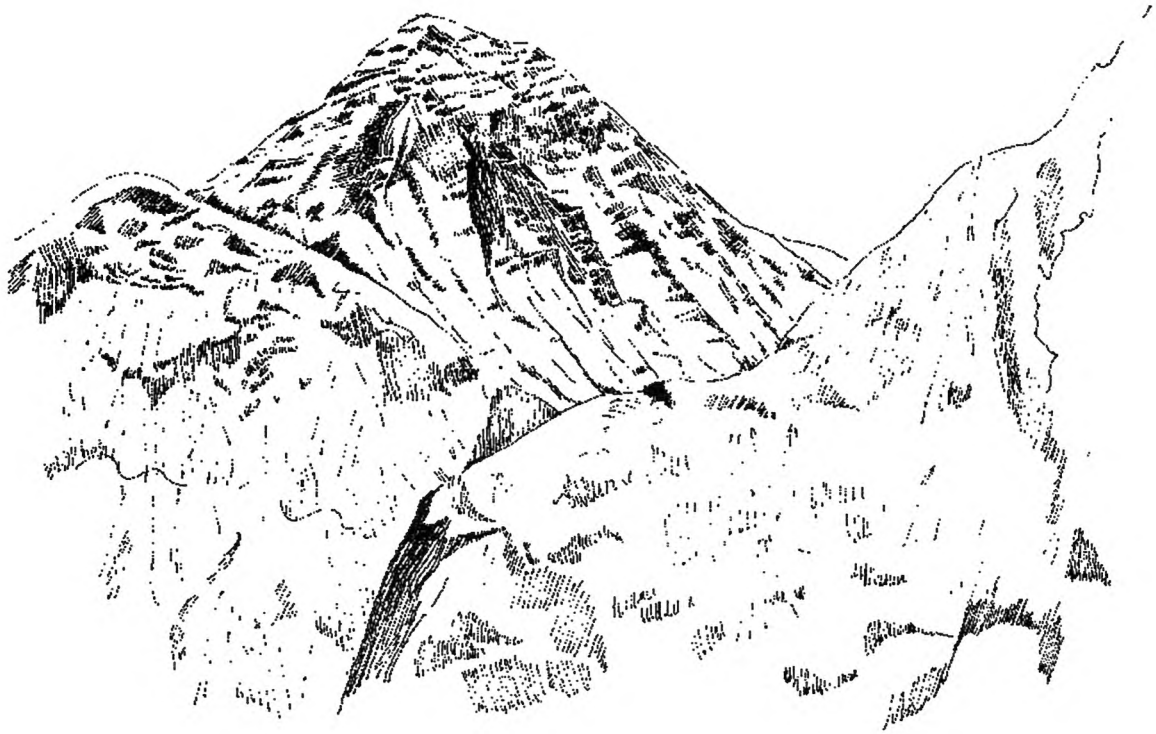


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British Mount Everest Medical Expedition 1994

Patrons: Lord Hunt, Chris Bonington and Dr Charles Clarke



Expedition Report

British Mount Everest Medical Expedition 1994



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Introduction

In many ways the British Mount Everest Medical Expedition 1994 was one of the strangest expeditions ever to go into the field. In all there were seventy five members drawn from all over the country with a few members coming from as far afield as New Zealand and America. Of the seven strong climbing team none had ventured above 7,500m before and nobody had had any experience of organising expeditions on anything like this scale. Many of the members aspiring to climb some of the lesser (6,000m) peaks had had very little mountaineering experience. Despite the huge costs involved the Expedition had no major sponsors and most of the mountaineering and research was to be financed by the members themselves. To make matters worse the Expedition had a set of objectives that went well beyond simply climbing Everest and a few of its neighbours. They proposed to perform 16 medical research projects, 2 environmental projects, conduct an educational campaign and promote the work of a Nepal based charity.

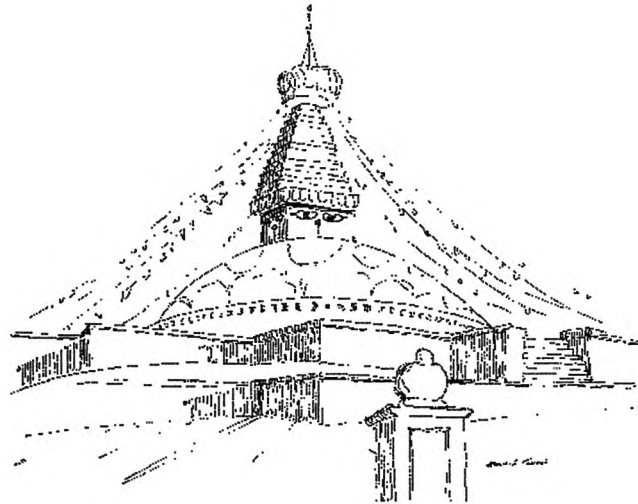
Not surprisingly before we left there were a few critics but the overwhelming enthusiasm of the members carried the project forward. It is, with hindsight, remarkable that the Expedition ever made it to Nepal and amazing that it achieved all of its objectives. As you will see in the ensuing pages the Expedition was most successful and it owes this success to the commitment and resourcefulness of all 75 members. Most importantly all personnel returned intact without serious accident.

The Research Teams grew over the years in scope and in stature and all research projects were completed despite the best endeavours of customs, yaks, extremes of cold and even avalanches at Base Camp. This Report summarises our preliminary findings but we anticipate that around 40 academic papers will be published in due course.

Everest evokes many images. To some it is a symbol of achievement to others a mountain of refuse and an object of derision. The popular press goes out of its way to make the image even more confusing. A few months ago a well known tabloid newspaper printed a double page spread with the bold headline, "300,000 people a year climb Everest". The article touched briefly on the environmental problems that this influx of climbers had had and made the bold statement that the, "Boffins on the British Medical Everest Expedition are going to install a loo with a view" .

Fortunately the facts are rather different. We neither installed a super-loo nor anything like it and, furthermore, only two Westerners, one Japanese and five Nepalese Sherpas reached the summit of Everest in the 1994 post monsoon season. The impression that climbing Everest is simply a matter of putting one foot in front of another up a well worn yak track bears no resemblance to the truth. Certainly there are few technical problems on the South Col route but nobody should underestimate the difficulty of even walking on the flat at altitudes of over 7,000m. let alone the cold and sense of isolation. Mix with that the dangers of the Icefall, avalanche and altitude sickness and you have an incomparable mountaineering adventure in a place filled with history. All of those who ventured into the Western Cwm felt immensely privileged to be there.

We have been criticised for taking too many people into the Everest area but I believe that we did this responsibly. The 75 strong team was divided up into 8 groups each with very different itineraries. At no point



did the entire Expedition assemble in its entirety and, most of the time, the members were spread thinly throughout the vastness of the Khumbu region at a time of the year when there were very few other trekkers in the area. All but 2 members did visit Base Camp but the arrivals of the groups were staggered over several weeks so as to minimise the numbers assembled there at any one time. Our environmental team made an assessment of the real pollution issues that afflict Nepal and demonstrated a very practical method for the safe disposal of human waste in a fragile mountain environment.

Far from being a refuse tip Everest was in near pristine condition thanks to the efforts of many clean-up expeditions and the reduced traffic in recent years. I am glad so say that we left the mountain in the condition that we found it.

I hope that by drawing contributions from across the Expedition that this Report will be more than a compendium of statistics and will evoke fond memories for those who took part. The Expedition was remarkable in that all 75 members were bonded by a strong sense of common purpose. It is impossible to describe the exhilaration of being involved with such a happy and successful project but I hope that this Report will go some way to convey the remarkable team spirit enjoyed by so many.

The Report paints a broad picture of those who took part, their projects and their exploits. Inevitably there are also a lot of dry fact and figures that may be of use to future planners as well as reports on borrowed, donated or discounted equipment.

The Evolution of the Expedition

In spring 1990, somewhere between Lukla and Jiri after our first trip to the Khumbu, Roddy Kirkwood and I realised that an Everest expedition was within the reach of ordinary mortals. We had spent the previous month climbing on trekking peaks and had shared much of the walk in with our New Zealand friends Rob Hall and Gary Ball who were in the process of making their first successful ascent. We had glimpsed the heart of an Everest expedition and our appetites were wetted.

A few months later, during a wet weekend in Wales, I got talking with Andy Pollard, who it seems, had been thinking about climbing Everest for years. Before I knew it Andy had, with typical efficiency, written a host of letters to trekking agents and signed them in my name. Within days the replies came rolling in. Most of them said that there was no chance of climbing Everest this century but one talked of a cancellation in 1994. We followed it up and by December 1990 we had an option on a permit. All we needed to do was find the Royalty (or peak fee) in full (then £2,400).

By March 1991 we had found a few people willing to speculate with their hard earned cash and we sent the money off to Nepal - we were committed. In the early days we were wonderfully naive about the fund raising process and assumed that corporate sponsors would be falling over themselves to sponsor a bunch of doctors climbing the highest mountain in the world. We were very relaxed about getting the funds because our budget at this time was based on a peak fee (Royalty) of £2,400.

Within weeks of getting permission we were delighted to receive the patronage of Mr Chris Bonington and Dr Charles Clarke whose presence on the headed note-paper gave the Expedition some early credibility. Lord Hunt became our third patron in 1992. The pre-eminence of our patrons undoubtedly made a significant contribution to the prestige and eventual success of the Expedition.

Our first crisis came in December 1991 when the Royalty was raised to \$10,000 by the Nepalese Government and made to apply retrospectively. By now we had recruited the nucleus of the climbing team. Charlie, Roddy, Andrew, Aidan and I met in Stirling to decide whether to continue. It was the first time that we had really got together and talked about our plans in any detail. It emerged that none of us had any real idea how to raise the cash but that we were all extremely enthusiastic and committed to the project. We decided to advertise for paying members of the climbing team and await the result. By then we had reasonably firm ideas about the research that we planned to do and we began to form a fledgling research team.

We placed the briefest of advertisements in the climbing press and for weeks my phone never stopped ringing. I was receiving about 5 phone calls a day from all over the world and was staggered by the overwhelming enthusiasm and support that people exuded over the phone. At the same time a few articles appeared in the medical and Scottish Press and they too generated a flurry of enquiries and even donations. We decided to organise an open meeting in the Lake District to gauge the support first hand.

In March 1992 over 30 complete strangers gathered at Dunmail Raise for the weekend and it became obvious that the mixture of medicine and mountaineering in the Everest region was a very powerful attraction. We had a great weekend of parapenting followed by a meal at the Old Dungeon Gill Hotel and the idea of a Support Group acting as guinea pigs for the research was born. With so many people now on board there was now no possibility of turning back.

In May 1992 the climbing team met in Oban and talked about attracting corporate sponsorship. There was lots of talk about "sexy packaging" and hype but nobody really came up with any good ideas.

The next bombshell erupted a few days before our next meeting at Blea Tarn in July. The Royalty rose from \$10,000 per Expedition to \$10,000 per person. Despite the horrendous weather and the gloom and pessimism preceding the weekend I emerged from it convinced that the Expedition would go ahead. If the level of enthusiasm amongst the Support Group had been high before it was now in the stratosphere. Jim Milledge attended the meeting and agreed to be our Research Advisor. He inspired us all with his excellent talk on the A.M.R.I. trip in the Old Dungeon Gill Hotel. Ronnie Robb was asked to join the climbing team and Alison Hargreaves also applied.

After that meeting Hannah Sutter kindly agreed to act as our legal advisor and drafted a Support Group contract, formed us into a limited company and registered us as a charity. What would we have done without Hannah? We prepared a colour brochure which Ronnie miraculously got printed and wrote a handbook which defined exactly what the Support Group would get for their money. By September we were ready to start taking £200 pound deposits which were designed to translate enthusiasm into commitment. I cleared off to South

Africa leaving my Mum to field the deposits as they flooded in. Within a few weeks we had received 40 deposits with 2 years to go before the Expedition was due to leave.

An October meeting and public lecture in Hyssington turned out to be a major turning point for the Expedition. In the audience was a relative of a trekking agent in Nepal who later made the trip to the UK to capture our business. Thus began our relationship with Thamserku. A relationship which saved us in the region of \$30,000 and meant that with a large Support Group the Expedition could be largely self financing but this is all still for the future.

While I was overseas Andy Pollard ran the Expedition. In February 1993 Mark Hoyle organised a press launch at the Aonach Mor ski fields. Brian Blessed agreed to come and give a lecture which turned out to be one of the best anecdotes of the Expedition - if you haven't heard it ask Ronnie (unfortunately it's too libellous to put in print). Swanlind (who for a time acted as our PR company) came along and made a promotional video and we had a good deal of television and press coverage.

We had initially conceived the idea of running a medical course as a way of increasing our prestige but it seems that once again we had underestimated the market. All of the courses at Plas y Brenin were hugely successful in terms of content, enjoyment, prestige and profit. The first one was in April 1993.

By the time of our meeting in the Lake District in July '93 the team spirit had really begun to work. Groups were emerging and people within the Support Group were beginning to plan and organise their own meetings. The Oldham Mountain Rescue Team proposed a team building weekend at Saddleworth which they organised and was a superb success.

In the autumn of '93 we made our flight reservations which represented another quantum leap in commitment but I was getting hassled by our Nepalese agent to hand over vast sums of money which we didn't have.

In November '93 Ang Tshiring Sherpa made the trip from Nepal to mid Wales to seek our business. We took a huge gamble and ditched our existing agent in favour of Thamserku and I believe this was the single most crucial decision of the Expedition. With the savings that we made by using Thamserku we were able to finance the Expedition without the need for a corporate sponsor. Thamserku, I consider, provided us with an exemplary service. Inevitably we had some difficulties and frustrations with the agent but they did cope admirably with the enormously complicated logistics of our Expedition.

By now the Team was meeting at monthly intervals and each meeting would typically be attended by 30 or 40 people some of them travelling from as far afield as Devon and Aberdeen. A winter skills training weekend, once again at Aonach Mor, was very successful and people who joined the Support Group as "trekkers only" began to aspire to the 6,000m summits of Himalayan Peaks. I am delighted to say that many ex hill-walkers now have a Himalayan tick to their names largely due to the success of this weekend on a wind swept Ben.

In March we took our training overseas for the first time and a small group had a go at ski touring in the Alps. This trip cost almost as much as climbing Everest!

The crux came in May 1994. The Expedition's cash flow was largely dependent on the Support Group following through and paying up on time. With increasingly urgent demands for huge sums money from the Nepalese Government and already committed to spending large amounts of other people's money, I confess that I felt more than a little pressurised. Fortunately virtually all of the Support Group paid up within a month of being asked, and we had a further surge of recruits after a Plas y Brenin Course in April. In June we even received our first corporate sponsorship - a cheque for £8,000 from the Royal Scottish Assurance.

By June I was becoming increasingly confident and even beginning to relax. This was helped by the rise in the value of the pound against the dollar. When I left for Pakistan in July I knew, for the first time, that we had enough money in the bank to cover most of our costs. It was, however, vital to maintain a tight control on spending as our budget was only designed to break even and any unanticipated expenses could have caused us a lot of problems. During the period from incorporation to February 1995 we turned over £294,395.36.

Highs and Lows from 1990-1994

From the day of our first open meeting in March 1992 the Expedition acquired an unstoppable momentum and although many hurdles were placed in our way we never really doubted that the Expedition would take place.

By far the greatest problem to confront us was cash and the rapidly escalating costs. Between 1992 and 1994 the Royalty alone rose from £2,400 to a staggering £53,000. In addition our Support Group budget was first calculated when £1 was worth US\$ 1.87. When we bought our dollars in July '94 £1 was worth just US\$ 1.5 and we had to buy 200,000 of them!

We were also unfortunate in the timing of our Expedition fund-raising. The 3 year campaign co-incided with one of the deepest recessions ever and companies had little cash to spare for public relations projects.

The quest for cash took us down some unlikely avenues. In the early days we were persuaded that gloss and films were the answer and we were actively courted by PR companies. It soon turned out, however that their naiveté was at least as great as ours and we gained little tangible advantage. Right up until the last minute various broadcasters and film producers were vacillating but in the end we had to rely on my trusty video!

The meagre amount of corporate backing we did receive (5% of turnover) came almost exclusively from the personal contacts of members and the huge quantity of trawling mail-shots that we sent out were, in retrospect, a complete waste of time.

In March '93 we all got very excited when we made a presentation to the board of a major pharmaceutical company which was received with great enthusiasm. For a while it seemed that our financial worries were over and the Expedition would be completely underwritten. Alas it was not to be. Ironically the Everest 40th anniversary publicity dealt us a cruel blow. Suddenly the press was full of stories of refuse on Everest and bodies on the South Col and our backers pulled out overnight.

The Expedition was fortunate in attracting the support of several distinguished figures as well as our patrons. All who went to the Lloyd's climb will have fond memories of the late John Smith who took time out of his busy schedule to browse our research displays. Similarly Brian Blessed's lecture at Aonach Mor in February '92 proved to be more than memorable!

We did achieve a reasonable media profile and the attention seeking escapades that we organised proved to be most enjoyable. Few people, after all, get the chance to swing from scaffolding in front of a swarm of cameras on the roof of London.

Pre Expedition Planning, Organisation, Training and Data Collection

We spent a great deal of time over the 2 years before departure building the Expedition into a cohesive team. At the same time we were keen to cultivate a media profile compatible with a serious research expedition in order to ease our fund raising problems. The events that we organised during the lead in period were therefore designed to achieve both goals.

Managing the Team

The thought of taking a 75 strong Expedition of mixed experience and ability to the high Himalayas is a daunting one. Coupled with that we wanted to conduct a complicated research programme on as many members as possible and, of course, climb Everest. The massive logistical problems threatened to limit the size and scope of the Expedition and these problems exercised our minds quite considerably about 18 months before our departure.

Fortunately we hit upon a very simple solution that worked very well. One year before our departure we divided the entire Expedition into groups and encouraged each group to meet and 'bond' before the Expedition as much as possible. By this stage in the Expedition the team had been meeting fairly regularly for about a year and some grouping was already beginning to take place, so it was a relatively easy task to form the groups provided that there was scope for individuals to move to another group if they preferred. In the end there was hardly any movement between groups during the 1 year lead in.

Having formed the groups we then decided on separate departure dates so as to minimise the pressure on the environment and on the hard pressed Research Team at Base Camp. We were keen to avoid individuals within groups being labelled as leader as this would carry with it unfair responsibilities and even possible litigation.

Instead we asked for volunteer spokespersons to act as the key contact person and to co-ordinate pre-expedition planning and meets. In addition we appointed one medical spokesperson to liaise with the Research Team and to be responsible for the day to day data collection. There were so many doctors around there was no need to name a group doctor.

On the whole the above structure worked well. There was a great deal of variation between the degree of 'bonding' before the trip and most of the groups remained intact and functioned well in the field. Some of the less experienced group organised pre expedition instruction weekends in the UK.

The logistical key to the whole Expedition was to make each group as autonomous as possible and to encourage them to plan their own routes and take their own mountaineering decisions. This meant that each group would be totally self contained with its own Sherpa crew and free to roam the Khumbu as it wished. We did ask each group to present itself at Base Camp on arrival and before departure from the Khumbu but imposed no other restraints. This independence within the Expedition framework made, I believe, all the difference between ours and a commercial trek. Members could plan their own objectives, train for a year to achieve them and carry responsibility for their own decisions. The absence of a guide, I am sure, heightened people's sense of satisfaction when they did achieve their goals - and most of them did.

As far as I am aware there were very few problems within groups related to decision making and everyone acted responsibly in assessing the conditions and their own abilities. This is reflected by the fact that there were no accidents. Groups seemed to be well satisfied with their sherpa crews and the quality of cuisine.

Medical Research Logistics

In addition to the projects administered from Base Camp we planned to collect a wealth of background data twice a day from Kathmandu onwards. This data collection was the responsibility of the medical spokesperson and, in most cases, this was performed meticulously. It is interesting that one of the non medics turned out to be the most assiduous data collector and medical spokesperson. Each individual was issued with a personal waterproof medical data book and the information on this was regularly transferred onto hand held computers. This data was eventually transferred to PC for processing. The palm held computers made by Psion proved to be very versatile and reliable..

One of the greatest problems confronting the Research Team was to 'process' groups quickly and efficiently as they arrived at Base Camp without confounding other projects. Some projects took a lot longer than others, some involved the administration of oxygen and some projects were dependent on having subjects not exposed to oxygen. Before leaving the UK each member of the Expedition attended one of two data collecting



The Graph above illustrates how the individual groups were staggered and kept separate in time and altitude in order to minimise environmental impact and ease the logistics of data collection at Base Camp.

weekends which proved a useful dress rehearsal in the relative comfort of laboratories in London and Stirling. Obviously these weekends provided vital pre-acclimatisation data.

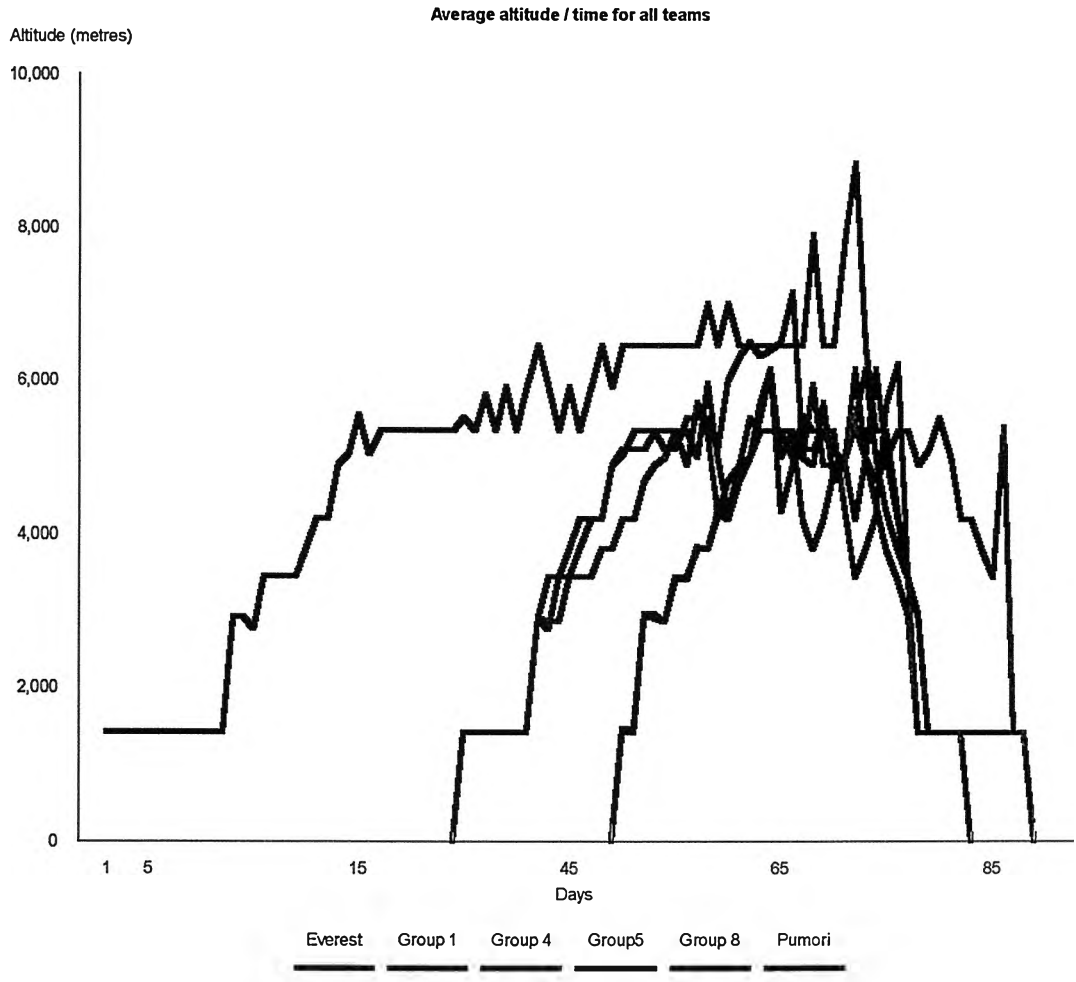
Inevitably groups were subjected to delays at Base Camp whilst they queued to be poked and prodded but there were few complaints and the Research Team collected a great deal of data.

Aims

- To make a safe and successful ascent of Everest and some of its neighbours.
- To raise the profile of altitude related illness.
- To make mountains safer for all by researching the mechanisms of altitude related illness.
- To seek, by research, sustainable ways of using remote and fragile mountain environments.
- To liaise with and involve local agencies in all environmental projects.
- To make the first female ascent of Everest without supplementary oxygen and make the first British ascent of Lhotse. .
- To collect medical data from the summit of Everest..
- To minimise environmental impact by using imported fuels and new technologies to dispose of waste
- To publicise and promote the work of the United Mission to Nepal (Nepal's largest development organisation).
- To promote informed discussion of the environmental issues associated with trekking and mountaineering in the Himalayas and to facilitate the exchange of scientific data.

Achievements:

- Dr Charlie Hornsby and Dr Roddy Kirkwood became the 21st and 22nd Britons to reach the summit of Everest (8,848m) on October 11th 1994. They were accompanied by Sherpas Dorje and Dawa Temba. During the season there were 3 other Expeditions attempting to climb from the South (Nepal) and 7 from the North (Tibet). Due to premature arrival of the Jet Stream winds only 2 Expeditions were successful. In the whole season only 2 western mountaineers (Roddy and Charlie), 1 Japanese (Muneo Nukita) and 5 Nepalese Sherpas succeeded. All ascents were made using supplementary oxygen.
- All fifteen of our medical research projects were successfully completed. In all 100,000 points of data were collected over the 3 month period from all 75 members of the Expedition. Much of the data is unique and, when processed, should yield valuable information. Scores of academic publications are anticipated in due course.
- Some data was even collected from just 200 metres below the summit (8,600m).
- Expedition members Chris Comerie, Mark Bryan and Paul Cleary reached the summit of the neighbouring peak Pumori (7,140m).
- Alison Hargreaves reached around 8,400m without supplementary oxygen before being forced to turn back due to high winds and the risk of cold injury.
- Members of the Expedition reached the summit of Island Peak (6,189m) and there were many ascents of Lobuje East (6,119m), Parchamo (6,273m) and Pokalde (5,806m). Only 2 out of 75 members failed to reach Base Camp (5,340m) which is an unusually low attrition rate.
- Our environmental team conducted a microbiological survey of water quality in the Khumbu valley. They demonstrated a safe and efficient method for the disposal of human waste at altitude which involved freeze



drying followed by incineration. All of the Expedition's waste was dealt with in this manner. They also documented some of the environmental problems in Kathmandu and lectured to the Royal Nepalese Institute of Science and Technology on aspects of waste disposal. The Expedition abided by the environmental code of conduct laid down by the UIAA and received a full rebate on its rubbish bond. Only 8 members of our Expedition were allowed to climb into the Western Cwm. Overcrowding was not a problem as only 21 climbers were attempting the mountain from the South side this season. Base Camp was found to be free from rubbish on our arrival and we left it in the same condition.

The Expedition has been extremely successful in its educational role. Four residential altitude medicine courses have already taken place and another is planned for late 1995. These have been attended by some 300 doctors and 250 laymen. One member of the Expedition is currently preparing a book aimed at GP's covering all aspects of high altitude medicine. Many articles have also been published in the medical press. As already mentioned we anticipate producing scores of academic publications in 1995.

The Expedition formed a promotional partnership with the United Mission to Nepal. The publicity surrounding the Expedition has been used by one of UMN's funding organisations to highlight some of the problems afflicting Nepal. This will form part of an ongoing fund-raising campaign. The Expedition has received significant T.V. and press coverage over the last 2 years.

During the 3,000 man days the Expedition was in the field there was inevitably some illness. Some of this was serious but there were no accidents and all members returned safely and unscathed.

Medical Research

Research Leader: Dr David Collier MBBS PhD, **Research Advisor:** Dr James Milledge MD FRCP

Members of the Medical Research team include: Dr Peter Barry DCH MRCPI, Dr Rachel Pollard FFARCS, Dr Andrew Pollard BSc MRCP, Dr Scott Frazer FFRACS and Dr Nick Mason FFRACS, Mr Peter Pollard MSc, Miss Isla Martin, Dr Martin Rosenberg PhD, Dr. Catherine Collier BSc MB BS, Miss Diana Depla FCOph, Prof. G. Arden FRCS, Dr Frederick Fitzke PhD, Mrs Angela Fry RGN, Miss Karol Howard RGN RCM, Dr Gerald Dubowitz MB BS, Dr Simon Travis MRCP, Dr John Nathan MB BS, Dr David Webb MD FRCP MFPM, Dr Chris Wolff MD MRCP, Dr Annabel Nickol BSc MBBS, Dr David Band PhD, Dr O'Callahan MB ChB, Dr Datta MB BS, Dr Mike Mullen, Doncaster Royal Infirmary.

Medical Institutions involved with BMEME;

St. Bartholomew's Hospital, Department of Clinical Pharmacology. St. Bartholomew's Hospital, Department of Cardiology. Kings College Hospital, Department of Physiology. St. Thomas' Hospital, Department of Medicine. Queen Mary and Westfield College London, Department of Physiology. Charing Cross and Westminster Medical College, Department of Medicine. Moorfield's Eye Hospital, London. The Institute of Ophthalmology, London. Veterans Administration, Seattle, University of Washington, Department of Respiratory Medicine. Institute of Medical Research, Northwick Park Hospital, Harrow. Stirling Royal Infirmary, Department of Obstetrics and Gynaecology. Birmingham Children's Hospital, Department of Medicine. Edinburgh University, Medical Research Council Unit. John Radcliffe Hospital, Oxford, Department of Medicine. Glasgow Western Royal Infirmary, Department of Respiratory Medicine. Royal Hallamshire Hospital, Sheffield, Department of Anaesthetics

Members of the Expedition who travelled to Nepal include: - A team of seven climbers who attempted the ascent of Mount Everest. Five environmental researchers who undertook projects to reduce the environmental and health impacts of high altitude trekking, looking specifically at methods of dealing with human excrement and the appropriate treatment of solid waste. Twelve medical researchers who undertook fifteen projects into subjects as diverse as the control of breathing during acclimatisation, balance and orientation, carbohydrate absorption and the role of endothelin in high altitude pulmonary oedema. Fifty members of the support group who climbed 6,000m peaks in the Everest region. They acted as subjects in the research projects, and also collected basic physiological data during the expedition.

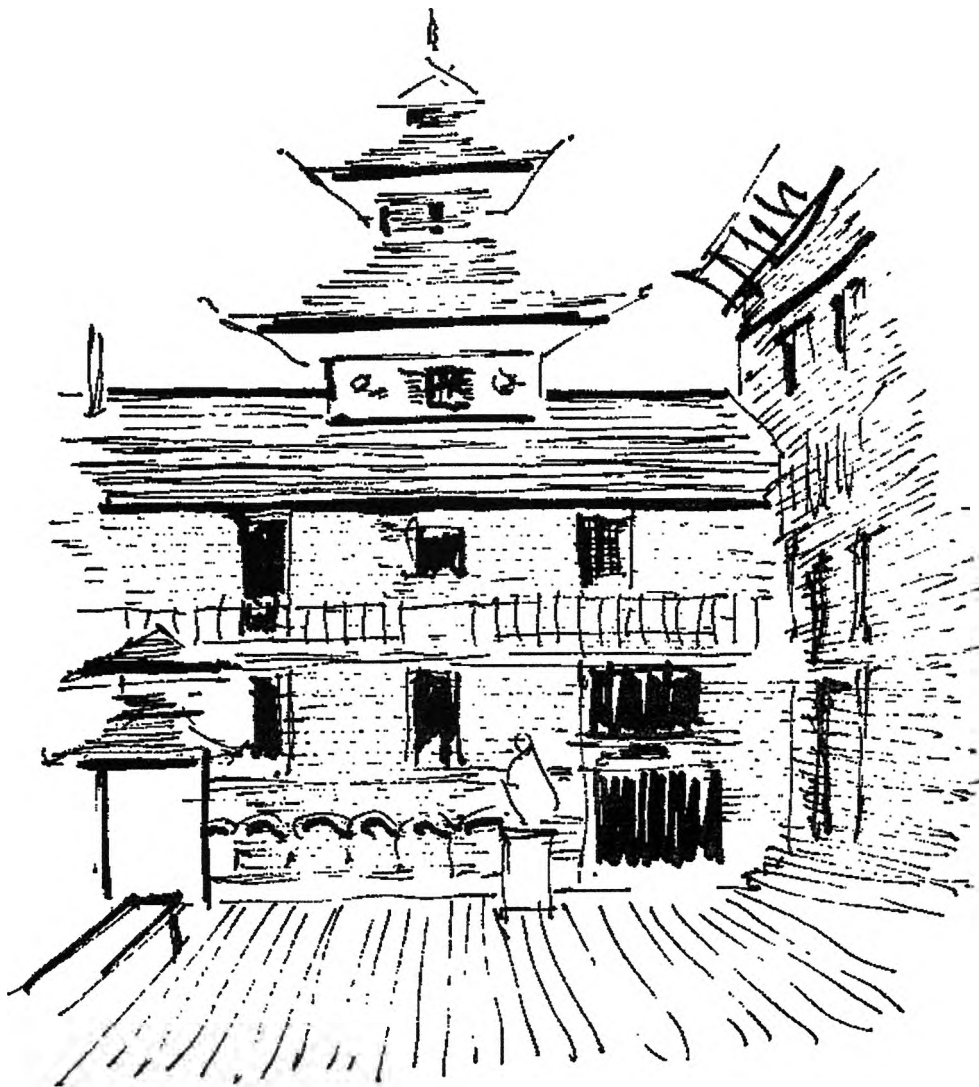
Expedition members were allotted to one of a number of trekking groups, designed to travel independently in the Everest region. Each group flew out from Kathmandu to Luklha (2,800m), and then trekked to base camp (5,300m) over a two week period or so. The groups were staggered so as to minimise their environmental impact and so as not to overwhelm the researchers waiting for them at base camp.

There were fifteen main medical research projects undertaken at base camp. Each trekking group had a three day period (or thereabouts) at Base Camp to get all their research done before they moved off and the next group arrived. As can be imagined, it was sometimes difficult to get all the research finished in the allotted time.

Apart from two groups, expedition members were meant to visit base camp on two occasions, once within the first two weeks of their journey, before they had acclimatised, and once ten days or more later, after acclimatisation. For two groups, the second visit was not compatible with their climbing itineraries.

Conditions on the mountain: The first wave of expedition members travelled to Nepal at the end of July, 1994. The monsoon is normally followed by a short period of relative calm, with low winds and clear skies, before the jet stream settles on the mountains and winter sets in. Unfortunately this year there was no such period, and high winds, estimated at up to one hundred and twenty miles an hour, swept the mountain almost constantly.

Despite this, members of the expedition were successful in their aims. The Everest climbers all reached over eight thousand meters, with two successfully reaching the summit at 8,848 meters, two of only three Western



climbers to reach the peak this season. The last of our climbers only turned back when high winds blew away his tent and equipment from the South Col.

Three members of the Expedition climbed Pumori, an exacting mountain of over seven thousand meters on the Tibetan border. Others climbed Pokalde, Imja Tse, Parchamo and Lobuje mountains, all six thousand plus metre peaks.

One of our climbers suffered an acute stroke, losing the power in one side of his body, and a member of another team lost the vision in one eye within a few hundred meters of the summit. Both were accompanied down to our base camp to be examined, and thankfully both have completely recovered.

The Research Environment: The original plan was to site Base Camp at Gorak Shep and use the traditional site as an advance Base Camp. Although this would have provided a much more comfortable environment in which to conduct the research it would have made the climbing logistics vastly more difficult.

Base Camp was therefore sited at 5,330 metres on the rock covered glacier at the foot of the Khumbu Icefall. Being the first expedition to arrive we sited it as near to the foot of the Icefall as possible which is the prime location. This, however, proved to be a mixed blessing.

Many of the Research team spent seven weeks at Base Camp which, in itself, is a substantial feat of endurance. The altitude, cold, relatively poor food and discomfort of camping on a creaking rock-covered glacier add up to create a harsh environment in which to perform research. I have listed below some of the other factors that made data collection difficult at Base Camp.

The first problem to afflict the Research Team was the absence of a suitable tent. Thamserku Trekking (our agent) had agreed to supply a second large Ferrino mess tent but unfortunately this never materialised. Instead we had to make do with a variety of flimsy, single skin nylon ridge tents which sadly were not weather proof. Excavating adequate flat sites for these tents proved a strenuous and exhausting task. During the last weeks of the monsoon there were frequent snowfalls and occasional rain showers and the tents had to be reinforced with hired plastic sheets. During this period the typical weather pattern was a bright, sunny morning with clouds and precipitation arriving by mid day. Typically the afternoons were cool and were followed by a clear, cold night. As the Expedition progressed the afternoons became less cloudy with less precipitation.

Diurnal temperature variations (-18 to +25 degrees C) meant that use of some of the equipment could only be used once the temperature had stabilised thus limiting the length of the working day. Despite taking 2 new top of the range 8 horse power generators with us we had difficulty in maintaining a reliable power supply. Much time was used in maintaining the generators. Furthermore research time was also restricted to some extent due to electronic interference with the radio schedules. More careful selection of a radio frequency would have avoided this problem.

Some equipment did not survive the rigours of the approach march. Portable computers fared worse two of which suffered screen failure and one hard drive failure. Some work was delayed by the late arrival of equipment due to freighting and customs delays followed by shortages of yaks.

The most devastating single event to afflict the Research Team happened in the middle of the night. A large serac broke off from high on the Lo La (the 6,000 metre Col above Base Camp). The falling serac triggered an avalanche which pushed before it a blast of wind. Although the avalanche itself did not reach Base Camp the wind blast did. Such winds can be over 100 miles per hour and in our case the blast was channelled several hundred metres horizontally before striking Base Camp. The blast ripped selectively through the camp taking out 3 of the research tents but leaving many of the other tents untouched. The McInnes Box tent weighing 78 kg was ripped up, blown clean over another tent and travelled about 40 metres before colliding with the Mess tent. Ironically this same tent had survived an avalanche at Camp 2 twenty years earlier on Bonington's South West Face Expedition. Fortunately nobody was hurt but the research tent and their contents were severely damaged. In the middle of the night the Base Camp residents worked frantically to retrieve scattered gear and rebuild the shelters. Despite the devastation much of the damaged equipment was repaired and, with some improvisation, none of the projects were compromised.

Many of the Support Group subjects arriving at Base Camp were inevitably suffering from acute mountain sickness and their fortitude in the face of a battery of intensive medical testing meant that little data was lost due to illness. However, the difficulty of crossing the glacier from Gorak Shep and the cul de sac position meant that some data was lost. Understandably those groups on a tight schedule were unable to make the return trip for the second data collection session at Base Camp. Despite these many difficulties and the

shoe-string budget that they had to operate within the Research team collected nearly all the data they had set out to collect. This is a tribute to their dedication, improvisation and stoicism.

The Projects so far (March 1995)

I have set out below summaries (by David Collier) and *abstracts* (by the individual researchers depicted in italics) of the first projects to be written up since our return (4 months ago at the time of writing). Most of the abstracts shown below were presented at the Meeting of the Society of Wilderness Medicine at Lake Louise in February 1995. Many projects have not yet been written up in any form and these are only mentioned in outline. It is anticipated that it will be several years before all of our data gets written up.

□ Changes in Spirometry at Altitude:

Extensive measurements of lung volumes and expiratory flow rates before and during acclimatisation. Results so far analysed show a decline in forced vital capacity (the largest amount you can breathe out) while staying at altitude. This fall in air capacity appears to be because of an increase in the amount of blood in the lungs, as the fall in volume is greatest in those with a lower blood carbon dioxide concentration. (Those with lower CO₂ levels will be better oxygenated, and as low oxygen shuts down the blood vessels in the lung, these people may have larger blood volumes within the chest). There is also interest in the possibility that people with larger lung volumes at sea level may be protected against acute mountain sickness.

Changes in Spirometry at Altitude

Pollard, A.J., N.P. Mason, P. Barry, R.C. Pollard, R.S. Frazer, D.J. Collier, J.S. Milledge.

British Mount Everest Medical Expedition 1994, 63, Estria Rd. Birmingham B15 2LG, UK

Peak expiratory flow (PEF) rises with altitude because of the decreased air density but devices for measuring PEF which are themselves affected by air density under-read. We collected spirometric data from 52 members (aged 19-55 years) of the 1994 B.M.E.M.E. at sea level (1012.1 - 1015.5 mB) and at Everest Base Camp (5,300m, 530 -547 mB) with a pocket turbine spirometer (Microspirometer, Micro Medical, UK), which is not affected by air density, and compared its performance with the density dependent Mini Wright Peak Flow Meter. Mean oxygen saturation at 5,300m was 80.7% (0.75) and 97.6% (0.33) at sea level. Using the Microspirometer there was no significant change in FEV1 ($p>0.1$); FVC fell by an average of 5.3% (0.94; $p<0.001$); and PEF rose by 23.5% (2.09; $p<0.001$). PEF, measured with the Mini Wright Peak Flow Meter, fell by 7% (1.24; $p<0.001$). We did not show a lower PEF in individuals with acute mountain sickness (AMS). The fall in FVC has been previously attributed to interstitial oedema but we found no change in FVC after 7 or more days of acclimatisation compared with the first 3 spent at Base Camp. This data confirms the rise in true peak flow at 5,300m and shows that the Mini Wright Peak Flow meter under reads by 30% at 5,300m. Supported by Micro Medical UK, Smith Kline Beecham, Zeneca.

Spirometry and Chronic Hypoxia

Mason, N.P., A.J. Pollard, P. Barry, R.C. Pollard, D.J. Collier, J.S. Milledge

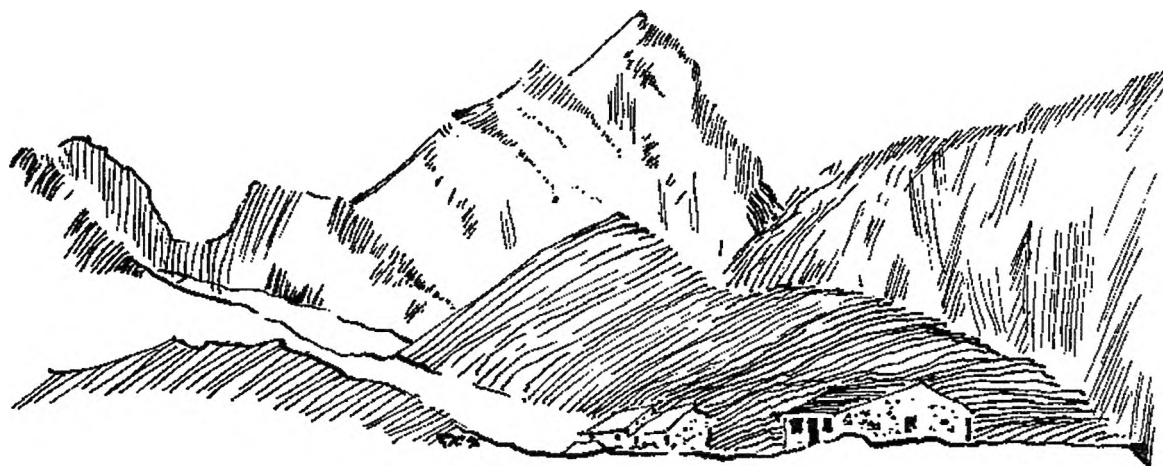
British Mount Everest medical Expedition 1994, 63 Estria Rd. Birmingham B15 2LG, UK

Chronic hypoxia causes a decrease in expiratory flow rate in adults with chronic obstructive pulmonary disease which is reversible with oxygen (Libby et al, 1981). We used altitude as a model to study the effect of chronic hypoxia on spirometric measurements using a pocket turbine spirometer. We administered oxygen for 5 minutes to 47 subjects (age 19 - 55) on the B.M.E.M.E. 1994 at Everest Base Camp (5,300m) using an open circuit system at 1L/min via a face mask. Mean Oxygen saturation rose from 80.7% before oxygen to 93.5% after 5 minutes of oxygen. There was no significant effect on FEV1 or FVC. PEF fell by 2.3% ($p<0.001$). 34 non asthmatic subjects were given salbutamol which produced no significant change in FEV1, FVC or PEF. Four asthmatics had a mean rise in FEV1 of 10% and PEF increased by 5%.

We have not been able to demonstrate any improvement in PEF, FEV1 or FVC after administration of oxygen or salbutamol at 5,300m except in asthmatics who responded to bronchodilator.

Supported by Smith Kline Beecham, Zeneca and Micro Medical UK

□ Does hypoxic vasoconstriction predict risk of high altitude pulmonary oedema (HAPE)? Dr Andrew Peacock, Dr John Nathan, Mr Martin Giles & Dr David Collier. Department of respiratory medicine, Glasgow



Western Royal Infirmary, Departments of cardiology and clinical pharmacology, St Bartholomew's Hospital, London.

HAPE kills climbers every year. Those affected have fluid in the lung airspaces and cough up frothy spit. Studies looking back comparing climbers with a good history of altitude climbing with those who became ill with HAPE have shown that those who became ill with HAPE tend to shut down their lung blood vessels more when they are exposed to low oxygen levels (HPVCR). Our study aimed to measure HPVCR before the expedition and see if any member who developed HAPE could have been predicted to be at risk in advance. Fortunately for members, but alas for the study, we had only one member with clear evidence of HAPE. He had shown a strong tendency to shut his lung blood vessels when exposed to low oxygen levels in London. This work may be combined with other similar studies to assess the value of HPVCR measurement. If we could predict who is at high risk of HAPE they could benefit from taking a drug to protect them against HAPE (nifedipine). Because of our healthy expedition, the data will probably need to be added to further studies to give enough statistical power to answer this question.

Can simple measurements predict day-to-day performance at altitude? Dr David Collier & Dr Andrew Pollard. Department of Clinical Pharmacology, St Bartholomew's Hospital, London & Department of Infectious Diseases, St Mary's Hospital, London.

There are no accepted ways of predicting who will perform well at high altitude, except previous history of success. There are also no accepted ways of telling who will perform well on a given day, or who might become ill. Because of the large number of people on the expedition, we had a unique opportunity to study these questions. All members of the team performed many simple measurements each day before and during their ascent to altitude. Measurements included blood pressure, heart rate, oxygen saturation, acute mountain sickness score and lung volumes. We are beginning to analyse this enormous pool of data, but it will be many months before the task is complete.

Respiratory Defence, Dr Peter Barry DCH MRCPI, Research Fellow, University of Leicester.

Muco-ciliary Clearance at Altitude

Barry PW, Mason N, O'Callaghan C. British Mount Everest Medical Expedition 1994, Dept. of Child Health, University of Leicester, UK LE2 7LX

Obstruction of the nasal passages significantly increases the work of breathing and subjective feelings of respiratory distress. Such obstruction may also affect performance at altitude. Mucous lining the respiratory tract is cleared by the action of cilia, beating in waves to carry secretions to the pharynx. We studied members of the B.M.E.M.E. at altitudes up to 5,300m. Subjects recorded their nasal patency (as patent, partially

blocked or blocked) for both nostrils on 2 occasions each day of their ascent. The saccharin test, a measure of muco-ciliary transport, was undertaken at sea level, on arrival at 5,300m and after 10 to 14 days at 5,300m. A small amount of saccharin was placed 1 cm from the anterior end of the inferior turbinate of one nostril. The time taken for the saccharin to be tasted, representing transport to the pharynx, was noted. Nasal patency was reduced with ascent to altitude and saccharin times were increased. These results indicate impaired muco-ciliary transport and increased blockage of the upper airway at altitude. It remains to be determined if this is due to altitude per se, or as a result of the low air temperatures and humidity experienced during the expedition.

□ **Respiratory defence at altitude.** Dr Peter Barry, Department of Paediatrics, University of Leicester.

The first systematic studies of cough and airway defences at altitude have already shown- cough does indeed increase with altitude (nocturnal cough monitoring), cough challenges with mists of weak acids show that the cough response is produced more easily after a prolonged stay at altitude. The results of light and electron microscopy of tissue samples of the cilia (hair cells) in the nose are awaited.

Respiratory Defence Mechanisms at Altitude An Interim Project Report. 11 December, 1994 by Peter Barry

Purpose This project was planned to determine the effect of travelling to extreme altitude on the production of cough, and the structure and function of respiratory cilia. Using validated research methods, we planned to determine cough frequency, citric acid cough thresholds, muco-ciliary transport rates, ciliary beat frequency, ciliary ultrastructural abnormalities and sputum character in a large group of healthy volunteers travelling to 5,500m or higher.

Plan of Investigation and Methodology

Overview We aimed to perform flow volume curves (pre and post cough challenges), cough challenges, saccharin tests and take ciliary samples on three occasions - before leaving the UK (UK1), on arrival at base camp (BC1), and after two weeks acclimatisation at altitudes of 5,000m or higher (BC2), We also have the opportunity to undertake further tests in January in the UK (UK2).

Cough monitoring, flow volume curves, and nasal patency scores were also undertaken at various altitudes on ascent to base camp.

Saccharin Test: 3-5 grains of saccharin, approximately 1 mm in diameter were placed on the inferior nasal turbinate 1 cm from the anterior end. The subject was asked not to sniff, sneeze, smoke, eat or drink during the test. The time taken to the initial perception of a sweet taste was recorded. If no taste was experienced after sixty minutes, the test was stopped.

Nasal Blockage: Subjects recorded the patency of both nostrils on two occasions each day throughout their ascent to base camp. Subjects occluded each nostril in turn and sniffed. Patency was noted as 'patent', 'partially blocked', or 'blocked' for each nostril.

Ciliary Sample Collection: A small bronchoscopy brush was used to collect ciliated cells from the middle turbinate of the nose. The nose was first anaesthetised with 1% lignocaine spray. After five minutes, two brushings were taken from the nose. One sample was placed into 4% gluteraldehyde for electron microscopy studies, and the other into tissue culture medium MDE 199 with 20% dimethyl sulfoxide for beat frequency analysis. The samples for beat frequency analysis were stored on ice for 24 hours, and then placed into liquid nitrogen.

Electron microscopy and ciliary beat frequency will be determined in our laboratory using previously validated methods.

Sputum and Cilio-toxicity Sputum samples from subjects were to be collected whenever available and stored in liquid nitrogen for subsequent analysis in the UK.

Cough monitoring: Frequency of nocturnal cough was measured using portable voice activated tape recorders placed adjacent to the subjects head each night.

Citric Acid Cough Challenge The citric acid challenge was given as successive inhalations of doubling concentrations of citric acid, beginning with a 0.03125% solution, and ceasing when the cough threshold (see below) or the maximum concentration (32%) is reached.

The solution was nebulised using a hand-held ultrasonic nebuliser (Easimist, Medix, Lutterworth, UK). Subjects were trained to inhale from residual volume to total lung capacity over five seconds. After breathing normally, subjects exhaled to residual volume, switched the nebuliser on, and inhaled steadily over five seconds to total lung capacity. Subjects repeated the inhalation three times with each concentration. They then waited up to two minutes while the nebuliser solution was changed.

The cough threshold was defined as the lowest concentration of citric acid that provoked cough, provided that the following concentration also provoked cough.

Standardisation of Cough Challenge: *To assess the reproducibility of the inspiratory manoeuvre, a micromedical spirometer was modified to measure inspiratory flow. Subjects were instructed to inhale from residual volume to total lung capacity, as in the cough challenge, over five seconds through the spirometer. The inspiratory flow rate and capacity were recorded, and the procedure repeated on five occasions.*

Aerosol output from the nebuliser over a two minute period was collected on a Respirgard filter. This was then washed, and the washings returned to the UK for HPLC determination of the amount of citric acid deposited on the filter. The experiment was repeated in the UK, allowing the citric acid output of the nebuliser at sea level and 5,300m to be compared.

Humidifying face masks: *Humidifying face masks were worn overnight (or as long as tolerated) by a group of six acclimatised individuals. Citric acid cough challenges were undertaken at the same time of day before and after wearing the masks, and comments as to the masks suitability recorded.*

Flow Volume Curves: *Flow volume curves were recorded with the subject in the sitting position using the MicroMedical Microloop device and recording the data on a PC. Flow volume curves were recorded before and after cough challenges in the UK and at BC1 and BC2, and in smaller groups at different altitudes up to 6,400m.*

Blood Gas and Haemoglobin Analysis: *Using a Ciba Corning 248 blood gas analyser, we analysed samples of capillary and arterial blood from subjects before and after acclimatisation (BC1 and BC2). Haemoglobin levels were measured using a Hemocue Haemoglobinometer.*

Subjects Data for the medical projects was collected over two weekends in July in the UK (baseline or UK1 data) on first arrival at base camp (BC1) and then on the second visit to base camp (BC2). I have examined the lists, and I hope that the following is not too confusing.

78 people were on the expedition mailing list at the time of the first data collection weekends. This includes me, so there were 77 potential subjects for the project.

Six people withdrew from the expedition at the time of the first data collection weekend for family or financial reasons, leaving 71 potential subjects. Two of these did not join the expedition in time to attend the data collection weekend, leaving 69. Of these four were living abroad and could not attend the data collection weekends. So there were 65 potential people for the UK data collection.

Firstly for the cough challenge. When writing the protocol, we decided that we could not safely undertake cough challenges on people who suffered from asthma, bronchitis, or airways obstruction. 17 people were excluded because of this, leaving 48 potential subjects. Of these, three did not attend the data collection weekend, and 45 challenges were undertaken.

At the first base camp visit, there were 51 potential subjects (48 above, plus three who had been abroad at the time of the UK data collection - the fourth was asthmatic and was therefore excluded). Three were too ill to be tested, and three were missed. 45 challenges were therefore undertaken.

From this there were 42 pairs of data from both the UK1 and BC1 out of a potential maximum of 48 pairs (87.5%)

At the second base camp visit, fifteen of those eligible were not scheduled to return, as described above. Therefore the maximum number of potential subjects was 36 (51-15). Of these, four were too unwell to be tested, two were missed and six did not return (the main reason being that they did not want to endure the hard walk across the glacier). 24 challenges were therefore undertaken, and 23 pairs of data from BC1 and BC2 recorded out of a potential of 36 (67%).

As far as the saccharin test goes, similar calculations to the above can be undertaken to determine how many people were eligible. There were 65 subjects in the UK who could have attended the data collection weekend. Six did not attend, and two were missed (the numbers differ from the cough challenge as patients with asthma are eligible for saccharin tests). 57 saccharin tests were undertaken in the UK.

The first two groups to arrive had saccharin tests undertaken by a co-worker. Unfortunately, these tests were not undertaken in the same way as the baseline or subsequent tests, and these two groups have been excluded from the analysis. This protocol violation has affected 21 subjects of the 69 potential subjects for saccharin tests at base camp. Furthermore, 8 of the remaining subjects were missed and 5 were too unwell to be tested. Thus 35 saccharin tests were undertaken, giving 33 sets of paired data between UK and BC1, out of a maximum of 44 (75%), assuming that one considers that the protocol violation has affected the group in an arbitrary manner.

Of the 69 who may have been eligible for a second saccharin test at base camp, 20 were not scheduled to return, leaving 49. Of these, 6 were unwell, 13 were missed and 7 did not return. Thus 23 saccharin tests were undertaken at BC2, giving 12 pairs of data between BC1 and BC2, out of 49 potentials. To put it another way, 12 of the 18 scheduled to return who had valid BC1 measurements, had BC2 measurements. Furthermore, there were 23 out of 40 possible UK - BC2 pairs.

Overnight cough monitoring was undertaken on a group of eight at altitudes of between 3,400m and 5,300m and a separate group of five at altitudes of 5,300 to 6,400m.

Humidifying face masks were worn overnight (or as long as tolerated) by a group of six acclimatised individuals. Citric acid cough challenges were undertaken at the same time of day before and after wearing the masks, and comments as to the masks suitability recorded.

Interim Results

Saccharin Test *As noted above, a protocol violation means that some of the BC1 saccharin data has been discarded. The remaining data has been paired, and analysis is currently being undertaken. However, interim analysis indicates that the saccharin time is prolonged by ascent to and stay at altitude, as summarised in the graph:*

Nasal Blockage *I am still waiting to receive the data on the nasal patency scores to analyse.*

Ciliary Sample Collection *About 120 samples in tissue culture medium and 120 samples in gluteraldehyde were taken and safely transported back to the UK. Sampling was difficult, and I am concerned that the samples taken were of very low quality. Samples will be stored until the time and finance can be found to allow their analysis.*

Sputum and Cilio-toxicity *In the event, no sputum samples were collected due to logistical problems.*

There were a number of problems with the monitors, which stopped working very quickly above 5,000m, even with fresh batteries. This is part of the reason why the data is so patchy. Also some equipment and tapes were 'lost' from base camp. There are, however, still some tapes to be analysed.

The conclusion from this data is that cough frequency increases with altitude, and increases markedly in those who ascend to altitudes greater than 5,300m.

The results suggest that citric acid cough threshold goes down with a prolonged stay at altitude, but that there is no difference in cough threshold with acute ascent to 5,300m. The power of the study to detect a difference needs to be computed.

Standardisation of Cough Challenge *The coefficient of variation for inspiratory capacity and peak inspiratory flow ranged from 6-19% (inspiratory capacity) and 4-40% (peak inspiratory flow) for the six subjects. Mean coefficient of variation was 12.1 (95% confidence intervals 8.9-15.2%) for inspiratory capacity and 21.9 (14.8-33.7%) for peak inspiratory flow.*

At base camp the output of the nebuliser was collected on to filters (nebulising the 8% solution for two minutes). These were washed, and the washings stored for analysis in the UK. Mass output of citric acid from the nebuliser at base camp will thus be compared with similar measurements made at sea level.

The humidifying masks were in general poorly tolerated and made no difference to cough thresholds.

Flow Volume Curves 306 flow volume curves were recorded. I am currently trying to determine the best way of analysing these.

Blood Gas Analysis 29 'pre-acclimatisation' (BC1) and 37 'post-acclimatisation' (BC2) blood gases were measured, including 10 pre/post (BC1-BC2) pairs, and four arterial/capillary pairs.

Initial analysis shows a significant reduction in PCO₂ ($p=0.007$), and a significant increase in PO₂ ($p=0.0625$) and haemoglobin ($p=0.011$) with acclimatisation. It is just a pity that there isn't more paired data, and the blood gas analysis will be of more use as supportive data for other projects.

There were no clear differences in the pre-post acclimatisation paired data, but this hasn't been fully analysed and the numbers (and hence the power to detect a difference) are very small.

The arterial-capillary comparisons showed higher capillary CO₂ (95% confidence intervals for the difference 0.25 to 1.22 Kpa) and standard bicarbonate (95% confidence intervals for the difference 1.29 to 3.86mmol/l) and lower (less negative) base excess (95% confidence intervals for the difference 1.69 to 5.3). There was no discernible difference between arterial and capillary pH or PO₂, but the numbers are very small. We could perhaps argue that this data shows the difference between arterial and capillary gases, taken under our experimental conditions, is small in a clinical sense, and therefore our use of capillary sampling is justified.

Conclusions and Suggestions for Further Work: The main conclusions from the above are: Saccharin times increase with altitude and time at altitude. Cough frequency increases with altitude, especially in those who ascend the highest, cough threshold decreases with time spent at altitude.

There are two opportunities for further work. Firstly at the post-expedition research weekend (UK2, January 1995). At this I should get those on whom I don't have baseline data and assess inspiratory flow repeatability on a larger group of people. I am not sure if I should do anything else.

Secondly, there may be an opportunity to undertake some work in a pressure chamber in Aberdeen towards the end of next year. This would have the advantage of allowing changes in 'altitude' without changes in environmental conditions, such as temperature and humidity. The costs to us would be our time and equipment, as the rest would be funded by Aberdeen.

We should therefore seriously consider repeating the cough threshold and cough monitoring, and the saccharin tests on this group.

Planned presentation of results Data from the blood gas analysis will probably be written up as an abstract for the Hypoxia '95 conference in Canada, February 1995.

The Saccharin test data and nasal patency scores could also probably be presented there.

The data on cough thresholds and monitoring will probably be written up as an abstract for the European Respiratory Society meeting in October 1995.

The data on flow volume loops could also perhaps be presented somewhere (possibly the BTS Winter 95)?

If the ciliary ultrastructure and beat frequency samples produce data, they, with the saccharin test, would fit together as one paper. The cough thresholds and monitoring would be another. The data on flow volume loops would be a third

Cough challenge results: Numbers indicate the solution that provoked cough when nebulised and inhaled according to the protocol.

Heart rate variability and autonomic tone at altitude. Dr Mike Mullen, Dr Nick Mason & Dr Peter Barry. Department of Cardiology, Doncaster Royal Infirmary, Department of Anaesthetics, Royal Hallamshire Hospital, Sheffield & Department of paediatrics, Leicester Royal Infirmary.

More advanced mathematical methods of analysis have recently allowed the various frequencies of change in heart rate to be studied. Briefly the two major nerve controls to the cardiovascular system alter heart rate at different speeds- the vagus nerve acts quickly in response to changes in blood pressure and other stimuli. The sympathetic system alters heart rate more slowly. So we can begin to separate some of the influences on heart rate just by recording heart rate and later looking for patterns of change in the records. We collected large

numbers of 24 hour recordings on support group members, and also significant amounts of recordings on climbers at extreme altitudes up to about 8600m, just below the South summit of Everest. The recordings will take some time to analyse and results will probably not be available until summer 1995.

An interim report on British Heart Foundation Project Grant No PG/94057 3 November, 1994 by Peter Barry

Introduction: This interim report, written only a week after my return from Nepal, outlines the progress that has been made with the project generously funded by the Foundation. It outlines the project aims, and gives some background on the expedition of which the project was a major part. The conditions on the mountain are discussed, and the achievements of the expedition highlighted. Finally the financial position of the grant is detailed.

Data from the project, consisting of a vast number of twenty four hour electrocardiogram tapes, have been safely obtained, brought back to this country and are currently undergoing analysis. The expedition was immensely successful, both in climbing and research terms, succeeding in a very difficult year in putting people on the summit of the world's highest mountain, and obtaining electrocardiograms and other research data at altitudes of over 8,400 meters.

Study aims: This study used miniature dataloggers to continuously record heart data in climbers participating in the British Mount Everest Medical Expedition. Data was collected throughout the expedition, from before leaving the United Kingdom to the summit attempt. The data collected during the expedition allowed the development of heart rate changes in response to altitude, the limitation of maximum heart rate during exercise and the development of the phenomena of sleep apnoea to be studied. Spectral analysis of heart rate variability will provide further information on the autonomic control of the heart, and the down regulation of the sympathetic nervous system that is thought to occur on acclimatisation to high altitude.

Ambulatory Monitoring of Heart Rate and Temperature on Ascent to the Summit of Mount Everest.

The original project approved by the Foundation planned to use solid state devices to record heart rate and temperature from the Everest climbers. These would be attached continuously to the climbers and require downloading and resetting in the field. They would not have recorded electrocardiograms, but were chosen because they were light and had a large memory. Shortly before the climbers left for Nepal, however, I was contacted by the manufacturer of the devices who informed me that he would be unable to fulfil the order in time. After discussions with the Research Grants Office of the Foundation, it was agreed that alternative dataloggers should be obtained.

The alternatives, Reynolds Trackers, have both advantages and disadvantages. They sample heart rate more frequently than the original loggers, allowing shorter variations to be detected, as might be seen at the earliest stages of high altitude sleep apnoea. They also give information on beat to beat heart rate variability, which may be used to study the autonomic control of the heart. Information on this is important in patients after myocardial infarction, and our data on healthy hypoxic subjects will be relevant to many 'low altitude' conditions where hypoxia is prominent. Finally the loggers allow the analysis of specific parts of the electrocardiogram, such as the ST segment. So we will be able to do all that we originally proposed, and potentially a lot more.

The disadvantages of the loggers are weight and memory size. The loggers weigh some three hundred grams, and use magnetic tape, rather than solid state memory. This has to be changed every twenty four hours. Furthermore, obtaining good reproducible data is more dependent on the way these loggers and electrodes are set up.

We were fortunate in being able to obtain the Reynolds Trackers at very short notice. The enforced changes in the equipment actually increased the amount of information that was obtained from the subjects, and in my opinion, improve the scientific basis of the project. Ambulatory monitoring of the electrocardiogram was undertaken on fifty seven members of the expedition. Cross sectional data was obtained by undertaking recordings in this country before departure and repeating these at Everest base camp (5,300m). Additionally longitudinal data was obtained on fourteen members as they ascended from Kathmandu to base camp and beyond. The Everest climbers collected data at Camp 2, on the Western Cwm, and ambulatory recordings were made during the difficult attempts on the summit, with data from a height of eight thousand four hundred meters being obtained.

This data is supported by other physiological data collected on a daily basis, including pulse oximetry, blood pressure and acute mountain sickness scores, and also measures of haemoglobin concentration and blood gas analyses. Activity was recorded using logs and on tape recorders.

Future progress *All the data and equipment have now returned to this country. The tapes are being analysed and the data collated on computer. We hope to be able to comment on heart rate changes, changes in the autonomic control of the heart, electrocardiographic changes, including arrhythmias, and the development of bradycardias associated with sleep apnoea.*

We have over two hundred and fifty tapes to analyse, having collected a vast amount of data. This, and the correlation with data collected in the expedition's other projects, will clearly take a little while.

Summary *The project 'Ambulatory Monitoring of Heart Rate and Temperature on Ascent to the Summit of Mount Everest' has been successfully completed, using equipment that collected more information than originally proposed, and at a lower overall cost. Data analysis is now being undertaken, and it is hoped that exciting information on the function and control of the heart under strain will be obtained.*

□ Balance and auditory function at high altitude. Dr Martin Rosenberg, Dr Catherine Collier & Dr Johnathan France. Department of Physiology, Queen Mary & Westfield College, London.

Exposure to low oxygen environments can produce subtle but lasting damage to the brain. Previous work has shown that the ability to locate the direction of a sound is poorer after reaching a new altitude, but is restored after acclimatisation to that altitude. Our work included the first large-scale study of hearing threshold at altitude. The results show that high frequency hearing is less sensitive on arrival at 5380m, and is slightly worsened after acclimatisation. Thankfully hearing was restored on return to sea level. The other section of the work was on balance- we measured postural sway ("wobble") using a force plate to determine the amount of changes in position of the body when standing "still".

□ Blood pressure at high altitude. Dr David Collier. Department of Clinical Pharmacology, St Bartholomew's Hospital, London.

Although there have been several studies, there is no agreement on the changes in arterial blood pressure which may take place during ascent to high altitude, and acclimatisation thereto. There are many confounding factors which may affect the quality of the results, but we hope that the measurements made on most members of the team every day will provide an insight into the changes seen in lowlanders blood pressure on ascent. This data is yet to be analysed.

□ Endothelin and high altitude pulmonary oedema (HAPE). Dr David Webb & Dr Peter Barry. Medical Research Council Unit, University of Edinburgh & Department of Paediatrics, University of Leicester.

Endothelin is a naturally occurring chemical, made by the cells which line the blood vessels of the body. It is remarkable as the most potent substance known to shut down (vasoconstrict) blood vessels. Endothelin has been shown to be involved in several serious lung problems at sea level including adult respiratory distress syndrome (ARDS). We know that climbers who have had high altitude pulmonary oedema ("water on the lung") also shut down their blood vessels in the lungs most strongly when exposed to low oxygen levels. This powerful shutting down of lung blood vessels may well be important in the development of HAPE, and endothelin is a strong suspect as the chemical which may do so. We have taken many blood samples from members at sea level and again at various altitudes. Thankfully we had a very low level of HAPE on the expedition with only one case, but this may also reduce our ability to reveal the role of endothelin in HAPE. The samples are still being analysed in Edinburgh.

□ The control of breathing at altitude. Dr David Collier, Dr Annabel Nickol, Dr Chris Wolff, Dr A. Datta, Ms Isla Martin, Mr Peter Pollard, Dr Catherine Collier & Dr Jim Milledge. St Bartholomew's Hospital, London; St Thomas' Hospital, London; Kings College, London; Charing Cross and Westminster Hospital, London; University of Aberdeen & Northwick Park Hospital, Harrow.

Studies designed to help separate the contribution of different chemical receptor groups to the process of acclimatisation were performed before and after acclimatisation to 5380m. Results so far analysed show; 1) The speed at which breathing adjusts at the start of exercise is increased after a period of acclimatisation. (This may be due to an increase in drive to breathe from the peripheral chemoreceptors). 2) Breathing small amounts of carbon dioxide at different times during each breath in causes more increase in breathing when the CO₂ is given early in each breath at sea level. Brief exposure to low oxygen at sea level abolishes this effect of CO₂, and it is not restored when you arrive at Everest base camp (partly acclimatised). Acclimatisation restores this "fast" response to CO₂, and even enhances it in those who have climbed higher (to Pumori 7100m or Everest 8848m). This work is the first to explore "fast" peripheral chemoreceptor responses to CO₂ in man at high altitude. These changes may help to explain why you can do more, and feel better after a period of acclimatisation at base camp even though the blood gas changes of acclimatisation are almost complete when you reach base camp.

Ventilatory Dynamics Alter with Acclimatisation

Collier D, Nickol A, Milledge J, Wolff C, British Mount Everest Medical Expedition c/o D. Collier, Clinical Pharmacology, St Bartholomew's Hospital, London EC1A 7BE

Climbers often comment that a constant work rate is important for best performance at high altitude, and we have noticed empirically that ventilatory matching at the start of exercise on arriving at a new altitude is less rapid and may result in an unstable oscillating breathing pattern for a minute or so. This study aimed to assess one aspect of ventilatory dynamics which is known to depend, at least in part, on the function of the peripheral chemoreceptors. We compared the time constants of the increase in ventilation at the start of mild to moderate exercise (60 watt) under four conditions: 1. at sea level breathing air (control n=40); 2. at sea level breathing 12% oxygen (n=36); 3. On arrival at 5,300m (sub-acute hypoxia n=46) and 4. After acclimatisation to 5,300m (acclimatised n=41). Acute hypoxia at sea level, and on arrival at 5,300m did not show a significantly faster onset of ventilation in exercise than control, with D values of 1. 86.3 (2.3SE) 2. 90>9 (2.8) 3. 91.1 (1.2). Acclimatised subjects did adjust their ventilation faster at the start of exercise, D=94.3 (1.9) p,0.01. This enhancement of ventilatory change at the start of exercise would be consistent with increased peripheral chemoreceptor drive after acclimatisation.

Dynamic Chemosensitivity to CO₂ Increases With Acclimatisation to Chronic Hypoxia in Man

Collier DJ, Nickol A, Milledge JS, Datta A, Collier C, Wolff CB. British Medical Everest Expedition 1994 c/o Clinical Pharmacology, St Bartholomew's Hospital, West Smithfield, London EC1A 7BE.

We show elsewhere that dynamic ventilatory changes are altered by acclimatisation. This study examined the changes in ventilation in response to small volumes of carbon dioxide given early (0-300 ms), or late (300-600 ms) in each inspiration. This dynamic stimulus (a variant of "reverse tube breathing") causes greater increases in ventilation if the stimulus is delivered early rather than late in inspiration at sea level. The difference between early and late responses increases with exercise. We studied members of the BMEME at steady state mild-moderate exercise (60 watts) during acute hypoxia at sea level (12% oxygen, n=29), and after acclimatisation to 5,300m (ambient air, n=31). During acute hypoxia the early CO₂ stimulus increased ventilation by 4.3l/min (0.5)(mean(SE)), late CO₂ gave 3.7l/min (0.4). There was no dynamic component (difference) in acute hypoxia. After acclimatisation, however, early stimulation gave increases of 15.6l/min (1.6) c.f. late 10.2l/min (0.9), the difference between early and late responses averaged 5.3l/min (1.1) (p<0.001). Further enhancement of dynamic responses was seen in a further group of 6 climbers on return from >7,100m on Pumori and Everest. Early stimuli gave 23.3l/min (3.3) increase in ventilation c.f. 8.8l/min (1.5) with late. This dynamic response was greater than that of those acclimatised to 5,300m (14.4l/min c.f. 5.3l/min p<0.025). The dynamic component of the CO₂ stimulus, attributed to the peripheral chemoreceptors, is markedly enhanced by acclimatisation to hypoxia.

Sex Differences In Blood Gases During Acclimatisation

Barry PB, Mason NM & Collier DJ, British Medical Everest Expedition 1994 c/o Clinical Pharmacology, St Bartholomew's Hospital, West Smithfield, London EC1A 7BE.

There have been few large scale studies of blood gas measurements during acclimatisation. This study investigated the changes in capillary blood gas tensions on arrival at 5,300m and after acclimatisation to that

altitude. We studied 29 members of the BMEME on arrival at 5,300m, and 33 members after acclimatisation to this altitude, using a Ciba-Corning 248 blood gas analyser. During acclimatisation $p\text{CO}_2$ fell from an average of 3.46kPa to 3.27kPa ($p<0.05$), the decline was greater in the women studied to 2.85kPa ($n+6$) c.f. 3.34kPa in the men ($n=28$) ($p=0.025$).

Capillary oxygenation improved with time at 5,300m, from a mean of 5.83kPA on arrival to 6.00kPA after acclimatisation ($p=0.6$), but although women showed a greater improvement, to a mean of 6.18kPa c.f. 5.97kPa in men, this effect did not approach significance ($p=0.4$). Capillary pH did not alter overall, from a mean of 7.43pH to 7.44pH after acclimatisation. Bicarbonate estimations showed little overall fall from a mean of 19.8mmol to 19.5mmol after acclimatisation (n.s.), but as you would predict from the above, bicarbonate fell significantly more in the women studied, to 18.6mmol c.f. 19.6mmol in men ($p<0.05$). The same was true of estimates of base excess, which showed a greater decline in women, -7.0mmol c.f. -5.6 mmol in men ($p<0.02$). As both men and women appeared to have maintained acid-base homeostasis well, the results suggest that ventilatory control changes in chronic hypoxia may be superior in women.

□ Visual function at altitude. Miss Diana Depla, Ms Angela Fry, Dr Fred Fitzke, Prof G. Arden. The Institute of Ophthalmology, London & Moorfields Eye Hospital, London.

Although a wide range of experiments was performed, perhaps the most exciting involves studies showing a reduction in visual field movement detection. Many people suffer from a condition in which the pressure in the eyeball is increased (chronic simple glaucoma). We do not understand what causes this. One theory is that it is caused by low oxygen levels in the nerve to the eye. Studies have shown that changes in visual field movement detection (MDT) happen very early in glaucoma. The idea is that if low oxygen levels cause this type of glaucoma then people exposed for weeks to low oxygen should also show changes in their ability to detect movement (MDT). Our results show that our members' MDT ability was normal when they got to base camp (5380m), but it deteriorated when they stayed at altitude. So the results support the idea that simple glaucoma may be caused by low oxygen in the nerve to the eye because climbers who stay in a low oxygen environment show the same MDT changes as patients who are developing glaucoma. If confirmed, these results not only shed light (sorry) on the cause of a common disease in Britain, but may also help to direct the course of drug development to prevent or treat the disease.

Assessment of Visual Function at Altitude using Movement Detection Perimetry

Depla DN, Fry AM, Fitzke FW Institute of Ophthalmology London

Objectives: To compare visual function at sea level with that at altitude using the detection of movement within the central visual field.

Method: The central visual field of 62 subjects was studied at sea level and at 5,300m using vertical bars moving horizontally on the screen of a lap top computer.

Results: Visibility of moving targets at altitude was reduced compared to sea level values. Visual function, as measured by this test, had returned to pre-expedition values 3 months after return to sea level.

Conclusion: Movement Detection Perimetry provides a method for assessing visual function at altitude. Detection of movement within the central visual field is impaired at altitude.

Changes in Scotopic and Photopic Vision at Altitude

Depla DN, Fry AM, Howard KA, Hogg CH, Arden GB; Moorfields Eye Hospital London.

Psychometric testing of scotopic and photopic vision (i.e.. vision in the light and in the dark) was performed on 65 subjects at sea level and altitude, and the results analysed for changes. The results were not as had been expected. Dark adaptation and colour luminance vision improved at altitude. The improvement in dark adaptation may reflect a learning effect, i.e.. people got better at doing the test the more they did it, although repeat sea level testing does not bear this out. The colour and luminance improvement may be due to environmental effects on the equipment, e.g.. as the ambient conditions became colder the video screen produced more contrast, making the letters easier to see.

□ Do benzodiazepine sleeping tablets improve or impair oxygen levels during sleep at altitude? Dr Gerald Dubowitz, Department of Medicine, John Radcliffe Hospital, Oxford.

Sleeping tablets of this type have been shown to improve the quality and duration of sleep at high altitude, but they may well also reduce the drive to breathe and expose the brain to even lower oxygen levels. This study looked at the saturation of the blood with oxygen during sleep with either active or dummy sleeping tablet. The active tablets did improve sleep, but they also reduced the average saturation of the blood with oxygen. Although the average blood saturation was reduced, the unstable "periodic" breathing which causes up to half a minute without breathing between spells of deeper breathing, was less frequent with the tablets. These "dips" in oxygen levels during unstable breathing may well be harmful, and so sleeping tablets may actually be of overall benefit to oxygenation at night.

The Effect of Temazepam on Arterial Oxygen Saturation During Sleep at High Altitude

Dubowitz G, British Mount Everest Medical Expedition 1994, John Radcliffe Hospital, Oxford.

This study was conducted on 12 volunteers at 5,300m on Mount Everest. Subjects were randomised to have temazepam 10 mg or placebo on 2 consecutive nights. Arterial oxygen saturation was measured continuously during the night using pulse oximetry, and a subjective appraisal of the quality of sleep was also made. Results were analysed with respect to mean oxygen saturation, minimum saturation and the amount of oscillation of saturation overnight. All subjects noted subjective improvement in sleep quality with temazepam compared to placebo. The response to temazepam differed, depending on the duration of acclimatisation. Subjects who had only recently arrived at 5,300m showed a small decrease in the oscillation of saturation. This agrees with previous studies done in the field. Subjects who had acclimatised over at least three weeks showed similar decrease in oscillation and subjective improvement in sleep. However the mean saturation showed consistent increase during sleep with temazepam when compared to the placebo. It is evident that temazepam subjectively improves sleep without a markedly detrimental effect on arterial saturation at 5,300m. In addition it appears that in better acclimatised subjects the use of temazepam leads to a small increase in mean saturations. The exact mechanism for this variable response is unclear.

□ Intestinal absorption at altitude. Dr Gerald Dubowitz and Dr Simon Travis. Department of medicine, John Radcliffe Hospital, Oxford & Department of medicine, Southampton.

Climbers at high altitude, and also patients exposed to low oxygen through lung disease, do not absorb all of the food they eat. Both groups tend to lose weight. We do not understand the reasons why this poor absorption happens. This study aimed to look at two separate ways in which the intestine absorbs sugars from the food. The results of the assays of the samples for the complex sugars used in the tests are still awaited.

□ Does Benzolamide prevent acute mountain sickness? Dr John Nathan, Dr David Collier, Prof Eric Swenson & Dr Jim Milledge. Surrey, St Bartholomew's Hospital, Veteran's Administration, Seattle, Washington USA & Northwick Park Hospital.

A drug called acetazolamide has previously been shown to offer some protection against acute mountain sickness (AMS), if taken before and during the ascent to high altitude. This drug, however, passes readily into the brain and can cause annoying side effects such as tingling and altered taste in the mouth (beer tastes horrid!). We have studied the effect of a more selective drug of the same class, benzolamide, which has theoretical advantages and may cause fewer side effects. The data has not been analysed completely yet, although certainly many of the volunteers taking our active tablets thought they were taking a dummy tablet. The results will be available in April 1995.

Environmental Research Report

Environmental Scientists:

- Colin Clarke BSc, MPhil, MREHIS, MInstWM, MRSTM&H Lecturer in Environmental health, Dept of Civil Engineering & Environmental Health, University of Strathclyde.
- David Swift BA, MSc. Research scientist, Water Research Centre, Innovation Park, Hillfoots Road, Stirling.
- Steve Archibald BSc, MSc, C Biol, MIBiol, MREHIS, FIMLS. Environmental Health Officer, Renfrew District Council.
- Peter Pollard MSc and Isla Martin, Aberdeen University

Environmental Co-ordinators

- Dr Ken Stewart MD, FRCS, FRCOG. Royal Infirmary, Stirling.
- Martin Hadlington BA, DipARCH, FRSA. Specialist Conservation Architect, Oban, Scotland.

REPORT TO THE ROYAL ACADEMY OF ENGINEERING

COLIN CLARK

INTRODUCTION: The British Mount Everest Medical Expedition was formed by a group of physicians who were interested in researching in-situ high altitude sickness and in climbing Mount Everest. As their plans coalesced they envisaged a need for an environmental input to the Expedition. As a result of this desire I was contacted and asked if I would contribute to the expedition. Having secured funding for the trip I subsequently agreed. Anecdotal evidence indicated that the trekking routes to Mount Everest base camp suffered several negative environmental impacts as a result of tourism. Firstly, there appeared to be concern over the quantities of solid waste being generated and discarded; and secondly the provision of appropriate and safe means of disposal of human waste, particularly at base camp. It was decided that both of these issues would be investigated during the trip.

I had also obtained the loan of a portable laboratory which would enable me to undertake a limited number of microbiological tests when on station at base camp.

At the planning stage of the expedition there was no particular intention to carry out works in Kathmandu. However it appeared to be too good an opportunity to miss. Consequently I made contact with several Nepalese students and from the information given I made contact with the Royal Nepalese Academy of Science and Technology. I subsequently agreed to give a paper to the Academy on clinical waste management. I also made contact with the representative of the British Council in Kathmandu.

I had also been communicating with a Nepalese engineer who had built a small incinerator for home use. He asked for advice on how the unit might be improved. To this end I gave him a new design based on his original which should allow an increased temperature of combustion to be achieved and therefore less harmful air emissions.

On arrival in Kathmandu I made several contacts as already stated. I duly gave my paper on clinical waste management and was given a tour of several hospitals including the cholera wards, which incidentally were full beyond capacity. The Academy on subsequent discussions appeared keen to engage in joint research on the subject, and this is currently being explored. However it is currently in a state of flux there having been a communist government elected in November. It is hoped that a degree of normality will return in the near future. I had several meetings with the British Council and was advised of the various projects which the Council might be interested in funding. I also had a meeting with the Traffic Engineer responsible for assessing ODA contracts. The Department (at Strathclyde) have very fruitful links with the ODA and Traffic Engineering in Nepal.

KATHMANDU: Although the expedition had essentially no remit in Kathmandu, the environmental and associated problems could not be overlooked.

The city has a stated population of around 800,000. Unofficially it is thought to be in the region of 2.2 million. It would not be an understatement to say that the city is probably beyond the stage where improvement would be effective. Several problem areas are manifest:

Traffic management and pollution.

Solid waste management.

Potable water and Sewerage provision.

Parts of the city have virtually come to a halt because of traffic congestion.

Additionally due to old vehicles being used and a preponderance of two-stroke machines the street levels of air pollution are remarkable.

The management of solid waste has to all intents and purposes ceased in any real sense of the word. Solid wastes are discarded onto the streets where they are allowed to accumulate. Dogs, pigs, cows and children are to be found scavenging on the piles of rotting vegetation. The overall problems seem to have been exacerbated by the introduction, some years ago of a "western style" system of collection sponsored by German consultants.

The wastes are removed occasionally and are deposited along the river bank. In some areas the river has receded some 15m as a result of this form of landfilling. There are no engineering controls in place and the waste is simply dumped and subsequently pollutes the river.

However in health terms it is perhaps the absence of a safe potable water supply and a sewerage system which is of most significance. It is generally accepted that all supplies used for drinking purposes by the local population are contaminated - as the cholera wards testify. It is very interesting to note that considerable external aid reaches Nepal and Kathmandu. In fact the Japanese were funding an extension to the children's hospital at a cost of some £10M. However there seems to be little realisation that it will simply fill with cholera cases unless and until a safe water supply is provided for the population.

TREKKING ROUTE TO EVEREST BASE CAMP: The majority of the actual walk-in is located within Sagarmatha National Park. Approximately 5000 people inhabit the park. However the numbers swell considerably during the two short trekking seasons.

The national park area is policed by a community based pollution control committee (The Sagarmatha Pollution Control Committee). The SPCC have an office at the largest settlement in the area, Namche Bazar. This office was visited and the local officer interviewed. I was asked by the SPCC to construct a "solar toilet" the pieces of which had been delivered to the SPCC by Bob McConnell, an American whose interest is in devising toilets for remote areas. This project was successfully completed on behalf of the SPCC by myself and several other members of the group. Although our design may have differed somewhat from Mr. McConnell's original concept!

The SPCC have responsibility for keeping the Park free of solid waste. In this respect they dig pits for infilling, have a mobile incinerator and a fixed unit at Luckla and collect returnable glass bottles which are flown free of charge from Namche to Kathmandu for re-use, by Asian Airlines. The Committee also employ litter pickers. One of the most important tasks of the Committee is to attempt to educate trekkers to adopt environmentally friendly practices when in the Park. Specifically they ask that local water sources are disinfected and used instead of bottled water and that only lodges using fuel other than timber are frequented.

Sanitary accommodation throughout the park is by "Thunderbox" which is simply a cabin with a hole cut in the floor. The trail has the nickname of the "pink prayer flag trail" (because of the prevalence of toilet paper along the track). However I did not find this to be the case as a rule.

My overall impression of the trail (excluding the specific issue of base camp) was that the extent of solid and human waste pollution was greatly exaggerated. The solid waste pits seem to be used in the larger settlements. Although it would be true to state that the composition of solid waste has undoubtedly changed to a "typical western standard", the present generation rate can be disposed of without unduly affecting the local environment.

Similarly it is doubtful whether the present practice of human waste disposal has significant environmental consequences. However it is likely that the practice is a cause of significant gastrointestinal illness amongst tourists who eat from local tea houses.

BASE CAMP: Base Camp is situated on the Khumbu glacier at the base of the Everest Ice Fall. It is a most inhospitable place with little or no discernible ecology.

A "bond" system is used to ensure that all solid waste is managed off-site. In this regard the Medical expedition lodged \$4000 with the SPCC which would only be returned if the camp site on departure was clean of solid waste. Waste consignments to the SPCC incinerator were taken by porter or yak from base camp to Namche Bazar. I carried out a waste analysis of this waste at base camp and found it to comprise almost 2/3rds putrescible waste. A reflection of the quality of food on offer! Thus close control is maintained even at base camp of the solid wastes generated.

However the SPCC take a much more relaxed view of human waste disposal. There are no prescribed requirements in this regard, as is obvious by the faecal contamination of the entire site.

To try and improve matters the environmental team organised a toilet (a 60 litre plastic barrel) into which the expedition members were requested to defaecate. The resulting soil was then emptied onto plastic sheeting and dried. The much reduced mass was then taken to Namche Bazaar for incineration (some was accidentally flown out to Kathmandu). To the best of my knowledge no other expedition has taken such care to ensure that its activities have minimal environmental impact.

I also undertook experiments on the water quality at base camp and interestingly found viable faecal organisms (see enclosed report to ELE). I also recovered samples of human faeces as it dried on the glacier. These samples are currently being processed to ascertain the level of kill which might be effected at base camp by the fluctuating temperatures and intense UV. Finally I also recovered fresh yak faeces and these are currently being examined for the presence of protozoans. It might be that yak faeces is an important source of gastrointestinal pathogens. The local populace use the faeces as fuel and to render buildings. Thus those same persons who cook meals for tourist habitually handle yak dung.

CONCLUSION: Before going to Nepal I was advised that the trekking region was in a very poor state as a result of the quantities of solid and human waste being deposited. This was found not to be the case. There is little doubt that the environment is fragile. However as long as western tourist spend large sums of money in the area it will be developed, and little blame can be apportioned to the very poor locals who take advantage of this situation.

The area most in need of engineering (and scientific) help is undoubtedly the Kathmandu Valley. The environmental damage being occasioned is enormous and only radical and expensive measures are likely to succeed in altering the situation. However one single issue could save lives and misery and that is the provision of a safe drinking water supply. This is a simple technical engineering task but logistically and politically may well prove to be beyond the reach of the Nepalese.

On a personal note I found the trip a "total education" and an experience I will never forget. My sincere thanks to the Academy for making it possible.

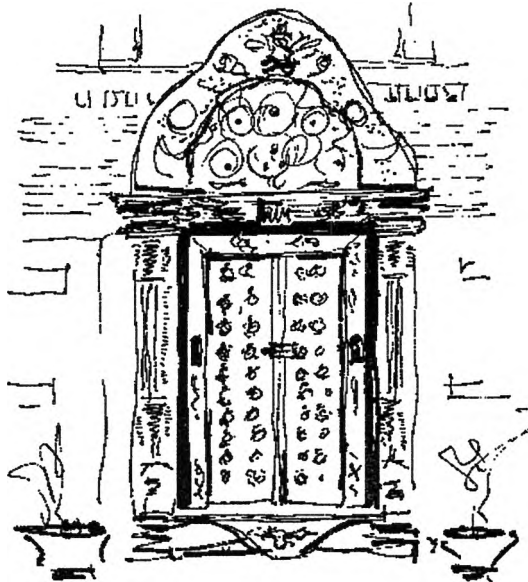
DISPOSAL OF HUMAN WASTE

David Swift

From the outset the Expedition was concerned to care for the environment. It aimed to minimise any adverse environmental impact, and where possible to find ways in which it and future expeditions can conserve and improve the environment.

One aspect which has been much in the public eye is rubbish - the area around Everest Base Camp had come to resemble a refuse tip. Fortunately, under the auspices of the Sagmanartha Pollution Control Project, much has been done to remedy this, with Expeditions now being required to remove all rubbish on their departure, and rubbish pits being provided along the main trekking route to Everest which are cleared on a regular basis.

Another important issue is the disposal of human waste. Along the trekking routes there are only limited facilities, although the Sagmammartha Pollution Control Project gives advice on the siting of latrines at camp sites. Also, despite the large numbers of people at Base Camp during each climbing season, at present there are no facilities for dealing with human waste. It was this latter aspect in particular which has been addressed by this expedition.



Current practice at Everest Base Camp: It is common practice for expeditions to provide no toilet facilities at all at Base Camp - people simply going behind rocks etc. The immediate consequence of this is that the camp becomes surrounded with small piles of excrement and toilet paper. This is unsightly, there is often a pervading offensive smell, and it presents a significant health hazard to the camp occupants. In addition, precipitation and/or glacier melt results in some of the excrement being washed away and contaminating the surface water which flows down the glacier. The significance of this contamination is not known, but prima facie it would be desirable to avoid or at least minimise this sort of pollution.

In some cases a latrine is provided which restricts the affected area - provided the camp occupants use the facility - which is unlikely unless it is well maintained. On striking camp the excrement is covered over with ice/rocks, which reduces the visual impact, but will not prevent continuation of runoff.

Alternatives: In the habitable regions it is common practice to use composting latrines - in which excrement is progressively covered with dried plant material, eg rhododendron leaves, which provide the carbon source and bulk to facilitate the composting process. These latrines are often sited beside fields to facilitate use of the compost as a manure. This is a good approach in the habitable areas where (i) the ambient environment is temperate and with adequate oxygen levels, allowing the composting process to take place, and (ii) there is a use for the compost close at hand. However at Base Camp, the greater altitude results in lower temperatures and oxygen levels, so composting would be slow, and this is compounded by the relatively short stay of expeditions - the adverse conditions and short time available mean that adequate composting could not realistically be achieved. In addition, even if it were possible to produce compost it would be necessary to transport it to lower altitude if it is to be used in agriculture.

Drying: In many respects incineration is an attractive option as, provided it is carried out appropriately, it is a process which minimises the quantity of residue and potential hazard from pathogens. The main draw-back is the high water content of excrement (typically 90%), requiring the use of auxiliary fuel to achieve satisfactory combustion. Alternatively, provided the excrement can be dried sufficiently, not only will fuel no longer be required, but it can become a source of fuel: dried animal dung is used as fuel in many countries, dried yak dung is used in Nepal, especially in the Sagmamaha National Park where it is no longer permitted to use wood for domestic fuel.

Even if it is not appropriate to carry out incineration (this is not permitted in the vicinity of Everest Base Camp for religious reasons), drying substantially reduces the bulk and weight of faeces, and makes it less offensive, making subsequent disposal more practicable.

Objectives of the Research Programme: The members of the environmental research team were aware of their lack of first-hand knowledge of the Everest region and the conditions prevailing at Base Camp. Consequently, it was clearly unwise to presume upon a disposal method; rather, the approach was to gather further information, in the hope that this will contribute towards an eventual appropriate solution. So far as human waste disposal was concerned, having identified the desirability of drying excrement, it was decided

that the main objective would be to assess the effectiveness and practicality of drying faeces using the ambient conditions. Two processes were considered. (1) Probably the most obvious option is to dry the excrement in the sun - the method already used for drying animal dung. Drying at altitude should be assisted by the low air pressure, and by stronger winds, but inhibited by lower temperatures. (2) A second option is to use freezing and thawing: It is well established that the dewatering of sewage sludge is facilitated by freezing and then thawing - freezing appears to break the affinity of the sludge solids for the water, such that on thawing much of the water readily drains away. The ambient temperature at Base Camp tends to alternate between mild or even warm during the day and sub-zero at night (the rapid changes occurring because of the thin atmosphere). This could provide the means to freeze and then thaw the excrement. It was not known to what extent raw faeces (rather than sewage sludge) would dewater using a freeze-thaw cycle, or how effectively this might be achieved using the ambient conditions at Base Camp. As a second objective, partly recognising that incineration at Base Camp may not be permitted, it was decided to investigate the options for disposing of the dried material - preferably to identify a recycling agricultural use. Such a disposal method would also be suitable for compost.

Experimental Method: Essentially it comprised a 0.5m square (0.25 m square area) container, 100mm deep, open at the top, and with a mesh at the bottom which supported a filter cloth. This fitted inside an open topped box which could be covered with a clear Perspex lid. The inner container could readily be lifted from the outer and weighed (using a spring balance), which comprised the principle measurements to monitor the loss of water. Water filtering from the solids passed through the cloth and mesh, drained from the outer container and collected in a calibrated bottle.

Temperature was measured with a platinum-resistance probe inserted into the excrement, to give the temperature of the drying material itself, not just of the air in the unit.

Results: Fortunately, for almost all the time at Base Camp the weather was clear - resulting in mild days and sub-zero nights - enabling both aspects of the experiment to be assessed. The excrement was spread in the unit in a relatively thin layer, about 25mm to facilitate changes in temperature as well as to aid drying.

Ideally, it would have been desirable to continue each run until a substantially constant weight had been achieved, ie until drying had been as complete as possible. However, the time required for this might have been excessive, indeed it may have been impossible to fully complete even one run within the time at Base Camp. Instead, runs were ended after a few days, approximately when it was thought that the material had dried sufficiently to permit combustion. In all, three experimental runs were carried out.

After 60 hours (the shortest run) about 40% weight loss had occurred, and this increased to about 60% after 140 hours (the longest run).

Almost all of the weight/water loss was due to evaporation. Some water was lost as filtrate, but only after the first night, and amounted to only 2-3% of the total weight .

During the first run, the value of using the lid was assessed. The lid was tried out at least once on each of the first 3 days, but as soon as the lid was put on condensation appeared inside (although there was a gap of about 5mm between lid and base unit to allow some ventilation) so it was removed again. On the fourth day, because the material had dried significantly and the rate of drying appeared to be slowing the lid was kept on for a few hours and readings taken every hour (compared with the normal frequency of every 3 hours from 6am to 9pm). The results showed that significantly higher temperatures were reached (eg about 40C instead of the usual about 30C), but there was little loss of water.

When each run was stopped the surface of the excrement appeared substantially dry, but on removing it from the unit it was found to be quite wet underneath, despite being spread in a thin layer. Clearly, drying would be expedited by turning the solids from time to time.

It is apparent from this that drying faeces at Base Camp (or similar environments) is a practical proposition, and that it should be dry enough for combustion without the use of auxiliary fuel within one week. This, however, is dependent on favourable weather conditions

As most of the drying was by evaporation rather than filtration, a simple open-ended box would be sufficient (or even just laying the excrement out on a flat surface), there seems little value in including a facility for filtration (+ve filtration?)

Also, it seems more important to have good ventilation to allow water vapour to escape than to have a 'greenhouse' which achieves higher temperatures. It would of course be useful to be able to protect the drying material from rain and snow.

Discussion: Any discussion regarding the disposal of human waste in remote (but much visited) regions needs to be far-ranging.

First, it is necessary to assess the real issues, not just respond to perceived ones. For example, how significant is the hazard to the health of the poor sanitation at Base Camp (i) directly to the occupants, and (ii) indirectly through contamination of surface water that may be used as a water supply downstream?

Second, the constraints must be clearly identified and verified. This includes technical and human issues. For example, before going on the expedition it was understood that burial of excrement was impractical due to ground conditions, and that Base Camp was too high to be reached by helicopter. Both of these were found to be wrong - flying equipment in or waste out may still be considered too expensive, but that is fundamentally different from being physically impossible.

Similarly, the Expedition was advised that burning of waste could not be carried out a Base Camp; it needs to be determined whether this is an absolute prohibition eg on religious grounds, or whether it is the smoke and/or smell which is objectionable - and might be circumvented by well controlled incineration.

ADVANTAGE OF MANAGING CLINICAL WASTE IN KATHMANDU, NEPAL

COLIN CLARK

INTRODUCTION: Before discussing the perceived and real risks to health which are associated with clinical waste it is prudent to consider the origins of western public, media and government interest on the subject.

Media and therefore public concerns on clinical waste is a relatively new phenomenon, traceable to the late 70's early 80's period. Indeed the first major government sponsored documents on the safe disposal of clinical waste did not appear until 1982 and 1983. Coincidental with the release of these documents were continuing reports of clinical waste being found discarded in public places including in the street and on beaches. Although large quantities of clinical waste are incinerated (usually at the site of arising) this fact also mitigated against the laissez faire attitude of government. Many of the incinerators being used by hospitals were (and indeed continue to be) poorly operated. However improvements were unlikely since all NHS properties were given umbrella protection from prosecution by Crown Immunity. The real catalyst for change towards clinical waste management was undoubtedly the public's fear of HIV and to a lesser extent Hepatitis B.

Controls on clinical waste are now considerable. All current GB waste management law applies to clinical waste as it has at last received formal legal definition. In the near future all clinical waste incinerators must comply with new and very stringent emission controls and the entire process will be subject to prior authorization by Regulating authorities. But what of the risks?

The most obvious hazard associated with clinical waste is that of infection. However this would appear to be more perceived than actual. It is true that clinical waste contains microorganisms. But the bulk fraction carries no more of a loading than domestic wastes. It may however be argued that it contains pathogenic organisms (and so might domestic waste). However for pathogens to cause infection in man there must be sufficient numbers present and they must gain access to a susceptible host. There is virtually no evidence to suggest that this is more likely to occur with clinical waste than with any other type of waste. And in this respect it is worth noting that most domestic type waste has been landfilled for many years in the west, without any epidemiological evidence to support the hypothesis that infection amongst the general population is probable. It could therefore be suggested that simple landfilling of clinical waste would not present a significant increasing risk to the well being of the population.

The real risk of infection does however present itself in the occupational environment. Particularly pertinent is the hazard posed by needlestick injuries to both health workers and waste management operatives. There have been numerous documented cases including some 37 cases of HIV associated with needlestick injury. Other hazards such as poisonings, and radiation are unlikely to present a real risk to the public at large. Whilst the pathological hazards may be low, clinical waste is undoubtedly offensive in the mind of the public in the west

(visually, smell) and for this reason alone, justifies particular protocols for its handling and disposal. Whether this is a major factor in Nepal is quite another matter.

Thus to summarize the risks of pollution to the environment and to the health of the public is on balance no more significant than that posed by equivalent quantities of domestic waste.

TREATMENTS: Given the need to treat the 300,000T/yr or so of CW arisings in the UK and the public's reluctance to embrace incineration, an array of alternatives have appeared on the UK market. Although there are a great many techniques which have been developed a few seem to be gaining some favour amongst UK operators and it is these which will be briefly described.

The various processes may be conveniently divided into two categories, those which are based on simple technological principles and may therefore have application in the developing world, and those which are artifacts of the first world and are likely to remain so for the foreseeable future. Incineration in all but the most rudimentary of plant (eg < 50kg hr) although not a "new" development would most appropriately be placed firmly in the latter category, due to capital costs and the sophisticated requirements of both operating and maintaining plant. In the first category the Bio-Sure Pressure Steam Autoclave, the ABB Sanitec Microwave Pasteuriser, the Scotsafe Continuous Flow Auger Disinfection System, and the Condor Waste Treatment System and possibly the Brookes/Sacone Management Inc. Gasifier could be represented with certain qualifications for each. Table 2 gives the main operational data of each system for comparison.

The Bio-Sure Autoclave is simply a large capacity pressure steam autoclave and in this regard is a well proven sterilizer. Waste once processed is macerated and then compacted and transported for final disposal.

The ABB Sanitec Pasteuriser and the Scotsafe CFA both utilise an auger system to slowly transport pre-macerated waste through a heating zone. The ABB processes waste by first injecting steam and then heating it using microwave guns which are situated along the length of the auger. The CFA unit on the other hand uses a hollow auger filled with oil at a temperature of 160 C to heat process waste. The main drawback of both units for use in the developing world is that both are controlled by fairly sophisticated programmable logic controllers. Howsoever both techniques are eminently simple in mechanical terms.

The Condor unit pre-macerates and sprays waste with a chlorine dioxide solution. The load is then immersed in a bath of C10. Once treated the waste is pressed and loaded for final disposal. This treatment although not used in the UK has found a niche in the middle east market.

The Brookes/Sacone system is a batch gasifier which uses a gas burner to heat and effect "slow combustion" of the waste. Volatiles from the waste are used as an auxiliary fuel as heating progresses. Again this is a simple process and if the refractory lining can be maintained in a developing country it too would be a realistic option.

Of the more technologically oriented forms, incineration, the plasma arc furnace and the Stericycle process are the most likely candidates. As stated earlier incineration is not new. However the skills and resources required to properly operate a modern plant are likely to be beyond most developing countries. Similarly the plasma arc which is currently being investigated by colleagues in the Dept. of Electronic Engineering is likely to fall into this category. Indeed the plant which uses the resistance of an ionised gas to convert electrical energy to heat reaching an operating temperature of 2000 C may find limited application in the west due to the extremely high energy consumption of the plasma arc. Finally the Stericycle process is similar to those already mentioned in so far as the waste is initially macerated and then heated. This batch process heats waste for approximately 5-7 minutes in a radiowave oven (again similar to microwave heating). The waste is heated to a temperature of approximately 90C - 100C and held. The unit apparently achieves a standard of sterilization.

STANDARDS: As will be appreciated from the foregoing each process strives to achieve a particular bacteriological standard for processed residue. The standard likely to be adopted for processing purposes for the UK is equivalent to "disinfection" (death of all vegetative forms) which in itself is an unfortunate term which can lead to unnecessary confusion. Sterilisation (death of all organisms) is the ultimate "safe standard" but could be considered as overkill where clinical waste processing is concerned. Pasteurisation (the death of all vegetative pathogenic forms) would also appear satisfactory. After all this is the standard applied to the processing of milk in the west. However ease of verification in this latter case could prove difficult when applied to a CW treatment process.

CONCLUSIONS: Although clinical waste disposal is high on the political agenda in the UK and west generally why should it be considered an issue of importance in the developing world and in Nepal? The magnitude of the solid waste management problem in Nepal and in the Kathmandu valley in particular is



brehtaking, and will doubtless take years to resolve. However it is in part due to the sheer size of the problem that concentration on a niche area such as clinical waste may provide real benefits to those involved in wastes management. Whereas endeavouring to implement a domestic or industrial wastes management strategy in Kathmandu, as the German experience has shown, is a first step too far for the existing infra structure to manage. The development of a clinical waste management strategy by comparison may offer a steady learning process for the municipal authorities and professionals involved. The wastes arise at a few easily identifiable premises, the quantities involved are relatively slight and responsible and educated personnel are available on-site who it would be hoped are more susceptible to the implementation of a wastes management programme than the general population. The success of implementing such a strategy would undoubtedly increase the confidence of wastes management professionals and they would gain invaluable experience which could then be utilised in a much wider wastes management context.

Additionally the adoption of one or other of the more rudimentary treatment technologies may re-enforce self confidence, engender and develop self reliance, and diminish the culture of western dependency. All of which are essential if the wastes management problems in Kathmandu are to be effectively dealt with by Nepali professionals.

Whatever decisions, if any, are made in the near future in respect of clinical waste management in Kathmandu the cannot succeed, for it is simply incongruous to possess modern hospital facilities - as Kathmandu will have when the £10M expansion to the children's hospital is completed in 1995 - and to simply discard clinical waste into an open skip at the front door!

In conclusion, whilst the imperatives for managing clinical waste may not appear obvious when the wider issues relating to wastes management are considered, it may offer a initial first step which will imbue the endogenous professionals with the necessary confidence and skills to tackle the overall wastes management problems in Kathmandu.

ACKNOWLEDGEMENT: This lecture was given to the Royal Nepalese Academy of Science and Technology during my visit as part of the British Mount Everest Medical Expedition 1994. My visit was made possible by the generous support of the following organisations and companies: The Institute of Wastes Management, ST Peter's Gardens, Northampton. The University of Strathclyde, Glasgow. The Royal Academy of Engineering, 2 Little Smith St, London.

REPORT ON THE USE OF THE PAQUALAB IN THE HIMALAYA

COLIN CLARK

This report is given in good faith and the comments contained herein should be considered as being wholly constructive and in no way critical of ELE International, its personnel or equipment.

The Paqualab was delivered and transported to Nepal in the container provided by ELE. Due to time constraints it was not inspected prior to despatch from the UK. On opening in Kathmandu the unit was inspected. It was without a fused plug. No international adaptor was supplied. In most countries where the Paqualab may be supplied these factors do not present a problem. However in Nepal (and countries of similar status) the following problems were difficult to solve:

Accessing a suitable plug capable of holding a fuse. Purchasing the correct size and rating of fuse. The purchase of methanol for sterilizing procedures. The unit was supplied with 3 small (65ml) media bottles, a small (38.1g) carton of powdered media and a large (500g) bottle of powdered media. It would be difficult in the absence of a measuring cylinder, a relatively sensitive balance and a facility for sterilizing the media to easily prepare media. It is understood that ELE now provide small vials of ready to use media with the Paqualab. This is liable to substantially increase the unit's flexibility and usefulness in the field. A drop dispenser would assist in dispensing the small quantities required into the petri dishes.

The unit understandably requires a power supply. In Kathmandu, a city of some 2M people the power supply is at best unreliable. Thus even in "developed" areas of the developing world auxiliary supply for the Paqualab would be useful. When on expedition there was virtually no electrical supply enroute to Everest base camp. Thus in its present state the Paqualab could not be easily used. It would be valuable for the Paqualab to be able to run off a solar cell. Many areas, including the Himalaya, where the Paqualab would be a valuable research tool have considered solar gain which could and should be utilised to the full. At base camp the unit performed well. However it should be noted that the temperature fluctuations were exceptional and on occasion were of the order of 35C to -20C. The Paqualab operates within a relatively restricted temperature range. It may be prudent to consider providing where required, an insulated carrying case to ensure that a relatively uniform ambient temperature around the unit can be maintained.

An ELE electric autoclave was purchased for use with the Paqualab. At base camp power was supplied by two petrol driven generators. The autoclave consumed all the power generated by the larger of the two units. Due to the altitude (17,500ft) the unit reached its operating temperature of 126C only momentarily. As a consequence alternative means of sterilizing the equipment was sought. Fortunately the medical team had brought a large supply of alcohol based "steri-wipes". These were used to sterilize the membrane filtration unit and the aluminium petri dishes. Perusal of the results of the bacteriological examination would appear to confirm that this strategy was entirely successful. However processing multiple samples presented certain logistical difficulties insofar as the unit had to be sterilized between use. A possible solution to this issue might be to supply sterile disposable (perhaps paper/wax inner surface) filter funnels. Additionally a sterile disposable fabric grid or washer placed on the filter support unit may negate the requirement for this to be sterilized between each sample.

If it has not already been done, research to determine how critical a non-sterile/contaminated membrane supporting surface actually is should be carried out. It may be that limited contamination of the under surface of the membranes would not significantly affect the growth characteristics of organisms on the upper surface.

On a more mundane note it would be useful if graduated sampling bottles were also provided with the unit. Again for very remote use sterile disposable paper sampling jars would be very useful. Although the expedition was in Nepal for nearly 2 months, The environmental team spent a total of only 12 days at base camp. For a variety of reasons the Paqualab could only be used for a total of 5 days.

Three water sources were processed in duplicate on 5 consecutive days. The three sources were as follows:

Water source used for drinking supply

Surface water above faecal contaminated area

Surface water below faecal contaminated area

Results: The results of the limited test programme would indicate that, although procedures were developed due to prevailing circumstances, they are reliable. Thus the value in carrying out such surveys in remote areas using the Paqualab is significant. It is likely that this is the first time that the bacteriological examination of melt water at Everest base camp has been carried out.

It is also interesting to note that in an area where extreme temperatures are occasioned and uv intensity is high faecal organisms can still be detected in melt water some distance from the area of contamination. It is unlikely that faecal contamination of the Khumbu glacier is a real health risk to either trekkers or the native

population of the region. However it is surely not desirable, not least because the originators are inevitably visitors to the Khumbu and indeed Nepal. \par \par Samples from the Western Cwm were to have been processed. Unfortunately bad weather prevented the summit team from delivering the samples to base camp in time to have them processed. Overall the unit operated effectively in a very hostile and compromising environment.

Whilst the aforementioned work provided limited but interesting data, a more important task lies ahead. A glacial water source is used as a potable supply along the entire Khumbu and also lower down in the valley. The quality of this water should be the subject of a comprehensive microbiological survey, as both the endogenous population and tourists depend on it as their drinking water source. Researchers thinking of undertaking such work should consider the merits of the Paqualab.

Everest Climbing Report

Team members: Simon Currin (Leader), Andrew Pollard (Deputy Leader), John Sanders, Charlie Hornsby (summiteer), Roddy Kirkwood (summiteer), Ronnie Robb, Angus Andrew and Alison Hargreaves (Alison was officially on a separate expedition -the Ferrino Everest Lady Alone- but was very closely attached to the B.M.E.M.E. and was part financed by the Expedition and is therefore included).

Liaison Officer: Mr Gongal, Ministry of Tourism, H.M.G.Nepal.

High Altitude Sherpas were: Kilu Temba (Sirdar), Dorje (summiteer x 5), Dawa Temba (summiteer), Tensing, Kami Rita and Finjo. All except Kilu Temba had summited Everest on previous occasions.

The post monsoon season of 1994 was a little unusual in that the monsoon persisted until September 23rd (officially) and the Jet stream winds commenced on October the first. It was the strong, cold winds that thwarted most of the other teams on the mountain.

We commenced work in the Icefall on September 1st as stipulated by the terms of our permit. The monsoon snow meant that the Icefall was in relatively benign condition and we made rapid progress to Camp 1 and required relatively few ladders in the process. As the season progressed fresh crevasses opened up and seracs collapsed obliterating our route. By the end of the Expedition many sections of the Icefall route were completely unrecognisable and we had deployed all 61 of the ladders hired from Asian Trekking - the ladders were retrieved by the Icefall Sherpas after the Expedition and were kept in Gorak Shep for the next season.

Poor visibility and frequent avalanches in the Western Cwm delayed our progress and we used much of this time to stock Camp 1. The conditions in mid September meant that we lost several crucial days before we could establish Camp 2 and thus we became established there a little later than we had hoped for. A large avalanche on the Lhotse Face engulfed Ronnie Robb and Henry Todd (International Lhotse Team) but fortunately they were relatively unscathed.

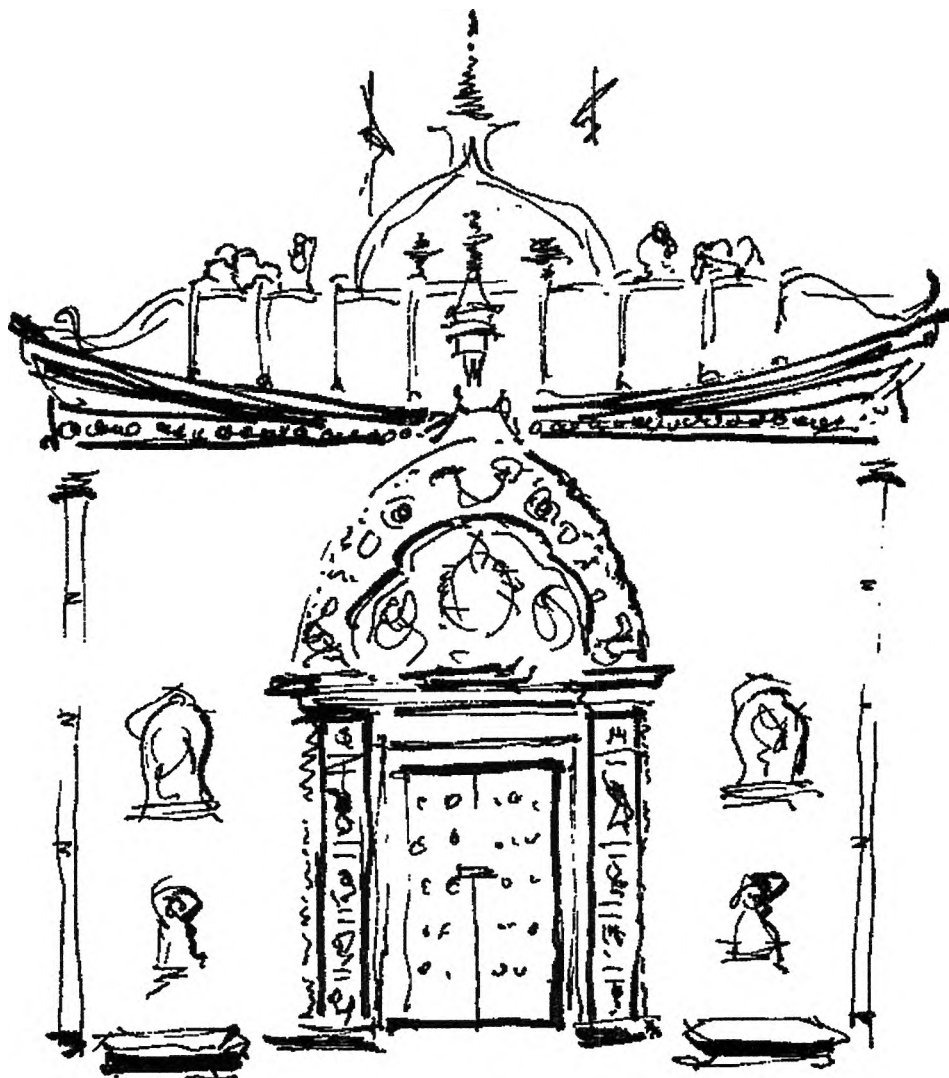
Statistically ascents take place from September 26th onwards and we had originally planned to be in position on the South Col for a summit bid during the last week of September. Indeed, had we been a few days ahead we would have encountered far less severe conditions as the last 5 days of September were both clear and calm. By the time we had stocked Camp 4 our first possible date for a summit bid was October 3rd and we made our plans for that date. Unfortunately this summit bid had to be further delayed due to Ronnie's illness (cerebral oedema). As it turned out October 3rd would have been an impossible summit day due to extreme winds. On this day the International Lhotse Team got into severe trouble 150 metres below the summit of Lhotse.

Camp 4 was occupied shortly afterwards but a serious summit bid was precluded due to the weather and shortages of food and fuel. Some members remained at Camp 4 attempting to sit out the storm whilst others

descended to bide their time. The weather moderated slightly on the 9th, 10th and 11th of October giving the only window of opportunity. Andrew Pollard made his solo bid on the 9th turning around at 8,600m metres due to difficult snow conditions and a shortage of oxygen. The Japanese team made their ascent on the 10th and Charlie Hornsby and Roddy Kirkwood went on the 11th. Alison, Angus and the French Team were poised to go on the 12th but by now the winds were back to full force and only Alison ventured above Camp 4. Angus remained at Camp 4 for a few more days but the winds never moderated.

Our Sherpas refused to assist in the clearance of the mountain and so much of this work was done by the Icefall Sherpas, the French Sherpas and the 2 remaining ones loyal to us. Base Camp was dismantled on 15th and the climbing and research teams flew from Syanboche on the 17th and 18th.

It is difficult to know how we would improve on our tactics in the future. We pushed towards Camp 2 with reasonable haste but the delay in our arrival made the summit bid all the more difficult. If we had been in a position to climb from the South Col during September then I am sure at least another 3 members would have reached the summit. Poor Sherpa leadership and relations certainly contributed to this delay and it is possible that with a better Sirdar, a more willing team and perhaps another couple of High Altitude porters we would have been in position a few crucial days earlier. We tried to be reasonably meticulous in packaging loads but in retrospect we should have sent all loads above Base Camp in pre-packed, locked containers as this would have avoided the problems of pilfering (particularly of food) and "down-sizing" by Sherpas. We left much of the day to day management of loads and record keeping up to our Sirdar who clearly was not up to the job but this was a difficult management problem. Our own lack of experience of recruiting and managing high altitude Sherpas





undoubtedly compounded our problems and future teams would be well advised to research the backgrounds of their key personnel fully seeking, where possible, personal recommendations.

Having made these observations the French and Japanese teams progressed at the same rate on the mountain as us despite their lavish Sherpa : Climber ratios and their apparently excellent teamwork. Our Sherpas did more than their share of the route making whilst the other teams stocked their camps. Of all the climbing teams on Everest ours was undoubtedly the strongest and this must be partially due to the fact that our team did much of their own load carrying whilst the others relied exclusively on their Sherpas.

Pumori Climbing Report:

I have not received a report from the Pumori team but have written down what I know of their ascent. I apologise in advance if the details are sketchy or inaccurate.

Team members: Chris Comerie (Leader and summiter), Edi Albert, Paul Cleary (summiter), Ian Newberry, Mark Bryan (summiter)

The Pumori team were delayed for 5 days in Kathmandu due to poor flying weather. Once on the trek their luck fared little better when half of the team fell ill with a severe flu like illness. The fit half pressed on in order to avoid contracting the same illness and began establishing Base Camp and preparing the route to Camp 1. Despite these early misfortunes they made rapid progress.

Although the route is technically demanding they were accompanied by a dog ("Shep" as in Gorak") as far as Camp 1. On its arrival there it completely flaked out and the team's logistical problems were compounded by the need for dog food at Camp 1. The dog's condition at Camp 1 gave cause for concern and Mark Bryan (a veterinarian) contemplated the prospect of euthanasia but fortunately it rallied and was later carried down in a rucksack. The team shared the route fixing with other teams on the Mountain and survived, unscathed, frequent avalanches on the face.

They placed a snow hole on the ridge and Mark Bryan and Paul Cleary went first to the summit. Edi Albert and Chris Comerie moved up to make their bid the next day but Edi became ill in the night and probably suffered some degree of cerebral oedema. Edi descended and Chris went alone to the summit in excellent conditions.

Despite early illness and delays they climbed a difficult and dangerous route quickly and efficiently without mishap.

Support Group Climbing Reports

Support Group Leader: Stuart McNeil. There were 68 members of the Support Group and 8 members of the Everest climbing team. The activities of the Support Group were too diverse to summarise in a single report so I have listed the ascents made and leave it to the accounts in the "Personal Observations" section to give a fuller account of what went on.

Thirty five members of the Support Group arrived in Kathmandu on September 5th where they were unfortunately delayed for 5 days due to bad weather. The remainder arrived on September 19th. The earlier

Table shows how their activities were kept separate in time and place in order to minimise over-crowding and consequent environmental impact. The Support Groups consisted of a broad cross section of experience, abilities and ambitions. Despite this there were no serious compatibility problems, no mishaps and a substantial number of ascents were made.

British Mount Everest Medical Expedition Members and Ascent Statistics

	Everest	Pumori	Island Peak	Lobuje	Pokalde	Parcarmo	Base Camp (6,340m)	Kala Pattar (5,500m)	
Ronnie Robb							1	1	1
Marin Pool							1		1
Peter Leatt,					1		1	1	1
James Parfrey			1		1		1		1
John Sanders							1		1
Christine Smith			1			1	1	1	1
David Swift			1				1	1	1
George Smith							1		1
Mark Howarth			1		1		1	1	1
Andrew Taylor			1			1	1	1	1
Marin Taylor			1		1	1	1	1	1
Angele Fry							1	1	1
Gerald Dubowitz			1	1	1		1		1
Denzil Broadhurst			1			1	1	1	1
Mark Bryan		1	1				1	1	1
Graham Hunt					1		1		1
Diana Depla,							1	1	1
Brigitte Bende			1				1	1	1
Martin Hawkins			1				1	1	1
Jeremy Ward			1		1		1	1	1
Will Reynish			1		1		1	1	1
Sally Smith					1		1	1	1
David Newman					1		1	1	1
Isla Martin							1		1
David Miller			1				1	1	1
Andrew Farbam					1		1	1	1
Stuart Hinsley			1				1		1
Alison Hargreaves							1	1	1
Charles Hornsby	1						1	1	1
Roddy Kirkwood	1						1	1	1
Ann Morgan					1		1	1	1
Graham Morrice					1		1		1
George Wormald			1		1		1	1	1
Mike Nield			1		1	1	1		1
Jan Newberry			1				1		1
John Nathan					1		1	1	1
Annabel Nicol							1		1
Louise Freeman					1		1	1	1
Karol Howard					1		1		1
Nick Meson			1	1	1		1		1
Scott Fazer				1			1	1	1
Sian Falder			1		1		1	1	1
Paul Cleary		1	1				1		1
Sally Glynn			1				1	1	1
Marin Thomas							1	1	1
Joy Ingram							1	1	1
Colin Clarke							1		1
Richard Perriss			1				1	1	1
John Curnn							1	1	1
Peter Pollard,							1		1

Simon Curran							1	1	1
Andrew Pollard,							1		1
Stuart McNeil			1		1		1	1	1
David Collier							1	1	1
Peter Smith							1		1
Ken Stewart							1		1
Marin Hodgkinson							1		1
Jane Oliver				1			1	1	1
Ed Albert							1		1
Angus Andrew					1		1		1
Ian Baxter					1		1	1	1
Peter Barry							1		1
Geraldine Boocock			1		1		1	1	1
Carol Collis							1		1
Cathenne Collier							1	2	1
Chris Comene		1	1				1		1
Neil Crossing			1		1		1	1	1
Tony Davies									1
Alex Alwood			1				1	1	1
Clare Thomas							1	1	1
Alfie Ingram							1	1	1
Steve Archibald									1
Howard Roper							1		1
Anne Kutter					1		1	1	1
Saye Khoo			1				1	1	1
Totals	2	3	29	4	26	5	73	47	75
	Everest (8,848m)	Pumori (7,140m)	Island Peak	Lobuje	Pokalde	Parcarmo	Base Camp (5,300m)	Kala Pattar (5,500m)	

In addition there were a number of "Independent Trekkers" who made the trip to or towards Base Camp to visit members of the team. These included virtually all members of my family They were as follows: Richard Weller, Gail and Carol Madgear, Victoria Weller, Sandra, Stewart, Margaret, Jill, Daniel and Joe Curran, Chris Wolff, Jim, Tom and Katie Ballard. Unfortunately one member was unable to journey to Nepal as he was badly mugged in Heathrow Tube Station en route to the Airport.

Personal Observations:

I have asked all members of the Expedition to write on any aspect of the trip however controversial. These are the contributions that I have received.

Impressions of Everest

by John Sanders

Daylight slits like a razor across Base Camp but I can't rouse from my bag before the sun's warmth and Diana's smiling aqua Koflachs and the tea she brings come. A rest day otherwise by now we would have skated across frosted boulders under a star filled sky cut from the gowns of Vegas show girls into the Icefall maze too beautiful and too uphill to be scary. Drifting in and out of fantasy passes the time on the carry and in the tent. Staring at her picture I write to my girlfriend thousands of miles away and dreaming of a friendly and familiar body wish the photograph would turn to smoke so I could inhale her.

For days foodless and wind sheared we sit on the south Col. Familiarity has stripped the Sherpas of their gilded reputation. Not cheerful carefree nobles; they are people too. Are they card playing jokers always with a gap-tooth smile or are they petty, angry and jealous? Appearances change quickly and reliability is important in the mountains. A battle rages between what we want and what we see putting tension in the fabric of the group. We have all read of and want to believe in selfless, hardworking mountain companions, but see whores who do only their job quickly and that without love or completeness.

Summits bestow their favours with tears, jewelled tears that flow so fast they need two hands to catch: Andy's South East Ridge tears for his baby Jamie; Roddy and Charlie's tears of ecstasy and relief, two Sisyphes freed and triumphant; Ronnie's stroke crippled, lop-sided face in laboured sobs of fear and loss. Rich emotions and mortar between friends that we would not trade. We sacrifice so much for the pain, to satisfy our sweet tooth and feel the shared joy of travel in the mountains. Chasing a shadowy love we exorcise our desire and chase the point. How do we know when to love and when to quit?

Foodless on the South Col and taking an incomplete gear inventory in Kathmandu we think polluting thoughts and find it is our companions and the mountains that are really important. Idolising the mountains, we think it is the summit we want and do not realise it is some ethereal combination of snow on rock, laughter with friends, shared moods and dreams that we crave. The deception is part of it too. Satisfied, for now, we go home no one having made the only possible wrong decision - the one that leaves an empty seat on the plane. Filled with stories we return to our other loves, but when we can say "I was scared" but can no longer retrieve the feeling of fear we will return.

John Sanders is a paediatric anaesthetist.

When did it Start? BMEME 1990 - 1994

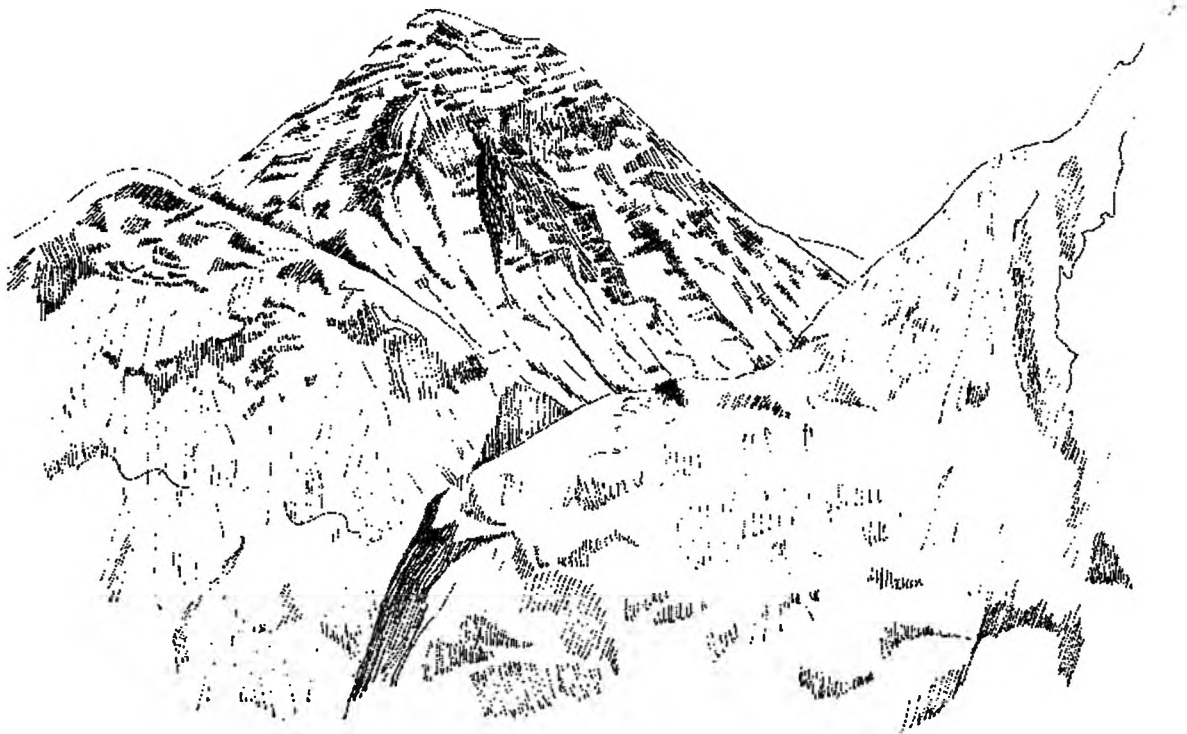
by John Nathan

We came, we saw, some conquered. I read that people go to the Himalayas to be gobsmacked. I was totally gobsmacked for weeks, but for me the Expedition started long before the autumn of 1994.

It started in January 1993 when I rang Simon and was accepted as a member. From that moment onwards my life changed completely. Suddenly I was rushing 250 miles to North Wales for a weekend medical course, where I was rubbing shoulders with mountaineers of world renown. This was, as the Americans say, 'sumthin else'. I was discussing research projects, seeing pictures of the Vallot Hut (ONLY ?! 4,000 metres), having lectures on frostbite, oo-er!

My colleagues tolerantly allowed me to change my duty weekends, and I soon found myself driving 500 miles to Scotland for the weekend (in the rain). I well remember climbing Ben Nevis by the tourist track, and feeling quite pleased with myself that in snowy, foggy conditions my companions and I reached the top by 1 p.m., the pre-arranged meeting time. We opened the McInnes biscuit tin that sits on the top of the mountain, only to see Charlie, Simon and Stuart who had climbed the vertical side quicker than we had walked up the easy side.

I remember wondering what on earth I was doing at Pen y Pass at 5 am one August morning (in the rain) and mist, with 3 others to try to climb all the Welsh 3,000 'ers, and I also remember the fear of seeing the arrete of



Crib Goch in the half light of dawn, all wet and slippery. I cannot describe the joy of seeing Tony with a cup of tea at his van after we had climbed the first 3.

I remember driving northwards again to Oldham in October (in the rain), and arriving exhausted at 10.30 p.m. after trying to follow the Oldham team's map which was perfect except that half the roads were missing from it! However, they got together with the famous Herbie and made that another magical weekend. (You remember the Oldham team in Nepal; they were the ones who were usually seen running when some of us found difficulty walking). There was another weekend in Derbyshire in January, when we found ourselves in a farmyard with cowshit just a fraction deeper than the top of our boots. In February I drove to Fort William again (in the rain). Conditions there, as it turned out, were colder than the Himalayas, and I well remember Ronnie insisting on putting up his broken tent in a gale underneath the Snowgoose Restaurant, 10 feet from a warm indoor shelter.

In April, a group of us went ski touring in the Jungfrau region. I remember well toiling up the Jungfrau Glacier in the heat one day, then the very next day struggling to find an Alpine Hut in a snowstorm.

Then in June we were all together in a mountain hut in North Wales (in the rain), and I was wondering whether George's little dog would water the end of a sleeping bag during the night. I have heard exactly who snores and who farts all night, and I am sure that I don't do either!

I am sure that there will be amazing stories about the Khumbu, but for me the period beforehand took me into places I have never been before in our own country. This, as well as the Himalayas, (not in the rain), will live with me for ever.

PS Does the sun shine in North Wales and Scotland?

John Nathan is a General Practitioner in Surrey.

The Announcement!

by Christine Smith

The group sat waiting in the small darkened room. The yaks were late - were they lost or just overdue? With no tents there was nothing to do but sit patiently. Eyes shifted tiredly around the room. This house was different to the others we had seen, an old Sherpa house with the cattle shed below. There was little light filtering in, the walls were blackened by years of smoke. Ornate copper pots lined the shelf opposite and the family altar stood proudly at the far end. Our rucksacks leaned against the central pillar, below the soot marks counting the passing years. Sherpa voices drifted from the yak byre below and nearby the kitchen. We decided to try the Kukhri rum. We sat quietly thinking about the past weeks and the Parchamo climb to come.

A voice broke the silence, something prompted Martin to think of the time and the radio schedule at 6 p.m.. No one was particularly interested - we'd been out of contact for several days now- still it was worth a try. Looks of surprise ensued when seconds later the radio burst into life, Base Camp was calling other stations. We tried to reply, but to no avail. We listened with growing interest as the clear tone of Simon's voice urged teams to respond. Something in his speech expressed a sense of urgency - did he have something important to say? He had no way of knowing we were listening. We were powerless. We could only will him to continue transmissions.

Everyone was more alert now and hoping for any news - it had been strange without communications for so long. To everyone's relief Simon's slightly agitated voice finally declared that he would transmit a blind message. Then as everyone leaned forward expectantly, the radio fell silent. Faces around the room showed the same thoughts; had there been an accident, was it bad news or was it summit success? The tension began to rise as voices quietly began to ponder.

The radio broke through the chatter and again everyone leaned towards it in anticipation. The Sherpas began to gather in the doorway, sensing the occasion. "Base Camp will be transmitting blind to all stations in the Khumbu". The message was repeated. The suspense grew and then the adrenaline really began to surge. Silence fell again. The room was filled with loud chattering this time as everyone willed Simon to make the announcement.

The next few minutes seemed an age. We were powerless to do anything but wait. Then the news came. Short but loud and clear. "Two members of the team have reached the summit of Mount Everest". Loud cheers broke the tension. The tranquillity of the Khumbu was momentarily shattered. They'd done it! Who'd done it? The cheers and excited chattering rose and fell as everyone applauded the success and simultaneously craved more information. It was another day before that came (and even then it was by a process of elimination!).

The Expedition could go home proud in the knowledge that its highest goal had been reached. Only now did we realise how much we had all wanted this success. As the excitement turned again to calm and the adrenaline levels subsided, the team celebrated in the style they knew best. A toast to the Expedition, its leader and to the mystery climbers. The lodge was soon out of rum! New thoughts began to dawn. Now we had to succeed on Parchamo!

Christine Smith is a school teacher near Manchester and was the Spokesperson for Group 1.

Names

By Ian Baxter

Group 4 included Stuart McNeil, Neil Crossling and me (Ian Baxter). I have noticed a tendency in the past to confuse Neil and Ian but Stuart is harder to explain. In any case we were for ever calling each other by the wrong name and I was probably the worst offender. Various solutions were mooted including writing names across the respective foreheads in indelible ink but they were never acted upon.. One morning I found myself walking behind Stuart and must have addressed him as Neil on a dozen occasions in as many minutes. Quite reasonably he remonstrated with me in the course of a good natured rollicking. Three and a half seconds later HE called ME Neil!

Ian Baxter is a policeman in Aberdeen

Summit Day

by Charlie Hornsby

Back again, home sweet home. The two Wild Country tents had not been blown away after all, perhaps more battered, a few tears, but still there. Oxygen bottles haphazardly scattered by the wind about this inhospitable, sastrugied wasteland, clattering together in a noisy rhythm. A cold and eternal wind whipped across the South Col. Drunk from hypoxia, exhausted and tired, I stood to take in the atmosphere of this amazing place. Wonderment and respect for the landscape but once more despair as our hopes and dreams blew off towards Tibet.

Several hundred metres behind me, Rod and Alison appeared on the horizon rounding the wind-slabbed convexity of the Geneva Spur; like me moving slowly but methodically towards the Col. Long shadows now. An even longer summit plume trailed to the North East, and to the west the sky-scape an explosion of soft colour heralding the day's end and a cold night ahead.

The three of us quite comfortably squeezed into one tent, big Dorje and wee Dawa into the other, communication between the two tents impossible despite their proximity. The time was set - rendezvous outside at mid night. Long night hours lay ahead, we settled down with numbed acceptance.

Peering out through the doorway I traced the line of the "Voi Normale" across the deeply reddening South face, the snow plumes beautifully illuminated by the last of the light. Two slowly moving figures caught my eye approaching through the veils of spin-drift; a wave and soon an oxygen masked face before us - Nukita - summit boy! Wide grins, warm congratulations and handshakes; tales of adventure. I wondered how he must feel now?

The three of us alone again, huddled into double dacron bags for warmth, actually quite comfortable until we moved; then melting hoarfrost would run in rivulet's down the tent fabric to dampen us further. Alison's tower stove swayed awkwardly on its suspension but its soft purr efficiently provided a steady supply of warm drinks. I was surprised to feel pangs of hunger. The intensity of the wind and the rattle of the tent gradually increased, along with my anxiety and tension. Not so much a fear but rather a feeling of hopelessness with our situation, wondering whether chances were ebbing away. But up here emotions were strangely blunted. I struggled to rationalise in the oxygen depleted atmosphere.

Midnight crept slowly by and Rod, geared up, chanced a look outside into the funnelling void of wind and spin-drift. Perhaps it wouldn't be so bad when we were up and out of here? He disappeared into the night to consult the two sherpas. Minutes later back with a committing expression - Dorje and Dawa were ready and impatient to leave, dollar signs alight in their eyes. Cynical perhaps, these "barrow boys" of the Khumbu.

Struggling with crampons and rucksack. The claustrophobia constraint of an oxygen mask; should I take my ski poles? I sensed the impatience of the others and yet I did not feel prepared, even after so much waiting. Then we were away into the darkness, me racing against my breath to catch up - no rhythm, feeling tired and strangely removed.

The incline of the slope increased quickly, sastrugi ridges tripping me and clumsy boots breaking through the islands of crust - this was exhausting although I was acutely aware of our limited oxygen supply and loath to crank up the flow. One litre per minute, struggling on into the night.

We gained ground, slowly, but definitely higher; joy to be out of that blasted wind. Able to think again, warm and more comfortable. The snow surface improved, now supporting our weight, neve like as we weaved upward via ramps and narrow couloirs. I was enjoying the movement. Ahead the twin head torch beams of Dorje and Dawa could be picked out intermittently. So this was Everest.

I am not quite sure when I first became aware of the dull glow in the eastern sky. Subtly, I began to pick out the rock features around me, the bulk of Lhotse behind, Makalu, and over there, that must be Kanchenjunga, a distant silhouette. The slope ahead widened out into a broad couloir and we cramponed steadily up its icy steepness.

Heavy breathing, slow rhythmic steps, many rests, but the crest of the South East Ridge was now close above us. Dorje and Dawa catching the first rays of the new day as they rested in the dawn stillness. Back to plod mode, not allowing my mind to travel too far, concentrating only on this moment, and then the next.....

The ridge at last and time to rest a while as the soft morning glow highlighted this beautiful ocean of mountains. The westward peaks of Cho Oyo and Pumori, Nuptse and Lhotse with its distinctive summit couloir and to the north the soft pastels of the high Tibetan Plateau. Below us, the Kanchung glacier a sea of contrasting shades and textures. We sat silently in awe, glad to be free of the uncomfortable masks for a while.

The South East Ridge curving up gracefully toward the South Summit, gentle at first, then finally rearing up in climax - quite steep and rocky. We changed cylinders, stashing another in readiness for descent. Moving quite easily now in the warmth of the sun.

The angle steepened, not very steep but sufficiently so to climb with great care. The snow surface changed, now quite soft and un-consolidated overlying loose, shaley rock, the bedding plane of which slanted awkwardly downwards. We moved to the very crest of the ridge, heading for the extra security of the rock there, in places adorned by straggled and frayed rope dubiously anchored and treated with extreme caution. Absorbing climbing as the Kanchung Face unfolded below our feet, eight thousand feet to its base.

Before us lay the South Summit. the wind had picked up and, worryingly, rather "funky" looking clouds had gathered above the summit ridge - "hog's backs". Snapped out of our time warp thoughts, Rod and I were apprehensive, success appeared almost tangible although I sensed a creeping anxiety that our great prize would be snatched from our grasp. Spurred on, we moved purposefully towards the waiting calls of the sherpas on the South Summit, only some 50 metres further. Several of Nukita's discarded oxygen cylinders marked the way.

Rounding the icy crest, suddenly a familiar picture in the frame before us, not déjà vu I told myself rationally. The scene that I had studied so many times in so many photographs in so many books - the summit ridge itself. Just as I had expected it to appear, the narrow arrete studded with Nukita's pigeon hole steps leading to the foot of the short, rocky Hillary Step. To my left, the steep South Summit gully - I felt instant respect for those men of 1975.

Reunited with Dorje and Dawa, we took shelter below a short steep wall just below the South Summit. The wind was tearing across the arrete ahead, obviously very strong as an almost horizontal plume of snow and cloud streaked off into Tibet. The prospect of the exposed ridge before us appeared suddenly daunting - apprehension drifted over me. I looked to Dawa, he was scared too, but was already dragging a 6 mm rope from his sack; I did the same.

Although communication was difficult, we signalled to one another. I tied on and, with the crudest of belays, scuttled off on all fours along the knife edge ridge, wind blasting me from the side. A tangle in the rope - perching precariously "a cheval" across the arrete, I fumbled with a surprising lack of dexterity with this "bird's nest". Of all places for this to happen! I gave up and cut the rope, rejoining the ends with a simple granny knot. The rope came taught but already Dawa was following behind using the rope as a hand-rail. He soon passed by, on to tackle the alarmingly unstable looking final ridge with gung-ho gusto. No disasters - Dawa was there and quickly secured his rope to an old rope to an old line dangling from this famous rocky step. Together we cramponed up with remarkable ease; although steep, the snow was firm and a narrow gully twisted through this final obstacle leading the way to the easy slopes beyond. We had turned the last key to success. The four of us moved on upwards.

"Just a walk now" I told myself although I could clearly see giant cornices overhanging the Kanchung face to the right. Was this really it? Were we really going to climb the Big One? I looked back to Rod and raised a clenched mitt with an overwhelming feeling of joyful emotion. I stooped, gasping and breathless over my ice axe and my eyes filled with tears. Far away faces I knew and loved.

Moving along the top of the world together Rod and I, Dorje and Dawa, an experience I had never allowed myself to imagine before. Perhaps a safeguard mechanism against the trauma of failure? Now my mind was free at last and the summit only a few feet away. I felt a deep feeling of relief, contentment and emotion, we had made it.

Standing on the top of the world, summited, ticked, bagged. How lucky I was to feel so alive and to feel the strength of the bond between us? I thought of the others at Base Camp, of Simon and of Ronnie now back home; it had been an incredible trip and we had succeeded.

Six weeks later I sit at a desk on another dreary November afternoon, tied to a bleep in a dull hospital. Alone again now, I remember the moments that I can never forget and wonder what this life's all about?

Charlie Hornsby is GP in Elgin.

GORAK SHEP TO BASE CAMP

by George Wormald

It was rather as travelling to a friend's party on a Friday night before a Bank Holiday - we knew it would be a pain but it had to be done. The journey was tedious, tiring and frustrating - how could it take so long? The route was stop start with queues forming on the steep slopes, and changes in direction where the way had to be changed. Occasionally there was the detritus of previous travellers rising to the surface. We had anticipated it to be a two hour journey but it was only after four hours that we came within sight of our destination. Everyone was thoroughly hot, exhausted and fed up.

The final straw was the last stage where we were crawling in first gear along a narrow switchback - so close and yet so far away from our destination that tantalisingly came into view every now and again. It was nearly dusk when we arrived, surprised at the number of people at the party and the noise coming from the green building. We were late arrivals, what would we find, who would be there so hesitatingly we entered.....

What a welcome from mine hosts Pete, Dave, Cathy and company. Stories were recounted of the trek, what was happening on the Hill, the who, what, when and why. It was just like gate crashing because our tightly knit group was now thrust into the hustle and bustle of a new world.

It was more like being in the racing pits at Silverstone. People coming and going, progress of the elite to follow, scanning the skyline through the binoculars, and reports of close shaves with the unthinkable. The adrenaline would flow when the radio crackled to life. News from the climbers on the Hill bringing us up to date with what was happening beyond the Icefall - so close yet so far away.

New people to meet - what was their name, what experiments were they doing, which expedition did they belong to? - then there were changed routines and new pecking orders, even new jokes to replace our tired and much overused ones of the trek in. However after a while it felt like home and a realisation that we had achieved one of the major goals of our expedition.

George Wormald is a business manager at Axis.

Adventure of a lifetime

by Victoria Weller

Culture shock! Adjustment! We had left the relatively familiar confines of the airport and were transported into another world, no longer seen through the lens of a TV camera, but through the open windows of a taxi hurtling through the dusty uneven streets, lined with a multitude of shops glimpsed beneath corrugated iron roofs.

Images flashed past of old men outside the dukas drinking sweet milk tea; of washing lines slung between buildings; of small boys animatedly trying to sell fruit; all amid the perpetual sounding of car horns and the clattering of rickshaws and the three wheeled tuk-tuks.

The plan was to go to Kathmandu, take a bus to the end of the road, and then trek for about two weeks to the Everest base Camp. After a few hectic days in the capital the first ten days of the trek were fantastic. On a typical day we would wake early and set off at around 7 am and walk until lunch, taken at a tea house at about midday.

They say that the first few days trekking exhausts everyone to begin with: I would certainly vouch for the truth of the guide-book description of our walk as, "very strenuous". Having managed to get places on the tourist bus, that is to say one where there is only one person per seat, we began the nine hour ride to Jiri.

I noted with interest that there was a button on the dash-board to indicate the brake failure. This would light up periodically as if to remind us that it still had a useful function. Eventually, after many rehearsals, the bus broke down for the last time at dusk, 13 km from our destination and we had to go on by foot. The sky grew darker and darker and as my friend and I were walking slowly with our heavy packs we became separated from our fellow passengers.

Unexpectedly we were beckoned to the side of the road by a Nepalese peasant family. A little anxiously I descended the rough path to their house where they invited us to spend the night. This generosity was one of many such displays of warmth and kindness we were shown throughout the trek.

That night we sat on the mud floor, around the fire in their kitchen, and joined them in a meal of boiled potatoes with salt and chilli and rice. It is surprising how quickly one learns a language when one is hungry. The following day we walked on to Jiri where we hired a porter and guide for our trek to Everest.

After so much bad publicity last year, I expected the trail to be littered with pink loo paper and other western debris. Admittedly I went before the tourist season was underway, but I was struck by the fact that the countryside was so clean. Kathmandu is a different kettle of fish. It is a sprawling city, full of great poverty, and the entire waste from the capital seems to be deposited in the river. Conversely, on the trek only an occasional loo in a lodge emptied into the river. The others were holes in the ground, which may not have been altogether pleasing, but at least they were environmentally sound. It was difficult to balance the facts that, as a tourist, one is contributing to a weak economy but at the same time encouraging the Nepalese to exploit their landscape. Not surprisingly they have a great desire to build tea houses of timber, which are frequently in groups, to benefit directly from each annual influx of visitors. However, it was reassuring to see that thousands of seedlings were being prepared for planting in the Sagarmartha National Park.

Despite the scars left by the axes of the ambitious, much forest remains and still covers a landscape which is beautiful and breathtaking in its variety. From lush, verdant hillsides filled with fascinating flowers and strange sounds one moved into a different world at higher altitude. The scenery became rocky, harsh and silent, with sparse vegetation. The weather was clear and cool with blue skies and brilliant stars by night.

After 15 days walking, at the highest point of the trek, lies a hill of 5,500 metres, called Kala Pattar. From there it is a spectacular and rewarding view. One looks down onto clear, reflected blue lakes on one side, rocky moraine on another, and then, towering majestically above, there are the magnificent, awe-inspiring, snowy peaks of several of the highest mountains in the world - one of which is Everest.

My admiration for those who attempt to climb the great mountain, with or without oxygen, has increased 10 fold. As we came down from Kala Pattar there is 50% less oxygen than at sea level, we remembered and understood another trekker who was inspired there to compose songs about what he had seen.

In the final four hours of our journey to Base Camp, at 5,300 metres, the change in landscape was dramatic and utterly removed from anything I had ever imagined. We slowly crossed the glacier before us, which was made up of acres and acres of huge boulders and scree on an icy bed.

There were vast seracs created by the glacial flow beneath forcing up ice mountains, and many of the boulders were perched high on great, frozen wedges. The path was barely discernible, marked by an occasional cairn or pile of yak dung, and along it we picked our way to the welcome lying beyond desolation.

The British Expedition's Base Camp was immaculate. Contrary to what has been reported in the world's press there were none of the piles of used oxygen cylinders, frozen bodies and waste described in the tabloids. Impressive arrangements had been made for the disposal of all human and material detritus, as one would expect from a well organised and serious research expedition.

The work that was being carried out for many weeks was thorough, detailed and well controlled. I was glad to be used as a guinea-pig for some scientific research during my visit. Amongst other projects the Expedition expects to produce much positive information on the effects of altitude on the body, which cannot be ascertained by air travel by plane or balloon for example. A valuable contribution to our knowledge of mountain sickness will certainly be one of many results that emerges.

To go to Nepal is an eye-opening experience for a molly-coddled westerner. We are aware of third world poverty from the media. To see the reality and reflect on one's own good fortune is quite another thing. To wonder what can or should be done in the world is something else still.

Now, when I consider Nepal, my mind will flick through a book of images it retains. Among the selection will be not only those of poverty, but also of the scenery, the welcoming faces of the Nepalese people, the gurgling laughter of a baby I met, and all the other sounds and smells of a beautiful and fascinating country.

Victoria Weller is taking a year off between 'A' levels and university. She trekked independently from Jiri and joined the Expedition at Base Camp.

Swimming at 17,000 feet

By Ken Stewart

At Gorak Shep (alias Lake Camp) I jokingly suggested a swim in the lake to Sherpa Santash. He took me seriously so I had to go in. So then had he. The water was cold but not as freezing as anticipated. The rapid breathing was hard to control; but this soon settled and then the dip was "almost" enjoyable. It didn't last long though. We swam about 25 yards and then out we came, cleaner than before, and really chuffed with ourselves. We had to repeat the dip every time we passed Gorak Shep so had 3 more!

Ken Stewart, when he's not off his trolley, is a gynaecologist in Stirling.

Everest - Next Time?

By Andrew Pollard

When I woke up again, if I had ever been asleep, it was getting light. The tent was still ravaged by the wind and the demented flapping of the fabric was unchanged, its continuing presence almost reassuring. The inner tent was coated in frost which was sprinkled onto me whenever I moved or the thundering wind shook the tent. My down suit was damp with condensation and my socks wet and cold. This was the fourth day at Camp IV on the South Col at 8000m without food and since yesterday I was alone.

For those four days the Col had been shrouded in cloud and the icy wind blew snow around with the intent of burying all of our equipment, which it did. The others had left to try their chances on a later day and the Sherpas had deserted me. It was desperately cold. I was using oxygen continuously now to suppress the lethargy, cold and physical debility, which was so overwhelming. During several finger-numbing forays through the tent door, it was becoming increasingly difficult to find full oxygen cylinders buried in the snow outside and I knew it was time to go down. Condensation pooled in my oxygen mask and trickled down my chin, my throat ached from coughing. Time passed easily though, I don't remember much detail of my mental musings, the lack of oxygen slowed thought and melting snow for drinking-water took all day.

But something was different this morning. I got to my knees and unzipped the tent a fraction in what seemed like a frenzy of breathless activity. A shower of fine snow blew in my face and I shivered. But it was glorious. The sky was blue and cloudless for the first time and the South Summit of Everest was visible and crowned golden with the early sun. The wind was still roaring out there but less snow streamed across the Col and the slopes in front of me up to the South East Ridge seemed calm. It was 9th October 1994.

After 2 squares of chocolate and a sip of almost frozen Isostar, I set off towards Everest. I don't remember why, or what I had intended, but I had three 3 Litre oxygen cylinders in my rucksack and a litre of fluid. The oxygen was set at 2 litres per minute. I decided I wanted to have a closer look at Everest and take some photos. But I didn't know where to go. I could see the South Summit and South East Ridge but there were too many possible approaches up the slopes to the ridge. I never imagined I would be alone here. I was scared.

The snow was horrible. Most of the slope up to the ridge was wind-slab - a thick hard crust resting on unconsolidated snow. Each step was treacherous. I either fell through the crust and stumbled or slid on the slab. A few small avalanches set off from my feet and I wished I had a longer axe. There had been no wind since I left the South Col and I was warm as long as I was moving. I felt good. Icicles hung from my chin and my toes were numb.

Suddenly I couldn't breathe. I thought I was being choked. I gasped and gasped. It slowly dawned on me that my oxygen cylinder must be empty. It was steep here and I couldn't safely take off my rucksack and get out a new one. I struggled on with pain in my chest, pain from sucking at the thin air. After an age I reached some rocks where I could rest before fumbling with the regulator and a new cylinder and begin gulping in life.

Sooner than I thought, I was just below the Ridge and pressed on straight up. Ten metres further and the snow became more unconsolidated. Like climbing on polystyrene beads. No upward progress. I turned the oxygen up to 3 litres per minute. I felt very insecure and traversed for half an hour plunging my axe deep into the snow with every side step until, eventually, I found good purchase and I stood on the South East Ridge of Everest.

The snow on the Ridge was the same. In places it narrowed and my slipping and stumbling threatened to hurl me down into Tibet or back to the South Col. Soon enough, though, the angle eased and I sat down on a flat section below the last slope up to the South Summit. I was at 8600m.

It is a remarkable place. I looked across to the summit of Lhotse, over Nuptse to the Mountains of Nepal and North and East into the brown plateau of Tibet. Below I could see the tents on the South Col. Red dots in the snow. I took off my oxygen mask and realised I was very alone. To my astonishment, I heard John talking on the radio from Base Camp. The friendly sound was deeply comforting and a wave of emotion swept over. I longed to speak to him and I talked frantically into the handset but he could not hear me and I felt rejected. It was about 11.00 am

I was within an hour of the South Summit of Everest and looking up I could almost touch it. I felt physically strong but the snow conditions were still unpleasant and dangerous and I was concerned about the descent. I was on my own, high on Everest with so much to lose. I began to sob. Not outwardly. There was no one to see anyway. Suddenly, it all began to seem so intensely pitifully pointless. I began to think of my son. Jamie was five and a half months old when I left and I cried at the loss of three months of his life. I missed Rachel desperately and wondered how I ever came to be sitting on this crazy frozen perch looking down on the world. So I got up, turned my back on Everest and went home.

It'll be Christmas Eve tomorrow. Jamie is quiet again now, tummy full of milk. Lying in his cot warm and snuggled under cosy blankets, his breathing is peaceful and content, hair ruffled and long eyelashes locked in sleep. Outside it's -6°C and there is ice on the window pane and a thick frost on the ground in the blackest night. Rachel is asleep too, deep in the duvet. It's 5.30 am and it's cold, but this is where I want to be tonight, with my wife and my boy.

Andrew Pollard is a research fellow in paediatric infectious diseases.

Clerical and Medical

by John Currin

With three days to go and the house strewn with blue plastic barrels and various piles of gear, the phone calls from newspapers, radio and TV suddenly came thick and fast. Feeling a little intimidated by the proposed TV coverage in my local gym whose infrequent use I now regretted I sought some support from my closest fellow expeditioner Chris Comerie. Having lifted some very light weights for the cameras I returned from the changing room just in time to hear the last part of Chris' interview. After some questions relating to climbing objectives and preparation the interviewer said "Tell me Chris why should a climbing expedition want to take a clergyman along?" I think Chris and I had met just once before at the Lloyd's event and this question was clearly one he had not anticipated. Searching for an answer while making some very diplomatic comments he finally said, "Well he'll come in very useful if someone gets killed."

We began the trek to Base Camp at Lukla in conditions of low cloud and drizzle. The weather remained more or less the same over the next four days, by which time we had taken a rest day in Namche and pressed on to Tengboche. The following morning I remember waking to bright sunshine, the sound of excited voices and tent zips being hurriedly opened. Suddenly after spending the last few days trekking in typical and all too familiar Lakeland conditions, that day we were presented with a full and glorious panorama of towering crystal white peaks, soaring into cloudless blue skies. In the warmth of the morning sun I shared the conviction of the Psalmist who said "*The heavens declare the glory of God; the skies the work of his hands.*" During the previous days of cloud and rain I had heard no one complain. In fact I think all of us were relieved to be free from the confines of Kathmandu. As I gazed around and at last saw, what I had long anticipated, the clarity of the light, the tranquillity of the morning and the majesty of the peaks far exceeded my expectations. For a while that morning we were all awed and subdued.

I am more than grateful that there was no need to officiate in the way Chris had mentioned. Although a little disappointed and frustrated that due to ill health my own mountaineering objectives were not realised but the trekking was unforgettable and enhanced by warm companionship and strong team spirit. I know the experience the summit team had with the high altitude Sherpas was to say the least mixed, but the Sherpas who accompanied Group One and also Nima with whom I left Jill and the children were excellent. I found them to be organised, reliable, industrious, trustworthy and uncomplaining. Their kindness and hospitality has left as profound an influence on me as did the impact of being amidst the worlds highest mountains.

John Currin is a Curate at Eastwood Church

Our rest day!

By Denzil Broadhurst

The calm, measured tones of David Collier, the research co-ordinator, came over the radio from Everest Base camp. "Ronnie's had a stroke at camp 1 and we may need you to help"

OK, so we were members of a rescue team, but we hadn't really expected to be needed. Simon had asked us some time ago if we would act as a rescue team whilst we were with the expedition. Of course we laughingly agreed, knowing that we were only going to be in base camp for the two brief periods whilst tests were being done, the rest of the time we would be trekking, or climbing elsewhere, so the chances of us being in the right place at the right time seemed somewhat remote.

We'd been up to Base Camp for our first 5 days of medical tests to give some pre-acclimatisation readings, and then trekked down to attempt Lobuje East, eventually being defeated by thigh deep sugar snow at about 5700 metres. The prospect of the route ahead being a few hours of dangerous navigation through some desperate looking seracs and snow bridges hadn't been very encouraging anyway.

We'd then moved on to Dingboche to start the trek up to Island Peak, and the plans for the day were a gentle stroll up to Chukhung. We'd originally planned to have a rest day, but with the time lost in Kathmandu just a couple of hours walk would have to count as a rest.

So there we were, two days trekking distance from Everest Base Camp, on standby for an incident.

"We're trying to get a helicopter into Base Camp, but if that fails we'll need him taking to Pheriche" "We'll know in a couple of hours if it's available"

Ah well, at least it was sunny and we could have a kip while we waited, and I guess the views were better than we normally get around the Peak District. The Nuptse-Lhotse ridge and our target of Island Peak ahead of us up the valley, Ama Dablam to the South and Tawoche to the West.

Ronnie was being walked down the icefall with the help of the climbers from all the different expeditions in the area, and a group of Sherpas had set off up the icefall with the stretcher. They had him on oxygen and slowly brought him down to Base Camp.

"No luck with the helicopter, so once the doctors have finished with him we'll get him started on the descent"
"If you can come up to meet him and take him the rest of the way to Pheriche"

If we were going to get a helicopter into Pheriche it made sense to also evacuate George Smith as well. George, 72, had made the trip up to Base Camp OK, but his health had deteriorated during his stay there. Eventually he'd started the descent, but at the speed he was capable of it would take a few days to Pheriche.

We eventually decided to make a move. Ronnie had still not left Base Camp, but we could get Mick over to Pheriche to borrow a stretcher for George, and start moving it up the hill to Lobuje, about 3 hours walk away. Mick and Martin went up to deliver the stretcher to the waiting Sherpas, and then continued on to meet Ronnie near Gorak Shep, while the rest of us followed on behind to assist the Sherpas on their descent with George.

The acclimatisation of the last 10 days had worked wonders. With that and the switch from our normal 25 pound sacs to just a spare jacket and head torch meant the journey which had taken a full day the first time was now over in less than 2 hours. The Sherpas had started the descent, but the stretcher was a standard folding hospital stretcher, with a man on each corner it was far too wide for most of the narrow paths. A set of rucksack shoulder straps and one of the Sherpas head straps sufficed to fasten George on with reasonable safety, then the Sherpas lifted the stretcher on to their shoulders and they were off.

We were off as well, jogging alongside at an astonishing speed trying to assist with balance on the steep slopes and loose scree. The carry continued at the same speed, no matter how steep or rough the path became, with a regular rotation of manpower on the stretcher between the Sherpas and ourselves. Not a carry method I would recommend for the UK, but in the circumstances amazingly effective.

Darkness began to fall as we reached the half way point of Tuglha after about an hour, but a round of lemon tea soon refreshed us for the next hour down to the tea house in Pheriche.

Ronnie was well on the way down by now, although he was still about 2 hours behind us. "We'll come up and meet you on the final valley section - give us a call on the radio" "I will if I can keep up, the doctor is already

about 10 minutes behind his patient!" Ronnie was obviously feeling much better, and no doubt the oxygen was helping as well.

We sat in the tea house waiting for the call, devouring some much needed food when Lhakpah, our Sirdar, came in with a kettle of chang - "You want to try?". We'd been warned not try the local fermented rice brew until we were on our way home, but we deserved a drink, and we had told Lhakpah that the drinks for the Sherpas were on us. It certainly helped to numb the sore shoulders.

Some while later, when we received the call from the group with Ronnie, we weaved our way up the valley to be met by him smiling and cracking jokes while the rest of his party struggled to keep up. We were all ushered back into the main room of the tea lodge, disturbing some of the Sherpas who had already bedded down for the night, for some more food and chang until we all crashed out for the night in the dormitory. We had been carrying our normal day gear so it didn't matter that our tents, porters, kitchen, yaks and climbing gear were half way to Island Peak.

The weather was bright and sunny the next day so by mid morning we heard the distant noise of a helicopter reverberating up the valley and the two patients and doctor were on their way down to Kathmandu.

Mission completed, OMRT chalks up another incident!

Perhaps the team member who had produced the joke T shirt before we left - "OMRT on tour" with a list of our 1994 team trips to Scotland, Northern Ireland, Lundy and the Himalayas knew more than he was saying!

So much for our easy day, and we'd lost more time from our schedule. As long as we kept the radio turned off for the next few days we should be OK.

P.S. Ronnie seemed fully recovered by the time he left Kathmandu, and when we met up with George in the Garden Hotel 3 weeks later he was back to full strength.

Denzil Broadhurst is an electronics design engineer

The Researcher's Perspective

by David Collier

Conceived four years ago by a group of ex-Barts Alpine Club doctors the BMEME started as a small group of doctors who wanted to climb Everest. With the passage of time it grew into a highly complex Expedition. The unilateral increase in fee charged by the Nepali Government (to \$10,000 US) for each climber to attempt the climb, made it necessary to broaden the membership of the expedition. For those of us interested in the research opportunities of hypoxia (low oxygen) this was to alter the entire project.

In addition to the seven climbers and twelve researchers there were a further 60 members recruited to the team. "Support team" members joined us for all of the pre-expedition weekends and mountain medicine teaching courses (half of them doctors). They paid the expedition a sum similar to the cost of a similar high altitude "trekking" holiday. In return they were members of a prestigious expedition, and volunteered for the medical research projects. It was the success of this symbiotic relationship between researchers, climbers and support members which made the most difference.

Before we left for Nepal, publicity efforts to help us included the climbing team scaling the atrium window of the Lloyds building; Labour leader John Smith came and saw displays of our research projects; we made a half-page cover picture in the Independent and the Times. This was only one week before John Smith died in our own hospital (where I was a Cardiology SHO at the time). We felt the loss of this sincere and forthright man who had tried to help us very keenly. A man of substance and conviction rather than the charisma and gloss we so often see from people in political life.

The separate support groups took part in our pre-expedition research weekends in London (Barts) and Stirling. The next time we all met up was at base camp, 5300m (18000 ft) on the Kumbu glacier. Groups of 8-12 members were tested on arrival at base camp and then on their return after attempts (usually successful) on mountains such as Island Peak, Pokalde or Lobuje East. Base Camp was established in September by the climbing and research groups. It was the focus of activity and linked the climbing team on the mountain with the research, and all the support groups as they came and went.

The research group included contributors from 13 UK universities including London (Barts, QMW, Kings, St Thomas', Charing Cross, Westminster, Oxford, Leicester, The Institute of Ophthalmology, Moorfields Eye Hospital, Birmingham, Edinburgh Glasgow and Northwick Park. We were unable to obtain umbrella funding for all the projects and only raised one £13,000 grant from the British Heart Foundation for a project on heart rate variability during hypoxia. Despite this we were able to complete almost everything we set out to achieve, largely due to the loan of equipment from all over Britain, mostly from the manufacturers themselves. Work included studies on the eye led by Diana Depla FCOpt (a project on visual field changes and hypoxia may shed light on the cause of chronic simple glaucoma). Balance and hearing work from Martin Rosenberg at Queen Mary and Westfield College addressed a theory about hair cell function and low oxygen exposure. Peter Barry from Leicester carried out the first cough challenge studies at altitude as well as recording nocturnal cough to confirm the impression that cough really does increase as you go higher. Our study on pulmonary oedema and endothelin-1 concentrations has just been beaten by a paper out last week in 'Circulation' from a European group. Gerald Dubovitz from Oxford performed studies on intestinal absorption and on the effect of sleeping tablets at altitude. The effect of benzodiazepine sleeping tablets appears to be dependent on how well acclimatised you are.

My own work, with collaborators from Kings College, Charing Cross and Westminster and St. Thomas', was to investigate peripheral chemoreceptor responses to carbon dioxide during acclimatisation. We have been able to show for the first time that fast CO₂ responses improve with acclimatisation to altitude. This work was made more difficult by BOC, who supplied eight incorrect gas cylinders! Normally this would have been annoying, but this order arrived during a snowstorm at base camp - four cylinders to a yak and half of it was wrong. You can't just fax or 'phone your problem. At 18,000 feet you are stuck! The other major problem with our research was an avalanche. Just three days after we had equipped our three main research tents (each the size of a small living room) and our experimental work was underway, a large slab avalanche from the west ridge of Everest at around 8,000 metres brought down a huge volume of snow and wind blast. Researchers during World War II looked into using powders and other materials to increase the destructive force of blast from bombs, by increasing the mass of the moving air, in our case the spindrift from the avalanche increased the effect of the blast. Our research tents were all flattened, one 90lb tent, a McInnes box that was thrown over 40 feet through the air, over a climber and his tent, smashed our main VHF radio mast (2 inch tubing) and landed just in front of our mess tent. We were glad to be alive, but spent much of the night rescuing precious and sensitive equipment from the snow before rebuilding the camp the next day.

Although the conditions for climbing at extreme altitude were poor due to excessive wind from the jetstream, which arrived early, two of our doctor-climbers were able to reach the summit using oxygen. Dr. Charles Hornsby and Dr. Roddie Kirkwood are both Scots, although Roddie chooses to live (and climb) in New Zealand.

Alison Hargreaves, the best British woman climber (she climbed all the major Alpine North faces in 1993 direct) was a semi-detached member of the team. She was climbing as solo as possible and carried her own equipment. More than this, she wanted to be the first woman to reach the summit without using supplementary oxygen. Although Alison spent four nights at the South Col and seemed surprisingly well there without oxygen, her summit bid was foiled by severe winds and the sensations of impending frostbite.

Others were not so lucky. I treated one Scots climber who got to within 100 metres of being the first Briton to climb the second highest mountain, Lhotse. His frostbite of the toes, however, was nothing to the severe hand and foot injuries received by a sherpa working for a Nepali speed-climber. He had slept with wet gloves at nearly 8,000m and subsequently lost most of his fingers in Kathmandu.

One of our older support team members had to be stretchered in and out of base camp over the Khumbu glacier. Fortunately one of our support groups was dominated by most of the Oldham Mountain Rescue Team. A climber had a transient ischaemic attack at Camp 1 and had to be evacuated down the icefall and out to Pheriche where he left by helicopter. Thankfully he recovered fully.

What are the lasting memories? Sunrise over Everest, researching from 10 until 6 each day, the relief of seeing climbers return intact.

The expedition was successful beyond my hopes, and the unique structure worked well - the vast variety of members all had something to contribute, from a silicon chip designer for GEC Plessey, and oil refinery manager, a hatful of GPs, gynaecologists, anaesthetists, pharmacists and paediatricians.

David Collier

The Ascent of Island Peak - 20,305 feet

by Mark Howarth

One of our ambitions in Group 5 was to climb Island Peak. The last time I had wielded an ice-axe it had a wooden handle, which dates me a bit and I had never worn crampons outside a climbing shop. Everest Base Camp was a good place for my first lesson on ice climbing. Jim kindly told me I was doing everything wrong. Now if anyone asks if I have done much on snow and ice, I casually mention that I have climbed the Khumbu Icefall ... well, it's partly true.

A few days later we were at Island Peak Base Camp. This must rank as one of the worlds most desolate spots. The next morning we walked up the mountain in search of a bivvi site and wrestled with the decision - to climb or not to climb. We found an ideal spot after about an hour and a half - a ledge of flat ground among the rocks. The immortal words of Bill O'Connor echoed in our ears - "... one of the great joys of Himalayan mountaineering is the high altitude bivouac". Well, we would see about that. Back down for lunch and more uncertainty over who wanted to go. Jeremy, George, Geraldine, Dawa and myself were committed from the start and in the end only the five of us went.

We got a good send off from our friends that afternoon as we prepared to go to our bedroom on the mountain while they waited below. We felt like real mountaineers now. Then Chandra, our cook handed out four plastic bags containing our packed suppers. Suddenly it was as if we were children out on a school trip. Perhaps that's what mountaineers are.

Retracing our steps with enthusiasm, we were soon back at the bivvi site. In the fast fading light we laid out mats and climbed into our sleeping bags. A tiny crescent moon set soon after the sun. Soon there was a hard frost. We had planned to leave at three in the morning and Dawa arrived to wake us soon after two (he preferred the comfort of his own tent at base camp). I was glad he had brought some water as mine had frozen overnight. Too cold to think, we packed our rucksacks, put on boots and head torches and started stumbling uphill. Plastic boots proved cumbersome but not as bad as I had feared. Walking up steep rock and scree in the dark was very tiring. Knowing that I only had one spare battery, I carried on using the first for far too long and soon my head torch was providing only a feeble glow. Several times I decided I had had enough, and was only put off turning back by the greater difficulty of going down in the dark. I would wait till first light. But just as the sky began to lighten, we reached the glacier and without saying a word we all put on crampons and harnesses and roped together. There was no turning back now.

There is a magic about walking on the snow. We were now on the high Himalaya, not among them. Soon it was broad daylight and there was a clear deep blue sky. The agony and the breathlessness were not gone but were mixed with exhilaration as we traversed the glacier with increasing confidence. On the steepest section Dawa went ahead and put in a fixed rope which we climbed up. Then, roped together, we walked along the summit ridge - all of two feet broad, with a dizzy drop on either side. A short, if painful final climb took us to the top. I would have yelled with joy if my lungs had let me.

Time for photos, hugs all round and a swig from the hip flask. This was well earned ecstasy. As we moved around on the summit we never thought to unclip from the rope. By the time we made off we were tied in a long knot like a cat's cradle and had to clamber over and under each other to get free. I can't imagine what Dawa thought of us. But I do know that I wouldn't have been there without him.

We had to be off the snow before it got too soft so we soon headed back down the ridge, abseiled down the rope into the cwm where we stopped for a short rest and some food. There were better opportunities to admire the amazing scenery on the more relaxed descent. Then on down and down and down. I think I have never been so tired as when I arrived back at base camp. Aware that Ann was videoing me as I approached camp I tried to put some spring in my step but failed miserably.

Mark Howarth is a General Practitioner in West Sussex.

Parchamo and group 1

by Denzil Broadhurst

"What do you mean, Parchamo isn't on our list of peaks?" There we were on the way to Kathmandu airport, hoping to fly out to Lukla, and Rai had just informed us that Parchamo wasn't included in our climbing

permits. We'd done our group planning back in May at a weekend in Saddleworth, and the final crowning moment of our expedition was going to be the ascent of Parchamo. We were stunned!

As soon as we got to the airport we pinned down Rai and Sonam, one of the Thamserku directors, and over a Fanta, Chris and I discussed the situation with them. After going round the houses a few times without success, and with them claiming that Simon had agreed to no ascents of Parchamo, a sudden light seemed to come in Rai's eyes when he realised that we were not intending to descend via the Rolwaling valley. The whole problem had been a misunderstanding, and Rai's attitude changed completely. There wasn't much time to sort the permits, he didn't know if the expedition would cover the costs, and wasn't sure of what the costs were going to be, but he was prepared to try and sort it out.

We didn't fly that day anyway, so a meeting took place later that afternoon at Thamserku, with Chris and Pete Smith negotiating the deal. Finally, success, they would sort the permits and make sure they met up with us while we were trekking, and if the original agreement with Thamserku didn't cover the cost of the permit our group would split the costs between us.

Our problem now was that we were losing time in the flight to Lukla, and our schedule was aggressive. We made various fall-back plans, including missing Pokalde and Gokyo if necessary, but Parchamo was right at the end and plenty could happen before that.

Almost 5 weeks later, having assisted in the evacuation of Ronnie and George, and cutting our second visit to Base Camp to the minimum, our final version of the schedule was unrolling. We'd sprinted from Island Peak to Base Camp and back to Namche, the yaks and climbing gear having been left in Dingboche for most of the time since they couldn't cover the distances fast enough. Only Mick, Martin and Jamie had attempted the slag heap of Pokalde, and we had missed out the trip to Gokyo completely.

We headed up the valley towards Thame, racing past a number of yaks. How things had changed from the start of the expedition when the sound of yaks behind you was a warning to move out the way, and a good excuse for a brief rest.

We were sitting in a small tea house in Thame and wondering if we could top out on Parchamo at the same time as the Everest team reached their summit, when we heard over the radio that 2 of them were already there. Great news! Now we had to succeed as well.

Jamie spent most of the night throwing up and the Sirdar's father was also ill, so we left them at the camp site in Thame and headed up the valley. We had a good chat with one of the monks in the monastery, he originally came from the village, but had spent some time in the USA. We heard from Jamie that the monk came down later to see if he or Kami needed anything.

Lunch at Tengbo, once we had found where the Sherpas were waiting for us, then less than an hour to our base camp. The following day was the climb up the Taschi Lapcha to the bivvi site, but before we left, our yak driver who had been a monk, offered to do a Puja for us. It was one of their holy days, and they put up the prayer flags across the nearby crag and set up the altar. The smoke drifted across us as we sat and took part in the food and drink offerings.

The ascent to the pass was one of the hardest days we had done. A few hours working our way up the steep moraine with large areas still very loose and indistinct. We assumed there must have been a significant rockfall in the last year or so. The glacier crossing was similarly difficult going and also often unmarked. We watched a German party descending from the pass, with their porters struggling on the ice and snow in their tennis shoes.

The final climb was a scree slope, which felt as long as the Great Stone Shoot in the Cuillin, only now we were nearly at 18,000 feet and I was carrying a sac weighing almost 50 pounds. Mick, Stu and Martin were already in their bivvi below an overhang and Andy joined them, but Chris and I looked at the recent scars on the rocks all around and opted for a spot in the snow out of range of any likely rock fall.

The Sirdar of one of the groups camped nearby asked where our Guide was. "What, no Guide!" Then where were our Sherpas, porters, our tents? "None!", "You British.....HARD!"

Stu's old knee injury was troubling him after the hard going, so he snuggled up in his bivvi bag as the rest of us left around 3.30. Mick stormed the hill with Martin pulling out all the stops and staying with him, while Chris, Andy and I made our more sedate way up. The whole route was a steep angled snow slope which we climbed

alpine style. Sure enough, by the time we were about half way up Mick and Martin came storming back down. Martin had kept up, but without the energy to bother putting a new film in his camera he had taken no photos.

The weather had been threatening all morning with dark clouds at about 24,000 ft and the occasional strong gust pinning us to the spot as we were peppered by the spindrift. The Sherpa guide with a group of Venezuelans reckoned there would be snow by lunchtime.

10.00 am and we were stood on the top, or rather within a few 10's of metres since the final section of the ridge was a series of dramatic crevasses. For the first time I had needed to wear my duvet jacket all morning, and my compact camera had to be kept tucked inside to stop it freezing. Both Andy's and Chris's cameras packed up on the summit but my trusty old OM1 carried on regardless.

An hour was spent with photos and radio calls to base camp and to Gerald and Nick on the top of Lobuje East, with a celebratory bar of chocolate, then a descent in just 1 hour to the bivvi site. We packed up the gear then began the long descent to the base camp for 4.30 p.m.. It had been a long hard day, but one of the best.

Overnight the wind picked up, blowing down the mess tent, and threatening the rest of the tents. We woke up to an al fresco breakfast in the snow. Perhaps the Puja had helped keep the bad weather away for those vital 24 hours, there was no way we would have been climbing today. Time to go home, we were due to be in Lukla the following day, but it had certainly been the climax of a great trip.

Only 23 kilograms!

by Denzil Broadhurst

So we were going to have to manage with 23 kg in the hold baggage and the hand baggage limit of 5 kg. We might end up wearing a lot for the flight out!

I'd cleared a space in the loft and all the gear was strewn across the floor with most of it sorted into piles: must have, probably need, might need, and luxuries. Before I'd got all the gear together I'd done a quick weighing and it was already over 30 kg. The luxuries pile seemed to be growing.

I guess the weight limit wasn't too bad for those who were only trekking, but we were planning on doing some of the peaks. Crampons, ice axes, helmet, rope and harness, a selection of normal climbing gear such as crabs and slings. What about the other climbing hardware? Chris and I had planned to take a set of chocks between us for belays, but we knew that they probably wouldn't be used. Chris would take a selection of smaller ones on wires, and I would take some larger hexes. A pair of jumars and a tuber went on the pile.

The plastic boots went in, and the lightweight fabric boots should be fine for all the trekking. A pair of sandals? They'll make a pleasant change in the evening. Trainers for the journey out - no, the boots would be okay.

Clothes? 3 pairs of underpants, it's only 7 weeks! 1 T shirt to travel in and 1 long sleeved shirt if I need to keep the sun off, I was planning to buy another T shirt in Kathmandu anyway. 2 pairs of thick socks and 2 pairs of thin ones would have to do. One pair of Troll trousers, a pair of shorts for hot days plus the tracksuit bottoms for climbing.

Thermal gear? Just how cold was it going to be? A couple of thermal vests plus a pair of long johns went into the pile. 2 pairs of gloves, a fleece balaclava and a skiing fleece headband went in as well. It's too easy to lose a pair of gloves and they could be crucial while climbing.

A huge pile of Buffalo gear! I was relying on it, and since they recommend not wearing anything underneath that saves some clothes. Would my 3/4 season sleeping bag be enough? I'd bought a good lightweight sleeping bag to go inside it for the really cold nights but it was over 1 kg.

The Goretex had to go in. Jacket, overtrousers and mitts made sure I had a full waterproof shell. Most wet conditions in the UK are dealt with by the Buffalo gear, but the Goretex is always there in the sack.

What about the camera. A second hand short zoom for the OM1 rather than a selection of lenses. It's incredibly rugged and doesn't rely on a battery. I'll put in the little weatherproof compact as well, far easier while climbing.

Everything in the barrel. No! It won't all fit, and it's already up to 28 kg. Put the light, bulky stuff in the rucksack and take it separately. It's all in but it's getting close to 40 kg.

Time to get brutal! Cut the extra climbing hardware to only 1 jumar and ditch all the hexes (it turned out Chris had dumped her chocks, so the set between us turned out to be none). Out with the thermal long-johns, and that nice new sleeping bag. I can always sleep in the track suit bottoms. Put the films in re-sealable plastic bags rather than their plastic canisters. Every little helps!

The procedure goes round and round, throwing a little bit extra out each time. Finally, 23 kg between the barrel and rucksack. 5 kg in the hand baggage, but I'm going to be wearing the plastic boots, two jackets and my pockets are going to be full of crabs! The luxuries are down to a handful of chewy bars, but I don't eat much chocolate anyway. If the airline doesn't actually weigh the hand baggage I can swap to my lightweight boots and empty my pockets, or swap after they have weighed it. Success!

Sunday morning at Heathrow. No, PIA aren't worried about the weight. Everything is just going in one large stack of barrels. Quick, get the plastic boots and crabs in the barrel and I'm down to one light carry-on bag.

All that fuss, but at least it forced everyone into thinking seriously about what they really needed.

Conclusions: On the coldest nights I slept in my Buffalo shirt and socks along with the track suit bottoms and was never cold. As far as the climbing gear went, I used a sling for a belay a couple of times and abseiled off Island Peak with the tuber, but couldn't have used the chocks, nor did I need the one Jumar which I took. I'm still glad I took it though. I didn't use the Goretex gear, and the only time I was glad of the Duvet jacket was on Parchamo.

My spare gloves, mitts and glacier glasses weren't needed since I didn't wreck or lose any. There was enough opportunity for washing so that the 3 pairs of underpants were plenty and I came back with an unused pair of socks. I didn't need the long sleeved shirt - but only because I'd bought one in Kathmandu. It wasn't as cold as I expected so I didn't use one of the thermal vests either. The Buffalo shirt served very well as usual, needing nothing more most days.

Next time I'll go really lightweight - I'll get rid of that spare thermal vest!

Memories

By Christine Smith

Being given the opportunity to travel in another country is always special. In this instance, the peace, tranquillity, simplicity of life in rural Nepal and the dramatic, constantly changing scenery makes the experience more memorable. I have recorded simply some of the most vivid memories (the good, the bad, and the silly!) that I will always cherish and have strangely changed my life.

- Flying through holes in towering, white, monsoon clouds in search of the airstrip at Lukla.
- Rain, mud, swirling clouds and a Sherpa village perched high on the hillside above the Dudh Kosi.
- Watching in wonder the faded old prayer flags fluttering in the wind.
- Seeing bright, newly decorated mani stones untouched for decades, their inscription worn with age.
- Seeing rivers frozen in the cold of the early morning, reflecting the rising sun.
- Standing in the courtyard of the Thame Monastery, watching the 'Angels Wings' forming and reforming in the a perfect blue sky.
- Walking between the crevasses on Island Peak, fascinated by icicles, the towering faces showing the lines of winters gone by, the wind patterns and the sheer beauty of the mountains covered in glistening white snow.
- The sudden realisation that I had just climbed the path from Dugla without stopping for breath - and that I had even held a conversation whilst walking!
- Walking through the Icefall, stunned by the patterns made by the snow, ice and sunlight. The awe and the feeling that one day I should go higher to see if the ice becomes even more spectacular. The descent between the ice towers and the colours of the setting sun.
- The huge glacier which so gradually crept into view on the ascent of Parchamo.
- The yearning for daylight to arrive and reveal the mountains from a new stance high on a climb.
- The aching head, nausea and unsteadiness crossing the glacier for the first time. Base Camp felt so horribly far away. The friendly reception we received which was so hard to repay.

- The International sing song at Base Camp. The Sherpas' song which we came to hear regularly on the trail.
- The night time grunting of the yaks in Pheriche. Their attempts at destroying the toilet tent having literally jumped the wall.
- Watching in amazement as the stretcher we came to assist sped past at an alarming rate. Catching it was difficult, carrying it almost impossible and getting to the tea house in Dugla in front of it to order tea turned into my first ever fell race!
- The sound of the monk's horns announcing the break of dawn in Namche Bazaar.
- The sight of Kami (nicknamed chang), weaving his way across the high path to Dingboche.
- Lhapka's son clutching what must have been his first ever bottle of Fanta. So precious was it that it was several hours before he could be coaxed into drinking its contents.
- Shaking a thick layer of hoar frost off my bivvi bag at 2 am before kitting up for a climb.
- Trying to decide where to drop my trousers before attempting to use the Base Camp loo - balanced on the platform or scrambling up with them around my ankle?!
- The smell of yak cheese.
- The Goraks flying off with my packed lunch still in its carrier bag.
- Peeling skin off a sunburnt nose.
- Seeing my tanned face for the first time back at the Garden Hotel.
- The horrible realisation of what the Khumbu must be like in the height of the trekking season; as we descended to Namche we passed a continual stream of people coming the other way, For that reason only I was glad to be leaving the Khumbu.
- The strange feeling on the flight back to Kathmandu when I found I was looking at a road and that it had a car on it. I'd not missed them at all. The radio message sent blind on 11th October announcing that two climbers had reached the summit of Everest. We were sat in a very dark, old house in Thame.
- "Niner November One Sierra Charlie" and "Portishead UK"!
- Our first clear sky. We woke early in Thangboche and were greeted with the magnificent sight of blue skies and a dramatic amphitheatre of snow white mountains. Our horizons had just lifted 10,000 feet.
- Riding the bike at Base Camp, just waiting for the infamous dose of CO2.
- The ramshackle old houses, giving an inkling of how things used to be.
- The rising and falling of young and old voices chanting their prayers in the Thame Monastery. The sound reached you long before you arrived and seemed to draw you closer.
- The Icicles permanently suspended beneath the bridge at Chukhung,
- The smoke rising from the alter, past the brightly coloured prayer flags and into a deep blue sky at Parchamo Base camp. We were given our very own Puja ceremony before the climb.
- The happy, smiling faces of the Sherpa people. Their willingness to share their homes and to help you. Their simple life style and their deep seated Bhuddist faith.
- The crowds and the noise were quite shattering when we walked into Lukla on our return.
- Turning the prayer wheels, feeling a sense of passing time and the hands of people who had turned them before you.
- The friendships built with other team members. Many you hardly knew, yet a meeting on the trail was like that of old friends.
- The darkened rooms of the Sherpa houses, the smoky atmosphere, the thick coating of soot on the walls and the tiny windows letting in only narrow beams of light.
- The sight of Sherpa families working together to harvest potato crops, sweetcorn and wheat. The crops drying in the sun. Winnowing the chaff from the grain in the wind. Seeing everything done by hand.
- The long discussion with Jim on why women climb mountains and why most women don't. I climb not because of the competition or the challenge. I climb because of the deep fascination for snow, ice and mountains. The tremendous feeling of exhilaration I get is driven by the natural beauty of the mountains.

Christine Smith

An Auditory Trek to Everest Base Camp

by Angela Fry

Transported into a part of the world where the internal combustion engine is yet to encroach, I encountered new sounds and a new sense of silence. Many times on the trail I regretted not having a tape recorder. On my return however, my first investment was a tape of Mozart's Clarinet Concerto in A, a piece of music with the power to instantly transport me back to the Himalayas. The second movement was found at the end of the

Directional Hearing Test and was one of the first tests I did on reaching Base Camp. It has become extra-ordinarily evocative.

At Lukla, my abiding memory is of water. The sound of raindrops dripping from the eaves of the lodges we passed and the heavy patter on our umbrellas, accompanied by the roar from the swollen torrents and enormous waterfalls. At Namche Bazaar, the largest town in the region, there was no sound from any ghetto-blasters or traffic, just the whistling and singing of the local people as they went about their work, and the occasional drone from a passing helicopter. At night we were kept awake by a most peculiar noise coming from the Buddhist Gumpa on the other side of the town. The monks were blowing conch horns which made a sound like a didgeridoo, accompanied by the crashing of cymbals and bells. Similar sounds were heard at Thangboche. Higher up, people noise got less, apart from the regular bulletins on the portable radios relaying news from Base Camp.

At Gorak Shep a new sound entered my perception when I heard the first of several avalanches, a terrific roll of thunder which seemed to go on for ages. An even more eerie sound occurred at Everest Base Camp. During the night, as the glacier moved, one heard loud cracks around the tents, followed by the continuous roll of small rocks and boulders. Standing outside the tent, while the rest of the camp slept, gazing into the starry night and the amphitheatre of surrounding snowy peaks, one was aware of a deep, lonely and powerful silence, interrupted by the occasional large snow avalanche rumbling in the night. Man seemed very insignificant in the vastness of that empty space.

Angela Fry is an ophthalmic nurse in South Wales.

Scotland for Ever

by Ian Baxter

John Nathan and I, both of group 4, gradually found ourselves involved in a good natured Scotland/England 'war', he being a chap from the home counties and myself hailing from North East Scotland. Late one night at the Garden Hotel I stuck a notice on the outside of his room door which read 'Scotland for Ever'. The next morning I found that it had been transferred to my room door and now read, 'Scotland For Ever Second, score England 1 Scotland 0'.

Ian Baxter

The Expedition Philosopher's point of view

by Martin Thomas

The defeasibility of the classical epistemological approach to the understanding of Himalayan Expeditions, particularly those of a medical nature, is that an unavoidable dualism is imposed upon it separating the experience from those that experienced it. Therefore I would like to suggest that we attempt to understand the expedition, without falling into the trap of epiphenomenalism, from a phenomenological point of view.

Therefore I would like to state the irrefutable fact that the expedition never happened and that there are no such mountains known as the Himalaya. Our delusions stem fundamentally from deterministic depersonalization of our collective selves due to being, or knowing on a personal basis, members of that insane institution known as 'The Medical Profession'.

Martin Thomas is a final year philosophy student.

A Personal Account

by Tony Davies

How did it start? When did it start? Perhaps for me, it started in 1949 when, at the age of 15, as a reading assignment, we were given Sir Frances Younghusband's book "The Epic of Mount Everest". It caught my

imagination and I started borrowing books with mountain themes. Even at that age I was fascinated by the medical aspects of life at high altitudes, and the problems arising from them..

At the Pen y Gwryd hotel in North Wales I saw the old photographs on the walls of moustachioed men with nailed boots, festooned with ropes (hemp), and this brought home to me the fact that some kind of mountaineering was possible in Britain. Soon after this I was camping on the Isle of Arran and with a friend walked up the tourist route to the summit of Goat Fell - my first mountain!

In 1992 I called in on a friend whose son had heard of an expedition planning to climb Everest and, at the same time, carry out research into high altitude medicine. That was the start of my involvement with the BMEME. The organisation of medical supplies according to a list drawn up by the Expedition Medical Officers was about to become my "baby". Steve gave me his son's number, he gave me Andy Pollard's and Andy gave me Simon's so that I could address myself to the fountainhead, and fill in an application form.

Two years later, having recovered from a bout of diarrhoea in Kathmandu, I joined Annabel Nickol, Peter Pollard, Isla Martin and Chris Wolff to begin our trek to Base Camp. Chris and I were both over 50 and relatively unfit and it was obvious that we were not going to be able to keep up with the other 3 in their twenties so we ambled off at our own pace stopping in Tea shops for the duration of any rain shower.

That first afternoon we walked about 5 km to a hamlet call Chumlo where we spent a very pleasant evening with Sonam Temba (a veteran of Bonington's 1975 expedition). It was our first experience of Sherpa hospitality which was to be repeated many times before we came home. I woke during the night to see brilliant moonlight shining through a crack in the door frame and went outside to see Kusum Kunguru bathed in light almost as bright a day, while the valley remained in darkness. Unforgettable.

After a leisurely ascent past Namche, Thangboche and Pheriche I arrived at Lobuje. That night, while struggling into my sleeping bag I experienced a pounding heart beat and great difficulty breathing while lying down. I propped myself up in the corner and eventually things settled down but I realised that I had reached my limit. Next morning I told the group what had happened and that I had decided to go down to lower pastures and higher pressures. Everybody agreed that this was the wisest course of action and Annabel kindly escorted me back to Dugla by which time I was feeling OK

While it was a disappointment never to actually see Mount Everest, it was a very worthwhile experience to visit the Himalayas and satisfy a fifty year ambition to see them for myself at first hand. I am most grateful to the Expedition for providing the framework and the motivation to make the trip. I could have gone on a commercial trek but I don't think that I would have derived as much satisfaction as I did from being associated with the British Mount Everest Medical Expedition. The fact that Charlie and Roddy got to the top and that the research team produced so much data made the Expedition a success of which I was proud to have taken some minor part.

Tony Davies is a retired community pharmacist.

Sherpas

by Simon Currin

Loving and loathing. Our climbing sherpas were easily capable of evoking both emotions simultaneously.

Our expedition, like all others venturing through the Icefall, would have foundered within site of Base Camp without them. Their strength made the efforts of some of the world's finest mountaineers seem feeble. Benoit Chamou, Loretan and Jean Troillet, each of them seeking their final few ticks of the fourteen eight thousanders, never came close to the feats of Finjo, Dawa and big Dorje - between them nine times to the summit of Everest. Their faces bore wide grins as they tiptoed over snow bridges and darted under seracs. Daily they risked their lives for the Expedition, casually ignoring the fixed ropes as they laboured with their loads over treacherous ground.

Remembered images of sherpas that will not fade and will, no doubt, outlive bitter memories. Chang and chanting as offerings to a God of good fortune; grins and giggles; giant strides on steep, soft snow; edging sideways through an icy corridor loaded with ladders clanging on the walls; Dorje dodging avalanches as he broke the trail into the Western Cwm. Images or illusions.?

The support groups loved their sherpas. Smiling, singing and always willing. Always striving to please with bed tea, birthday cakes, laughter and jokes.

Why then the loathing? Above Base Camp their darker nature emerged. Their grins would occasionally give way to sulks as petty disputes arose. Infighting, strikes and mutinies within their team. We looked to our sirdar to manage his team but he was already discredited by his own incompetence and dishonesty. A power vacuum filled by shouting and bickering.

Long, circular negotiations in draughty tents. Broken English and childish reasoning, the arguments went on and on. The Sirdar now out of control and ignored by his team. Money, loyalty and testimonials were feeble defences against their weapons of theft and strike. We were innocents on Everest contending with a team of sherpas that had been there so many times that they knew every trick of the trade and they used those tricks ruthlessly.

We tried hard, from the start, to avoid exploiting them and to treat them as equals. I am afraid that that tactic was part of our undoing. Whilst other teams acclimatised without loads we struggled in the thin air. The Sherpas saw this as a weakness and exploited it. We were forced to carry more and more to maintain momentum whilst the porters looked for rest days.

We owe our success to our Sherpas and yet so many times they tried to sabotage our efforts. Food that walked or never was, deceits, disappearances and finally desertion. Careless caching on the South Col meant that food and fuel were blown and blasted into Tibet and led to nights in overcrowded tents without calories or water. The saga goes on: Andy abandoned and forced to risk a solo ascent; Dawa and Finjo too drunk to climb; tents vandalised and wholesale plundering.

The eruption occurred in the last days. We had known for sometime that our sirdar had embezzled hundreds of dollars. Keen to preserve what little goodwill that was left we did not confront him but the deception was common knowledge amongst the porters. Oiled by liquor in the small hours, a dispute arose over how the booty should be split. Broken teeth and broken bones shattered the last illusion.

Were we unlucky or just incompetent in our dealings with our high altitude porters? It seems not. Tales of dishonesty and desertion abound. Corrupted by greed and, by Nepalese standards, astronomical salaries these climbing elite have grown complacent and callous. No longer the noble mountain folk that we long to believe in.

Simon Currin is a locum GP in mid Wales.

Chitwan

by Andrew Fairbairn

John Nathan and I went off on an elephant safari into the Chitwan National Park to see some wildlife.

So there we were sitting high up on an elephant at six in the morning confronted by 2 bad tempered looking Asian rhinos. As I was changing my camera lens to get a better picture, I thought, "better not drop one of these here or I'll never get it back, too high to climb back up if I jump down to get it, and besides these animals will make short work of me".

Just then, a chap sitting at the front of the elephant exclaimed "Oh **** I've dropped my camera case". The elephant driver lightly tapped the elephant on the head with a stick, whereupon the elephant picked up the case with his trunk and returned it to the owner...

"300,000 People a year climb Everest!" (Daily Express 1993)

by Simon Currin

If the tabloid press is to be believed climbing Everest these days is simply a matter of putting one foot in front of the other until you reach the top. Astonishing statistics are casually thrown into articles assuring readers that hundreds of thousands of climbers reach the summit every year and leave behind mountains of trash.

Four months ago I was struggling in the thin air high on Everest. The extreme effort of every step made my lungs heave and the cold, dry air triggered bouts of uncontrollable coughing. Every few minutes a blast of wind would stream down the steep west face of Lhotse bringing with it showers of stinging spindrift. The cold was intense and all the time I could hear the roaring wind on the summit itself. The rocky summit pyramid was bathed in the evening sunlight and a broad plume of cloud stretched away into Tibet signalling the premature arrival of the winter jet stream winds. Below me the Upper Khumbu glacier curled down the Western Cwm before cascading through the Icefall to Base Camp some five miles away. No trash, no crowds and definitely not a Sunday afternoon stroll. I will never believe a tabloid journalist again!

Simon Currin.

Losing It

by Andrew Fairbairn

The suspension bridge leading over the river into Phakding was as bouncy as a trampoline, missing a few planks here and there, and handrails at knee height.

Lhakpa our Sherpa, pitched the tent in the grounds of a Tea Lodge, and we turned in for the night, leaving our blue barrels full of equipment out of sight under the fly sheet at the entrance. During the night we were awakened by a dog barking, and John (Nathan) eventually poked his head out to investigate. I came wide awake with a sharp nudge in the ribs. "Andy!!!, our barrels have gone", exclaimed John. John put his head torch on and sprinted off over the infamous bridge in hot pursuit of the would be barrel thieves. Meanwhile I hammered on the door of the lodge with clenched fists making sure that everyone was awakened. "What's the matter", muttered Lhakpa, rubbing his eyes? "Our barrels have been stolen", I replied. "No", said Lhakpa starting to look amused, "I moved them into the lodge to keep them safe!". "Well you'd better go after John then", I replied. So Lhakpa went off after John, whose progress could now be traced by a point of light disappearing along the opposite bank of the river.

Andrew Fairbairn is a computer engineer in Scotland.

"A Day In The Life Of....."

by Ronnie Robb

The following is a direct extraction from my diary which details my closing days with the Expedition. Nothing has been edited out. It's a particular point in time of my life which, for better or for worse, I will never forget. I am aware that it contains personal views which might normally have been held private but I make no apologies for this because I believe it makes for a good story and may well reflect the views of many at the time.

Now that I have been back a few months, I find it interesting to note that there is only one slide out of hundreds that I have made the effort to enlarge, make into a print and frame. It's a group photo and it features the climbing team on our jaunt up the Thame Valley from Namche Bazaar. It's sunny, we're all smiling and clearly enjoying each others company in a relaxed atmosphere.

The reason why I think it's so special is because I believe the photo could just as easily have been taken on the walk out, such was the feeling of companionship that I felt we all had. The point is, we have all remained friends despite all of our individual traumas and there can't have been many expeditions of this size and complexity where this has been the outcome.

I'm extremely proud to have helped organise and take part in the Expedition but the sum of the parts is greater than the whole and we could not have achieved what we did without the help of everyone else's contribution, no matter how small.

The way I like to look at it is, that "I did not reach the summit of Everest, but we did!"

Here's the story of my epic day.....

Thursday 29th September 1994

The day dawned dark and cold. All of us gathered in the mess tent in nervous anticipation of the summit push over the next 3 days. Except Angus! He incurred the wrath of Andy because he couldn't be bothered to get out of his pit and we don't have enough radios to allow him to go through the Icefall on his own.

So, four of us set off up the Icefall, me at the back, in silence with a sore head in the cold. The ice was good and the crampons bit well. I got to "the dam" in record time and kept a steady rhythm going all the way to Camp 1. I amazed myself by not losing ground between myself and Roddy/Charlie/John.

Whilst John was packing loads, my headache got worse and my cough had deteriorated to retching. I was aware that none of this was good but it wasn't unusual in this cold, dry climate and at this altitude. In the short walk from Camp 1a to Camp 1b I started to become aware of a "drag" feeling in my mouth and when I caught up with Roddy and Charlie packing the oxygen cylinders it was all I could do but to watch them.

Roddy left, then I plucked up the courage to ask Charlie if "my speech was slurred". The shock hit me immediately. I had heard myself mumble incoherently. Charlie looked horrified and asked me to repeat it. I knew before I opened my mouth that I couldn't say it properly. I tried, but the words just dribbled out.

He called for Roddy to come back. He then examined me for other defects and discovered that I had little sensation in my left arm, no power, tingling in my left hand, a speech impediment, a sore head (left side) and a paralysis of the left side of my face, basically I was f.....!!

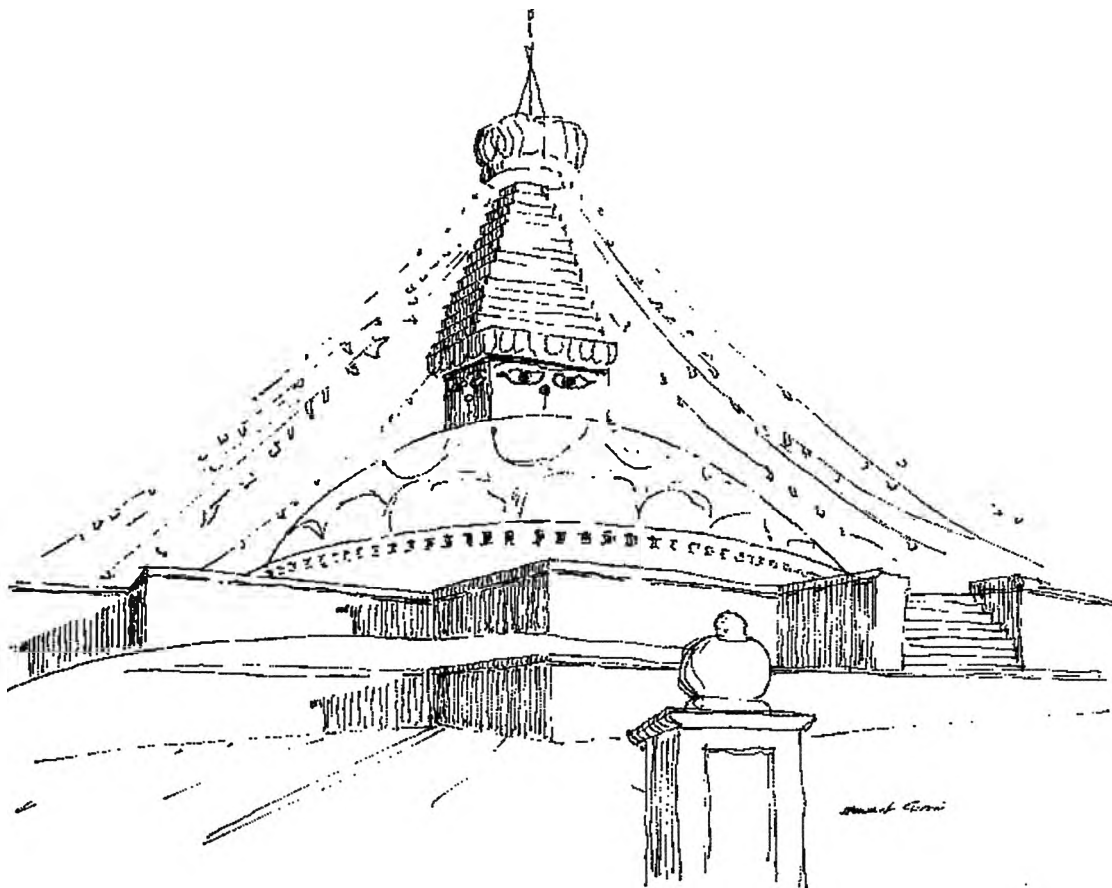
Frantic confirmation with Roddy, John and Andy at Camp 1a. Meanwhile I was left to console the realisation that I was not at all well. I was dreadfully scared despite Charlie's reassurances.

I kept thinking of what Jeanette would do with a retarded physical wreck, who would explain it to her, and how would I get a wheelchair through the door of my office without banging my knuckles on the sides? I was in inconsolable tears when John administered the oxygen mask to my face. His arms around me and both he and Angus in tears with me. For their part they wished to see me down safely. The process of getting down and getting better was explained but it didn't sink in. Dexamethasone was taken along with a litre of fluid, forced down and the oxygen flow was cranked up.

I was led (without my rucksack now) to the abseil ropes, ladders and tricky descents of the Icefall guided by the four of them. My glasses continued to be misted up with my breath from the oxygen mask and tears. I blabbed the whole way down. Three years work blown with three days to go. Delaying the summit push by becoming ill, endangering the others by forcing them through the Icefall one more time and disappointing everyone that cares for me. My descent was a truly lonely one. It was my birthday in 2 days and this was not how I had hoped to celebrate it.

Half way down, the French team, the Icefall doctors, Kilu and the Italians had all come out to help. I couldn't believe that all these stars of the mountaineering world had come to assist me.

By now, 2 hours after, I could make myself understood by talking and my walk was stronger. I marched into Base Camp followed by the Portuguese TV cameraman and an entourage of doctors. All the symptoms and signs, including retinal



haemorrhages, were there of a "Transient Ischaemic Attack". I had recovered because the correct drugs and procedures had been administered quickly but the likelihood of a recurrence was high and the conclusion was helicopter evacuation at a much lower altitude than Base Camp.

This was promptly arranged for me the following morning from Pheriche. My tent was cleared, barrels and rucksacks packed, oxygen bottles assembled, doctors to accompany me and reporting stations established. The Expedition was being ended for me, its conclusion was being dictated and there was nothing I could do. By now I felt normal but no amount of pleading to at least stay at Pheriche would persuade David or Andy.

The parting was extremely emotional. I blabbed my way behind the oxygen mask hugging and kissing everyone. The most emotional parting was with those who will likely reach the summit without me, my climbing team mates. I had got very close to John, Alison and Charlie and it was all I could do to tear myself away from them and Base Camp and saunter down the glacier away from Everest for good.

Colin Clark came with me and Howard had heard on the radio waves of my plight and was on his way back to meet us. We were accompanied by Annabel and Gerald and a rucksack full of drugs and oxygen bottles.

It was a long march over difficult terrain but I was feeling strong, still on oxygen, no rucksack and I marched on ahead of everyone. I couldn't talk much or favour their company anyway. I was in a state of emotional turmoil. We stopped briefly at Lobuje meeting up with one of the groups and then on to Pheriche where the guys from Group 1 (Oldham Mountain Rescue) had come up the hill to meet us. More tears and consolation as I became overwhelmed at how much people cared about me and what I felt. I arrived at Pheriche at 10.00 p.m. and I was last to bed.

Ronnie Robb is a Personnel Manager working for Shell Exploration and has made a complete recovery from this episode of high altitude cerebral oedema (H.A.C.E.).

Medical Report

Expedition Medical Officers: Dr's Gerald Dubowitz and Nick Mason. Although Nick and Gerald were the official doctors there were 40 others on the Expedition and most encountered some medical problems. During his long stay at Base Camp David Collier dealt with many of the problems occurring during the absence of the Medical Officers. (report by S.C.)

Inevitably with 40 doctors, 1 midwife, 3 nurses and 2 vets amongst our members we were asked to provide medical advice and treatments for most of the other expeditions as well as trekkers and local inhabitants. Indeed we were able to offer internal referrals to specialists on the Expedition and one of our vets was even asked to perform a hysterectomy on a dog in Namche! The busiest of our specialists seemed to be the ophthalmologists who dealt with a range of different problems.

Health problems amongst our Expedition Members:

Peptic Ulcer: One member of the climbing team suffered bouts of acute epigastric pain at base camp which was presumed to be due to peptic ulceration. The pain resolved with a course of omeprazole. The same member also developed a dental abscess which resolved after dental extraction, antibiotics and descent to Namche Bazaar.

Cerebral Oedema: Another member of the climbing team developed an intense headache during his ascent through the icefall. At this stage of the Expedition he was extremely fit and well acclimatised having been at altitudes between 5,330m and 6,800m for over five weeks. Despite the headache he made excellent progress through the middle sections of the Icefall and only started to slow down as he neared camp 1a. At this point he noticed some weakness in his arm and began moving a lot slower. The short climb between 1a and 1b took four or five times longer than usual. On arrival at 1b he was dysphasic and had developed a facial palsy. An immediate decision to descend and seek helicopter assistance was made and he was treated with dexamethasone and oxygen (4 litres per minute). Descent through the difficult upper Icefall proved problematic in view of the large crevasses and ladders that formed the route. A rescue team comprised of some of Europe's strongest climbers (Benoit Chamou, Loretan and Troillet) was dispatched from Base Camp to assist in the descent but by the time they rendezvoused with the descending casualty his symptoms had largely resolved and he made good progress unassisted through the lower Icefall. At Base Camp he was found to have marked retinal haemorrhages and a haemoglobin of 18g. He was able to descend unassisted (on oxygen) but was accompanied later the same day to Pheriche where he was evacuated by helicopter. On arrival in Kathmandu he was completely asymptomatic and flew home a week later. In London he was examined by Dr Charles Clarke who made a diagnosis of acute cerebral oedema.

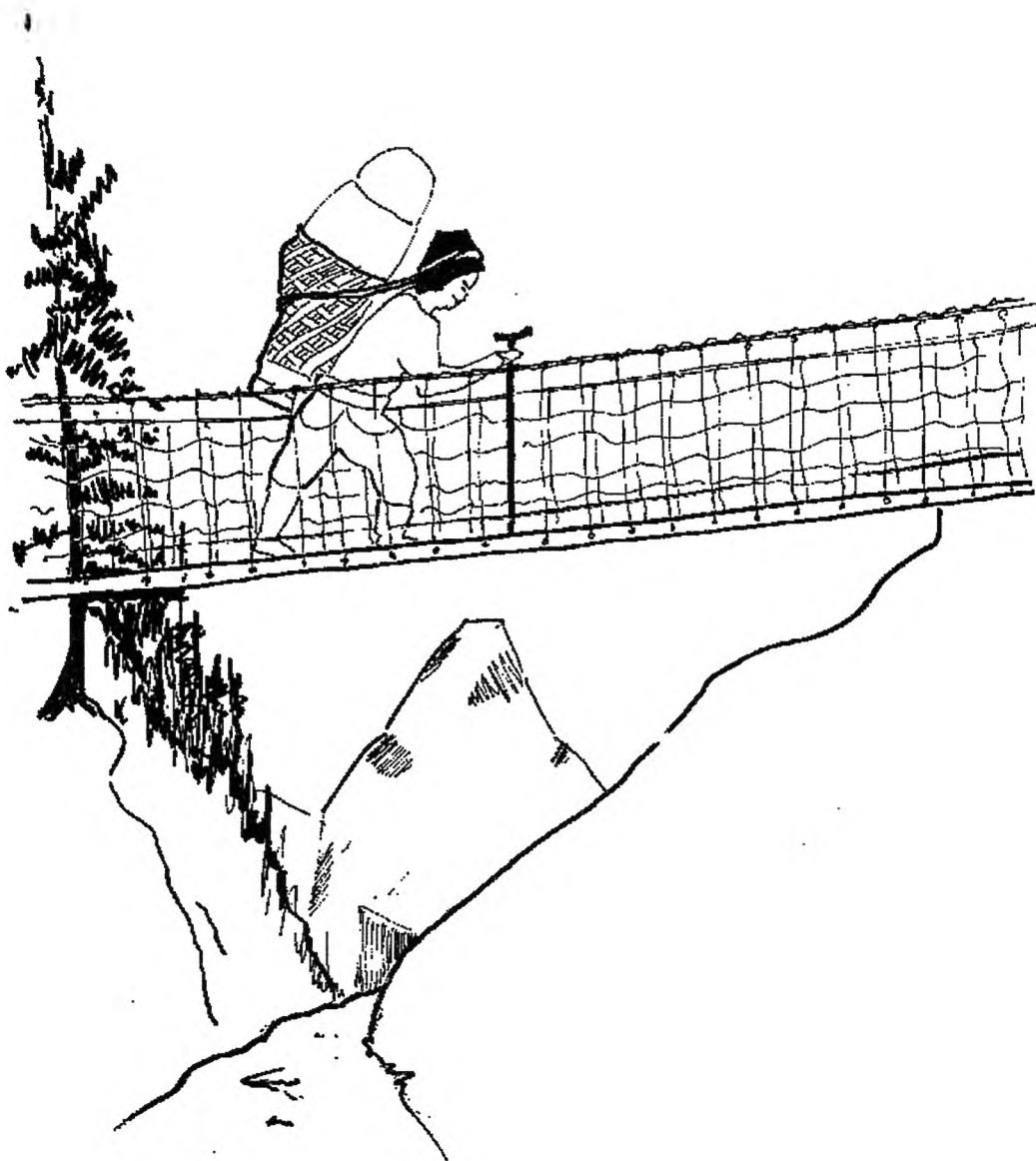
Cough, gastro-enteritis and coryzal symptoms: These were almost universally experienced throughout the Expedition in the first few weeks after arrival. Most of those who spent significant time in Kathmandu developed symptoms there.

Gastro-enteritis: One member developed particularly severe purulent diarrhoea in Kathmandu that did not resolve with either ciprofloxacin or metronidazole. He later required intravenous fluids. Although his symptoms improved they never fully resolved and some weeks later this member returned home to the UK. No pathogens were isolated on his return to the UK. Symptoms of giardia occurred frequently amongst the Expedition members and were successfully treated with either metronidazole or tinidazole.

The productive cough that many acquired in Kathmandu frequently improved with antibiotics unlike the non productive cough that occurred in those venturing above Base Camp. An anecdotal trial of becotide in the management of altitude related cough was abandoned due to lack of scientific method!

Cardiovascular problems: One of the more senior members of the Expedition made a rapid ascent to Gorak Shep but required assistance with the last few miles of his ascent to Base Camp. During his stay at Base Camp he developed significant fluid retention and shortness of breath on minimal exertion. He was treated with frusemide and was assisted (by stretcher) in his descent to Pheriche (2 days) and was evacuated by helicopter to Kathmandu where he was successfully treated with diuretics and made a full recovery.

Health problems amongst members of other Expeditions:



None of the other Expeditions had medical cover and our Base Camp was frequently visited by other teams seeking medical advice. David Collier (as a Base Camp permanent resident) had a relatively demanding case load providing care to other Expeditions.

Frostbite: We looked after several cases of frostbite. The most severe was sustained by one of the Speed Climber's sherpas at Camp 3. Both hands and feet were involved. We understand that many of his fingers were later amputated. There were other incidents of cold injury (minor) amongst the sherpa staff of other teams.

Ken Stewart sent in this case report:

Alex McNab of Aberdeen (International Lhotse Expedition) suffered severe frostbite and impaired vision 150 metres (approx. 8,350 metres) from the summit in very high winds. On examination he had a foveal retinal haemorrhage and a central scotoma, the skin of his toes was peeling and necrotic. The loose skin was debrided at Base Camp under sterile conditions by Ken, Annabel Nickol and Karol Howard. Augmentin was used prophylactically. Alex was flown out the next morning by a big Russian helicopter - the third ever rescue from Base Camp by helicopter. The first 2 were earlier in the year by the same helicopter. Hitherto smaller helicopters have been unable to get up because of the altitude and thin air. At the "helipad" a large rock sheltered us from a barrage of small pebbles!

An Israeli trekker dislocated his shoulder climbing on some rocks at Gorak Shep. He was a large, muscular man in a great deal of pain and there was a lot of muscular spasm. We were faced with the prospect of having no X ray facilities to exclude a possible fracture and no general anaesthetic. Intra venous morphine would have been dodgy due to the risk of central respiratory depression and consequent hypoxia at 5,100 metres. In the end we treated him with repeated doses of i.m. morphine every 10 minutes (by anaesthetist Saye Khoo). We achieved adequate control with 20 mg after 45 minutes. Tried all 3 of the usual methods of reduction: hanging arm; boot in the axilla and traction; pulling on the elbow, external rotation, internal rotation and adduction. The last one worked with a wonderful clunk and suddenly all was well. Subsequent news from Israel is that he has had no further problems.

Ken Stewart is a gynaecologist

Health problems amongst local inhabitants. (not employed trekking crew)

The Expedition's policy was to avoid providing temporary medical care and encourage locals to seek help from the permanent medical services that exist in the Khumbu. Despite this our help was sought and we were involved in several incidents. One member performed a urinary catheterisation to relieve distress in a terminally ill elderly resident at Namche. Another attempted to give assistance to a young woman at Lukla with advanced septicaemia of unknown origin. Unfortunately no drugs were available and the woman died within hours.

Pharmaceutical supplies and procurement

Retired pharmacist, Tony Davies did an excellent job of obtaining pharmaceuticals. We took with us 6 barrel loads of pharmaceuticals and that which was not used was donated to local hospitals in Khunde and Kathmandu.

The bulk of the medication was kept at Base Camp in locked barrels. Each member of the Expedition was issued with a miniature medical kit. Each group medical representative should also have received a more comprehensive kit but some of these went astray at Namche Bazaar. Each member of the climbing team carried with them at all times their own supply of dexamethasone, acetazolamide and nifedipine when above Base Camp. Each Camp on Everest itself should have contained a reasonably comprehensive medical kit but in practice most of these kits were kept at Camp 2. The only omission in the high altitude kits were simple cough remedies (codeine linctus and inhalations). There were also shortages of throat lozenges.

The most frequently used preparations were: metronidazole and tinidazole (giardial symptoms); ciprofloxacin (enteritis); various rehydration sachets; simple analgesics; amoxycillin and augmentin (respiratory infections and prophylaxis in frostbite); temazepam (insomnia). Dexamethasone, Antacids, omeprazole and diuretics were also occasionally used (see above).

Tony Davies (pharmacist) has sent in the following report: I went to my first meeting in the Lakes in 1992 and got to know for the first time various core groups about whom the Expedition would revolve. Andy, Ronnie, Angus, Charlie and Simon of the main ascent group. David and Jim and others in the research group. Chris, Mick and Andy of the Oldham Mountain Rescue Team.

Over the next 2 years we had a succession of meets at various mountain venues from Capel Curig to Grindewald during which Expedition business and policies were decided, and friendships established in the pubs and on the hills. I nurtured my 'baby' and did my job as Expedition Pharmacist by organising supplies of the pharmaceutical and surgical requirements from lists thrashed out at various meetings.

Most of the manufacturers approached were co-operative and generous, and eventually the goods started to appear for unpacking, checking-off and repackaging according to where it was likely to be needed. This was a fascinating exercise, as I had to prepare packs for the various trekking groups, and packs for individual members to treat themselves, in order to reduce pressure on the group packs. All this of course was additional to providing for the wants of a small clinic at Base Camp. All was then packed into plastic barrels for ease of transport and proof against water and pilferage

Eventually the fateful day arrived, and members of the advance group assembled at Heathrow for the flight to Kathmandu, where we arrived on Monday 1st August. Unfortunately, during the first few days, in spite of taking what I thought were all the normal precautions, I was reduced to almost total inactivity by a gut infection which restricted me to my hotel room for almost a whole week. Other members of the advance team went ahead with their own jobs and had to take over the work that I should have been doing on the medical supplies. My 'baby' had to find a new foster parents: Gerald Dubowitz and Nick Mason. This resulted in misunderstandings, and some of the packs not being in the locations which Gerald and Nick had planned, nor being as well equipped as I had anticipated.

I had assumed that trekking groups would pick up their kits at BC but this meant that they would be without supplies for the 10 day approach. Gerald and Nick left the kits in Kathmandu to be picked up by arriving groups but I was unaware of this and sent them on to BC to catch up the advance group once I had recovered. They were then sent back to Namche for collection but unfortunately some went astray en route.

I had planned to provide kits for each of 5 trekking groups but a last minute recruitment campaign confounded this by adding a sixth group. This created some shortages. Another problem arose from my community pharmacist's lack of awareness, that an intravenous fluid needs its own plumbing kit to get from container to vein. Fortunately Gerald was able to conjure up a few giving sets at the last minute.

I made up 80 individual kits for the members. I understand that a few members did not receive a kit, and to them I must apologise. The kits should have been there for them at some stage but somehow never made it. For all these sins and errors of commission and omission: Mea Culpa, Mea Culpa, Mea Culpa.

Tony Davies is a retired community pharmacist.

Despite Tony's contrite report he did an amazing job very conscientiously and no significant shortages were encountered that I am aware of.

List of Suppliers of Pharmaceuticals etc.

Allen & Hanburys Ltd.	A.P.S. / Berk
Bayer PLC Pharmaceuticals	Crookes Healthcare Ltd.
Geigy Pharmaceuticals	Glaxo Laboratories Ltd.
Hoechst UK Ltd.	Janssen Pharmaceuticals Ltd.
Leo Laboratories Ltd.	J. Pickles & Sons
Park Davis & Co. Ltd.	Reckitt & Colman Products
Rhone-Poulenc Rorer	Roche Products Ltd. Roussel Laboratories Ltd.
Searle Pharmaceuticals	Seton Healthcare Group PLC
Smith & Nephew PLC	SmithKline Beecham Pharmaceuticals
Thornton & Ross Limited	The Wellcome Foundation Ltd.

To the Above Companies we owe a debt of gratitude for their generous support in supplying the Expedition with a wide range of products free of charge. We would also like to thank S.H. Containers Ltd. Brighouse, West Yorks. (tel. 01484 714473) who supplied (at cost) plastic barrels into which everyone packed their luggage and equipment. They were totally weather proof, almost indestructible and the 60 litre size was the ideal unit for porters and yaks alike. They were much

sought after by the Sherpa staff who recognised their qualities and put them to good use as domestic food and water containers after the Expedition.

Communications

Communications officer: Andrew Taylor. Radios supplied by Yaesu, Japan. (Report by S.C.)

Radios: The superbly reliable and powerful radios supplied by Yaesu of Japan were a key feature in the success of the Expedition. It was possible to communicate with the handsets between Base Camp and Namche Bazaar which meant that a large percentage of the Expedition was in daily contact with Base Camp. This was a remarkable achievement considering the topography and the line of sight limitations of VHF. In all we had 10 VHF handsets and 2 Base sets as well as 2 Short Wave sets. The handsets were extremely well specified and combined a 5 watt output with an extremely lightweight and compact design. The Radios were of inestimable logistical value. They were heavily used and were most effective during some of the various rescues that took place.

Very High Frequency (VHF): We chose to use 144 MHz and paid a licence fee of \$60 for each handset and \$165 for each Base set. We also paid \$165 for each of 3 short wave frequencies. We operated a twice daily radio schedule at 9 am and 6 p.m.. There was a considerable amount of traffic throughout the day and occasionally the airways became congested. Congestion was exacerbated by the very lengthy communications by Sherpas. The French team also used our radio permit and shared the same frequency.

The choice of frequency, although ours, was rather unfortunate as it co-incided with the interference frequencies of many of the research computers and chart recorders. We attempted to minimise this by earthing and construction of Faraday Boxes but not with much success. This was an unforeseen and very unfortunate choice of frequency and caused substantial difficulty to the Research Team whose activities were curtailed around the time of the radio schedules and at crisis times. This was, at least partially, overcome by illegally using 146 MHz. Use of 146 was also limited as it interfered with the Italian's communications.

Communications were very difficult between Camp 2 and Camp 4 due to the extremely high winds which seemed to attenuate the signal. This was in spite of the fact that it is virtually line of sight. Communication between Base Camp and Camp 4 was rarely possible. The same difficulty was encountered by other teams using other systems. The Japanese team used telescopic aerial extensions on the mountain which certainly improved the performance of their Yaesu radios. Unfortunately even these caused communication difficulties when the aerial extension was blown off on the summit. Our radio failed between the South Summit and the main Summit after the battery fell off (not an uncommon problem). Whilst the battery was being replaced one of the terminals broke off (presumably related to the cold).

Camp 2 proved to be an excellent communication centre and tuning into Radio Khumbu was a good way to while away the days. It was frequently possible to relay messages from the Chukhung valley to Base Camp which seems an extraordinary achievement for VHF. One memorable 3 way simultaneous conversation took place between Base Camp and members on the summits of Parchamo and Lobuje East.

Batteries inevitably caused some problems. The small 4.5 volt Nicad's did not work at all in the cold. The 6 volt Nicad's worked well as long as they were kept inside clothes (actually next to the skin rather than just inside a wind proof) but porter difficulties made the recharging of these at Base Camp somewhat erratic. In the end we relied largely on AA (Duracell's) which were slightly lighter than the Nicad's and worked well. One small criticism of the handsets was that the low battery warning indicator seemed to be unreliable. One set of 4 batteries lasted for about 20 hours of continuous monitoring with about 30 minutes of broadcasting on high power (5 watts). Electricity was available for recharging at Lukla, Namche, Thangboche, Pheriche (12 volt only) and the Lobuje Research Pyramid. We, of course, had mains electricity at Base Camp.

In retrospect the ideal power source for the radios above Base Camp would have been AA Lithium batteries - available in the USA.

One of the Base VHF sets (50 watts) was left at the Panorama Lodge in Namche Bazaar to communicate with incoming members but the dubious power supply at Namche and the difficult topography meant that it was rarely effective.

Short Wave (High Frequency): We opted to pay the Royalty on 3 frequencies (\$495) to communicate with Portishead in England but in practice used all 12 available frequencies as these frequencies are not monitored

in Nepal. Due to an administration error our spare SW set was sent to Base Camp rather than being left at the Ministry of Tourism as required by the law. This caused considerable distress for Gongal- our Liaison Officer.

We elected not to use a frequency to communicate with Kathmandu as we had no representative in Kathmandu to monitor it. In the event we made heavy use of the Japanese HF link to their trekking agent in Kathmandu who relayed messages direct to Thamserku. This link was a very valuable way of communicating press releases at the end of the Expedition and we were able to speak directly to members that had returned to Kathmandu. Ronnie Robb was, on one occasion, patched through onto VHF and thence direct from Kathmandu to Camp 2.

Radio Distribution: Both SW sets were kept at Base Camp. One 50 watt VHF set was kept at Base Camp and the other in Namche. Despite having the luxury of having 10 handsets they were still in short supply. They were extremely popular due to their range and reliability and were therefore spread thinly throughout the 75 members. On average 2 were used by the Everest climbing team, 1 by the Everest Sirdar, 2 by the Pumori team, one by Alison (due to the danger of her endeavour), and the remainder were spread throughout the other teams.

Satellite: We enjoyed an element of co-operation with the Italian Research Expedition based at the Lobuje Pyramid but this fell short of the co-operation that we had been led to expect. We were, however, able to access their INMARSAT transceiver direct from Base Camp via our VHF system. This was used on several occasions but was prohibitively expensive (\$13/minute + \$20 connection fee). We did make some use of the satellite fax facilities at the Pyramid. The Telecom Managers Association (TMA) gave a grant to assist with communication between Base Camp and the Church Missionary Society in London.

Logistics, Sherpas and Trekking Agents

Base Camp Manager: Peter Smith. (report by S.C.)

Freight and transport from Kathmandu to Base Camp: Peter Smith, our Base Camp Manager, performed a brilliant task in the UK during the weeks leading up to our departure. All of the equipment was collected in London and Peter delivered it to the Airline freight terminal at Heathrow. Pakistan International Airlines were kind enough to give us a specially discounted freight rate of just over £1/kg. Unfortunately we were unable to freight all of our equipment in one go and this was to cause us significant problems once in Nepal. In total we freighted 1,000 kg of equipment in 3 separate shipments. Wherever possible equipment was packed in lockable, waterproof, plastic chemical barrels. Most of these were 60 litres in size and provide the most manageable porter or yak loads. Each barrel contained, as near as possible, 30 kg. Tony Davies was tireless in his efforts in obtaining these barrels at minimal cost (£4) and distributing them to members throughout the UK. These barrels proved to be extremely popular amongst the Sherpa staff and were worth over \$20.

We were most grateful to Pakistan International Airlines who allowed us to take an extra 800 kg as accompanied luggage in early August. In this way we managed to avoid the hassle and expense of importing extremely precious scientific and mountaineering equipment through Nepalese Customs. This luggage allowance saved us many thousands of dollars in import duty. Gas cylinders and Coleman fuel were freighted by special air freight from Manchester at a cost of about £10/kg.

Thamserku negotiated customs efficiently on our behalf and when we left Kathmandu on 13/8/94 we were accompanied by 70% of our research equipment and all of our climbing equipment. The remainder of the Research Equipment was forwarded to Base Camp by Thamserku. All personnel were flown together with equipment by helicopter to Lukla (2,900 metres). From there it was carried by yak or porter. The porters carried the more difficult oversized loads. The yaks carried 2 x 30 kg loads. The heaviest loads were the generators which when boxed weighed 75 kg and each of these were carried by a single porter.

Above Lukla we had considerable difficulty in obtaining sufficient yaks as they were deployed on the land during the monsoon. This delayed arrival of much of our equipment at Base Camp and David Collier had to return to Namche Bazaar to oversee the despatch of equipment. We had 100 items of equipment (50 loads) and lost one item en route to Base Camp. Unfortunately one of these barrels contained personal climbing equipment which was difficult to replace. Transport of equipment from Kathmandu to Base Camp cost around Rs 75 (£1) / kg.

Icefall: Equipment for fixing the Icefall was hired by Thamserku from Asian Trekking. The 61 ladders are kept from season to season at Gorak Shep and are the responsibility of the 'Icefall Doctors' who are employees of Asian Trekking. This equipment was removed after the Expedition for use next season.

Tents: The tents at Base Camp provided for the Research Team by Thamserku proved to be inadequate but despite this the Team coped admirably. We used the venerable McInnes Box tent as a research tent and it is extraordinary that this most durable of tents was the only one to be blown away by the freak avalanche at Base Camp. We can only assume that the winds generated by the avalanche in the middle of the night were very localised as it tossed this 78 kg tent 25 metres down the glacier leap-frogging another tent on the way.

Electricity: The 2 Haverhill generators powered by petrol 8 HP engines were our only source of electricity at Base Camp and their reliability was less than we had hoped for. One had been incorrectly assembled and had to be completely dismantled and the coils re-magnetised. The other never ran smoothly and was relatively inefficient. Neither would function at 5,300 metres with their air filters in place and so were run for the duration of the Expedition with no filters. They consumed around 350 litres of petrol between them. 240 volt electricity was essential for most of the research and communication equipment. It would have been a great advantage to have had a 12 volt lead acid battery to power lights and radio base sets in the evenings instead of having to run the generator.

Climbing Logistics: The ascent of Everest via the South Col is a difficult logistical exercise but there is no shortage of previous experience to draw on. We are most grateful to Steve Bell and Rob Hall in this respect. Both have organised successful commercial expeditions to Everest (Rob has summited 4 times) and gave their advice freely. We also had a very experienced team of 6 high altitude sherpas which helped the logistical problems (but created other problems).

The first barrier is the Icefall which has to be bridged using a combination of ladders and fixed rope. This work was performed by the Icefall Sherpas who were supported by our own Sherpas. Camp 1 was established at the lip of the Western Cwm but was seldom occupied. Most of the equipment was ferried to Camp 1 during a period of bad weather during which it was impossible to push the route out to Camp 2.

Once Camp 2 was occupied both Sherpas and Members moved up to Camp 2 and began carrying loads between Camps 1 and 2. Once at Camp 2 each Expedition team provided 2 Sherpas to form a strong 6 man team to fix rope on the Lhotse Face and force the route up to the South Col. Whilst this was happening members of the climbing team and the rest of the sherpas were deployed ferrying loads between Camps 1 and 2.

Camp 3 was placed at 7,000 metres below a serac on the Lhotse Face and was never occupied. Camp 4 was placed at the South Col (7,940 metres). Two carries were made by Sherpas to the South Col placing all food, tents, stoves and oxygen there prior to a summit bid. Alas the food was left in bin liners rather than the kit bags that we had provided and had been entirely blown away by the time of the first summit bid.

Eight x 2 litre cylinders of oxygen were left at Camp 3 to be collected by members and used during their ascent to the South Col if required.

Difficulties with Sherpas meant that the supply line between Base Camp and Camp 2 often broke down causing food shortages. This was exacerbated by the fact that our Sirdar had misappropriated the money for Camp 2 food and the Sherpas pilfered what edible food we had brought from the UK. Fortunately we were able to recruit help from the Icefall Sherpas who made several carries to Camp 2 during quiet days on the glacier!

Good radio communication between Camp 2(occupied for 3 weeks by up to 14 people) proved an immense logistical asset.

Often Sherpas would carry a double load for a double bonus. It was not unusual for loads to be considerably less and for the Sherpas to re-pack them at Camp 1 on route to Camp 2. This caused considerable difficulties. We also relied on our Sirdar to keep account of the work done by each sherpa which proved a costly mistake as the worksheets were, I suspect, grossly inflated. The Climbing members carried a great deal more than is usual on modern Expeditions between Base Camp and Camp 2.

Clearance of the Mountain: Relations between the Sherpas and the Expedition broke down following a fight between our Sirdar and one of the High Altitude Porters. The argument was over the money that had gone missing for the purchase of Camp 2 food. All but 2 of our Sherpas refused to go back onto the mountain to retrieve equipment and oxygen cylinders (vital for our \$2,000 rubbish bond). In the end we sacked all but 2

however this had little effect as they remained at Base Camp to take part in the pilfering during the striking of the Camp.

Two of our remaining loyal sherpas retrieved the tents and equipment from Camp 2 and we recruited help from the French team of Sherpas to retrieve spent cylinders from the South Col.

Equipment was carried out from Base Camp by 80 yaks and flown from Syanboche (3,500 metres) to Kathmandu by helicopter. PIA granted us a free extra 1,000 kg accompanied luggage allowance and 200 kg of empty oxygen and carbon dioxide cylinders were freighted back to the UK by Thamserku (cost \$5/kg). The oxygen cylinders have to be exported in order to obtain the refund of the rubbish bond.

High Altitude Bonus Pay Scale

All teams climbing Everest from the South (The Japanese and French) adopted the same bonus scale which is shown below.

	Weight Carried	Bonus
Base Camp to Camp 1	20 kg	\$3
Camp 1 - 2	15 kg	\$4
Base Camp to Camp 2 direct	15 kg	\$10
Camp 2 -Camp 4 direct	10 kg	\$40
Camp 4 - summit	10kg	\$300
Bonus for retrieving oxygen cylinders from the South Col	3kg	\$10/cylinder

Other Teams:

I have listed below all the teams in the Western Cwm. We understand that a further 10 (or so) teams were operating from Tibet but we never had any contact with these.

Everest - French commercial Expedition (9 members): Bernard Muller (Leader), Lawrence de la Ferriere (Deputy Leader), Michael Paklaglou (French), Alain Hubert (Belgian), Michael (Belgian), Thierry (French), Pedro (Portuguese), Philip (French). Contact address: Stages Expeditions, Chamonix. The French team were an interesting mixture of teachers, disco owners and polar explorers. Michael's lycra clothes and the other Michael's guitar were both very entertaining. Along with Pedro came a TV crew (Oralio and Philip) who were trying to film the first Portuguese ascent. Lawrence brought a 'Sigma' photographer on assignment from 'Hello' to photograph her ascent. We enjoyed excellent relations with the French team and enjoyed their company.

Everest - Japanese (2 members): Mr Muneo Nukita (summiteer), Mr Mirahara and Ms Tajika (Base Camp Manager). Contact address: Muneo Nukita, 47 17 618 Nakajuku, Itabashi-Ku, Tokyo, Japan phone/fax 081 3 3963 7600 The Japanese Team gave us a great deal of support. We had unlimited access to their High Frequency link to Kathmandu, they provided us with food at the South Col when ours had blown away and even gave us their spare oxygen. Above all they were delightful company and always most hospitable. Their Expedition was successful although Mr Mirahara failed to summit. He lost the vision in one eye at the South Summit but this thankfully returned on descent. Nukita reached the summit for the second time.

Everest - Indonesian Expedition, 2 members. Attained Camp 3 before retreating. Their expedition was celebrating the Indonesian year of the woman.

Everest - Nepalese speed climber Pasang Kagee attempted to climb Everest alone and without supplementary oxygen in 17 hours from Base Camp. Early in the Expedition one of his supporting Sherpas suffered severely froshitten hands and feet at Camp 3 and was evacuated. His first attempt was abandoned at Camp 2 due to very high winds and his second attempt ended at the South Col. He left Base Camp at 4 p.m. on 10th of October and planned to summit with Roddy and Charlie the next morning but arrived at the South Col (9 hours after leaving Base Camp) only to find that his Sherpa had left his down clothing at Camp 3. He abandoned the Expedition at this point.

Lhotse -Italian French CNR South Col Survival Expedition: Augustina (Leader), Benoit Chamou (Climbing Leader). Benoit and 2 Italians summited on October 11th. Their research programme involved placing 2

people on the South Col (without supplementary oxygen) for 10 days and monitoring their responses. This project had lavish TV and government backing but unfortunately they never reached the South Col but they did manage to do some of their work in the Western Cwm at Camp 2.

Lhotse - International Lhotse Expedition: Henry Todd (Leader), Aleck, Tim, Richard (summiteer), Reuticer. Richard (Polish) summited October 11th. Alec was evacuated by helicopter after suffering frostbite at 8,400m. Contact address: Henry Todd, Himalayan Guides, Edinburgh. Henry shared the same avalanche as Ronnie Robb.

Lhotse - Swiss Lhotse: Jean Troillet (summiteer), Rudi Hoffenberger and Loreten (summit). Reached the summit on October 3rd but abandoned their traverse to the un-climbed middle peak of Lhotse due to high winds and cornices.

Education: Past, present and future

Course Organiser: Dr Andrew Pollard (report by A.J.P.)

Returning over the Mera La in 1991, after the successful 1st British ascent of Chamlang, David Collier and I (Andrew Pollard) came across a man in his early 20's who was dying from High Altitude Cerebral Oedema. He was with a trekking group from mainland Europe and was accompanied by a trek doctor. The doctor told me he did not know what was wrong with the sick man. He had been at 5200m in a coma for 4 days and despite our efforts he died the next morning. I was quite shocked to see this young fit man die, not least because the trek doctor, the sherpas and the Chamonix guide who accompanied the group had made no effort to descend with him. Descent might have been life-saving, but they failed to recognise the nature of his illness and thought it best to wait for a helicopter. This experience led to a series of articles in the medical press to raise awareness of altitude-related illness and the correct management.

In the meantime, Everest planning was in its early stages and, with 20,000 British trekkers and climbers visiting Nepal each year, I felt there was a great need to increase awareness of altitude illness amongst the British GP's who had responsibility for these 'patients' and the 'patients' themselves. The *British Mount Everest Medical Expedition (BMEME)* provided the vehicle for this as a charity run with the remit of education and research. With the title '*Mountain and High Altitude Medicine*', courses were run for 300 doctors in April 1993 and April 1994 covering altitude medicine and physiology and emergencies in the mountains. The courses for the general public, organised in conjunction with Charles Clarke's UIAA Mountain Medicine Data Centre, in December 1993, entitled *The Medical Problems of Mountains, Trekking and High Altitude*, were attended by over 150 people.

The educational saga linked with *BMEME* is not over. Numerous papers, posters and publications are expected to appear internationally from the research team in the next year(s). A handbook for GP's is in the early stages of preparation as a joint effort between David Murdoch, a past Kunde Doctor from New Zealand, and myself. Finally, a further '*Mountain and High Altitude Medicine*', will be run for up to 150 doctors in December 1995 to include presentations of the research performed on *BMEME*. And, if the interest out there remains, maybe more courses in '96, '97.....2000.

Other Educational activities

The Expedition's main educational objective was to encourage a greater awareness of altitude related illness. In addition to this some experts within the Expedition used the opportunity to pass on some of their knowledge to their counterparts in Nepal. Colin Clarke lectured to the Royal Nepalese Institute of Science and Technology on the management of clinical waste, Steve Archibald lectured on aspects of environmental health and Ken Stewart lectured to doctors and midwives on the use of the Partogram.

Ken Stewart is a senior consultant obstetrician, has sent in the following report:

The Partogram is a graphic display which enables the events of labour to be seen at a glance. On it are guide lines to the management of abnormal labour. The use of the Partogram greatly improves the standard of management of labour. In an effort to reduce maternal mortality world-wide, it is the aim of the World Health Organisation (W.H.O.) to introduce the partogram to Third World Countries. I (K.S.) was involved with the partogram when it was first set up and used in Zimbabwe and, then with the WHO, I made 2 lecture tours to Thailand and Indonesia in '92 and '93 to introduce it there. As the Partogram was not used in Nepal I was asked to talk about in Kathmandu. On my last 2 days before leaving Nepal I had a really enjoyable time.

speaking to the Doctors and midwives all of whom were very interested, keen, hardworking and cheerful. I have since heard that the Partogram is now in use in Kathmandu and has spread to other parts of Nepal.

Programme for the

Mountain and High Altitude Medicine 1995

Friday December 1st 1995

11.00-13.00	Registration
12.00-13.00	Lunch
13.00-13.10	Introduction (Dr AJ Pollard)
13.10-13.15	BMEME (Dr D Collier, Dr S Currin)

Altitude and Acute Mountain Sickness

13.15-13.40	The Atmosphere, Altitude and Barometric Pressure (Prof J West)
13.40-14.05	Acclimatisation - Overview (Dr J Milledge)
14.05-14.15	Epidemiology of Altitude Illness (Dr D Murdoch)
14.15-14.35	Acute Mountain Sickness - Introduction (Dr D Murdoch)
14.35-14.55	Acute Mountain Sickness - Prophylaxis (Dr J Bradwell)
14.55-15.05	Hyperbaric Treatment of AMS (Dr D Murdoch)
15.05-15.30	Tea

Cardiovascular Changes and Adaptation to Altitude

15.30-15.55	Cardiovascular overview (Dr A Peacock)
15.55-16.20	Haemoglobin and Erythropoiesis (Dr J Milledge/Prof J-P Richalet)
15.20-16.35	ECG (Dr N Mason)
16.35-17.00	Heart and the Adrenergic System at HA (Prof J-P Richalet)

Rescue

17.00-17.20	Mountain Rescue (Dr P White)
17.20-17.40	Helicopters in UJK Rescue (Dr J Pote)
18.30	Cash Bar
19.30	Dinner

Saturday December 2nd 1995

8.00-8.05	Introduction (Dr A J Pollard)
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CNS and Altitude

8.05-8.30	High Altitude Cerebral Oedema (Dr C Clarke)
8.30-8.50	High Altitude and the Eye (Dr D Depla)
8.50-9.15	Sleep at Altitude (Dr A Knight)
9.15-9.30	Hypnotic Drugs at altitude (Dr G Dubowitz)
9.30-9.45	Balance and Orientation at Altitude (Dr M Rosenberg)
9.45-10.00	Audiometry and Auditory Localisation at Altitude (Dr C Collier)
10.00-10.20	Psychology and Mountains (Prof L Hardy)
10.20-11.00	Coffee

Provisional Programme

More Mountain Sickness

11.00-11.25	High Altitude Pulmonary Oedema (Prof J-P Richalet)
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11.25-11.50	Pathogenesis of Pulmonary Oedema (Prof J West)
11.50-12.05	Endothelin and HAPE (Dr D Webb)
12.05-12.20	Children at Altitude (Dr A J Pollard)
12.20-12.50	Chronic Mountain Sickness (Prof D Heath)
12.50-14.00	Lunch
14.00-17.00	Free (Walking/Climbing/Ski Break?)
16.00-17.00	Tea

Respiratory Changes and Adaptation to Altitude

17.00-17.25	Overview (Prof J West)
17.25-17.40	Control of Breathing (Dr D Collier)
17.40-18.05	Pulmonary Vasculature, Carotid Bodies and Altitude (Prof Donald Heath)
18.05-18.20	Respiratory Defence (Dr P Barry)
17.20-18.35	Spirometry (Dr R Pollard)
18.35-18.50	Sex differences in blood gases at altitude (Dr P Barry)
18.50	Cash Bar
19.30	Dinner

Sunday 3rd December 1995

8.00-8.10	Introduction (Dr AJ Pollard)
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Gut, Kidneys and Performance at Altitude

8.10-8.35	Gut at Altitude - Overview (Dr S Travis)
8.35-9.00	Nutrition (Prof J Edwards)
9.00-9.25	Renal Function and Fluid Balance at Altitude (Prof J-P Richalet)
9.25-9.50	Factors Limiting Performance at Altitude (Prof J West)

The Environment at Altitude

9.50-10.15	The Mountains and Your Skin (Dr J English)
10.15-10.40	Cold Injury and Extreme Altitude (Mr M Ward)
10.40-11.05	Altitude and the Environment (Mr K Stewart)
11.05-11.35	Coffee

Accidents, Injuries and Preparation for Altitude

11.35-12.00	Immediate Care in the Mountains (Dr D Hillebrandt)
12.00-12.25	Upper Limb Injuries in Rock Climbers (Mr S Bollen)
12.25-12.50	Management of Musculoskeletal Injuries (Mr R Villar)
12.50-13.15	Personal Preparation for the Mountains (Dr D Hillebrandt)
13.15-13.30	First Aid Kits for large and small expeditions (Dr D Murdoch)
13.30	Closing Remarks and Lunch

Financial Report

Financing the Expedition presented the greatest problem of the whole Expedition -greater even than climbing Everest! Our early dilemma was that we were seeking corporate sponsorship but were keen to avoid the sensationalism, and gimmickry that the media and some sponsors demand. We were anxious that the quality of our research and good environmental credentials should be our main attractions and we were not prepared to compromise this. Needless to say our search for a corporate backer was largely fruitless.

The table below gives a rough cost per item as well as a few comparative costs:

Everest Royalty	US\$ 10,000 per climber	Total paid \$80,000 (including Alison Hargreaves)* Alison paid \$6,400 towards her Royalty of \$10,000 and the Expedition contributed the remainder.
Pumori Royalty	US\$ 2,000 for 5 climbers	Total paid \$2,000
Trekking peak Royalties	US\$ 600 per peak per group	Total paid \$9,000
Airfare (PIA)	return fare via Karachi £500 per person	Total paid £40,000 (including "independents")
Insurance (travel and personal accident)	ranged between £100 -£189 depending on duration	Individuals responsibility
Transit through Icefall	US\$ 350 per member of the climbing team	Total paid \$2,800 * The Expedition met the cost of Alison's transit through the Icefall
Oxygen	2 litre cylinder via Thamserku \$147 2 litre cylinder via Himalayan Kingdoms \$279!! mask and regulator via Thamserku \$250 mask and regulator via Himalayan Kingdoms =\$384!	We bought £11,610 worth of Oxygen from Himalayan Kingdoms which cost a further £350 in import duty. The remainder of the oxygen was purchased direct from Thamserku and did not attract further import duties.
Freight UK - Kathmandu (PIA) Freight KDU - UK Freight KDU- BC	£ 1/ kg US\$ 7/kg £1/kg (for research gear only, Expedition equipment was transported within the basic cost.)	Total paid £1,500 Total paid \$1,531 £2,400 return N.B. PIA kindly gave us a free 1000kg free accompanied out and return excess luggage allowance
Bluet 250g Gaz cylinder Epigas 250g Petrol for generator	Thamserku \$1.5 , \$2-2.5 elsewhere in Kathmandu \$5-6 each \$1 per litre	\$500 + \$300 portage
Generators (2)	£750 each = freight + import tax	£1,500

Our freight and customs bills were much less than anticipated due to the generous personal luggage allowance negotiated for us by Marion Lawrance of Pakistan International Airways.

At present our balance shows a small profit (< 1% of turnover) and it is expected that this will be used to pay various outstanding debts related to the replacement of various pieces of borrowed research equipment.

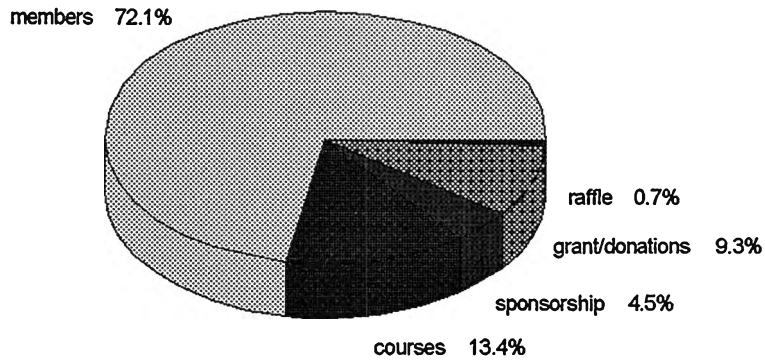
The tables and pie charts overleaf give a complete picture of the finances of the Expedition at the present time.

The Table below summarises the year on year expenditure and income of the Expedition since incorporation broken down into class totals

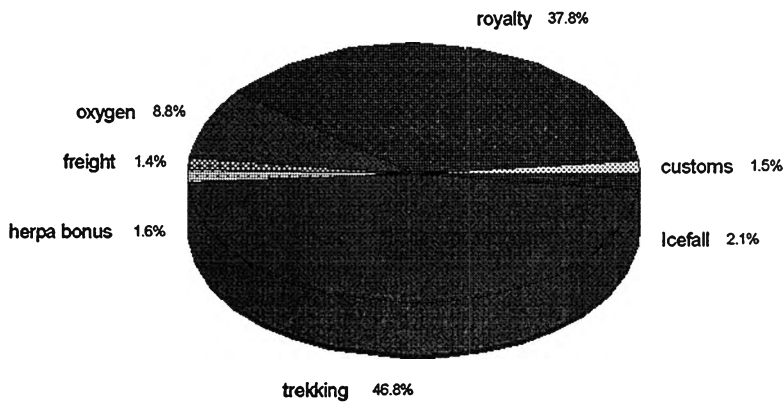
Class Total	Sept '92 to	Aug '93	Sept'93 to	Aug '94	Sept'94-Feb '95		Net class total balance
				Provisional			from Sept '92 -Feb'95
	expenditure	income	expense	income	expense	income	
interest		385.52		1,628.80			2,014.32
products. Cards, T shirts, Fleece etc	(2,986.31)	798.79		2,333.40		281.57	427.45
sponsorship				9,550.00			9,550.00
Grants and donations		10,003.51		6,834.00		4,007.00	20,844.51
oxygen	(19.63)		(11,702.00)		(803.00)		(12,524.63)
typing	(71.60)						(71.60)
fees (Company's House)	(50.00)				(50.00)		(100.00)
post	(1,189.78)		(880.00)		(150.00)		(2,219.78)
printing. Cards, mailshots, newsletters etc	(1,514.34)		(1,077.00)		(1,003.00)		(3,594.34)
stationery	(465.35)		(230.00)				(695.35)
insurance			(1,323.00)				(1,323.00)
Members contributions		19872.79	-1450	143677	-126		161,973.79
airfares international			(36,917.00)			480	(36,437.00)
Royalty (includes Nepalese Bank charges)	(2,400.00)		(47,168.00)		(4,518.00)		(54,086.00)
miscellaneous	(1,319.40)			735	(9.00)		(593.40)
advertisement (for courses)	(247.50)		(447.00)		(382.00)		(1,076.50)
phone & fax (included international to and from Nepal)	(729.90)		(474.00)		(278.00)		(1,481.90)
Mountain Medicine Courses		8,335.37		14,480.85		502.5	23,318.72
Tax rebate (reclaimed tax on donations)		1,666.67	(29.00)				1,637.67
equipment	(1,589.64)		(14,852.00)		(2,748.00)		(19,189.64)
raffle				1,532.18		39	1,571.18
Bank charges (UK only)			(225.00)				(225.00)
Pumori Royalty				1,360.00			1,360.00
transport			(10.00)		(990.00)		(1,000.00)
hospitality			(109.00)		(51.00)		(160.00)
accommodation in Kathmandu			(362.00)		(1,851.00)		(2,213.00)
food (for use above the icefall)			(492.00)		(343.00)		(835.00)
audit -accountancy fees					(1,175.00)		(1,175.00)
report					(1,164.00)		(1,164.00)
icefall					(3,006.00)		(3,006.00)
High Altitude Porter Bonus					(2,265.00)		(2,265.00)
pharmaceutical					(107.00)		(107.00)
Lake Louise - presentations, Society for Wilderness Medicine.					(1,950.00)		(1,950.00)
Oldham 95						32	32
Trekking costs					(64,007.00)		(64,007.00)
radio permit					(725.00)		(725.00)
National (Sagamartha) park entry fee (\$10/person)					(593.00)		(593.00)
liaison officer					(455.00)		(455.00)
Nepalese customs					(2,215.00)		(2,215.00)
Reunion Dinner (Old Dungeon Gyll)						800	
	expense	income	expense	income	expense	income	Totals
Total net income and expenditure for class totals	(12,583.45)	41,062.65	(118,926.00)	182,131.23	(95,355.00)	6,142.07	2,471.50
Total gross income							294,395.36
Total gross Expenditure							291,923.86

Simplified accounts expressed as percentage

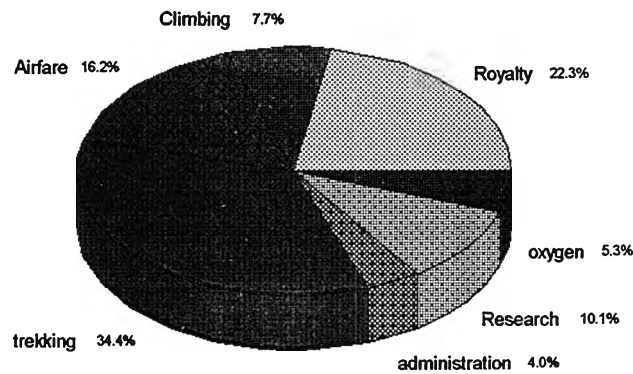
Income



Nepalese Expenses



Expenses



Gross income £294,396.36
 Gross expenditure £291,923.86
 Balance £2,471.50

Facts and Figures:

There seem to be some slight variations between the available statistics and so I have quoted both sources. Miss Elizabeth Hawley of Reuters in Kathmandu kindly provided us with her statistics and Bill Ruthven of the Mount Everest Foundation provided his data derived from Kit ? - a Yugoslavian whose name, I am afraid, escapes me. I have added on the data we gleaned from other Expeditions to produce the figures in the right column.

Everest Ascent and Accident Statistics

Everest statistics	Miss Hawley 31/7/94	Kit 30/6/94	31/10/94
Total ascents	647	647	655
Total people	546	547	*550
From Nepalese side	474		482
From the UK	19	20	22
From the USA	84		84
Without supplementary Oxygen	50		50
Women	30	30	30
British Women	2	2	2
Women without supplementary oxgen	1@		1
Total Expeditions since 1921	187		189
Total expeditions successful from Nepalese side	316		326**
Total expeditions successful - all sides	131		133
Total successful expeditions successful from Tibet	24		24
Number of successful guided ascents from Tibet	0		0
Successful ascents from both sides simultaneously	1		1
Deaths in the Icefall	19		19
Deaths from Nepalese side	85		85
Deaths overall	128	129	***130
Nations	41		41

* I am uncertain how many of the three summiting sherpas on the Japanese team had previously summited. Both of our Sherpas had summited before (this was Dorje's 5th ascent) as had the Japanese climber Muneo Nukita (via the North Col in 1991).

** We believe that there were 9 or 10 teams attempting Everest from Tibet in addition to the 4 teams on the South side.

*** We received unconfirmed reports that one porter died on the West Ridge in an avalanche whilst taking part in a Norwegian attempt from Tibet

@ Lydia Bradey's ascent in 1988 was originally discredited but is now generally agreed that she did indeed make the first female ascent without recourse to supplementary oxygen.

British Mount Everest Medical Expedition 1994 Ascent Statistics

Everest (8,848m)	Pumori (7,140m)	Island Peak (6,000m)	Lobuje (6,000m)	Pokalde (5,900m)	Parcharmo (6,000m)	Base Camp (5,300m)	Kala Pattar (5,500m)	Total Members
2	3	29	4	26	5	73	47	75

For the record this Report contains 53,775 words and occupies 13 MB of hard disk!

BMEME logistical statistics

Research equipment	1,200 kg	Break down below
High Altitude Sherpas	5	
Climbing Sirdar	1	
Ladders	61	
Snowstakes	60	
Fixed rope (8mm)	2,000 metres	
Ice screws	40	most unused
Deadmen	30	anchoring tents
Karabinas	100	most unused
Gas Cylinders	60 x 250g units	
Coleman fuel	22 litres	
Psion computers	9	
VHF handheld radios	10	
Personal Computers	4	only 2 worked
Assault tents	7	
Generators (8HP petrol 240 volt)	2	One working and one back-up
High altitude food	120 kg	does not include the Sherpa food that never arrived
Oxygen sets	12	Cylinders listed separately (One set kept at Base Camp)
Bicycle ergometer	1	
Ciba Blood Gas analyser	1	
Medical Scales	7	
Haemoglobinometer	1	
Saturation meters	10	various sorts
Ophthalmic funus camera	1	
Audiometer	1	
HF radios	2	
VHF Base sets	2	
VHF Hand sets	10	
Carbon Dioxide cylindes	18	
Kerosine space heater	1	
Research tents	3	
Revolving balance chair	1	
Wobble Plate	1	
Spirometers	8	
End Tidal CO2 analyser	1	
Control and monitoring equipment	numerous	
Petrol for generators	400 litres (@400 kg)	

This table gives an indication of some of the types and quantities of equipment that we used. It is by no means complete.

United Mission to Nepal and Church Missionary Society

UMN liaison: Rev John Currin.

Introduction by John Currin - To my knowledge there has never before been an association between a Christian development agency and a mountaineering expedition. As the United Mission to Nepal (UMN) is largely engaged in primary medical health care and with the unambiguous medical emphasis of the expedition this afforded some common ground. As someone who understood a little about both of the parties involved in the partnership, I acted as the expeditions liaison with the UMN. That this unusual partnership developed to the considerable assistance of both parties was due largely to the Church Missionary Society (CMS is one of the UK constituents of UMN) and in particular to the work of Russell Price and Martin Thomas. Through highly imaginative and well organised events CMS in conjunction with the expedition raised public awareness and financial support to the mutual benefit of all concerned.

Report received from Church Missionary Society (CMS)

by Russell Price, Parish Programmes Officer, CMS, Partnership House, Waterloo Road, London SE1 8UU tel. 071 928 8681

"He would have died if we had not brought him here. His diarrhoea would not stop," claimed Dambur Banadur. Dambur, father of nine year old Shanta, had struggled for a day through the valleys and over the rugged hill tracks with his son in a 'Doko' (bamboo basket) strapped to his back. He brought him to Okhaldhunga Hospital, located among the remote valleys of Eastern Nepal. Shanta had become dehydrated. Following treatment, he made a full recovery at the small hospital run by the United Mission to Nepal (UMN).

The United Mission to Nepal has 40 years' experience of working alongside the people of Nepal, developing the latter's skills and serving the nation in the areas of agricultural and community development as well as making an enormous contribution in the field of health care. One of UMN's major British partners is the Church Missionary Society (CMS), which shares in UMN's medical work. CMS welcomed the decision of the British Mount Everest Medical Expedition 1994 (BMEME) to promote the UMN's work, recognising the UMN to be the appropriate channel through which to pass on to the Nepali people the benefits that the expedition was to win for them. CMS became the Expedition's point of contact with the UMN.

To mark the 40th anniversary of the UMN and to promote the Expedition, CMS approached Lloyd's of London to ask it to allow Expedition members to climb and abseil the 130 foot atrium window. The event passed off successfully, members of the Expedition abseiling and climbing on the Lloyd's building with its dramatic architecture. This coup marked the start of a mutually beneficial relationship between CMS and the BMEME.

Peter Middleton, the chief executive of Lloyd's, hosted the event, at which the late John Smith MP, an active mountaineer, wished the Expedition well. Bishop Michael Nazir-Ali, then CMS general Secretary, and the Ambassador of the Royal kingdom of Nepal attended and endorsed the initiative. The media, including The Independent, The Times of London and regional TV news, seized the event extensively and illustrated it with excellent photographs.

CMS developed its relationship with the BMEME further as the Society promoted the Expedition's unique dual contribution to the world of mountaineering and high altitude medicine. CMS told the story of the Expedition to study groups in 200 English Parishes and in a further 200 Church of England junior schools.

CMS introduced the Expedition to the Telecommunications Managers Association (TMA), at first with the view to TMA providing funds and technical advice to enable data collected high up in the Himalayas to be processed in teaching hospitals in the UK. The short lead-time subsequently closed off this option but funds and technical advice did enable valuable voice contact to be made and maintained between the Expedition in Nepal and CMS in London.

The Society congratulates the Expedition on realising its objectives and succeeding in conducting the largest medical research project ever undertaken on Everest. CMS hopes to strengthen its links with the Expedition by continuing to provide support through the UMN in ways which may contribute to bringing lasting benefits to the peoples of Nepal.

Russell Price, Parish Programmes Office, CMS February 1995.

Publicity and the Media

A prerequisite for obtaining financial support is to achieve a media profile. Although we had limited success in obtaining funds by this method our publicity was of inestimable assistance in recruiting our Support Group and it also led to many unexpected spin-offs. Media recognition certainly also played a role in our team building. Our media flirtations proved to be most enjoyable and valuable in many ways.

Our early dilemma was that we were seeking corporate sponsorship but were keen to avoid the sensationalism, and gimmickry that the media and some sponsors demand. We were anxious that the quality of our research and good environmental credentials should be our main attractions and we were not prepared to compromise this. Undoubtedly this was the correct decision.

The media's tendency to sensationalise and report only bad news did indirectly effect our Expedition. In March '93 we were severely damaged by the ill-informed and irresponsible reporting (surrounding Everest's 40th anniversary) that addressed the 'rubbish problem' on Everest. We took a decision to counter this and use it to our advantage by promoting our own environmental credentials. This worked fairly well in the quality press but the tabloids picked up on the wholly inaccurate 'super-loo' story. Interestingly the 'super-loo' story was fabricated by a toilet manufacturer and distributed through the press networks without our knowledge or permission.

These experiences led us to be very cautious in our dealings with the media and the tabloids were not invited to attend events such as the Lloyd's Tower Climb. The coverage that we achieved at Lloyd's was both very broad and entirely favourable.

Russell Price of the Church Missionary Society did a good job, on behalf of the UMN, in building our profile and, unlike others, made no attempt at sensationalism. He was also very sensitive to the unease of our patrons with respect to our relationship with any religious organisation.

Once in Nepal CMS distributed our press releases and organised TV coverage. They were particularly keen on promoting a profile amongst children and our appearance on Blue Peter was one of their triumphs.

The United Mission to Nepal and the Church Missionary Society were both keen to use the Expedition as a tool to raise their own profile. The UMN is the largest external development agency in Nepal and employs some 2000 Nepalese. It operates within Nepal within strictly defined guidelines which forbid any form of proselytising. CMS is one of UMN's funding organisations. The Expedition was the cornerstone to a parish based fund raising campaign and therefore broad publicity was important.



Filming and photography:

Filming Proposals

In 1992 a TV production company proposed filming the Expedition and selling it on in various forms to documentary makers, news programmes and medical cable networks. At the same time researchers from the BBC Natural History Unit proposed a documentary looking at the science of acclimatisation. The budgets for both projects were astronomical and both were abandoned.

Phil Coates, an independent film producer, compiled a 'Treatment' entitled 'Rare Air' which was to be a documentary looking specifically at the effect of altitude and hypoxia on the airways. Unfortunately he was unable to find a sympathetic commissioning editor.

In the weeks before departure we were contacted by BBC Horizon who wanted to make a low budget documentary looking at extremes of survival. This was to be filmed by the members themselves on BBC Hi 8 video equipment. Their timescale for filming the data collecting weekend in London was hopelessly short and they too were unable to secure a commissioning editor.

The filming that we ended up with

BBC Open University did film some of our projects in the UK and made a film for their physiology module.

Swanlind, Grampian TV and BBC Scotland filmed our mock base camp at Aonach Mor in 1993

BBC London South East filmed the ascent of the Lloyd's Building

Filming in Nepal was performed entirely with 2 Panasonic NSV 85 palmcoders. These provided High band video on the miniature SVHS C format. They were powered by rechargeable NiCad batteries recharged at Base Camp. An 8 hour battery belt was used in the Western Cwm and produced more than adequate power at very low temperatures. The cameras weighed just 0.8 kg and their light weight and compact size meant that they could be used relatively high on the mountain. Video filming took place to Camp 3 (7,100 metres). Some footage was lost at Camp 3 presumably due to condensation. Strong winds and porter difficulties made filming above this impossible.

Editing was performed by the Expedition's members on an High band SVHS Panasonic editing suite. The SVHS master was commercially copied on to VHS and distributed to members and those interested.

Cameras

A wide variety of cameras and film were used. Fujichrome Sensia and Ektachrome Elite were the most popular slide films. Most of the Everest climbing team carried both SLR's and compacts. The lithium powered cameras performed reliably and on the summit day most of the photographs were taken on compacts as it was possible to keep these warm within an internal pocket. One of the SLR's failed to work on the summit day. Most of the SLR's were equipped with 28-80 mm zoom lenses.

In order to enhance this Expedition Report we organised a competition with a cash prize of £50 for the best photograph. This was judged by an independent professional photographer.

Expedition Diary:

April 1990 :The idea occurred somewhere between Lukla and Jiri after a trip to Island Peak and Lobuje.

November 1990 : Getting permission. We applied to various trekking companies for assistance in getting permission and eventually managed to secure the South Col Route for 1994.

March 1991: Making a commitment. The first commitment was to stump up the required £2,400 Royalty.

August 1991: Looking for sponsors. First crude attempts at seeking a commercial backer. Needless to say this was fruitless.

December 1991: First crisis meeting in Stirling- Royalty rises to \$10,000 decide to recruit support group and begin to develop the Medical Research. All team members reaffirm their commitment to the trip.

January 1992: Advertise in "High", "Climbing" and "Climber and Rambler". Articles also appear in "Doctor".

March 1992: First open meeting in Langdale attended by 30 prospective Support Group members.

July 1992: Royalty rises to US\$10,000 per climber. At this stage we had 11 climbers!

September 1992: Form charitable company and write a formal contract with members of the Support Group. Start taking deposits. Open meeting in Hyssington attended by Thamserku Trekking representative. PR company becomes involved.

November 1992: Planning meeting at Kenilworth.

February 1993: Media launch at Aonach Mor Ski field. Excellent local TV coverage, national press coverage and guest speaker has temper tantrum during evening lecture. Promotional video made.

April 1993: First 2 day course for doctors on altitude related illness. Extremely popular and profitable. 150 doctors attend.

July 1993: Meeting in the Lake District. Many new members now joined.

October 1993: First team building meet at Oldham attended by over 30 members and extremely successful. Bonding begins.

December 1993: Mountain medicine course for non medics: 250 attend.

February 1994: Winter skills and team building at Aonach Mor. 40 people attend and most camp out on the mountain in gale force winds.

March 1994: Promotional event organised by UMN/CMS at Lloyd's of London with research displays and ascent of the Atrium on the roof. Excellent press and TV coverage. CMS begin their 'Climb with Charlie Hornsby' appeal.

April 1994: Training in glacier travel during ski touring trip to the Bernese Oberland in Switzerland.

May - July 1994: Further team building weekends in Glencoe and Snowdonia.

August 1st 1994: Climbing and research teams arrive in Kathmandu.

August 13th 1994: First party fly to Lukla.

August 27th 1994: Establish Base Camp.

September 1st 1994: permission to start climbing begins. First forays into the icefall.

September 5th 1994: Route to Camp 1 established. First wave of Support Group arrive Kathmandu.

September 17th 1994: Camp 2 established (delay due to poor visibility in the Western Cwm, snowfall and avalanche danger during middle of September).

September 19th Second wave of Support Group arrive Kathmandu.

September 23rd: Camp 3 established.

September 29th: Camp 4 established.

October 1st: First summit attempt abandoned when one member of the climbing team suffered a stroke and had to be evacuated to Kathmandu.

October 3rd: Swiss climbers summit on Lhotse but do not attempt their planned traverse due to strong winds. Scottish member of International Lhotse team suffers frostbite and exhaustion 150 metres from the summit of Lhotse and is brought back down. Alec is Helicopter evacuated from Base Camp the next day.

October 4th: Rest day. High winds.

October 5th: Rest day. High winds.

October 6th: Andrew Pollard, John Sanders, Charlie Hornsby, Angus Andrew and Alison Hargreaves together with Sherpas: Kilu Temba, Dorje, Dawa Temba and Finjo move up to the South Col. All food has been blown away and most stoves refuse to work. Tents overcrowded as only 2 hyperspaces have been pitched due to high winds. Japanese team also occupy Camp 4.

October 7th: Roddy, Charlie and Alison descend from Camp 4 to Camp 2. Food, oxygen shortages and stove malfunctions together with ferocious winds make the S. Col virtually uninhabitable.

October 8th: John and Angus descend. John goes straight to Base Camp. Strong winds persist. Japanese team give food to Andrew. Sherpas retreat.

October 9th: Andrew Pollard makes solo summit attempt (leaving late) after being abandoned by sherpas. Attempt abandoned at 8,600m due to shortage of oxygen and anxieties about snow conditions. Andrew descends to Camp 2. Camp 4 tents beginning to disintegrate.

October 10th: Charlie, Roddy and Alison move up to South Col to make their summit bid. Muneo Nukita and Mirahara make their summit attempt. Mirahara retreats from the South Summit after going blind in one eye. Nukita continues along corniced ridge in violent winds to reach the summit at 1 p.m..

October 11th: Charlie Hornsby, Roddy Kirkwood, Dorje Sherpa and Dawa Temba Sherpa reach the summit of Everest in strong winds at 11.30 am. Spend the night at the South Col. Angus returns to South Col having obtained more oxygen from the Japanese. Sherpas refuse to accompany him. French team move up to C4 for their summit bid.

October 12th: Alison makes solo bid for summit without supplementary oxygen but forced to retreat due to frost nip at around 8,300m. Winds persist. French abandon their Expedition. Angus remains on South Col.

October 13th: Angus alone on South Col awaiting good weather. Radio no longer working.

October 14th: Angus forced to abandon South Col when his tent finally disintegrates at 3 am.

October 15th: Strike Base Camp.

October 17th: Fly from Syanboche to Kathmandu.

October 27th: Depart Kathmandu.

Acknowledgements:

Firstly to Dr Jim Milledge from Northwick Park Hospital in Harrow, one of the national and internationally recognised authorities on the medicine and physiology of high altitude, who acted as adviser to the research team from planning to analysis of data. Without his help much of this work would not have been possible.

Hannah Sutter (solicitor) who worked hard to establish the framework within which the Expedition operated and has now provided several years worth of invaluable advice and assistance.

Mr Peter Smith, our basecamp manager, provided excellent and faithful support and logistical backup at all stages of the expedition.

To all the members of BMEME for their enthusiasm and commitment to our work, even when the environment or their own interests made participation difficult.

Grants from: Dr Scholl Foundation, British Heart Foundation, Foundation for Arts and Sports, Mount Everest Foundation, Scottish Mountaineering Trust,

Gifts and sponsorship (cash donated either directly to the Expedition or to individual members): George Smith, Ian Baxter, Rev George Tolley, Margaret Waterton, Olive Cooksey, Esplanade Surgery (Oban), Fiona Thexton, Chuck Evans, Andrew Knight, Elsie Perry, Jim Thornton, Freda Webster, Hon Jean Mussell, Prof. Dubowitz, Ruth Collier, D. Thomas, Barclay Trust, Ali Diba, K. Tattersall, Rachel Pollard, Julian Tout, Steven Hinsley, Mr & Mrs J.L. Hunt, Mrs Sally Stewart, Margaret Depla, Sally Newberry, Dr S. Gilchrist, Mr A. W. Bryan, Dr F.T. Crossling, David Alderson, Noel Howard, Peter Tattersall, B.D.N. Bicknell, David Nickol MBE, Prudence Broadhurst, Stephen Jarvis, B.M. Albert, Joyce Wormald, J.P. Lane, Carla Hornsby, I.S. Frazer, Sheila Ward, Mrs Barry, Rev. J. Harrison, Mrs M. Leatt, Glan Hafren NHS Trust, Hyssington Village Institute, Van Omeron Oil Terminals, Jean Hunt, V. A. Leeming, Richard Morgan & Co Ltd, Albert Fry, Alison Davies, Sheila Ward, Sarah Neild, Pirelli Tyres, EISAI Europe Ltd Mrs Carole King, Langley County Primary School, Yorkshire Bank, A & J Fabrications, Mr Pilkington, J.R. Decor, City Papers, Jini Leerose, Medlock Building Company Ltd. Diocese of Southwell, Royal Scottish Assurance, Elastoplast, Compaq Computers (Donation), Clydesdale Bank (Donation), Telecom Managers Association (to pay for communications with UK media), Perpetual Unit Trust Management Ltd. (financial support in return for slides of Ama Dablam), Ciba Corning (for presentation of arterial blood gas results), Alcon Laboratories Ltd. Dolland & Aitchison, Glan Hafren NHS Trust, Gwent County Council, Ophthalmic Unit Staff, St Woolos Hospital Newport Gwent, Rayner intra-ocular Lenses Ltd. South West Nurses Society (c/o V. Travers).

Approval from: British Mountaineering Council (no grant), Mount Everest Foundation

Sponsorship in kind: Because of our parlous financial state, little of this would have been possible without the support of many British and overseas manufacturers and suppliers. Their extensive loans of equipment were not helpful, they were essential. We would particularly like to thank-Pakistan International Airways (free extra luggage allowance), Koflach and Glacier Imports (expedition boots), Yaesu Ham Radios, Snowsled (clothes and stretcher), Bolle (sunglasses), Swanlind (promotional video), Church Missionary Society (Press Relations), Lloyd's of London (loan of building!), Scholl Pharmaceutical (sun-block), Himalayan Kingdoms (advice and assistance), Sprayway Limited (jackets), Nevis Ranges Torlundy (Assistance with Public Relations), Add Lib PR, Bradford Cover and Tent Company Ltd. Bradford, West Yorks., Shell U.K. Exploration and Production, Aberdeen (production of brochure), CITP and Sally Nathan, Bruce Herrod Photography (photograph), Paragon Pictures, Centre Parcs (holiday raffle prize), Tomatin Whisky, Murrayfield Whisky, Rowenta, Kall Kwik Printing (some stationary), Robson, McLean Solicitors, Edinburgh. A.C. Lossor & Sons (Surgical) Ltd. (sphygmomanometers), Siemens Medical Engineering (pulse oxymeters), Lederle (Diamox), Henkel Cosmetics (toothpaste for group 5), Axis Resources Limited (clothing), Kanco (humidifying masks), Clement Clarke International (peak flow meter mouth pieces), Bio Systems International (Kidderminster), Alexander Partnership Chartered Accountant (Tenby), Bounty Services, Brain Industries Ltd (Kilgetty), Glaxo, Allergan Humphrey Ltd. Carleton Optical Equipment Ltd Dolland and Aitchison Group (Keeler Ltd.), Queen Alexandra Hospital, Portsmouth (Ophthalmic Unit), Smith & Nephew Medical Ltd. Spectrum Mentor Ltd. Accuson (Cossor sphygmomanometers) Airmed (Wright peak flow meters) Amplivox Limited (Audiometer) Astro-Med UK (Dash IV chart recorder) Ciba-Corning UK (blood gas analyser) Datex (carbon dioxide analyser) Digital PLC (desktop PC's) Digitimer Limited (Digistore data acquisition system) Cambridge Electronic Design (CED 1401 data acquisition system) 3M PLC (red dot electrodes) Duracell UK (dry cells) Harmonic Drive UK (motor controls) Micro Medical Limited (microspirometers) Minolta (sleep study pulse oximeters) Nellcor UK (pulse oximeters) Olivetti computers (portable PC's) Psion Computers PLC (series 3A for day-to-day data collection)

RAM computers (portable PC); Chris Pelling, Queen Mary & Westfield College Dr Atholl Johnson, St Bartholomew's Hospital; Prof. P. Ceretelli of the EVK2CNR project (Assistance with communications), YHA Adventure Shops Ltd. Dept of Cardiology, Doncaster Royal Infirmary (loan of ECG trackers)

Discounted equipment: Mountain Equipment, Asolo, Wild Country Tents (now known as Terra Nova Tent and Clothing),

Equipment and Gear Reports

Oxygen: We purchased our oxygen, masks and regulators through Himalayan Kingdoms in the UK who arranged for it to be delivered direct to Kathmandu. Unfortunately on arrival we discovered that 13 of our cylinders were empty and 5 of the 11 regulators had broken "O" rings making them useless. Spare "O" rings were not available in Kathmandu and we experienced considerable anxiety in the days before our planned departure. We managed to exchange some of our empty cylinders with a batch delivered to Aeroflot. Replacement oxygen and regulators were eventually delivered to Base Camp after protracted negotiations between Peter Smith and Himalayan Kingdoms and these negotiations have yet to be satisfactorily concluded. The oxygen also caused difficulty with customs as the supplier had used our order to import a much larger quantity than we had ordered. This caused significant embarrassment as our agents documentation (supplied by us) did not match the airway bill and we are still owed the excess customs duty that we were forced to pay. *We are still (March '95) in dispute with Himalayan Kingdoms who are attempting to make us responsible for the loss of the excess delivery that was piggy backed onto our order.*

In retrospect we would have saved several thousand dollars and would have had a more reliable service if we had bought directly from Thamserku. This was one of the most costly mistakes of the Expedition.

We used both 2 and 3 litre cylinders (the latter weighed 3 kg) charged to around 210 bar at room temperature. The cylinder pressure dropped to nearer 150 bar in the cold experienced at the South Col. Oxygen was delivered at a flow rate varying between 0.5 and 4 litres per minute to a mask fitted with a reservoir. A simple rubber leaf valve in the mask allowed air to be mixed with oxygen on inspiration.

The main problem encountered were with the "O" rings which were made from a very brittle plastic. The sets were not supplied with instructions and it rapidly became apparent that it was essential to have the flow rate turned to the maximum 4 litres before screwing the regulator on or off a full cylinder. Failure to do this resulted in rapid disintegration of the "o" ring and loss of oxygen. Despite considerable experience amongst the team of dealing with compressed gases this problem had not before been encountered and the failure to provide an instruction manual was a serious (and costly) oversight.

The only other significant problem was that the flow rate seemed to be very unreliable. Gas was consumed at a very variable rate and the lack of calibration meant that it was very difficult to predict the length of time a cylinder would last.

Planned Usage: We planned for members to have the option of using oxygen if necessary above Camp 3 and to provide sufficient to sleep on in Camp 4 and to climb with at a rate of 3 litres / minute. We therefore planned for each member to have access to 3 x 3 litre cylinders at Camp 4 and 1 x 2 litre cylinder at Camp 3. The Camp 3 cylinder was to be collected en route to the South Col and used as required. The remainder of this cylinder would be used to sleep on at a rate of 0.5 litres per minute. Sherpas would carry the spare 3 litre cylinders on the summit day. The 3 x 3 litre cylinders were planned for the Sherpas above Camp 4. We anticipated using 1 x 2 litres for research and 1 x 2 litres for medical gas.

We therefore planned on using:

$(3 \times 3 \text{ litre} \times 7 \text{ climbers}) + (3 \times 3 \text{ litre} \times 4 \text{ Sherpas}) = 33 \times 3 \text{ litre bottles}$

$(1 \times 2 \text{ litre} \times \text{medical}) + (1 \times 2 \text{ litre} \times \text{research}) + (1 \times 2 \text{ litre} \times 7 \text{ climbers}) + (5 \times 2 \text{ litre reserve}) = 14 \times 2 \text{ litre bottles}$

11 masks and regulators were used on the mountain and 1 kept at Base Camp for medical and research use.

Actual usage: Several cylinders were used in the medical evacuation of one of the members following a cerebro vascular accident. A flow rate of 4 litres / minute was used down to an altitude of 4,300m. A further cylinder was used in the treatment at 6,400m of a frost-bitten sherpa of another team. Several cylinders were used in two of the research projects at Base Camp.

Some of the climbing team used little or no oxygen between Camp 3 and 4 whilst others climbed on relatively high flow rates. During the first bid high winds were encountered at the South Col and two thirds of our available remaining oxygen were consumed at rest by both members and sherpas during their extended stay. During this stay it was noted that the length of time a cylinder lasted seemed to be very unpredictable. During the second summit bid Roddy, Charlie and the Sherpas had access to 3 x 3 litres each and this proved to be sufficient although their last night at Camp 4 was spent without supplementary oxygen. More Oxygen was obtained from the Japanese team to facilitate a further summit bid by Angus but this was eventually abandoned at Camp 4.

We consumed rather more gas than we had planned and were glad to be able to use 5 cylinders of the 13 x 3 litre cylinder reserve that Peter Smith had brought to Base Camp.

After sacking our sherpa staff we were fortunate in being able to use the French Sherpa team to recover most of our empty cylinders from the South Col. These were freighted back to Kathmandu and thence back to the UK where we will attempt to recycle them. All of the regulators and masks were salvaged.

Tents: We purchased 7 discounted high altitude tents (Wild Country Mountain Hyperspaces) for use above Base Camp and members of the climbing team provided their own tents to be used at Camp 1 and Camp 2. We had originally planned to use the veteran McInnes Box tent as a mess tent at Camp 2 and to provide Sherpa sleeping accommodation but its 78 kg weight and our limited Sherpa support made this not feasible. We therefore used some of our assault tents at Camp 2 to provide Sherpa accommodation.

We were extremely pleased with the tents on the Expedition. The 4 man (Wild Country Terra Nova) provided comfortable sleeping space for 3 and proved very popular in the bitterly cold evenings when it was frequently occupied by all 8 members of the climbing team. It also provided very useful equipment space in the porches.

One of the Hyperspaces became the victim of some Sherpa tent art and now sport large primitive illustrations of Everest on the inner.

The Hyperspace used at camp 3 became engulfed by snow and was substantially damaged when it was dug out at the end of the Expedition. Interestingly one of the poles snapped as the tent was being erected presumably due to the cold.

The 2 Hyperspace tents at the South Col were erected in very strong winds and with minimal up wind protection. They were anchored with dead men. During the first night each tent was occupied by 4 people but after that by 3 or less. They survived 8 days on the South Col in atrocious winds and provided very good shelter. The only real criticism was that the zips on the fly-sheet tended to undo spontaneously as a result of the buffeting from the wind. When this happened spindrift would enter the porch and, sometimes, the inner. Inevitably large amounts of frozen condensation formed in the inner tent and, together with the ingress of spindrift, this caused the sleeping bags to become quite damp.

The South Col proved to be the ultimate test to destruction. At 3 am, after 8 days of relentless battering by the jet stream, the fly-sheet of the last remaining hyperspace disintegrated and the tent was abandoned.

Deployment of tents

Camp 1a.

Initially 1 2 man Vango ridge tent. This was used only as a temporary equipment store and was later moved to Camp 2.

Camp 1b:

A Wild Country Quasar was the only tent left permanently at Camp 1.

A Salewa Mountain Tent was also used at Camp 1 but was damaged by heavy snowfall early in the Expedition and was removed.

Camp 2:

1 x Nepalese made ridged mess tent - light to transport but very precarious in the wind.

1 x Wild Country Terra Nova - occupied by 3 people.

3 x Hyperspace- each occupied by 2 people.

1 x North Face 3 man dome tent without porch- occupied by 2 people.

1 x 2 man Vango Ridge tent - occupied by 1 person.

1 x Ferrino dome tent - occupied by 1 person.

Camp 3

1x Wild Country Mountain Hyperspace - never occupied

Camp 4

2 x Wild Country Mountain Hyperspace - each occupied by up to 4 people. Survived 8 days.

1 x Ferrino domed assault tent used without fly-sheet - occupied by up to 2 people.

Stoves and fuel: We took a wide variety of stoves and fuels as we had heard conflicting reports about the reliability of stoves at great altitudes.

1. MSR multi-fuel stove powered by Coleman white spirit imported at great cost from the UK. We took 22 litres and the price per litre once freighted and imported turned out to be about £13 per litre. The MSR's were used very successfully at Camp 1 and Camp 2. We did not attempt to use them above Camp 2.

2. Kerosene and locally acquired stove. About 40 litres of kerosene were consumed by this stove at Camp 2 at very little cost. No problems were encountered at this altitude.

3. MSR gas burner (x1) fuelled by Epigas (propane / butane mix). This was the most powerful and reliable stove at C4.

4. Epigas Alpine Stove powered by Epigas (propane butane mix). These did not perform well at the South Col. These worked only if the cylinders were pre-warmed.

5. Epigas lightweight burner modified with copper tubing based heat exchanger with foam insulated cylinder. This performed reasonably well at Camp 4.

6. Marco Tower stove powered by Camping Gaz (Bluet - butane). This was modified with a few extra ventilation holes, a copper heat exchanger and a foam insulated cylinder. This performed reasonably well.

7. Camping Gaz Bluet Butane burners with foam insulation and copper heat exchangers.

8. 2 x Epigas Lanterns were most useful at Camp 2.

Stove failures were a major problem at the South Col and caused a great deal of discomfort and dehydration. Kerosene alone would have been an adequate fuel at Camp 2. The MSR epigas burner and 60 x 250g cylinders of Epigas (Propane / butane mix) would have been the best option or, failing that modified Marco Stoves and Camping Gaz.

Insulation and clothing: Above Base Camp each member of the Everest Climbing team had 2 sleeping bags. Members spent most time at Camp 2 and everyone had a top of the range sleeping bag there. At the South Col we opted to use cheap and disposable dacron bags to combat the condensation problem and to avoid the necessity for members to carry their own bags from Camp 2 to Camp 4.

The extra wide Gortex Everest bags made to special order by Peter Hutchinson of Mountain Equipment and supplied at a discount price were excellent. They proved warm and comfortable throughout our 20 day stay at Camp 2 and, when it really got cold, easily accommodated a down suit inside.

The bottom of the range dacron bags were bought in Kathmandu. We had them sewn together in Namche to make them into doubles to facilitate the "sharing of body heat". Obviously they provided little insulation but when used in conjunction with a down suit they were adequate. They were largely immune to the condensation and now reside somewhere in Tibet (with or without the tent they were in). The consensus was that the dacron bags were very successful.

All of the Everest Climbing team were equipped with one or 2 piece down suits. Most were made to measure by Mountain Equipment and most were Goretex covered. They performed flawlessly and nobody suffered any significant cold injury despite some very severe conditions. The Goretex cover was a great advantage at Camp 4.

Boots: The Everest Climbing Team were generously supplied with free Koflach Arctis Extreme boots with alveolite inners. Unfortunately three pairs were lost when a barrel was stolen during the approach march to Base Camp so some of the team used their own boots (all Asolo). All boots were ordered between 1 and 2 sizes larger than the normal shoe size. Lack of availability and late supply made accurate sizing very difficult.

Above Camp 2 boots were worn in conjunction with Neoprene (mainly Forty below, USA) over-boots. Several people encountered difficulty with their crampons whilst using over-boots. Most members opted to use either a vapour barrier sock or a neoprene sock in conjunction with a thin inner (wicking) sock and a thicker (insulating) sock. This combination was comfortable and reasonably effective. Two members of the Climbing Team suffered frost nip but none frost bite which is a testament to the quality of the equipment.

Cold feet are inevitable on high mountains and use of supplementary oxygen certainly prevents a great deal of frostbite. Some members did use exothermic foot-warmers and one of the other teams even had electrically heated insoles but I am not sure how they performed.

There was some adverse criticism of the boots. The eyelet's on the standard inner boot of the Koflach frequently separated from the inner due to poor stitching but this was not a problem on the velcroed alveolites.

Shell clothing: I was fortunate to have been given some Ventile clothing by a company called Snowsled. This is a highly breathable cotton that is sufficiently densely woven to be both breathable and waterproof. I used the climbing smock a great deal during the approach trek where it proved adequate protection against the monsoon although the single layer construction is not waterproof. It was very comfortable and versatile in the humid conditions. I wore my ventile smock to just below Camp 3 (6,900m) where I had to abandon it as it was insufficiently roomy to accommodate down clothing underneath. Had it have been large enough I am sure it would have been an excellent breathable windproof for use higher on the mountain. The smock's kangaroo pocket was ideal for accommodating radios, snacks and suntan cream and the integral hood made it into a very versatile garment.

The double layer jacket is a very smart coat but was sadly too heavy to be used high on the mountain and too warm to be used below Base Camp. Curiously I find the jacket a most useful work coat.

Food:

Food procurement; Ronnie Robb. Advisor Dr Christine Fenn (Nutritionist)

For a variety of reasons (already mentioned) much of the £1,000 worth of western goodies did not arrive at Camp 2. Food at Base Camp lacked variety and could easily have been improved by taking along some western snacks. Fortunately the Japanese came to the rescue as they had brought with them their own food and chef. I will not forget the delight of visiting the Japanese Base Camp and sitting down to a multi-course Japanese banquet one Sunday afternoon. Our Expedition budget did not, however, stretch to such luxuries and we did receive very good value for money from Thamserku. Reports from the Support Group regarding the quality and quantity of their food are mixed. Inevitably variety was restricted but it is relatively easy to pick up tinned delicacies from the lodges below Base Camp or dine in these lodges at very little cost.

Ronnie Robb has sent in the following account of the High Altitude food:

The work associated with the planning and logistics of the Expedition food is very complex, time consuming and should only be tackled by those who are thick skinned! Churchill's "pleasing all the people" speech springs to mind and the organiser should consider it a measure of success, if the Expedition members are still talking to him/her at the end of the trip.

The primary aim of the BMEME diet was that it should consist of a variety of foods which should be tempting and palatable. It may seem surprising but providing the correct balance of nutrients and calories was my second (but closely following the first) aim. The theory behind this was that if no-one eats the food it's of no use.

The food supply for the climbing team was planned in 2 parts, low-altitude provision and high altitude provision. The low altitude diet related to the walk-in period to Base Camp and was provided by tea houses and paid for by the trekking Agent. On the whole this was good but standards varied considerably with memorable low points being at Phakding and Gorak Shep but compensated for with highs at Namche and Thengboche. It consisted mainly of soups, vegetable stews, breads and fried breads.

The high altitude rations were determined by issuing a dietary questionnaire to all the climbing team members asking them for their likes and dislikes, allergies, preferences and favourites. From this a calculation of quantities was made based on 7 climbers above Base Camp for a total of 35 days each.

The rations at advanced camps consisted largely of pre-packed foods which we were able to purchase at cost price from the suppliers. This was to be supplemented by locally purchased carbohydrates e.g. rice, lentils, pastas, pulses, flour, sugar and salt.

A complete list of all the foodstuffs provided and the quantities is included in this report. It all fitted into 8 x 60 litre plastic barrels and was shipped direct to Kathmandu. The total budget for all the high altitude rations purchased in the UK was £1,000. Due to time constraints we did not write to individual companies for donations and few companies gave any free food or drink Our thanks go to the following who did:

Get up and Go - Breakfast compliment

Tomatin distillery

The Bennachie Whisky Company

Upon arrival at Base Camp the High Altitude rations were split into individual packages, placed in plastic bags and carried up to the 4 camps. most foodstuffs were in powdered form although there was a variety of "luxury" items which were in tins e.g. fruit and meat. Most food loads weighed an average of 12 - 15 kg. Some food was packed as emergency supplies with the view of leaving them unopened at Camps 1 and 3.

With all the planning and the best will in the world it is impossible to plan for the unpredictable and this expedition had its fair share of unforeseen.

Unfortunately the Expedition suffered from unreliable Sherpas, some with "sticky fingers", a crooked Sirdar, bad weather and a temperamental stove/gas system at Camp 4.

Food packages left at Camp 4 were dumped and in the ferocious winds that prevailed they just blew away. We had a complete barrel with nothing but confectionery and this proved to be popular with the Sherpas to the

point where most of its contents just "ghosted away". The luxury items were indeed popular and in most cases they proved to be the highlight of the day following load carries to and from Camp 2.

The final straw and potentially dangerous was the lack of carbohydrates to supplement the dehydrated meals above Base Camp. We had given money to our Sirdar to cover the costs of the supply of rice, lentils, potatoes, etc. but precious little of this ever turned up, certainly not enough to cover the needs of 7 climbers and 6 Sherpas. The money vanished (\$600) and what we did about this is another story.

The final conclusion is that there was not enough food, without the carbohydrate supplements and the "missing" goodies. It is therefore difficult to assess whether or not the objectives were ever met. Even the biggest fan of curries, chillies and spicy meals soon gets fed up with the same each day and the alternative vegetable stroganoff was positively disgusting.

Never mind, the whisky more than made up for it!

High Altitude Foods Suppy

Foodstuff	Manufacturer	Size	Unit Weight (grams)	Total Weight (Kg)	Quantity	Total Price (£)
Pre-packed Meals	Various	225g sachets	500	250	500	360
Get Up and Go	Highr nature	Tubs	50	35	700	0
Dried Sultanas	Village Bakery	1 bag	3000	3	1	0
Marzipan	Village Bakery		250	6.25	25	0
Mixed Nuts	Village Bakery	1 bag	4000	4	1	0
Dried Yeast	Village Bakery	1tub	500	0.5	1	0
Power Bars	Higher Nature					0
Pepperami Sausages	Mattesons	40 sticks	1000	2	2 boxes	29.92
Jam	Family Choice	jars	340	2.04	6 jars	2.85
Marmalade	Family Choice	jars	340	2.04	6 jars	2.79
Darjeeling Tea	Twinning	100 teabags	300	0.3	1 box	2.99
Earl Grey Tea	Twinning	100 tea bags	300	0.3	1 bx	2.99
Ovaltine	Ovaltine	6 tubs	400	2.4	1 slab	8.49
Chocolate Break	Cadburys	18 sachets	1000	2	2 boxes	12
whole Hazel Nut	Cadburys	24 bars	100	2.4	1 box	9.69
Snickers	Mars	24 bars	100	2.4	1 box	8.15
Tuna in brine	John West	12 tins	200	2.4	1 slab	7.09
mackerel fillets	John West	10 tins	125	1.25	1slab	4.05
Kit Kat	Nestle	48 bars	100	9.6	2 boxes	15.04
Toffee Pops biscuits	Burtons	12 packets	150	1.8	1 box	3.5
Ginger Cake	McVities	16 cakes	300	4.8	1 box	8.8
Hob Nob biscuits	McVities	12 packets	300	3.6	1 box	5.99
Chocolate digestives	Family Choice	12 packets	200	9.6	4 boxes	19.68
Dried dates	Whitworths	12 packets	250	5	1 box	6.15
Dried Apricots	Whitworths	1 bag	2000	2	1 bag	7.19
Porridge	Scotts	12 packets	750	9	1 box	9.59
Porridge Oatmeal	Hamly's	1 bag	3000	3	1 bag	1.99
Chesse biscuits	Ritz	48 packets	100	4.8	1 box	8.42
Liquorice	?	1 box	2000	2	1 box	2.99
Marmite	Marmite	24 sachets	8	0.19	1 box	3.55
Coffee	Nescafe	12 jars	100	1.2	12 jars	17
Coffee	Nescafe	1 large tin	750	0.75	1 tin	10.75
Dried fruit salad	Whitworths	1 bag	2000	2	1 bag	6.89
Museli	Jordans	1 bag	1000	1	1 bag	2.49
Museli	Alpen	6 packets	825	5	1 box	7.7
Oatcakes	Nairns	6 packets	300	1.8	1 box	3.79
Tinned Pineapples	Princes	12 tins	432	5.18	1 slab	4.89
Oxo cubes	Oxo	128	4	0.51	1 tub	6.99
Honey	Family Choice	6 jar	340	2.04	1 slab	3.99
Peanut Butter	Family Choice	6 jars	340	2.04	1 slab	3.55
Corned beef	Ship	12 tins	240	4.08	1 slab	10
Corned Beef	Ship	1 tin	2700	5.4	2 tins	13.78
Tomato Soup	Heinz	12 bottles	460	5.52	1 box	9.35
Ploughman's Pickle	Heinz	12 jars	310	3.72	1 slab	8.05
Cup a Soup	Batshelors	9 packets	100	4.5	5 boxes	25.45
Curry Powder	Willston	12 pots	25	0.3	1 slab	2.05
Chilli Powder	Willston	12 pots	25	0.3	1 slab	2.29
Assorted herbs	Willston	12 pots	15	0.15	1 slab	3.75
Curry Powder	Noels	1 tub	400	0.4	1 tub	2.14
Chilli Powder	Noels	1 tub	400	0.4	1 tub	2.42
Garlic chips	Noels	1 tub	400	0.4	1 tub	5.27
Milk Powder	Milac	2 bags	2000	4	2 bags	11
Dried skimmed Milk	Marvel	12 packets	200	2.4	1 slab	12.79
Jelly	Family Choice	12	142	1.7	1 box	2.69
Totals				428.46 kg		£722.97
				packaging 24kg		freight £500

Addresses:

Sorry , when I down loaded my data base I ended up with all the computer speak as well!

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The Company:

Directors: Simon Currin, Andrew Pollard, Ronnie Robb, Charlie Hornsby, Stu McNeil, Rachel Pollard.

Company Secretary: Hannah Sutter

Share Holders: Roddy Kirkwood

The Everest Medical Expedition became a charity in 1992 by making a commitment to both medical research and education. Our charitable status meant that we have been able to reclaim some of the tax paid on donations. This amount was not as large as envisaged as we were eventually advised not to attempt to reclaim tax on money paid by the friends and family of individuals in order to secure a place on the Expedition. The degree of "linkage" seems to be uncertain but the conservative consensus was that we would be stretching the meaning of "Gift Aid" too far.

The Companies books are kept at the Pinfold and are audited by qualified accountants and copies of our accounts are lodged with Companies House. They have also been independently scrutinised by one of our grant giving bodies - The Foundation for Sports and Arts. The proportion of our turnover qualifying for VAT was deemed by the VAT Inspector to be below the level for compulsory VAT registration and we have not elected to register.

The Company continues to operate within its charitable remit and has funded the presentation of medical data as well as furthering its educational role by planning further courses. Funds earned in the future will be used in further, similar ventures.

Everest Medical Expedition 1994 is a charitable company registered in Scotland and limited by guarantee. Registered office: 14 Eyre Crescent, Edinburgh EH3 5ET. Company Number 140415 Charitable Number SC 020922

Was it all worth it?

"It was the experience of a lifetime, and I will remember it for my whole lifetime." *John Nathan*

"I can only speak for myself, but it was the experience of a lifetime and at the grand old age of ** I achieved at least, if not more than, I had ever hoped for. This time last year the most I had ever done was walk the dog! She's very fit though! I even climbed Pokalde, but not Island Peak. Group 5 was a magic group. We had lots of fun, fond memories and great friendships. Long may they last." *Ann Morgan*

"Acclimatisation has been much harder at home. I've never liked the rat race, Nepal has shown me all the reasons why. I will never forget the tranquillity and sheer beauty of the Khumbu. The opportunities and experiences gained on the Expedition will be impossible to repeat. Was it worth it? Yes! Worth it for more reasons than I could ever have dreamed of before going." *Christine Smith*

"What an excellent trip! From the perspective of the non-climbers/researchers I thought it all went very smoothly. Flights were on time, weather was perfect, accommodation in Kathmandu was good, Thamserku provided a far better service than I expected (and I have done a lot of trekking in Nepal...), our sirdar and his staff were superb. The research was certainly an added interest and I look forward to reading the results. The reflected glory of being part of a successful Everest climbing party feels good too!" *Mark Howarth*

"Base Camp is a powerful and strangely beautiful place which holds the most memories for me." *Martin Thomas*

"Bloody brilliant - when's the next trip?" *David Newman*

"For me, apart from the wonderful scenery of the Himalayas and the excitement of having taken part in a major expedition, the highlights were the news of the Expedition's successes in reaching the summit. getting all our data and the amazing sense of rapport and dedication that was expressed throughout the Expedition membership. I am very proud to have been part of that." *Angela Fry*

"There were so many aspects to the expedition that it has left a permanent scar that will only be healed by doing something similar again - I can't wait!" *George Wormald*

"A total education!" *Colin Clark*

Other Publications:

"My Brother, Nima and I" by Jill Currin. A children's book based on the diaries of Joe and Dan Currin. The book documents the trek from Lukla to Kala Pattar.

"Headache in the Himalayas" by John Nathan. Based on the diary of John Nathan and his trek to Base Camp and ascent of Pokalde

"Mountain Medicine" a Handbook for GP's by Andrew Pollard and David Murdoch.

"Everest: The Video" a video diary of the Expedition from Winter 1993 to October 1994 by Simon Currin.

"Everest" video by Ann Morgan follows the progress of Group 4 & 5 around the Khumbu

All publications can be ordered from Expedition address: The Pinfold, Hyssington, Montgomery, Powys SY15 6AY Telephone or fax 01588 620614

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British Mount Everest Medical Expedition 1994

Patrons: Lord Hunt, Chris Bonington and Dr Charles Clarke

Mountain and High Altitude Medicine **Plas Y Brenin, Capel Curig, Gwynedd, North Wales**

December 1st-3rd 1995

Dr Andrew J Pollard in association with 1994 British Mount Everest Medical Expedition

PGEA Approved, Course Fee £250

(includes conference facilities, all meals and 2 nights accomodation)

* The above course will be held at the National Mountain Centre (Plas Y Brenin) and will cover recognition and treatment of common medical problems in the wilderness on mountains including a systematic review of physiology at altitude, pathology and management of altitude induced illness; chronic mountain sickness; mountain sports psychology; hypothermia and frostbite; management of musculoskeletal injury in the wilderness; rock climbing injuries; skin problems in mountain wilderness; mountain rescue; expedition planning; medical kits and other travel and other mounatin medicine related issues.

* This course is based on the successful April 1994 course in Mountain and High Altitude Medicine but will include updated information and improvements suggested by the 1994 delegates and, in addition a full report of the research undertaken on the **1994 British Mount Everest Medical Expedition**.

* The course is for General Practitioners, Travel and Sports medicine doctors, physiologists and all interested in altitude, wilderness and travel medicine and is organised in association with the 1994 Everest Medical Expedition.

* The course fee includes accomodation with full board, conference facilities, buffet lunch and the following speakers have been invited: Dr Charles Clarke (London), Dr James Milledge (Middlesex), Dr David Hillebrandt (Devon), Dr John English (Staffordshire), Dr David Collier (London), Prof. Donald Heath (Liverpool), Dr Joe Bradwell (Birmingham), Dr Andrew Knight (Herefordshire), Mr Michael Ward (Sussex), Dr David Murdoch (New Zealand), Dr Andrew Peacock (Glasgow), Mr Richard Villar (Cambridge), Mr Ken Stewart (Stirling), Dr David Williams (Liverpool), Dr Gerald Dubowitz (Oxford), Prof. Lew Hardy (Bangor), Dr Martin Rosenberg (London), Dr Nick Mason (Sheffield), Miss Diana Depla (London), Prof. John West (La Jolla, California), Dr David Webb (Edinburgh), Dr Peter Barry (Leicester), Dr Simon Currin (Powys), Dr Jonathan Pote (Devon), Dr Peter White (Cumbria).

Application by sending the reply slip below to Dr AJ Pollard, 32, Mattock Close, Headington, Oxford OX3 7AH (tel. 01865 62120)

Mountain and High Altitude Medicine

Name.....Occupation.....

Address (Block Capitals).....
.....

Telephone No. (Home).....(Work).....

Mountain Experience: *Fell Walker/Trekker/Rock Climber/Alpiniste/High Altitude Climber. *delete as applicable.

Occupation: General Practitioner/Trainee/Hospital Doctor/Physiologist/Other. *delete as applicable.

I enclose a cheque for the sum of £250 to secure a place on the above course (Cheques payable to 'Everest Medical Expedition 1994 - Charitable Company').

Signature.....Date.....