not exercise our minds at this stage.

Having selected the target area we then had to design an expedition framework to suit. Ideally we needed to have a comfortable, central base camp with teams venturing onto surrounding peaks. If possible a strong climbing team would attempt a major assault on Kangchenjunga itself.

It seemed to me that the profile of the Medical Expeditions venture could only be boosted by association with a serious attempt on an 8,000 metre peak. However, the prospect of mounting a serious bid as well as attempting to achieve all the other research objectives did not appeal. I had always been disappointed that I had not been able to offer Chris Comerie a place on our Everest permit in '94 and I began to develop the idea of asking Chris to run his own parallel expedition on Kangchenjunga. The directors of Medical Expeditions quickly saw the attraction of having a logistically separate, but closely allied, 8,000 metre team and readily agreed to fund Chris' Kangchenjunga permit believing, correctly, that the outlay would be recouped by boosting our own profile and recruitment. I was, therefore, delighted to be able to ring up Chris and offer to fund his permit should he wish to mount his own expedition. Chris, I think, at first was a little dubious of our motives and was at pains to point out that he would be in total command of his team. Having been reassured on this we rapidly reached agreement and thus not one, but two, expeditions were born. The association proved most successful for both parties.

I then entered into a lengthy correspondence with HMG Nepal in attempt to get a permit for Ramtang Peak that had, until then, been out of bounds. Permission was finally secured in 1997 and in March 1998 it was granted a special status whereby no Royalty and no Liaison Officer were required. This proved a huge bonus to us and gave the climbers in our midst an excellent objective to get their teeth into. We also received permission for attempts on Dhromo and Tengkongma.

In the early days we contemplated an accompanying "family trek" but as the months went by the various families withdrew with the notable exception of Jo Argyle Robinson, Ian Cameron and their four children aged from 5 to 14 years. They engaged a separate agent and trekked under their own steam to Pangpema. Those of who were worried that they would not keep up were humbled by the whirlwind that surrounded them on the trail. Chris (aged 14) and Sholto (aged 11) repeatedly stormed past regular Medex members and climbed several of the spurs north of the Pangpema and Lhonak to around 6,000 metres.

Pangpema, with its wonderful pure water and grassy meadow, was the ideal nerve centre for the Expedition. With teams on Kangchenjunga, Ramtang and Tengkongma the researchers could beaver away in comfort secure in the knowledge that each trekking group would arrive and be inspired by the spectacular panorama. Boardman had described the approach march as the finest in Nepal and our hugely experienced sirdar described Pangpema as the most comfortable base camp on any big mountain. They were both correct. Pangpema was magnificent and perfect for our purpose.

As the Expedition plans grew Andrew Pollard ploughed his huge energies into the research programme. A research committee was formed, adverts placed and projects vetted. Emails whizzed around the world with bewildering frequency as new and enthusiastic researchers were signed up. Expedition organisers struggled in Andy's wake as he recruited in Europe, the USA and New Zealand.

Frequent meetings ensued over the following 2 years and by the early summer of '98 we began to relax as we tied the last few logistical knots. We were financially secure having been deluged with enthusiastic trekking recruits. We had secured outside funding to assist the research. Chris Comerie had recruited his team and, in mid August, he said his farewells and left for Kathmandu. With growing excitement we followed him a month later to begin the adventure. By then the expedition was already two years old.

Resume of expedition possibilities in the area

By Sally Glynn

The Kangchenjunga region of Nepal is a remote and fascinating area, much less visited than the popular Khumbu and Annapurna regions. Official Ministry of Tourism records confirm that only 516 trekking permits are issued for this region annually. In the north it borders Tibet whilst in the east it abuts the kingdom of Sikkim, now part of India.

Up until 1988 the area was closed to trekkers. It has almost 100 peaks over 6,000 metres, a significant number of which have no recorded ascent. Indeed, due to the closure of the region, many of the peaks that have been climbed were last climbed in the 1940's or earlier. Reliable information on lesser-known peaks is hard to come by - adding to the sense of exploration to be experienced in visiting the area.

CLIMBING OBJECTIVES

Tengkongma 6,210 metres

The first recorded ascent of Tengkongma was during a Swiss expedition in 1949. The expedition report in the Himalayan Journal of that year reads as follows:

“At last we had achieved a Himalayan ascent which was not killing, and which gave us every chance to enjoy to the full the unsurpassable view. Everest, Makalu and Lhotse first drew our gaze, but many other peaks, less in stature but no less beautiful, enthralled and intrigued us.”

Ramtang 6,700 metres

This peak had captured our attention, partly due to its location between the massif of Kangbachen, Yalung Kang and Wedge Peak, and partly due to the description of the first and only recorded ascent in Frank Smythe's book, *The Kangchenjunga Adventure*. Following a failed attempt on Kangchenjunga itself, Smythe and Schneider, members of Professor Dyhrenfurth's German expedition to the area in 1931, turned their attention to Ramtang.

Kangchenjunga 8,586 metres

The history of Kangchenjunga since its first ascent in 1955 is one of surprisingly few ascents. For almost 20 years there were no expeditions - and to date to our knowledge there has only been one further British ascent, that of Tasker, Boardman and Scott in 1979 via the north ridge. In 1989 the traverse of the four main summits was finally achieved by the Soviets, following the 1955 route up the south-west face. It was a phenomenal achievement by an incredibly fit team. During the past 15 years there have been a number of ascents but the main summit is one of the few remaining 8,000 metre and the first female ascent was made in spring 1998 by British climber Ginette Harrison.

The Alpine Journal 1996 describes Kangchenjunga (with K2) as “the most challenging of the 8,000 metre peaks” and continues “Nor does it have any easy routes. All of its faces are objectively dangerous and its ridges long and hard. Challenges remain, but they will not easily be won. Kangchenjunga is a mountaineers' mountain, and it will remain so.”

Structure and strategy of the Expedition

By Simon Currin

Personnel

Medical Expeditions is a charitable organisation whose remit is to conduct research into altitude related illness and to educate mountaineers and trekkers to recognise and avoid such illness.

The current Directors of Medical Expeditions took over their responsibility in May 1995. They are Jim Milledge, Sally Glynn and Annabel Nickol. Plans were soon developed to organise a major research expedition to the Kangchenjunga. All 3 directors contributed a very great deal of their time and energy before, during, and after K98. Jim and Annabel assumed research responsibility, and Sally took on much of the administrative responsibility and, of course, became a highly effective treasurer.

I was appointed Expedition Leader shortly after and assumed the responsibility for recruitment and planning. Andrew Pollard agreed to take on the responsibility for developing the research package and David Collier became Research Leader.

The above team worked very closely over the ensuing years with very regular correspondence. Most of this was conducted by email. Early on it was decided to broaden our research base and encourage new blood and accordingly we advertised for active researchers to apply to join the research team. A research committee was formed which included Jim Milledge, Andrew Pollard, David Collier and Annabel Nickol. They worked closely with other prominent members of the previous B.M.E.M.E. Research team notably Peter Barry.

Chris Smith and Denzil Broadhurst worked with Annabel Nickol and David Collier to ensure that the data collection weekends went as smoothly as possible. These London based weekends were, alone, no mean logistical feat.

Peter Smith was eventually persuaded to take on the major logistical role of Base Camp Manager. In reality his work and responsibility began many months before arrival at Base Camp, as his key UK function was to organise freight and communications. Denzil Broadhurst played a very important role as a technical adviser mainly with regard to the planning the power requirements and supply at Base Camp.

Once in the field Gerald Dubowitz became the general fixer and facilitator and managed to display a dazzling array of technological skills. Gerald took on responsibility for returning freight to the UK at the end of the Expedition.

Jacqui Lawson assumed responsibility for accumulating a vast amount of pharmaceuticals free of charge. Paul Richards, Mukul Agarwal and Ken Stewart became the Expedition Doctors.

Malcolm Dyson devised the menu for the Ramtang climbing team, purchased it and packed it for freighting.

Meriel Gillespie performed a very important role at Base Camp where she managed the flow of subjects through the various research projects. She also enforced the collection of fees related to the satellite phone.

Most of the research projects had one individual who was identified as the lead figure for that project. In most cases this was the first named author.

Structure

In March 1998 we had a fairly certain idea of expedition numbers and were able to carve the total membership into manageable groups. These groups averaged ten members. In each group there was a nominated spokesman, research data collector and doctor. Groups had no formal leader, as we believed that a democratic model was to be preferred.

No formal mountaineering guides or leaders were appointed, as members, particularly those venturing onto mountains, were repeatedly advised that they must be self-sufficient. Some members of the Ramtang team struggled with this informal approach, but the success on Ramtang eventually vindicated this management structure.

These groups were encouraged to meet as frequently as possible in the UK, and to function as autonomously as possible when in the field. Each group was provided with its own sherpa crew consisting of sirdar, cook, cook boys and porters. All sirdars were ultimately answerable to Dorje the Base Camp Sirdar who was directly answerable to Peter Smith.

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Below is the list of the members split into their trekking groups. Most stayed in these groups for the duration

Group 1 - arriving on 5 October, depart 6th

November
Margaret Lamont
Alfie Ingram
Joy Ingram
Bill Hammerton
Fiona Whiting
Geraldine Boocock
Dave Newman
Sandra Green
John Hirst
Roger Shapely
Emma Jackson

Group 2 - arriving on 5 October, depart 6th

November
Bruce Bricknell
Lee Romer
Chris Bagge
Ken Stewart
Don Patterson
Ed Irving
Matthew Thomas
Ann Luxmoore
Daniel Morris
Lance Jennings
Leonie Cameron

Group 3 - arriving on 28 September, depart 6th

November
Ronnie Robb
Dave Robb
Denzil Broadhurst
Michael Schupp
Richard Russell
Chris Smith
Ben Mason
Eli Silber

Group 4a - arriving on 14 September, depart 6th

November
Mark Howarth
Rick Havely
Gill Havely
David Geddes
Ian Baxter
Malcolm Dyson
Jon Pote
Damien Bailey
Mukul Agarwal

Group 5 - arriving on 21 September, depart 6th

November
Michel Pakloglou
Simon Currin
Sally Glynn
Liz Bowen
Nigel Hart
Roger McMorrow
Jacqueline Lawson
Richard Weller
Warren Dellow
Ulrich Steiner

Group 4b - arriving on 14 September, depart 6th

November
Henriette Van Ruiten
Diana Depla
Annabel Nickol
Gerald Dubowitz
Debby Miller
Pete Smith
Meriel Gillespie
Jim Milledge

Group 7 - arriving on 21 September, depart 6th

November
Gwilym Rivett
Alan Tate
Richard Oxley
Paul Richards
Sarah Bakewell
Kate Wilson
Bill Yallop



Village on the trek

Personal Accounts

In this section members were asked to recount in a few words an experience that meant a lot to them.

Prologue to Kangchenjunga By Don Patterson

"Overbooked on an Airbus by fifty-eight passengers! I don't believe it. I demand to see the Airport Manager." My behaviour at Karachi was boring, predictably white sahib, but, naturally, wholly justified.

Moustached, bespectacled Authority arrived. "With so many of us, can't you put on an extra flight to Kathmandu?" I asked.

"We are having no spare aircraft," he answered. End of discussion.

Thus, after travelling from Heathrow, and expecting a simple transfer for the next stage of the Medex Kangchenjunga 1998 Expedition, I found myself in a strict Muslim Karachi hotel with fifty-odd strangers and one Expedition colleague for a night. We shared some expensive, non-alcoholic beer, tried some rice and pickles, and a few of us flirted, foolishly, it turned out, with some half-heated vegetables. They were basking in a sauce, laced, not only with fenugreek and chillies, but also, as suggested by symptoms several hours later, a blend of E. Coli toxins. For me this was a novel way of acquiring diarrhoea in Asia. I had thought I'd tried most options over the years.

Attractive though Karachi may be, Kathmandu, literally, (City of) temples of wood, provided a very welcome sight as clouds parted in the Valley next morning to greet the descending aircraft. Kathmandu now strives to clothe its old and sacred features with a veneer of the new:- western cars, French wines, phones, PCs and the Internet. It has grown enormously, like an out-of-control adolescent, but instead of acne, it offers toxic traffic fumes. I hardly recognised the Capital that I had lived in eighteen years ago. Thamel, the main tourist area, now boasts hotels that have three and four-star status. In its narrow streets, rickshaw-wallahs insisted on my custom, and shopkeepers beseeched me to buy brass oil-lamps, postcards, Kashmiri carpets, incense sticks and paper lampshades. I succumbed to two of the latter, green-blue, for my daughter's bedroom, and a couple of brass bowls. "Special cheap price for you," they said, "because you speak Nepali." Oh, polyglots! What avenues to international bargains are open to you!

Early next morning, I consumed what seemed a singular breakfast at the Marshyangdi Hotel, but is probably available everywhere in the City now: egg, cooked to order, a variety of breads, juice, cereals and coffee. Then, replete, and with a sense of growing anticipation, together with colleagues, my rucksack and expedition blue barrel, I flew by Avro to Biratnagar, in the Tarai. It is the second largest metropolis in Nepal and a town that gives the impression of expanding randomly. Biratnagar boasts two climates, warm in winter, and sweat-gland-challengingly-hot and humid in summer. When I worked there in the late seventies, I would sit under a cold shower, fully clothed, then, dripping water like a well-soused sponge, go downstairs to the office and sit under a fan for an hour or so, trying to be coolly creative.

A bus had been chartered to take us on the six-hour journey from the Airport to the village of Basantapur in the foothills. In the eighties, a British engineering firm had constructed the challenging forty-kilometre road to Dhankuta, the District Centre. It required two winding climbs, each of about a thousand metres, separated by the Tamur, a River that we were to meet again some four walking days later. The Tata-engined bus coped well with the steep, metalled road to Dhankuta, but, like its passengers, it was less happy for the next two hours on the rough, post-monsoon pot-holed track to Basantapur. As night descended, we reached our objective. The village, situated at two thousand odd metres, once consisted of a dozen houses and half a dozen shops. It has now expanded to meet the demands of the new road.

We were quickly escorted, some hundred feet up the hill to the campsite, by our Sherpas, and provided with "daal-bhaat", the Nepali staple diet of lentils and rice. Most of us then spent a fairly undisturbed night to be woken the next morning at six o'clock with, "Tea, sahib/ memsahib?" and a fairly gentle tug at the tent zip. This, followed by a washbowl of hot water fifteen minutes later, was to be our réveille for the next four weeks.

After a breakfast of porridge and eggs, we placed our unsuspecting feet in well-waxed boots, pulled on a couple of layers of Lowe Alpine, looked up at the oak and rhododendron forest, and stepped, not too apprehensively, on to the trail.

Kangchenjunga! We're on our way.

A Bridge Too Far... By Jacqui Lawson

A week into our trek I was concerned that in the heat and the damp - yes it was still monsoon, despite our Expedition Leader's optimistic prophecies - my fellow trekkers' good nature was beginning to fail. How to ensure this did not happen? I know, throw myself of a log bridge, that should do it!

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The trick was to pick a bridge over a relatively small drop, about 6 foot should do it, and if there was fast flowing water all the better. (Less chance of picking up some nasty water borne bug). It took some finding, but there it was - a beautiful waterfall that should photograph well, but also had the advantage of being easily accessible to the rescue party.

Now the tricky bit, make it look like an accident. This was going to require skill of the very highest calibre. Why? Well I had to avoid the huge boulder and the branch resting on it, but not by much otherwise I would slip over the next level of the waterfall. This was definitely one to be avoided since there was an unspeakably big drop there. I had also heard that white water rafting was much better in a raft and not on a backpack.

Okay, saunter into the middle of the bridge, look cool, NOW...

I am told it was majestic, although I have to confess I don't actually remember any of it myself. I landed on my backpack and sadly bore more than a passing resemblance to an upturned turtle, since I was wedged between the boulder and the branch. On the plus side, like a true professional when I'd sussed out that I was still alive, I remembered to keep my boots out of the water and joy of joys I'd remembered to wear clean underwear that day. (Mother had always warned me about that one!)

The flaw in my plan? My timing. It was not quite spot-on, although I missed the boulder I did manage to check out the branch with my head. With hindsight this was not a bright idea. I now had a permanent memento of my dunking, a nifty scalp wound, which the medics kindly informed me would require more than the Band-Aid I was hoping for.

In honour of my efforts the waterfall now bears the name "Jacqui Falls", a name bestowed upon it by Nigel, a thoughtful and witty fellow group member.

Fortunately it was too dark in the jungle to suture me there, so after a quick change of clothes I was kitted out with a rather fetching bandage and encouraged to walk on to our lunch stop at the next village. Now I love to make an entrance, and it has to be said that if you want an entire Nepalese village to turn out and stare at you, a head bandage is *the* accessory.

In the village of Fun Fun - yes my timing was bad, but not *that* bad. I, or should I say we, really were going to have "fun" in Fun Fun. In front of an audience of bemused locals I was treated.

My sutures were inserted by Richard, our bona fide dermatologist. A grand job he did too, all achieved whilst teasing his eminently qualified attendants. Yes the bonding process was coming along nicely, but how to include the other group members? Well they were creative people and so found themselves a much more important role. That of official record keepers. The whole process was videoed and photographed on the entire group's cameras. What better way to bring us together?

So my cunning plan worked. Our group forgot the misery of the jungle and monsoon. They were united in their mutual care and concern for my welfare. What a great team.

As for me, my selfless actions had been amply rewarded. I had a waterfall in Nepal named after me, and 3 beautiful sutures. A most profitable day's work.

Now some uncharitable people may say that I just slipped off the bridge, but that couldn't possibly be true- could it?

High Altitude Cerebral Oedema - A Rescue By Mark Howarth

On such a large expedition there were bound to be crises but I little expected to be involved in so many. Our worst day struck on 17 October. We had not been sorry to leave the rather stifling atmosphere of Base Camp that day. Gill, Rick, Alan and I planned to climb Tengkongma, a "small" peak of about 6,200 metres. It hasn't been climbed often - and never legally till this year.

A couple of days earlier we had gone for a recce and mistakenly headed up the wrong gully towards Drophmo. We thought we now knew the route so we were a little surprised when the porters again turned up from the valley sooner than we expected. Much yelling and gesticulating achieved nothing but confusion. Alan got increasingly upset and kept asking why they had gone up the wrong route. After about the twentieth time of asking I snapped and said that if I knew the answer I would certainly have told him by now. Dawa shot on and caught them up and then signalled a compromise route to us that involved a horrendously steep climb alongside a scree slope. I was soon too busy trying to breathe to worry about the route and in any case I had supreme confidence in Dawa. This is the third time I have trekked with him and he has never let me down. I climbed Island Peak with him in 1994 and I knew he was itching to get his crampons on again. I found the going very tough. Because we were late getting to base camp after evacuating Malc with typhoid, we were not as well acclimatised as we had hoped and any uphill walking left me breathless after a few steps. As I struggled to keep up with Gill and Rick I noticed Alan striding on ahead. We had fantastic views across the valley to Kangchenjunga, Ramtang, Wedge Peak, Nepal peak and Jannu. Eventually we reached a traverse and then cut into the valley leading up to Tengkongma where, to our initial dismay, we spotted our porters heading *down* the valley. However they had been to the high camp and set up tents at the foot of the glacier. After stopping for a snack we set off down a steep scree descent. This brought a change of fortune for me and I sped on ahead with Dawa leaving Alan far behind. I was not unduly concerned. Many people have difficulty on steep descents and Alan had said he had been seriously scared on a scree slope a few days earlier so I was not surprised that he was slow. The

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route led down to a river and then ascended through a big boulder field and alongside a waterfall to the tents. By 2.45 pm I had reached the camp and was delighted to see Dorje, our cook-boy brewing tea on a stove sheltered under a large rock. It was nearly half an hour before Rick arrived carrying Alan's pack. Another 15 minutes later Gill arrived supporting Alan who was exhausted complaining of a severe headache and cold. We got him straight to his tent, gave him some hot soup and some painkillers for his headache and hoped he would soon feel better.

The glacier ended at an ice wall a few yards from the tents and looked very inviting so the others wasted no time in kitting up to practise some climbing and plan the route for the next day. As the only doctor in the group, I stayed back to keep an eye on Alan. We were at about 5500 metres. He had spent a week at 5000 metres and been for two separate day walks to 5400 without trouble but now he clearly had at least moderate AMS and severe exhaustion and cold. I contemplated descent but the prospect was daunting to say the least. The route we came up was not an option because of the ascent involved. Going straight down the gully would be a difficult scramble down a big boulder field with a long way to go before we lost any significant altitude. Most of the journey would be in the dark. I radioed base camp and was at least able to discuss the case with experts in high altitude medicine. In retrospect of course it is easy - we should have headed straight down. But the prospect was horrendous and he didn't initially have signs of serious illness. But his headache got worse and he started vomiting. Examining someone in a small one-man tent in the cold is not easy but he was clearly deteriorating and said he felt desperately ill. He was beginning to get a bit confused. I forced him up to see if he could walk and was shocked by his ataxia. There was no doubt he had cerebral oedema. Nightmare or no nightmare we had to go down and it was now 5 pm.

We abandoned camp with alacrity leaving Dorje to sort things out there. I gave Alan some Diamox and dexamethasone which he promptly vomited. He needed two people to support him taking nearly all his weight. The nimble Dawa took one side nearly all the way and we took turns on the other. There was a thick mist and no moon so we were soon walking by torchlight. We would manage barely 20 yards before he would need a rest. Even sitting down he still needed support and tended to drift off to sleep. On several occasions his breathing became very slow and shallow and he appeared to be slipping into coma. We shouted at him to keep breathing and not to fall asleep. I gave him some more dexamethasone, which he kept down. We followed the gully down, scrambling over large boulders walking three abreast, and it took a lot of concentration to avoid stumbling. Never have I blessed my trekking pole so much.

Also invaluable was our radio. As soon as we set off we were able to ask for a rescue team to meet us and we stayed in radio contact all the time. Paul, Ian and Gerald were on their way to us with a team of Sherpas. Once they started up the Tengkongma gully we spoke to them every few minutes but we were all on new terrain and there was no way for either party to identify our position or even know if we were on the same route. Because we were losing altitude so slowly Alan's increasing exhaustion outweighed any benefit from the increasing oxygen pressure. We frequently had to force him on when he asked for a rest. When we did stop it was worse for us as we had to keep shaking him and shouting at him to keep him awake. Gill was brilliant at keeping up a "conversation" with him. Whenever we stopped we listened out for the others. We whistled, we yodelled, and shone torches into the mist, but to no avail. As the rests grew longer and more frequent I got more scared. On several occasions I thought we were losing him.

Finally a glow in the distance heralded our rescuers. One of their Sherpas had spotted us and came running to us. Frustratingly he had got disorientated and for a while couldn't find the rest of the team but suddenly we were surrounded by people. It was now 9.30 pm. After an injection of dexamethasone and a few minutes on oxygen, Alan was soon looking a lot better. Progress down the hill was barely faster though, partly because it was getting much steeper and turned into scree. But at least he could have oxygen at each of the stops. I was able to stop supporting Alan now which was as well as I was getting seriously exhausted myself. Gerald kindly took my pack. I was glad to be able to hand over clinical responsibility to Paul and concentrate on getting myself down. At one point I lost my footing and did a spectacular somersault. At first I couldn't believe I hadn't broken anything but apart from a badly bruised knee all was well. Even Dawa took a nasty fall cutting his hand badly.

Finally, at 11.40 pm we reached the valley. The rescue team had kindly put up some tents there to save the long slog back to base camp and Paul stayed to keep an eye on Alan overnight. By morning Alan was considerably better with symptoms of a hangover but he managed to slowly walk back to base camp with Paul. After a few days there with a continuing headache, he descended to Ghunsa — an altitude loss of 1700 metres, waited there for the rest of his group and they trekked out together.

I next met Alan at Taplejung on the last day of the trek. Mercifully he could remember little of that eventful evening except that he had promised to buy me a beer - which he promptly did.

Shopping With The Master By Richard Weller

We sat in the garden of the Marshyangdi, subconsciously soaking up the air of calm and civilisation as we breakfasted. Simon and Sally were in delegating mood, handing out the tasks that needed to be packed into the short 48 hours we had in town. Solar panels, helicopter baggage checking and weighing, flight arrangements, visits to agents and suppliers.....and buying the Ramtang climbing kit.

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I am the world's great department store lover. Shopping is a necessary evil, but John Lewis -'never knowingly undersold'- and Marks and Sparks -that quality- make most of it bearable. Nepal isn't like that. Simon turned to me. "...and can you buy the climbing gear. I'll give you a list". No!

Michel was sharing a room with me. "Shall I come with you?" At least it would be someone to help carry the gear back. The list was daunting in its length.

What followed was an education. We walked through the streets of Thamel, trying a few shops, but nowhere was right. Finally we lighted on the place. I sat back and watched the expert in action. Snow stakes, ice screws, stoves, fuel, tat for marker wands, axes, tents, sleeping mats, sacks and so on and so on. Michel was calmly and competently in his element. As we sat, equipment was brought to us for approval, staff were sent out to fetch what was not immediately available, and Michel negotiated. Then he was on the phone to Tandy, chatting amiably about previous trips, and Tandy was talking to the shopkeeper ensuring a good deal. Prices were compared with other stores, calculations were made, and suddenly it was done! So easy, under budget, and nothing so onerous as carrying it ourselves. Everything would be delivered to the hotel that evening.

The money was produced for the expectant store owner. But no. "And two of those bags please". A goodwill gesture. Not particularly needed, and not on my list, but Gallic pride and mercantile honour was at stake. Dominance was established. As we left, I found myself humming the Marseillaise.

A Day to Remember By Chris Smith

We were camped at Tseram, not Yalung as we'd expected. Our aim was to visit the south side of Kangchenjunga. Yet no one was sure if we could get from here to base camp and back in a day. The whole group was up early, but enthusiasm waned fast and indecision crept in – should we go – should we rest – will it cloud over – will it stay clear for long enough to get a view?

Eventually four of us almost half-heartedly decided to take a stroll ... at least up to the first rise. By the time we were half way up the sky began to cloud and it seemed as if we'd be heading back to camp very soon. Then as we continued to climb, the sky began to clear and amazing views of the huge pyramid of Rathong unfolded. Our spirits rose and our enthusiasm to continue grew as the scenery became increasingly spectacular and we became aware of just how fast we were travelling.

After a while we reached the two-house settlement and tall fluttering prayer flag of Ramche. We stopped to eat our packed lunches, gazing up at the mountains that surrounded us. Yet still Kangchenjunga was out of sight, around the next corner – how much further did we have to go to get a glimpse? Could we make it?

We had to try! The sky was still crystal clear so we headed on around the corner alongside the moraine of the, as yet unseen, Yalung Glacier. We stopped to watch as a big flock of blue sheep grazed on the hillside above us. Then as we continued to rise new mountains appeared to the side, and gradually a wall of ice appeared ahead. Kangchenjunga was coming into view - tantalisingly slowly. The path led us onto the moraine and the huge grey glacier appeared below. Ahead stood a chorten bedecked with prayer flags, tridents and offerings and beyond the massive south face of Kangchenjunga.

The view was stunning and the silence absolute, broken only by the distant clatter of rocks sliding on the moraine. We sat and stared awe-struck – trying to take in the immense scenery. We were in a place more spectacular than our wildest dreams. How lucky we'd been.

As we watched the moon rose over the magnificent ice fluted Kabru.

The path continued still further so we continued until Jannu came into view. We stopped again and stared again. The route ahead to the base camp looked horrible, a jumble of moraines and screes. It was time for us to quit. We could ask for no more.

We returned to Ramche and rested in the house, where we enjoyed a mug of hot yak milk, before wearily wandering back. As we made the final descent the clouds rolled up the valley and we returned to Tseram in an eerie grey light.

Magic!

Camp 3 to Camp 4 By Mark Bryan

And then there were two. Having spent 4 days at BC and below, gorging on yak stew and suffering the gastrointestinal consequences; swapping stories with the great guru Scotty; greeting each day's influx of new, wide-eyed researchers and sharing their needles; and attempting to stir the team into maintaining some form of upward momentum on the mountain via the airwaves, myself and Chris C found ourselves plodding slowly over the glacier from C2 to the foot of the NW Face.

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Up at 3.30am, got going at 5.30, foot of the ropes by 7. Reasonable sacks for a change, although we both felt less strong than we'd have liked. Nothing to do about it but get going. Above the summit, the huge lenticular clouds had vanished, and the 7 hour grunt to the top of the 1100m of fixed ropes was spent in a dream-like state, during which I alternated between visions of a sunny Christchurch, fresh salads, good food and warm sea; and a heroic descent from the summit in good weather and the end of a successful expedition. To be honest, neither could come quickly enough, and my only concern was that whatever happened there would still be 2 of us in 2 separate pieces descending these same ropes in a few days' time.

Early on the ropes the inevitable barrage of debris from above inflicted another insult when a lump of ice caught my face, as I foolishly glanced up to see how far we had left to punish ourselves. When the snow became spotted with blood I looked up again to see what had happened and received lump number two across the nose. A learning experience, albeit it took twice as long as it should have to sink in. Halfway up the face, at the initial bivvy site, we came across Gordon and Ian A, descending from their carry to C3. It was a week since Chris and I had first arrived at the N Col and dumped 2 loads there at the site of C3, and we were keen to get back up there again.

2 o'clock at the N Col, and time enough to rest and eat. The tent was in an awesome site, dug well into the windward side of a huge cornice that overhung Sikkim, and lashed securely to a boulder 30m down on the Nepalese side of the face. From the front porch we had a superb, unrestricted view across the 80miles or so to Makalu and the Everest horseshoe. I must say that the Terra Nova tent was superb- the wind was perpetual, only varying in its intensity, from gale to hurricane force. The tent fabric sounded at times like it was seconds from being shredded and hurled into Sikkim, but it stayed intact throughout. Very impressive.

You don't wake at these altitudes, you sort of become aware you're not asleep. So next morning, we both became aware that the wind was horrendous outside, but that we were going to have to move anyway. In the desperate slowness that is simply *doing* up there we got ourselves organised, and decided that we'd carry rope and food up to the Castle, possibly fix the Castle, and return to C3. My diary entry for that night simply says, in a sort of spidery hieroglyphical scrawl, '*Exhausting day, pushing up to C4. Absolutely atrocious weather: wind and spindrift, appalling snow underfoot.*' Clearly not a day conducive to weighty tomes on the meaning of life. But I remember the day as being a slow plod up through dreadful snow, and those of you who watched from BC may have wondered why people so slow and unfit were anywhere near a mountain.

The snow was about thigh deep, but covered in a thick wind-crust just not strong enough to bear our weight. After various experiments, we discovered that the easiest form of travel was to put your knee on the crust, and push down at the same time as thumping around it with your fist, until it gave way. Then you could wallow another few feet forward and begin the process all over again. Luckily it wasn't all like this though- occasionally the snow would become dangerous wind-slab on top of this crust, usually where we had to contour around an obstacle and hang over the NW Face, and here there would be large inspiring slabs breaking off behind and around us as we inched forward, trying hard to breathe at the same time, while the wind tore whatever breath we could muster instantly away from our faces.

By 7400m we'd had enough of getting knocked over by the wind, stumbling through appalling snow and seeing the slopes above through a haze of spindrift that extended about 2km horizontally. Reckoning that we were only 100m below the final technical pitch that led to the Terrace, and realising that my enthusiasm had long since been blown into the stratosphere, Chris wisely decided to stop and dig into a likely looking drift on the ridge. In a moment of delirium at having stopped going up after 6 weeks, I opted for first shot, during which I thrashed around gamely as Chris froze his balls off sat at the mercy of the wind. But if you want a house built well, get a builder to do it, so I quickly relinquished my duties to Binder, in anticipation of a 4 star residence within 15 minutes. In fact, within 15 minutes he had contrived to throw the only building implement we possessed 1500m down to C2, and the rest, as they say, requires a decent pub and a few beers to be told to maximum effect. Camp 4 was shaping up to be every bit as 'interesting' as the rest of the expedition.

Bed Tea By Sally Glynn

Simon, Simon, tea's ready, tea's ready. It's six o'clock and I struggle with the tent zips, opening up to the smiling face of Mangshire and two metallic mugs of steaming black tea. He always remembers, one with sugar, one without. We lie back in the tent, letting the tea cool and listening to the sounds of the awakening camp. Simon, Simon, wash water, wash water. The pink fluid fills the bowls and its time to drink the tea. Simon, Simon, breakfast ready, breakfast ready. The porters await patiently but eagerly for our packed barrels as we struggle from the tent. Another day on trek has just begun.

Kangchenjunga; The decision. October 19th 1998 altitude 7400 (24,250ft) By Chris Comerie

An opaque pale blue hue of light filters through the ice where we have inadvertently carved our refuge close to the outer slope. Outside the storm rages relentlessly as the Jet Stream races in from the west with enormous life threatening force. The wind is screaming over the Terrace causing a huge tail of ice crystals and snow to extend horizontally out over Sikkim. Wind, an invisible force, is revealed by the millions of frozen particles of water. Below the normally invisible horizontal line extending out from the cliff top is a chaotic confusion of air with nowhere to go, trapped between the rocks, lower slopes and the force above.



Chris Comerie, snowhole, camp 4.

The atmosphere is deceptively calm in our cramped snow hole dug into the slopes of the north ridge below the buttress known as the Castle. Just above us lies the deceptively close looking summit pyramid. Two pitches would take us to the perimeter rim of the Great Terrace, and they look easy, my god we would cruise that buttress after all we had already been through over the past few weeks on the NW Face below. And then it's a walk, just a few hours to the foot of the easy angled summit slopes, a high altitude stroll on the very edge of heaven. Mark and me have enthused for weeks, months, and even over the past couple of years about this walk. We could make it, I know we could, despite all the work and difficulties with the resultant loss of muscle tissue, we were still going well and highly motivated, it's still possible if only this damned weather would give us a chance. Inside lurks a realisation, not a fear, that this walk on the edge of heaven could in these conditions give us an irreversible journey to that place!

Life has been very hard for many weeks, our one and only chance for the summit is slipping through our fingers like dry sand, jeopardised by the rapidly deteriorating weather.

During the night our claustrophobic home has been partly filled with spindrift, blown in through our entrance plug constructed from rucksacks boots and axes. We've been half buried in our fitful sleep and most of our equipment and food is lost under a blanket of white powder. Simple tasks and life functions become monumental chores of difficulty requiring extreme mental application just to move, to get things going, to make it happen. We light the stove and fill a pan with snow from the roof of our home. It takes an age for the crystals to produce a pan of hot water. The flame burns the little oxygen that exists and leaves us gasping. I reach up and pull a rucksack from the entrance plug in an attempt to replenish the depleted supply. Tea is hopeless and disgusting, a brew of hot sweet water is far more palatable. We drink. Mark immediately throws his share back into the pan, not wanting to make a mess on the floor of our abode. Most considerate of him in these circumstances. I suspect the same consideration was absent years ago when a student after a session in Glasgow!

It takes almost three hours to finally sort ourselves out. One hour to melt sufficient snow for a brew, one hour to don our protective clothing and boots, and just about another hour to think about it and actually make the moves. I drag myself up the forty-five-degree entrance tunnel out onto the ridge. Immediately I'm flattened by the fury of the gale force wind, blinded and grit blasted by a million particles of ice in wind chill temperatures well down below minus fifty degrees. The situation is becoming serious, it could become desperate! and yet I'm more concerned, and even positively mortified by the thought of failure. How after all this time and effort could we be so unlucky? It's so cruel!

Over the next few hours we lay in wait for an abatement in Kangchenjunga's fury. We lay in silence. We're unable to look at each other. Our eyes are filled with tears and avert to the white blank walls. The warm salty water trickles down my face and comes to a rest as ice in my frozen beard. We're afraid of the inevitable truth that exists behind the masks, which are our faces. Avoiding the utterance of the words we dare not say.

A decision has to be made.

The Home Perspective **By David Lawson**

If we're lucky enough, at least once in our lifetime we experience an event that destroys our preconceptions and redirects our life. Early in 1997 balance sheets and cash flow forecasts were causing brain atrophy when suddenly it happened to me. Pictured in the middle of the company staff magazine was a relaxed looking company accountant standing against the silhouette of Mount Everest. Next to the picture was an article inviting people to join "Kangchenjunga '98". I'd always had an interest in the active outdoor life but this article was shocking for a number of reasons. Staff magazines never have anything worth reading, do they? Surely, accountants have the last semblance of anything interesting removed on qualification. And, how does she manage to get seven weeks off work? Again!

Having resolved to float the idea at home that night I pondered what the reaction might be. Bearing in mind my wife's idea of an activity holiday was having to move from the poolside sun-bed to the bar to get her own Pina Colada, there was unlikely to be much empathy about. In fact, her reaction was surprisingly favourable.

The subsequent months contained many more surprises. That one person could spend so much money on kit. That the women in the office can be so graphic about what they would do if they were in a tent with the "hunky" expedition leader pictured in the brochure. And, just how supportive friends and family can be. These months also contained a number of significant challenges. How to prepare the children for seven weeks without one of their parents. How to prevent kit expenditure exceeding the proportions of Russia's national debt. How to ensure a fitness level sufficient to withstand the pace to be set by a Teutonic masochist. And, how to manage last minute panics about barrel weight.

The day finally came with just a couple of choices remaining. The decision to part from the children at home rather than suffer the trauma at the airport was definitely a good one. The decision to leave the chocolate out of the barrel was not so wise. Having given ourselves eight hours to complete a three-hour journey we set off for Heathrow determined to enjoy our last day together for what would be almost two months. Two miles into the trip we realised we didn't know which terminal to aim for and we had left all the useful phone numbers behind. It would be too risky to waste ten minutes by going back so we ploughed on. Not for the last time, parents and the mobile phone came to the rescue. On arrival at Heathrow panic levels

began to rise again. Why were there no other blue barrels to be seen? Were we at the wrong terminal after all? Or was it because we had arrived five hours before check in time? That time spent drinking tea in the cafe was reminiscent of those days as an undergraduate when you endure long, passionate good-byes with the latest love of your life at the railway station before returning for exam term at college. There was the same trepidation about what lay ahead but without the groping.

The hours were passing, blue barrels were still as inconspicuous as the pre-flight safety drill on Pakistani Airways and the pulse rate was up to 125 at sea level. Finally the tension was relieved when a yellow barrel appeared, closely followed by a dishevelled looking Irishman carrying colouring crayons. An avalanche of barrels ensued, perhaps caused by the animal magnetism of the Irishman, perhaps due to the magnetism of the lorry-load of confectionery he was carrying, or perhaps because by then it really was check-in time. The next few minutes proved that the concern over barrel weight had been misplaced. Others, with over 15 kilos of alcohol, tobacco and assorted electrical goods, in addition to the less essential items a trekker carries, were preparing to board with an alacrity that would do justice to a car boot trader exiting through the green channel.

All of a sudden she was on her way. My wife was in the air with seven weeks of stomach cramps and toilet tents in front of her with only a bunch of errant medics for company. I was on the M4 with a 200-mile drive in front of me and only three kilos of Cadbury's Dairy Milk for company.

I can't say the seven weeks were easy. Living with one's parents again never is. The first news we heard was reassuring however. The prospect of spending seven weeks in a tent with Jacqui had driven her tent-mate to pledge the rest of her life to some unsuspecting, but very fortunate, taxi driver at Heathrow. We all missed "Mum" terribly, but as the weeks passed we settled into a routine and some things even returned to normal. The children quickly trained someone else to shout at them and, even from 7000 miles away, I could tell I was in Jacqui's bad books for something or other.

So what sort of person would come back? As I'd been wrong so many times about Jacqui's reactions over the last few months there seemed little point speculating. The person who emerged at Manchester airport was a couple of pounds lighter, in need of a bath and the attentions of a good hairdresser but, on the outside, the same gorgeous creature I married all those years ago. On the inside though, things were different. Along with a piece of her scalp, part of Jacqui's spirit was still in the mountains. I think it always will be and I hope the experiences and friendships she made will stay with her forever. The lady who swore she would never spend one night in a tent and whose idea of roughing-it was having to switch off the central heating in July now has a passion for the outdoor life. It's the same enthusiasm that persuaded the UK drug industry to part with tablets, potions, medicines, dressings and other assorted 'rubbish' in the name of charity during the weeks before the expedition and which almost drove her to an oxygen induced nervous breakdown. It's also this same enthusiasm she puts into hitting her credit card limit and which she puts into her family life.

Part one of the plan, which hatched early in 1997, has worked out pretty well. The next part is to ensure that Mum, Dad and the children continue to benefit from the redirected enthusiasm so that none of our bits atrophy for a few more years at least.

Can We Stop Running Now?

By Denzil Broadhurst

The plan was tight. We'd made it into base camp on the 15th but were going to have to leave by the 22nd to safely achieve our exit plan via the Mirgin La, south base camp and southern valleys. Chris and I were not going to get a chance to start climbing Ramtang until the 20th, which meant not getting back to base camp until at least the 23rd, but we had to try for it. The rest of the group would leave on the 22nd.

Leaving after lunch we were at camp 1 just after dark. The following day was 7 hours across the glacier and miles of loose moraine to camp 2, and after 3 hours the next morning we were on the East summit of Ramtang in spectacular conditions. A rapid descent down the fixed ropes meant we were back to camp 2 for lunchtime, where we packed up most of the camp and carried it down to camp 1. A 20kg load at 5,800m is heavy going, even downhill.

An early start got us to base camp for 10.00 the next morning, and after 4 hours with the researchers for final tests we were leaving with rucksacks and a tent. Our barrels left by porter at 12 noon, with a note to tell the rest of the group - we were assured that the porters would get to them in Ghunsa by the evening.

The last hour to a camp in Kambachen was in the dark, though we had been accompanied for the final section by two of our group's sherpas. We ate that evening in one of the lodges, amidst loud arguments between our sherpas, some of the locals and 2 porters. The porters who were carrying our barrels had not gone to Ghunsa, but were here eating their meal in the lodge, much to the disgust of the locals. They eventually came over to us shame-faced and promised to leave at 4am the next morning, and ensure our note got to the group before they had a chance to leave - though later our sherpas said they would look after the barrels.

Waking at 5am, and with a handful of nuts and raisins for breakfast, Chris and I were packed and leaving at 5.30. The sherpas passed us shortly before we arrived in Ghunsa (some 4am start!), where we had a proper breakfast at 8.30. We were back with the group - and the prospect of a full day's trekking over the Mirgin La ahead of us. After a high camp on the passes we descended to Tseram for two nights, with the opportunity to head up to see the south base camp. Sprinting past a trekking group we completed the 1½-day trekking journey past Ramje to the viewpoint in just over 3

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hours. The view was astounding and we just sat and stared for an hour before heading back to the camp, refreshed by a mug of hot Yak milk on the way.

Another long day followed with half the team, including the Sirdar and the cook, taking the wrong path and ending up with no equipment, well after dark, in a small tea-house almost in Yamphudin. The rest of us had continued on the correct path down to Omje Khola, with Chris again finishing the day in the dark.

Half a day trekking the next morning took us to Yamphudin where we met up with the others. They were already sunbathing and drinking beer. It was finally time to stop, have a rest, relax – a dip in the river and chance for a wash. Nine days of hectic climbing and trekking, during which Chris and I had covered distances equivalent to about 13 normal days, but we'd done and seen everything we'd hoped for! The rest of the walk out should be straightforward - though Ronnie had other ideas (but that's another story.....).

Illegal, Immoral and It Makes You Sick.

By John -I like Rolo's - Hirst

It was all Mukul's fault, I swear it. Oh yes, we were waffled all right, altitude-related illness, infectious disease, land-slips, avalanche, high degree of self-reliance, etc. Why, oh why didn't someone warn us of the one thing that was to have the greatest effect on us?

CHOCOLATE. Not the hot drinkable one that was readily available, but the one that comes in various size slabs that are divided into irritable little squares which makes it difficult to break up in the mouth unless you have teeth like a J.C.B. shovel.

The 20th October was to be the day like no other. It was a beautiful afternoon, we were all in good spirits with a sense of humour that would see us through anything Kangchenjunga might have in store.

We alighted on Mukul as he wended his way down the trail from his base camp. A pleasant time passed while Mukul talked about his experiences and the wondrous sights we were to see during the next couple of days to Pangpema. Nepalese Custard Creams (YUK not YAK) were exchanged for Mukul's bourbons. A wide grin broke across his beaming face as he passed the little block of mint flavoured Semtex over. "Enjoy it, Bye, see you in Kathmandu". I'm sure he knew what emotional damage he would cause!

As we set off over the huge land-slips at 10m intervals I remember thinking pray God if one of those boulders comes down it doesn't take out the Semtex carrier. The rot had set in! Roger was the next to crack. "What flavour was it John"? Over the next couple of hours various members of our twelve strong party confessed a weakness for the dark coloured delight. Bill Hammerton kept breaking out into his Barbers Shop rendition of That Old Black Magic.

Over Dahl bhat and dried spuds (damn Walter Raleigh) we debated when we should devour the attractive little package. "NOW" screamed Margaret in her best bedside manner. "After I've done my max breath-hold" whispered Joy. "You, nor anyone else will have a breath to hold if I don't get a fix NOW", shouted Alfie showing his true leadership qualities. Fiona was pitiful, sobbing without shame. "I'll cross any bridge if only.....". "Chocolate and anything else for that matter is best washed down with Tongba" said Emma dashing into the night for her nocturnal gargle. "Lee, Chris, wait for me"! Sandra stomped her feet in a real paddy. "I'll kill if I don't get just a taste NOW".

One piece for every group member out of the little slab which had now been divided into sixteen little brown diamonds. "That leaves four over," said Dave our Oxford based mathematician. "Bugger Me," said Stuart. "Not likely" said I frowning on the yachtsman's incorrect terminology. "No John, I mean Bugger Me the card game to decide the fate of the four remaining pieces". All agreed, after a good old Yorkshire shuffle the cards were dealt. They sucked and rolled the exquisite little gems around their mouths, pausing occasionally to examine how much it was decreasing until the first game was decided.

Fiona won the first and second game. Murder was also on the cards if she won a third! Group doctor Geraldine took the only sensible decision. How she sedated eleven of us we will never know but the self satisfied smile on her face when we regained consciousness said it all.

Too Late!

By Chris Smith

On this years trip there was a problem – a problem that will remain on my conscience. I should have known better. But however bad I feel about it, **it's too late!**

I expected to spend the trip with our Sirdar from 1994, but this was not to be. Yet I had no worries when we set out from Kathmandu. We were with one of Nepal's well known trekking companies – I didn't need to ask any questions about

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environmental policies – I never gave it a thought. I should have done – because by the time we were on our way - **it was too late.**

It was not long before I began to worry.

We had a massive crew at the start, a Sirdar and 2 assistants, a cook and 4 assistants, a porter guide, 16 Sherpas and innumerable local porters. Yet only the ‘tourists’, the Sirdar and the kitchen staff ate food cooked on Kerosene, everyone else was responsible for their own food and cooked on wood fires – granted they used dead wood – but the supplies can not be never ending. No facilities had been provided in Kathmandu for the majority of the staff to use Kerosene. Now we were in the mountains - **it was too late.**

Then one morning I noticed that the latrine had not been properly covered and the spare toilet paper was simply thrown to one side. I tidied the site before we left. (Had we left the other latrines uncovered? Too late to find out.) It became apparent as the days went by that this was not a ‘one off’ error, but the routine. I spoke to the assistant Sirdar and things improved for a couple of days, then it was back to the old routine. The problem was never resolved, though I know most latrines were covered before we left, because I did it. But for those I didn’t do – **it’s too late.**

Then there was the rubbish we were producing. I had to be quite alert to spot the empty cans being hidden under rocks or discarded along the trail, but that’s what I realised our Sirdar was doing. The majority of our waste must have gone this way. I tried to stop what I saw and made a point of clearing campsites, but I guess in the end a lot went unnoticed - **until it was too late.**

As we headed back to Ghunsa, over the Mirgin La and on to Suketar we had no local porters. What this really meant was that we were carrying minimal food, relying on local meat and vegetables for our daily needs. Many local people were reluctant to sell and I began to wonder how much of their family rations we were eating into. Would they go hungry in the winter months after we’d gone? By the time I’d noticed, **it was too late.**

Once back in Kathmandu I was able to voice my concerns on our evaluation form, but sadly ...

... for this trip – it was too late.

Kangchenjunga 1998 Group one – The poem: By Geraldine Boocock

There’s a famous resort called Pangpema
That’s noted for fresh air & fun
Some researchers and trekkers and climbers
Went there to relax in the sun

The walk-in was quite an adventure
But we had our bold sirdar Dick
There were snakes, wonky bridges and land-slips
And John got a leech on his p....

Group seven had some serious problems
They had typhoid & HACE as well
Alan had mental confusion
But he’s a Yorkshireman so how could they tell??

Our motto’s “To Rest is to Conquer”
But sadly Bill does not agree
He thinks 6:30’s a lie-in
So we put Temazepam in his tea

We arrived at Base Camp in good spirits
T’researchers they welcomed us with glee
And Richard gave us all a bottle
Just too small for 12 hours worth of pee

Kate & Sarah were kind & were gentle
Truth to tell chocolate was their main charm
I’m beginning to think we were mental
To allow them to do us such harm

Lee’s test was a different matter
With his timer & whip he was stern!
There was no depth that he would not sink to

Medical Expeditions: Kangchenjunga 98

To get us to go for the burn

We were poked, prodded, bled dry & Milledge'd
'Til we didn't know our blow from our suck
"Keep going, keep going" was our mantra
But by then we could not give a f...

The dome was the local attraction
The natives a curious bunch
You could phone Daventree or Darjeeling
But only after Gerald finished his lunch

Some, seeking for further amusement
Climbed up a mountain or two
The rest of us were totally knackered
After a trip to the loo

Michel was another attraction
We hear, in his gear, quite a toff
But "ze jungle, Ze leeches & Ze porridge"
Were de trop, so he buggered off

We lost Stu & Em & Fiona
They left us without backward glance
How frail the ties are of friendship
Compared with the bond of romance

Mirgin La was our final objective
Some said 'twas a bold, reckless bid
Ann frowned, Don looked grim, Ken tut-tutted
But Simon said go so we did

And now we're all safe in Kathmandu
We've all had a bit of a thrill
And soon we'll be back home in Blighty
Saving up for to climb our next hill!

Dancing and Tongba By Annabel Nickol

We have been invited to see some dancing to raise money for "The local footpath committee" whatever that may be! The other trekking group has caught up with us now, and we all pile into the upstairs room of the lodge. The evening started in stilted style, six Sherpani ladies coyly in line in the centre of the room, arms interlocked behind their backs, shuffling their feet in complex step in rhythm with their soft singing voices. They are dressed all in their best and exchange shy glances with one another as they go, intermittently trying to resist pleas from their children to be distracted from the party.

In the centre of the room embers from the open fire glow brightly, and occasionally the woman of the house stoops to ladle boiling water from a pot to replenish Tongba supplies for one of the men. Next to the warmth of the fire huddle a pyramid of children, heads and limbs popping in and out of the pile as they strain wide eyed to watch their mothers dance or to peer at us strange people in wonderment. Around the edge of the room we all squeeze in clutching mugs of chang, which on this occasion has been watered down to help it stretch the distance.

As the evening progresses our cook boys creep in one by one as they finish their chores. Slowly the evening begins to warm up: the formal dance line is broken and two small girls take to the floor elegantly holding their heads high and waving their arms in time to the mandela drum as they spin around the dance floor. The cook boys have now taken over as the main musicians clapping in time to the music and singing songs of life or love in low dulcet tones. Rick and Gill sporting as ever, are now pulled onto the dance floor to give a few twirls to much applause from the audience. It is now a free for all to dance and drink the night away.

The man opposite me has a face which looks as if it could tell a million tales: eyes which laugh and sparkle as he talks and deep creases which speak of former joys, sorrows and a life of hard outdoor toil. He wears a thick woollen hat and jumper, and between his fingers is a string of prayer beads in constant motion, sending prayers to heaven as he drinks, the only ostensible indication that he is in fact a Tibetan monk... not that that stopped him offering Rick a good price for Gill (having first verified that her bedroom skills would be up to scratch)... a cup of rice and two dead mice I believe, much to the mirth of all around! At his side is a boy of 12 or so brandishing a wide brimmed cowboy hat and defiantly chewing gum. He wears shorts outside trousers for extra warmth. This afternoon I saw him herding yaks through the village, whistling and shouting to move these stubborn beasts to pastures new.

From time to time a handful of young men try and coax the beautiful Sherpani ladies to dance, but they retreat shyly into the shadows, eager to avoid attention.

Nba Temba is the honoured guest at every party, and wherever he goes is plied with drinks be it night or day. Now he sits in the corner with a large pot of Tongba before him alternately chatting to us or talking animatedly to his Nepali colleagues. Tongba is the speciality Tibetan drink of this area, or more precisely Tongba is the cylindrical wooden pot with brass ornamentation that it comes in. Fermented millet is placed in the pot over which boiling water is poured. The lid is then replaced with a bamboo straw through its middle that reaches to the bottom. Nba Temba assures me that this drink is guaranteed never to give a morning after headache!

The music and the dancing slowly peter out as weary children drift off to bed shortly followed by their parents. We leave the glow of the fire and the lamp to the talk of men as they smoke and swap stories, whilst the Tongba continues to flow freely.

Not Quite the Summit Day By Richard Weller

If life at high altitude could ever be described as comfortable, then this was it. I lay in my corner of the tent swathed in down, while Saila crouched over the Primus in the doorway melting a constant supply of snow and handing drinks back to Ulli and me. Outside was the pre dawn gloaming and 700 metres above us was Ramtang.

We had scrambled up from Camp 1 the previous day, labouring under 20kg loads which made the loose scree and boulders a fairly soul destroying experience. At half height we had met the two Nba Tembas, and our loads were lightened to my great relief. The Nba Tembas and Saila rocketed on ahead, followed by Ulli in Übermensch mode, while I slogged on up in the rear.

Camp 2 had appeared unexpectedly early; 2 tents in the middle of the glacier and a few hundred metres back from the lip of the ice-fall that we had been skirting. Around it a glorious panorama of mountains. To the south was Kangchenjunga itself, still hugely higher than us; to the east the north ridge of Kangch' was clearly laid out with Mark and Chris somewhere up there, slowly working their way along it; to the north of us was the long summit ridge of Ramtang. We gathered round the tents to discuss plans. The following day's route clearly started up the fairly easy looking 60m ice fall behind the tents. Beyond that things were less obvious; the ridge of Ramtang was heavily corniced all the way along, with a continual fluting of avalanche runnels on the face. The Nba Tembas suggested putting fixed ropes up the runnel coming directly down from the main summit; Ulli and I were unanimous in our rejection of this plan. Do-able but dangerous, and thus not for us! The runnels and cornices stopped on a slight spur that ran down from a minor summit to the east of the main summit however. It looked objectively safe; the decision was made.

Steep exercise first thing in the morning is an uncivilised way to wake up. Only 10 minutes from our pits and we were all soloing up the ice slope behind the tents. Ten feet from the top I looked down and decided that it was time for a second axe, which Ulli detached for me. This was the highest I had ever been and it was fascinating to feel the effects. Thanks to our slowly ascending walk-in we were well acclimatised, but the lack of oxygen was debilitating. The angle eased off above the ice slope and we wound our way through crevasses across easy slopes beneath the long south face of Ramtang to our spur. The possibilities of getting up, and more particularly down again, had been exercising my mind for several days before hand. What we found was reassuring. A 55 degree slope of even névé led up to the ridge above us, and -taking a sledgehammer to a nut- the Nba Tembas were already moving on up it, fixing ropes to ensure a safe descent whatever the conditions. Ulli and I stopped for water and food, enjoying the magnificence of the location. All around us were the highest mountains on earth, with no sign of man other than our footprints. We clipped onto the ropes and began to follow the sherpas' steps up. I had never been on a fixed rope before, but this was easy. Axe in left hand, jumars in the right and stop for a breather every 7 double paces. Slow and steady and a longer rest at each change over point. Swathed in Gore-Tex and fleece, warm and comfortable in my shell, methodically moving up.

Above me the sherpas followed by Ulli were moving round a slight ice step on the face, and above it they stopped. I high stepped round the bulge, and there was nowhere else to go. A flattening on the ridge and a precipitous drop down the other side, with the bottom lost in clouds. We poked our noses onto the ridge to the west of us, to find it crazily corniced to both north and south, usually simultaneously; to venture onto it would have been suicidal. So that was it. We were going no further. We exchanged cameras and snapped away. Ulli produced a flag from one of his sponsors and the commercial duty was done. This was the highest I had ever been, and probably ever would go. I turned to Nba Temba I; "What was the first mountain you climbed?"

"Makalu". Impressive.

"Nba Temba II, what was the first mountain you climbed?"

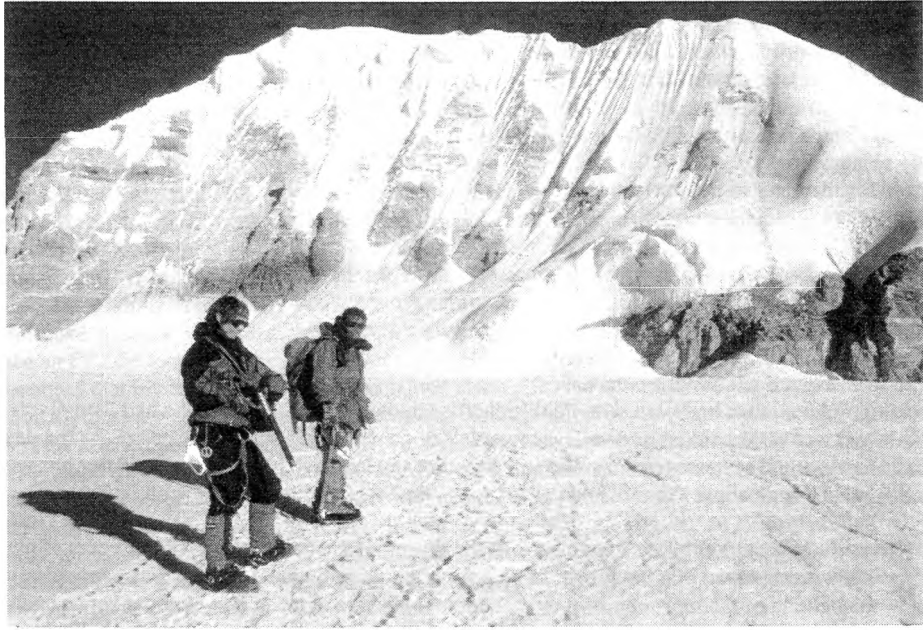
"Everest".

"How many times have you climbed it?"

"Six".

An awful thought crossed my mind. "Nba Temba, what is the smallest mountain you've ever climbed?"

"This one". Suitably humbled I turned and began to descend the fixed ropes.



Above camp 2, Ramtang.

Resham Firiri

By an anonymous songster

Resham firiri - resham firiri
udero jonki dadama banjang resham firiri
kukuralei kuti kuti - biralulei suri
timbro - hambro - maya priti dobatoma kori
resham firiri - resham firiri
udero jonki dadama banjang resham firiri.

Ten Days in the Wilderness

By Simon Currin

The last crackling radio contact had been with Paul Richards ten days earlier. The groups had then diverged. Paul's group up the Tamur Kola and us over the ridges and valleys towards Kangchenjunga's south base camp. As the days went by we progressed into remoter and remoter territory. We saw no other trekkers and heard no news. After our wonderful isolation we emerged on the hillside high above Ghunsa and paused to try the 9a.m. radio schedule with base camp.

All of a sudden our little group of trekkers were back in the throng of the Expedition. After 2 years of planning and fretting over logistics we had disappeared into the forests of Nepal and could only guess at what was happening on the other side of the hill. Would the tail end of the monsoon stop the helicopter? Had we delayed it enough when we had managed to get through to Kathmandu 10 days earlier at Taplejung? My mind had been racing for days. If the helicopter couldn't get in we could kiss goodbye to the science. Most of the climbing food and equipment was on the chopper too. If it had flown part way and turned back could we afford to summon it again? Could we even communicate with Kathmandu if we couldn't power up the phone? A game of \$10,000 roulette that I didn't want to play. Rumours of dissent and disagreement in the groups ahead fed the growing sense of anxiety as we crested the Mirgin La. What would we find on the other side? A scientific expedition without its equipment, a crowd of unhappy researchers and a bunch of climbers without their boots?

I know Sally had been thinking the same thoughts but we had dared not to voice them. We had gambled so much, now was the crunch.

"Base camp, base camp this is group 5"

I was pretty sure we would get through on the radio to Pangpema from our lofty position above Ghunsa but I found it difficult to place the call. What if all that planning had been de-railed by those unforeseen extra weeks of mist and rain?

Barely had I released the push to talk button when the voice boomed out,

"How the devil are you?"

It was Gerald of course and the speed of his answer suggested that his radio microphone had been surgically implanted on his chin. He put us on hold whilst he closed down all the other stations and then the news gushed out. Yes, the power was working and, yes two helicopters had come. One to deliver our freight and one to evacuate Malcolm who had been savaged by typhoid. Yes most of the projects were up and running and no, world war III had not broken out.

The relief was fantastic as we sped down the mountainside through the sunlit forests to Ghunsa. The gamble had paid off and the final, crucial link in the logistics had been made. The weight had been lifted, it was all up to the scientists now.

31st October - Kewswar to Lali Kaka

By Ronnie Robb

The plan was innocent enough, walk steeply downhill into the gorge, and then climb the long steep hill on the far side. A relatively straightforward day like many others in the five weeks of this long, difficult trek. Dave and I descended to the river in under an hour and we were dismayed to find the lunch mat laid out. It was only 9:30 am! I was all for moving on and forgoing lunch since I've had so little of an appetite anyway, but I stuck around until the others arrived to find out the mood of the group. Bruce and I were keen to go but this was a distinct minority so I decided to mellow out and read my book.

After lunch I was impatient to go, even though it was only 12:25pm. In the process of picking up my rucksack I was struck on the left shoulder with a searing pain. It was like someone had sunk a red-hot needle into me, or like a magnifying glass was held between me and the sun, burning a hole into my skin. I'd been stung by something and my dancing around with arms flaying and fuck, fuck, fuck's brought hilarity among the others. Denzil and Chris were close by, but saw nothing of the little bastard and neither did I. The others casually went back to their books and I was left to rub the shoulder with Denzil informing me that there was no sting visible and just a small raised red lump to show for the agony of the sting.

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It was a mere three minutes later that I started to feel itchy and considered a wash in the river. This was most strange because I'd gone thirty days so far without a wash and it was only three days until I would be back in Kathmandu, where a shower was one of the luxuries that I was looking forward to. Another minute of agitation passed and I turned to four of the group slouched on the dinner mat and announced "Guys, I think there's something's wrong with me here, something's definitely not right!" I didn't even wait for an answer as I turned towards the shade of a small tree to sit down. Executing this process proved increasingly difficult as I lost my orientation and slumped backwards onto a paddy field dyke, the world closing in as my peripheral vision narrowed alarmingly quickly. Michael appeared by my right hand side and asked if I was going to faint. I mumbled "I think so" and then fell into someone's arms as the 'lights went out'.

Not five minutes had passed since I was stung. I was unconscious and worse was to follow as I drifted in and out of a comatose state barely aware of what was happening. I could hear some instructions and was capable of the odd rational thought, but this was short-lived and seemed to be induced by others rather than a conscious will from within myself. I had three doctors around me but it was Eli who took control. He ordered the procedures, decided the roles to be taken and drugs/dosages to be administered. His bush doctor training in South Africa and A&E experience lent him well to the exercise. Michael, a Consultant Anaesthetist from Newcastle slapped my hand, tourniqueted my arm and expertly found a vein to place an IV drip into. Ben the A&E doctor from Edinburgh was by my head with hands on my neck monitoring my pulse and ensured that my breathing channels remained clear. He also administered the oxygen. All of this early treatment happened quickly because of the proximity of the group medical barrel containing all the necessary drugs and the speed by which one of the kitchen porters, Rai went to get it. Everyone else seemed to pull together and find a role. Richard held my feet up aiding blood distribution, Chris held my head, Denzil engineered thermorests and sleeping bags into a casualty ward. Oh, and Bruce took photographs! Within twenty minutes the small area where I had collapsed looked like something out of a scene from MASH. I was lying on the ground with two sleeping bags around me, an IV drip supported by a ski stick pierced my right hand, an oxygen bottle to my face, three doctors doing their stuff, another five people around them and drugs scattered around a small area. There was also, not surprisingly a small gathering of porters and kitchen staff looking on. I was asked frequently to open my eyes, grasp a finger, etc. to which I could respond, just. I was also conscious of the thought that this was how I might die. This was where I was supposed to be strong, assist the drugs, think of reasons to live, pull myself through this, and will myself to a recovery. However, I had no grip of my faculties or senses and this seemed difficult to do against the power of subconscious and sleep. The one pain I felt was when 10ml of Adrenaline was injected sub-cutaneously into my chest, but outside this, my world was a haze.

Dave too thought that I had died when my head flopped to one side and my pupils rolled in their sockets. A frightening scene for him to witness. I was told afterwards that Dave by this time had gone off to the bridge by himself, presumably to contemplate the whole event and wonder how a simple sting could lead to the near death of his brother. Thanks to Eli's experience he diagnosed my condition as 'Anaphylactic shock'. An extreme reaction to an insect venom which can kill and affects a tiny minority of the population. I owe my life to Eli. His quick actions, and his experience made the difference. If the necessary drugs and the support of my group had not been there so quickly the outcome may have been very different.

I am resigned to carrying an adrenaline 'Epi-Pen' around with me like Dave's diabetic pen and being wary of biting/stinging insects but at least I was able to see out this day. An hour after the drugs were administered, (Dexamethasone) I proceeded to shiver without control but started to make a recovery. We camped where we lay that day even though it meant the porters coming all the way back down the hill with the tents, etc.

It would appear to be that if it's early October in Nepal then Ronnie has to be in an oxygen mask! Looking back on the events of the day it seems bizarre that I come on a mountaineering expedition, crossed glaciers, navigated landslides and potentially risked life and limb only to come closest to death by an insect bite! My thoughts turn to Jeanette again and wonder what she would make of it all. She will be home by now and in theory Pete Smith will be telling her how well I am. How ironic is that on this day! I do miss her and I now definitely want to be home, even though I'm still in the midst of the Nepalese hills. Boo Hoo.

The NW FACE , 18th Sept to 9th Oct By Mark Bryan

Early on the 17th Chris C and I arrived at C2 to spend our first night there at around 5900m. Apart from the fact that we spent that first night convinced that every avalanche and rockfall had our name on it, we slept little because the next day we were to start on our strange object of desire, the NW Face. That afternoon, after the customary 'acclimatisation period' (ie, mid-afternoon snooze), we set off through fog to mark the way to the face. A bit ridiculous really, when we couldn't see beyond the next crevasse, but it seemed better than sharpening crampons or sorting bags of food or other such manly things.

The next morning we stumbled with ridiculous sacks of over 20kg through deep snow, around crevasses and over avalanche debris, floundering from one flag to the next as the fog swirled through the darkness. The flags were all very good and useful and exciting, but unfortunately they ran out where we'd deemed the 'dangers' to end the day before. If only. In the fog we took a punt, and headed with great mountaineering judgement to the opposite end of the glacier to the front, reckoning that was where we would find the NW Face; ie, at the back. Sure enough, after what seemed years stumbling through even bigger avalanche fans, with frequent stops to vomit, nurse headaches and nausea, and just to whinge, through the gloom rose a darkness which we recognised as being the back of the Ben. Since we knew we weren't near Fort William, we figured this must be it.



Mark Bryan on NW Face

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Using any excuse to rest and whinge some more, we sat down as dawn rose to wait for a 'clearing' in the weather to see where the hell we should start going up. After another vomit or two, and a couple of shits, our view came, and we elected to plod up to a line to the left of Scott's original line, which looked more sporting than his dull gully. About 10 years later we arrived at the top of the mother of all snow cones, and I elected to take the short 'shrund pitch of approximately 3m. That dealt with, it seemed only fair that Binder should get the first real pitch of the face. As we sorted ourselves out and geared up, it started to snow like buggery. Good Scottish conditions, what more could we ask for.

After 2 moves on our intended line it became obvious that Scott had a rather canny knack of lines than we did. Chris performed the first girdle traverse of the NW Face as he led across to a stance uncannily near the original line. Struggling with 200m of 10mm static rope, 2 litres of frozen water, 2 muesli bars, spare rack and extraneous climbing matter, a situation I would come to know well over the next few weeks, I followed. My pitch was pretty horrible- semi frozen shale arranged into a sort of near vertical pile and loosely covered in fresh snow- and then it seemed we were bugged and it was time to descend.

The next day was far happier. We got up around 3am, and felt much better as we plodded up moonlit slopes to the foot of the route. This time we carried less, and perhaps as a consequence vomited less and moved faster. At the bottom of the snow cone we wondered what the distant peaks were glowing red in the sunrise, and as we plugged up the cone we realised, with mounting awe, that they were in fact Makalu, the Everest horseshoe and Cho Oyu, 80 miles away.

So the pattern was set, and over the next few weeks we would get up at some unearthly hour, struggle for a couple of hours to prepare a warm brew and open a muesli bar, put as much kit as we could on inside the tent (by the end we became masters at this, able to even rope up together, don rucksacks, crampons and helmets, and cover the first 30minutes of ground while still ensconced in tent/sleeping bag/both), before heading drearily for our daily game of Russian Roulette under the seracs of Gimmergela en route to the face.

The slog across and up to the ropes was draining; the jug up the ropes tedious and draining. The climbing was pretty straightforward, with just enough difficulty to maintain interest. At about one third height was a large buttress, which was our initial goal. Once there, we took a day to rearrange and move all the fixed ropes, as some had been chopped by various errant rocks, and we elected to follow Scott's line which seemed a lot safer from rockfall now that a vicious thaw was in progress. However, it proved less safe from avalanches, being a gully line which drained the whole of the upper face. Some days, during and after snowstorms, the route appeared under a waterfall of spindrift, which cascaded down it in spectacular fashion.

The various landmarks passed slowly: the buttress at one third height where we were able to excavate 2 tiny bivvy ledges for use later on; a difficult traverse section straight after on dubious ice and under deep snow; up better and better ice towards the top 'Chamonix' buttress, with a hideous wallow of a pitch for Chris C; around the buttress and onto the best pitch of the route- squeaky ice at 22,500ft; and then it got real gnarly. Luckily, I had my secret weapon- Chris. He had a horrendous run-out pitch for 70m up yucky steep snow, eventually tying his trailed static to the end of his run-out dynamic rope and continuing un-belayed while I descended 100m to radio for some paramedics. After tweaking with the ropes below and picking up yet another load- all good displacement activity- I juggled up to find him hanging on rock hard ice by a couple of dodgy pegs, pretty well spent.

The sight of the most driven of the team members exhausted didn't instill gladness in the heart of the least driven, but after a difficult brew using the hanging-belay-hand-held stove technique, I retained my composure and elected to send him on the next pitch, a heinous and exposed traverse across steep, bottomless snow. He had, after all, already gained good experience of this medium on the last pitch, so it was a sensible bit of man management I thought. A huge, noisy 'crack' half way across the pitch, during which Chris descended a few inches, but more disturbingly so did I and the belay 20m away, led us to review the situation. Going up and then down, and lacing the whole thing with our total rack seemed eminently preferable, but it was still over 2 hours and many scary moments later when Chris arrived at a reasonable belay. It was almost dark and I was frozen, but that's the price you pay for being a wimp and ducking out of the hard work. I dropped back to the belay and was finally followed by a very tired Binder.

I think this was the famous 'shooting star' night, for those of you privileged to have heard those moments of delirium over the airwaves late in the evening. Sat cooking some slop on our bivvy ledges, with what seemed the inevitability of the N Col the next day, we were tired but very, very happy. It was a gorgeous night, and the next day could only get better.

But first it was going to get a lot worse. The grunt up the ropes when we finally emerged from our fitful sleeps was exhausting and took forever. Yesterday's final traverse pitch was desperate even with a fixed rope (superb effort CC), and it took us to the infamous 'Bettembourg's Chimney'. What was even worse was that there was no way I could avoid this pitch, having already proved myself to be merely baggage for the past few days- although I did make a valiant effort to squirm out of it. So, without further ado (it was already 11am) I began to half swim, half grovel, and totally inelegantly thrash my way upwards. There was a sort of rock bulge that I could vaguely bridge up, but the exposure was incredible. I'm pretty used to looking between my legs and seeing nothing, but this was all rather more stressful. By the time I'd run out about 25m I had exhausted my supply of adrenaline, and it was time to retreat to the nearest (and only) rock around, excavate a belay, and pass the remaining metres onto the master.

Chris looked as unimpressed as I've ever seen him when he realised what a slimy stunt I'd pulled. Ahead lay 80-degree snow flutings which were at least 4 feet deep, and devoid of anything solid for probably 100m. A bastard trick if ever there was one. I covered headfirst in my 4ft hole, at the back of which nestled a poorly tapped in peg and two cams of a friend, and sheltered from the rapidly deteriorating weather and the increasing chilliness from my partner. It was the crux of the climb, both in climbing terms and in psychological terms. The climbing was very dangerous; the 2 runners very poor; the belay

marginally better, and a fall potentially catastrophic. We were perched near the top (how near?) of this massive face, at around 6900m, above a string of increasingly tenuous anchors, the wind was reaching gale force and spindrift was entering every orifice. I hadn't felt my feet for hours, and my hands were getting likewise. It was the single most miserable belay that I've ever experienced in a career of many, many miserable belays. And it went on for hours. It was the nearest I came the whole time to giving up, despite knowing that if we didn't crack the face that day, it may as well be all over.

I had reached my lowest ebb about an hour before; hung on for a while, and finally shouted to Chris, still only 20m above, that we should give up. 'No way; because I'm going to fucking climb this pitch.' And he was off, simple as that. He said later that he realised it was 'do or die', and, not wanting to die, he did. He shot up, across, around over the horizon and was gone. I followed at full speed in a blur of spindrift, going well simply because my entire blood volume was circulating only half way along all my appendages, and it was, quite simply, the most scary and dangerous pitch since the last ice route I fell off (the day before I left for Nepal...). The final pitches were a romp (ha!) up easy angled slopes, running it out until we were on the Col, loads thankfully dumped and cameras out. It was a very happy event- we were physically and emotionally drained; it was a summit in itself.

We felt the tremendous support of the whole of BC and beyond, and it was a great boost to us in our shattered state; at once bizarre and yet fantastic to hear Pete Smith's dulcet tones on the radio- we were so far away and yet felt close. Sikkim was obliterated by a plume of spindrift, and it was all suitably gnarly up there but we didn't care. At last we had met an objective and a time-scale we had set- a great achievement on this expedition, and for the time being we could do no more. We began our descent, arriving at the foot of the ropes at 8 o'clock in the darkness totally spent; to C2 and thence to hand the baton over to the rest of the team for a few days.

We had spent 22 days climbing the 1000m NW Face, including interruptions by bad weather, and become only the second British team to reach the N Col in the process. Chris and I had lead, carried and fixed 21 of the 24 pitches over that period, spending 11 days on the face, and lost 18kg between us. Chris's pitch above the chimney had been the defining lead. The whole climb rested on this pitch, and Binder had pulled it out of the hat once more. Like his two pitches the day before; like him single handedly fixing the icefall; like him finding a route across the glacier while we were all 'resting' at BC; and like us getting to the mountain in the first place.

Personal Account

By Henriette van Ruiten

It all started after reading "The High Altitude Medicine Handbook", I got fascinated by high altitude medicine and after reading this book I read many more. I decided I still wanted to learn more about it. At my university they couldn't help, now I have the bad luck of living in a country where parts of it are even below sea level so this was understandable. I decided to write an email to one of the authors who had put his email address on the last page of the book. This was Andy Pollard, we wrote many emails and I got even more enthusiastic. Andy put me in contact with Sally, who told me about the forthcoming expedition. I couldn't believe it, going on an expedition was something I have always dreamed of and now it became very close. She said, come to the Ambleside weekend so you can meet everybody. That's what I did, I was very scared in the beginning, I didn't know anybody and Ambleside was far away but it turned out to be a fantastic weekend. Everybody was extremely kind and it was even possible for me to join the research, it was even better than I could expect and I decided to join the expedition. I was full of happiness going on an expedition to the Himalayas.

Coming back in Holland my life changed very fast. Many people became interested in the expedition, newspapers and magazines wrote about me and I even had an interview with the national newspaper. It was amazing going into a bar in Amsterdam and see my picture and story in the newspaper. But for a Dutch person, especially a woman, going on an expedition is exceptional. I used the publicity to find the sponsors for the trip. This went quite well and in the meantime I could think of a research subject, this was easily found in the cold finger experiment. Unfortunately this experiment was not appreciated by the subjects as it was very painful!

Departure time came very close now and sometimes I was a bit scared of the adventure that was in front of me, not to speak about my parents who were terrified. It was two days before leaving I made an agreement with a newspaper that I was going to send every week an email with my experiences. Then the expedition came like a hurricane and two months long it took me with it.

It was only back home that I realised what had happened to me. The whole trip, the research, the mountains and especially the people have changed me forever. I have seen things and met people who I will never forget, also I am sure I have made friends for a lifetime. Back home it was incredible, many people had read my articles and were very interested in my story. They asked me for interviews, photographs, radio programs, slide shows etc. and that only because of the combination of Dutch, woman and Himalayas! At the moment I am in the middle of working on the results of the research, sometimes I go to a conference to talk about the expedition and my research. During these conferences I meet famous scientists on high altitude medicine and can discuss with them about fascinating subjects. It is difficult to believe that it is only one year ago that I was dreaming of going on an expedition, doing research and could not even imagine of going to a conference!

For me the expedition is like a rollercoaster that never seems to stop!

Shorts on Fire

By Sholto Campbell Age 11.

It was day thirteen on our amazing trip to base camp, we were just coming out of a village with a extremely long suspension bridge when one of my brothers said he needed to go to the toilet. We walked on until the village was nearly out of sight, then we gave him the toilet roll and matches and told him to go behind a big boulder to go to the toilet.

It was quiet for ten more minutes, and then I saw there was a lot of smoke coming from the boulder. As a joke I said "Oh it look's like Cameron having a bonfire". I carried on talking to my Mum about what sort of wild life was around, when I heard Cameron shouting "my shorts are on fire!" I immediately ran to Cameron.

I looked down to where his shorts were, they were on fire! It was lucky there was a stick nearby in the rice fields, I got a stick and beat the shorts until the fire went out. I expect it was a frightening experience for Cameron with fire up his legs.

It was lucky that Cameron did not have his legs burnt, otherwise he would have had to have some serious burns on his leg.

But the story still carries on, after we had got the fire out. We got him to the path almost crying, but we still needed to clean him up after the accident he had with the fire. We took him down to the river, to try and clean him up, the water was almost still behind the boulders. But the river certainly wasn't still, and the leeches definitely weren't still either, no, no by far, they had an opportunity, and they weren't going to miss it. We did not notice he had leeches on him until we were up on the path, then we started to notice. They were really tucking into him, but we picked them off very quickly, and this was when Cameron really started to have a fit, but we soon calmed him down.! We carried on, with Cameron vowing that every leech he sees he will kill it.

This story was far from being made up, it was a story that I will never forget on the journey to the first base camp I had ever been to.

A rash comment?

By Nigel Hart

As a medical elective it was certainly unorthodox – seven weeks in the Nepalese Himalayas participating in medical research. When the idea was first mooted we weren't sure whether the faculty would buy the idea for our final year elective – most people usually did their elective in a foreign hospital. To our surprise they liked the idea. We then noted that written finals were due to finish on the 25th September whereas the expedition was due to leave on the 20th September. We were positively bowled over when they offered to have finals finishing by the 18th to accommodate us. We omitted to share this fact with many of our colleagues!

So there we were at Pangpema, 5000 m, probably having the best elective of anyone in our whole year. One morning Roger and I stood together as we watched one of the highly impressive Russian-made MI 17 helicopters land and take-off again in front of the incredible backdrop of Wedge Peak. Awed by this incredible sight, Roger, thinking of the electives of our colleagues, turned to me and said, "Just think, we *could* be standing on a ward round right now looking at a rash". We exchanged a 'high-five' in mutual appreciation for having chosen the elective of a lifetime.

D'ya know the werds ?! (must be said with a thick Irish accent)

By Nigel Hart

"I don't know why I bother bringing a guitar" said Chris Comerie ruefully, "I'm never around base camp long enough to get the use out of it".

.....It *had* been my intention to purchase a guitar in Kathmandu before setting off on the trek to base camp but using all time available to search for a replacement camera that I had broken on arrival, I never really got around to looking for one. I was thus thrilled when I arrived at base camp to find that Chris had bought a guitar, a 'Givson' no less! It had been some time since I last played the guitar and even longer since I had used one to lead a sing-along. I was to find out however that similar to the 'riding a bike' situation, I had indeed not forgotten how to play. Gathering together on my second evening at base camp in the 'pleasure-dome' (the popular name for our communications tent), suitably clad against the cold in down jackets, I was quickly infected by the enthusiasm of those gathered for a sing-along. Soon a stream of song-titles were being offered up as suitable material. In contrast to my memory of how to play the guitar, my recollection of song words was not so good. "What about 'American pie' " offered someone? "Do you know the words?" I replied....."Or what about 'The boxer'" suggested another? "Do you know the words?" I again replied. It stuck! From that time to the end of the expedition the phrase became immortalised and was always said with an accent that would not have been out of place in 'The quiet man' – a Hollywood film set in the west coast of Ireland.

I was later to discover however, that 'knowing the words' was not an imperative for a successful sing-along, a fact witnessed most especially by those who gathered on the night Chris and Mark returned to base camp from Kangchenjunga. We sang and danced and laughed into the wee small hours and I don't think we managed to complete even half a song between us.

"Do *you* know the words?" Don't worry if you don't – just let your spirit do the singing!

Logistical Report

By Simon Currin

As with Everest in 1994 the logistics for Kangchenjunga became very complicated. We had learned much on BMEME 1994 that enabled us to take significant short cuts and control costs.

Chris Comerie's Kangchenjunga climbing team functioned as a completely separate expedition with a different Nepalese agent and Chris was in complete charge of all his own logistics. Full details are included later in this report.

Furthermore, Jo Argyle Robinson and family made their own flight and trekking arrangements.

Personnel

Experiences on Everest were of great value in planning K98. Once again we elected to break down the whole expedition into small, semi-autonomous, units. In this way any major logistical error would be restricted to the people in that group rather than impacting on the whole expedition.

Six months before departure for Nepal we formed these groups, each containing around 10 people. As far as possible groups were kept separate in time and place in order to restrict environmental impact. Each group was supported by its own sirdar, cook and porters. Sirdars were responsible for maintaining the supply of food for that group for the duration of the trek. Early formation of these trekking groups meant that individuals had the opportunity to get to know each other prior to departure for Nepal. Some groups took this opportunity to meet regularly and plan in some detail their trekking objectives and itineraries.

By spacing the departures of groups from the UK, and hence their arrival at Base Camp, we were, at least to some extent, able to regulate the work of the research team which would otherwise have struggled to cope with a major influx. The first 2 groups departed London on the 13th September, 2 more the following week, 1 the next and 2 more the following week. Once in Nepal we tried to separate further the groups by staggering their departure from Kathmandu, or by encouraging them to take alternative routes. One group elected to enter via Tumlintar and the Milke Danda, whilst group 5 elected to enter via Kangchenjunga's South Base Camp. Physical separation avoided the pressure on very restricted camp-sites during the approach.

Even data collection was ensured by appointing a person in each group, and making them responsible for overseeing day to day measurements. A Medical Officer was nominated for each group who assumed responsibility for acquiring and maintaining the medical kit. A Spokesperson was also nominated whose role was to liaise on behalf of the whole group with the expedition organisers. No group leader was appointed as most preferred a more relaxed, and democratic decision process.

The system of separated units broke down to some extent during the exit from base camp when there was some overcrowding in campsites, but this was not a serious problem.

Certain key decisions related to the method of approach to the trek. Initially we had planned to fly everyone in to Taplejung, but later elected to extend the trek by going in overland to Basantapur. This proved a most fortuitous decision as bad weather in late September delayed flights to Taplejung by up to 10 days. Large numbers would have found themselves stranded at Biratnagar had we not opted for the more certain approach.

Communications

Key to organising a smooth running expeditions is good communications during all phases.

In the months before departure Newsletters and information sheets were produced on a frequent (monthly) basis. Meetings at Ambleside, Langdale and the Data Collection weekends also provided an opportunity for members to discuss and develop plans.

Unlike Everest in '94, all of the K98 organisers, and many of the members, had access to email. A huge amount of regular email traffic made it possible to share information and decisions in a way that was not possible 4 years earlier.

Good and reliable VHF communications were judged to be essential, and an investment was made accordingly. Twelve state of the art VHF handsets, and one 60-watt base station were deployed, with each trekking group having access to at least one set. Four sets were shared between the 7 members of the climbing team. Regular schedules were operated (co-ordinated by base camp) and there was a vast amount of traffic. Criticism was made in some quarters of the overuse of VHF, however their key role in logistics and rescues more than justified their use. Those that felt the system was overused had only to switch their set off, as indeed I did on more than one occasion.

The organisers also felt that they had an obligation to provide robust communications with the outside world. With 72 souls entering an isolated and rugged region some sort of emergency was almost certain to arise requiring assistance from outside the expedition. Accordingly an INMARSAT satellite phone was acquired which provided reliable email and voice communications. Its presence was justified as it was used to summon a helicopter for a very sick member, and possibly saved his life. An added benefit was that it allowed researchers in the field the ability to communicate with researchers at home, and

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thus refine projects and iron out problems. The satellite phone was also used to communicate with the Nepalese Agent over supplies of food, book exit flights from Suketar (fixed wing), and co-ordinate evacuation of base camp at the end of the expedition. Members also had email access and were able to communicate freely with friends, relatives, and sponsors around the world. Once again there was some criticism made about having such ready access to the outside world, but its presence was more than justified by its use in the emergency situation mentioned above. I feel that it would have been irresponsible, if not negligent, to organise such an expedition without ensuring adequate communications when the technology was available.

Freight

In addition to the personal equipment taken by members, 2800 kg of research equipment and high altitude food was taken to Nepal. Peter Smith was given the task of getting all research equipment safely to Base Camp.

A 1000kg free luggage allowance was negotiated with the airline so that precious research equipment could travel as accompanied luggage. The benefit of this is that customs problems in Kathmandu are thereby eased. The remainder of the freight was sent unaccompanied. Members were restricted to 15 kg as the allocation of porters had been calculated on this basis.

Peter spent many months throughout the summer of 1998 attempting to ensure that all freight movements were planned in as much detail as possible. Unfortunately his job was confounded in two ways:

1. Most members took far more than their allowed 15kg, and some exceeded this by a huge margin
2. The research team were slow in getting accurate weights to Peter with respect to their scientific equipment, and some were very late in forwarding packaged equipment to him. I am sure much of this was unavoidable and an inevitable part of the logistical headache of organising a large and complex scientific expedition.

Peter made detailed inventories of the equipment and packages freighted to Kathmandu, but unfortunately some of this good work was undone by the need to repack equipment in Kathmandu. As a result some essential components went astray in Kathmandu. One of the important lessons learned is that all equipment must be available early and be properly packed well before it leaves the UK.

Although we tried long and hard to enforce the “freight rules” Peter was left with a virtually impossible job. Thankfully his tenacity saved the day and the vast majority of equipment survived the journey to Base Camp intact.

The system also broke down during the repatriation of equipment where adequate inventories were not kept.

Customs

Unlike on Everest, negotiating customs in Kathmandu proved relatively easy and inexpensive. The credit for this must go to our agent. Some problem however was encountered at Manchester on return. Luggage was taken off the flight at Amsterdam due to overloading. This then arrived at Manchester unaccompanied several days later and the customs took a dim view when they examined the contents and found them full of computers etc. In future, we were warned, we must get an export carnet for all items worth over £600 whether accompanied or not. This carnet must be stamped at each frontier crossed. The prospect of doing this in Kathmandu defies the imagination!

Helicopter

We were exceedingly fortunate on K98 in having sufficient funds to finance helicopter freight to and from Base Camp (total cost \$20,000). Given the terrain and remoteness of this base camp I believe that it would be virtually impossible to organise a research expedition, with the same diversity of projects, without recourse to helicopters. Even they were not, however, without their problems. The freight was accompanied by an experienced base camp sirdar (Dorje) who remained responsible for all equipment for the duration of the expedition.

i. Weather and aborted flights.

When chartering a helicopter in Nepal the charterer has to pick up the costs of a flight even if it is aborted and the cargo is not delivered. The prolonged monsoon gave us considerable anxiety in this respect. Whilst on the trail we did manage to contact Kathmandu to delay the flight when it became obvious that the weather was too bad to fly on the planned date (October 1st). Had we not been able to do this the cost would have been \$10,000! The helicopter flew instead on the first clear day of the post monsoon season (October 4th).

ii. Altitude

As altitude increases the helicopter payload diminishes. Pangpema at 5,000 metres is near the ceiling for helicopter flight, and also at the limit of their range from Kathmandu. All flights were therefore to Ghunsa (3,400 metres)

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where the helicopter dumped fuel and split the load into two. Two flights then ferried all of the freight to Pangpema before returning to Ghunsa for refuelling. The reverse procedure was adopted at the end of the Expedition.

iii. Crashes

The helicopters used were the very robust Russian made MI17's that have the ability to carry a huge payload and operate in strong winds and at high altitude. Their use is, however, limited by visibility, and this is a common cause of crashes. Five people were killed the day before our helicopter was booked to evacuate base camp. They had been flying in low visibility and had hit trees. Furthermore these former gun-ships are nearing the end of their operational life and spare parts have become prohibitively expensive and poor maintenance undoubtedly contributes to the escalating number of crashes.

iv. Future restrictions

As a consequence of the maintenance issues and accident record the license to carry passengers by helicopter in Nepal was revoked by the Government on April 1st 1998. It is likely that cargo flights will also cease in the foreseeable future.

Power Supply

Having assembled the 2,880kg of kit safely at Pangpema the next requirement was for power. After the experiences on Everest we had elected to take two completely separate and stand alone power systems. Each was specified to provide sufficient power to maintain the required output should the other fail.

A second hand solar system was purchased from an American Everest Expedition and various extra bits were hired from Lotus Technology in Kathmandu. Both flexible and rigid panels were used to generate electricity and fortunately Pangpema was blessed with a good deal of sunshine. A mixture of Lead Acid and Gel batteries (12 in all) were used to store electricity and AC inverters were used to provide 230 volt power to all PC's and projects as well as radio and satellite systems. By rationing power use in the mornings (which were almost always sunny) a good level of charge was maintained in the batteries and solar power accounted for 98% of the power used at Base Camp.

The back up system consisted of two 4HP Honda generators powered by petrol. Their jets had been suitably modified for use at altitude and 200 litres of fuel were flown in. Only one of these machines was used and it functioned perfectly. Fortunately this system only had to be used on the one overcast day of the expedition.

Transport of Samples

A very major headache in a research expedition is the transport of biological samples – particularly when these samples have to be kept frozen in liquid nitrogen.

Dewar Flask and cryopacks were purchased in the UK and exported to Nepal where they were filled with liquid nitrogen at the Agricultural Artificial Insemination Centre. It was considered (correctly) too dangerous to transport these using porters and impractical to use yaks. The need to transport liquid nitrogen to base camp was, therefore, a major factor in the decision to use a helicopter.

The containers were supposed to have been topped up a few days before departure from Kathmandu but I suspect the Hindu festival of Dashan prevented this from happening. As a result the 4 containers arrived partially full, but in the end this proved adequate. The samples then exited by helicopter and the flasks were refilled in Kathmandu.

International transport by air back to the UK proved to be very difficult and expensive. The 2 cryopacks conformed to the required regulations for air freight, and so they were freighted by DHL with the intention of sending them straight back to be refilled for the second wave of samples. Unfortunately DHL delivery took 10 days, and by the time the empty cryopacks were back in Nepal all Medical Expeditions personnel had left. Transfer of samples therefore had to be done by our agent's staff.

The remainder of the samples (urine) were sent back in dry ice but, as dry ice is not available in Kathmandu, this had to be sent out from London. As dry ice does not last very long in transit there was considerable anxiety as to whether the samples would survive the journey frozen. Accordingly 100kg of dry ice was sent from London and this proved just about adequate for the round trip.

Transport of refrigerated samples was an anxiety provoking and expensive exercise.

Medical Supplies and Oxygen

With 72 persons in the field some sort of illness was inevitable. Given the remoteness of the situation we had to be as self-sufficient as possible. Each trekking team was issued with a comprehensive medical kit and the responsible doctor was asked

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to top it up as he or she saw fit. Controlled drugs were the responsibility of each group medical officer, who had not only to procure them, but also to arrange the necessary home office export permit. The group medical kits were issued to the responsible doctor in the UK, and traveled with that person at all times. It was also their responsibility to dispose of surplus items at the end of the Expedition (most was donated to the British Nepal Trust).

In addition a comprehensive base camp kit was assembled and transported to base camp by the expedition official doctors.

A Gamow (hyperbaric) bag was hired for the duration, and lightweight oxygen equipment (left over from Everest in '94) was taken to Pangpema by Chris Comerie in August. The bag remained at base camp and the oxygen equipment was deployed at the various camps on Kangchenjunga for emergency medical use.

Three portable cylinders of oxygen were flown to base camp by helicopter with the freight, and they stayed there for the duration. A trial portable Oxygen re-breathing system was brought by Ulrich Steiner and accompanied group 5. In addition to the above medical oxygen supplies, large quantities of research oxygen were freighted by helicopter to base camp. All cylinders were taken back to the UK.

Intravenous fluids and a specially purchased lightweight stretcher were kept at base camp.

A very large amount of pharmaceuticals was procured by Jacqui Lawson (pharmacist) free of charge and these are detailed elsewhere.

The need to carry comprehensive medical kits in such remote areas was reinforced by the incidents that did occur – see Ronnie Robb's personal account of his brush with death just 2 days from the end of the trek.

Trekking Agent

The complexity of this expedition with its large membership and freight movements meant that it was important to appoint an agent with the resources necessary to cope. Initially we had intended to use the agent that looked after us on Everest, but later switched when Himalayan Expeditions Inc. proved that they were able to provide a similar, if not better, standard. Risk is always involved in these sorts of decisions but I think that in this case we benefited by changing from Thamserku Trekking to Himalayan Expeditions Inc. The service that we received was very personal, and a lot of thought and effort had gone into the planning of the local logistics.

Our agent was meticulous in his attention to detail and this played a large part in the success of the expedition.

Financial Report

By Sally Glynn

From the bean counter

I'd first heard of this group of climbing doctors when, in 1994, a friend who was interested in investigating the disposal of human waste at altitude invited me to join the Everest Expedition. Three months of anguished preparation followed - collecting kit, getting fit, which boots to buy, which jacket, how to fit all of my gear into a blue barrel which shrank by the second as the crammed packing filled it. What ensued was glorious, an opportunity to climb amongst the world's highest mountains, the forming of lasting friendships, the excitement of being part of a major expedition, the thrill of knowing that two of our number had summited on Everest. But how was all of this made possible? Who was behind organising such a tremendous experience and how had they ever pulled it off? What's more, there didn't appear to be any people with any business experience, these were all doctors, products of medical school and the NHS. What could they know of the finances of such trips? How could they control it all?

Enthusiasm after the trip was unbounded. There had to be more and I wanted badly to be part of the action. Being the only bean counter amongst the group of BMEME people, I became the treasurer of Medical Expeditions, as we became known, following the Everest expedition.

In early 1996 the idea of a trip to the eastern part of Nepal began to form. My bean counting was not all-consuming at the time, and I was despatched to the Alpine club to research the area and suggest possible trekking objectives, Chris Comerie already being interested in an attempt on Kangchenjunga.

The library at the Alpine club is awesome and I roved the Himalayas, dreaming of long hidden valleys, reading of Kellas, Freshfield and Dyhrenfurth, of expedition doctors who prescribed blood letting and liver pills to improve acclimatisation. Nepal peak, Tent peak, Gimmegela, Wedge peak, all began to be real. My climbing experience is not exactly extensive, but a couple of peaks did seem like attractive objectives. Copious notes were written, articles copied for discussion.

Our first meet to launch the expedition was at the Pinfold, Hyssington. About 50 people came. The Wolverhampton Mountaineering Club had visited the area in 1991 and lent me their slides to show. The expedition was born!

Now we needed to attract people to join, and to find an agent in Nepal. My second major task emerged - our expedition brochure. Simon had mentioned that the Everest expedition for him was a real learning curve in the use of office software. So it proved for me. Tasks that I would normally have left to a secretary I finally mastered. Both Simon and Annabel helped me write the text for the brochure that was published for us by Tarmac, my employer. Amazingly the print room person who dealt with our brochure recognised the photo of Jim Milledge as a cousin of his family and was very co-operative.

February 1997 saw me in a role I could never have thought possible - in a seedy hotel on Tottenham Court road meeting with a trekking agent and his Nepalese scribe, discussing the services they could offer us if we appointed them as agent. Simon was in Canada and not able to join us so I'd enlisted the support of Dave and Cath Collier to join this somewhat bizarre meeting.

Slowly people started to hear of our plans and requests came through for information. Newsletters became more frequent, and mounting enthusiasm reached a high point at the Ambleside meet in January 1998.

Bean counting has to come into my story somewhere, and one of my toughest tasks was to elicit the fees from people, especially with the added complication of having formed a gift aid scheme. The gift aid scheme, as can be seen from the financial report, increased our income by some £9,000. In fact virtually everyone contributed, but explaining it was hard work! Despite the reputation of accountants, it is not an easy task to ask people for money!

So much was new, so much was unknown for me, that budget setting was very difficult. How much did researchers spend? (This remains a mystery). What was an E.I.T. machine? How could research equipment be supplied without VAT? How could we organise a gift aid scheme if people were paying to come on an expedition, albeit that some of their money was used directly for our research? What should charity accounts look like? Not just any charity but a Scottish charity that was a company limited by guarantee. As with a medic who is trained to be an obstetrician, and would not be familiar with paediatrics, so the world of charity finance was a new one for me. Nor had I been too involved in my professional career in treasury issues - many people may find this strange for an accountant, but I'd never had to transfer large sums of money overseas, deal with money market deposits, or forward exchange contracts. Our bankers were very helpful and dealt with my questions with great patience.

Fortunately I also had the experience of Simon to fall back on and he helped in a myriad of ways. Other worlds also needed to be explored. What were the requirements of the Data Protection Act, and how did one go about being registered. Could we, as a charitable company, gain membership of the BMC for the members of our expedition? In each case people in the various organisations were a great help in explaining the issues to me, and helping me to sort through what we needed to do.

Other people, who were a delight to deal with, and whom I must mention, are the staff from the PIA office in Bristol, Marion Lawrence and Jane Slade. Both were excellent, particularly at knowing that when I cancelled a seat I did not always mean to have cancelled it, and would need it again!

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At length the monies were collected, equipment ordered and paid for, flights booked, our agent notified of who would arrive when, with whom they wanted to trek, with which sirdar, and by what route. The months of work were finally being tested. Would everyone arrive at the airport on the right day? Would they make their flights, would they enjoy the trip and share my enthusiasm for the wonders of Nepal, and would they all come home safely? How would the research work, would the equipment reach base camp safely and in working order?

It was wonderful to be finally back in Nepal, becoming familiar again with the streets of Thamel, meeting again the charming local people. I'd not been prepared for the frantic activity with which the days in Kathmandu were filled. Pete Smith had done an amazing job the preceding week in making arrangements for kit to reach base camp, leaving Simon and myself just a few wee tasks to clear up. Four years previously, I would never have imagined that I would be dealing with an agent in Nepal, making final arrangements for helicopters and flights, checking vats of liquid nitrogen at the insemination centre, arranging the finances for the hire of solar equipment, trying to convince a bank that I really did need to change US\$2,500 into local currency (in the end Nigel and Roger assisted by separately going to the bank for me to complete the transaction).

At last to trekking! Finally we were on the trail in a monsoon that just didn't know when to stop this year! Previous experience led us to believe that the rains would stop about the middle of September. I'd not met leeches before, and had often wondered how I would react to their attentions. The answer was with screeches and screams but our attentive sherpas followed me closely, calling out "leech Sally", "leech Sally", as they spotted them on my boots. Liz actually became known as "leechy!"

The walking was wonderful, and for over a week we were also out of radio contact with the other groups which was blissful, but also left us a little anxious over the fate of the helicopter - had it reached base camp with the climbing and research equipment, or would we never be spoken to again? We'd no idea if the monsoon clouds had cleared at the same time as it tried to reach base camp. Would it try again if it failed, and how much would our bill amount to for two attempts? Simon and I contemplated the fate of the expedition, not knowing or able to do anything. Nervously we made contact with base camp shortly before Ghunsa and received the wonderful news that the helicopter had got through.

We arrived at base camp to find an incredibly industrious research team, being very innovative with solutions to kit that crashed or refused to work in the extremes of temperature and altitude, or due to bits having been mislaid in Kathmandu and not arriving. I was told by the researchers that this was normal, that nothing would ever run smoothly, and that this was the essence of field research. The compensation was the glorious location, a meadow on the side of the Kangchenjunga glacier, bathed in sunshine for most of the day with fresh running water for drinking and the panorama of the north side of Kangchenjunga, Wedge peak, the Twins, Cross Peak, Nepal Peak laid out before us. These names that had come alive to me in the Alpine Club were finally before me.

What remained was to see Ramtang and try to climb it. Initial reports were not encouraging, but Richard tells the story well. For me the experience of climbing a peak that no one had visited in over 60 years was overwhelming.

Thinking that all we now had to do was trek out to Suketar and thence to Kathmandu, I think none of us were prepared for the beauty of our return trek. Most had trekked in with varying degrees of monsoon cloud. Trekking out was a very relaxing and enjoyable part of the expedition - research was done, base camp was packed up, and whilst in Ghunsa we had seen the helicopter exit, fully laden, with a vast array of kit.

Kathmandu was again frenetic, this time to convince overbooked hotels that we really did want them to honour their contract with us and accommodate our people. The return flight saw Simon's skills of diplomacy reach new heights, as he convinced PIA that they would accommodate all of our people on their already full airline from Karachi. Manchester airport baggage handling officials showed great consternation over our claims for lost luggage, left behind in Amsterdam due to the plane being too small to carry all of our barrels.

I sit in my office now looking at a poster of the top of the world and prints of Ramtang, knowing that I would not have had the last four years happen in any other way, and puzzling over how I am to convince my employers that it would be a terribly good idea if I had leave of absences more often!

My grateful thanks are due to Tarmac, who despite their faults, have been incredibly good to the expedition in allowing me to take leave without pay, and in allowing me free access to their photocopiers for the printing of our newsletters and the assistance of their print room in the design and production of our brochure.

I am still in the process of collecting the final costs of our expedition, but present below the status as it currently stands. The price we charged people to come on the trip was designed to meet our costs and to fund the research. Our administrative overheads are incredibly low. In July 1998 we received a grant of £65,000 from Liverpool University to fund various of the research projects due to the contacts and work of Andrew Pollard. We are extremely grateful for this funding as it enabled the expedition to fund much more research than would otherwise have been possible. It has also meant that we have a healthy surplus from the expedition to fund future research, grant bursaries, and to fund the incinerator project in Ghunsa. The directors of Medical Expeditions will shortly be setting guidelines for the use of these funds, having regard to the future programme of research that they would like to undertake.

If anyone has any questions at all about our finances, please do not hesitate to speak with me. Medical Expeditions is required to produce annual statutory accounts that are filed at companies house and for the year ended 31 December 1998 the accounts will be audited. If you would like to see a copy of our audited accounts, please let me know. The following can

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only be a brief summary and is focused on the expedition finances, but hopefully will give a good idea of the costs of putting on an expedition such as this.

What must also be borne in mind are the financial risks involved. We fortunately did not have any major mishaps and the majority of our equipment has found its way safely back to the UK. It is essential to build into the budget of such an unusual expedition a large contingency. What would have happened if the helicopter had had to make two attempts (or more) to get to base camp? What would have happened if it had not made it at all, invalidating the research projects that the Liverpool money had been donated to cover - would we have had to repay the grant to Liverpool? What of our finances then? I tried, but failed, to get insurance cover for our equipment. Reasonable premiums suddenly became non-viable when I mentioned that we might have to transport the equipment by yak, would not be able to pre-pack everything in Styrofoam, and would certainly not be able to supervise it all of the time or keep it under lock and key.

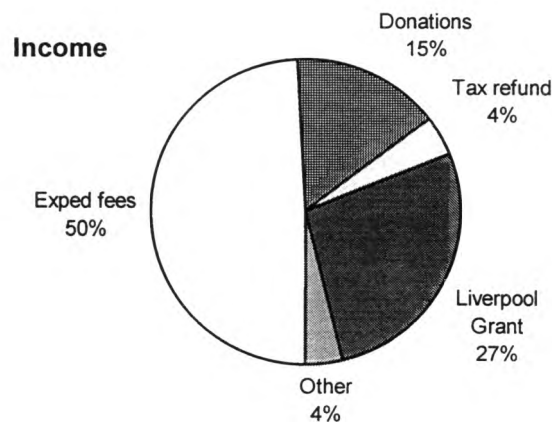
And finally, most importantly of all, is the amount of time that individuals have donated to the expedition, and to which it is impossible to place a value, but which would certainly consume a good deal more than the surplus that currently stands on our books. I know all of the researchers gave a great deal of their time for their own projects. Annabel, David, Andy and Jim contributed tremendously to the overall research effort. Logistical thanks are due to Denzil for his sterling work on our solar supplies and to Gerald for getting it all working at base camp. Pete Smith worked tirelessly to try to ensure that kit was freighted out to Nepal and reached base camp, and to organise the satellite phone and radio communication systems which saved lives. Jacqui Lawson obtained vast quantities of pharmaceuticals free of charge. Chris Smith did all she could to marshal the subjects for data collection and help with the smooth running of the data collection weekends. Finally Simon, of course, for having the vision to run such a unique expedition, and taking the responsibility for pulling it off.

Now the finances!

Income

Our income splits into the following categories:

| | |
|---|-----------------|
| | £ |
| From members of expedition as fees for expedition | 118,134 |
| Gift Aid donations by expedition members | 37,200 |
| Tax refunded by Inland Revenue re gift aid | 9,857 |
| Grant from Liverpool University | 65,855 |
| Sundry income from other grants and donations | 2,410 |
| Satellite telephone receipts collected at base camp | 590 |
| T shirt sales | 180 |
| Barrel sales | 45 |
| Bank interest received | 6,000 |
| | <hr/> |
| Total | <u>£240,271</u> |



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Expenditure

Expenditure costs can be split into two broad categories, those for the expedition itself and those for the research. The expenditure splits virtually 50/50 between these two categories as follows:

| | |
|------------|-------------|
| | £ |
| Expedition | 93,468 |
| Research | 90,925 |
| | <hr/> |
| Total | £184,393 |
| | <hr/> <hr/> |

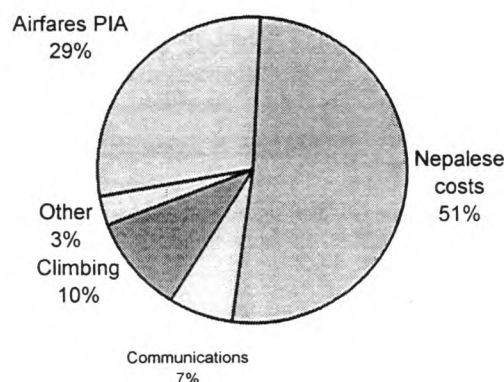
Expedition expenditure

| | |
|---|-------------|
| | £ |
| Airfares | 26,829 |
| Agents fees for trekking and climbing services | 37,639 |
| Internal flights | 10,409 |
| Satellite phone costs | 3,399 |
| Radios | 2,784 |
| Peak permit for Chris Comerie for Kangchenjunga | 6,169 |
| Climbing costs | 3,259 |
| Stretcher | 1,139 |
| Hire of gamow bag | 738 |
| Pharmacy supplies | 538 |
| BMC club membership | 262 |
| Postage, telephone, fax | 303 |
| | <hr/> |
| | £93,468 |
| | <hr/> <hr/> |

Almost a third of our expedition expenditure was on airfares to Nepal. Half of our expedition expenditure was actually spent in Nepal on agent's fees and internal flights. When the permit fees for the satellite phone, the peak fee for Chris Comerie, and other Nepalese elements of the climbing costs are included, almost £60,000 (or 63%) was actually spent in Nepal. This is obviously good for the local economy, but also shows how exposed the expedition can be to currency fluctuations. Fortunately the US\$ in which our local costs are incurred remained relatively stable throughout the period of the planning for the expedition, although we did take out a forward exchange contract to protect part of our expenditure, in the event of a strengthening of the dollar against sterling.

Another interesting element of the costs was the overall cost of having the satellite phone at base camp. When local permit fees are added to the UK hire costs and the call costs, the total cost is £3,399. This compares to the amounts collected at base camp (through the sterling efforts of Meriel Gillespie) of £590. You may have considered the cost of the calls expensive but from this analysis you will see that they were actually charged to you at a great discount.

Expedition expenditure



The other major point to note is the virtual absence of administration costs. This analysis does not include the costs of running the charitable company such as audit fees, legal costs, company registration fees etc, as we are dealing purely with the expedition costs. Nevertheless, the admin costs of the expedition are very small. This is due to the vast amounts of time given voluntarily, and the great benefit the expedition organisation gained from the use of email. In addition the costs of the newsletters have been excluded, as these were funded by the newsletter subscription. The expedition had £15,000 in its coffers at inception, remaining from the Everest Expedition. £13,000 has been paid to Medex as a fee with a view to supporting future expeditions.

Medical Expeditions: Kangchenjunga 98

only be a brief summary and is focused on the expedition finances, but hopefully will give a good idea of the costs of putting on an expedition such as this.

What must also be borne in mind are the financial risks involved. We fortunately did not have any major mishaps and the majority of our equipment has found its way safely back to the UK. It is essential to build into the budget of such an unusual expedition a large contingency. What would have happened if the helicopter had had to make two attempts (or more) to get to base camp? What would have happened if it had not made it at all, invalidating the research projects that the Liverpool money had been donated to cover - would we have had to repay the grant to Liverpool? What of our finances then? I tried, but failed, to get insurance cover for our equipment. Reasonable premiums suddenly became non-viable when I mentioned that we might have to transport the equipment by yak, would not be able to pre-pack everything in Styrofoam, and would certainly not be able to supervise it all of the time or keep it under lock and key.

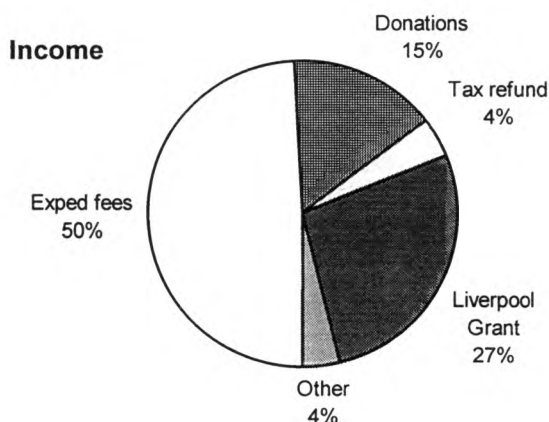
And finally, most importantly of all, is the amount of time that individuals have donated to the expedition, and to which it is impossible to place a value, but which would certainly consume a good deal more than the surplus that currently stands on our books. I know all of the researchers gave a great deal of their time for their own projects. Annabel, David, Andy and Jim contributed tremendously to the overall research effort. Logistical thanks are due to Denzil for his sterling work on our solar supplies and to Gerald for getting it all working at base camp. Pete Smith worked tirelessly to try to ensure that kit was freighted out to Nepal and reached base camp, and to organise the satellite phone and radio communication systems which saved lives. Jacqui Lawson obtained vast quantities of pharmaceuticals free of charge. Chris Smith did all she could to marshal the subjects for data collection and help with the smooth running of the data collection weekends. Finally Simon, of course, for having the vision to run such a unique expedition, and taking the responsibility for pulling it off.

Now the finances!

Income

Our income splits into the following categories:

| | |
|---|-----------------|
| | £ |
| From members of expedition as fees for expedition | 118,134 |
| Gift Aid donations by expedition members | 37,200 |
| Tax refunded by Inland Revenue re gift aid | 9,857 |
| Grant from Liverpool University | 65,855 |
| Sundry income from other grants and donations | 2,410 |
| Satellite telephone receipts collected at base camp | 590 |
| T shirt sales | 180 |
| Barrel sales | 45 |
| Bank interest received | 6,000 |
| | <hr/> |
| Total | <u>£240,271</u> |



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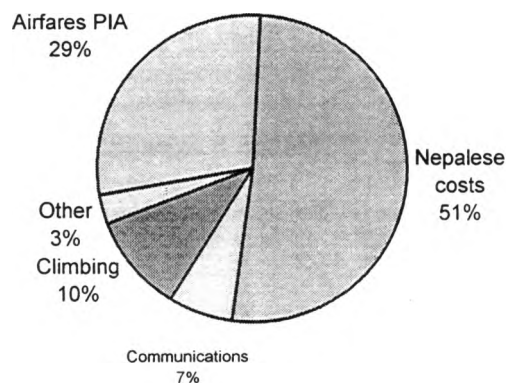
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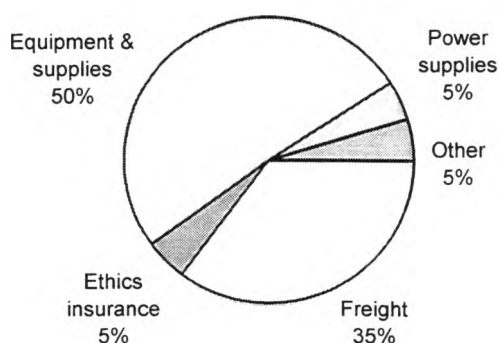
Research expenditure

| | £ | |
|--|--------------|------------------------------|
| Equipment and supplies | | |
| E.I.T. machine | 10,450 | |
| N.Z. project | 9,950 | |
| Pulse oximeters | 5,193 | |
| CED Micro system | 4,390 | |
| Gases | 2,795 | |
| Arginine | 2,674 | |
| Bikes | 2,475 | |
| Microphones/tapes | 2,134 | |
| Centrifuges | 1,922 | |
| Histamine | 1,366 | |
| Computer | 1,215 | |
| Spirometers | 705 | |
| Electrodes | <u>536</u> | 45,805 |
| Freight costs | | |
| Helicopter charter | 12,308 | |
| Freight | 12,720 | |
| Sample carriers | 3,208 | |
| Additional porter costs | 2,649 | |
| Customs fees | <u>1,220</u> | 32,105 |
| Solar & generator power | | 4,151 |
| Ethics insurance | | 4,160 |
| Other | | |
| Base camp kit expenses | 1,029 | |
| Postage, batteries etc (Airways defence project) | 904 | |
| Data collection books | 880 | |
| Data collection weekends food | 768 | |
| Weather monitor | 490 | |
| Hire of research tents | 308 | |
| Eli's project expenses | 168 | |
| Liquid nitrogen | <u>157</u> | 4,704 |
| Total | | <u><u>£90,925</u></u> |

The equipment purchased for the expedition comprises 50% of the research costs. It is the intention that this equipment will be available for future use, and Jim Milledge has gone to considerable efforts to check that it has been safely returned and is in working order. It remains the property of Medical Expeditions.

The cost of the power supplies is remarkably low in the overall research spending. However the most surprising cost is that of freight. This was contributed to by the decision to use helicopters to take the research equipment into and out of base camp. The fact that all of the equipment reached base camp in working order, and that none was lost to theft or from yaks falling down ravines, justifies this decision. In addition, the demand for a large number of blood and urine samples to be transported back to the UK in liquid nitrogen reinforced the decision to use helicopters due to the difficulty of having this carried by porters or yaks. The transport of the samples is a large proportion also of the additional freight costs, as dry ice was flown to Nepal, and specialised freighting had to be paid for to return the samples to the UK.

Research expenditure



Base Camp Manager's Report.

By Peter Smith

The key to success for any large Himalayan expedition is logistics. That's what I thought anyway, simple enough to say, but a somewhat more difficult thing to achieve. With our successful Everest 1994 expedition behind us, I thought I had the experience to make the Kangchenjunga 1998 expedition successful, others can be the judge of how successful.

Freight

Many individuals were involved in the gathering of equipment for this expedition, those that assisted me are too numerous to list. Those that sat on their backsides doing nothing were too few to worry about!

It was nearly twelve months before leaving for Nepal, that the I really started working on the logistics, if I told the full story it might well fill several pages of this report, so what follows is an outline. Most of the planning and organising was achieved by Simon Currin and Sally Glynn and I certainly owe them a great deal for their efforts and support.

It's their skills that made this expedition a success. The researchers had a difficult role in gathering all their equipment and making the deadline I had set for delivery to PIA cargo at Heathrow, indeed, some didn't! This was frustrating.

David Collier and myself moved 890.93Kg of equipment to PIA cargo. I had hired a lorry from a man in Basildon Essex! Never! Hire a lorry from a man in Basildon! It will, either break down or will have been stolen from its rightful owner the day before you pick it up! Our lorry decided that all the direction indicators would be sick as we left Heathrow, the return journey across central London and back to Essex man's house was challenging! I will not record here, the conversation I had with the alleged owner.

I left for Nepal on September 14, all was in place, or so I thought. I had arranged to pick up the 670Kg. of accompanied equipment from Queen Mary's in London at 12.00hrs and then meet all the group members at Heathrow at 16.00hrs. The researchers were still packing equipment at 15.45hrs. Frustrating is the word!

At Heathrow we were well over our 700Kg accompanied baggage allowance. Aer Lingus managed to check in all the personal equipment of the 13 group members until it was my turn. I was checking in 28 barrels of equipment, 700Kg in total however, unknown to me, Aer Lingus had directed my 28 barrels only as far as Karachi. Not for the first time Marion Lawrence, of PIA, came to the rescue.

One of the biggest problems for me during this expedition was the controlling of the individuals baggage allowance. Freight weight is easy to control you just hire a helicopter and lift it straight to base camp! Simple! I'm it? Individual's kit is more difficult and potentially very costly to the expedition. This caused of more arguments than anything else did and greater control must be exercised in the future. Possibly individual members should be made responsible for the excess baggage payments?

Readers of this report will, by now be thinking, this all sounds very negative and unprofessional. They should not. These are just some of the acceptable glitches that must be overcome. All the freighted equipment (see listings) and all the personal equipment arrived at base camp and returned back to the UK.

Satellite Telephone

It was my son, Tom, who introduced me to Star Communications of Gt. Yarmouth. Tony McCarthy and Zena who run the company proved to be very helpful and experienced. I would recommend that any future expedition contact Star Communications.

The satellite telephone system used on this expedition proved to be an excellent choice, The MASCOT-M system proved reliable when in use, it was used to locate emergency rescue helicopters, equipment and personnel calls to all the continents. The e-mail system worked very well through the satellite phone, this also proved to be extremely useful and important in co-ordinating rescues from Pangpema.

During the walk in to base camp power to the system was provided by an internal battery, the charging of which was to be via a small purpose made solar panel (not supplied by Star Comm.). This panel proved to be ineffective due to the damp and cloudy weather encountered during the walk in. On the few sunny days when the panel could have worked, it proved itself to be useless.

A satellite phone should be seen as an essential item for all future expeditions, especially with the forthcoming reduction in size, weight and cost.

Radios Communications

It took three weeks to find a company willing to supply us with a radio system. Having achieved this, it took a further nine weeks of negotiating to get the company to supply it free of charge. I was pleased! Twelve old, but excellent, Yaesu hand held radios, a base station, twelve nicad chargers, four rapid nicad chargers, all with new batteries and twelve AA cell adapters plus an excellent aerial rig. I was very pleased! The ever-faithful Tony Davis picked up the system and delivered it to me. I was even more pleased! All that was left was to get Denzil Broadhurst to check the system. I was very, very pleased. Two days later Denzil called to tell me the system is UHF, not the VHF I had specified, I was very, very pissed off! Four weeks before we were due to leave and we had no radio system!

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One of the many positive aspects of Medex is the support given to active members. One call to Simon Currin and the funds were released to buy a radio system. One week later I was negotiating with Waters & Stanton in their Essex office, an excellent company, with the most helpful staff I have ever met. I left having secured an excellent discount on an equally excellent radio system.

The Yaesu system we bought was as follows:

| | | |
|----|---|-----------------------------------|
| 12 | x | Yaesu FT 10R 2m. hand held radios |
| 1 | x | Yaesu FT 2500M base station |
| 1 | x | W-25AM power supply |
| 14 | x | super rod 2 Ariel |
| 12 | x | FBA-15 |
| 12 | x | CN-2 |
| 1 | x | CP-22E |
| 1 | x | MFJ 281 |

This system performed very well, but was not without some annoying faults. The main one being the on/off button on the hand held. It was all too easy to accidentally switch on and waste valuable battery life. Some of the radios easily accepted moisture into the battery box although this may have been more to do with the user than the radio. The effective range was good but not as good as I thought it should have been. Even taking account of the terrain I felt we should have reached beyond Kambachen with the aerial array and our powerful FT 2500M base station. We relied on the incoming groups to relay messages down the valley. This took place at 18.00 hrs. and worked very well but did interfere with radio communications between the climbing team. Any future expedition seeking to buy a radio communications system should contact Waters & Stanton at their Essex office. Credit where it's due, they were excellent.

Power supplies.

Generators v Solar

My dinosaur approach to supplying electricity at 5100m. worked well during our 1994 Everest expedition. We relied solely on petrol generators. I understood, and supported, the reasons for a solar energy approach to supplying power to run the allocated research equipment on this trip. However, I was not convinced that the Researchers and the Greens had got their calculations right. For that reason I purchased two Honda EC2200 petrol driven generators, cables, sockets, plugs and spares, also 260lts. of unleaded fuel. This would, at least, provide backup to the solar equipment that we had pre-arranged to buy in Nepal.

On our arrival in Kathmandu the solar equipment deal looked as if it would fail, the whole thing was a mess. The old dinosaur ordered extra unleaded fuel, proudly polished the two new generators and sat down with a smug grin.

Two days before we started our walk to base camp Gerald Dubowitz and Debby Miller arrived in Kathmandu. Gerald took on the role of sorting the solar equipment and achieved more in 8 hours than most had achieved in 8 weeks. He pulled the whole thing together and produced a solar system that supplied all our power requirements for the duration of the expedition. The generators were redundant! The old dinosaur licked his wounds and muttered things like "That Bastard Dubowitz"

I am in no doubt that the generators would have supplied a sufficient supply of electricity at a reasonable cost and with little demand on an individual's time. Solar equipment is very expensive, initial setting up is time consuming and can only be achieved by wizards such as Gerald.

In summary, the overall cost of generators i.e. buying, fuel, air freighting, porter expenses and the need to scrap them if used extensively makes a clear case for using solar equipment. The findings of the solar equipment used during this expedition will be reported elsewhere and will make interesting reading. Provided that alternatives to solar equipment (i.e. wind powered or the latest generation solar panels) can be procured, I believe that a solar system should be the first choice for future expeditions, providing, of course, you can get a Gerald Dubowitz to manage it!

Medical Report

By Paul Richards

(Permission has been obtained from patients named to identify them in this report)

Introduction

As everyone knows even only two doctors means at least three opinions so organizing medical cover for 62 people when half of them were fellow medics, some with extensive altitude experience, was a daunting task.

The call for volunteers was answered by Mukul Agarwal, Jackie Lawson the team pharmacist and Paul Richards. Ken Stewart also acted as advisor.

The climbing team of 7 left some weeks before the main group and organized their own medical cover. They had no doctor with them during this time but were OK as 2 of them were Vets !

With so many doctors most specialties were represented which enabled 'referrals' to colleagues for opinions

Medial Kits

The logistics of the expedition meant that personnel would be arriving in country in groups of about 10 in successive waves over a month, trekking via differing routes and all converging on base camp where science experiments would be conducted. They would then split into splinter groups with various climbing or trekking objectives before departing in their trek teams again at various times and by several routes.

This meant that each trek group would have to be independent and carry its own medical supplies. Seven medical kits were thus required of sufficient complexity to provide aid for illness or trauma in a remote environment. It was decided at the outset that the kits should contain sufficient Intravenous fluids etc to sustain a casualty for 2 days as evacuation was potentially slow especially in poor weather.

In addition to the expedition MO's who had overall responsibility each trek group therefore nominated one of their doctors to act as group medic. They were provided with a medical kit mostly from donations procured by the indefatigable efforts of Jackie Lawson from sponsoring drug companies. Such was the generosity of these companies that only £500 was required for the whole expedition to buy essential items that were not donated. It would have been impossible for the expedition to afford the required drugs without this support.

Each group MO then added favorite drugs or kit as per taste including strong painkillers with the appropriate Home Office license and expedition documentation. This arrangement worked very well and meant that equipment and drugs were available at the right place at the right time and in sufficient quantity which proved life saving as illustrated by the case histories below.

Additional stock and special equipment was stored at base camp

The kits were stored in 60 litre waterproof, sealed blue barrels, the more frugal managing to pack into 30 litre barrels. These were appreciated by porters who found them easy to carry, withstood the inevitable knocks and no fluids inside them froze despite night temperatures of minus 8 at base camp.

A small rucksack was purchased in Kathmandu as a 'grab bag' containing trauma kit and emergency drugs for rapid deployment in an emergency

In anticipation of a casualty requiring a firm back support as opposed to evacuation via porter basket or yak an inflatable Snowsled 'Airframe' stretcher was purchased. This was rigid when inflated weighed 10kg and packed into its own rucksack. Fortunately it was not required but provided some amusement in a quiet moment at base camp

In view of the outside risk of serious side effects of experiments at base camp this expedition was more comprehensively equipped than any normal expedition. Like many expeditions we had a Gammow bag but other special kit taken included lightweight Russian oxygen, anaesthetic drugs and spinal anaesthetic kit, two laryngoscopes with ET tubes and bags, rigid neck collar and lightweight splints. Access was also available to research resources such as haematocrit measurer, pulse oximeters in abundance and echocardiograph.

To reduce the size of the group medical kits and for convenience small personal first aid / medical kits were advised for the treatment of minor wounds, blisters, diarrhoea etc. Those climbing carried a small pocket kit of acetazolamide, dexamethasone and nifedipine.

A total of 7 medical barrels and 3 base camp barrels left Britain, a huge amount of equipment!

Most commonly used drugs were cough sweets/, paracetamol, ibuprofen, codeine, antibiotics especially ciprofloxacin and amoxycillin, Savlon-dry iodine spray, non-adherent dressings For the serious conditions: oxygen, dexamethasone, acetazolamide, 5% dextrose IV fluid. Some groups with foresight had supplies of 'medicinal' whiskey!

Preparation

Much of the expedition medical officer's role is of course enacted before the expedition even departs:

- anticipation of potential problems and hazards e.g. altitude, cold, burns, trauma etc
- preparing appropriate medical kit/drugs for these scenarios
- evacuation procedure
- assessing each member physical, psychological and emotional health in readiness for the inevitable stresses of expedition
- advising them of the potential hazards to which they might be exposed.

To this end a detailed medical questionnaire was completed by members when they attended the data collection weekend in London followed by a short discussion and examination. This enabled each person to discuss any particular worries and the medical officers to meet everyone in the team. The purpose was not to exclude anyone keen to participate as in a group expedition such as this each member was responsible for their own health and conduct but to anticipate and plan for any problems.

Information leaflets were supplied to each member to facilitate informed discussion with their personal physicians:

- Immunisation and malaria prophylaxis.
- Advice on infection avoidance-clean food/water etc.
- Advice on content of personal medical kit
- Evacuation procedure
- Sources of further information

In addition each member was supplied with a copy of *The High Altitude Medicine Handbook* by Pollard and Murdoch which explained altitude illness and hazards.

The following preexisting diseases were represented amongst the expedition:

| | |
|--|---------------------------------|
| Asthma | Knee Meniscectomy |
| Hay fever | Oesophageal Spasms |
| Eczema | Colitis |
| Psoriasis | Intestinal obstruction |
| Glaucoma | Irritable Bowel Syndrome |
| Raynaud's Disease | Appendicectomy |
| Coronary Artery Bypass | Teeth Problems |
| Hypertension | Hydronephrosis |
| Back Pain | Ureteric Obstruction |
| Spinal Vertebrae Fusion | Previous Depression |
| Spinal Discectomy/Laminectomy | Migraine |
| Assorted lower Limb Tendinitis. | Neurofibromatosis |
| Chondromalacia Patellae | Previous altitude illness |
| Anterior/Posterior Cruciate Ligament Repairs | Knee Collateral Ligament Repair |

Evacuation Procedure

Each group carried a radio which gave surprisingly good distance communication along the valley. As groups were staggered along the route messages could be relayed up or down the valley to communicate with base camp who had a satellite phone. This was used on 2 occasions to call the trek agent in Kathmandu for helicopter rescue. Other descents were effected on foot as below.

Treatment of Non Expedition Members

Part of the reason for the quantity of medical kit carried was the need to provide aid to the Nepali staff who were more than double our number. Other trekkers or expeditions also requested medical advice or help.

Treatment of local villagers was generally discouraged as it was of far too transient a nature to effect any real aid and risked undermining local health care systems or creating a dependency. It was important not to promote the belief that all westerners had medical competence as our experience of some other expeditions showed this to be far from the case. In example, one American trekking expedition frighteningly thought a legitimate use of its Gammow bag was to ease AMS headaches by giving each suffering member an hour in the bag each night so they could continue ascent next day. Fortunately no one deteriorated into severe mountain sickness!

However some groups found themselves treating quite a number of local people. Much of this was of an advisory health education nature but also helped in being able to identify those with definite illness and recommend they seek appropriate care from local facilities.

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Most of the complaints were mild with coughs, upper respiratory infections and dyspepsia common in porters with occasional minor injuries, joint aches and sometimes mild AMS symptoms. In locals treatment was often for minor wounds/grazes, skin infections such as impetigo or fungal rashes. Toothache was not infrequent and there were several diagnoses of migraine and scabies en route.

Advice was sought for a local woman with a difficult labour. Unfortunately without obstetric equipment little could be done but delivery was eventually successful with mother and baby well.

One porter slipped and impaled his foot on the welding rod frame of his back pack. Several dressings and a course of antibiotic later he made a full recovery and was able to recommence load carrying.

Dr Diana Depla an ophthalmologist held an eye clinic at the Health Post at Pale during the descent from base camp. Diagnoses were: Presbyopia, Cataracts, Old Iritis, Macular Degeneration, Episcleritis, Entropion, Allergic Conjunctivitis and Meibomiamitis.

The climbing team were concerned for one of their Sherpas with recurrent headaches and weight loss from when they had known him 4 years previously. On the walk in he had collapsed on the trail and took 2 days to recover. It transpired his weight had been steady for 2 years and he and his team were reassured that he gave a good history of migraine for which analgesia and anti-emetics were prescribed.

One young male porter looked ill with a persistent productive cough. His group was concerned and insisted the Sirdar send him down the hill to recuperate. This he did only to re-emerge 2 days later still coughing and carrying a load with the next group! His cough eventually settled. This demonstrated to us the hard life of the Nepali people, if this young man wasn't working he wasn't being paid!

One trekker from another expedition sought help from Geraldine Boocock in Ghunsa with rapid heart rate which sounded like episodes of SVT. She had seen her own doctor in Holland and been reassured. Seemed well but seen on the trail to Kambachen the next day very tired and breathless although no more SVTs. Advised to descend but apparently carried on to Kambachen before descending late that day.

Eli Silber was asked to see an elderly woman with osteomyelitis of the knee. He commenced flucloxacillin and strongly advised that she be carried to hospital.

Eli was also brought a young girl with alleged rectal bleeding. Careful examination with a chaperone was unrevealing and with no evidence of abuse. This did demonstrate possible cultural difficulties in taking on treatment of locals.

Health Problems Amongst Expedition Members

A note from Simon Currin (medical officer group 5):

"Incident at Jacqui Falls where Jacqui fell head first off log bridge over waterfall. Fell approx. 2m and water instantly turned red. The resulting wound was sutured with 3 x 3.0 silk under Lignocaine and adrenaline.

Day 1-5 of trek - 5 cases of traveler's diarrhoea. Initial advice that antibiotics were contraindicated was quickly undermined when we discovered that 1000mg stat of ciprofloxacin restored constipation and feeling of well being within 2 hours. Several other ciprofloxacin episodes were encountered later in the trek all with miraculous results!" (Other groups also noted diarrhoea in the first few days of trekking with a strong suspicion of infection at a restaurant halt on the bus journey en route to Basantapur! -PR)

This is one medical officer's list:

Coughs/upper respiratory infections were common usually treated with cough sweets and paracetamol. Some required antibiotics.

Sinusitis

Headache often altitude related requiring simple analgesia.

Dehydration Headache x 2 after day walk from Ghunsa (3300m) to 4185m on Lapsang La

Insect Bites

Leech bites- including one infected on shin requiring antibiotics

Chaffing of thighs from wet clothing- Vaseline now no longer recommended

Pulled Shoulder Muscle after minor fall

Intermittent Diarrhoea

Assorted Grazes

Subungual Haematoma- trephined

Migraines

Conjunctivitis

Burst toe- barrel fell on it!

Lacerated Thumb

Foreign Body in Foot

Raynaud's Disease. Nifedipine didn't help.

Insomnia- occasionally treated with Temazepam.

(Acetazolamide if AMS)

One episode of dyspnoea, nausea and slight cyanosis on waking the morning after arriving the previous afternoon in Base Camp (5000m). Rapidly recovered to normal on rising. Possible mild early pulmonary oedema considered. No further problems.

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Warren fell on the scree above base camp sustaining multiple grazes to his hands, and knees. At sea level these would have been sore but uncomplicated. At altitude healing was very slow and required regular dressing and iodine/chlorhexidine antiseptic.

Mountain Sickness

Most MO's saw members, porters or other non K98 trekkers with altitude related headaches and fatigue which usually required nothing more than paracetamol and rest and were well next morning. On occasion acetazolamide was used with good effect.

Those venturing onto the glacier to climb Ramtang reported lethargy, headaches anorexia and generally feeling unwell. Some took acetazolamide prophylaxis.

One child of 4 years was irritable, anorexic and vomited 6 hours after arrival at base camp (5000m). His parents thought it was just tiredness though he had been carried from Lhonak. Simon Currin noted the slightly puffy eyes and preferred a diagnosis of mild AMS, notoriously difficult to diagnose in young children. A small dose of acetazolamide (62.5mg) was promptly vomited but the child slept well, was observed through the night and was boisterously normal next morning.

An older member with Coronary Artery Bypass Graft developed AMS which responded well to acetazolamide. However he felt extremely tired and unwell whenever it was stopped so he did in the end take it all the way to base camp, 11 days there and during descent till over the Mirgin La.

We met a group of 10 'experienced geriatric walkers' (their words) at Ghunsa. Average age they told us was 74! Their plan to walk directly to base camp without a single rest/acclimatization day raised eyebrows and strong words of advice. However they strode purposely through our rest day at Lhonak and accomplished just that! We learnt later they had artificial support in the way of acetazolamide but still an achievement when the rest of us were puffing behind. "Grey and Gay" indeed!

Serious Illness

With so many people in such remote terrain we had thought that trauma would be our greatest worry. This was almost borne out when some of the landslides we had to cross in the rain were found to be still moving!

Gwillym was launched into free space when the edge of the path beneath his boot collapsed. Remarkably he was less traumatized than his team who saw him hanging upside down from his ankle fortuitously caught in the V of the only local and somewhat weedy tree which nevertheless halted his plummet to the gorge below.

1. Grand Mal Convulsion

35 year old Sherpa at Pangpema (Base Camp). Attended by Liz Bowen. 10 minute tonic/clonic convulsion ceased and post ictal by arrival. History by tent-mate of fits every 2-3months but on no medication. Smell of alcohol was from tent mate as Sirdar assured that the patient did not drink. Given Oxygen. Recovered and alert at 30minutes after waking. Letter given to his Sirdar for referral to the clinic in his home town of Taplejung.

2. ?Scorpion Sting

Pete Smith backed into the trees to take a photograph and suddenly experienced a severe pain in his forearm. It immediately swelled and he felt light headed and unwell. The group medical kit was summoned in case adrenaline required. Antibiotics were later needed and the arm continued to pain for some weeks. Having largely settled, it again became swollen and painful as Pete descended alone with a Nepali team ahead of the main expedition. Feeling unwell and fearing infection Pete accepted the offer of 'a lift to Kathmandu' in Doug Scott's helicopter from Ghunsa. Roger Mear had seen the wound and believed he had seen similar before with scorpion stings!

3. Alcoholic Hypoglycaemia

A Sherpa from a Japanese climbing team was discovered face down on the trail about 15 minutes from Base-Camp as Pete Smith descended. Pete radioed camp and Dr Mukul Agarwal ran down to join him. The man was unconscious (Glasgow coma scale 4) with laboured Cheyenne-Stoke breathing, central cyanosis and cerebral irritation but not fitting. Equipment had not yet arrived but pulse was thready and just palpable indicating a systolic blood pressure of at least 80mmHg. HACE was considered although less likely as it was known this man had probably been high and was descending. Nevertheless it was felt there were reasonable grounds for Dexamethasone 1vial (6.6mg) IV as unlikely to do harm. Likewise HAPE considered though no rales on listening with ear to chest. Nifedipine 20mg capsule was broken and the contents given sublingually. Equipment arrived and O2 saturation found to be 84% supporting non-altitude aetiology. Oxygen was given. Alcohol was detected on the patients breath and at this point the casualties friend arrived having left to seek help from his group who were ahead down the hill and was able to furnish a history.

It transpired there had been a major celebration the preceding night of a successful ascent (including the casualty) to 6900m. This had been followed by further Rakshi that morning before a hasty departure without breakfast. The patient had been fine till 30 minutes before the event when he had complained of feeling tired, woozy and had to sit down. He had then collapsed. Intravenous dextrose 5% was available and infused quickly. Within 10 minutes he regained consciousness and was talking within 15 minutes. At 20 minutes he wanted to descend but was persuaded to return to base camp where he was fed, was cold and shaky and spent the afternoon asleep. By next morning he was well and descended uneventfully to his group who had been informed of his progress by radio.

4. Typhoid

Malc was a fit climber who developed a headache en route from Ghunsa (3300m) to Kambachen (3920m) and went to bed that night with a fever and sweats. In the morning he had seemed better but over the next few days he became more unwell with lethargy, bitemporal headaches only transiently eased by ibuprofen, intermittent fevers and sweats. There were loose motions without blood on 1 day only. Initially the group MO considered malaria as there had been 1 or 2 days of walking at the start of the trek at altitude less than 1300m. As malaria risk was considered minimal in Nepal, in common with most of the expedition, no chemoprophylaxis had been taken relying only on bite avoidance. Therapeutic doses of quinine were commenced and taken for 2 days before stopping due to side effects of tinnitus and worsened nausea. At times he improved and was able to eat a little rice but by the 4th day had become a little confused on waking before again rallying. On day 5 he agreed to descend to Ghunsa as he felt so ill and despite thirst was unable to tolerate any local water due to the smoky taint from sterilizing it over open fires.

His group had mostly gone ahead to complete their mission to set up base camp in preparation for the main expedition in hot pursuit. Gill and Rick Havelly and Dr Mark Howarth stayed with Malc and radioed their intention to group 7 and myself at Ghunsa in a final check call before we departed. Unfortunately as first impressions that morning were that Malc had rallied again we had packed to leave and our kit was already moving up the trail. A decision was made for the group to continue and I would remain in Ghunsa. Ghunsa was a good place to make an assessment of the situation as the lodges were comfortable, the climate pleasant and helicopter access possible.

I spent an agreeable day in the sun catching up with all those little housekeeping jobs such as clothes washing, diary and boot waterproofing but as dark approached became increasingly concerned that the descent team had not arrived. My group had taken the radio making me feel strangely naked and alone in an alien land as the first day without regular contact with other teams. Before the trip I had asserted that it would be a better wilderness mountain experience without communications and regretted the necessity of being reminded about the modern world. Now I missed the chat over the ether.

Almost at the point of deciding to organize a party to search up trail, 2 figures came into distant view somehow distorted by the failing light into Lowry-like matchstick silhouettes. I descended from my vantage point to meet them. They were both hurrying and the tall figure seemed to stumble and falter somewhat. I took this for Malc who at that time I did not know well but only as they closed did I realize that it was Mark. He had rushed ahead of the others with Dowa his Sirdar to secure a comfortable lodge he had spied on the ascent through Ghunsa the week before.

I was struck by how exhausted he looked and as Gill and Rick arrived slowly with Malc I began to realize the strain this small group had been under.

Malc was as sick as I'd seen anyone look for a long time. Barely able to stand his words were an incomprehensible mumble. Gill helped him to bed where he rested and recovered enough to tell his story.

He had been to altitude before and had had altitude illness but this felt different. There had been no urine for 14 hours and that a small volume and dark. The others continuously urged him to drink but he had managed only 1 litre of water during the descent. I searched for clues. There had been no severe muscle or joint aches and in any case there was little Dengue in Nepal. Neither were there any rashes and although headache was at times severe he was not confused and had no meningism so encephalitis or meningitis were unlikely. Descent which would help HACE had made no improvement and in any case HACE would not explain the fever. He had had typhoid immunisation 2 years previously but had not had Japanese B encephalitis.

He was obviously dehydrated but declined IV fluids despite my assertion that in Britain he would be admitted to hospital and automatically have an IV and probably a catheter too. In the end I relented to trying oral re-hydration but if no urination by morning he would have to have fluids, IV or Rectally!

Malc was a model patient. He couldn't tolerate much re-hydration solution but stoically persevered with frequent sips of water when not dozing fitfully. I stayed with him that night hearing him groan with head pain but hoping that re-hydration would ease much of his symptoms and restore renal function. He could then safely be given blind treatment with antibiotics. I suspected he might have typhoid which often causes constipation before later diarrhoea. Headache, remittent fever and a pulse disproportionately slow compared with that expected with the fever supported this theory. What was happening to his chemistry could only be hypothesized, as remote from the technology and paraphernalia of modern medicine I realized this was how a Victorian Physician must have worked.

By the early hours he had passed urine with blood on testing and bloodless diarrhoea twice. Malc was not getting better and as dawn approached I knew he had to go home. Mark, looking better for sleep, agreed.

Malc is a tough no nonsense Yorkshireman and I approached our conversation with some apprehension expecting an insistence to persevere. However Malc simply replied "I want to be home with my family". Hearing this from him proved how ill he must have been feeling. We both knew that even if he stayed and recuperated he would not be fit enough to climb

Ramtang, his reason for being there. His expedition was over. Malc had done more than most for the Ramtang attempt and spent days procuring and packing what was considered some of the best high altitude ration packs we'd ever seen. The disappointment of unfulfilled ambition and months of planning was palpable

Fortunately base camp was now functional but although we could hear them with their powerful radio we could reach only as far as group 7 at Kambachen. They stayed to relay a helicopter request and other messages. Base camp then satellite phoned the Kathmandu agent and we made our way to the landing site at the appointed time. We should not have hurried. Time in any Asian country is an elastic substance and it was not until late afternoon that our anxieties about the steadily worsening weather and the possibility of a delay for another day were relieved by the helicopter dodging aials and prayer flags to land next to the army border post. Mark, able to speak Nepalese had selflessly volunteered to escort Malc to Kathmandu but in the end this was not necessary. Malc was loaded through a crowd of villagers, children and gesticulating policemen and accompanied by Dr Cave from the Kathmandu C.I.W.E.C. clinic was lifted into the fading day to the collective relief of the small group of friends below.

Tired and emotionally rung-out the 4 of us remaining in Ghunsa ate well in a lodge and toasted Malc with a few beers.

In Kathmandu typhoid was confirmed and re-hydration and ciprofloxacin started in Ghunsa were continued. Malc improved over the next few days and although feeling very weak was able to be flown to Britain to recover slowly at home. We later learnt that there had been an outbreak of Typhoid in the Dhankuta region through which we had traveled. Were some of those other diarrhoeas also typhoid in semi immune people?

5. Depression & AMS

Meanwhile in group 7 one member who had been suffering from sinusitis and respiratory infection not helped by the continual wetness of the late monsoon was feeling the effects of 2 weeks of disturbed sleep. He felt lower and lower and developed AMS symptoms on ascent to Lhonak. Alan Tate accompanied him to Kambachen but despite the lower altitude he did not improve and was evacuated by helicopter.

6. HACE / Dehydration / Exhaustion

Alan's evacuation from Tengkongma base camp is eloquently described by Mark Howarth elsewhere. Again he, Rick and Gill Havelly were involved in a rescue. Alan although initially walking strongly was exhausted and complaining of headache by arrival at 5500m. The group had acclimatized at Pangpema (5000m) and on day walks to 5400m. The ascent had been arduous and rapid with Alan carrying a heavy load with only 0.6l of water, the rest being unavailable in his climbing backpack with a sherpa ahead. They had eaten breakfast but only snacked for lunch pushing upwards. He later developed ataxia and confusion, vomiting Diamox and dexamethasone given, descent becoming imperative.

A retrieval team of Gerald, Ian and Paul with sherpas took the emergency medical pack and met the descending group at 5200m. The terrain was horrendous, loose and mobile rocks, the only thing worse being the descent as Alan was exhausted and required physical support on both sides. Secondary and tertiary casualties ensued as the group tired and slipped, Mark spectacularly falling in that resigned non-corrective way of the weary but fortunately spraining, not breaking his knee and Dawa bleeding briskly from lacerating his hand.

On contact Alan was ataxic and fading into unconsciousness at each rest. IM dexamethasone, and Oxygen improved him sufficiently to continue agonizingly slowly with frequent rests. We had joked that the sherpa answer to all crises is 'Tea?' but were grateful of the flasks of hot sweet resuscitation cached on the way up. Near midnight we reached the valley floor and found our emergency tents.

We had left one young sherpa with the tents agreeing to whistle as we approached so he could shine a light to guide us to the camp. Despite this arrangement he was found shivering in a tent. Only then did we remember that he was the one with chronic ear perforation and partially deaf!

Alan re-hydrated and slept though Cheyenne-Stoked a little but was much better in the morning. He was able to walk the relatively short distance with minimal height increment to the facilities and comfort of base camp.

7. HACE

A 27 year old lowland porter from the Trisuli region carried a load rapidly from Kambachen (3920m) to Pangpema (5000) with nothing to drink or eat en route. This is usually a two day walk plus rest day. Eli Silber, his group MO was called from the celebratory base camp firework party to see him as he complained of headache and vomiting. As Eli talked with him the patient rapidly deteriorated becoming confused, ataxic and semi comatose. IV 5% dextrose was initiated and 3 vials (19.8mg) of dexamethasone given IV. His oxygen saturation at 56% rose to 98% with this and Oxygen at 4 l/min. After 40 minutes in the Gammow bag at 1 1/2 PSI still on oxygen and monitored by Michael Schupp, anaesthetist, he was able to stand and walk a few steps with a wide gait.

Time had been bought but he still required descent. Accompanied by Eli and Paul he was carried piggy back by 6 of his porter colleagues in rotation effecting a more rapid descent than could have been achieved by stretcher. Cloth wicks in bottles of spirit gave surprisingly good light, unfortunately enough to hint at precipitous drops from the narrow paths.

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The casualty improved with height loss but was still unable to walk. We had thought to continue to Kambachen but in spite of warm wrapping, being carried he became very cold. Fearing hypothermia we halted in the lodge at Lhonak (4600m) at 1 15 am, nearly 3 hours after departure. Disturbing the slumbering porters a flurry of activity produced a fire and cups of tea. Ever attentive to their guests, even amongst all the excitement the sherpas still insisted Eli and myself administer to their sick colleague sitting on stools and not the floor.

Re-warmed in bed and no longer nauseated, his O₂ saturations were the same as ours, 84% in air and he was asking for food. Acetazolamide 250mg was given in quarters with soup and Eli wanted to give him another 8mg dexamethasone orally. As a neurologist he regularly used doses, he explained, 'large enough for an elephant or someone with cerebral oedema' I mentally ripped up the HACE protocol!

By 6.30am the casualty, still with some headache, was mobile outside but without ataxia though still had correcting maneuvers to heel-toe walking. Eli gave him another 4mg of oral dexamethasone 'to be sure'.

The ascending group 2, surprised to find us inhabiting their sirdar's tent, offered breakfast and I journeyed with them to Pangpema. Eli was joined by his group descending that morning to Kambachen and the porter walked with them under his own power.

Having exhausted the IV dexamethasone, Ronnie in Eli's group brought replacement with him from base camp which was strangely fateful as this later saved his own life.

8. Anaphylaxis_ (From Eli Silber)

We were down from the heights, a few days from Tapeljung and no major emergencies were anticipated. During one of those long, lazy lunch stops near a field Ronnie Robb came stumbling to us saying that he had just been bitten by something and was feeling strange. By the time that we had walked him to the shade he collapsed and was unconscious in anaphylactic shock with barely palpable femoral pulses. Fortunately our medical barrel was not too far ahead and our brilliant cook ran to retrieve it. Michel Schupp, Ben Mason, and I had established a line, administered oxygen, adrenaline, dexamethasone (the same replacement stock that Ronnie had brought down), two litres of intravenous fluids and antihistamines. The rest of the group were brilliant with warming, giving fluids, cracking ampoules and fighting off more insects. Within a short while Ronnie had regained consciousness. He was cold, itchy and miserable but his major concern was whether anyone had taken any photos (particularly with his Shell umbrella!).

I was gratefully able to abandon plans of a bush tracheostomy! Ronnie made an excellent recovery apart from an allergic rash which lasted a few days and now (hopefully) carries an adrenaline pen with him on all outings. I suppose that this little incident reminds us that trekkers are not only at risk of altitude problems in Nepal and that if one has kit, it should always be accessible to the party!

9. ?Fit ?HAPE

A 40 year old porter who lived at 2500 had spent the previous few months in Kathmandu. He had carried heavy tables from Kambachen directly to Pangpema with no fluids and not having eaten since the previous night. Roger McMorrow (medical student), investigating commotion in a mess tent, found him semi conscious and frothing pink bloody sputum at the mouth. Debby Miller joined Roger and they gave the contents of Roger's own climbing supply of 4 Nifedipine 10mg capsules sublingually. O₂ saturation was 76% but rose quickly to 99% with facemask oxygen from Ulrich's proprietary oxygen system.

He rapidly recovered, denied headache or nausea and seen to walk well. There had been no tonic/ clonic jerking witnessed nor incontinence but his friend did say that he had had similar attacks even at low altitude over the last 3 months. The patient denied this possibly through fear of loosing his job. Ulrich accompanied him down to Lhonak with his oxygen system and radioed later that all was well.

10. Gastroenteritis, collapse

A middle-aged man traveling alone collapsed nearby as the expedition booked into Kathmandu airport en route home. He was unconscious, jittery and obviously incontinent so first impression was of a fit. A quick search of his papers showed him to be French and no insulin or other medication was found on his person. He vomited, awoke groggily, and Gerald, revealing French as yet another of his talents, was able to ascertain that the man was not a known epileptic and had been traveling alone through Bangkok. He had just arrived in Kathmandu and felt unwell with a sudden urgency for the lavatory and so had rushed into the departures section in his search for the toilet then collapsed.

His trekking agent was phoned to collect him and the man slowly recovered. The airport authorities had ignored the situation which was by then under control till interrupted by an excited airport official. Jim who was staying on in Kathmandu was left to calm the situation but shortly the trek agent arrived and the Frenchman was able to walk to the car for transport to the C.I.W.E.C. clinic.

Dental Problems
(David Geddes - Dentist)

Problems arising included:

1. Pulp death and necrosis. No equipment for root filling or extraction. Required repeated amoxycillin 500mg and ibuprofen. This was a large molar filling just before departure and the obvious moral is to have dental work well before leaving in case of complications
2. Molar pulp death, necrosis, sub-acute swelling. Amoxycillin and ibuprofen pending root filling or extraction.
3. Sherpa: Two broken necrotic molars. Distracted by great pain with swelling and trismus. . Deep and well established infection responded slowly over 10 days to Amoxil 500mg and Ibuprofen and Dihydrocodeine. Extraction would have been indicated. Advised see dentist in Kathmandu.
4. Six more instances of broken teeth on hard foods, usually popcorn. Longest temporary filling lasted 20minutes! Advised avoid hot/cold/sweet or salty stimulants and treat in U.K.

Rudimentary dental kit consisting only of temporary filling material proved almost useless. Funds for a more comprehensive kit were not available but in view of the number of teeth related cases future expeditions may wish to carry more dental surgery equipment especially if a dentist is in the party.

Popcorn does not 'Pop' properly at altitude and was the source of much dental misery. Nepali muesli also contained sharp splinters of 'wood' which lacerated at least one gum. Beware!

After the Expedition

Some medical kit was donated directly to the health workers at Ghunsa and Phole. The rest was donated to the British Nepal Medical Trust with which Don Patterson has a long relationship, for distribution to their clinics throughout Eastern Nepal. In this way we could be sure that the maximum use would be made of them

Some expedition members had health problems continuing after return to Britain and required further advice. Letters were sent on the request of patients to General Practitioners detailing problems and treatment in Nepal.

Notes and recommendations for future expeditions arising from the above

1. Lack of water and rapid ascent was a feature in several of the altitude illness emergencies. This largely seemed to be related to the attitude of the Sirdars, some pushing their crews harder than others. The good Sirdars ensured plenty of brew stops and reasonable distances appreciating that lowland porters were just as much at risk of AMS as anyone else. It is recommended that trekking groups ensure their staff are aware of altitude illness, the need for slow ascent and that they all carry water bottles. Bottles should be issued to those without.
2. Medical kits are useful only if accessible. Ronnie was lucky that his group medical kit was nearby. Often the porter carrying it is way ahead or behind the group who themselves can sometimes be strung out along the trail. From my own experience it is just about impossible to keep the medical kit porter with the group. Some MOs may decide to carry a few items of essential kit on their person but what is essential kit? Essential drugs are those you need right now and that depends on the nature of the emergency. It is impossible to legislate for every eventuality.
3. Westerners treating locals should be careful not to undermine local health care services. They have a duty to ensure the treatment given is correct. A villager may ask successive groups for help and receive several different treatments such as serial courses of antibiotics. Leaving a note with the patient detailing the treatment given would help avoid later travelers giving conflicting medication
4. Many Westerners venturing to altitude need educating themselves re the risks and treatments of AMS.
5. The carriage of intravenous fluids was debated when the medical kits were constructed and packed in case of trauma and haemorrhage or severe dehydration. They were extremely useful and it is advised that taking some IV fluid on remote wilderness expeditions is considered.
6. Some other expeditions allowed sick members to descend accompanied only by Nepali staff with whom they often couldn't communicate. This is risky if the casualty deteriorates in addition to the poor morale of having no companion who speaks their language. Better that another team member also travels with the casualty.

**Pharmaceutical Supplies
By Jacqui Lawson**

Below is the complete list of pharmaceuticals procured free of charge by Jacqui Lawson. A few additional drugs were purchased to supplement the below. These included certain Injectable cephalosporins, controlled drugs and iodine. Further Ciprofloxacin was obtained by group medical officers. As mentioned elsewhere all unused pharmaceuticals were distributed to either the British Nepal Medical Trust or the Clinics at Ghunsa and Phole.

| | |
|---|---|
| 1000 Amoxicillin capsules 250mg | 48 Triangular Bandages |
| 200 Amoxicillin capsules 500mg | 6 x 25 Knitted viscose bandages |
| 1000 Acetazolamide tablets 250mg (<i>Diamox</i>) | 50 <i>Mepore</i> low exudate dressing 9 x 10cm |
| 500 Chlorpromazine tablets 50mg | 30 <i>Mepore</i> low exudate dressing 9 x 20cm |
| 1 x 56 <i>Largactil</i> tablets 25mg (Chlorpromazine) | Various dressing(e.g. <i>Tielle, Release, Inadine, Topper</i>) gloves, sutures, |
| 20 x 10 <i>Ciproxin</i> tablets 500mg (Ciprofloxacin) | plasters and cleansing wipes supplied in quantity. |
| 30 x 30 <i>Clarityn</i> tablets 10mg (Loratidine) | |
| 1000 Co-codamol tablets | 24 x 30g <i>Savlon</i> cream |
| 2000 Codeine tablets 30mg | 24 x 50ml <i>Savlon Dry spray</i> |
| 14 x 30 Dexamethasone tablets 0.5mg | 24 x 100ml <i>Savlon Wound Wash</i> |
| 20 x 50 <i>Decadron</i> tablets 2mg (Dexamethasone) | 24 x 250ml <i>Savlon Antiseptic</i> |
| 100 Diclofenac tablets 50mg | |
| 500 Dihydrocodeine tablets 30mg | 12 x 2.5cm <i>Micropore</i> tape |
| 100 Doxycycline capsules 100mg | 24 x 1.25cm <i>Micropore</i> tape |
| 1000 Flucloxacillin capsules 250mg | |
| 500 Co-Amilofruse tablets 40/5mg | 100 x 2ml <i>Plastipak</i> syringes |
| 24 x 60 <i>Gaviscon</i> tablets | 100 x 5ml <i>Plastipak</i> syringes |
| 1000 Ibuprofen tablets 400mg | 100 x 10ml <i>Plastipak</i> syringes |
| 10 x 100 <i>Maalox Plus TC</i> tablets | |
| 200 Mebeverine tablets 135mg | 100 x 21G ⁺ x 1 1/2" <i>Microlance</i> green needles |
| 2000 Metronidazole tablets 400mg | 100 x 20G <i>Venflon</i> winged and ported cannulae |
| 8 x 14 <i>Flagyl</i> tablets 400mg (Metronidazole) | 100 x 2.6mm Administration sets |
| 1000 Nifedipine capsules 10mg | |
| 2000 Paracetamol tablets 500mg | 20 x 1litre Normal Saline |
| 1000 Penicillin VK tablets 250mg | 20 x 1 litre Dextrose 5% |
| 10 x 56 <i>Phenergan</i> tablets 25mg (Promethazine) | 20 x 1 litre Saline 0.9%/ Glucose 5% |
| 500 Trimethoprim tablets 200mg | |
| 12 x 100 <i>Senokot</i> tablets (Senna) | 6 x 10 x 1ml Adrenaline 1 in 1000 amps |
| 10 x 84 <i>Stemetil</i> tablets 5mg (Prochlorperazine) | 3 x 10 x 1ml Atropine 600mcg |
| 7 x 7 <i>Suprax</i> tablets 200mg (Cefixime) | 1 x 10 Chlorpromazine injection 2.5% |
| 50 <i>Voltarol SR</i> tablets 75mg (Diclofenac) | 2 x 10 Frusemide amps 10mg/ml amps |
| 15 x 28 <i>Zoton</i> capsules 15mg (Lansoprazole) | 20 x 5 <i>Lasix</i> amps 20mg/2ml (Frusemide) |
| 15 x 28 <i>Zoton</i> capsules 30mg (Lansoprazole) | 25 x 2ml <i>Decadron</i> injection 4mg/ml (Dexamethasone) |
| | 20 x 10ml <i>Ketalar</i> injection 100mg/ml |
| 24 x 30g Hydrocortisone cream 1% | 10 x 10 x 2ml Lignocaine 2% |
| 20 <i>Voltarol Emulgel sample packs</i> (Diclofenac) | 10 x 10 x 5ml Lignocaine 2% |
| 1 <i>Metrogel</i> (metronidazole) | 20 x 10 x 2ml <i>Oruvail</i> inj. (Ketoprofen) |
| | 10 x 5 x 1ml <i>Stemetil</i> injection (Prochlorperazine) |
| 4 x 20 <i>Electrolade</i> sachets (ORT) | 30 <i>Voltarol</i> amps (Diclofenac) |
| 3 x 6 <i>Electrolade</i> sachets (ORT) | 10 x 10 x 2ml WFI |
| 11 x 4 x 10 <i>Dioralyte</i> sachets (ORT) | 10 x 10 x 5ml WFI |
| | |
| 6 original packs of <i>Albustix</i> | 24 x Betnesol N eye/ear drops |
| 6 original packs of <i>Clinistix</i> | 24 x Betnesol N eye ointment |
| 2 original packs of <i>Uristix</i> | 24 x 13.5ml Opticrom eye drops (Sodium cromoglycate) |
| | |
| 20 Beclomethasone inhalers 100mcg | 1 x 20 Amethocaine 1% Minims |
| 30 Salbutamol inhalers | 4 x 20 Proxymetacaine 0.5% Minims |
| | 2 x 20 Cyclopentolate 1 % Minims |
| 36 boxes of Decongestant pastilles | 1 x 20 Fluorescein 2% Minims |
| 36 boxes of Blackcurrant and glycerine pastilles | 2 x 20 Chloramphenicol 0.5% Minims |
| 36 boxes of Lemon, honey and glycerine pastilles | 2 x 20 Gentamicin 0.3% Minims |
| 36 boxes of Sore throat pastilles | 1 x 20 Phenylephrine 2.5% Minims |
| 36 boxes of Pholcodine pastilles | 2 x 20 Artificial Tears 0.3% Minims |
| | 1 x 20 Prednisolone 0.5% Minims |
| 25 x 5 <i>Steri-strips</i> 12mm x 100mm | |
| 25 x 5 <i>Steri-strips</i> 25mm x 125mm | 2 x 2.7L Portable oxygen cylinders with regulators. |
| 25 x 5 <i>Steri-strips</i> 3mm x 75mm | 1 x 1.7L Portable oxygen cylinders + regulator and giving sets |
| 25 x 5 <i>Steri-strips</i> 6mm x 100mm | |
| | |
| 80 single <i>Compeed</i> medium sized blister relief plasters | 10 x 100g Absorbent cotton wool BPC |
| 2 x 100 Gauze swabs BP (not sterile) | 20 Crepe Bandages BPC 5cm |
| | 20 Crepe Bandages BPC 10cm |

Power Supply

By Denzil Broadhurst

The 1994 Expedition had used a pair of petrol generators at base camp to provide all of the electrical power for the research projects. This system had worked satisfactorily, though the generators needed the spanner wielding of Pete Smith from time to time. One problem we did have was the noise from the generator – a steady chug-chug during the whole day disturbed the peace of such a remote location. This was made even worse when Andy Taylor fired the system up in the early hours of the morning to use the Amateur Radio system when atmospheric conditions were at their best.

In the view of a number of people we needed to improve the system – in keeping with the general aims of the organisation we should be more environmentally friendly and try to make use of alternative energy sources. Solar power, wind power, and water power were all considered – but in all cases there would be a need for power storage in batteries, and mains inverter units to provide the 230volts AC for most of the equipment. In addition, since a Research Expedition that couldn't run its research due to lack of power would be in a somewhat embarrassing situation, we still needed one or more petrol generators for backup.

Regarding the power requirements, the researchers were surveyed about 6 months before the start of the expedition to identify how much power they would require, and for how long during the day. In most cases the researchers had little idea of what pieces of equipment they would be taking. Effort was concentrated on identifying the high power devices, with a general figure put in for laptops and various rechargeable items. The guess at peak power was 1.3kW, with a daily consumption of 5kWhours over the 8 hour day. This would only be relevant when base camp was full, and sufficient people were around to run all the research projects for the whole day.

I had detailed Email discussions with a fellow Electronic Design engineer in the States, named Bob Pease, who works for National Semiconductor and writes a column in one of the electronic magazines. Through these discussions an overall design eventually emerged. The water turbine was ruled out due to problems with freezing of the water and little information regarding the size of the local stream. Discussions with another expedition, who had been in the area in 1997, indicated that there was typically little wind at base camp, hence the wind generator was ruled out. This left solar panels as the main power source, but the necessity of always having power meant we still needed a petrol generator to cover for when the weather was poor. The energy storage would have to be lead-acid batteries, even though the weight of these seemed excessive.

Through Bob Pease we made contact with Lotus Energy in Kathmandu, who provide solar power systems for buildings and villages around Nepal. We asked if we would be able to hire some of the equipment from them, and hence reduce the amount of gear to be bought and freighted from the UK. Although they had not done this previously, they agreed to consider the idea, and made a proposal based on the initial estimations of power requirements and system design.

The system consisted of a number of 12volt battery banks, a number of solar panels, two solar charge controllers, and two battery charger/mains inverter units. Should any part of this system fail, the remaining equipment could be reconfigured to provide an operational, but perhaps slightly downgraded system. The final part of the system was two petrol generators, (smaller than the ones we used in 1994), that we would bring from the UK. These would provide the capability of charging the battery bank in bad weather, or even providing mains power should the rest of the system fail. Experiences in 1994 with the reliability of the generators meant that two were taken.

The initial proposal from Lotus was based on providing a system for the peak loading, and besides being expensive, would have weighed in at a total of about 600kg. A lower spec system was proposed, which would cover the days with a lighter research loading, such that the generator could be used to give it a boost for a short period each day as necessary.

During these discussions Gerald Dubowitz, who was working in Nepal, was able to acquire some solar power equipment from an American expedition. This would give us a number of good quality solar panels – about 300W capacity, plus a number of sealed lead-acid batteries. Since we did not know the state of these batteries I arranged to acquire a number of similar batteries in the UK, which would be freighted out to Nepal. These batteries have the advantage of being leak-proof under normal circumstances – a useful feature when they might have to be carried by the porters.

The deal we sorted with Lotus was to provide a pair of charger/inverters, one solar charge controller, and one home lighting unit (solar panel, charge controller and 3 lights), and they would provide assistance to check out the system with our parts at their factory in Kathmandu. Mark Howarth was the first into Kathmandu, and checked the ex-American equipment out at Lotus, discovering that although the solar panels were fine the batteries were all dead except for one. Gerald arranged to purchase an additional 6 batteries from Lotus, which would replace the dead ex-American ones. These, however, were normal wet lead-acid batteries, and required secure boxes before they could be transported by helicopter.

Pete Smith, the base camp manager, arranged the purchase of two petrol generators in the UK, which were freighted out to Nepal along with much of the research equipment. All of the freighted equipment, plus the solar power equipment, was then taken into base camp, using a helicopter, in time to meet up with the first of the trekking groups. A small solar panel system designed for laptop computers, which Mark had obtained, was intended to be used by Pete Smith for recharging the satellite phone and laptop during the trek in. Unfortunately the weather was wet and dull for almost their entire journey to base camp, which meant it was unable to be used.

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Gerald was in the first group to reach base camp, so took charge of setting up the system, though he also had a number of items of his own which were used. The batteries were set up in two banks, one including all of the UK batteries (~150Ahr) and the other those bought from Lotus (~500Ahr). Each system used its own charger/inverter unit, with the majority of the panels connected via the charge controller from Lotus to the larger battery bank. The smaller system used Gerald's charge controller. The power for the research tents was provided from the main system, with the smaller system providing power for the satellite phone, its associated laptop computer, the base station radio, and lighting for the main dome tent which housed the system. The two generator were dug partly into a small earth bank, some distance from the tents, to keep any noise to a minimum, and mains cables run up to the dome tent.

In the normal operation of the main power system, any use was limited until mid-morning to allow a couple of hours of charge into the battery bank. Only those experiments that required darkness were run in the evening. By careful management and strict control of what was used and when, Gerald was able to run all the experiments using only the solar power from the end of September until Oct 19th. On this day an urgent message needed to be sent using the satellite phone, and the batteries had been discharged – hence the generator was run briefly.

Other than this occasion, and also when the last two trekking groups turned up at base camp, and were only going to be there for two days – hence the researchers needed to run “flat out”, did the generator have to be run. In total less than one tank of petrol was used - an amazing achievement considering how few solar panels we were using, though it was helped by the failure of a couple of pieces of research equipment which would have used a significant amount of power! The weather, in general, was very good allowing power to be generated by the panels every day.

When the base camp was dismantled the wet lead-acid batteries were donated to the clinic in Ghunsa and the Tibetan refugee clinic at Phole, to add to their solar power systems. The other batteries were returned to Lotus, who donated the market value equivalent in batteries to the Himalayan Light Foundation, who provide solar power systems for co-operatives in the villages. Half the cost of these systems is covered by a charity called the Solar Sisters Association, and the remainder is paid by the village. The rented equipment was delivered back to Lotus in perfect working order, and the deposit reclaimed. The remainder of the purchased equipment was freighted back to the UK to form the basis of a power system for future Medex expeditions.

Overall the system proved very effective, though it required Gerald to be fairly authoritarian with the researchers at times! We suffered no failures of any of the power system, so the redundancy plans were never tested, though the split battery system meant that even if the researchers ran their battery bank down completely, the other system could still run the radio and satellite phone. With the limited power from the solar panels it is unlikely that we made use of more than a fraction of the total capacity of the batteries, using the panels alone it would have taken 3 to 4 days with full sunlight, and no power usage, to charge them fully.

With more knowledge of the conditions at base camp a wind generator would probably have been worth taking – especially since it could continue to operate 24 hours a day (given suitable wind!). The organisation should consider acquiring one for the next expedition. The weight of the batteries was not a major problem on this expedition, since the helicopter was able to fly everything to base camp – but this may not always be the case, and on future expeditions we should be able to manage with less storage. The situation regarding duplication of equipment in case of failure will be a difficult decision, and will need to be reviewed carefully.

List of Hardware:

Solar Panels:

| | | |
|-----|-----------------------------------|-----|
| (4) | Non Flex Panels (Blue) | 40W |
| (3) | Larger Flexible Panels | 32W |
| (1) | Small Flexible Panels (8" X 1.5") | 10W |
| (1) | KISS Mercury 2 laptop power unit | |

Solar charge controller:

| | |
|-----|-----------------------------|
| (1) | TRACE C40 charge controller |
|-----|-----------------------------|

Battery charger/inverter:

| | |
|-----|--|
| (2) | TRACE DR1512E 1.5kW Inverter/Charger - 230 volt AC version |
|-----|--|

Lighting unit:

| | |
|-----|---|
| (1) | Complete 36Watt Lotus Solar Home System (includes 36Watt Solar panel and 3 lights but no battery) |
|-----|---|

Batteries:

| | |
|-----|--|
| (6) | 12 volt 94Ah TROJAN flat-plate lead-acid |
| (6) | 12 volt 24Ah Yuasa deep-discharge gel type lead-acid |

Generators:

| | |
|-----|---|
| (2) | Honda EC2200 2kVA Petrol fitted with 99101 2F5 0700 high altitude jet |
|-----|---|

In addition to this there was a solar charge controller, small 110volt inverter and 2 110volt fluorescent lights belonging to Gerald.



Ramtang and Wedge Peak from Kangchenjunga

Climbing Report (Ramtang and Tengkongma)

For two years prior to the Expedition we had campaigned with the Government of Nepal to be granted access to two peaks in the area of Kangchenjunga. Fortunately our attempt coincided with a government initiative to boost tourism in Nepal and 1998 was designated "Visit Nepal Year". In the end we were granted permission to attempt 3 peaks, Tengkongma, Dhromo and Ramtang. These Peaks were released as a special category and no peak fee was payable, neither was there any need to employ a Liaison Officer. We were, thus, in the very privileged position of being able to attempt mountains that had hitherto not been granted permits, and at minimal extra cost.

Below is a brief account of the ascents that were made. A full account of Chris Comerie's climb is included in his expedition report that appears later in this publication.

Detailed accounts of the trekking and climbing are included in the Personal Accounts section, and in Annabel's Diary.

The trek to Base Camp:

This was, for most groups, a very enjoyable experience. Most made the direct approach via Basantapur, Dhoban, Sukethon, Amjilassa and Ghunsa. One group chose the longer trek in via the South side of Kangchenjunga and then over the Mirgin La. The early groups were treated to a couple of weeks of monsoon conditions ensuring full exposure to leeches, landslides and slippery bridges. Unfortunately this meant that mountain views were in very short supply, however from October 4th onwards the weather for trekking was magnificent.

The approach trek ranges from an altitude of 640 metres to 5,130 metres and is full of variety and interest. Both approaches went through some very remote and rugged territory. Base Camp itself was perfect. Situated on a grassy meadow above the glacier with stunning mountain panorama it even had the benefit of an excellent and clean water supply. Its only drawback was the 100 metre slog up from the glacier which was always close to the hearts of those climbers returning, exhausted, from Camp 1.

Some groups trekked out via the Mirgin La and the South Base Camp to the airstrip at Suketar, the others took the direct route via Amjilassa to Suketar. All 70 members were flown from there to Kathmandu over 3 consecutive days.

Ramtang (6,700 metres)

The team shared the same Camp 1 as the Kangchenjunga team and this camp was established around the 10th October. We then avoided most of the icefall by scrambling up the lateral moraine to gain the upper glacier where Camp 2 was pitched at 5,900 metres. The serac band above Camp 2 was climbed more easily than anticipated and this led to an easy walk to the foot of the South Face of Ramtang. Most of the face was threatened by a high band of seracs and a formidable cornice so we elected to climb the shoulder leading to the Eastern Summit. This turned out to be an easy névé slope of around 55 degrees and about Alpine AD standard. Fixed ropes were put in place to safeguard descent and these were removed 5 days later. On reaching the Eastern summit we decided not to traverse to the main summit (which appeared only marginally higher) due to the presence of huge and dangerous double cornices.

Ascents were made as follows: 18th October Richard Weller, Ulrich Steiner, Nba Temba, Nba Temba and Sange Saila Sherpa. 19th October Roger McMorrow and Nigel Hart. 21st October Sally Glynn, Simon Currin and Sange Saila Sherpa. 22nd October Denzil Broadhurst, Chris Smith, Gerald Dubowitz, Nba Temba and Nba Temba. After early doubts about the difficulties and dangers of Ramtang the route proved to be relatively easy, objectively fairly safe, and most enjoyable. Ramtang is a fine vantage point for viewing the Kangchenjunga massif, and we had the great privilege of being the first team to receive a permit to climb this fine mountain.

Tengkongma (6,200 metres).

Two attempts were made on this rather undistinguished looking mountain. Mark Howarth, Jill and Rick Havelly, and Alan Tate set up a high camp on the mountain, but were forced to abandon their attempt later that evening when Alan developed severe AMS (probably HACE). Fortunately Alan made a full recovery with descent to Lhonak and then later to Ghunsa (3400 metres). Ronnie Robb, David Robb and Bruce Bricknell made a second attempt a few days later and retreated about a hundred metres from the summit when a heavily crevassed glacier confronted them.

Meteorology Report

By Jon Pote

On previous Medical Expeditions, neither weather recording nor forecasting was attempted. Therefore, at the request of David Collier, I purchased a Davis "Weather Monitor II" for £500. This user-friendly device records temperature, humidity, and barometric pressure. With external sensors, practical only at fixed camps, i.e. Pangpema, external temperature and humidity, wind speed and direction, dew point and wind chill factor could be recorded. A weather diary was also kept.

Although the manufacturer's specification only claimed ability to read down to 880mB, in fact the instrument gamely carried on down to 550mB, finally refusing to read pressure after a single figure at Pangpema. All other indices were unaffected, and even the pressure came back on line on the first day downward bound.

Daily recordings were made on arrival at each camp, and used to confirm the height of that site. An hourly profile of all indices, dawn to dusk, was recorded on four separated days at Pangpema. These figures proved consistent

1998 was characterised by a late monsoon and an early winter, the worst combination for everyone, most especially for the climbers. Within this abnormality, the weather was found to be predictable, but the use of a sophisticated monitor added nothing to that which any fairly experienced mountaineer would deduce from experience.

There was (fortunately) no sudden severe storm that might have proved the worth of forecasting capability.

Expedition Statistics

By Simon Currin

Medical Expeditions recruited 65 paying members who participated in the Expedition for a variable length of time. The duration of the time out of the UK varied between 35 and 56 days.

The 7 members of Chris Comerie's Kangchenjunga Climbing team departed the UK in mid August and returned early November. Jo Argyle Robinson and Ian Campbell took their 4 children Rowan, Cameron, Sholto and Chris (aged 4,7,11 and 14) to base camp on a logistically separate venture.

Male 45/ female 20

Age of participants: 17 years - 69 years

Nationalities: 3 New Zealanders, 2 Germans, 1 Netherlands, 1 French

Occupations: Medical 38 (Doctors: 28, Medical Students: 4, Sports Physiologists: 4, Dentist: 1, Pharmacist: 1). Other occupations represented included, Accountants: 1, Teachers: 3, Engineers: 3

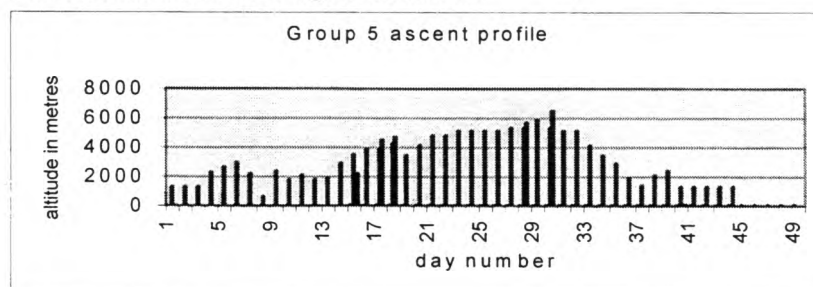
Freight:

- From UK, Accompanied 1,000kg, Unaccompanied 2,000kg
- By helicopter 2,800kg
- Excess baggage on trek 1,000kg (mainly people exceeding their personal luggage allowance).
- Return freight from UK, Accompanied 1,000kg. Unaccompanied 2000kg (includes transport of dry ice and liquid nitrogen)

Fuel. Two hundred litres of petrol were taken to fuel the generators. Only a few litres were used thanks to the success of the solar power system.

Typical Ascent Profile

As can be seen from the graph below most groups enjoyed a very lengthy ascent profile. This was not only highly desirable but was also inevitable due to the extremely remote location of Kangchenjunga's North Base Camp. Although altitude related illness occurred amongst our members I am delighted to report that only two failed to reach Pangpema. Both of those who failed to make it did so because of other illness not directly related to altitude. This is in stark contrast to other commercial treks that follow rigid itineraries and have a much higher attrition rate.



Donations by Medical Expeditions

Drugs

Clinic in Ghunsa. Most of the dressings and a large amount of simple medications were donated to the health clinic in the sherpa town of Ghunsa. Being staffed by a solitary health worker it would not have been appropriate to donate the more sophisticated preparations to this clinic.

Clinic in Phole. A similar donation was made to the Tibetan Refugee Health Clinic at Phole.

British Nepal Trust, Taplejung. The bulk of the left-over medication was delivered to the British Nepal Medical Trust Clinic at Taplejung. Don Patterson, a B.N.T. trustee, had arranged for the pharmaceuticals to be collected from there and taken to Biratnagar, where they were to be divided and distributed throughout eastern Nepal. The B.N.T. specialises in distributing medication appropriately thus ensuring that the more sophisticated, and potentially dangerous, substances only end up in the hands of those qualified and able to prescribe them.

A great deal of pharmaceuticals was disposed of via the above routes and this proved a great improvement over the clumsy way we handled this on Everest in 1994. On that occasion the bulk of the 9 barrels of medication destined for the Kunde Hospital never reached its destination. We can only assume that much of it ended up being traded inappropriately in the bazaars.

Batteries

The lead acid batteries used at Base Camp were taken by helicopter (to avoid the risk of potentially dangerous spillage) to Ghunsa. Here they were donated to the Ghunsa Clinic and the Tibetan Refugee Clinic. Gerald Dubowitz, our solar expert, supervised their installation.

The gel batteries were taken back to Kathmandu where they were donated to the Himalayan Light Trust - a charitable organisation which installs solar electric systems in Western Nepal. The aim being that the community raises the cash to fund half the project and the Trust provides the training and the other half of the funding. Our batteries were specifically destined for the Sisters of Light project where the woman of the household is trained to maintain the system.

Individual's charitable fundraising

Some members of the expedition undertook to use their involvement to raise money for other charities. Such beneficiaries included: Macmillan Nurses, the British Nepal Trust, and the Friends of Selsey Surgery.

Incinerator Project

Mention is made elsewhere of the investment planned to provide an incinerator infrastructure for this fledgling trekking region.

Mount Everest Foundation

The Expedition received a grant of £900 from the Mount Everest Foundation that we were very happy to refund after the successful conclusion. The Mount Everest Foundation supports expeditions to attempt new peaks and unclimbed routes throughout the world. It also supports, from time to time, scientific expeditions.



Research at Base Camp

Research Summaries

By Annabel Nickol

We have recently undertaken an exciting research programme on an expedition to Kangchenjunga to tackle many issues relating to high altitude medicine. The aim has been in part to increase our understanding of the changes which take place in the body during acclimatisation to high altitude, and in part to carry out trials of drugs or training programmes which may help to enhance altitude performance or ameliorate troublesome symptoms. Our work has consisted of a welcome blend of fresh new ideas and the development of projects which were initiated during "Medical Expeditions" founder venture to Everest in 1994.

We have, once again, collected a wealth of data, and will be ever indebted to the great gusto and enthusiasm with which our volunteers threw themselves into the task of acting as guinea pigs, for those of us who wished to exercise them to exhaustion, measure their dwindling fat supplies, gaze into their eyes and give them ridiculously small pots to pee into in the cold of the night. I can confidently say that the scientific element of the expedition has been a tremendous success, not only due to the quantity of high quality research which was carried out in circumstances which most would admit were far from ideal, but also in terms of the friendships forged as we battled to overcome obstacle after obstacle and raced to meet our research objectives in the short time frame available. Outlined below is a brief synopsis of the work carried out. An archive of all abstracts and papers published will be compiled in due course.

This report would not be complete without a word of thanks to our tremendous Nepali staff who did their utmost to help us set up the research station at base camp, with special thanks from my team who received significant amounts of help to inflate a 3000 litre gas reservoir each morning using a foot pump!

AIRWAYS AND RESPIRATORY PROJECTS

A trial of the effect of two inhaled drugs, nedocromil sodium or salmeterol xinafoate, on the cough threshold of subjects as they travel to high altitude.

Sarah Bakewell, Nigel Hart, Kate Wilson, Roger McMorrow, David Collier, David Williams and Peter Barry.

Debilitating dry cough is common at altitude and the cause is unknown. The cough threshold to inhaled citric acid was measured at sea level, and subjects randomised into 4 groups. They received a nedocromil, serevent or placebo (inactive) inhaler, or no inhaler. They were asked to use the inhaler for 2 weeks prior to departure and for the duration of the trek to 5000m. We aimed to measure cough threshold on arrival at 5000m and again after acclimatisation.

Results were obtained from 13 people taking tilade (nedocromil), 10 taking serevent (salmeterol) and 22 controls (placebo or no inhaler). A reduction in cough threshold was shown in the control group at altitude (ie they coughed more easily). This was not seen in the nedocromil or serevent groups.

Although this implies nedocromil and serevent are beneficial in preventing high altitude cough, it is not proven statistically as there were too few subjects.

We also asked participants to record coughing at night using a voice (or cough and other interesting noises!) activated dictaphone. We have had much fun listening to these tapes, and are currently analysing the results.

Intermittent moistening of the nasal passages as a method of reducing impairment of nasal function which occurs at high altitude. Kate Wilson, Sarah Bakewell, Roger McMorrow, Nigel Hart, David Collier, David Williams and Peter Barry.

The functions of the nose (warming and humidifying inspired air) are reduced at altitude, possibly due to the lining of the nose drying out. We investigated whether moistening the nose with saline would maintain nasal function. 15 subjects were given nasal sprays to use four times a day during the trek (treatment group). Nasal function was tested at sea level and at base camp in these and 25 "control" subjects who did not use sprays. We tested nasal function by measuring "saccharine time", placing saccharine at the front of the nose and timing how long it takes to reach the back of the nose where it is tasted. Saccharine times were longer at base camp compared to sea level in both groups, (ie nasal function was reduced) with times for control subjects longer than in the treatment group (8.2 compared to 7.4 minutes). However the difference between the groups was not enough to be statistically significant. We have demonstrated again that nasal function is reduced at altitude and our results support our hypothesis that nasal moistening may prevent this. Further studies are planned...!

Changes in Airway Responsiveness induced by chronic exposure to cold or hypoxia

Nigel Hart, Roger McMorrow, Kate Wilson, Sarah Bakewell, David Williams and Andy Pollard.

Bronchial responsiveness, or how much the airways constrict, is increased in asthmatics on acute exposure to cold and hypoxia. In normal people changes in bronchial reactivity are minimal with acute exposure to these stimuli, however, a recent study of elite cross-country skiers suggests that individuals who are exposed to breathing large volumes of cold air over a prolonged period of time may develop asthma. It has also been shown that normal subjects experiencing weeks of hypoxia at

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high altitude develop a chronic cough of unknown aetiology which may reflect changes in bronchial reactivity due to hypoxia.

A study was designed to look at the changes in bronchial reactivity associated with:

1. Chronic exposure to cold and hypoxia
2. Chronic exposure to cold without hypoxia
3. Acute hypoxia

On K98 we carried out the first arm of the study looking at the changes associated with chronic exposure to cold and hypoxia.

Fifty-one subjects were recruited from the members of K98 for this study. The subjects were studied at sea level, on arrival at 5000m and again after acclimatisation. We were able to collect paired data for 38 subjects. The study involved the delivery of increasing doses of histamine to the airways using a handheld ultrasonic nebuliser (Sonix 2000, Clement Clarke International, Harlow, UK). After each dose spirometry was carried out measuring partial and full flow volume loops using a micro-spirometer (Micro Medical, Kent, UK). Histamine challenges were stopped if the FEV1 (maximum amount of air that can be breathed out in one second) dropped by 20% from the saline control value. Some of the data has already been analysed and has been accepted as an abstract for the "Hypoxia '99" conference.

There are plans to complete the other two arms of the study in the near future. The effects of chronic cold will be studied in a trip to the North Pole in April/May and a study is being planned for acute hypoxia in a hypobaric chamber in the UK.

With thanks to the National Asthma Campaign and Micro Medical UK.

Respiratory Infections in High Altitude Trekkers.

Lance Jennings, Warren Dellow, David Murdoch and Andrew Pollard

Respiratory symptoms of rhinorrhoea (runny nose), cough and sore throat are common among high altitude trekkers in Nepal, affecting most adults. These symptoms frequently disrupt normal daily activities and are associated with a higher incidence of acute mountain sickness. Whether these symptoms have an underlying infectious cause has not been determined.

To investigate this, daily personal recordings of respiratory symptoms and of acute mountain sickness were made by approximately 80 Medex Kangchenjunga 1998 Members (70 Trekkers and 10 Climbers), over a four to seven week period. Samples for respiratory aetiology studies were also obtained. Serum samples before and after the trek were obtained from 60 members, and stored in Kathmandu at -20°C. Respiratory secretions were obtained where possible from members with respiratory symptoms. Three groups (32 trekkers) were studied intensively with samples being obtained before (baseline) during and after the trek. A total of 169 per-nasal and throat swab samples were collected into virus transport medium, the cellular material was sedimented using a hand centrifuge, re-suspended in phosphate buffered saline, and spotted onto multi-well glass microscope slides and FTA Gene Guard System nucleic acid binding membranes. These samples were air dried, the slide samples preserved by fixing in acetone, then all samples were stored in airtight containers. Considerable difficulty was experienced drying the samples in the field during periods of high humidity which may impinge on the quality of these samples. Sputum samples were obtained from individuals developing productive coughs, air dried and fixed in acetone. Laboratory analysis of these samples using immunofluorescence and molecular (PCR) techniques to establish specific viral and bacterial aetiologies will be carried out in Christchurch, New Zealand.

Evaluation of a closed circuit breathing system for treatment of high altitude related disease.

Ulrich Steiner, R Fischer, K Voll and R Huber. Pneumology, Medizinische Klinik, Klinikum Innenstadt, University of Munich and EMS Inc., Erlangen, Germany. Mail to: Fischer, R., Ziemssenst. 1, D-80336 Munich

The closed circuit breathing system is primarily used for diving accident rescues. It comprises a tight fitting face mask, breathing bag, CO₂-absorber and carbon fiber oxygen cylinder. With an 2 litre oxygen cylinder, the system achieves continuous oxygen concentrations of more than 95% for 6 hours at normal atmospheric pressure. The system was tested on the expedition to look for tolerability and efficacy of the facial and nasal mask and at how effective it was at increasing arterial oxygen saturations with different flow rates. Its use in assisting active descent and durability under extreme climatic conditions was also tested.

It was found that this device is a safe and practical way to deliver high oxygen flow rates to patients suffering from hypoxia (low oxygen levels) at high altitude. The main advantages are its low weight (4.5kg) and longer life compared to conventional oxygen delivery systems.

Changes in the control of breathing which occur during acclimatisation to high altitude. Annabel Nickol, David Collier, Jim Milledge, Henriette Van-Ruiten, David Williams and Chris Wolff.

Many trekkers notice that when they reach a certain height their breathing becomes erratic, and may even oscillate in frequency until they have had time to acclimatise. Good performance at high altitude cannot take place until this process has taken place. We have looked at the way in which this control is achieved. There are many factors which are important in helping to control breathing, such as messages sent from muscles and joints when exercising or voluntary influence. At high altitude the low oxygen pressures upset the normal equilibrium, driving us to breathe more, in the process blowing off more carbon dioxide. We believe that it is this unusual situation which causes problems with control of breathing until the body manages to adapt.

There are two main groups of carbon dioxide sensors, so called "chemoreceptors": central chemoreceptors situated at the base of the brain, and peripheral chemoreceptors situated in the neck. It is this latter group which is particularly important in second by second control since it is in direct contact with the arterial blood stream. It is the function of these peripheral chemoreceptors that we are particularly interested in, since they are likely to be very important in accurate control of breathing.

To look more closely at peripheral chemoreceptor function we stimulated these sensors with small pulses of carbon dioxide. The timing of delivery of these pulses in inspiration is important, and may cause breathing to be stimulated more when the pulses are given early in inspiration than late. If this occurs it suggests that these receptors are working hard to help control breathing. We can therefore use this method to study peripheral chemoreceptor function, and see if their action changed during the process of acclimatisation. We studied our volunteers at sea level under normal conditions, and then using a hypoxic gas mixture with an oxygen level equivalent to that found at Kangchenjunga base camp. We studied them on initial arrival at base camp, and then after a period of acclimatisation.

We found that sensitivity of the peripheral chemoreceptors to the timing of carbon dioxide that was present under normal oxygen levels at sea level was abolished by acute hypoxia, but then gradually restored after a few days of acclimatisation to high altitude. This heightened sensitivity of the chemoreceptors may contribute to tighter control of ventilation and thus better performance following acclimatisation to high altitude.

Respiratory muscle function and training during ascent to high altitude.

Lee M. Romer and Alison K. McConnell. Sports Medicine and Human Performance Unit, School of Sport and Exercise Sciences, The University of Birmingham, Edgbaston, Birmingham B15 2TT, UK.

One of the important adaptations to high altitude that occurs, is an increase in breathing. A study was carried out to see whether training the inspiratory muscles (the ones that make you breathe in) of trekkers would improve their performance at high altitude. Volunteers were recruited into the study, and then randomised into two groups, the control group who did not receive any inspiratory muscle training and the study group who did. The two groups were well matched for respiratory muscle strength and endurance. Respiratory muscle strength was assessed using a portable hand-held mouth pressure meter for the determination of maximum respiratory pressures that could be generated. Inspiratory muscle endurance was assessed using an incremental inspiratory threshold-loading test. The perceptions of effort and breathlessness were assessed using ratings of perceived exertion for 6 min of bench stepping.

The training for the study group consisted of one set of 30 inspiratory efforts which had to be performed twice daily for a period of 8 weeks prior to departure on the expedition. The participants rated their sea-level breathlessness using a special scoring system. After the 8-week training period they rated their breathlessness at regular intervals during the ascent.

The results showed that the control group who did not undergo inspiratory muscle training demonstrated marked reductions in inspiratory and expiratory muscle strength at base camp compared to sea level. In contrast, the experimental group demonstrated slight improvements in inspiratory strength, although expiratory strength was still significantly reduced.

It appears that inspiratory muscle training reduces the decrease in respiratory muscle endurance at high altitude, as shown by the observation that the study group could continue the test for longer than the control group, and produce greater inspiratory pressures. Inspiratory muscle training may even prove effective in reducing the perceived magnitude of effort associated with ascent to high altitude.

CARDIOVASCULAR PROJECTS

Pulmonary artery pressure variation measured by Doppler echocardiography in healthy subjects at 4250m.

Gerald Dubowitz and Andrew Peacock. Pulmonary Vascular Unit, Western Infirmary Glasgow UK.

This work was carried out at Pheriche, and preceded the study on Kangchenjunga.

Low oxygen levels cause blood vessels in the lungs to constrict. At sea level this is often a good thing, e.g.: when a small bit of the lung is affected by pneumonia the blood supply to that area is reduced, and instead flows to another area where it can be well oxygenated. At altitude however, the whole lung is affected by low oxygen levels, and so high blood pressure in the



Research and breakfast on the trek

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arteries to the lungs (pulmonary artery systolic pressure or PASP) can develop. In many normal people who have a leaky tricuspid heart valve, PASP can be estimated using echo-Doppler cardiac ultrasound.

During a study based at Pheriche the relationship between PASP and the development of acute mountain sickness was examined. No correlation was found, which may in part be due to the low prevalence of mountain sickness amongst volunteers for the study. The delivery of oxygen during the test produced a significant reduction in PASP. It is hoped that further studies will increase our understanding of the relationship between the response of the blood vessels of the lungs to low oxygen tensions, and the development of acute mountain sickness or high altitude pulmonary oedema.

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Changes in lung water during ascent to 5500m.

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High altitude pulmonary oedema, or HAPE, occurs in its most severe form in between 0.6% and 2.5% of subjects ascending to altitudes of greater than 2500m. It occurs when there is an increase in interstitial lung water, ie: in fluid in the tissues surrounding the air sacs of the lungs. Sufferers may notice a relatively rapid onset of shortness of breath, cough, and lethargy, and if not treated it may even lead to death. Unfortunately the methods available to date to measure lung water have been either inexact or impossible to use in a mountain environment. A new technique was used to measure the amount of interstitial lung water which collects, and to measure whether the delivery of additional inspired oxygen made any difference to this. This study has generated a huge amount of data which requires complex analysis. This is to be carried out in the spring of 1999, and is so involved that it is being undertaken as part of a mathematics PhD!

The effect of chronic hypoxia on nitric oxide synthesis in man.

Professor Nigel Benjamin, Dr Pablo Forte, Dr Richard Weller¹, Dr Mukul Agarwal, Dr David Williams² and Dr David Collier³ Clinical Pharmacology, St Bartholomew's and the Royal London Hospitals' School of Medicine & Dentistry, London EC1M 6BQ, 1 Department of Dermatology, University of Edinburgh and 2 Department of Pathology, University of Liverpool.

We have recently shown that blood pressure in healthy trekkers and climbers increases during ascent to high altitude. This increase is greater than would be expected from the effect of cold alone. One possible cause of the greater blood pressures observed at high altitude is reduced synthesis of nitric oxide. Nitric oxide is a molecule that is made from the amino acid L-arginine, and has only been discovered in the past few years. It has been found to be very important in a number of processes such as regulation of systemic blood pressure, neurological pathways, cell differentiation and the control of infection.

A new technique was used in which an infusion of N15 labelled L-arginine was delivered, and then the amount of N15 excreted in urine over the next 36 hours was measured. This gives an indication of total body nitric oxide turn over. All the volunteers were studied at sea level prior to the expedition, and then at high altitude. The results have yet to be analysed, but if there transpires to be reduced nitric oxide turn over at high altitude, this may play a role in elevated blood pressures observed at high altitude.

Effect of high altitude on plasma endothelin-1 production in man.

Dr N L Cruden, Dr DE Newby, Professor D J Webb. Clinical Pharmacology Unit and Research Centre, The University of Edinburgh, Western General Hospital, Edinburgh, EH4 2XU

Endothelin-1 is a small protein molecule that produces profound vasoconstriction of blood vessels. It is produced by the endothelium (blood vessel lining) in response to various stimuli, including hypoxia, shear stress and changes in posture. It has been speculated that endothelin-1 may contribute towards raised blood pressure in the arteries supplying the lungs by causing vasoconstriction, and thereby lead to high altitude pulmonary oedema. The aim of this study was to measure circulating concentrations of endothelin-1 in a large number of trekkers participating in the Kangchenjunga '98 trip.

Cold fingers.

Henriette van Ruiten* and H. Daanen**

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When a finger is exposed to cold the blood vessels in the skin will start to constrict (vasoconstriction); this is in order to prevent heat loss to the surroundings. When the finger is exposed to an *extreme* cold environment however, like water of 0°C, the blood vessels will start opening again after the initial vasoconstriction, thereby allowing the temperature of the finger to rise. This process is called cold induced vasodilatation (CIVD). Cold induced vasodilatation is seen as an important protective mechanism for the occurrence of local cold injuries. The *higher* the finger skin temperature gets during the vasodilatation the *smaller* the risk of cold injuries.

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A reduction in CIVD is found during exposure to high altitude, which could explain why at altitude climbers suffer a lot from cold injuries of the fingers. The purpose of this study was to investigate whether the reduction in CIVD at altitude is caused by the cold or by the hypoxic *per se*? Both cold and hypoxia are known to reduce CIVD. Furthermore the mechanisms behind CIVD at altitude were studied.

The results have shown that CIVD is indeed reduced at high altitude. This cannot be attributed to the cold however, since core temperatures did not fall. Interestingly climbers who were studied after a period of acclimatisation showed a partial restoration of CIVD, indicating that a protective mechanism against cold injury to the fingers develops with time.

METABOLIC PROJECTS

Menstrual cycle abnormalities and the oral contraceptive pill at high altitude.

Debby Miller. Himalayan Rescue Association (HRA), Pheriche, Nepal. Correspondence : 25 Middleton Rd., London, NW11 7NR, UK

(This work was carried out at Pheriche and preceded a study of the influence of female hormones on acclimatisation on Kangchenjunga).

The combined oral contraceptive pill is commonly used at high altitude, not only as a contraceptive, but also for controlling symptoms of menstruation. The female hormones oestrogen and progesterone have been shown to increase breathing, and it is possible that use of the oral contraceptives may improve acclimatisation. It has been suggested that breakthrough bleeding may be a problem with the pill use at high altitude due to poor absorption, diarrhoea, or antibiotic use. There are theoretical risks of thrombo-embolic events (clots in the veins of the legs or lungs), which may be exacerbated by the fact that high altitude produced an increase in red blood cells which carry oxygen around the body, so making the blood thicker and more likely to clot. To date, there is no data to support this theoretical risk.

The incidence of menstrual irregularities in women using the pill at high altitude was studied. Volunteers were recruited from trekkers attending lectures given by the staff of the HRA clinic on altitude sickness, based at 4200m and asked to complete a questionnaire.

Approximately 1200 people attended lectures, 926 filled in questionnaires, 66% (610) males and 34% (316) females. It was found that use of the pill at high altitude is an effective method of controlling menstrual periods at altitude. However, irregularities may occur, especially if pills are not taken regularly. Although no cases of medical complications of pill use were seen, no conclusion can be drawn about its safety, as the increased risk, if any, would be very small.

Thanks to Himalayan Rescue Association for permission to undertake this study.

Anthropometrics on ascent to high altitude.

Sandra Green and David Collier.

Most people lose weight during a stay at high altitude. A study was carried out to record the amounts of weight lost by men and women during a trek to Kangchenjunga base camp. Detailed anthropometric studies were carried out on a number of trekkers, including fat fold measurements, and estimation of skeletal bulk. Measurements of impedance, a body's resistance to a small electrical current through it, allowed an estimate of fat and muscle composition to be made.

The new hormone leptin at high altitude: a key-parameter for the understanding of endocrine disorders at hypoxic conditions?

M. Tschoep, Neuroendocrine Unit and the Munich High Altitude Medicine Study Group, Klinikum Innenstadt, Ludwig Maximilians University Munich Germany.

In 1994 an obese-gene product, leptin, was described which is thought may be important in maintaining normal fuel and body weight. Development of specialist tests for the measurement of human serum leptin has made an immense number of clinical studies possible within the last 2 years. Due to those studies, the understanding of the role of leptin in the regulation of body weight and energy balance is much improved. It has been found that very low leptin serum levels are present in particular conditions such as anorexia nervosa, in which case highly sensitive method for measuring leptins are required. We have developed a highly sensitive technique for doing this.

It is known that at high altitude hormones of the reproductive system and growth hormone are altered. Furthermore impairment of reproductive function and reduced growth/final height in high altitude populations is well known. Leptin provides signals to the brain and several other parts of the body and hormone systems about sufficiency of energy stores of the body. It is therefore speculated that decreased leptin levels at high altitude could play a role in hormonal imbalances, which occur at high altitude. Leptin levels in a number of trekkers were measured at sea level prior to departure, and then at Kangchenjunga base camp. The analysis of these results is complex, and the results are still awaited.

Free-radicals and amino acid metabolism at high altitude, and their role in acute mountain sickness.

Damian Bailey and Mike Richards.

This project examined the potentially less beneficial changes that occur during acclimatisation to high altitude. We are particularly interested in changes in immune function and free radical activity which may be responsible for a number of pathological reactions that occur on the mountain, in particular the incidence and severity of acute mountain sickness.

There is some evidence which suggests that the reduced partial pressures of oxygen experienced at high altitude cause adverse changes in immune function, thus increasing susceptibility to contracting an infectious illness on the mountain and perhaps following return to sea-level. In light of these observations, we are interested in how plasma glutamine concentrations change during the trek because this amino acid is extremely important in maintaining "normal" immune function.

Free radicals are fragments of oxygen molecules with either positive or negative charges which can disintegrate DNA, destroy cell membranes and generally create havoc with the cells' basic enzymatic processes!!! A limited number of studies have also suggested that free radical-induced cell damage is increased at high altitude but no single study to date has measured these changes directly.

In this study a number of biochemical changes were investigated, such as free radical activity, antioxidant status and glutamine metabolism. These will be correlated against acute mountain sickness scores at altitude as soon as the analysis is complete.

SENSORY AND NEUROLOGICAL PROJECTS

The effect of high altitude on the autonomic nervous system in the eye.

Mark Howarth and Diana Depla

The effect of high altitude on the autonomic nervous system has not been extensively studied. The autonomic nervous system has two components - sympathetic (SNS) and para-sympathetic (PNS) - which usually have opposite effects. In the eye, the diameter of the pupil is controlled by the autonomic nervous system. The para-sympathetic nerves constrict the pupil in response to light and the sympathetic nerves dilate it in darkness.

Pilocarpine is a drug which mimics the effect of the PNS and therefore constricts the pupil. If the PNS supply to the eye is blocked, the pupil becomes more sensitive to the effect of dilute pilocarpine.

Measuring pupil reaction time is not easy as any light used to see the eye will affect the size of the pupil. We borrowed a portable infra-red scanning pupillometer. This uses infra-red light to measure pupil diameters in the dark ten times per second after a flash of light. We tested the machine in London on 40 Medex subjects. We then repeated this on 57 subjects soon after arrival at Kangchenjunga Base Camp before and after breathing oxygen. This was done again after a drop of dilute (0.1%) pilocarpine in one eye. The whole exercise was repeated again on 21 subjects who had acclimatised to high altitude for a week at base camp.

With several thousand readings to analyse it is too early for conclusions but we hope to prove whether hypoxia at high altitude influences the PNS.

We are very grateful to Peter Brock of Amersham Medical Optics for the loan of the Pupillometer and to members of Medex for their co-operation (in return for a welcome blast of Oxygen!)

Visual fields at high altitude.

Diana Depla.

The visual fields of trekkers were studied at sea level, on initial arrival at high altitude and then after a period of acclimatisation. The full results are yet to follow, but preliminary data suggests that peripheral vision is impaired on first arrival at high altitude. This seems to improve by breathing supplementary oxygen or following a period of acclimatisation.

Effect of altitude on the perception of vertical and horizontal and on postural sway.

Jim Milledge, Martin Rosenberg, David Collier and Gwilym Rivett.

These two projects continue work began on BMEME '94 into the effects of altitude on the function of the inner ear, eighth nerve and the brain processes involved with balance.

Both studies were conducted with base line measurements carried out before the expedition in London and repeated at Base Camp, in most cases within a few days of the subject's arrival. All studies were performed in the dark. In London this was in a darkened room and at Base Camp at night in a science tent.

For the first study the apparatus consisted of a rotating, lighted arm, 25 cm long in a metal frame. This could be controlled electronically by the subject who was instructed to rotate the arm to the vertical or horizontal. The rotation of the arm read out on an LCD display, in arbitrary units, visible to the researcher who recorded the result on a pro-forma. Twenty moves

were made by the subject for each run and the results calculated as the mean error, disregarding the sign. We studied 40 subjects at sea level and re-tested 24 of them at altitude. The results on these 24 subjects showed, on average, increased error at altitude. Although the increase was only from 1.3 to 1.9 degrees this was statistically highly significant. This is the first time this test has been used to study the effect of altitude on this function.

Sway was measured, as in '94, using an electronic postural sway meter or plate which fed into a computer. The sway was measured over a 30 second period under four conditions:- eyes closed; eyes open and fixated on a single light at the centre of a target; eyes open and un-fixated, the centre light being out and four lights at the periphery of the target being on; all five lights on. 41 subjects were tested at sea level and the test repeated in 28 at altitude. The results from these 28 subjects showed an increase in sway at altitude for each condition and this was statistically significant for all conditions except eyes open but not fixated.

Both studies confirm that the systems subserving balance and the perception of vertical and horizontal is affected by altitude hypoxia but leaves unanswered the question of whether the impairment is in the balance organ of the ear itself or in the brain.

Complications in the nervous system at high altitude.

Eli Silber

My research has involved assessing the effects of altitude on the nervous system.

Upper limb function / Co-ordination. Previous studies have demonstrated a reduction in upper limb function, in particular tasks involving fine motor co-ordination (such as finger tapping) at high altitude. There is debate as to whether these deficits persist upon return to normal altitudes. Studies to date have generally used been on small numbers of individuals and many have compared individuals to presumed "normal controls" rather than to themselves at sea level. The age range in other studies has been limited, few have assessed individuals over the age of 50 years and none have attempted to correlate changes in function with age or sex.

I have analysed matched pegboard results on 45 individuals who were tested at the data collection weekend and then again at base camp. The baseline data shows (as expected) those older persons have on average slower times than younger persons do. Men were also on average slower than women. When comparing baseline and altitude results, there was a significant slowing in test times. People over 50 had a significantly greater deterioration than did younger people. This may have important implications when planning trips remembering the large number of older trekkers we came across and Doug Scott's first ascent of Dromo aged over 50. I attempted to have all testing done within 24 hours of arrival at base camp. When comparing the results of people tested within 24 hours (about 2/3rd) with those tested at a later time, the people tested early had a significantly greater deterioration in testing times whereas those tested later did not. This emphasises the importance of adequate acclimatisation for both respiratory and neurological function.

Headache. Headache is a common problem experienced at high altitudes and is a fundamental feature of acute mountain sickness (AMS). The characteristics of the headache have not yet been well defined and the causes of headache are uncertain. We are unsure whether headaches are due to one major cause or, as in daily life to a variety of conditions.

The aims of this research were thus to evaluate the characteristics of headaches experienced at altitude. Because headaches of different causes have different characteristic clinical features, this may contribute to our understanding of the causes of high altitude headaches. I also wanted to assess whether any individuals are at particular risk of developing high altitude headaches, in particular whether there is a relationship between having a headache disorder (particularly migraine) in daily life and developing headaches at altitude.

At present, I have entered baseline headache data on most members of the group and still collecting outstanding reports of headaches whilst at altitude and hope to analyse the results soon.

Risks of AMS. It would be useful to identify simple clinical tests that predict a person's chances of developing AMS. The mechanisms of AMS are uncertain, should a risk factor be identified, this may contribute to our understanding of the mechanisms of this condition. There have been reports of a correlation between risks of AMS and the duration of time that an individual is able to hold his/ her breath as well as gag reflex (which makes some of us retch when we brush our teeth). I helped collect this data (remember the stopwatch and spatula) and am at present correlating this with AMS scores.

The use of Acupuncture in preventing Altitude Induced Headaches and Sickness.

Paul Richards

Acupuncture involves the insertion of fine needles into specific points on the skin in the expectation that they will alter body processes and therefore help or even cure disease. Incredulous one might think but several million Chinese over 2000 years of experimentation have localised these points and found them helpful. Initially sharpened slivers of bone, modern needles are now made of sterilised steel.

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Modern western medicine is now exploring acupuncture scientifically and finding that it is indeed effective. Good results have been shown with headaches including migraine and with nausea particularly sickness in pregnancy or from chemotherapy.

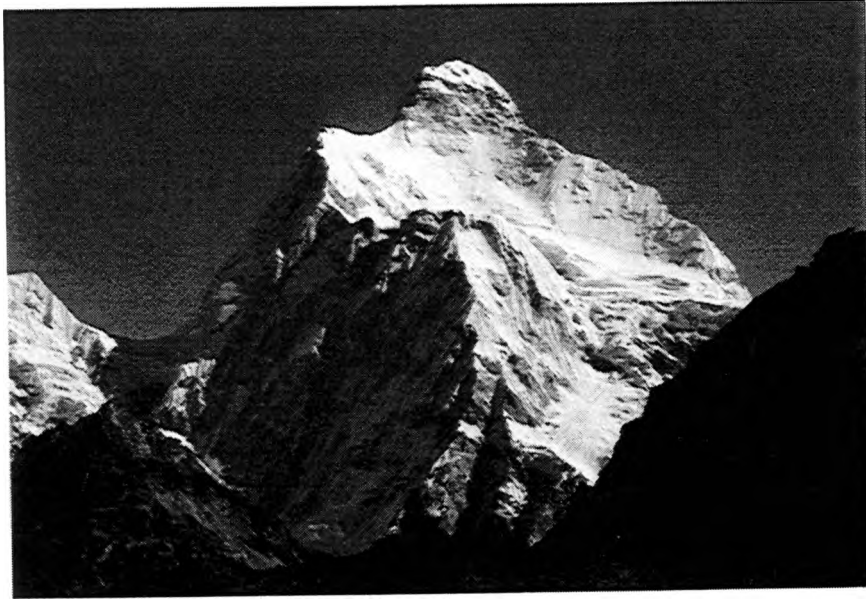
As headache and nausea are common symptoms of acute mountain sickness, it is plausible that acupuncture may therefore have a role in their treatment or prevention.

This study gave acupuncture to 4 pre-selected sites chosen as likely be effective, twice a week for 15 minutes, to 7 people during the ascent phase of the expedition. The severity of their headache and sickness was then recorded in a data book twice a day. Additionally further symptoms of infection and other common symptoms of AMS such as sleep were also recorded as the chosen acupuncture points also had immune stimulating or sedative properties.

The records of these 7 people were then compared to those taken by other members of the expedition who did not receive acupuncture to see if there was any difference in the severity of symptoms. Results were not available at the time of going to press but should be by summer 99.

This was a small study and thus unlikely to definitely prove an effect but may show that 'there is something in it' in which case a larger study would be advised. If acupuncture works it would be a useful non-drug preventative that might help avoid using current AMS prophylactic medication with its notorious side effects.

Future studies may examine non-needle acupuncture consisting of a small electrode touched to the skin which stimulates the points by passing a small electric current through them. If effective it would likely be more acceptable to mountaineers than needles and could be self-administered.



Jannu fro the Mirgin La

Environmental Matters

By Simon Currin

Taking a small army of mountaineers, trekkers and scientists into a remote mountainous region of Nepal will, inevitably, impact on both the local economy and the environment.

On Everest in 1994 we were extremely aware of the environmental issues and, as a result, took along our own team of environmental scientists. They published a very interesting report on the waste management problems that afflict Kathmandu and various points along the trail to Everest Base Camp. We went to extraordinary lengths to minimise our impact.

On Kangchenjunga I think we were less aware than we had been in 1994 and had not planned ahead how we would address various specific issues. Chris Smith, in her personal account, alludes to some of the errors of omission that we made and I am sure we were guilty of many more.

We were, of course, full of good intentions and stuck to the U.I.A.A. code of conduct but, like most other trekking groups, there were areas in which we failed to pay sufficient attention to detail. In future we should plan ahead and appoint someone to develop and implement an environmental policy.

Enough of the self-flagellation, Medical Expeditions has been able to set aside sufficient funds to make a meaningful investment in the waste management infrastructure of this area. Since our return we have been forming alliances with various local Government and charitable organisations to fund and implement an incinerator scheme in the Kangchenjunga region. Such schemes operate very successfully in the busy Khumbu and Annapurna areas. Tourism is already starting to grow in the Kangchenjunga region and an investment now may go some way to averting some of the pitfalls that have afflicted more trafficked areas.

I Hope to be able to keep members abreast of developments in this area through future newsletters.

Porter Welfare

Tourism is easily Nepal's largest earner of foreign currency and has become crucially important to many local economies. However, as tourism has developed it has not been accompanied by an improvement in the working conditions of employed porters. Kathmandu based porter unions are going some way to address this but there remains a huge gulf between the working conditions the permanent staff and those recruited casually along the trail.

As with the environmental issues I am sure that we were as guilty as most other trekking groups in not paying sufficient attention to porter needs. There is a fine balance to walk between exploitation and distorting the local economy but I am sure that addressing some specific issues would go some way to redress the balance. Adequate food, warm clothing, appropriate foot-ware and decent sleeping accommodation are not routinely provided to casual employees. Further more some of the health issues mentioned in the medical report resulted from porter's pushing their bodies too hard in our service.

Despite this tourism still provides a much sort after cash crop to supplement an even more meagre subsistence. If the balance is swung too far in the opposite direction then the traditional ways of making a living will be cast aside as more and more turn away from the land and move into trekking and tourism.

There is no easy solution but, in future we should try harder to address the question. Perhaps, in 1998, we were too eager to delegate environmental and welfare issues to our sirdars?

Annabel's diary - a complete chronicle of day to day events through the eyes of a member of the research team.

by Annabel Nickol

A Distant Dream!

It's that time again... as I enter my room it is with a rising sense of panic that I view the ever growing pile of "essential items" which must be compressed into a backpack, which clearly will NOT weigh less than the specified meagre allowance. For the past month the phone has never stopped ringing, keeping up with the flow of E-mails is like trying to hold back the sea, and the IN pile is always frighteningly large. Why don't I like holidays in Benidorm? Life would be so much simpler. Suddenly with a blinding flash this venture, which has seemed a vague and exotic dream for so long, has passed that threshold from dream to reality... at that dream phase all those thoughts of packing, cold toes at night and hard tent floors were somehow missed from the equation. But dreams are where it all starts... *"the dreamers of the day are dangerous men, for they may act their dreams with open eyes, to make it possible"*... a threat or a promise?!

I dreamt of Nepal ever since I chanced upon some dusty old books talking of its soaring peaks many years ago, and its jewel, part of that immense Himalayan chain of mountains stretching over 2,500 km running from west to east, pushed up towards the sky as two tectonic plates were thrust violently together. A country with such dramatic geography cannot help but produce fascinating people, as physical obstacles hold apart populations to evolve along separate lines, such as the southern people of the Tarai tropical plains and the agile Sherpas of the highlands.

That man can support life above 8000m, let alone put one foot in front of another and maintain motivation for going even higher, is truly amazing. By all intents and purposes it shouldn't be possible: at 8848m, the summit of Everest, the atmospheric pressure should be only 236mmHg. And yet by a lucky quirk of fate the bulge in the earth's atmosphere pushes the pressure up to 253mmHg, just enough to sustain the life of an elite climber who staggers his weary way to the top of such a majestic peak. A destiny achievable with a lot of good judgement, skill, and careful acclimatisation, and of course a lot of luck. A man, however fit, whisked from sea level to the summit without acclimatisation, would rapidly decline into a coma before departing this mortal frame. It is these facts that fascinated and inspired me in those formative years, and led me to begin that tortuous path of life which has led me to this merry band of scientists, in a quest to unlock the secrets of the body in this amazing process.

This venture is the second major undertaking of "Medical Expeditions". MedEx is many things to many different people: it has fulfilled its charitable remit of education and research in the field of high altitude mountain medicine admirably, with a number of educational symposiums, books and articles. Too many people die needlessly in the mountains from the effects of altitude and the harsh environment. Sadly some of these deaths would have been avoidable with better understanding and appropriate adjustment of trekking schedules. The more expedition doctors and trekkers who understand this, and put pressure on trekking agencies to organise safe trekking schedules, the better. Simon Currin, who had the vision of MedEx way back in 1990 before its first venture to Everest in '94, would say that the medical research is the magic formula that brings people from different backgrounds in contact. It is the "glue" which holds them together as they step into this amazing country of Nepal, in the hope of achieving something greater than a trek alone would bring.

The enthusiasm for adventure in the mountains, which was generated by the Everest expedition, just didn't die down, fuelled by many friendships formed through the good times shared. About one year on as everyone was settling down into work and "normal life" there was a growing, contagious "itchy feet" syndrome that spread slowly but surely. Besides, there was a little money left in the kitty, and it seemed a shame not to use all that expertise which had been built up by enthusiasts with no professional background in the trials and tribulations of organizing trekking for large groups, and variable amounts of experience of field research. After the success of our last expedition it was with some trepidation that we set forth again on a new mission, now with Sally Glynn at the helm.

This time we headed to the more remote and much less frequently visited mountain, Kangchenjunga. Was there a danger in trying to re-create something that had worked so well? Would people want to come to a place they had hardly heard of? It is hard to compete with an expedition to the highest mountain in the world after all... would its remote location further away from western influences inspire people? Kangchenjunga... the name itself sounds foreign and exotic. Many people will never have heard of it; to me it was only a name before we set our sights on its snowy peak. It literally means "the five treasures of the eternal snows". At the height of 8595m it boasts to be the third highest mountain in the world. Charles Evans, who led the first expedition to climb it in 1955, captured the imagination with his beautiful description of the view from Darjeeling:

"From the lawn the terraced gardens fall towards the distant Rangit river, and the eye, bridging the gulf of the valley, sees in the blue haze crest beyond crest of jungle-clad foothills rising towards the snows. There, forty-six miles away, is Kangchenjunga. Brilliant in sunshine, cold in shadow, it seems to float above the darkness of the valleys and the lower ranges, filling the north-western horizon."

Preparation and Planning

With Sally and Simon putting in a phenomenal amount of groundwork in all spare moments after work the momentum grew, and it seemed that this was really going to take off. The research led by Andy Pollard, Dave Collier and Jim Milledge also began to take shape, and the call for research proposals produced a good blend of well-recognised faces from the last trip, and fresh blood with new ideas. Attempts were made to tame this mish-mash of projects into some sort of shape, and select those which would complement each other, whilst editing out potential clashes which could be predicted to interact... no mean feat and World War III was narrowly avoided as over zealous scientists put forward their case! Disappointing to turn down some

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good ideas, but the main consolation is that should we ever be mad enough to embark upon another trip there will be no shortage of work to be done.

Evenings became increasingly taken up with applying for grants and pondering how to broach the subject of my requirement for three months unpaid leave out of my two-year medical rotation. Did they notice the small print on my CV mentioning the expedition when I applied for the job? Thankfully they couldn't have been more supportive: first major obstacle negotiated and I didn't even have to hand in my notice at work... phew! The next major undertaking before the trip was to gather base line data on all our expedition members. This took place in an enormous lab at Queen Mary and Westfield in London after many anxious weeks of planning how to move nigh on 70 volunteers through 20 research stations. Frenetic discussions went on to solve the conundrum of getting equipment in place, estimating how long each station would take, and avoiding potential interactions, not to mention keeping everyone amused in between tests. It is a reflection of the enormous support we have had that of 72 members of the expedition there were only a handful who couldn't make it to one of our two data collecting weekends, and all of them with good excuses such as being in New Zealand or such far away places!

The weekends seemed to go smoothly. Why I had been concerned people would be "bored" between tests? Due to a combination of David's tight and efficient time tabling, and some entertainment laid on, such as a quiz by Geraldine Boocock, a fantastic photographic display by David Geddes and some educational videos such as extreme climbing and "Mr Bean", all were kept fully occupied. It was also the last of many weekends for us to meet together and pore over maps and guide books and make the final plans. They were frantically busy weekends, but very productive, I can't believe there can be many organisations who have experienced such high intensity data collection!

To Kathmandu

The best and most redeeming feature of PIA (alias Pray In the Air or Pakistan International Airways) is the wonderful Marion Lawrence, who after her spectacular work in '94 feels more like a friend than the company agent. We had over 2000kg of delicate research kit that we needed to be reliably transported to Kathmandu. Marion negotiated a substantial free accompanied baggage allowance that made it worthwhile using PIA. David had weathered most of the burden of the task of gathering, packaging and transporting kit to Heathrow. To our surprise things started off by going pretty well. With Marion there to whip the staff into action and a somewhat over-officious man to attempt to get us and our kit in the right place at the right time (no mean feat!) our 500kg of accompanied research kit was checked through without too much ado... or so we thought until Pete noticed that it had only been checked through to Karachi.. AAaargh! Yes it did seem a bit too good to be true that it had gone so well! Added to that, boarding time was approaching and final members of the team bearing essential kit were still missing. Anyway, the mistake discovered in time was thankfully remediable, and although we had to forego our team beer we at least managed to do a sprint through duty free, relieving it of a few plastic bottles of gin and whisky, which, if they survived the journey without being drunk, would hopefully travel safely to base camp.

Aboard the plane I felt an enormous sense of relief: still much to be done, but none of it possible from the air... no phones, no beeps, no E-mails, no applications to write...! The journey is a useful time for mental transition from the world left behind to the venture in store. There was time to stop and reflect on what the next few weeks would hold. Our journey around the globe is so easy today in comparison to the mission into the unknown that those early explorers must have made. In spite of all that we have read and seen it is still hard to form a mental image of what the trek and mountain will be like. Those first men must have been brave indeed.

THE EXPEDITION

The Big City!

Kathmandu at last: vibrant city full of colour and noise; it has the smell of an adventure about to begin! As we made that first bus ride from the airport to the hotel my head was a whirl of different emotions... excitement to be starting this great venture at last after all those months to years of planning, and apprehension at all that is to be done. Our week here was pretty hectic, purchasing kerosene heaters for the mess tents at base camp and a ladder for our research, arranging freighting of equipment, and getting hold of liquid nitrogen for storage of blood and urine samples. I managed to do a bit of T-shirt and sarong shopping, but didn't venture out to any of the tourist spots... maybe there will be a chance at the end of the trip. It was a relief to leave Kathmandu at last and head out for the hills. We just about caught our flight to Biratnagar after a panicky scramble that must have caused our Kathmandu agent, Bikrum Pandey, to age considerably. Biratnagar is much lower than Kathmandu and so horribly hot. We then had a 6-hour mega-bumpy bus ride to Basantapur, which was thankfully higher up. Our first campsite was on a small grassy shoulder above the town... at last a cool breeze, a view of the hill and the sound of silence!

We have a superb trekking group. Pete Smith is going to be our base camp manager and can put his mind to solve any problem: he manages an oil terminal as his proper job so this must seem like small fry in comparison. Jim Milledge, an eminent retired chest physician, is a seasoned trekker who has taken part in many notorious expeditions including the Silver Hut Expedition. Gerald Dubowitz and Debbie Miller have recently worked at Pheriche running the health post on the trek to Everest, and then at Mount Hutt ski field taking care of the casualties. Gerald rapidly became known as "Indiana Gadget" due to his amazing ability to turn his mind to absolutely any technical problem. Between them they set up and ran much of the communications. Diana Depla, a long-term best buddy, is an eye surgeon in Newcastle. She will be running the high altitude ophthalmology projects, and was my tent mate on both this and the last trip. Henriette van Ruiten (Cloggie) is a refreshingly keen physiology post-grad student from Amsterdam with whom I am lucky enough to be working on our forthcoming



Sherpani

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research project. Last, but most certainly not least, is Miss Meriel Gillespie, a completely mad, hyperactive French teacher from South Wales. We tried to get rid of some of her boundless energy by making her "base camp hostess", a challenging task to keep these doctors and scientists in order, which she took to with great aplomb! We are the "advance party" who will go and get base camp set up. The rest of the trekkers and climbers are divided into groups of about ten each who will set off from the UK at staggered intervals, so making less impact upon the environment here.

Day 7: Sat 26th Sept Chirwa to Secathumb ~ Start to the day

Started the day with a baby clinic: one with an infected left thigh following an immunisation jab the previous week, and the other with a nasty discharge from his right ear.

The sun rose with great promise, just catching a distant peak and sending arrows of fire down its flanks, somewhat reminiscent of an alpine ski morning. We have settled down into a routine now with our marvellous Nepali staff... bed tea at 0600, warm washing water at 0615, pack up before breakfast at 0700 whilst they take down our tents and the porters set out with loads to avoid the gruelling heat of the day. The porters have two meals of Dahl bhat (rice, lentils and vegetables) a day, the first of which they have on the trail mid-morning, so they are keen to be off. Today it's porridge, omelette and chapatis for us. Gerald has a cafetiere coffee plunger and endless supplies of real coffee with him, which means that by the end of breakfast I am just about ready to face the world. Am very proud of myself for even attempting to issue medical advice before the caffeine has hit my brain this morning. We linger over breakfast savouring the bright new day, and allowing the other trekking group to get ahead of us so we won't be jostling for space on the trail.

We are following the Tamur Khola, a ferocious torrent of a river that whirls down over enormous boulders throwing up jets of white froth all the way to Kathmandu. Our Sirdar, Nba Temba, tells us that he has had "porter troubles". For some reason the Kathmandu porters are paid 150Ru (just over £2) per day whilst those hired further up the trail in Basantapur are paid 200Ru. They have been quibbling over money and threatened not to come any further. Nba Temba is calm and has things completely under control in spite of the fact that he has over 100 porters and additional kitchen staff in his charge. He has solved it by some means or other...they don't like us prying too much into their business. He is extremely fit and strong, and has summited Everest twice and worked with many of the world's current big names in mountaineering. He has been 100% reliable so far in everything he has promised to do and we are very lucky to have him. His 2nd I/C is also called Nba Temba and is built like a Greek God ~ taller and slimmer. He has summited Everest 6 times, and a number of lesser-known but more difficult peaks besides. I think they are brothers-in-law, coming from Kari Kola, a village not far from Lukla on the Everest trail.

The Lowland walk

The first week of our trek has been up and down over the hills at very modest altitude. The valley sides shoot steeply up either side of the river. Every accessible inch is terraced and planted with rice, the paddy fields forming a vibrant bright green mosaic. We pass through small settlements from time to time around which are clustered trees bearing fruit, or crops of maize or vegetables. Chicken and buffalo roam freely, whilst tethered goats shelter under woven mat or thatched roofs. In places the paddy fields give way to patches of sub-tropical rain forest, with bamboo and trees covered with hanging moss, epiphytes and lianas like an enchanted wood.

Everywhere we go we are a source of great fascination. Kids gather to watch us unpacking a back-pack and pull out a sleeping bag and change of clothes, as if expecting a bunny rabbit to be drawn out of the magician's hat at any moment. The fascination is entirely mutual, and so often it is the everyday chores such as washing, cooking or cultivating a field that hold us spell bound rather than any elaborate displays: the other day we stopped on the trail for over half an hour to watch a family husking rice. An elderly woman heated the grains over an open fire, whilst her beautiful young daughter with a babe at her breast kept turning the grains in a hollow in the ground, skilfully removing her hands moments before a wooden post thudded down into the hole. This was one end of a sea-saw, which two young men at the other end kept in perpetual motion. This whole process was a family affair with many members sitting around to chat or occasionally take over a task or offer advice.

Day 8: Sun 27th Sept Secathumb to Amjilassa

Woken by bed tea to the sound of rain pelting on the canvas, and a heart-sinking feeling at the thought of moving from my warm, albeit wet, sleeping bag. By the time we emerged for breakfast it had stopped raining, and by the time the pancake course arrived a small distant circle of bright blue sky had emerged at the head of the valley. Looking up, our path is barely perceptible, appearing like a fine hair half way up the rugged mountain-side. The hill-tops are close together at this point, as if we're at the bottom of a large crack in the mountain which weaves its way as far as the eye can see into the distance. The circle of blue is rapidly widening, now catching a vertical rock face ahead so it gleams brightly in reflected sunlight. The first hour of our journey is in the comfort of shade, but as the sun tracks up rapidly, the distinct shadow line of the opposite hill-top sweeps towards us, and soon we will be plunging into an uncomfortable sticky heat.

The other group has been struck down with a vicious stomach bug and so is taking an extra rest day. We have got off more lightly ... Meriel has stomach cramps but is soldiering on. Heard Simon from group 5 and Paul from group 7 loud and clear on the radio this morning for the first time. Am really looking forward to seeing all their groups, but it is strange no longer to feel that we are alone in these hills. By the afternoon the clouds had closed in again and it was pouring with rain. More wet kit! The monsoon has unfortunately been heavy this year and is dragging on a long time.



Dhromo from Ramtang

29th September: Into the Highlands!!!

Up to Ghunsa and at last we're heading into the highlands and leaving the lush green forests behind us. The people are now more Tibetan in appearance, the women with beautiful high cheek-bones and large dark eyes. They wear dark coloured woollen dresses down to their ankles, with coloured woven striped aprons, and brightly coloured headscarves and jewellery.

Our campsite at Ghunsa is excellent: a large grassy field situated at the further end of the village. We now have a large bright red mess tent in operation that traps the heat...fantastic!!! Thankfully after 10 days of trekking we are now obliged to have a rest day at Ghunsa to allow time for acclimatisation. Today is a major clothes washing day, and soon the camp site is adorned with numerous interweaving laden washing lines fluttering in the breeze, in sharp contrast to the Buddhist prayer flags fluttering more elegantly behind.

Day 14: Sat 3rd October 98 Kambachen to Lhonak

The scenery changes dramatically with each day's ascent that we make now. Up until yesterday the countryside was somewhat reminiscent of the open hills of Scotland. Now it is distinctly different. Our path takes us up the left-hand side of glacial moraine. To start with, the cloud base is about 30m above our heads, tantalisingly hiding spectacular views which we have read about in the guidebook. We soon enter the clouds and the visibility drops throughout the day. About mid-day the snow starts and the temperature drops again.

At the 9 o'clock radio sched, most excitingly for the first time on this trip, we hear a broken transmission from Kangchenjunga base camp to the climbers up the hill! We just about manage to hear them say something about "all is in place", and to ascertain that David Turton and Gordon Delgarmo are at base camp and that Chris Comerie is up the hill, and that their next sched will be at 1200. We have been trying them at each of our radio scheds for the past few days, and even put the radio on a perpetual scan of three likely channels for a few hours at our last rest day, not being sure at what time their transmissions would be or the frequency they are on. Frustratingly they cannot hear us yet. There is a great incentive to gain some height so we are in a better position to try and talk to them before 1200. This time we hear them loud and clear and Diana is able to speak to David for the first time in about two months! A boyfriend at base camp is the best recipe for rapid acclimatisation I've ever come across!!!

The weather continued to deteriorate for the remainder of the walk, with wind driven snow reducing the visibility further... It feels as if the monsoon is never going to end. We are now completely reliant on a break in the weather for our research kit to be flown in from Kathmandu to base camp. It will be a disaster if the other trekking groups arrive at base before we are ready for them and we miss crucial parts of our data collection. The other worry is that the helicopter will only make it as far as Ghunsa, which would provide an enormous logistical challenge to get the gear up to base camp. There is little point worrying as all matters are beyond our control at this stage, but I know it is on Pete's mind.

Come the 6 o'clock transmission we learn that Chris bivvied 200m below the top of the rock band where Camp 3 is destined to be situated. Apparently Ian Arnold somehow broke a bone in his foot on the way in and had to spend the first two weeks sitting around at base whilst the others got going: it must have been very frustrating.

Sun 4th Sept: Rest day at Lhonak

Awoke at 0600 to find Diana already alert and thinking about packing ready to go up to BC and catch David before he goes up the hill again. She is usually up near the front of the group when we're trekking and I can't believe that she's just had two major ops. Stuck my head momentarily outside the tent to see mist all the way around AGAIN, so went back to doze in a depressed state to dream of dry socks and toast and marmite.

20 minutes later Meriel was screeching in crazed fashion to get up, which I assumed to be because it's her birthday, but no... the clouds are lifting... there's a view!!! Suddenly we can see that we are in a large grassy plain surrounded on all sides by gigantic snow capped mountains!!! This is a true high point of the expedition so far: Nepal Peak to the east, Wedge Peak to the south-east obscuring views of Ramtang, Tengkongma to the north and a long rocky ridge stretching up to further snowy peaks to the west. Suddenly the cold feet and hands and wet socks of yesterday are forgotten, and I remember what this is all about. As if this excitement is not enough the stillness is broken by the distant hum of a helicopter, presumably dropping our research kit at Ghunsa. 45 minutes later our suspicions are confirmed as the chopper hums its way slowly, up the far side of the glacial moraine past us and on to Pangpema base camp. With the lower atmospheric pressure here the chopper must drop half its load at Ghunsa and then make two shuttles to get it to BC. The last major link in the chain is complete and now it is up to us to make things work at base camp.

Today has been the most fabulous day. After the preliminary hour of exultation, running around taking photos and marvelling at the phenomenal sights all around, we settled down to Meriel's birthday breakfast: we have got her a T-shirt with her name embroidered on it ("Merry-Hell"), a sarong and a card signed by all of us and the cook boys. After breakfast we saw Diana off, did some washing and then settled down to the major task of the day: catering. The universal providers (alias Debby and Gerald) knocked up the most amazing Swiss fondue followed by mocha chocolate cake then chocolate digestives for afternoon tea. Henriette and I made pear and mango cinnamon crumble for dinner, which was washed down very nicely with a little cherry brandy.

Jim and I went to chat to the climbing Sherpas who are currently with Doug Scott on his expedition to climb Dhromo. It has never been climbed, and is obviously a very challenging mountain as Doug Scott was out here for 52 days this spring in an attempt to climb it, but was thwarted by bad weather. He went up to Camp 2 today, and his team reckon that if luck is on his side he may reach the summit in a further two days... here's hoping! He is reputed not to favour large scale expeditions, and is no doubt glad to be up the hill whilst our lot pass through: it would no doubt seem like quite an invasion after he has been used to having the area to himself. Besides, all these big mountain climbers are usually paranoid about catching germs from passers by. Before dinner we put together a bit of a game plan for BC with a plan of where tentage and projects will be, and how power requirements can best be met. Will also need to put together a preliminary timetable. One of the highlights today was phoning home: David and Cathy are well and have not had their baby yet... it is now 4 days overdue so could come at any moment! It was great to be able to tell them the good news that the kit is now at base. Also phoned my cousin Victoria who got married yesterday: apparently everything went brilliantly so wish I could have been there. Anyway, Pete must feel very proud of his achievement so far to get the base camp infrastructure to its destination. Really looking forward to reaching Pangpema tomorrow and seeing what our new home will be like.

First Impressions of Base Camp

From Lhonak our path continues parallel to the right hand edge of the glacier all the way to base camp. At this altitude the final day's walk seems much more effort than it should, and when we eventually spot the base camp tents as far away specks nestling into a grassy shoulder beneath the hills it is a most welcome sight. The physical geography of this area is in many ways similar to Everest, with the glacier curving away from us to the right to end in an arc of immense mountains. The main difference is that rather than the base camp being situated on the outer curve of the glacier itself, it is set back on a raised grassy plateau lower down. Here we have the additional comfort of running water and the warmth of camping on grass rather than the glacier. No shifting of tents to fill in ice cracks which open up in the ground on this trip! The disadvantage for the high altitude climbers is that when retreating to the comfort of BC from the hill there is an additional unwelcome 1-2 hour slog up and down over glacial moraine which they all grow to hate! We are considerably closer to the mountains themselves here. BC is dominated by Wedge Peak, situated the other side of the glacier, and through half shut eyes in the moon light you can almost imagine you could reach out and touch it. Its near face appears near vertical, fluted with tracks from repeated small avalanches, whilst its lateral walls rise up to a triangular point like a child's drawing. The other faces cannot be seen from here, but the mountain gives the impression that its ridges will be razor sharp and inhospitable. It is no wonder that it has never been climbed, and as such its summit adopts an almost sacred quality.

We are all pretty happy with our new base camp... well done Sally... good choice! There is so much to do, but the simple task of standing up renders us dizzy and breathless. We move a few barrels around into appropriate piles ready for a major set-up day tomorrow, collapsing into an undignified heap after each journey. The altitude affects everyone to differing degrees: I suffered from severe bouts of glacier lassitude and afternoon headaches for the first three days... where is Paul with his "acupuncture to relieve altitude headache" trial when we need him?! The main blessing is the knowledge that given a week we will have begun to adapt and be a whole lot more active. The other blessing is the memory of how fantastic it feels when you finally descend to lower climes and feel as if you can run marathons (a rare and short lived sentiment in my case at least!)

Science in a Cold Climate

Anyone who has tried to do any kind of research in a given time frame at sea level will know how challenging it is. Anyone who had taken a look at our ambitious research proposals to be carried out in such a remote location would probably think we were mad... they might well be right. There seem to be innumerable set backs to overcome, the first being that only half the tentage and tables promised to house the projects materialised. Close on our heels would be further researchers eager to set up their projects with nowhere to go.

The one thing which did seem to go smoothly, thanks to Gerald's brilliant expertise, was the solar power to provide for all the projects, and it is to his credit that for the duration of the expedition we only required the use of the generator on two or three occasions when the research was at its peak, and the weather too dismal to power up the batteries. Its success was helped along by some judicious rules laid down by Gerald... he threw up his hands in horror at our intentions to inflate our 3000 litre bag of gas required for experimental purposes (our so called "Viagra bag") using a hair dryer. A HAIR DRYER??? Did we have NO idea how much power this would consume? Attempts to reduce its power consumption by removing the heating element failed dismally, and we moved rapidly from thoughts of solar power to Sherpa power. Jim had had the foresight to bring with him a small foot pump normally used for inflating lilos. I am not normally one to be caused of being girly, but... 3000 litres is quite a lot! After watching my feeble attempts at inflating this bag with considerable amusement the Sherpas soon took over. Was this a gamow bag they questioned? (High pressure bag in which a hapless person is temporarily placed should they be suffering from severe altitude related illness to aid their descent). I wondered if this was the time to talk about the exciting work we would be doing to break through scientific frontiers and discover the secrets of respiratory control at high altitude... possibly not. It never ceased to amaze me that our work must be so far removed from their own sphere of experience, and yet they never held back in offering help.

To them much of our work must seem lacking in purpose, unlike climbing a mountain or caring for a sick patient where there is an immediate goal and the results are instantly visible. One way or another we managed to fit most of the projects under canvas before the next tents arrived with much cajoling of our sirdars by Pete, Gerald and Debby. We also became quite adept at fashioning make shift tables out of barrels strapped together, and a couple of examination beds out of turf.



Kangchenjunga from slopes above Pangpema

Tentage in place and all set eagerly to work to try and get up and running in time for the first influx. Jim, Henriette and I were working together, and we seemed to have a frightening amount of kit to get going. It was with a great deal of anxious anticipation that we opened the barrels and gingerly removed their contents to see whether everything was present and intact. It was at this stage that I become extremely jealous of all those projects involving low infrastructure, such as Eli with his simple but discriminating neurological tests drawing spirals, or speed tests inserting and removing pegs from a nine pin board, and Henriette with her test of finger vasoconstriction in response to cold. Improvisation was the name of the game, and in our tent we used the tried and tested method of a ladder strapped between two tent poles to lash a portion of our kit to: an ideal method of getting the firm anchorage required for the mouth piece of our set up and associated pneumatically driven pistons. The ladder height was easily adjusted by means of a pulley system, our ropes ending in prussic knots around the tent poles... one thing at least is easier here than at sea level.

We were to test our volunteers whilst gently exercising, as this makes it easier to detect the changes in respiratory control that we are looking for. For this we had a bicycle... not any old bike but a state of the art bicycle-ergometer the like of which has certainly never been seen at Pangpema before. It is an elegant shade of light green, and promised to have a smooth pedal action and a high tech braking mechanism which will allow us to subject our volunteers to precisely the required work rate... or will it? To our dismay the braking mechanism seemed to have gone missing somewhere between our hotel in Kathmandu and Pangpema base camp. This threw us into a mild sense of panic. Thankfully Jim seemed well versed in the work rate generated per kg of load applied to a wheel... now did I ever dream that those physics lessons balancing weights from springs would EVER come in handy? After much hanging of 1 litre pee bottles full of varying amounts of water from Gerald and Debby's bungee cords, which they kindly donated to our worthy cause, we eventually had a calibrated biking mechanism... amazing!

So now, tent, makeshift work surfaces, bike and ladder in place. Next came our crucial pistons driven on compressed CO₂, a suitable inert gas that would allow the solenoid valves to function safely. Next hurdle... our gas regulator head did not have the right fitting, in spite of the fact the supply company had assured us cylinder and gas head would be compatible... second minor panic of the day! We had to run the pneumatics on compressed oxygen, which ran the risk of causing the solenoids to burn out. Nervously we started the pistons working, and indeed a few minutes after starting the kit there was an ominous smell of burning. With a bit of adjustment to the plumbing, and the less crucial and more temperamental piston disconnected, we managed to achieve success...to our amazement it kept functioning well till the bitter end! Lift off at last in sight, we were able to start experimenting and enjoy the results tantalisingly unfolding in front of us. That's not to say that we were free from technical hitches for the rest of the trip: a couple of crucial bits of kit were extremely temperamental and required constant coaxing into action. Another advantage of a large expedition is that there's always the hope of an electrical engineer emerging up the glacier!

Our volunteers were once again amazingly supportive in putting themselves through innumerable tests. All in all there were twenty two scientists in the field, all keen to get data, and an even greater number in support back home, and so juggling the time table at base camp was no mean feat for Meriel. The "respiratory defence" team soon arrived to set-to with cough challenges, tests of airway reactivity and studies of the benefits of nasal moistening; Jim and Gwilym drew the short straw being confined to the cold hours of darkness to do their experimenting, when their essential light emitting diodes would show up, to study the effect of altitude on postural sway and the perception of vertical; Rick, Gill and Lee got to work with their study of respiratory muscle training, and Mike with his studies of hormones involved in appetite at altitude and other complex biochemical changes. Later arrived the Kiwi team armed with nasal brushes and throat swabs to compile epidemiological work regarding respiratory pathogens within our group, and Sandra with callipers and tape measure at the ready for her anthropometrics study.

The battle to fit our innumerable blood and urine samples into a seemingly small volume of liquid nitrogen, in a safe transportable form, was an ongoing battle which Debby and Richard handled admirably. Richard and Mukul's project involved collecting 36 hour urine samples for determination of nitric oxide turn over (a recently "trendy molecule", which is thought to be important in determination of blood pressure in health and disease). This proved one of the more challenging ones... how many times have I nonchalantly told a patient to "go and pee into that minute narrow necked container"? Well if you thought that was hard at sea level let me tell you: you know nothing till you've tried it at altitude, in the dark, in sub-zero conditions, whilst carefully straddling an unpleasant latrine pit... and all without the benefit of supplementary oxygen.

All in all, phenomenal amounts of data were collected under somewhat challenging conditions. Only careful analysis will tell, but the preliminary feedback from various groups seemed to suggest that some exciting results would materialise in due course.

4th Oct: "Pap of Pangpema East"

Today, after more than a week's intensive research, we have decided that our group deserves a rest day. We are going to do a recce of the peak behind BC with a view to climbing it later. Amazingly, at night on 6000m, it does not have a name that we can make out, being a peak on the way up to the Dhromo ridge: this is however to our advantage as it means we are free to wander without peak permits and bureaucratic encumbrance. It is largely steep scree and grass with a beckoning snow capped peak. At this altitude every false footing and recovery, or over zealous pace, renders us gasping for breath, and it is striking that the Kangchenjunga climbers regard this camp as a place for R&R, of warmth and bounteous oxygen. Every metre that we ascend brings these awe-inspiring mountains into sharper focus... *"only a hill but all of life to me, up there between the sunset and the sea"*. As we expected, we seem to be climbing one of those "magic mountains" with a top that recedes out of proportion to our effort. We are blessed indeed to be in such a unique place. At about 5300m we become level with the first of the hanging seracs. Each year's snow fall forms a distinct band in the ice revealing a little of its history, like lines in a tree

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trunk, the mass twisted and turned into an array of patterns. At the top left edge is a huge ice cave far above, like the nave of a Cathedral. Icicles guard its border, and a torrent of icy water gushes from its back wall. There is something immensely satisfying about the scramble up to peer at its entrance... bare hands on warm black rock/ cool white rock, warmth of the radiant heat of the sun and chill of the cool air not yet warmed by the day, intermingling all at once.

Leaving the ice behind us to contour round the mountain-side. We are square on to the Kangchenjunga glacier, and through binoculars can just about make out faint dots of the Camp 1 tents for the Kangchenjunga climbers, and a little above it the Camp 1 for the Ramtang climbers. The Kangchenjunga massive shoots vertically up behind, immense and austere now it is blazoned in the morning's fiery light. To the south west is Nepal peak, and to its south Nepal gap... a misnomer if you ask me, for to cross it into Tibet is a steep, obviously avalanche swept, ridge. How tantalising... just beyond that ridge is the once forbidden land of TIBET!!! Is it a characteristic desire amongst would-be mountaineers or explorers always to be yearning to see what is just beyond the next horizon, and yet out of reach?

Over the summit of Kangchenjunga hangs a delicate lacy plume, the only cloud to break up the blue, blue sky. It gives little sign to the uninitiated that this indicates high velocity winds that temporarily force the moisture out as cold air hits the landmass. The climbers estimate that they have little more than a week left before the jet streams, which sweep the Himalayas following the monsoon, will kick in, guarding those sacred summits once again till the next climbing season.

Catch a shooting star if you can!!!

As we sit eating dinner the boys high up on the mountain break through the meal time chunter with a radio call to enquire whether we are enjoying the evening's shooting star display. Taking courage to exit the warmth of the mess tent into the cold night air, an amazing display can be seen lighting up the sky. There are more shooting stars than any of us have ever seen before... and the more you stare the more appear, as if the concept of infinity can be grasped for the very first time. Wish upon a shooting star... what do you wish for? I wish that all these guys would come back home safely from this ferocious mountain... I also wish to look at the stars from the warmth of a steaming hot pool, I wish for a beer and I wish for a LARGE bar of dark chocolate.

Climbing

Our three weeks at base camp went by in a whirl of frantic activity. Whilst we scientists had our heads down exercising our subjects, taking blood and urine samples, nasal swabs, lung function tests and almost every test you could think of, the climbers were busy elsewhere. The two Nba Temba's, Richard, Ulli and Saila, shortly followed by Nigel, Roger, Sally, Simon, Denzil, Chris and Gerald put up a new route to climb Ramtang East, a great achievement which raised team morale considerably after all the uncertainty re the feasibility of any route at all.

There was also success from other expeditions: during our stay at base camp a Japanese lady and her Nepali team were successful in summiting Cross Peak. We were pleased to have a visit from Doug Scott and Roger Mear at our base camp, and to hear that they had been successful in achieving a first ascent of Dhromo. Meanwhile on Kangchenjunga, Chris Comerie and Mark Bryan climbed the North Col and reached the base of the Castle on Kangchenjunga, an amazing feat that has not been achieved for several decades. In spite of heroic efforts they were turned back by dreadful weather. They were bitterly disappointed that a summit within reach and so well earned could be so cruelly snatched away from their grasp, yet knowing that the risk of going on is never worth the prize, however glorious.

For those of us left down below, we were enormously relieved to hear that the battle was over, and that they were on their way down: the weather was obviously turning, and we feared that that decision to turn back might be too hard to make with the effect of hypoxia blurring the senses, and the enormous levels of motivation to reach the top that several years of intense planning and saving generates. It was a good feeling indeed when late one night we welcomed Chris, Mark and Ian safely back into base camp after their long period high on the mountain. Then followed one of our best base camp parties yet, helped along by generous quantities of finest Scotch whisky, and energetic playing of the guitar into the wee small hours of the morning. Chris, Mark and Ian were in fine voice in spite of their prolonged period at extreme altitude enduring poor quality sleep, reduced appetite, and the other many adverse effects that are inevitable at such heights, all the while expending phenomenal amounts of physical energy. High altitude mountaineers are indeed a class apart from the mortal man!

Descent from Base Camp

Here, unlike the Everest base camp, there is not the same sensory deprivation, where living on the glacier brings with it a noticeable absence of colour and sound. And yet as we descend, the new grass smells sweet, and there is a child-like sense of discovery with the vision of each new type of vegetation, as if seeing it for the first time: initially scrawny shrubs, later gnarled trees hung heavily with moss, and ultimately the paddy fields and bamboo shoots of lower climes. The larch trees are now delicate shades of orange, red and brown, which reminds me that at home kids will be kicking through piles of freshly fallen leaves and tussling in the swept piles, and of the smell of baking potatoes. There is a short-lived pang of home-sickness that is rapidly forgotten as the next babbling waterfall comes into sight. The air is rich, and after the occasional false step and recovery there is no longer the anticipated gasp for breath which surely follows on the high mountain. Sleep is now deep and sweet, and gone are the cold toes and rocky bumps under the ground sheet at night. As the trek sinks lower into the warm valley, the restricting layers of fleece and down in the sleeping bag at night can be discarded, and the tent flaps left wide open

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to let in the cool night air. It is tempting to sleep out under the bright stars, so clear here away from the city lights and the waxing moon, but the dew fall is heavy.

There is now the sound of animal life; yak bells as these beasts of burden lumber by, the squawk of a chicken as it is chased across a yard, or the call of birds out of sight to the untrained eye as they hide away in the undergrowth. We are sick of the bland taste of the remaining rations of rice, potatoes and noodles, and when the long awaited supplies of vegetables and a freshly slaughtered chicken eventually arrives, it seems a feast fit for a king. The evenings are now taken up with drinking Tongba, or singing with variable tune, but always with equal gusto, the words of a half-remembered tune to the strumming of the guitar. Life is sweet, and it is with regret that we realise this pleasant limbo between the pressure of base camp and the hubbub of everyday city life will have to end.

Kathmandu once more

Too many cafes... too little time. We are on an eating tour of the big bad city, and the focus of many conversations is of the relative merits of the next eating venue. For better or for worse the citizens of Kathmandu have laid on all that the hungry, trail weary traveller could wish for, and the streets of the tourist centre are a noisy mish-mash of cafes of every description, and stalls selling garish, hippie clothes, carpets and carvings. Between the throngs of foreigners intermingle touts bearing tiger balm, wooden flutes, and painfully pitched string instruments. All intermittently leap out of the way as a rickshaw grinds and weaves around the potholes, ringing its bell.

The thrill of the city begins to pall after a couple of days, and a new sport is required. A raft/ kayak down the Trisuli fits the bill, and it is exhilarating to crash through gigantic waves in such a high volume river compared to those back home.

Our sport the following day is a hot air balloon ride. Sally, Simon, Jackie and I set off in the direction of Baktapur to watch the process of inflating the enormous canopy (280kg, and 260,000 cubic feet once inflated), drink coffee, and await the sun to burn off the early morning mist. Two enormous turbo fans inflated the canopy on its side before blasts from the butane burner allowed it to rise elegantly to the upright position. Air traffic clearance granted, and we leaped into the basket for take off, each noisy blast of the burner whisking us up to the sky whilst sending down a blisteringly hot jet of air. The city steadily shrank beneath our feet, the important land marks still being visible... the Palace, the Monkey temple, the football pitch and the airport to name a few. How many international airports can there be in the world where alongside the airstrip women harvest rice or light fires for dinner? How many international airports can there possibly be in the world where an air traffic controllers voice is heard loud and clear announcing all flights delayed, and where aircraft helplessly back up awaiting take off, whilst a dog ambles its way across the runway? Poor Sally had unfortunately got the unavoidable Kathmandu stomach bug, and soon became a proud member of the "Mile High Chunder Club"... a few of our friends admitted to feeling a couple of spots of rain around mid morning as they sat eating breakfast!

Back Home

It has been a truly amazing trip, and the friendships forged in the depths of leech-laden forests will be sure to last. We now have the fun and the frustration of analysing the fruits of our labour, and seeing how the data will tell the story of the body's amazing adaptation to this inhospitable environment of high altitude. As I drive through the Wiltshire countryside in Autumn my breath hangs heavily in the cold air. To either side of the road arch an avenue of beautiful oaks, golden and glowing with fire. The low set sun casts long shadows across the earth, and the fields, now set alight, are in various states of harvest: huge round bales in one and deep dark furrows being ploughed up in another, as the tractor hums its way to the distant end of the field. The river is in spate due to some unusual early heavy rain fall, but never-the-less the trout are still rising, not yet having entered that sluggish winter phase. Back in the city the comfortably familiar stone work of the Cathedral towering up to the sky has a distinct air of unreality about it ~ a welcome island of sanctity and calm. The bells ring out over an evenly mown green, precisely on the hour ~ life is suddenly predictable and ordered. It is indeed good to be home, enjoying the delights of gathering wood for the fire, tea at the flick of a switch, toasted crumpets, hot baths and clean sheets.

And so what next?

There is no time to feel wistful that the trip has reached its natural end: we already have a busy MedEx schedule running into the end of 1999, with a healthy blend of scientific and social activities, and are not short of ideas to take us through the next five years. The evenings will once again be taken up, this time with number crunching and paper writing. There now seems no doubt that MedEx will continue, and it is for us to steer its course in the best way that we can. The map is laid out in front of us, but the fun of the route plotting is still to come.

And so it seems that this venture, which started as one small spark, has gone on to be something much greater: they say that all men dream... what is yours? ...look into the embers of the fire or the depths of the deep, dark night, close your eyes... who knows where the next dream will lead you?!

Science Diary

By Jim Milledge

This is a personal account of the science done at Base Camp from the arrival of the first researchers on Oct. 6th to the striking of camp on Oct 25th 1998.

Important research data was collected by all groups on the trek into Base Camp, and more data was collected on the trek out and after arrival back in Kathmandu. Also, although I was present at Base Camp throughout this time, and tried to keep abreast of the research going on, I may have missed out someone's work. If so I apologise.

Those of us in Group 4b had had a very wet trek in as far as Lhonak, but the next morning the weather suddenly went fine and for our rest day there, and for our final half day to Base Camp, we had clear weather and fine views as we walked along the delightful track into Base Camp. The climbers were already in residence and made us welcome. We chose a site out near the cliff edge for our tents with room for the "Science Park" when these tents should arrive. We soon set about unpacking the scientific barrels that had arrived by helicopter the day before. Inevitably some items were missing, or at least mislaid for a time. For instance a laptop computer for Martin Rosenberg's project was eventually found in a sack of climbing gear. But the brake assemblies for both stationary bikes were never located until we returned to Kathmandu, when they were discovered in the back of our hotel store. We managed to jury-rig both bikes and used them in the two projects for which they had been brought, Annabel Nickol's dynamic CO₂ response, and Mike Richards' exercise work. By using the helicopter we had very little breakage of equipment. The spirit level for the "Vertical Challenge" was a casualty but again we were able to make one out of a bamboo stick and plastic tubing. Gerald Dubowitz and Pete Smith deployed the solar panels, generators, batteries and inverters and gave us power. The solar panels were so successful that we did not have to use the generators at all apart from a few hours during a spell of poor weather near the end of our three-week stay.

Over the next few days the big red science tents arrived and were erected. Eventually we had five of these 3 x 5 metre tents, and by the time all the research teams had arrived and were working we had two or three projects going in each tent. They were a very great improvement on facilities in 1994. At first we lacked the tables that Bikrum, our agent, had promised but managed to construct some from barrels and cardboard. We had numerous problems with electronic equipment, most of which we were able to deal with, often with Gerald's help, but in some cases, such as the blood gas analyser, we were defeated.

On our second day at Pangpema an advance party of group 4a arrived, and the following morning we did the first of the nitric oxide studies and blood taking. We were fortunate that Mike Richards had brought a centrifuge for his study and was happy that it be used for all the other bloods. The two main expedition centrifuges never surfaced at Base Camp. Annabel and her team set up the complex dynamic CO₂ apparatus with some difficulty. We found that we had no regulators for the CO₂ cylinders so that we had to use oxygen for powering the pneumatic valves and it was with some trepidation that we fired them up. One of the two seemed to get hot so we disconnected that one and managed on just one piston. I rigged up Martin Rosenberg's two projects, on balance and perception of vertical and horizontal. These required complete darkness so we decided to work with them only after dark. This was unpopular because of the cold and the fact that it interfered with supper. However in the end we were able to get through most of the planned subjects. Diana Depla got her two ophthalmic projects up and running in a screened-off part of one of the science tents where Debbie Miller also processed the bloods. Mike Richards' exercise and lactate project shared a tent with Mukul Agarwal and his lung water project. We had no problems with the latter except for the time when one of the black boxes stopped working, and it took us a day to realise it used dry cell batteries and these were flat. In the end tent Gerald had the sherpas build a splendid couch out of turves for his Doppler echo work on pulmonary artery pressure. Unfortunately, just after starting work on this project, the apparatus developed a terminal electronic fault.

On the fifth day, October 10th the splendid 8-metre dome tent that Gerald had borrowed for us, arrived and was erected. It was soon christened "The Pleasure Dome" and served as the communications and power supply control tent as well as a mess tent for our group. It was a great venue and played host to many parties with over 30 people squeezed in.

On October 12th Group 7 and some members of Group 5 arrived, and Sarah Bakewell and Kate Wilson, with the assistance of the two Irish medical students, Nigel Hart and Roger McMorro, set up their cough project in a tent they shared with Rick and Gill Havelly who were doing the respiratory muscle project for Lee Romer, who assisted Sarah and Kate doing citric acid cough thresholds and saccharin times.

The next day the rest of Group 5 arrived, and the science really started to hum with most of the researchers in place and a new batch of subjects. Warren Dellow set up his stall in the science tent where Gerald's couch and Jim's wobble plate were sited. This tent also housed the liquid nitrogen store. Warren was investigating infections in trekkers and besides taking blood for antibodies carried out the least popular procedure of nasal swabbing, "a lavatory brush up your nose" was the usual description of this. The next few days saw all the researchers working hard. The weather was perfect.

The day often started with blood taking by various venipuncturists outside the "blood tent", where Debbie spun and pipetted the blood samples into tubes to be stored in liquid nitrogen. In the first science tent Annabel, with help from either Henriette or me had her subjects cycling and breathing her CO₂ pulses, and Henriette might be doing her cold finger tests. In the next tent behind Debbie and her bloods, was Diana in her dark room doing eye tests. Next to that was Warren and later Lance Jennings doing their microbiology. Then in the row behind was Mike Richards with his subjects cycling up to maximum work rate having ear lobe bloods taken every two minutes and Mukul or I doing the electrical impedance of the chest in the

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other half of the tent. Finally in the tent next door Sarah, Kate, Nigel, Roger, Gill and Rick were working on up to four subjects. In the evening, after dark, Gwilym Rivet would work on the perception of vertical and horizontal, and I would test people's balance on the wobble plate as they fixed on a central or peripheral light(s), or had their eyes shut.

On October 15th Group 3 arrived and provided us with more subjects. On October 19th many of the researchers had decided that with no new trekkers due to arrive it would be a good opportunity to take a day off and go hill walking. Unfortunately the weather deteriorated and, though we enjoyed ourselves attempting the peak behind Base Camp, we got no views and ran out of time and weather on the little glacier below the final rocky summit. This was the day Chris and Mark decided to abandon the climb of Kangchenjunga. From the next day the weather improved though not as good as in the first 10 days of our stay. On this day Annabel started to study the effect of acetazolamide on the CO₂ dynamic response but after two subjects, smoke started to come from the electronics. This turned out to be a terminal failure of one of the integrated circuits and that was the end of that project. However she persuaded Kate and Sarah, during the last two days we had at Base Camp, to see the effect of acetazolamide on the citric acid cough threshold with quite exciting results.

On October 21st four of the twenty-two members in Groups 1 and 2 arrived, followed by the others next day. It was not possible in the two days remaining to study all of them, but with the addition of selected subjects from these groups most projects had sufficient numbers for their statistics. Lee Romer and Sandra Green, arriving at this time, worked very hard in the limited time they had at Base Camp to complete their projects.

It may seem from this account that most of the apparatus we had gave trouble but, of course, I have not mentioned the many pieces of equipment which functioned perfectly. During the 23rd and 24th we were busy finishing off the last experiments and packing up the apparatus and the rest of the camp. On October 25th, in perfect weather, we left for Lhonak and Kambachen, sorry to be leaving what must be the most beautiful Base Camp site in Nepal.



Chris Comerie on NW Face

Chris Comerie's Report on the his Expedition which proceeded in parallel to Medex K98

As mentioned earlier, Chris Comerie led a logistically completely separate expedition to attempt Kangchenjunga itself. Although his team was completely independent of the Medical Expeditions one, there was a very close liaison between both parties during the planning and in the field. I am sure that both expeditions benefited considerably by working so closely together. I have included a complete transcript of Chris's Expedition Report as I am sure it will be of great interest to many of those who participated in Medical Expeditions Kangchenjunga 98.

Report of Kangchenjunga Climbing Team by Chris Comerie

Introduction

During the summer of 1996 I had a telephone call from Simon Currin inviting me to consider the possibility of forming a team for an attempt to climb Kangchenjunga. Medical Expeditions had already begun to formulate plans for organizing further high altitude medical research in the Kangchenjunga region. Several teams of trekkers, researchers and mountaineers were to trek to base camp to undertake a variety of objectives. It was considered that an ascent of Kangchenjunga would provide further focus and interest to all concerned.

At the time of the invitation I was heavily involved in organising another Himalayan expedition, and therefore asked that my decision be delayed until my return later in the year. Over the next few months the idea gradually grew more appealing prompting me to accept the challenge, providing that I could organise the entire expedition independently from Medical Expeditions. Although in conjunction with the **Kangchenjunga Medical Expedition 1998** we would remain an independent organisation which I considered necessary to maintain complete control over the project. This agreed, we decided to operate under the slightly different title of: **Kangchenjunga 1998 Expedition**. As part of that agreement the team were to take part in the data collection weekends and the high altitude medical research.

I was particularly attracted to the North face of the mountain by way of the Kangchenjunga glacier to gain access to the **Northwest Face**. One then needs to climb and fix this face to reach the **North Col** on the **North Ridge**, which when followed gives access to the **Great Terrace** and the final summit pyramid. Subsequent research revealed that this line was first successfully climbed by the 1979 British expedition comprising of **Boardman, Bettembourg, Scott and Tasker**. The route appeared difficult but interesting, affording the type of climbing that appealed, reasonably lightweight without the encumbrance of ladders and other heavy equipment, and technical. The route was further enhanced by the fact that it had only received two further ascents since that time, none of them British.

The Plan

The proposal was to make the attempt without the use of supplementary oxygen or porters above base camp. Two oxygen sets would be stashed on the mountain, at camp II and camp III respectively, to be used only in the case of emergency. It was proposed to make base camp (5100m) at Pangpema on the true right hand bank of the Kangchenjunga glacier. The approach to the NW Face was to be serviced by two stocked camps, camp I on the glacier at 5300m and camp II at 5900m in the upper Cwm at the foot of the North and North-West Faces. Camp III would be situated on the N Col. The remaining two camps or bivouacs! above that point were to be snow caves to escape the high winds that are a particular feature of Kangchenjunga. Four lightweight handheld radios were to be used for communication. All food and equipment to be used and consumed above base camp would be imported from the UK and New Zealand.

The Team

My Himalayan partner of two previous expeditions, **Mark Bryan**, currently living and working in New Zealand, had agreed to accompany me right from the start and had been involved in the research and decision to attempt this route. Soon after, we were joined by **Dave Turton** from Cumbria, who was able to arrange a meeting with **Doug Scott** who kindly gave us much useful information. The remaining team members were recruited in the latter months of 1997, **Chris Howarth & Ian Arnold** from Yorkshire and two Scots **Ian Miller & Gordon Dalgarno**.

Finances

Financial and other support was obtained and provided from various sources, which included **Medical Expeditions, Boots Healthcare International, Vango, Troll & Terra Nova**. Fund raising events were also organized, which provided further financial support. The deficit was paid by the individual team members.

Our Agent

Our affairs in Nepal were handled by **Lakpa Tenje Sherpa** of **Sherpa Excursions (P) Ltd.** Kathmandu. Our Sirdar whilst trekking to and from base camp, and including our time there, was **Pasang Temba Sherpa**, a veteran of many previous expeditions, including an early attempt at Jannu situated in the same region. The Ministry official and liaison officer was **Raju. K. C.** Other staff permanently employed whilst in the field included **Gyanbhandur Tamang (Gani)** the head cook,

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Rjun cook assistant, **Dawa** Sherpa guide, and an old friend **Nima Sanga** also a Sherpa Guide. Other staff were employed over the period of the expedition, but mainly on a temporary basis. During our trek to base camp we had approximately eighty porters plus ten more senior staff.

Arrival in Nepal

The team with the exception of Mark Bryan arrived in Kathmandu on 17th August. Mark arrived a few days later direct from N.Z. The climbing permit and other official documentation were obtained over the next four days along with other minor items of equipment. All seemed to be going pretty well until we learned that the heavy monsoon rains had caused land slips and washed away sections of the road on our proposed route to Taplejung, the start of our trek to base camp. This would be our first set back causing an additional four days of walking.

The journey and trek in to base camp

On the 22nd of August at 3:30pm we left Kathmandu along with fifty of our staff in two large buses. The 1200kg of imported food and equipment contained in blue plastic barrels was carried on the roof racks of both vehicles. Twenty-one grinding hours later we arrived in Basantapur around midday August 23rd. The final two hours of the journey were touch and go through a deeply rutted mud bath of a road. A short wade through the mud of this depressing little village brought us to our camp-site for the night in a grassy hollow just outside. Our Sirdar recruited from the village the additional porters required to carry our equipment. We began our trek the following day, August 24th, amid growing tension between the various groups of porters. Apparently the unrest was caused by the varying weight of the loads. This was not entirely unforeseen as some of the barrels were very heavy. Before leaving Kathmandu we had offered to reduce these loads by re-packing the contents into smaller barrels, however we were advised by our agent that they would be OK. Another unforeseen reason for tension and unrest was the fact that we had a mixture of porters from different tribal areas who clearly did not get on with each other. Over the coming weeks this would develop into arguments and eventual fighting which came to a head with one man threatening another with a knife. This resulted in small groups leaving periodically, which caused havoc and delays almost every single morning. Eventually some equipment had to be left behind. As the villages became more remote it became increasingly more difficult to recruit sufficient local porters. Eventually all our equipment did arrive at base camp.

The trek proved very difficult, mainly because of the monsoon rains rendering the trail into a quagmire. Sometimes the path became a stream bed where wading became the only option. In addition we were plagued by leeches and insects that inflicted numerous bites to everyone. It was extremely hot, so little could be worn in the way of protective clothing. Land-slips continued to hamper us, the most serious causing a two day detour up from the valley floor to the village of Taplejung then back down the following day. Fifteen days later we finally arrived at Pangpema, base camp (5100m) on September 7th.

The approach climb

On the 8th September a route was found through piles of loose blocks to cross to the center of the Kangchenjunga glacier. The first of the loads were carried September 9th. The route up the glacier was without difficulty and camp I (5300) was established on September 11th. This would be our main depot and loads continued to be carried to this camp from base camp throughout the duration of the expedition. We continued to make progress and established camp II (5900m) on September 16th on the glacier in a hollow between two crevasses. This camp was situated in a central position in the upper Cwm about one hour's walk from the foot of the NW Face. It was a lucky break that a water supply was found right next to the camp. This provided an unlimited supply of fresh water, which therefore saved on gas that would have been required for melting snow and ice. The main obstacle in the climb from camp I to camp II was the ice-fall. Shortly after leaving camp I you arrived at the foot of the North face of Kangchenjunga. You then make a left hand turn at ninety degrees to the glacier through a steep ice fall to access the steep snow slopes leading up into the Cwm. Various ice walls and crevasses had to be climbed and fixed with 100m rope anchored by ice screws. The ice-fall was continually on the move necessitating re-fixing and adjustment of the ropes on a daily basis. This ice-fall was unexpected, the team of 79 simply walked up a steep snow slope! Further objective danger came in the upper Cwm from hidden crevasses, avalanche, and stone fall from Gimmegele which formed the south wall of the Cwm. The crevasse system made it necessary to pass the very foot of the face, which was continually strafed by stone fall. Avalanches continually roared down the slopes from all sides of the Cwm but none ever reached the three tents.

The North-West Face

Camp II was stocked with food and equipment and served as a base to tackle the face. Temperatures were extreme in the Cwm with recorded readings ranging from minus 30 degrees to above plus fifty degrees, all in the space of a few hours. Because of the intense heat of the day it became necessary to be off the lower part of the face by midday to avoid falling stones, ice and heat exhaustion. This meant that an early start was essential. Anytime from midnight to 3am were regular starting times. The 1000m face was steep and very sustained. Almost the whole route was climbed on snow and ice at approximately Scottish grade three in the lower half, and up to grade four in the upper parts. We climbed a total of twenty-four pitches and fixed 1200m of rope. We were hampered by periods of bad weather causing huge amounts of spindrift to cascade down the face. Each day we went onto the face some of the fixed ropes had to be chopped out of the ice. The final push to the North Col was achieved by two nights' bivouacking at around half height. Two small ledges were hacked out of

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the ice at the foot of a protective slightly overhanging rock buttress. We reached the N Col (6900m) October 9th. It had taken twenty-two days. We had originally intended to climb the face in two weeks, but bad weather, team injuries, sickness and poor acclimatization had cost us dearly. Together with the delays experienced at the start of the trek in, we were now almost two weeks behind schedule, and the winter jet stream winds were beginning to batter the upper part of the mountain.

Over the next few days camp III was established on the Col and stocked with food, gas, medical supplies, and emergency oxygen.

By now the MedEx research teams and trekking parties had arrived at base camp, and all members of the climbing team were taking part in the data collection on their periodic visits to base.

We had originally intended to leave base camp on October 21st. To enable us to mount a summit attempt our flight out from Suketar had to be cancelled and re-scheduled to allow for a delayed departure date. This was made possible by the use of the MedEx satellite communications.

Summit attempt

Mark Bryan and myself left base camp for the summit attempt on October 14th. We progressively worked our way through the camps each day until arriving back on the North Col by October 16th. The weather had begun to deteriorate, with a dark hogs-back of cloud now obscuring the upper part of the mountain. The wind had increased considerably and was doing so by the hour. On the morning of October 17th we climbed the North ridge and reached a point (7400m) close to the foot of the final rock barrier (The Castle) which forms the perimeter of the upper Great Terrace. Conditions were very difficult and the going very slow. We had to break trail through a hard wind blown crust, which would not always support our body weight. Below lay deep unconsolidated snow, sometimes thigh-deep. These conditions gave concern that we could be caught out by a wind slab avalanche. We dug a snow cave with some difficulty because I dropped the snow shovel in a fit of enthusiastic shoveling. We continued with axes and used our helmets to remove the spoil. The weather continued to deteriorate as the day wore on so, we decided to leave our loads in the cave and retreat back to camp III at the Col.

The next day we climbed back to the cave in high winds, and enlarged it big enough to accommodate us both. Blocking off the entrance with rucksacks and other equipment we had a reasonably comfortable night, although lots of spindrift blew down into our grotto, burying us and our equipment, making life difficult the next morning.

We emerged, October 19th, to a wild day, high winds, intense cold and poor visibility. The wind screamed off the Great Terrace just above us, creating a great tail of spindrift extending out over Sikkim. We retreated back to the confines of the cave to wait for improvement. It never came. In fact the situation deteriorated, then after some hours we decided to call off the attempt and retreat.

It was a fight to get back down the ridge to the Col. Most of our tracks had filled with snow, and there was a real danger of stepping off the cornice into Sikkim in the poor visibility and appalling conditions. That night was spent on the Col before retreating back to base camp the next day.

Over the next few days remaining food and accessible equipment was cleared from the mountain. A period of forty-six days had elapsed since arriving at base camp. We left base camp on October 24th bound for Suketar, where we caught the first of two flights back to Kathmandu on November 2nd. After concluding the expedition business we left Kathmandu on November 7th.

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Shrewsbury School, Kingsland, Shrewsbury.

CMJ Architects, Kingsland Bank, Shrewsbury.

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Mrs. R. Turcan, Lindores House, Cupar, Fife KY14 6JD

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Lord Peyton, The David Barclay Foundation

The Dale and Bushton Foundation

The Physiological Society

Ted Carter, Chief Technician, Queen Mary and Westfield College, London

Psion UK Ltd.

Palm-Tec Ltd

Nonin Medical

Free for One, Driebergen

Van Ruiten Meat trading, Apeldoorn

Demmenie Sport, Amsterdam

Lowe Alpine

Rabobank, Epe

The Oswald Smith Fund

Shropshire Youth Foundation

Cotswold Camping, Bettws y Coed, North Wales

Future plans for Medical Expeditions and Medex

By Simon Currin

As with Everest the mood post Kangchenjunga remains very buoyant, with unanimous support for Medical Expeditions continuing its unique blend of research mixed with adventure in a similar, or expanded, role.

Medical Expeditions will remain a charitable organisation whose function will be to promote research and education into all aspects of altitude related illness. Within this remit, Medical Expeditions will continue to perform its own research and will advise others planning their own projects. It will also continue to run the very successful Plas y Brenin courses along similar lines. To encourage the publication of research, Medical Expeditions will also provide occasional competitive bursaries for members to attend and present their research at international conferences. It will also, from time to time, support active researchers in developing countries who would not otherwise be able to afford to attend such conferences.

In the past, charitable works have been largely funded by members participating in expeditions. However, the work of organising the research, expedition, and social activities, has outgrown the resources of the charity. Maintaining an income stream for the charitable activities will remain an essential requirement for the future, and for this reason Medex has been formed, which is now a separate trading company. Profit from Medex will be donated to Medical Expeditions, and in this way the directors of the charity will be free to concentrate their efforts on the research and educational aims, without the onerous responsibility of having to organise treks and expeditions. Medex will, therefore, assume responsibility for maintaining the mailing list, newsletters, organising social events and future treks and expeditions. Medex will also continue retailing discounted equipment to members. We hope to develop Medex along informal club lines with members having a major say in how the expedition programme is developed, and a major contribution to the research ideas and activities of Medical Expeditions. An open meeting at Ambleside (March 99) will be the first forum for this discussion.

By separating the research/education role from the expedition/organising role, we hope that we will be able to do both more efficiently, and avoid potential conflicts of interest. At the same time, the donations from Medex to Medical Expeditions will maintain the vital income in a tax efficient fashion, and provide a framework for increased expedition activity and enhanced research.

All the above sounds very dry and dusty, but the bottom line is there will be plenty more expeditions in the future, and the research will go on, but hopefully both will be done in a more professional fashion. Do contact Sally Glynn or myself if you want any further information on this.

The 5 year expedition programme

Ideas for the forthcoming Medex 5-year expedition programme include:

1. Spring 2000 - trekking expedition to Kangchenjunga area (in the pre monsoon, rhododendron season) to install incinerators along the trail (see below for details on incinerators).
2. Training and instruction programme for members anxious to learn mountaineering skills either in the UK or Alps. Small groups of similar ability working with a Medex employed guide (or instructor) in order to raise the skill and safety of members on future expeditions.
3. Hut based research projects in European Alps perhaps combined with instruction for those not confident in Alpine terrain?
4. Small groups to Himalayas with or without ascents of logistically simple trekking type peaks.
5. Mt Kenya Summer 2000. Opportunity for members to climb either technical or trekking routes to 5000metres combined with easy research logistics
6. South America Winter 2000. Either Peru or Chile. Again lots of altitude without hassles over peak permits
7. Major expedition in 2002 to Tibet or Nepal.
8. 2003 Low altitude but very cold. A chance to look at cold without the complications of altitude in the Antarctic. With new ascents on the Antarctic peninsular - the ultimate logistical challenge!

The idea of the expanded programme is to boost both the funding and the opportunity for research, and at the same time, accommodate people who may not be able to make the huge holiday commitment involved in a major trip. To accommodate members with different experience and abilities it may be possible to combine some of these activities with professionally guided ascents if this is felt desirable.

As with K98 and BMEME, all fees will be set at or below the going market rate, and members will be encouraged to participate directly in the research.

A research committee is currently defining objectives for a 5-year research programme.

Mailing List and Membership

In the run up to BMEME we instituted a mailing list fee to cover the considerable cost of regular mailings. We repeated this for K98 and the current arrangement will expire on March 31st 1999.

Members would pay an annual fee that brings the following benefits:

1. Regular newsletters circulated to all members giving up to date news of past and planned exploits, changes of address etc. Although time consuming to produce (and to read) the Newsletters have, in the past, proved an essential ingredient in the unique Medex formula. Hopefully they will continue to do so.
2. If the current arrangements continue then members can continue to enjoy associate membership of the British Mountaineering Council. This enables members to obtain Reciprocal Rights Cards and take advantage of BMC negotiated discounts on equipment purchase and specialist adventure insurance. From 2000 we hope that the BMC will mail a copy of Summits Magazine to associate members as well.
3. Members will be able to enjoy the considerable discount available on certain equipment available through Medex and exclusively to members.
4. Members will be able to apply for occasional bursaries available from Medical Expeditions and take part in expeditions and other activities.
5. Access to BMC affiliated huts in the UK.

Tiers of membership

1. Full UK membership, which entitles members to 1,2,3 and 4. (BMC associate membership for one adult) **Fee £16 / year.** (Add £4 for additional adults for BMC membership.
 2. Email membership (UK and International) which entitles members to 1 (electronic version) and 4. **Fee £12 / year**
 3. International postal membership entitles members to 1 and 4 **Fee £20 / year**
- Note that options 2 and 3 do not include BMC Associate membership and that Medex equipment discounts are not available to overseas residents.

Please note that if you are using BMC insurance then this will be invalidated if you do not take up the optional BMC associate membership.

Sadly the newsletters and mailing list are expensive to maintain and the fees above represent the true cost of administering it. As individual membership of the BMC (without High magazine) costs £15 alone the Medex membership fees represent very good value for money.

A membership application form is included at the end of this report.

For further information visit http://ourworld.compuserve.com/homepages/medical_expeditions

Membership Application Form

Please send to Medex, Pinfold, Hyssington, Montgomery, Powys UK.
Tel. ++ (0) 1588 620 614
Fax ++44 (0) 1588 620160

Date

Title **First Name** **Last Name**

Address

Post Code

Nationality

Telephone

Fax

Email

Date of Birth

Occupation

Type of membership:

1. Full UK membership, which entitles members to 1,2,3 and 4. (BMC associate membership for one adult) **Fee £16 / year**. (Add £4 for additional adults for BMC membership.
 2. Email membership (UK and International) which entitles members to 1 (electronic version) and 4. **Fee £12 / year**
 3. International postal membership entitles members to 1 and 4 **Fee £20 / year**
- Note that options 2 and 3 do not include BMC Associate membership and that Medex equipment discounts are not available to overseas residents.

Please note that if you are using BMC insurance then this will be invalidated if you do not take up the optional BMC associate membership.

I enclose a cheque for £

Membership runs from 1st April - 31st March.

Medex is holds records on computer. Tick here if you do not wish your records to be passed to another party. _____

http://ourworld.compuserve.com/homepages/medical_expeditions

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