THE ARMY MOUNTAINEERING ASSOCIATION HIMACHAL PRADESH EXPEDITION 1973

REPORT

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1973

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The Army Mountaineering Association Himachal Pradesh Expedition 1973 took place between April and July 1973 in the Kulu and in the Chamba-Lahaul areas of the Himalayas in Northern India. Because the party was such a large one, the team was split into two Groups. One Group under Major Gerry Owens went to climb Deo Tibba (19,687') and Indrasan (20,410') and five other peaks of similar height in an area some 35 miles south east of Manali. The other Group under Major Jon Fleming crossed over the Rohtang Pass (13,050') and went to climb two peaks some 70 miles, as the crow flies, north west of Manali called Menthosa (21,140') and Baihali Jot (20,602'), as well as two further peaks.

The Expedition was the first of three designed to select men and materials for the Army Mountaineering Association's attempt on Mount Everest during the pre-monsoon period of 1976.

The Expedition was sponsored by The Director of Army Training, Ministry of Defence; the sponsoring Headquarters was Headquarters Scotland (Army). It was, in addition, endorsed by the Joint Services Expeditions Trust and supported by The Royal Geographical Society.

This Report is written in amplification to the Preliminary Report, produced under 1 PARA letter 90/3/4 dated 9th August 1973.

LEADER

Aldershot
May 1974

Walk quietly in any direction

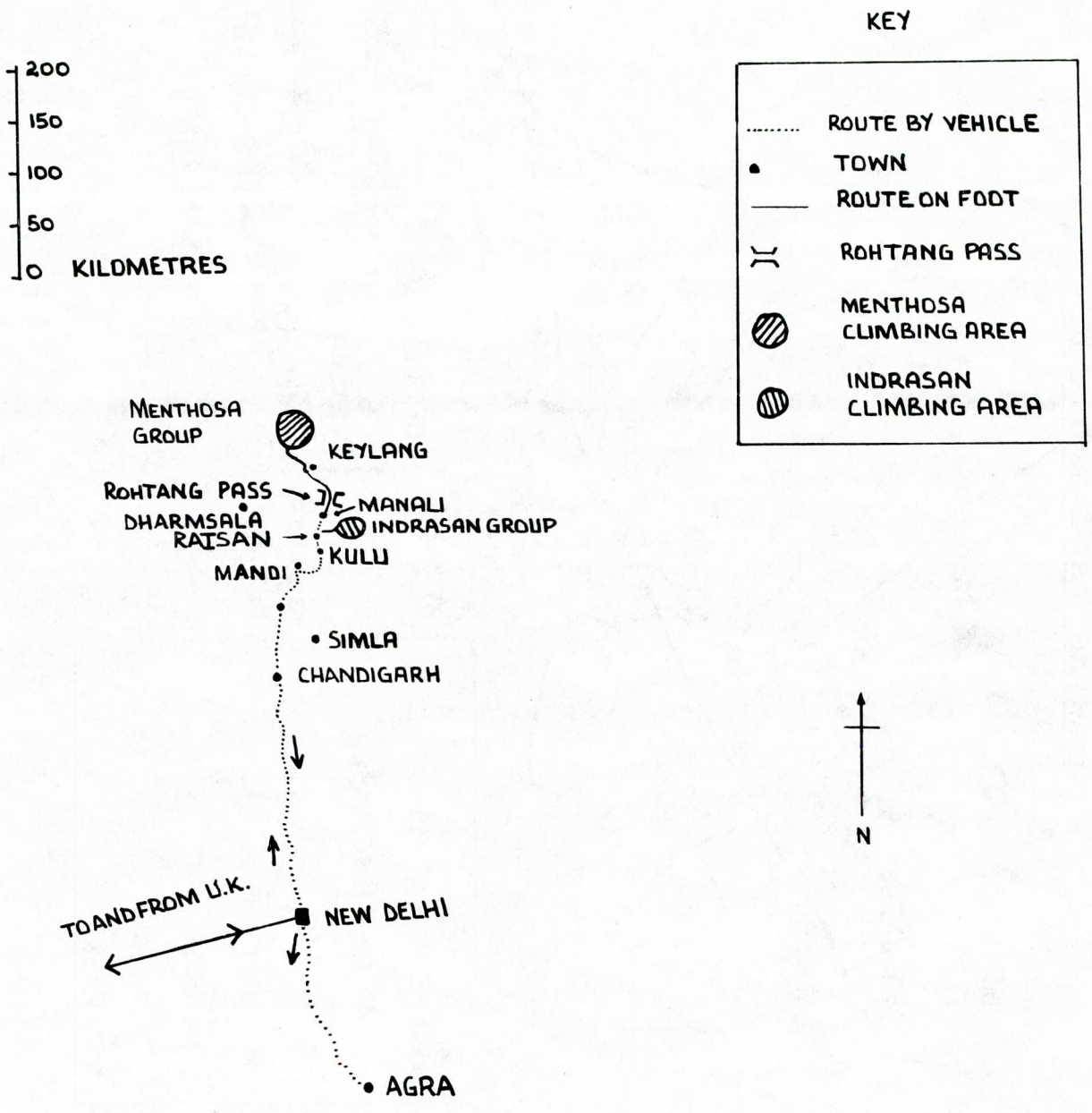
and taste the freedom of the mountaineer.

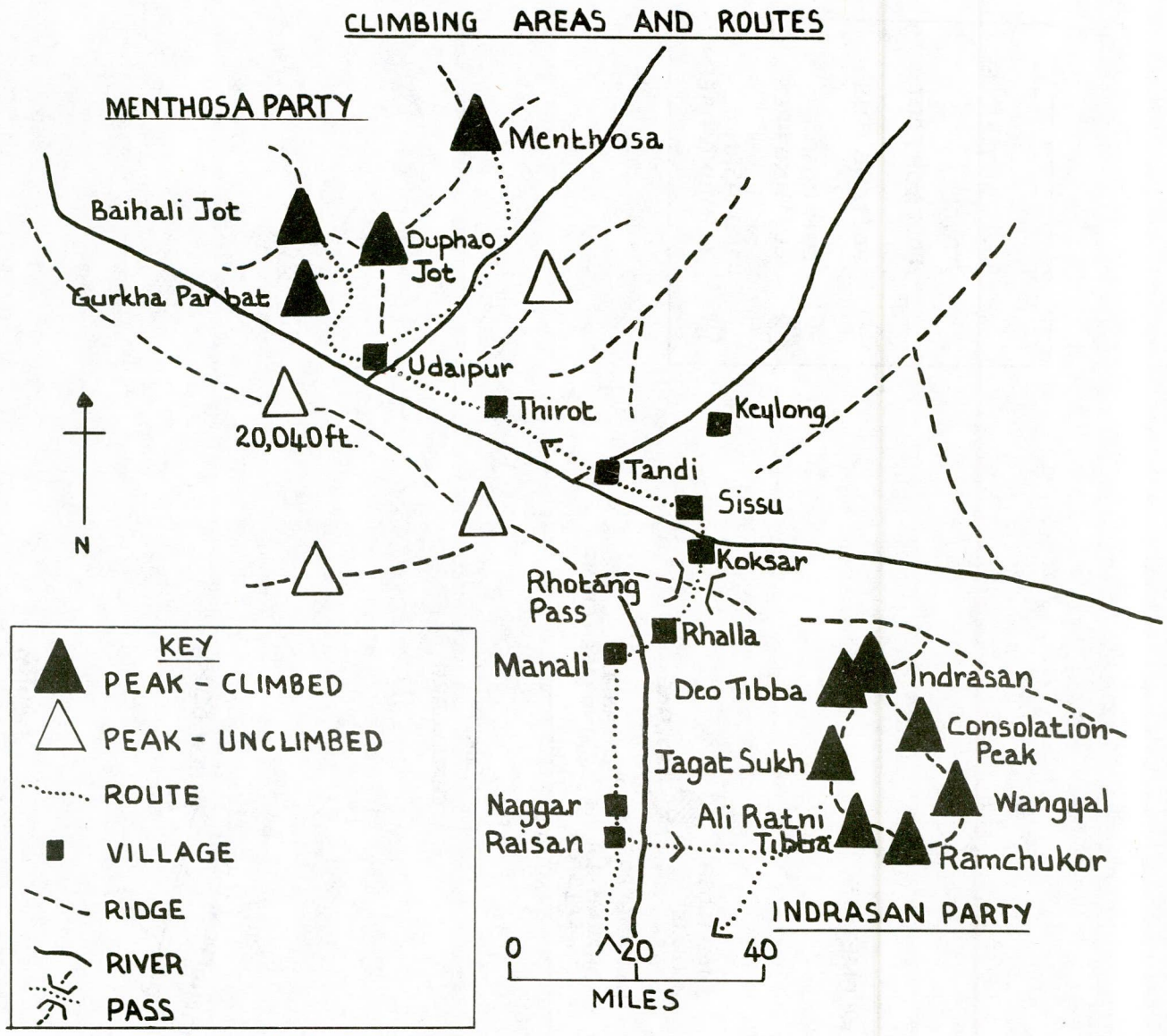
John Muir.

To

All those who helped and
who made the expedition
possible.

JOURNEY FROM NEW DELHI TO KULU




CLIMBING AREAS AND ROUTES
MENTHOSA PARTY
Menthosa
Baihali Jot
Duphao Jot
Gurkha Parbat
Udaipur
Thirot
Keylong
20,040ft.
Tandi
Sissu
Koksar
N
Rhotang Pass
Rhalla
Manali
Deo Tibba
Indrasan
Consolation Peak
Jagat Sukh
Wangyal
Naggar
Raisan
Ali Ratni Tibba
Ramchukor
INDRASAN PARTY
KEY
PEAK - CLIMBED
PEAK - UNCLIMBED
ROUTE
VILLAGE
RIDGE
RIVER
PASS
0
20
40
MILES

EXPEDITION AIMS

The aims of the expedition were:

a. To climb MENTHOSA (21,140'), BAIHALI JOT (20,602'), INDRASAN (20,410') and DEO TIBBA (19,687').

b. To test high altitude clothing, equipment and food for future Himalayan use.

c. To try out and test oxygen equipment for future Himalayan use.

d. To evaluate the acclimitisation potential of the members of the team.

e. To select a team for the Army's attempt on Mount Everest (29,028') during the pre-monsoon period of 1976.

LIST OF PARTICIPANTS

Following a 'paper' selection board and then an interview held in October 1972, the following took part in the expedition:-

Sgt J Anderson. RE	JSMTC Scotland (Deputy Equipment Officer)
Sgt G P Armstrong. RAF	RAF St Athan
Rfn Basantakumar Rai.	7 GR
Flt Lt A K Bhattacharyya.	I AF (LO)
Lt J N G Beckett, RA	32 Lt Regt RA
Capt M G le G Bridges. RE	24 Fd Sqn RE
Lt D A J Brister, Int Corps	OUOTC
Capt MWH Day. RE	RSME (Oxygen)
Surg Lt Comd PN Dilly GM. RNR	HMS President
Lt S. Eskell. RE	38 Engr Regt RE
Maj J W Fleming PARA	1 PARA - Leader
Capt P W Gunson. REME	CVHQ REME
C/Sgt Gyalzen Sherpa	7 GR
Lt Col R H Hardie. RAMC	23 Para Fd Amb (Doctor)
Capt I J Hellberg. RCT	School of Transport (Photography)
Capt M H Kefford	7 GR (Porters)
L/Cpl Khagendrabahadur Limbu	7 GR
L/Cpl M P Lane	22 SAS (Signals)
Capt T J Lynch. PARA	Para Battle School (Equipment Officer)
Maj A J Muston. RAOC	COD Donnington (Rations)
L/Cpl Norbu Sherpa	7 GR
Maj G F Owens. WFR	JSMTC Scotland - Deputy Leader
Capt P B Page. RE	JSMTC Wales (Deputy Equipment Officer)
Rfn Pasang Tamang	7 GR
Lt Col J D C Peacock, REME	RA Range Hebrides (Photography)
Capt O P Sharma	ITBP (LO)
Maj J S K Swanston. RAMC	23 Para Fd Amb (Doctor & Oxygen)
Lt T D Thompson. RM	CTCRM
Capt P R West. RA	17 Dep & Trg Regt RA. (Signals)

The Indian LOs were arranged by the Indian Mountaineering Foundation (IMF). Because the team was visiting 2 different areas 2 LOs were required.

3 Sirdars were engaged at the mounting base in the Kulu Valley. They remained for the duration of the expedition's time in the field.

When the team split up at RAISAN the parties became as follows:

MENTHOSA, BAIHALI JOT Party

Maj J W Fleming PARA - Leader
Lt Col J D C Peacock REME - Deputy Leader
Sgt G P Armstrong RAF
Rfn Basantakumar Rai 7 GR
Flt Lt A K Bhatacharyya - LO
Lt J N G Beckett RA - Photography
Capt M G le G Bridges RE
Lt D A J Brister Int Corps
Surg Lt Comd P N Dilly GM. RNR - Doctor
Capt M H Kefford 7 GR - Porters
L/Cpl Khagendrabahadur Limbu 7 GR
Capt T J Lynch PARA - Equipment
Maj A J Muston RAOC - Rations
Capt P B Page RE - Deputy Equipment
Rfn Pasang Tamang 7 GR
Maj J S K Swanston RAMC - Doctor & Oxygen
Lt T D Thompson RM
Capt P R West RA - Signals

INDRASAN, DEO TIBBA Party

Maj G F Owens WFR - Leader
Capt M W H Day RE - Deputy Leader
Sgt J Anderson RE - Equipment
Lt S Eskell RE
Capt P W Gunson REME
C/Sgt Gyalzen Sherpa 7 GR
Lt Col R H Hardie RAMC - Doctor & Oxygen
Capt I J Hellberg RCT - Photography
L/Cpl M P Lane SAS - Signals
L/Cpl Norbu Sherpa 7 GR
Capt O P Sharma ITBP - LO

EXPEDITION PLANNING

1. Planning began at the end of 1971 when it was proposed that a team should climb in the Buni Zom, Gokka Sar areas of Chitral in West Pakistan. However in October 1972 our formal request to visit this area was refused by the Pakistan authorities.

2. A request was therefore made to the Indian authorities through the British High Commission (BHC) in New Delhi, for us to be allocated peaks of around 22,000 to 23,000' in the Garhwal, Gangotri or Kishtwar areas of the Himalayas.

3. In November 1972 The Indian Mountaineering Foundation (IMF) informed the BHC that if an area in the Kulu and Chamba - Lahul areas of the Himalayas were to be accepted, formal political clearance to climb peaks there would be speedily given. We agreed this proposal.

4. In the event it was not until February 1973 that political approval was given, while the specific peaks were not notified to the BHC by the IMF until March 1973. This was not a disaster in itself, but it did mean that certain aspects of planning, (for example the approach march to the mountains, relevant to the numbers of porters who would be required and for how long, ultimately affecting the budget), could not be carried out satisfactorily until a late stage.

5. The BHC was the most helpful agency during this stage of the expedition. They continued to give us maximum assistance during the time we were in India as well. Our grateful thanks are due to the Defence Adviser, Major General L Scott-Bowden CBE. DSO. MC and his staff for their help so unstintingly given.

6. All expeditions requiring help from the Indians, and particularly those intending to visit restricted areas, (as we did), are very strongly recommended to contact the IMF at an early date. The Secretary is Mr CHAKRAVARTY and his address is The Indian Iron & Steel Co. Ltd., No 3 Parliament St, New Delhi 1.

7. Planning the expedition was made very much easier for me by the knowledge that The Royal Air Force had agreed to fly the team both to and from New Delhi. This was a tremendous bonus, and we are very deeply grateful to Headquarters Air Support Command, to Squadron Leader Tony Smedley and to the crews of both the aircraft concerned for their very real help to us. Without this help it is doubtful whether the expedition would have been a viable proposition.

THE EXPEDITION

8. The team held a Press Conference at The Alpine Club on Monday the 16th April. This resulted in a good press coverage in National Newspapers and on BBC Radio. The Leader appeared on Southern TV in the evening of the same day.

9. Apart from the few, last inevitable hitches, we were ready to go.

England to Raisan

10. The advance party of two (OWENS & ESKELL) left UK on 18th April, arriving in Delhi via Hong Kong & Kathmandu on 23rd April. Their tasks were:

a. To contact Sqn Ldr A Salter-ADA at BHC.

b. Arrange accn in Delhi for the team.

c. Smooth out any likely customs complication before the team's arrival.

d. Liaise with the IMF and the LOs.

e. Travel to Raisan to:-

(1) Liaise with Jimmy Johnson

(2) Arrange porters for the move of both parties into their operational areas.

f. Arrange transport for the move from Delhi to Raisan.

g. Arrange radio licences.

11. The main body of 19 left UK early on the 25th April in a Hercules of 24 Sqn RAF, together with all the expedition stores and food. Travelling by way of Cyprus and Masirah the team arrived in New Delhi in the afternoon to be met by the ADA and OWENS (ESKELL having travelled to Raisan). Accn was arranged for the whole party in the YMCA Hostel, Jai Singh Rd, in the centre of New Delhi. The rooms were comfortable, and most importantly, air conditioned.

12. The 7 GR element of the team arrived in Delhi from Hong Kong, via Kathmandu, on 1 May. Accn was arranged for them in the Red Fort with 11 GR. This struck up a useful liaison resulting in the loan of trucks as well as storage space for the equipment we did not need to take to Kulu.

13. Soon after our arrival in Delhi it became apparent that there were going to be problems with the customs authorities over importing our consumable stores, and with the radio licencing authorities over obtaining a permit to operate our radio sets in the hills. Time was the eventual answer to both these problems but it did take a week of frustrating negotiations to solve the customs problem entirely in our favour.

14. Liaison with Mr CHAKRAVARTY, Secretary of the IMF, retulted in the provision of a permit to cross the Rhotang Pass and the information that regular evening broadcasts of weather forecasts would be provided on A11 India Radio specifically for the expedition under the codename 'TIGER'.

15. While certain members were engaged on the above most of the remainder of the team took this opportunity to visit the Taj Mahal and Fatehpursikri. The members of the BHC Club most generously allowed us to use their swimming pool and bar facilities. Without these amenities life would have been unbearable. We are deeply grateful to the BHC Club for their understanding and help.

16. On the 3rd May we were allowed to take the non-consumable stores out of the Customs compound at Palam Airport. On the 5th May, as a result of the ad hoc exemption order at last being issued, the consumable stores too, were released by the customs. Capt KEFFORD flew up to Chandigarh to arrange the team's accn for that night there, and to arrange transport to Raisan.

17. At 2200 hrs on a sultry 5th May the team left Delhi in a hired bus amid scenes of indescribably chaotic traffic conditions. Speeding through the hot night we reached Chandigarh, a Le Corbusier town, at 0300 on the 6th and slept the rest of the night under the stars in the grounds of the new YMCA building.

18. Because of the late arrival of the trucks which were due to carry out food and stores we did not leave Chandigarh until 1015 hrs the next day. After a hot, dusty, and cramped but spectacular journey via Bilaspur, Mandi, Pandoh and Aut the team arrived at Johnson's Orchards in Raisan at 0100 on 7th May. We slept thankfully under the stars that night.

19. Johnson's Orchards is a 100 acre estate of fruit orchards situated some 30 miles south of Manali and 5 miles north of Kulu. It is owned by Mr Jimmy Johnson an Anglo Indian; whose father served in the Gurkhas with General Bruce of Everest fame. Jimmy befriends most, if not all, British Expeditions who wish to call upon him and allows them to camp in his delightful orchards. His hospitality is overwhelming. Raisan thus became our mounting base, and we are deep in Jimmy's debt for allowing us to use his home as such.

20. On the 8th May the Leader went into Kulu to collect cash for the two teams. Williams & Glyns of London had kindly arranged cheque cashing facilities. This worked very well. The State Bank of India in Kulu was the last bank up the valley where such transactions can be arranged. Less satisfactory was the refusal of the District Commission (DC) in Kulu to accept the IMF letter of authority that we should be allowed over the Rhotang Pass. It was not until early evening that FLEMING returned to Raisan with the necessary permit and the cash.

21. That night, on the eve of the departure of the Indrasan party under the leadership of Major Gerry OWENS we all advanced our watches 2 hours to 7½ hours ahead of GMT. "Expedition time" ensured that best use would be made of daylight hours and that evening cooking would be conducted in the warmth of the sun.

22. Besides the British element our party was completed by the Liaison Officer O P SHARMA, Border Police and two High Altitude porters, Dharam CHAND and MANGYAL.

23. The Indrasan party left Raisan amid excited cries of farewell & best wishes early on the 9th May. Base Camp was to be established in the Malana Nala under the imposing presence of Ali Ratin Tibba. The expedition went by the way of Nagar, over the Chandra Khanni Pass, thence down into the Malana Nala. 63 porters were engaged to carry the stores and equipment, but because not all of them turned up on the day 35 had to return for a second carry up to Base Camp. The Journey was accomplished in four stages. (four days).

24. Base Camp was established at circa 12,500 feet. On the 14th May members of the party carried loads up to the site of Camp I, circa 14,000 feet. Tents, food and equipment were stockpiled at Camp I by members ferrying each day from Base Camp. ANDERSON, DAY, OWENS and WANGYAL occupied Camp I on the 16th May. The remainder continued to ferry stores.

25. Camp II (circa 15,500') was established on 17th May and occupied on 19th May by DAY and OWENS. LANE and NORBU occupied Camp I. An early start was made on the 20th May (0430) by the occupants of Camp II. The way to the site of Camp III was barred by a steep couloir which towered 2,500' above our heads. The snow conditions were atrocious - likened to wading in thigh deep sea water set at an angle of 40 degrees - which caused the party's effort to be terminated at 16,500' - particularly after a powder snow avalanche had occurred. Some fixed rope was placed to assist future load carrying parties.

26. Another early start (0430 hours) was made the next day, 21st May. At the foot of the couloir we noticed that a huge ice avalanche had occurred during the night. Our footsteps, made the previous day, were obliterated and numerous boulders of ice lay scattered around. More fixed rope was placed in sugar snow conditions to a height of 17,500 feet. Meanwhile ANDERSON and LANE moved up to Camp II, and HARDIE, GUNSON and CHAND occupied Camp I.

27. The Couloir was finally scaled on the 22nd May. It was a long and tiring day (nine hours climbing) and for OWENS, certainly, it was a day to remember. Whilst leading the last 300 feet he lost his sunglasses which caused him to suffer the pain of snow blindness later, he was also caught in a powder snow avalanche on his descent. Luckily OWENS had reached the top and placed a 'Dead Man' and was returning attached to the rope by a decendeur. The system held, much to his relief and to that of the belayer, DAY, who was out of harm's way in a recess in the rock. The top 300 feet consisted of deep powdery snow on hard ice. It was necessary to kick through the snow into the ice to secure an adequate foothold. The avalanche cleared the snow away and exposed a steep hard ice slope.

28. CHAND and NORBU SHERPA moved to Camp II on the same day and GYALZEN SHERPA arrived at Base Camp from HONG KONG. DAY and OWENS returned to Base Camp for a rest. ANDERSON, CHAND, LANE and NORBU SHERPA established Camp III, circa 18,000 feet at 150 metres back from the top of the couloir on the 23rd May. It was an eleven hour day for them - a fine effort. The altitude, steepness and loads made them very exhausted. ANDERSON, unable to trust the top 300 foot fixed rope after the previous day's avalanche, had to climb this last section "Scottish" style. They reported that the upper plateau was

covered in deep snow. HARDIE and GUNSON continued to ferry between Camp I and Camp II on the 23rd and 24th May whilst ESKELL, HELLBERG and WANGYAL ferried loads between Base Camp and Camp I.

29. The leading party did sterling work by again carrying loads up the couloir.

30. On the 25th May DAY and OWENS returned to Camp II. GUNSON and HARDIE joined them from Camp I. ANDERSON, LANE and NORBU SHERPA went to Base Camp for a well earned rest. ESKELL and HELLBERG occupied Camp I.

31. CHAND, GUNSON and OWENS continued the carrying up of loads from Camp II to Camp III on the 26th May. Depending on the individual's acclimitization the journey took from 3½ to 4½ hours. DAY and HARDIE climbed JAGATSUKH peak, 17,155 feet on the same day. ESKELL and HELLERG ferried loads between Camp I and Camp II and GYALZEN SHERPA and WANGYAL ferried from Base Camp to Camp I.

32. The aim every day was to finish work by midday because it started snowing without fail at this time and continued until well into the evening. This pattern of weather continued until the end of May.

33. Advance Base Camp (ABC), circa 18,000 feet, was established on 27th May by CHAND and OWENS. This camp lay at the base of INDRASAN. The journey involved a 2½ mile flog across the plateau in knee deep to thigh deep snow. The route was marked by flags because in white out conditions it would be extremely difficult to locate camps. ANDERSON moved up to Camp II. ESKELL, HELLBERG and WANGYAL climbed an unnamed peak, 16,800 feet near Camp I which they called WANGYAL. The remainder ferried loads between respective camps.

34. It snowed more heavily on the 28th May starting at 1030. Thunderstorms occurred in the afternoon and the snow continued until 1900 hours. However, with the advantage of an early start loads were ferried between respective camps and everyone was able to 'batten down' before the snow fell heavily.

35. All was now ready for ABC to be occupied. What was needed was a change in the weather. There was no use in 'festering' at ABC using up precious supplies of fuel and food. So it was decided to 'sit out' the bad weather at Camp II. All camps were adequately stocked and it was a question of waiting for good weather to begin our attempt on INDRASAN, GYALZEN and WANGYAL had also moved up to Camp II, ready to support the attempt on INDRASAN. CHAND and OWENS came down from Camp III early on the 29th May and joined the party of 6 at Camp II in "sitting out" the bad weather. This continued until the 31st May.

36. The party of 8 set forth on 1st June. It was probably the most strenuous day of the expedition. The new deep lying snow proved very exhausting. Originally the start was to have been at 0430 hours but the sky was overcast and lightning flashed to the North.- so it was delayed. The bad weather clouds began to clear at 0600 hours so a start was made. The fixed ropes were hidden under the snow and were very difficult to pull out. The snow was thigh deep everywhere. It took an hour longer to reach Camp III. After a short rest the party moved on across the plateau to ABC. The sun was scorching hot and the snow very soft. All were exhausted on arrival at the destination. The plan was for ANDERSON, DAY, GUNSON and HARDIE to occupy ABC and to find a new route on the EAST ridge of

INDRASAN. Although the Indrasan/Deo Tibba region is a popular climbing area and many expeditions visit it, INDRASAN had been climbed only three times before - once by a British party on the WEST ridge and twice by Japanese parties on the SOUTH Face.

Indrasan from the South taken from Camp III
The East Ridge Route is up the right hand side of the Mountain

37. INDRASAN is an unusual mountain in that there is no easy way to its summit. The EAST ridge from Advance Base looked very impressive and we reckoned that it would provide a searching challenge. CHAND and OWENS were to continue supplying Advance Base based from Camp III. GYALZEN and WANGYAL were to carry on ferrying loads from Camp II up the couloir to Camp III.

38. On the next day ANDERSON and DAY scaled a steep rock wall of 650 feet to reach a col on the ridge. GUNSON and HARDIE supported them carrying equipment and fixed rope. The return to Advance Base was speeded up by abseiling down the fixed rope.

39. On the 3rd June the same party returned to the col and started on a buttress which was the next obstacle to progress. This rose steeply for 900 feet. Ledges and cracks were filled with ice and snow. DAY and GUNSON negotiated some VS pitches whilst ANDERSON and HARDIE placed fixed rope. ESKELL came from Camp II to aid further efforts, having previously moved up from Camp I to Camp II the day before. Meanwhile GYALZEN, HELLBERG, LANE and WANGYAL did sterling work lifting loads from Camp II to Camp III. OWENS moved across from Camp III to Advance Base so as to keep in closer touch with efforts on the ridge.

40. On the 4th June, ANDERSON and OWENS continued probing for a way round the buttress as a direct ascent provided too many problems. They traversed across an unstable snow and ice gully for 60 feet and then abseiled down an overhanging section for 60 feet to a snow coloir. This was a good piece of route finding by ANDERSON. The couloir ANDERSON and

OWEN'S had abseiled into was impressively steep and it fell away for 3,000 feet to a glacier below. They climbed up the couloir on rotten snow and ice for a further 150 feet before calling a halt to the proceedings, having established that there was a way to the summit.

41. On the 5th June DAY, GUNSON and HARDIE set off for an attempt on the summit. Meanwhile ANDERSON, ESKELL and OWENS climbed DEO TIBBA, 19,687 feet from the North. CHAND and LANE traversed DEO TIBBA from South to North and returned to Camp III.

42. In the afternoon the figures of the Indrasan party were seen on the col of the East ridge. Unfortunately HARDIE sustained a deep gash on the left cheek from falling rock so they had to return as he was not in a fit state to continue. They did however progress further up the couloir. GUNSON scaled an impressive rock buttress and placed some fixed rope. A bivouac tent, cooking equipment, and food were left at the highest point reached.

43. The next day ANDERSON, ESKELL and OWENS set off for an attempt on the summit of INDRASAN. The weather was good but a late start (1000 hours) was agreed upon. The couloir on the other side of the ridge was in very soft condition until midday but once it was in the shadow it quickly froze.

44. Arriving at the previous highest point reached, ANDERSON led out for 300 feet up a steeply curving snow slope. The difficulties were such that he spent three hours on this section. The day was rapidly drawing in so it was a relief that ANDERSON espied a small platform on the ridge which was large enough to pitch a bivouac tent. This literally was the only place in the vicinity where it was possible to pitch a tent. A very tired and weary party pitched camp at 1900 hours and 'brewed up'.

45. The party set off the next day, 7th June at 0600 hours up the crest of the ridge and reached the summit at 0910 hours. The difficulties were of Alpine 'difficile' standard. The route followed over a short rock gully along a corniced ridge, across a crevassed section to a bergschrund which barred the way to the summit slope. The summit slope consisted of a layer of snow on hard ice so the party did not move together on this section but climbed it pitch by pitch.

46. That same day, DAY and HARDIE climbed DEO TIBBA from the North and skied down (It was rumoured that HARDIE slid down on his backside!). GUNSON traversed the mountain from North to South and GYALZEN SHERPA and HELLBERG traversed it from South to North. They all had a grandstand view of the successful attempt on Indrasan.

47. DAY, GUNSON and HARDIE repeated the new route on Indrasan on the 9th.

48. On the 12th June NORBU SHERPA and CHAND climbed DEO TIBBA from Camp III. On the same day GUNSON, HELLBERG and LANE set off to try their hand on ALI RATNA TIBBA 18,013 feet. Bad weather prevented them from climbing to the top on the 13th but they succeeded on 14th June. They repeated Moss's Route on the South Face. It was the fourth ascent at that time of the mountain.

49. On the 16th June CHAND and DAY climbed CONSOLATION PEAK 16,800 feet and on the 18th June DAY and HARDIE climbed RAMCHUKOR 17,200 feet.

50. The expedition left Base Camp on the 20th June and returned to Raison, Kulu Valley by way of Malana village and Bhuntar Town arriving at Johnson's Orchards on the 23rd June.

Deo Tibba taken from Camp III

The MENTHOSA Party - By MAJOR J W FLEMING. PARA
(All times "EXPEDITION TIME")

51. The 19 of us, including BATTU our LO, left Raisan in 2 vehicles early on 10th May. Being early in the year the road over the Rhotang Pass was still blocked by snow and landslides. Following a Border Post check at Vashisht and numerous halts to throw water over the boiling radiators of the vehicles we arrived at Rhalla Falls (8,000 ft) early in the afternoon. The vehicles were unloaded and camp was erected. It then rained hard for the rest of the day!

52. Very early the next morning porters began assembling to carry loads over the Pass. By 0945 we had 109 porters who had started off for Koksar some 8½ hours away. It was a long flog and for many of the team was their first test of altitude. The lesson of not forcing the pace was well learned on this stage. By 1900 everyone had arrived at the Rest House in Koksar (10,000') some suffering from the affects of altitude, - all tired.

53. Rumours that there were buses plying back and forth and that mule trains abounded in the Chandra Valley proved to be manifestly untrue. Instead we were left with 16 faithful porters, 2 tons of stores and 45 miles to go to Base Camp - Udaipur (8,230'). The other porters fled back over the Rhotang not deigning to carry loads for even Rs 40 a day (Rs 18.50 = £1).

54. Back packing these loads across the Chandra river by a dubious, rickety 'bridge' it was all hands to the pump to start ferrying stores to Sissu, a small village 9 miles down the

valley. On the 3rd day we were relieved to receive 48 mules, each capable of carrying 170 lbs, obtained by our sirdar (RIKSING) whom I had sent on ahead for this purpose.

55. Progress now became much faster. The road was blocked in lots of places by avalanches, landslides and turbulent rivers - hence no transport of any kind. The scenery was most spectacular. By the evening of 17th May Base Camp on the football field in Udaipur had at last been established.

56. Leaving a day to recover and sort ourselves out for the mountains, the team set off for Menthosa (21,140') accompanied by 53 porters up the Miyar Nallah on May 19th. This was a magnificent steep sided gorge with the river tumbling noisily through it. The path was not even mule-able and clung at an alarming angle to the left hand side of the gorge, often overhanging.

57. On the 21st May, 3 days out of Udaipur and nearly a month out of UK we established Advance Base Camp up the Urgus Nallah, well above the snow line at 14,200'. Here the porters struck for more money so we dismissed them.

58. Wasting no time FLEMING, BASANTAKUMAR, KHAGENDRA, PASANG, DILLY and ARMSTRONG moved up the next day to Urgus Col at 16,500' to establish Camp I, the last two named remaining there to carry out a recce of the route to Camp II on the next day. The rest of the team sorted out porter loads destined for the higher camps.

59. Menthosa is a fine looking peak, rather like a piece of Christmas cake with the perpendicular, 5,000' south face forming the cake and the thick covering of snow forming the icing. We had decided to climb it by the east face, although a route by the south east buttress would 'go' had there been the time. It had been climbed only twice before - the first time in 1970 by a Royal Marine party.

The team at Advance Base Camp.
Menthosa in the background

Camp II (18,350) on Menthosa.
The summit is on the left of the high plateau.

60. The back breaking, soul destroying work of load carrying up to the higher camps now began. The secret of acclimatisation is "carry high: sleep low". Thus by the time the storm hit us Camp II, (18,350'), was occupied by DILLY, ARMSTRONG, THOMPSON and KHAGENDRA and Camp I by everyone less KEFFORD who, suffering mildly from altitude sickness, was at ABC. A party of 19 on one mountain requires a lot of logistic support and in order to get this to the high camps fixed ropes had to be positioned along a steep, exposed traverse, ably led by DILLY, and then up 700' of steep, deep, avalanche prone snow to Camp II.

61. From 28-31 May (bdi) the mountain was storm bound. The wind howled round the camps; the temperature dropped to - 26° and 3 feet of snow settled on the ground and on the fixed ropes which were later released with difficulty by FLEMING, BRIDGES and BRISTER. On 31st May the weather cleared sufficiently to allow SWANSTON to unfold the mysteries of the three types of oxygen apparatus to those of the team who were at Camp I, now joined by KEFFORD.

62. On the 2nd June DILLY, ARMSTRONG, THOMPSON and KHAGENDRA completed their recce to Camp III (20,300'). The final part of the route lay along the most magnificently exposed snow knife edge ridge with a drop of 5,000' on the left and of 2,000' on the right. On this day more loads continued to be taken up to Camp II while FLEMING and SWANSTON moved up to occupy it.

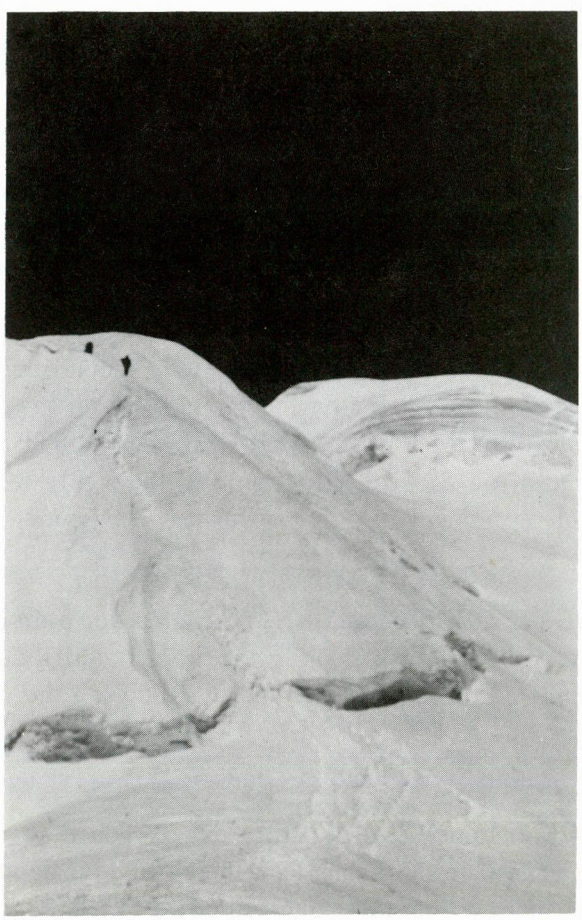
63. The plan provided for each group of 4 to occupy Camp II, carry out oxygen tests under the aegis of SWANSTON the following day, climb to the summit on the third day, occupying Camp III that night, and on the final day withdraw from the mountain down to ABC. The

necessary control for this programme was maintained by the Leader by means of the Clansman PRC 350 and Pye Bantams, situated at ABC, Camp II and Camp III. Ideally more time should have been spent in Camp III, in order to be aware of what conditions on Mount Everest are likely to be, but lack of time precluded this.

64. On the 3rd June Camp III was established by FLEMING, SWANSTON, MUSTON, BATTU, DILLY, ARMSTRONG, THOMPSON and KHAGENDRA: the latter 4 remaining there; the first 4 named acting as load carriers, who then returned to Camp II.

65. Taking advantage of the perfect weather the first summit group left Camp III just as the 4 of us were pulling, rather breathlessly, into Camp II. They moved as four slow dots across our front but 2,500 feet above us. After an hour they were out of sight. Twenty minutes later a lone speck appeared on the left hand pinnacle. Was this the top; or were we in for a shock? Ten minutes later the cloud, which had been boiling up from the north all afternoon, tantalisingly obscured any further view of progress. It was not until the 1900 hrs radio check that we learnt that the peak had been climbed and that the summit party were safely down and in Camp III. Excitedly, against our own summit bid, it was drams all round by courtesy of Bells Ltd and SWANSTON (who carried it!).

66. This was the 3rd ascent of the mountain. The successful party came down on the 4th June and after suitable halts at Camps II and I, to take refreshment, went down to an ABC - now completely unrecognisable so well had the sun done his work. A largish river flowed through where the tents had once been. Flowers and greenery grew in coloured profusion.



Left. On the ridge to Camp III. Menthosa Summit Plateau on the right.

(Photograph by P N DILLY)

Right. Muston (left); Swanston (Right) on Menthosa Summit

67. Following the plan outlined above the 4th ascent of Menthosa was made on 5th June by FLEMING, SWANSTON, PAGE, MUSTON, BRISTER and BECKETT; the 5th ascent on the 7th June by KEFFORD, BASANT, PASANG, BATTU, SWANSTON and FLEMING; the 6th ascent on the 9th June by PEACOCK, LYNCH, WEST and BRIDGES. All ascents were made in perfect weather. The view from the top, which dominated the whole area, was fantastic. A profusion of peaks, almost all of them unclimbed, ranging as far as the eye could see. The mountainscape was scored by the lines of deep, dark gorges formed by the Miyar Mallah, the Chandra river and a host of smaller valleys. An unforgettable moment.

68. The withdrawal off the mountain bringing down all the equipment, camps and fixed ropes was affected efficiently and nearly without injury. Unfortunately BATTU slipped and fractured his ankle at ABC. Notwithstanding this, this plucky, fit and thoroughly popular Officer walked all the way out, the 3 days, to Udaipur our Base Camp. He must have borne excruciating pain; he never, to my knowledge, complained once.

69. By the evening of the 14th June the team was camped in the grounds of The Forestry Officer's house in Udaipur, having engaged 34 porters to carry our loads off Menthosa.

70. The next day while the team was resting, washing and sorting out kit for Baihali Jot, the sirdar, RIKSING and 27 porters took loads to the village of Arat up the Ur Gad Nallah, our approach route for that mountain.

71. On the 16th June, having 'shuffled round' in the groups we, less BATTU, set off for Baihali Jot accompanied by 26 porters with whom we were now on the most friendly terms, fostered mainly by the efficient and cheerful way KEFFORD, BATTU and the Gurkhas organised them and their loads every morning. 3 days and one strike later (!) the team arrived at ABC 14,100', just underneath the most chaotic 2,500', noisy icefall. The porters were paid off and asked to return on the 26th June.

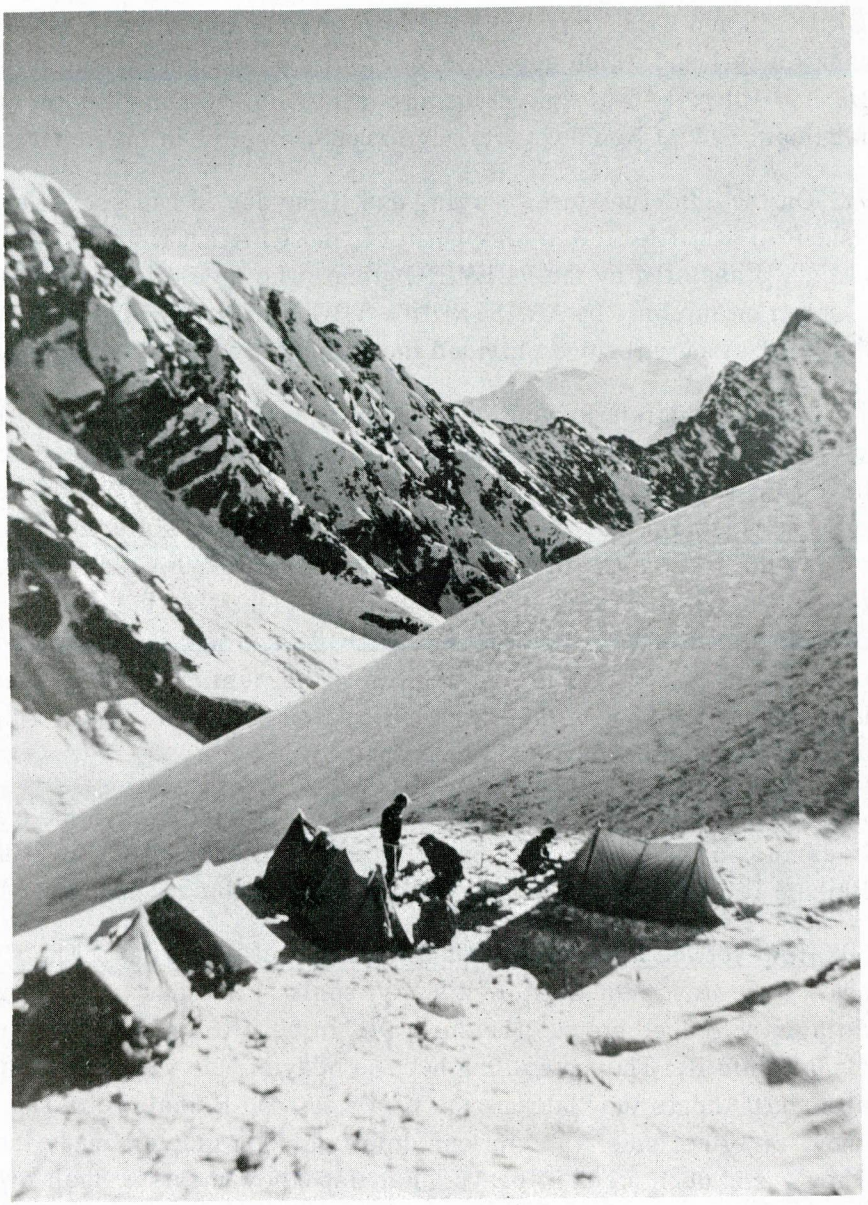
Advance base camp on Baihali Jot, showing the huge chaotic icefall. The summit of the mountain is on the left of the snow ridge. *(photograph A J Muston).*

72. With only a week to go and two peaks to climb (we had decided to go for Duphao Jot - 20,011', as well) we had to move fast.

73. Accordingly Camp I on Duphao Jot, put at 17,400' was established on a knife edge ridge by MUSTON, ARMSTRONG, THOMPSON, DILLY, PAGE and BRISTER with the last three acting as load carriers and returning to ABC. On the same day, 19th June, the Baihali Jot (20,602') party comprising PEACOCK, LYNCH, WEST, BRIDGES, FLEMING, PASANG, SWANSTON, KEFFORD, BASANT and KHAGENDRA - the last 6 being load carriers taking up the camp, food and personal kit for the first four - moved up through the left hand side of the icefall. After a short vertical ice pitch (fixed roped) and the salutary experience of seeing a huge serac disintegrate with no warning at all, progress became blocked by an enormous, unbridgeable crevasse stretching the whole width of the icefall. This effectively barred any access to the glacier beyond. The 'porters' withdrew, because it was by this time time late, leaving the 'van party' to recce a route round this obstacle by taking to the rock on the left.

74. The next day saw the Duphao Jot party make their summit bid. It was a long way and the snow conditions appeared to us, peering through binoculars at ABC, to be very variable. They were still moving very well when cloud obliterated them from view. So we turned our gaze to the 'van party' on Baihali Jot, in the icefall, who by midday had recced a route to Camp I (16,700') via a rock gully. By evening they had successfully established the camp.

Right: Camp I on Baihali Jot (16,700') Menthosa in the middle of the picture in the distance with the flank of Duphao Jot on the left.



They had beaten the icefall and sounded in high spirits over the radio that night. LYNCH had a narrow escape when he fell into a crevasse. Because of his load it took an hour to get him out. BECKETT and KEFFORD had to return to Udaipur both suffering from chest infections. The Duphao Jot summit party had, however, been temporarily defeated by bad weather, which by the evening had reached ABC with a vengeance.

75. After drying out their wet kit in the morning sunshine FLEMING, SWANSTON, BASANT, PASANG, KHAGENDRA and RIKSING moved up to Camp 1 taking food and loads. They returned to ABC that night in ghastly weather. BRISTER changed places with MUSTON on Duphao Jot.

76. Again on the 22nd June (SWANSTON's birthday so he got breakfast!) we dried out our kit and the FLEMING group then moved up to occupy Camp 1. The PEACOCK group ('van party') had split up on this day. PEACOCK and LYNCH recced an unpleasant looking ice fall so as to gain access onto the main peak of Baihali Jot. No feasible route was found.

BRIDGES and WEST recced up the main glacier moving west up to a col some 1,500' higher than Camp 1 and which appeared to afford a good, though long, route to Baihali Jot. The Duphao Jot party 'sat tight' waiting for the snow to consolidate. That night we saw the most fabulous view of Menthosa, its huge ramparts aglow in the setting sun.

77. On the 23rd June after a trying and tiring day in bad snow conditions and involving the ascent of a brittle, rotten rock buttress, the PEACOCK group was established at Camp II (18,500') assisted by the FLEMING group, who then returned to Camp I. Duphao Jot was climbed on this day by ARMSTRONG, THOMPSON and BRISTER, who left their Camp I very early. The summit ridge provided them with a most interesting snow and rock climb.

78. It is appropriate to mention at this stage that in 1969 an Indo-British Expedition had visited this area. It was led by Major H V BAHUGUNA. One of the peaks they reckon to have climbed was Baihali Jot. The further we progressed up our route the clearer it became that the mountain they had climbed as Baihali Jot was not the same mountain that we were aiming for as Baihali Jot. We had a copy of the 1970 Alpine Journal (Vol 75 No 319, pp 39 to 47) and could identify 'their' Baihali Jot clearly on the ground. As we breasted the top of Pegasus Col (the col recced by BRIDGES and WEST on the 22nd) a large prominent rock peak reared up at us some 2 to 3 miles to the west. Was this Baihali Jot? Or was it the unnamed peak 20,650', which was not marked on our inaccurate map but which is marked on another one which I have obtained since?

79. Nearly a year later the mystery has been solved through the medium of photographs and in discussions with the 1969 party. It is now clear that we made the first ascent of Baihali Jot and that the prominent rock peak of 20,650' has never been climbed.

80. However the 24th June dawned - our last climbing day. The PEACOCK Group were away early from their Camp in a sharp, sunlit, crisp dawn. The route lay along an exhilarating razor-edged arete. The snow was in beautiful condition as their crampon points dug cleanly into it. Their breathing became heavier; the way steeper and more exposed. At about 1100 hours they became the first men atop Baihali Jot. The summit was a point of snow, on either side a precipitous drop to hidden glaciers many thousands of feet below. They gazed upon a sea of peaks. Far, far below they saw their own route threading its way through serac and crevasse. Reluctantly they turned and descended to their Camp, which they struck before proceeding to Camp I.

81. While Baihali Jot was receiving this attention FLEMING, SWANSTON, PASANG, BASANT, KHAGENDRA and RIKSING climbed up to Pegasus Col and continued climbing steeply along a fascinating, exposed, knife edge ridge, complicated by the presence of hidden crevasses, on another virgin peak. Before long Camp II on Baihali Jot was below us. Soon the clouds rolled in and at 1320 - 2 hours after leaving Pegasus Col - the party was standing on a huge, overhanging cornice which made up the summit. I have reason to believe that this peak, is higher than the 18,667' suggested. The name of GURKHA PARBAT has been put forward for approval by the Indian Authorities for the peak, as a tribute to those cheerful soldiers who were on the first ascent of it.

82. On the 25th June Camp I on Baihali Jot was struck and we moved down to ABC. On the way down, in the icefall, one third of a huge ice tower - we called it Ronan Point - suddenly collapsed. BRIDGES and WEST were at that moment underneath it negotiating a very tricky part of the route. Fortunately most of the debris fell into a crevasse and apart from giving us all a heart attack no one was harmed. The rest of the journey was uneventful and by the evening of the 27th June the team was back at Base in Udaipur.

83. The next day we packed up for the journey out. That evening a goat was roasted/ curried by way of celebration. KEFFORD with GYALZEN and NORBU arrived in the middle of this and passed on the good news that the return journey should be both easier and quicker than the outward one.

84. Engaging 20 mules, now in plentiful supply, the stores were sent direct to Manali, arriving there on the 3rd July. The team walked to the bus-head at Thirot on the 29th June spending the night in the Rest House there. On the way some visited Triloknath Temple, the scene of many a famous pilgrimage. From Triloknath bridge all the mountains up the Ur Gad Nallah were clearly visible.

85. From Thirot a bus was hired to Koksar. The journey took only 4½ hours, instead of the 5 days it had taken before. The scenery was superb; it began to get hotter.

86. The next day, because the Rhotang was still closed to all vehicles less jeeps, we walked over it, and were met on the top by HARDIE with a vehicle which had been arranged by TARA, Jimmy's Orchard Manager.

87. By 1530 hours we were all back in Raisan, a reunited expedition once again.

88. Watches were put back to IST.

Raisan to England

89. It was now known that an RAF Hercules from 36 Sqn RAF was due to leave Delhi, taking the expedition and stores, on the 14th July. We, therefore, thought it safe to be in Delhi by the 10th. While the stores were being cleaned up and thoroughly checked in Raisan those who wished went their own ways. FLEMING and PEACOCK left on the 4th July for Kathmandu to discuss Everest 1976; OWENS and ANDERSON went to Delhi on the 5th to arrange customs formalities, accommodation for the team's arrival there and to make plans for a party we wished to give to all those who had helped us so much; MUSTON, BRIDGES and BRISTER went sightseeing to Jaipur and Udaipur; KEFFORD and the Ghurkas went to Dharamsala to seek an audience with the Dalai Lama. They were successful in their quest.

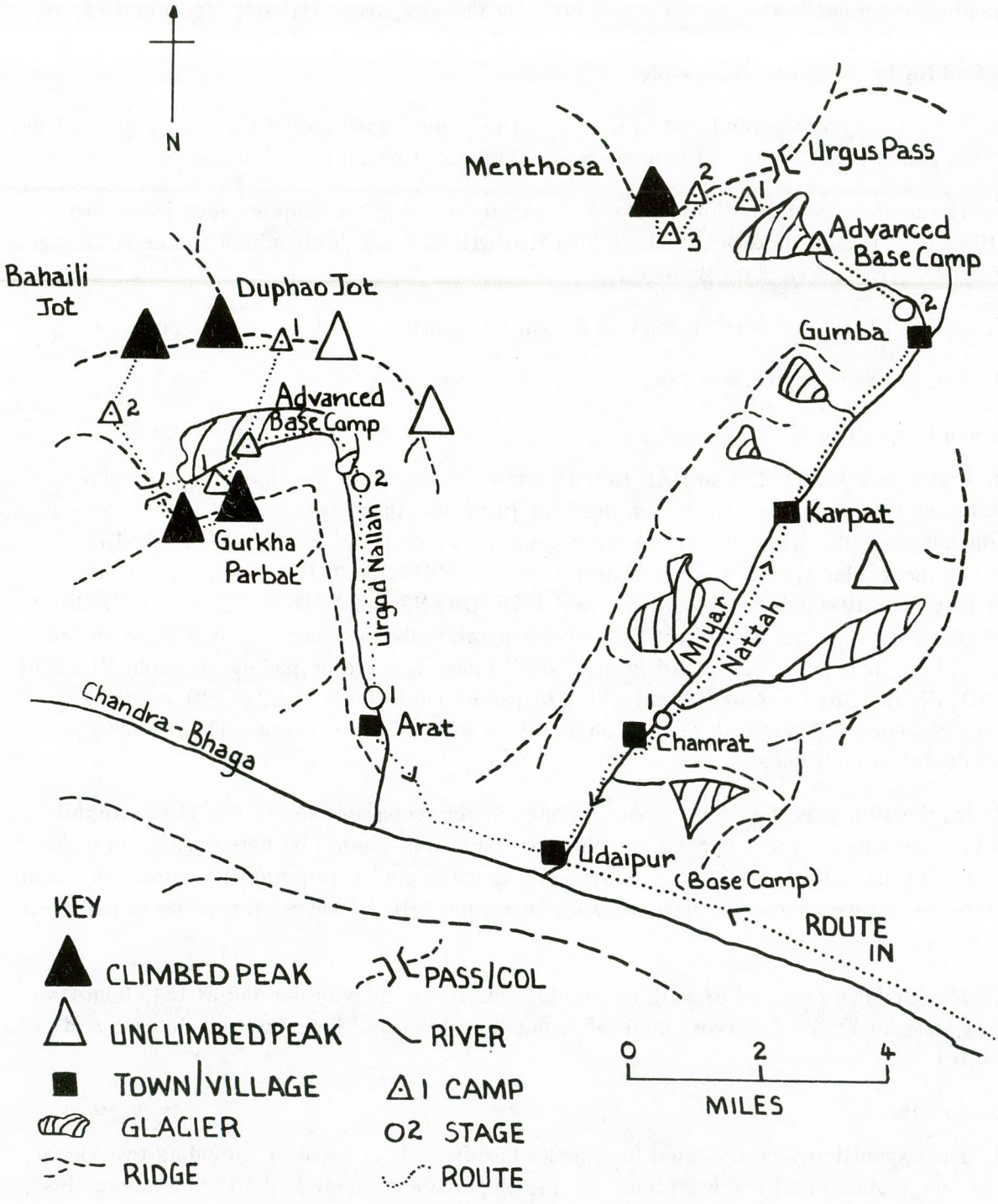
90. On the 10th July the whole team was once again accommodated in the YMCA Hostel; last minute shopping was carried out; the Taj Mahal was visited by those unable to do so before and the BHC facilities of the bar and swimming pool very gratefully used. The night before we left we gave a cocktail party for which the BHC Members allowed us to use their premises.

91. The customs provided us with no problems at all on the way out and at 1545 hours we left Palam for England arriving there 35 minutes early on the 16th July via Masirah and Akrotiri.

Conclusion

92. The expedition was allocated four peaks to climb. It climbed 11 including two virgin ones and another one by a new route. In this Report we suggest to the Indian authorities that the 19,500 foot peak to the south and east of Pegasus Col be called Gurkha Parbat - Major General the Brigade of Gurkhas, Major General E J S BURNETT, DSO, OBE, MC has already given his approval for this. I believe that all the aims of the expedition have been achieved and that the Army Mountaineering Association is now well on the way to selecting a competent, well equipped team to climb Mount Everest in the Spring of 1976.

MENTHOSA PARTY



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RATION REPORT

by

Major A J Muston, RAOC

1. INTRODUCTION

The purpose of this report is twofold:

a. to report on the rations used during the expedition and

b. to suggest the rations that should be used for the 1975 and 1976 expeditions.

2. GENERAL

The following rations were taken to India for use by the expedition:

a. 756 rations of 4-man compo

b. a bulk supplement

c. certain items for trial purposes

d. 1280 high altitude rations

3. 4-MAN COMPO

This ration is known to be under constant review by MOD and it is not intended to comment in detail. The general impression is that this ration is well liked and within the bounds of tinned food is probably as good as one can get. The introduction of coffee to the ration was especially welcome. The only suggestions made by members of the expedition are that the loose tea should be replaced by tea-bags and that the quantity of sugar should be increased.

4. THE BULK SUPPLEMENT

A bulk supplement of the following items was provided:

96 lbs Lemon and Orange Powder

68 lbs Canned Vegetables (tomatoes and green beans)

75 lbs Canned Potatoes

14 lbs Sauce

25 lbs Milk Powder

6 lbs Curry Powder

1 lb Pepper

1 lb Mustard

380 packets of Cereals (individual packets)

2160 packets Tissues

35 lbs Pre-cooked Rice

Briefly the comments on these items are:

a. the Lemon and Orange Powder could have been reduced to 60 lbs.

b. potatoes were available locally so the tinned ones need not have been taken.

c. considerably more sauce would have been welcome and it should be packed in plastic containers to avoid breakage. Some pickle would also have proved very acceptable. It is suggested that the quantity of sauce and pickles should be doubled for the future.

d. for the amount of cereals provided the milk powder was more than adequate.

e. the expedition could easily have used twice the quantity of cereals.

f. half the quantity of tissues would have been adequate.

g. where an expedition contains a high proportion of Ghurkas as this one did more rice is required. 100 lbs would not have been excessive.

5. TRIALS ITEMS

The expedition was asked to try certain items and to comment on them. This was done and the results are below.

a. Freeze-dried Vegetables Peas and French Beans provided by Heinz Erin were the subject of the trial. They were tried by all members of the expedition under varying conditions up to camps at about 18000 ft. The universal comment was that they were good and the peas an improvement on those in the high altitude ration. The flavour was considered satisfactory and the ease of preparation very welcome when cooking under difficult conditions. The only slight disadvantage is that weight for weight the freeze dried vegetables are a little more bulky but this would appear to be a small price to pay for their greater palatability and ease of cooking.

b. Packet Sauces 4 different flavours of dried sauces were provided for trial. The flavours were tomato, curry, demi-glace and bechemel. Opinion was mixed on the value of these sauces. The demi-glace and bechemel, being a fairly bland taste, found little favour. The tomato and curry sauces were generally added to the meat part of the high altitude ration and this did provide some variation to the flavour but no-one went into rhapsodies of delight over the sauces and if they had been suddenly removed in mid-expedition it is doubtful if anyone would have commented on their absence. If any further trials are contemplated it is suggested that they should be concentrated on the tomato and curry sauces only.

c. Rum Butter Candy This was tried as an alternative to the traditional Kendal Mint Cake. Two-thirds of the expedition liked it. Just over half preferred it to Kendal Mint Cake. Half would like to see it in future expedition rations and in military rations. Only one person would prefer to have it rather than a Mars bar or chocolate.

d. Hot Climate Butter One case of this was provided and proved to be very popular with those members of the expedition who disliked margarine. Some tins, for this reason were taken quite high on the mountain although it was originally expected that it would only be used in base camps. Most of the expedition were quite happy with the margarine provided in the high altitude ration but there was a small and vociferous minority who clearly disliked it. It is suggested that consideration should be given to putting butter in ration packs in place of the margarine.

6. HIGH ALTITUDE RATION

To assist in evaluating this ration a questionnaire was produced and a copy of this is at Appendix 1. Some of the comments that follow are as much criticism of the expedition as of

the rations provided in that they got what they requested. As an example honey was asked for, and provided, in all four menus. From hindsight it is clear that a variation of jam or syrup would have been welcome. The voting of the comment sheets completed by expedition members is summarized in the table below. 27 questionnaires were completed, one for each member of the expedition excluding the Indian liaison officers. A breakdown of the ration is at Appendix 2.

ITEM	Too Much	Too Little	About Right	GRADING 5	4	3	2	1
Chocolate Drink Mix	10	0	17	8	9	9	1	0
Oats/Sugar/Milk Mix	6	2	19	6	15	2	2	2
Oatmeal Block	1	3	23	13	10	3	1	0
Alpen	3	11	13	12	8	1	5	1
Service Biscuits	8	1	18	2	13	11	0	1
Beef Spread	10	1	16	3	6	7	10	1
Chicken & Ham Spread	12	1	14	2	5	5	12	3
Chicken Spread	11	1	15	3	5	6	11	2
Cheese	0	11	16	17	7	2	1	0
Dextrasol Orange	9	0	18	5	14	5	1	2
Chocolate	9	1	17	9	14	3	1	0
Confectionery Bar	0	2	25	14	10	2	1	0
Nuts and Raisins	1	1	25	10	8	8	1	0
Margarine	4	2	21	3	11	8	4	1
Honey	8	1	18	9	9	7	1	1
Oxtail Soup	14	0	13	5	11	7	4	0
Mock Turtle Soup	14	0	13	2	12	9	4	0
Onion Soup	17	0	10	1	7	7	8	4
Beef Granules	5	4	18	7	10	6	3	1
Curry Granules	2	3	22	2	13	7	3	2
Mutton Granules	0	3	24	3	14	5	4	1
Chicken Supreme Gran	8	1	18	2	5	7	7	6
Potato Mash Powder	0	19	8	5	17	4	1	0
Pre-cooked Rice	12	2	13	6	11	8	1	1
Dehydrated Mixed Veg	7	1	19	0	5	9	8	5
Dehydrated Carrots	10	1	16	0	1	1	8	17
Dehydrated Peas	1	5	21	3	11	8	4	1
Apple Flakes	8	2	17	7	9	6	3	2
Apple & Bilberry Flakes	7	2	18	7	10	4	4	2
Coffee	10	0	17	7	12	5	1	2
Instant Tea	4	4	19	0	11	6	4	6
Bovril Granules	3	6	18	12	8	4	1	2
Sugar	1	8	18	21	5	1	0	0
Condensed Milk	2	3	22	19	6	2	0	0
Lemonade Powder	12	0	15	6	15	4	1	1
Orangeade Powder	10	0	17	5	17	3	1	1
Salt	0	11	16	-	-	-	-	-
Wooden Spatula	-	-	-	5	5	8	4	5

a. Chocolate Drink Mix A generally popular item but the quantity could well be halved and still provide enough. It is not clear why this counts as breakfast and is not classed as 'Drinks'!!

b. Oats/Sugar/Milk Mix It was generally thought that the porridge/Alpen ratio should be 1:1 not 1:3. Most climbers would prefer to add their own milk and sugar to taste rather than have it pre-mixed. There was a minority view holding out for cornflakes type cereals but without an easily prepared 'second course' it would seem difficult to have these and still provide an adequate start to the day.

c. Oatmeal Block A sound favourite.

d. Alpen Very popular and almost as sustaining as porridge. If the quantity was increased from 3 to 4 oz it would be as good.

e. Service Biscuits At one time Biscuits Plain and Biscuits Sweet provided some small variety, now it seems there are only Service Biscuits. The main criticism was the total lack of variety. This may not matter on a three day exercise but on a ten week expedition it becomes paramount. The 6 oz provided was more than adequate and a reduction to 4 oz would not cause hardship.

f. Meat Spreads These were liked at first but very soon came to be heartily disliked. The flavours were very similar and all rather insipid. The quantity was too much. In a four menu ration variety could be introduced by having one each of cheese, meat spread, fish paste and meat extract eg Marmite.

g. Cheese Universally liked and much more would have been eaten had it been available. It is interesting to note that on the 1972 Axel Heiberg expedition one tin of cheese was provided in the ration every day and it was still being eaten with relish at the end of the expedition. It is not known what the 'life' of foil wrapped cheese is but it is thought that it could be long enough for an expedition ration. If this is so the whole range of foil wrapped cheese is available for selection.

h. Dextrasol Generally accepted but if it was not in the ration it is unlikely that anyone would shed a tear. This might have been due to monotony since only the orange flavour was provided. Variety in the shape of fruit gums or boiled sweets would be welcome, and would not lead to any great calorific loss.

j. Chocolate This suffered somewhat from being stored in the Customs 'go-down' at Delhi airport for 8 days in temperatures well over 100°F but the main criticism was the complete lack of variety. Only Cadbury's Dairy Milk was provided. Tiffin, Aero, Fruit & Nut etc would all have made this a much more acceptable item. For expeditions to hot climates it is suggested that Smarties or Treets should be considered. Both these have outer coatings which will stand high temperatures. A small experiment in a kitchen oven has shown that up to 130°F (the limit of a domestic thermometer) there is no deterioration in the outer coating and they remain very palatable.

k. Confectionery Bar This also suffered at Delhi airport and again there was no variety, only Mars Bars were provided. A Mars Bar every day for 10 weeks is acceptable but a Bounty, Crunchie, Marathon or similar bar would have been much more acceptable.

l. Nuts & Raisins The nuts appeared to be of a rather poor quality compared even with those that can be bought in Woolworths. They were rather dry and lacking in taste. This apart the item is a popular one. Variety could be introduced with some menus having a packet of mixed nuts or a packet of just raisins.

m. **Margarine** Is there any technical reason why butter cannot replace margarine? If there is not this would seem to be a reasonable thing to do.

n. **Honey** This became monotonous and a variation with jam, marmalade etc would have been welcome. There was also a wish for the stiffer type of honey rather than the clear type. If the stiffer honey proved difficult to get out of the tube the top could always be cut off the plastic tube.

o. **Soups** These became monotonous after a time. With the vast range of soups on the market it should be possible to find half a dozen which only need 2 or 3 minutes simmering after bringing to the boil. The quantity of soup could easily be reduced by one-third and still provide enough for everyone. Of the three soups provided the onion soup was by far the worst and, in fact, needs considerably more than the 2 minutes simmering suggested.

p. **Meat Granules** Knowing the difficulties of obtaining this item it is difficult to complain but in time it became difficult to recognise any real difference between the beef, mutton and curry. If something better or more variety can be found they should be introduced forthwith. The chicken supreme was not a success. It took a lot more soaking and cooking than the other meat granules and even then was not a popular item. The general consensus of opinion was that it should not appear in expedition rations again unless in a much improved version.

q. **Potato Mash Powder** Well-liked but there was not enough. The ration schedule laid down 1 oz per man. This should be increased to 1½ oz.

r. **Pre-cooked Rice** This appeared to be a poor quality rice and proved very dry and tasteless. It did not compare with the pre-cooked rice in the 4-man compo which was a magnificent long grain rice. Most expedition members would have preferred the rice/potato ratio to have been 1:3 not 1:1.

s. **Dehydrated Vegetables** The carrots were the disaster item of the expedition. They should never ever appear in an expedition ration again. They were tried in 1971, found to be awful and deleted from the ration for 1972. Now they have slipped back in again. Whatever one did they never became anything more than wet lumps of hard cardboard. The mixed vegetables were better and the carrot element was lost in the other vegetables. The only really acceptable vegetable was the peas which reconstituted quite rapidly and palatably.

t. **Apple Flakes** A welcome and popular item but if the trade can be encouraged to produce more varieties this would be even better. Alternatively an expedition in the future might like to consider taking some of the 'whip' type puddings on the market.

u. **Coffee** This could be reduced to one sachet provided the size of the sachets remains the same.

v. **Instant Tea** A retrograde step, can we not revert to tea-bags?

w. **Bovril Granules** Liked by some and for the weight involved worth taking.

x. **Sugar** The 4 oz provided was not enough for some. It would seem that 5 oz is required per man per day.

y. **Condensed Milk** Very nice but a great weight penalty, 5 oz including the weight of the tubes. Powdered milk is really the only sort of milk which should be considered for expedition purposes.

z. Lemon/Orange Powder This proved to be too much, ½ oz per man per day would have been enough.

aa. Salt Although the amount provided is enough, medically, for the hottest climates quite a number of the expedition wanted more.

bb. Spatula Opinion was mixed over this. It would seem to be one of those items which could be quietly eliminated from the ration and no-one would say anything.

cc. Packaging The ration weighed between 3 lb 6 oz and 3 lb 8 oz depending on menu. Of this no less than 9 oz (17%) was packaging. This is an unacceptably high proportion. Let it be said that the packaging provided was superb, the only fault being a failure of some of the heat sealing on the peas, but this amount of waste material is too much to be carried up a mountain for every man every day. The following suggestions are offered:

a. the individual meals need not be overpacked in polythene. All the items could be packed in the outer bag and that bag heat sealed.

b. a lighter gauge of polythene should be used.

c. ideally the tins for cheese and the meat spread should be eliminated, likewise the metal milk tubes.

d. a book of matches would be better than a box.

One further point of interest is that as far as possible the air should be expelled from any polythene bag before it is sealed. When the rations were taken up to altitude many of them expanded like small balloons due to the air trapped inside them being at a greater pressure than that outside. A small point but it becomes rather important when one is trying to pack rations in a rucksack.

dd. Weight Reduction The question on the comment sheet asking for suggestions to save weight produced some interesting results. To save 6 oz the most popular item to effect a saving was packaging closely followed by one packet of biscuits and a reduction in weight of the chocolate drink. Few suggested substituting powder for condensed milk although this on its own could save three or four ounces. To save 12 oz the most popular item was a packet of biscuits and the chocolate drink, then a bar of chocolate closely followed by packaging, meat spreads and soup. To reduce the ration by 16 oz the most popular items were the packet of biscuits and the drinking chocolate closely followed by the soup and packaging then the meat spread. A bar of chocolate and the lemonade powder.

ee. Additions to the Ration Clearly the most desired item was sardines. This was suggested by far more members of the expedition than anything else. Next in popularity was jam followed by pickles and sauces. Further down the list came egg powder, meat extracts, sweet biscuits and breakfast cereals in that order. Tinned fish, dried fruit, foil wrapped cheese, 'whip' puddings completed the list of those items requested by more than one person. It is perhaps important to realise that an expedition ration must be attractive and palatable to the consumer and that its nutritional balance is of second importance. A ration may be superb, nutritionally, but it is of little value if only half of it is ever eaten.

ff. Effect of Altitude There was little response to the question on the comment sheet regarding items that were disliked at altitude probably because this only becomes a real problem at greater altitudes. A few commented that they began to dislike the nuts and raisins and the meat spreads but this was as likely to be due to monotony as to altitude.

gg. Luxury Items The question asking for suggestions of items that would be enjoyed at altitude brought forth considerable response. Top of the poll were tinned fruit and sardines. Well behind these two were kipper fillets and Bovril, then oatmeal blocks tinned meat and fruit juice. Other items quoted were individual choices not asked for by anyone else.

7. GENERAL COMMENTS

General comments made on the questionnaire are dealt with below. In most cases they repeat comments made above but are none the less valid for that.

a. There was a great need for more variety especially in the meat, meat spreads, chocolate and soups.

b. The tinned butter was very popular and led to the obvious suggestion that it should be included in the ration on a regular basis.

c. The possibility of making the ration a 2-man one should be considered. This should effect a saving in packaging if nothing else and it could well lead to other weight savings where commercial items are used.

d. The ration had too many sweet things and thus there was a great demand for savoury and other items with 'real' taste.

e. It was suggested that the ration was short on fat and protein.

f. The ration was clearly too heavy. The maximum weight should not be more than 3 lbs per man per day including packaging and there would seem to be little reason why something approaching 2½ lbs should not be produced.

g. Nothing in the ration should require more than 5 minutes simmering to make it palatable.

h. On a Himalayan expedition it should be possible to use fresh rations obtained locally. The expedition ration plan should be based on this.

8. RATIONS FOR 1975 & 1976

In order that the experience gained on this expedition should not be lost in the three years before 1976 it is proposed to make firm suggestions as to a ration 'plot' for the 1976 expedition. These suggestions take account of experience gained by the British party on Everest in 1953 and the experience gained by both the Army and the Bonnington parties on Annapurna in 1970. Some items eg the meat have been left specifically vague to take account of any possible technical breakthrough between now and 1975/1976 although any 'new-fangled' ideas should be well tested before they are incorporated in any expedition ration. Everest is not a place for troop trials.

4-man compo supplemented with fresh items should be used for the march-in and there would seem to be little reason why this ration should not be used up to and including Advanced Base (approx 22000 ft). There is clearly a morale advantage in using compo as high as possible. In addition to some fresh items plans should be made to bake bread up to and including Base Camp (approx 18000 ft). Using Breadmix and Aldershot ovens this should be easily possible and would be another fillip to morale. Chupattis, while being an acceptable second best, do not compare with bread freshly baked.

Above 22000 ft a lightweight High Altitude ration is required. Four different menus is the minimum that should be aimed at and for many items there should be no difficulty in providing

six varieties. In the table below four menus have been assumed and the quantities are per man per day although this should not be taken to imply that a 2-man ration pack is unacceptable.

Porridge Oats (2 menus)	**OR**	2½ oz
Alpen (2 menus)		4 oz
Powdered Milk		1 oz (1½ oz in Alpen menus)
Sugar		5 oz
Oatmeal Block		1 oz
Salt		1 oz
Instant Coffee		3/16 oz
Teabags		6
Lemonade/Orangeade Powder		½ oz
Bovril Granules		1 sachet
Fruit Juice Powder (Kellogs Rise & Shine)		½ oz
Soup Powder (oxtail, tomato, mushroom, asparagus)		1 oz
Chocolate (milk, Tiffin, nut, plain)		2 oz
Confectionery Bar (Mars, Bounty, Milky Way, Smarties)		2 oz
Fudge (Kendal Mint Cake, Rum Butter Candy, Atkinson's Butter Fudge, Atkinson's Coconut Ice)		2 oz
Nuts (mixed nuts, nuts and raisins, raisins, dried fruit)		1½ oz
Margarine		1 oz
Biscuits (service, ginger nuts, chocolate, Macvita)		3 oz
Jam (honey, golden syrup, strawberry, blackcurrant)		2 oz
Meat (4 varieties available in 1975 & 1976)		3 oz
Potato Mash Powder (3 menus)	**OR**	1½ oz
Pre-cooked Rice (1 menu)		2 oz
Fruit Flakes (4 varieties by 1976)		1 oz
Sardines (2 menus)	**OR**	4¼ oz
Kipper Fillets (2 menus)		4 oz
Cheese (cheese - 2 menus, meat spread, fish spread)		1½ oz
Multivitamin Tablets		1
Toilet Paper		10 sheets
Booklet of Matches		1
Candle (in 2 menus only)		1
Tissues		1 small packet
Towel, paper, cleansing, wet (packet), antiseptic		1

This ration totals about 39 ounces with variation according to menu. When packed it should not weigh more than about 2 lbs 11 oz which is a very acceptable weight. In addition to this

basic ration it is suggested that luxury boxes should be available from which individuals could select items which they are prepared to carry themselves above Advanced Base. The contents of these boxes should be determined by the members of the expedition giving their choice some months before the expedition leaves. However it is suggested that the following items will form the greater part of this selection:

Tinned Fruit	Tinned milk	Tinned Meat	Tinned Fish
Oatmeal Blocks	Dried Fruit	Tinned Vegetables	Tinned Pate
Tinned Cream	Selection of Cheese	Cereals	
	Milo, Horlicks etc	Sauces & Pickles	

It will be important not to let the luxury boxes get out of hand and an upper limit of 8 oz per man per day should be set.

The question of rations above about 26000 ft (the South Col) raises some problems. At this altitude experience has shown that all that a climber really wants is sugar and drinks with an occasional sudden passionate desire for a certain dish, usually quite unobtainable, eg fresh strawberries and cream. A special Assault Ration could be devised and packed but a simpler solution, especially bearing in mind that ration choices will be very individual at this stage is for climbers going above the South Col to throw out from the High Altitude ration the items they do not want and in addition, to select from luxury boxes, earmarked and taken to the South Col for this purpose, items which appeal to them.

Whoever is responsible for the selection of the rations should commence his task now and should monitor the food trade for the next 18 months, where necessary testing likely products under difficult conditions.

APPENDIX 1 TO ANNEXURE

RATIONS COMMENT SHEET **YOUR NAME**

Please engage brain before answering since the views and comments of this expedition will influence the rations used on Everest.

Quality Grading In the column marked 'Grading' please put a figure according to the following table:

5 - I liked it very much
4 - I liked it
3 - I neither liked it nor disliked it
2 - I disliked it
1 - I strongly disliked it

Quantity Grading Put a tick in one of the three columns marked 'Too Much', 'Too Little' and 'About Right'. There should be a tick for each entry in the 'Item' column.

ITEM	Grading	Too Much	Too Little	About Right	Additional Remarks
Chocolate Drink Mix					
Oats/Sugar/Milk Mix					
Oatmeal Block					
Alpen					
Service Biscuits					
Beef Spread					
Chicken & Ham Spread					
Chicken Spread					
Cheese					
Dextrasol Lime					
Dextrasol Orange					
Dextrasol Lemon					
Chocolate					
Confectionery Bar					
Nuts and Raisins					
Margarine					
Honey					
Oxtail Soup					
Mock Turtle Soup					
Onion Soup					
Beef Granules					
Curry Granules					
Mutton Granules					
Chicken Supreme Gran					
Potato Mash Powder					
Pre-cooked Rice					
Dehydrated Mixed Veg					
Dehydrated Carrots					

ITEM	Grading	Too Much	Too Little	About Right	Additional Remarks
Dehydrated Peas					
Apple Flakes					
Apple & Bil-Berry Flakes					
Coffee					
Instant Tea					
Bovril Granules					
Sugar					
Condensed Milk					
Lemonade Powder					
Orangeade Powder					
Salt	N/A				
Wooden Spatula					
Toilet Paper	N/A				
Can Opener	N/A				
Matches	N/A				

If you had to reduce this ration weight what would you throw out to save:

6 oz 12 oz 16 oz

What items and in what quantity would you like to see added to the ration?

Did you 'go off' any item at altitude which you normally enjoy lower down?

Suggest, in order of priority, up to three items, irrespective of weight, food value etc, which you think you would especially enjoy at altitude.

Heinz Erin Beans and Peas were being tried on the expedition. Please comment on them a. for expedition use, b. for normal military use.

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4 sauces - tomato, curry, bechemel and demi glace, were provided for trial. Please comment on them a. for expedition use, b. for normal military use.

Rum Butter Candy was available to you. Did you like it? Did you prefer it to Kendal Mint Cake? Would you like to see it in future expedition rations? Would you like to see it in military rations? Do you prefer it to Mars bars or chocolate?

Additional Comments - continue on another sheet of paper if you wish.

THANK YOU FOR YOUR HELP

Item	Scale Oz	Packaging	Menu A	B	C	D
BREAKFAST						
Chocolate Drink Mix	2½/3	Sachet	1	1	1	1
Rolled Oats	1½	)				
		) Sachet	1	1	1	-
Milk Instant	1	)				
		)				
Sugar	1	)				
Alpen	2 x 1½	Sachets	-	-	-	1
Milk Instant	½	Sachet	-	-	-	1
Oatmeal Block	1	Laminated Pouch	1	1	1	1
SNACK						
Biscuit Service	2 x 3	Packets	2	2	2	2
Beef Spread	2¾	Can	1	-	-	-
Chicken & Ham Spread	2¾	Can	-	1	-	-
Chicken Spread	2¾	Can	-	-	1	-
Cheese	1½	Can	-	-	-	1
Dextrasol Tablets Lime	1	Trade	1	-	-	1
" " Orange	1	Trade	-	1	-	-
" " Lemon	1	Trade	-	-	1	-
Chocolate	Trade Bar	Trade	2	2	2	2
Confectionery Bar	Trade Bar	Trade	1	1	1	1
Nuts and Raisins	1½	Sachet	1	1	1	1
Margarine	1	Tube	1	1	1	1
Honey	2	Tube	1	1	1	1
MAIN MEAL						
Oxtail Soup	2	Sachet	1	-	-	-
Oxtail Soup	2	Sachet	-	1	-	-
Mock Turtle Soup	2	Sachet	-	-	1	-
Onion Soup	2	Sachet	-	-	-	1
Beef Granules	2½	Sachet	1	-	-	-
Curried Beef Granules	2½	Sachet	-	1	-	-
Mutton Granules	2½	Sachet	-	-	1	-
Chicken Supreme Granules	2½	Sachet	-	-	-	1
Potato Mash Powder	1	Sachet	1	-	1	-
Pre-cooked Rice	3	Sachet	-	1	-	1
Mixed Vegetables Dehydrated	½	Sachet	1	-	-	1
Carrots Dehydrated	½	Sachet	-	1	-	-
Peas Dehydrated	½	Sachet	-	-	1	-

Item	Scale Oz	Packaging	Menu			
			A	B	C	D
Apple Flakes	1	Sachet	1	-	1	1
Apple & Bilberry Flakes	1	Sachet	-	1	-	1
DRINKS						
Coffee	3/16	Sachet	2	2	2	2
Tea Instant	1/16	Sachet	2	2	2	2
Bovril Granules	Trade (5 grams)	Sachet	1	1	1	1
Sugar	1	Sachet	4	4	4	4
Condensed Milk	2	Tube	2	2	2	2
Lemonade/Orangeade Powder	1	Sachet	1	1	1	1
SUNDRIES						
Salt	2	Dispenser	1	1	1	1
Wooden Spatula	-	-	1	1	1	1
Toilet Paper	-	Sheets	6	6	6	6
Can Opener	-	-	-	-	-	-
Matches	1	Box	1	1	1	1

EQUIPMENT REPORT

by

Capt T J Lynch, PARA

1. GENERAL

Having been asked by the Expedition leader to act as the equipment member, it was not long before I realised the enormity of the task. An initial appreciation outlined the following comprehensive and demanding agenda:

a. Compiling the equipment list. (Appendix 1)

b. Circulating the list and making amendments as a result of suggestions and observations received.

c. Procuring a large store, centrally located with telephone and typing facilities initially, and labour, weighing and transport facilities latterly.

d. Access to clothing and equipment manuals, indenting, purchasing and arranging for collection or delivery of necessary items.

e. Obtaining leave of absence from a demanding and time consuming appointment.

f. Unpacking, accounting, decentralising, manifesting and repacking the stores.

g. The safeguarding, loading and despatching of freight to the mounting airfield.

h. Stores control, exchange, maintenance and distribution in the field.

2. EQUIPMENT

Assisted by our experienced Himalayan members, not to mention the tenacious typing ability of our leader, plus the invaluable assistance given by Graham Tiso and his manager Rod Pengelly, the list eventually took shape. Due to the devoted and unselfish efforts of Major Jack Crane, Quartermaster of 1 PARA, without whom I should have perished in a quagmire of vocab numbers and cross references, indents began to overflow on to the desks of stores controllers in various ordnance depots throughout the country. These were based on obvious governing factors:

a. Expedition objectives.

b. Team numbers, their sizes, and in some cases personal requirements.

c. Equipment availability.

d. Duration of expedition.

e. The budget.

f. Environment and local facilities.

g. Equipping of LOs and HA Porters.

h. Aid to the civil community.

3. SUPPLIERS

Sophisticated climbing items excepted, 80% of the required stores were obtained from ordnance sources:

a. C & GS 1 & 2.

b. ROD Thatcham.

c. ROD Donnington.

d. ROD Bicester.

e. ROD Stirling, via 45 Commando, Royal Marines, Arbroath.

f. The Stores and Clothing Research and Development Establishment (SCRDE), Colchester, who made or supplied certain items of clothing and equipment for trial purposes (Report at Appendix 2),

g. Expedition members supplied much of their own clothing and personal items, plus:

(1) Ice Axes.
(2) Helmets.
(3) Harness.
(4) Crampons.

There was, however, a pool of these and other items available in varying types and sizes to supplement losses and breakages. Items not available through the above mentioned sources were duly purchased from Tiso of Edinburgh or YHA (Sports) of London. Generous discount arrangements were available for bulk orders from the former.

h. Time allowing, it is strongly recommended that the equipment member visits the establishments and departments which supply the items. Though not possible in isolated cases, personal contact worked wonders and gave those who assisted us a sense of purpose and a personal association with our venture.

4. PACKING

a. The plan to have two parties operating independently of each other in different locations meant that separate complete and self contained stores units were required.

b. Factors governing fair distribution were similar to those at para 2, a - h. For this additional task the knowledge, experience and untiring help of Andy Anderson were invaluable.

c. It had been decided that Airborne Panniers supplemented by Granby boxes would be used. Inside these the stores were packed into Universal and Sea Kit bags. Though panniers are more bulky, we favoured them for the following reasons:

(1) Robustness and weight bearing capability.

(2) Ease of access due to strapping as opposed to the screwing and banding of boxes. This proved to be sound reasoning as last minute inclusions and extractions, not to mention frequent inspections by the host country customs officers, took their toll of the few boxes taken; also, the maximum permissible weight allowed in each box being only 150lbs presented a grave threat of the aircraft "bulking out".

(3) Numbered panniers and kit bags allowed for the pin-pointing of any single items required in a relatively short time.

(4) For porterage, both by humans and mule, the kit bags served us well, though it must be admitted that some porters preferred carrying boxes.

5. HAZARDOUS FREIGHT

a. Our hazardous freight consisted of the following in varying amounts:

(1) Oxygen bottles - altitude and medical equipment.
(2) Methylated Spirits - medical and domestic.
(3) Mercury - thermometers (various).
(4) Pottassium Permanganate - snow dye.
(5) Pyrotechnics - Signal flares.
(6) Aerosol sprays - medical and domestic.
(7) Various bonding solutions - repair equipment.
(8) Radio transceivers - communications.

b. Aware of the stringent precautions required when moving such items by air, Air Movements were given early warning of our intentions to do so, as extra in-flight precautions needed to be carried out. Furthermore, the AMC at South Cerney (Tel 2210) and the Air Cargo Allocation Centre at Upavon (Tel Ext 601) furnished us with the latest packaging, labelling and manifesting details to ensure a smooth passage through freight channels.

c. Procedure dictates that Hazardous Cargo be called forward to the Freight Terminal earlier than, and separate from, normal Expedition freight, but exemption from this was obtained by arrangement.

d. A signed certificate to the effect that all hazardous freight had been prepared as per regulations laid down was required and accompanied this freight to the terminal.

6. BONDED GOODS

a. Delivered to the bonded warehouse by the suppliers and to the a/c under customs arrangements, we were still required to manifest them on RAF Form 1380 (Air Way Bill) signing the customs certificate on the reverse of page 2 of the quintriplicate form.

b. Ease of access to the bonded goods aboard the a/c is advisable as its distribution to Expedition members prior to landing at Delhi could have avoided a myriad of beaurocratic complications with customs officials on our arrival.

7. MANIFESTING

a. Pax outbound and inbound were documented on F/MOV 237 in quadruplicate.

b. Ordinary freight on F/MOV 238 both ways, outbound typed in quadruplicate and inbound in longhand in quadruplicate. We found that the broad descriptions of items - eg "Climbing Equipment" and "Cooking Utensils" - was insufficient and it was necessary for more detached itemization, mainly for the benefit of the host country customs officers and clearance agents.

c. Radio, camera and binocular serial numbers were scrutinised and items thoroughly checked when arriving and leaving.

d. Hazardous freight was manifested on F/MOV 239 in quintriplicate both ways.

8. LEDGERING AND ACCOUNTING

a. An AFB 183 was duly opened and RV and IV copies kept accordingly.

b. An AFG 8046 Special Stores Register was maintained for radios, binoculars, watches, cameras and other controlled items.

c. In the field, distribution and control of stores was maintained by keeping a pocket sized ledger. Though necessarily time-consuming due to redistribution, consumption of edibles, constant load readjusting for porters, not to mention breakages, losses and acceptable wastage, this system worked quite successfully.

d. Knowledge of accountable and non-accountable items of stores for reasons of retention or disposal allowed for some bulk to be discarded on the march out, thus saving portering fees, and freight space in the a/c on the return flight.

e. Where possible, however, if powers of write-off can be obtained from the sponsoring authority at MOD (A) and a party possesses sufficient status/rank structure to convene a Board of Officers, it is recommended that this be done in the field prior to returning to UK; in our case it worked admirably. This then enables return of loan stores to be executed swiftly and without complication.

9. PORTERING OF EQUIPMENT

a. In partnership with Mike Kefford, whose mastery of porters and mulateers enabled us to move our equipment over so many stages with virtually few losses and only minor equipment damage, I was able to locate and control stores with ease.

b. At the end of the day, baggage was laid out in lines for checking, each porter stood by his load. When checked, porters were released. Expedition members were encouraged to return camping kits to the respective pile each morning. This assisted greatly with the move off each day. Despite this, however, the 'Salters' lightweight hand held spring balance was used time and again to convince the doubters that their burdens had not been added to overnight! This, and chalking the weight on each bag or box was yet another aid to smooth running and fair play.

c. During porterage there were, as already mentioned, few losses. This was mainly due to the vigilance of Expedition members as it was not uncommon for items to fall from loads and to remain unseen or neglected alongside the track. The few irritating but unavoidable breakages which occurred, mainly when pack mules were being used, were eventually eliminated as we became more experienced in using mules.

d. Tilley lamp glasses were frequent casualties and solutions such as tubed Bostik and Araldite adhesives unless packed in rigid containers created untold problems. Dixie nests, too were invariably bent or buckled leading in some cases to a great loss of efficiency at altitudes from ill-fitting lids.

10. THE RETURN TO UK

a. On our return the pause at the roadhead in RAISAN was put to good use. Equipment was cleaned, dried and packed for the return journey by road and air. Yet again, Peter Page, who had volunteered his services as 2 i/c equipment half way through the Menthosa stage, was a veritable dynamo. With his help and that of Phil West, labelling and manifesting were duly accomplished.

b. All equipments from tents to stoves were cleaned and inspected, repairs were carried out where possible. Alternatively damaged items were labelled as such with relevant details.

c. The pains taken with ledgering and accounting at the Aldershot stores each paid dividends on our return. The return of stores was accomplished with the consumate ease of the experienced Quartermasters' representative in the shape of C/Sgt McNeill. It was also due to his painstaking thoroughness that the Board of Officers into losses and damages enabled the final figures to be verified and the ledger closed.

d. Considering the scope and size of the Expedition, the final bill was an exceedingly small one (Appendix 3).

Item	Qty
Ropes Climbing No 3 Nylon 125'	15
Ropes Fixed Corlene 300'	8
Ropes Fixed No 4 125'	8
Ropes Plodding No 3 60'	14
Loops prussic Purlon 11m	60
Line Terylene Purlon 7 yds	150
Etriers tape	20
Pitons hard/soft assorted	80
Nuts/checks assorted	20
Bongs assorted	20
Pitons ice Salewa large and small	60
Screws ice assorted	40
Karabiners 2 200kg	60
Karabiners alloy Cassin	40
Slings tape 1" x 21"	80
Clamps Jumar prs	4
Stakes alloy	16
Deadmen	30
Helmets climbing (Pool)	7
Helmets balaclava	4
Vests string (reserve)	3
Shirts woollen "	3
Pullovers heavy	3
Anoraks	9
Cagoule	1
Overtrousers	9
Long Johns	2
Boots Alpine	2
Bags sleeping + liners	28
Crampons adjustable	5
Straps Crampon	8
Lamps head	28
Hammers Piton	8
Bags survival	28
Cloths face	28
Towels hand green	28
Hats jungle	38
Ladder sect 5'	4
Snow saws	4
Cylinders oxygen botts	24
Cylinders oxygen medical	2
Tents (2 man) (SCRDE)	6
Tents 2 man Assorted blacks	15
Tents ultimate	1
Flysheets	6

Item	Qty
Tent repair outfit	4
Polythene bags ass sizes	100
String balls	10
Tape masking black 4" rolls	16
Sponges cellulose	14
Bags kit universal	80
Silica Gel Dessicar 4 ozs	48
Ski sticks medium	30
Skis prs	10
Spring balance - 30 lbs	2
Snow dye or Potassium Permanganate bags	8
Footpowder tins	56
Insect repellant	56
Mattresses Air	30
Knives clasp	28
Shelters Airborne	2
Beds camp	2
Water Sterilising Sets	28
Tent brushes	14
Bags sea kit	30
Panniers airborne	30
Cases wood packing 30 x 21 x 18	25
Stencils labelling	4
Scales Dial Indic. 56 lbs	1
Stoves Optimus III	26
Stoves Propane/Butane	3
Spares Optimus ass bag	2
Nester sets of 3	18
Knives forks spoons sets	30
Plates soup 8¼	30
Plates steel 10"	30
Dixies 2½ gall	4
Ladles ½ pint	4
Fish slices	4
Knives cooks small 4½"	2
" " large 9"	2
" " "	2
Spoons wooden medium	4
Towels tea	16
Scourers plastic	30
Steel wool pkts	20lb
Scouring powder	24lb
Washing up liquid galls	8
Buckets water canvas	8
Stools folding	12

Lamps HPP with spares	8
Mantles lamp HPP	50
Funnels plastic ½ pint	4
Funnels Metal ¼ pint w/gauze	16
Hexamine pkts	1box
Jerrycans 4½ gal	24
Kerosene gals (India)	150
Pots 2 pint	4
Pans frying medium	4
Bowls washing plastic	8
Soap bars	24
Primer cans (lamp or stove)	12
Soap flakes lbs	10
Cloths dish	8
Cookers pressure 4 pint	1
Kettles 4 pint	1
Clothes pegs plastic doz	8
Candles doz	8
Carrier w/p top	5
Collapsible water container	9
Bottle allum kero ¾ litre	6
Bottle allum kero 1 litre	12
Aerosol insect repellant	16
Kleenex kitchen rolls	28
Rolls toilet Andrex	28
Rags assorted bag	1
Spirits methylated galls	2
Powder anti louse - tins	18
Torches hand	14
Batteries 1½ volt	200
Binoculars No 2	4
Compass lightweight	4
Watches G1098	28
Watch straps	28
Thermometer max/min	4
Altimeters	4
Flags Union small	4
Flags AMA	4
Plaques AMA	36
Whistles Acme Thunderer	14
Stretchers/Airborne folding	2
Bostik tubes medium	4
Araldite tubes small	4
Bifurcated rivets ass pkt	2
Canes pea	80
Flags fluorescent	80

Mini flares, wallets complete	12
Flares Schermully h/held	28
Flares Schermully 1.5	12
Pliers 6"	4
Screwdrivers 1/8"	4
" ¼"	4
" ½"	4
Bottles water 58 patt	28
Mugs plastic 58 patt	56
Alarm Clocks	4
Stamping pads blue/red	4
Pencils assorted doz	4
Biros, felt tipped ass doz	2
Magic markers assorted	12
SO Book 421	12
SO Book 609	12
Rubber bands ass boxes	12
Tapes measuring	1
Hammers small 8 oz	1
Nails assorted lbs	1
Screws wood and steel ass lbs	1
Paperclip pkt	2
Pins steel pkt	2
Air Weigh Bills pads	1
Air Manifest Forms pads	1
Labels luggage	100
Envelopes ass doz	4
Picks airborne	1
Shovels airborne	1
Shovels snow Avalanche	8
Polish black large	6
Polish brown large	6
Neats foot oil pts) or	2
Wrens liquid dubbin) Supplefeet	2
PRC 320, PRC 350 Radios	2 & 6
Pocket Phones (Pye)	12
Shoes Snow trugo prs	6
Pulks with harness	2
Skins - ski prs	44
Files	2
Hand drill and bits	1
Spools 400 lb para cord	2
Spools 1200 lbs para cord	2
Flags Indian Small	4
Pullovers Heavy	60

Boots DMS prs	60
Socks prs	120
Gloves woollen khaki prs	60
Gloves outer c/w Med prs	60
Helmets balaclava	65
Ice Axes	42
Anoraks	69
Carriers Manpack	60
Goggles snow	60

Overtrousers quilted	4
Suits Pile (Trs - Jkt)	6
W/proofs (jkt-trs)	6
W/proofs (jkt-trs)	6
Gaiters Snow	6
Goggles - snow	26
Sleeping bags Artic	3
Caps knitted OD	28
Mitts inner	28
Mitts outer w/proof	28
Socks Artic prs	56
Mats sleeping	28
Vest/Drawers ECW	28
Helmets Air Crew minor size 1	28

1. Socks, long, Cold Weather (Red)

On the whole a warm and comfortable stocking that wore very well, the only outward signs after two months of continuous wear being heavy matting inside and out in the toesend, heel and ball of the foot areas. Newly worn, the sock retained its shape and clung to the leg well. The dye was of poor quality however, and was not fast. Some form of support similar to a broad elasticated band at the top would be a sound improvement.

2. Quilted Trousers (Hot Pants)

A pleasant extra which though bulky, were very lightweight indeed. The full length zips were excellent and worked efficiently, proving a swift method of dressing. A 'fly' could have been provided and it is suggested that a simple Velcro device could be used to do this. Used as 'tent trousers', pyjamas and under garments, they were quite excellent.

3. Suits, Pile

The pile wore very well and suffered no deterioration apart from some "balling up" under the arms, crotch and similar areas of heavy contact. As a tent/sleep suit it proved excellent in temperatures down as far as -30°C. When climbing it must be worn under windproof garments.

4. Suits Windproof

The jacket proved more than adequate up to 20,000 ft. The following improvements would be welcomed. The hood instead of using a drawstring, ought to have a malleable wire to enable the user to form a visor for wind protection. A pleat, held in with Velcro strips or press studs, should run from back to front to allow room for a climbing helmet to be worn inside without straining and lifting the material off the shoulders, thus restricting arm movement. The zip and Velcro front fastenings should be more widely separated, 4 inches minimum was suggested suggested for the overlap, as gloved hands could not cope with the present fastenings which either jammed or became caught up with each other. The windproof qualities were suspect above 20,000 ft and whereas it was agreed a DOUBLE thickness of orange cloth would suffice at even greater heights, the qualities of the green cloth were suspect. The need for a crotch strap was mooted. The trousers were adequate up to 20,000 ft, though the following improvements were suggested - above that height a double layer of orange material would be preferable. Again general opinion went against the green lining material. There was disagreement too about the necessity for the green inner leg patches, since no appreciable signs of wear were noticeable in that area during the period for which we wore the trousers. Lower down, the Velcro leg strip made good sense, but it did not open far enough to allow the trousers to be drawn on over climbing boots.

If pockets could be included on the trousers an access point to under garments would not be necessary.

5. Suits, lightweight, Waterproof (Yellow)

This suit was rarely worn on the expedition as conditions were never severe enough to warrant its regular use. The following points were made as a result of a close study made by by the wearer during periods of very wet weather in this country:-

a. The concept of an opening jacket is better than an anorak for this type of garment in that it allows the wearer to adjust ventilation. However, in the opinion of the wearer, there also should be ventilation panels across the back and under the arms.

b. The front fastening with Ri-ri type zip (double ended) fairly generous overlap and pop fasteners is good but in common with similar garments the inner margin of both top and bottom flaps tends to catch in and jam the zip. This could be rectified by so stitching the flaps that they lie naturally away from the zip.

c. The hood is noticeably too small and badly shaped. It fails to keep out both wind and and rain. A light weight stiffener in the edge of the hood would be an advantage.

d. The cuffs seem overgenerous in cut and would benefit from an elasticated inner cuff. The two position fastener is good.

6. Goggles - snow

Though the panoramic style of the goggles afforded a good allround view, the lower rim and nose piece prevented one from seeing the ground immediately in front of ones feet. This is often the most important part of the ground to a mountaineer. The tinting was good and gave good protection to the eyes even in the bright sunlight. Despite ensuring that the demisting holes were clear, there was on the whole a tendency for the goggles to mist up. The rubber face piece was comfortable once adjusted but in the warm conditions we experienced and during the long periods of physical exercise, it tended to increase facial perspiration and thus added to the fogging up of the visor.

7. Bags Sleeping Experimental

An extremely good item of equipment. Comments made here should be tempered by the knowledge that it is an item of Arctic Warfare equipment and was not designed for mountaineering activities. The waterproof outers were not tested and only one of the three nylon liners issued was used, the other two users preferring either a muslin or standard issue flannelette inner. By the end of the expedition the inners had been discarded as either unnecessary at low altitudes or because of the extra weight and bulk higher up the mountain. The bag is heavier and bulkier than its high grade mountaineering counterpart. For mountaineering purposes a slimmer and possible slightly shorter version could quite easily be developed by excluding two panel widths from its length or by taking in a sizeable tuck and discarding the surplus. Below 10,000 ft it was at times unbearably hot. Up to 16,000 ft one slept naked and extremely comfortably. At 21,000 feet and in temperatures around -25°C one slept comfortably wearing arctic socks and ECW underwear only, occasionally slipping into a jumper and hot pants for the two hours before dawn. By the eighth week one bag showed signs of losing the very fine, smaller feathers through its upper surface. It was for the most part warmer when used with a sleeping mat compared with an airbed, though this observation should be tempered with the likes or dislikes of the sleeper for one or the other of these sleeping aids.

The waterproof outer has a secondary use as a suitable survival bag.

8. Tents - Arctic (SCRDE)

It is accepted that this is not a mountain tent, but it was despite its weight and bulk, taken up to and used successfully at 21,000 ft. The following general observations were made:-

a. Ventilators must be able to be pulled inside tent so they can be closed without having to go outside.

b. The press-studs on the internal cooking flap break too easily. An alternative sealing (perhaps Velcro) should be found.

c. A tape should be tied to the top of the sleeve entrance so that it can then be tied to the guy, thus extending the sleeve for cooking, access during bad weather, etc.

d. Tapes at the lower part of the entrance would be useful to stop loose material snagging on boots, kit etc during exits and entrances.

e. Mosquito netting in doorway should be a continuous sheet suspended from top of door hanging down to ground, and not a circular piece tied in middle.

f. We had no occasion to use 'white' part of doorway.

g. It would be convenient if the side 3 guys could be placed on one peg, as in the "Blacks Mountain". If this is tried the tent sags too much. At present three side guys are needed on each side.

h. It was found that sometimes the tent leaked along the seams.

Stores which had become damaged or lost by the avalanche on DEO TIBBA on 22 May which fell into crevasse on BAIHALI JOT on 21 June or which became pilfered during the Expeditions stay in INDIA

Item	Qty	Item	Qty
Helmet Type	9	58 Patt Bottle (body)	21
Skis c/w 210 cm long prs	2	Lantern	5
Norwegian Bindings prs	8	Retainer Water Bottle	29
Plate eating 10"	1	Cap Water Bottle	28
" " alum	1	Pliers	1
Knife cook 12"	1	Screwdriver 4"	1
" " 9"	1	Hammer Hand	1
" " 4½	2	Tape Measuring	1
Spoon Food Service	1	Cans Water	6
Saucepan 2 pt	2	Torch	11
Basin wash 14 x 5"	6	Pannier Airborne	2
Clock Alarm	3	Pick Ice McInnes	2
Chair Folding Canvas	1		
Poles Ski Steel Shaft	10	Karabiners L/W	15
Goggles	39		
Helmets climbing med	3		
Lamps Head	8½		
Karbiners D Screw type	7		
Pitons No 6	4		
Harness Perlon	8		
Anoraks Orange Small	1		
Anoraks Gaberdine Med	11		
Anoraks Gaberdine Large	10		
Knives Clasp	18		
Knives Clasp Spike	5		
Trousers Gagoule sml	7		
Trousers Gagoule lge	2		
Carriers w/p top	5		
Karabiners 2,300 lbs	4		
Knives Table	9		
Forks	12		
Spoon	12		
Pin Tent	33		
Malet Head	1		
Malet Handle	1		
Cup 58 Patt	15		

OXYGEN REPORT

by

Captain M W H Day, MA, AMICE, RE

1. INTRODUCTION

With a view to making a preliminary assessment of oxygen breathing apparatus currently available to mountaineers, a selection of systems was assembled and tried out on the Himachal Pradesh Expedition by the climbers. The use of the equipment also gave members of the expedition a limited opportunity to familiarise themselves with the oxygen apparatus.

2. SYSTEMS

Three different continuous flow systems, and one demand system were tested.

a. **Compressed oxygen, continuous flow system**

(1) Sabre Safety Ltd, Farnborough, Hants UK

(2) Appareil Medical de Precision, Paris, France

b. **Chemical oxygen continuous flow system**

Puritan Equipment Inc, Lenexa, Kansas, USA

c. **Compressed oxygen demand system**

Robertshaw - Blume USA

3. OXYGEN SOURCES

Two sources of oxygen were taken:

a. **Light alloy cylinders.** 25 light alloy cylinders with on/off taps were bought from Sabre Safety. These contained gas compressed to 3000 lbs/sq in, each cylinder containing 700 litres (NTP) of oxygen. Each weighed 3.7 Kg empty, and 4.5 Kg (10 lbs) full.

The valves had been manufactured in Britain and fitted to the cylinders. When supplied to the Institute of Aviation Medecine (IAM) for charging 19 were found to be faulty. In the event only 6 were available and fully charged with oxygen for the expedition's use in India. These six proved successful in the field although the taps on three of them jammed finally.

b. **Chlorate candles.** One chlorate candle container with four spare candles was purchased from Puritan Equipment. The apparatus had been manufactured as an energy source of oxygen on aircraft and was designed for a duration of 30 minutes. The flow of oxygen was 4.5 litres on initiation and reduced to 2.5 litres at the end. The charged container weighed 4.75 lbs. The oxygen provided was odourless, moist and warm. All these features proved most acceptable. Heat given off during the chemical reaction was easily dissipated by the container when strapped outside the rucksack or pack frame. The length of the cylinder (400 mm long and 150 mm in diameter) enabled it to be carried conveniently along the width of the pack. Once initiated there was no way of stopping the flow.

4. OXYGEN DELIVERY SYSTEMS

a. **Diluter demand.** Two sets of the Robertshaw-Blume (R-B) diluter demand system were bought second-hand from the British Everest South West Face Expedition 1972. They were given limited check at IAM. Each of the regulators performed according to specification providing a mixture of oxygen and air on demand which contained a concentration of oxygen equivalent to breathing air at an altitude of 18,000 feet. The R-B diluter demand regulator was supplied with oxygen from the light alloy cylinders through a reducing valve, the fitting having been altered from the original by Sabre Safety. The total weight was 26 oz (0.75 Kg).

b. **Constant flow - French.** One set of the Appareil Medical de Precision regulator was purchased from Mr Hamish MacInnes. This was adapted by Sabre Safety to fit directly to the cylinder. The regulator weighs 0.41 Kg and is in one piece incorporating a pressure gauge and a click stop tap with seven settings. This controls the flow at 0, ½, 1, 2, 3 4 and 5 litres per minute. These were not checked and rudimentary tests in the field indicated that the flow rate marked as 2 was far in excess of 2 litres per minute. Otherwise it was found to be a neat and light regulator with a useful range of flow rates. No difficulties were experienced with its use. It was important to remember that 'F' meant 'ferme' and NOT 'full'.

c. **Constant flow - British.** Sabre Safety provided two models consisting of a reducing valve with integral pressure gauge connected with an appropriate flow controlling orifice.

(1) The standard model consisted of three separate tubes clearly marked to indicate their respective flow rates of 1, 2 and 4 litre (NTP) per minute. The 2 litre per minute tube was normally selected between 17,000 feet and 19,000 feet AMSL. The weight of the unit with the single tube was approximately 0.5 Kg (1 lb). The tubes were calibrated with one reducing valve which meant they were not interchangeable between sets.

(2) The manifold model consisted of all three orifices mounted on a short length of tube. The flow was chosen by plugging the delivery tube into the selected orifice valve. This weighed a few ounces more than the standard model and tended to become unplugged if the weight of the manifold was taken by the delivery hose.

5. MASKS

A variety of masks were taken for use by day and for sleeping. A reservoir was required with all constant flow systems to prevent oxygen being wasted during exhalation.

a. **RAF Mask with Reservoir Bag.** IAM provided four assemblies for use with the constant flow systems. Each type P & Q facepiece was fitted with an inlet valve, an outlet valve and a lightly spring loaded check air inlet valve. Oxygen at a chosen continuous flow passed into a reservoir bag from which it inspired through the inlet valve into the mask. The assemblies had been specially prepared and were not standard items. only a limited amount of testing of the performance of the mask had been carried out by IAM who anticipated that certain of the valves might have frozen at high wind velocities. In fact such conditions were not encountered. Freezing of the outlet valve was once reported under particularly cold and still conditions on Indrasan. It was found that the mushroom valve could be easily manipulated with a finger to clear it of ice.

A major objection to this mask was that it seriously impaired downward vision. Nearly all users complained of the difficulty of seeing where to place their feet. The more difficult the going, the more significant this became, since the ability to climb became impaired.

b. One RAF mask was, in addition, fitted with a speech diaphragm by Sabre Safety. This clearly transmitted the voice when the climber was at rest. However exertion at altitude renders the climber speechless and voice communication is rarely attempted. At rest it is customary to observe the speaker's lips - clearly impossible without removing the mask. The diaphragm protruding forward aggravated the downward vision problem of the standard mask.

c. **French mask with Reservoir Bag.** The French regulator described in para 4b was supplied with a mask used by aviators. It was a large size that only fitted two members of the party. They reported that it was completely satisfactory and obstructed vision less than the RAF mask. However the reservoir protrudes awkwardly beneath the mask and flaps about. The assembly has been extensively tested by Himalayan climbers and any problems have been corrected. It weighed 0.40 Kg.

d. **US Military A-14 mask.** This was fitted to the R-B set. It has a long history of reliable performance and excellent properties in the cold. It was made of silicone rubber and did not harden in sub-freezing environments. The small mask dead-space and the positioning of the outlet valve minimised the problems of moisture accumulation and icing within the mask. It was a full mask that covered the cheeks. It weighed 0.40 Kg.

e. **Sleeping Masks.** A selection of simple lightweight masks suitable for use while sleeping were procured from medical sources. They were of two basic types:-

(1) Moulded plastic mask with re-breather bag and a length of polythene tubing. This was attached to a cylinder and regulator giving a constant flow of either a ½ or 1 litre per minute. Condensation was found to be considerable and unpleasant, but not unbearable. The re-breather bags on one model became detached. No comment was made about the effects of re-breathing. On two occasions these masks were used with the chlorate candle set, when they were reported to be a success. In comparison with the RAF mask they were lighter, smaller and permitted a clear downward view.

(2) **Nasal Cannula.** This consisted of a polythene tube culminating in twin stubs protruding about 10 mm into the nostrils. There was no reservoir. The user complained that the constant jet of cold oxygen into his nose caused distressingly large amounts of mucus to be formed, so that he constantly required to blow his nose. He was unable to sleep.

6. SUMMARY OF EXPERIENCES ON THE MOUNTAIN

As many members as possible were given the opportunity to experience the use of oxygen apparatus at high altitude. Most members had attended a familiarisation session at IAM before departure for India, during which they witnessed and experienced hypoxia. On Menthosa Major John Swanston RAMC conducted a series of graduated tests. On Indrasan I invited members to test the sets in the course of the most strenuous carries up the fixed ropes, towing the sledge and during the final ascent of Deo Tibba (19,687 feet).

The detailed findings have been included under the appropriate headings. In general all the equipment, except the cylinders, functioned satisfactorily, but there was general dissatisfaction with the masks.

7. RECOMMENDATIONS

a. **Cylinders.** Sabre Safety should be asked to complete the fitting of a satisfactory valve arrangement. The search should continue for an economical unit giving a good oxygen/cylinder weight ratio.

b. **Chlorate Candles.** This should be followed up with a view to getting a flow rate of up to 4 litres/minute for 4 to 8 hours.

c. **Delivery Systems.** A closer study should be done into the relative economy of demand systems to constant flow. Consideration should be given to taking both types - the constant flow being considerably cheaper. Second-hand sources of either type should be sought.

d. **Masks.** IAM should be asked for their assistance in solving the problem of impaired downward vision. They should be asked to advise on the use of lightweight masks.

CLIMBING REPORT

by

Major G F Owens, WFR

1. The only route of any complexity on the entire expedition was that of the East Ridge on Indrasan. Thus this is the only route described in detail.

2. An obvious snow gully leads up to a horizontal ledge from the extensive plateau on which Indrasan is situated. This ledge is very prominent when looking at the ridge in profile. It is near the foot of the ridge. Ascend the snow gully for 150 metres when it narrows into a funnel.

3. Climb the right hand wall following a line of cracks and small chimneys for 180 metres to reach a horizontal ledge on the ridge proper - mainly rock climbing of V Diff/Severe standard.

4. Follow up disrupted diagonal cracks which trend right for 270 metres - mainly rock climbing with some short pitches of VS.

5. Traverse right across unstable snow gully for 20 metres, then abseil down an overhanging section for 20 metres to a snow slope.

6. Ascend diagonally on unstable snow for 70 metres until a snow couloir is reached, which curves left in its upper reaches.

7. Ascend 50 metres on snow to where the couloir branches off left and becomes a gully.

8. Climb a rock bulge (30 metres) and then up steep snow for 100 metres. May be difficult to secure belays on this section. (The gully to the left also seems feasible).

9. At this stage the route arrives back on the East Ridge. There is a very prominent niche halfway up the ridge and this is a good bivouac site. A descent of 50 metres from the top of Section 7 is necessary. The route from here to the top of Indrasan equates to the Alpine Grading of Difficile (D).

10. Scale a short rock gully (10 metres) then ascend directly a steep snow slope to a snow ridge (30 metres).

11. Follow the snow ridge, which in parts is intricately crevassed. until the final bergschrund is reached.

12. Negotiate the bergschrund with little difficulty and move up two rope lengths on the final summit slope to the top.

THE BUDGET

by

Major J W Fleming, PARA

1. There are still one or two small bills to come in, even now. The income/expenditure account is:-

Income		*Expenditure*	
Members' Contributions	£3,854.00	Equipment	£2,323.70
Axel Heiberg Expedition	£ 300.00	Porters, Mules etc	£1,859.43
Director of Army Trg	£1,080.00	Accommodation	£ 487.11
Mount Everest Foundation	£ 100.00	Travel	£ 449.53
Nuffield Trust	£1,000.00	Presentations	£ 332.41
		Customs Agent	£ 220.75
		Miscellaneous	£ 182.43
		Ents (Press Confs)	£ 163.16
		Food	£ 119.33
		Insurance	£ 100.00
		Photography	£ 57.44
		Radio Licences	£ 14.17
TOTALS	£6,334		£6,309.46

This leaves an excess of income over expenditure of £24.54, which has now been absorbed by the new Himalayan Venture Account, held by Williams and Glyn's Bank against the 1975 and 1976 Expeditions.

2. It should be explained that the equipment expenditure included the sums spent on oxygen equipment. It is interesting to note that over half the income was provided by the individual members of the expedition themselves.

3. The team are extremely grateful to The Secretary of the Nuffield Trust, to the Director of Army Training and to The Mount Everest Foundation for their very generous contributions to the expedition, and for their continuing support for Army Mountaineering Association Expeditions. Without this support the Association would not be able to mount such ambitious undertakings.

4. We are also very grateful to Williams and Glyn's Bank, Holt's Branch, for continuing to be our Bankers for our ventures.

MEDICAL REPORTS

by

Lt Col R H Hardie, RAMC

1. The decision taken in the planning stage of the expedition, to divide into two parties each to tackle one of the main, widely separated objectives made the inclusion of two doctors essential. The original intention to further split the Menthosa party to make concurrent attempts to Menthosa and Baihali Jot made the inclusion of a third doctor highly desirable. Three doctors were therefore included on the expedition. These were, with the Indrasan party, Lt Col R H Hardie, and, with the Menthosa party Surg Cdr P N Dilly, GM and Major J S K Swanston.

2. All members of the expedition had been required to have a medical examination before leaving UK and had been advised to ensure that they were dentally fit.

3. Members were instructed to have immunization against smallpox, typhoid, paratyphoid, tetanus, cholera and poliomyelitis brought up to date. Gamma Globin was given on the day prior to departure as a protection against infective hepatitis. Anti-malarial prophylaxis, to cover the periods spent in Dehli, was enforced.

4. The main conditions affecting expedition members were:

a. Injuries

(1) There were two cases of back strain. One was a recurrance of an old injury which started in Dehli and continued to give symptoms throughout the expedition. The other was an acute episode which settled quickly with rest.

(2) There were two ankle injuries. The more serious was a fractured ankle at the site of a previous fracture, sustained by one of the Indian Liaison Officers. This was treated in Plaster of Paris and was healing well at the end of the expedition. The second was a severe sprain that happened on the Indrasan march-in. This was treated with strapping and rest but delayed his arrival at Base Camp for five days and continued to give trouble for a further two weeks.

b. **Gastro-intestinal Upsets.** Almost all the members suffered either in Dehli or at Raison. There was one case of severe gastro-enteritis with dehydration. Most responded well, but slowly to treatment. There were no cases at altitude when only Army rations and melted snow were consumed.

c. **Respiratory Tract Infections.** Five cases occurred. Three responded well to anti-biotic therapy but the other two had to be evacuated from the mountain down to about 8,000 feet before there was any improvement. It is interesting that in both these latter cases there was a history of respiratory infection in the month preceding the expedition.

d. **Cold Weather Injury.** Twelve members suffered cold injury to the toes affecting from one toe to all ten. This consisted of numbness and "Pins and Needles" and all recovered completely within four weeks. Predisposing factors were tightness and wetness of boots and socks.

e. **Snowblindness.** There were 3 cases all of which responded well to treatment and settled within 24 hours.

f. **Altitude sickness.** There were nine cases of mild altitude sickness. Of these, four occurred on the first day of the Menthosa March - in when the Rohtang Pass (c 13,250 ft) was reached. All other cases occurred at over 16,000 ft and all responded to treatment and to a drop in altitude. Only one case recurred when subsequent higher altitudes were reached.

5. Simple tests of acclimatisation, consisting of measurement of pulse and respiratory rates at rest and following step-ups were carried out at various altitudes. The tests were unpopular but the results were good.

6. LOCAL TREATMENT

About 160 of the local population were treated by the doctors. These consisted both of porters and the inhabitants of villages along the routes. Clinics, held at each overnight stop, were very popular and a wide range of conditions including tuberculosis, stroke, heart failure, arthritis, conjunctivitis and numerous traumatic conditions were seen. Treatment unfortunately, had to be, in many cases, superficial as it was not possible to investigate or follow up cases but some cases from the march-in were seen again on the return journey and were found to be much improved. Two such cases worthy of note were, firstly, a girl with a badly burned arm and shoulder which was clean and almost healed one month later, and, secondly, a boy with a severe laceration of the leg which had been sutured and was completely healed. One dental extraction was successfully carried out.

7. MEDICAL EQUIPMENTS AND DRUGS

The Medical Equipment and supplies taken are listed at Appendix 1. These, on the whole, were adequate but the following suggestions are made for future expeditions.

a. Kits Individual First Aid (J packs), a standard Army pack, was issued to each member and on this occasion was adequate. An individual First Aid pack with a wider range of drugs, and instructions in their use, is suggested for the future.

b. There should be a pre-packed medical pack for each of the high camps as well as a doctors pack which should be at whichever camp the doctor is occupying at the time.

c. Increased quantities of the following are recommended:

Norgesic, Codeine, Mist Kaolin et morph, Lomotil, Uvistat Cream.

d. The following additions are recommended:

Sulphonamides	Triplopen 1M	Uvistat L	Ronicol
Ronicol Timespan	Brulidine	Vaseline	Vitamin C
Corn Plasters	Cutter for POP		

MEDICAL EQUIPMENT

DRUGS

Albucid eye ointment	tubes	96
Aluminium hydroxide	tabs	500
Aminophylline 250 mg in 10 ml Amp		20
Anthisan	tabs	100
Anti-louse powder	tins	4
Anusol ointment	tubes	12
Anusol Suppositories		100
Aspirin Soluble	tabs	1,000
Avomine 25 mg	tabs	250
Benzyl Benzoate	mils	500
Betnovate - N ointment	tubes	12
Chloromycetin eye drops 5 ml		4
Clove oil	mls	100
Dequadin lozenges		500
Dextran	litres	2
Digoxin 0.25 mg	tabs	200
Efcortelan - N eye/ear drops 5 ml		12
Fortral 25 ml	tabs	100
Gentian Violet	mls	200
Hartmans solution	litres	2
Kaolin et morph	litres	2
Ketalar 10 ml		6
Lasix 40 mg	tabs	100
Lasix inj	amp	5
Lignocaine 1%	10 ml	10
Lignocaine 2% Dental cartridges		100
Lip salves		30
Lomotil	tabs	100
Minims Amethocaine		100
Mogadon	tabs	500
Mycota powder	tins	24
Neomycin ointment	tubes	5
Nupercainal ointment	tubes	12
Omnopon syrettes		36
Paludrin	tabs	3,000
Papaveretum & Scopalomine	amps	12
Paracetamol	tabs	500
Penbritin 250 mg	caps	500
Pethidine 50 mg	tabs	100
Pethidine inj 100 mg	amp	65
Phenobarbitone 60 mg	tabs	100
Piperazine elixir	mls	500
Senokot	tabs	400

EQUIPMENT

Diagnostic set	2
Sphygmomanometer	2
Stethescope	2
Torch	2
Thermometers	6
Scalpel handles	3
Scalpel blades No 11	12
" " No 22	36
" " No 24	36
Needle holders	2
Spencer Wells forceps	6
Mosquito forceps	2
Tissue forceps	3
Tissue forceps (toothed)	3
Scissors	4
Dental mirrors	2
Cartridge syringe	2
Mitchell Trimmer	2
Dental forceps No 29	2
" " No 74	2
" " No 76	2
Syringes disposable 2, 5, 10 ml	150
Needles Hypodermic various	300
Kidney dish 8"	2
Suture needles packets	12
Needles, surgeon set	2
Suture chromic No 1	12
" " No 5	12
Suture silk No 4	12
Aneurism needle	2
Needle ligature	2
Heimlich chest valve	2
Trocar cathetor	4
Blood administration set	2
Nelatin catheter	2
Endotrachial tube	2
Naso-fundal tube	2
Eye bath	2
Nail brush	2
Spatulas wooden	1 box
Orange sticks	2 boxes
Plastic bottles 1 litre	12
" " 250 ml	24

DRUGS (Contd)

Sonalgin	tabs	100
Stelazine 1 mg	tabs	50
Stemetil 5 mg	tabs	100
Tetracycline 250 mg	tabs	500
Uvistat cream 50 g	tubes	50
Valium 10 mg	tabs	100
Vitamin capsules		500
Xylodase ointment	tubes	3

EQUIPMENT (Contd)

Plastic pill boxes small	50
" " " medium	50
" " " large	50
Safety pins	144
Sterile gauze swabs pkts	8
Sterile cotton wool balls pkts	4
Paraffin gauze tins	3
Cotton wool 1 oz compressed	36
Cotton wool 16 oz rolls	4
Airstrip dressings tins	4
Crepe bandages 3"	24
" " 6"	12
Elastic bandage 6"	6
Bandages 2"	12
" 6"	12
Dressing No 10	20
" No 11	20
" No 12	20
Triangular bandage	36
Shell dressings	50
Elastic adhesive bandage 1"	15
" " " 3"	10
Steri-strip pkts	6
Inflatable splint tib & fib	3
" " femur	3

REPORT ON PHOTOGRAPHY

by

Lt Col J D C Peacock, REME

BACKGROUND

1. This report was written some months after the expedition returned to UK and after all the exposed film had been processed. The results generated more than a little heart searching in an attempt to identify where things had gone wrong. Photography is a combination of art and applied science and, while some of this report is reasonably objective, the remarks about subject matter, composition and lighting must necessarily represent a personal view.

2. Much of what follows is coloured by previous experience on earlier expeditions although none of these was to the Himalayas. On this expedition we tried out new ideas generated from old experience and sometimes relied on established methods. In nearly every case we learnt something of value.

AIM

3. The photographic aims of the expedition were limited to

   a. Obtaining a comprehensive record of the expedition from which to select a set of colour transparencies which could be used to illustrate lectures.

   b. Obtaining sufficient illustrative material for the expedition report.

   c. To gain experience of the problems of photography in the Himalayas.

PREPARATIONS

4. It was decided beforehand to concentrate on colour photography, though not to the total exclusion of black and white. It was considered easier to film in colour only in most instances and make black and white negatives from selected transparencies where this was desirable.

5. Five photographers were nominated: Beckett, Muston and Peacock in the Menthosa party and Hardie and Hellberg in the Indrasan party.

6. Nearly all the members of the expedition had their own cameras however and it was anticipated that any gaps in the 'official' record could be filled from the general selection. A brief resume of the problems and aims of expedition photography was given to all members.

EQUIPMENT

7. Cameras

a. 3 Pentax SLR cameras were obtained from Ordnance. These were fitted with standard Takumar 50mm lenses. 85mm telephoto lenses were also supplied.

b. Muston and Peacock used a privately owned Leica IIIc and Nikkormat SLR respectively. The Leica was used with the standard Leitz Elmar f3.5 50mm lens, the Nikkormat was used with a Nikkor f3.5 43–86mm zoom lens and a Nikkor f2 50mm lens.

c. Of the numerous 'unofficial' privately owned cameras on the expedition the Rollei 35 was by far the most popular. Nearly all the Rolleis were made in Singapore.

d. None of the cameras was specially prepared for the expedition.

8. Accessories

a. Filters. 'Skylight' and orange filters were used as appropriate on the Pentax and Nikkormat cameras. The Leica had a Wratten 1A gelatine filter fitted behind the lens. A polarising filter was also used on the Nikkormat.

b. Lens hoods. Lens hoods were always used. The Nikkormat and at least one Rollei were fitted with collapsible rubber lens hoods.

c. Exposure meters. Pentax and Nikkormat SLR cameras all had built in 'through the lens' CdS meters. Muston used a Weston Master IV meter with his Leica.

d. Cleaning materials. 'Blow brushes', lens tissues, lens cleaning fluid and "Calotherm" impregnated anti-static lens cloths were purchased for the 'official' photographers.

FILM

9. Colour Film. A general attempt was made to standardise on one type of colour film for official and unofficial photographers alike with a view to avoiding the differences in colour balance inevitable in a mixed bag of slides. Kodachrome II was chosen on the grounds that

a. experience indicated that its particular colour balance produced the best results and that this advantage outweighed the disadvantage of its limited latitude

b. bright lighting conditions anticipated in the mountains would overcome the disadvantage of its relatively slow speed.

c. As a group the official photographers were more familiar with this film than any other.

Since Kodachrome is no longer available as a Service item a Local Purchase Order was obtained for 100 cassettes of 20 exposures each.

10. Black and White Film. Kodak Plus X was chosen as a good compromise between reasonable contrast and speed. 60 cassettes (36 exposures each) were supplied by Ordnance.

RESULTS

11. Equipment Reliability. The three types of camera used by the official photographers proved reliable except in the case of one Pentax in which the re-wind mechanism jammed. This could not be repaired but since it happened near the end of the expedition did not affect results significantly. In contrast several of the privately owned cameras gave trouble of one sort or another; in particular nearly all the Rollei 35 cameras developed faults, some of which rendered the camera useless. Only on one occasion did a camera freeze up and it is reasonable to conclude that special preparation is not necessary for altitudes up to 22,000 feet.

12. Cameras. The Pentax, Nikkormat and Leica were all suitable cameras, each having peculiar advantages and disadvantages, viz:

a. Pentax. Reasonably light and not too bulky, robust, but lacking the versatility of a zoom lens (although zoom lenses can be purchased to fit the Pentax).

b. Nikkormat. Very versatile when fitted with the zoom lens (an even longer lens would have been an advantage) but rather heavy (just over 3 lb with zoom lens and case).

c. Leica. Compact, light and rugged but with the minor disadvantages of a range-finder camera (cf SLR).

The popularity of the Rollei 35 stems from its eminent suitability as an expedition camera. Its small size and light weight make up for its limited versatility and somewhat fiddly operation. Nevertheless the unreliability of several of the Singapore manufactured cameras indicates that there may be room for improvement in this respect.

13. Lenses.

a. Resolution of all the cameras mentioned proved adequate for the purpose (i.e. slides for lectures).

b. The 85mm Takumars supplied for the Pentax cameras were particularly useful for mountain scenery.

c. The 43–86mm Nikkor proved extremely versatile. In spite of its weight and bulk it was used exclusively on the Nikkormat and was carried to the summits of both Menthosa and Baihali Jot. It is worth mentioning however that on this particular lens although some compensating adjustment is made automatically the action of zooming still appears to alter the amount of light entering the camera so that exposure settings must be made after the focal length has been selected. This fact is not immediately evident and is not recorded in the manufacturer's literature. Unfortunately it was directly responsible for several incorrect exposures during the expedition (the photographer's limitations notwithstanding!).

14. Filters. These proved adequate but it is noteworthy that even the 'Skylight' filters did not absorb all ultra-violet radiation at high altitudes at times when the sun was high. The polarising filter proved particularly useful in reducing high levels of glare. On the other hand it represented one more complication and was probably only of real value near the middle of the day. Its high filter factor (x3) made it almost impossible to use in the dull lighting conditions experienced in the lower valleys. In these circumstances however its use would not be of any particular value.

15. Lens Hoods. Lens hoods were used by all photographers. The collapsible rubber lens hoods were very popular with those who used them.

16. Cleaning Materials. All were adequate and the lens brushes essential; the "Calotherm" anti-static cloth proved excellent: it was easy to store, proved ideal for lens cleaning and in general seemed to be a better accessory than lens tissues.

Colour Results

17. Processing. Shortly after the expedition returned to UK an industrial dispute developed at Kodaks. Most 'private' film was submitted immediately and was returned in a satisfactory condition. The official film was not sent until a 'test' film had been processed and by this time the dispute had reached such proportions that long delays were inevitable. Eventually the processed film was returned in four 'lots'. One of these was satisfactory but film in the remaining parcels had a strong green bias and was therefore useless.

18. Exposures. It may be significant that, in general, exposures calculated using a "full field" meter (e.g. Weston Master V, or the Rollei 35 built in meter) appeared to give better results overall than 'through the lens' metering. In the absence of any control however it is impossible to be categoric about this; there are too many variables and photographers used different cameras. The effect of the zoom lens has already been noted (para 9c). It is possible that photographers were not sufficiently familiar with the technique of using a 'centre loaded' metering system. Taken overall however there was a disappointingly high proportion of incorrect exposures even after allowing for one instance where a mis-interpretation of the handbook appears to have led to a situation where correct exposure could only have been fortuitous.

19. Lighting. The most pleasing results were often obtained when the sun was comparatively low in the sky, thus reducing the flat glare from the snow. Likewise 'contre-jour' shots proved the most effective particularly when the sun was high. As was to be expected conditions in the mountains were usually extremely bright; in contrast lighting in the deep steep sided valleys was often dull. Even on a sunny day, light values in Delhi were surprisingly low.

20. Composition and Content. Standards of composition varied from photographer to photographer. However, there appeared to be a general tendency to shoot almost indiscriminately, at least as far as composition was concerned, in order to obtain a complete record of every activity. Even so there were gaps in the coverage, notably where the climbing was particularly sustained, arduous or exhausting. In the circumstances this is hardly surprising - even though these may be the aspects one wants to record most. There was a lack of 'close-ups' in some instances, particularly as foreground to more distant views. By the same token, there was a high proportion of long shots of mountain vistas which, though they look magnificent when spread out in front of one, are seldom so effective on film. This is particularly so when the lighting is high and direct.

21. Selection. In spite of the large number of ruined slides due either to processing defects or incorrect exposure, a preliminary selection produced 150, more than enough to illustrate the official presentation of the Expedition's activities in both the Indrasan and Menthosa areas. Nevertheless it is fair to say that the standard is less than consistent and would clearly have been better had it not been for the errors in processing and, to some extent, in exposure. It should also be said that this selection was only made possible by reinforcements from pictures taken by other members of the expedition.

Black and White Results

22. A much smaller proportion of black and white film was exposed but the results appear better than the colour results taken overall. At the time of writing a selection for the report has not been made but there should be no difficulty in providing adequate black and white coverage. In this respect of course it will be possible to obtain black and white negatives even from the incorrectly processed colour film although this is a somewhat costly and time consuming process.

CONCLUSIONS

23. Colour. Although an adequate selection of transparencies has been made the colour photography can hardly be regarded as an unqualified success. Numerous factors contributed to this, not the least of which was outside the Expedition's control. In most other cases the correction of errors is obvious enough and the lessons are enumerated below.

24. Black and White. Although so far the selection for the Report has not yet been made there is no apparent reason why the aim in this respect should not be achieved. However it is worth noting that because of the time involved it is impossible to rely on obtaining black and white prints from colour film for immediate use (e.g. press conferences, displays).

25. Experience. Considerable experience was gained on this expedition, no doubt rather more than would have been the case had the results been more successful. As it was the lessons either learnt or re-learnt were many and could be said to be the most valuable facet of this aspect of the expedition.

LESSONS AND RECOMMENDATIONS

26. Colour Film. The high incidence of wrongly exposed film indicates that better results would probably have been achieved had we used a colour film with greater exposure latitude. Ektachrome X would have been very suitable and on occasion its higher ASA rating would have offered advantages over Kodachrome II. In the unlikely event of the higher speed proving an embarrassment a neutral density or a polarising filter could be used to counter this.

27. Black and White. On this expedition the 'aim' was wrong in so far as it did not include provision of black and white pictures for the Press and for displays. Clearly there is no time to meet this demand from re-photographing colour transparencies and it is essential to include complete black and white coverage.

Equipment

28. Familiarity with Equipment. It was clear that at least some of the errors on the expedition were due to photographers' unfamiliarity with the equipment. The remedy is obvious. What may be less obvious is that it may be preferable for a photographer to use his own camera (provided this is of reasonable quality) rather than use an 'expedition' camera with which he is less familiar.

29. Prior Testing. All equipment should be tested thoroughly beforehand. In particular this should include the calibration of built-in and external light meters in conjunction with the associated cameras. It would also be worthwhile calibrating cameras normally used with built in meters against any separate meters taken on the expedition. Daytime temperatures do not call for any special preparation of the cameras.

30. Automatic Cameras. The effects of altitude and fatigue can easily lead to errors in handling equipment. There is a strong case therefore to include small fully automatic cameras for use at altitude, despite their inherent disadvantages of cost, complexity and limited versatility. Reliability can at least be checked beforehand.

31. Filters. The strongest possible ultra-violet filters are essential and cheap makes should be avoided. A polarising filter is well worth including but one needs experience to achieve the best results.

Techniques

32. Exposure. While a slightly underexposed film may be acceptable this is seldom the case with overexposures. It pays therefore to err on the side of underexposure. However, related to other items, film is neither costly nor particularly heavy so that it is obviously worthwhile to make two or three different exposures of the same subject where there is the slightest doubt about the correct exposure. This must apply particularly when the subject is unique or of outstanding pictorial or other merit.

33. Lighting. Best results are obtained when the sun is comparatively low in the sky. It is extremely difficult to get pictures of any merit taken in the middle of the day. This applies particularly with snow scenes and general mountain vistas. With the sun at a lower altitude not only do shadows add depth and life but the ultra violet content of the light is considerably reduced. Colours tend to be more vivid too.

34. Subject Matter. While it is obviously desirable to get as complete a photographic record as possible there is little point in taking a picture which is so lacking in pictorial merit that it will never be used. By the same token there is little to be gained by taking large numbers of pictures of similar subjects. It would be much more profitable to be more selective in subject matter but use additional film to ensure a perfect picture from the point of view of trying both different compositions and different exposures. At the same time however it is well worth while keeping a standard setting on the camera so that the opportunity of a quick shot of a fleeting incident (e.g. an avalanche) will not be missed. If time allows a second attempt will allow a closer approach to perfection - but the first quick shot at least makes certain that the action is recorded. It obviously demands more than ordinary determination to secure pictures of difficult or dangerous situations but because they are the most interesting not only must they be planned and allowed for if at all possible but every member must have a clear understanding of their importance.

35. Composition. Photographs of wide mountain vistas are frequently disappointing; it nearly always pays to get in close either physically or with a long lens. Although the eye can see over a very wide angle (nearly 180^{o}) we tend to concentrate on a much narrower sector of the field of view, very often only about half that covered by a standard 50mm lens. To achieve the same effort in a photograph one should use a lens of the order of 85mm to 105mm focal length. Close-ups of people add interest and while they themselves may constitute the subject

matter they should not be ignored as foreground to lend colour, balance or interest to more general views. In this respect it is by no means necessary to include the whole of a figure (it is generally advisable to include the head though) - and of course a variety of inanimate objects can be pressed into use to provide foreground close-ups. Selection of photographs is necessarily an individual and fairly subjective matter but it is not without significance that when a number of slides are examined together (say, on a light box) the ones which stand out immediately are those which contain a bold pattern of shapes, colours and contrasts.

Administration

36. **Processing.** It would seem well worth while in the face of any hint of processing difficulties due to industrial disputes or any other reason to send film to processing plants elsewhere (in the case of Kodachrome, France, Holland or Germany). This factor also reinforces the recommendation to use Ektachrome X because processing facilities for this film are not limited in UK to only one plant.

37. **Private Film.** To avoid misunderstanding and difficulties after the expedition it is worth obtaining formal agreement from all members beforehand that the expedition has first call on all film irrespective of the photographer. It would probably facilitate this arrangement and be an aid to standardisation if the expedition provided film for all members.

38. **The Aftermath.** The task of processing and selecting from a vast number of photographs, not to mention copying and enlarging, is very time consuming. Unless it is acceptable for this to drag on over several months, if not years, it is desirable that this is co-ordinated by one person who is completely free of other commitments. It is also very important that arrangements for processing are made before the expedition, and to ensure not only that the agency is able to undertake the commitment but that there is a clear understanding of the quantities and degree of urgency involved.

METEOROLOGICAL REPORT

by

Captain P B Page, RE

1. INTRODUCTION

The aim of this short report is twofold; firstly to give a factual report on the weather conditions we experienced and secondly to explain briefly in some instances the reasons behind the conditions.

2. The report is divided into 3 phases as follows:

a. Conditions during the approach to the mountains i.e. from New Delhi to Base Camp.

b. Conditions above Base Camp.

c. Conditions from Base Camp to New Delhi.

3. The author was a member of the Menthosa party and as such this report deals basically with that area. It may be assumed (I hope rightly!) that similar types of conditions were occurring in the Indrasan area.

4. THE APPROACH - NEW DELHI TO BASE CAMP

Although we were eased into warmer weather via Cyprus and the Persian Gulf it was still quite a shock to step from the aircraft at New Delhi into a shade temperature of 110°F! The hot weather in India usually commences about February and continues until June. The hottest temperatures normally being recorded towards the latter end of this period as the land has then been subjected to constant heating for several months. Because of the tremendous heating effect during the day the night time temperature falls only a small amount it being about 85 - 90°F during the period we were in Delhi initially.

5. Naturally it was a great relief to leave Delhi but the temperature does not fall appreciably until one has left the great Indian Plain and has started to climb into the foothills of the Himalayas. The temperature falls about 3°F per 1,000 ft (the lapse rate) up to about 10,000 ft after which it drops more rapidly. Between 16,000 and 20,000 ft it drops about 4°F per 1,000 ft because one is above the average upper limit of the lower clouds.

6. At Raisan it was pleasantly warm during the day 70 - 80°F.

7. From Raisan to Base Camp only the lapse rate made any appreciable difference to the temperature, there being little or no wind.

8. The skies were generally clear throughout this period although local clouds could be seen over the distant mountains.

9. THE CLIMBING - ABOVE BASE CAMP MENTHOSA

From Base Camp (10,000 ft) to Advance Base Camp the weather was clear and hot sunny days and cool evenings characterised this period. As soon as the sun set the land radiated its heat quickly and it was generally necessary to wear a pullover or duvet.

10. Above Advance Base Camp (14,500 ft) conditions changed quite dramatically. We were subject to much more localised mountain weather. The first week's weather can be summarised as follows; it varied little day by day.

a. Hot sunny mornings with a Mean Shade Temperature at 14,500 ft of 18°C

b. Cloud over Menthosa by 1100 hrs (Indian Standard Time) 8/10 cloud by late afternoon
Late afternoon winds

The clouds were formed by the warm air rising, cooling and then condensing, this effect gradually building up during the day.

The wind, which was always more apparent in the late afternoon and evening, was a katabatic or gravity wind. The air in contact with the snow higher on the mountain cooled, became more dense and under the action of gravity flowed down the slopes towards the valleys.

11. On 24th May a storm in the afternoon forced a party carrying loads from Advance Base to Camp I to camp in a col about 1 hour short of Camp I. This storm lasted all afternoon and cleared during the night.

12. From 24 - 27 May the weather improved although there was still cloud in the afternoon. The average minimum temperature during this period was -10°C at 14,500 ft.

13. On 27 May a storm broke that lasted 3 days. Although the weather was generally good enough to allow something to be done in the morning, the storm returned by mid-day or earlier. The average minimum temperature during this period was -4°C.

14. From 28 May until we left Advance Base Camp on 12 June the weather returned to its normal pattern. The average temperature at Camp 2 during this period was -20°C. The lowest temperature recorded during this period was -28°C at Camp 3 (18,350 ft).

15. The weather was good from Advance Base to Base Camp.

16. THE CLIMBING - ABOVE BASE CAMP - BAIHALI JOT AREA

The weather from Base Camp to Advance Base in the Baihali Jot area was again very good but from the 19 June it gradually deteriorated. It is probable that we were being influenced by the summer monsoon blowing from the south west.

17. During the period 19 - 25 June the weather was rarely good for more than 24 hours. There were some periods of sunny weather but on every day there was an increasing amount of cloud and snow fell above 13,000 ft. The average minimum temperature at Advance Base Camp (14,300) was -3½°C. All the surrounding summits circa 18,000 ft were in cloud for all or part of this period.

18. The weather improved a little for the march out from Advance Base to Base Camp and it was generally sunny and fine.

19. THE MARCH OUT - BASE CAMP TO NEW DELHI

The weather from 26 June - 1 July was stable. It was very warm and the humidity had increased appreciably since the march in.

20. We learnt that the monsoon had "broken" in Raisan but we had little effect of this north of Rhotang Pass. Because of the deviation due to the earth's rotation the SW monsoon

turns NW and in the Kulu Himalaya it has little effect on the mountains. The Rhotang Pass is a convenient place to draw the line and the local inhabitants do not consider the monsoon to have any effect northwards of the Pass.

21. During the period we were in Raisan (1 - 8 July) we were subject to the normal monsoon weather for this time of the year. It was warm during the day but there was normally about 5/10 cloud. Storm clouds would build up over a period of about 6 hours and torrential rain would fall for 1 or 2 hours accompanied by thunder and lightning. Carefully packed stores and equipment had to be unpacked when we were caught unawares by the rain in the middle of the night 4 July.

22. New Delhi was cooler now than it had been in April. The shade temperature was about 90°F and the humidity about 65%.

23. FORECASTING

The Indian Authorities had made available to us a daily weather forecast for our particular area. For various reasons we were rarely able to pick this up on our radios.

ORNITHOLOGICAL REPORT

by

Major G F Owens, WFR

1. The Expedition flew by courtesy of the RAF from UK to New Delhi. Here we languished for seven days whilst the difficulties of our stores were sorted out with the customs. This stay did, however, allow some time to look at the birds. The British High Commission compound with an abundance of water, flowering shrubs and trees provided a rich source of our feathered friends. Of the many common species I was particularly delighted to observe the beautiful Golden Orioles, Kingfishers (Common and White Breasted), Indian Rollers, Purple Sunbirds, and Hoopoes. Pied Mynas, Bay-backed Shrikes, Magpie Robins and White Eyes took my eye because of their vivid markings. Skulking birds included the Common, Large Grey and Yellow-eyed Babblers. Many birds made their presence known by their calls. Indeed it would be difficult to ignore the Tailor Bird, Rose Ringed Parakeet, and Red Wattled Lapwing. To complete the scene Pariah Kites, Egyptian Vultures, White backed Vultures circled overhead together with myriads of White rumped Swifts. A false impression would be given if I did not mention the presence of numerous Common and Bank Mynas, Drongos, Red Vented and Whiskered Bulbuls, Spotted Doves and White-breasted Munias. I was reminded of the time of season when a Bluethroat appeared in winter plumage.

2. An early morning visit to Sultanpur (about 30 miles from Delhi) was well worthwhile, though I was assured that winter is the ideal time when vast flocks of wintering populations of ducks, storks, flamingoes, pelicans and spoonbills are present. The lake had shrivelled to a mere pond at this time of the year. There I watched the display of a pair of tall and elegant Sarus Cranes. They do become somewhat undignified when they leap vertically into the air during their antics. Present in small numbers were Black-necked Storks, and Painted Storks. Amongst these birds I picked out one Pelican, one Flamingo, one Spoonbill and one Grey-Heron. Both on the journey to Sultanpur and on the return therefrom delightful Green Bee-eaters were perched on the telegraph wires. Good views were also obtained of the diurnal Barred Owlet.

3. The month of May in New Delhi is scorching - maximum daily temperatures ranging from 108° to 112°F - so it was with considerable relief that the expedition departed for the Kulu Valley. A very good camping site was established in an apple and plum orchard - Jimmy Johnson's Orchard Farm - at Raisan (4,500 ft). The foothills of the Himalayas are ideal rest havens for heat afflicted Europeans who work or tour the sub continent of India.

4. In the vicinity of the orchards new species of birds were present. Particularly evident were the Paradise Flycatchers. Seeing them in flight made you think that you were indulging in fairy-tale dreams. In the same tree those splendid birds, Golden Orioles, Drongos and White-breasted Kingfishers all appeared simultaneously in binocular vision. A common bird here was the Yellow Billed Blue Magpie, but my eyes never tired of gazing on this magnificent looking bird. Hoopoes, Common Mynas, Grey Tits, White Cheeked Bulbuls and Little Brown Doves were also common. I was thrilled early one morning to catch the fleeting but vivid view of the Yellow Backed Sunbird - a worthy equal to the Hummingbirds of the West Indies. Another bird which took my eye was the Collared Scops Owl.

5. Other birds present in the Kulu Valley were the Parish Kites, Egyptian Vulture, Griffon Vulture, Lammergeier, Kestrel, Jungle Crow, Black Bulbul, Collared Bushchat, Dark Grey Bushchat, Indian Redstart, Plumbeous Redstart, Cinnamon Tree Sparrow, Brown Fronted Pied Woodpeckers and White Eyes. A fuller list is attached as Annexures to this Report.

6. There finally came a time when we ran out of excuses for staying in the beautiful valley, so we departed for the mountains. We walked into Base Camp by way of Naggar and the Chandra Khani Pass.

7. Almost inevitably the first bird that you see once you leave the tree-line and enter the world of rock and of glacial torrents is the Plumbeous Redstart. This bird must be impervious to the ice cold temperature of the water it flits over. Overhead the various raptors wheeled, soared and swooped in the thermals.

8. The Chandra Khani Pass in May is covered in snow and so it was with difficulty that we succeeded in securing a safe passage for our porters with their heavy loads.

9. Once on the other side we descended again into the warm, green, soft world of the somewhat isolated middle Himalayas. A very clever porter actually caught a Monal Pheasant amongst the rhododendron shrubs - an impressive and imperious bird. A little further along the trail I saw a Red Flanked Bush Robin and a Bullfinch.

10. The avian fauna on the outskirts of the last inhibited village, Malana, we passed was limited but provided new species not previously located. These included the Indian Bush Chat, Simla Black Tit, Sooty Flycatcher and the Himalayan Nutcracker.

11. It took a further three days to reach Base Camp. This bleak spot was sited at 12,500 feet on the lateral morraines of the Malana Glacier. At this time of year snow and ice lay thickly on the ground, but later when summer arrived the snow melted to reveal gorgeous alpine meadows richly endowed with numerous alpine flowers.

12. The Upland Buzzard was seen daily and provided endless fascination with its soaring displays. I was reminded of the Honey Buzzard when looking at its shape and silhouette. To remind me that I had not escaped the Western World a small number of House Martins appeared daily, and so too did the ubiquitous Cuckoo. It seemed bizarre to hear this bird so far away from its, to me, normal home.

13. Because of the stark surroundings the smaller birds were seen in clear relief. Very close up views were enjoyed of the Himalayan Rubythroat, Hodgson's Grandala, Tickell's Willow Warbler, Blue Fronted Redstart and the Upland Pipit. Good views were obtained of the Rufous Hedgesparrow, Black and Yellow Grosbeak, Hodgson's Rosefinch and the strikingly handsome Snow Pigeon. Tantalising glimpses of the Himalayan Snowcock were available but not once did I have the time to study these birds properly. A nearby wood (11,000 feet) revealed the presence of Yellow-bellied Fantail Flycatcher.

14. On this my third visit to the Himalayas I had been most fortunate in the rich variety of birds. The widely differing habitats ensured an interesting cross section of birds. The thrill and wonder of seeing new birds can be compared to one's childhood and the growing awareness of life before it becomes all too familiar and commonplace. Perhaps when we become adults and there is little in the normal way of life to surprise our complacent selves we nostalgically recall our pleasure and wonder of discovery in childhood. It was pleasant to experience this feeling once again.

Appendix 1 - List of Indian Hill Birds observed.
Appendix 2 - List of Indian Plain Birds observed.

List of Indian Hill Birds (Salim Ali) observed by Major G F Owens, WFR

1. Jungle Crow (Corvus (Corvus Macrorhynchos)
2. Yellow-billed Blue Magpie (Urocissa Flavirostris)
3. Himalayan Tree-Pie (Dendrocitta Formosae)
4. Himalayan Nutcracker (Nucifraga Caryocatactes Hemispila)
5. Chough (Pyrrhocorax Phyrrhocorax)
6. Alpine Chough (Pyrrhocorax Gracules)
7. Grey Tit (Parus Major)
8. Black Bulbul (Microscelis Psaroides)
9. Indian Blue Chat (Luscinia Brunnea)
10. Dark Grey Bush-Chat (Rhodophila Ferrea)
11. White-capped Redstart (Chaimarrornis Leucocephabus)
12. Plumbeous Redstart (Rhyacornis Fuliginosus)
13. Black Redstart (Phoenicurus Ochrurus)
14. Himalayan Rubythroat (Calliope Pectoralis)
15. Bluethroat (Cyanosylvia Svecica)
16. Red-flanked Bush-Robin (Ianthia Cyanura)
17. Rufous-breasted Hedge-Sparrow (Prunella Strophiata)
18. Sooty Flycatcher (Hemichelidon Sibirica)
19. Verdita Flycatcher (Eumyias Thalassina)
20. Brown Flycatcher (Alseonax Latorosttis)
21. Grey-headed Flycatcher (Culicicapa Ceyloneusis Pallidor)
22. Yellow-bellied Willow Warbler (Phylloscopus Affinis)
23. Large Crowned Willow Warbler (Phylloscopus Occipitalis)
24. Grey-headed Flycatcher-Warbler (Seicerous Xanthoschistos)
25. Yellow-bellied Fantail Flycatcher (Chelidorhynx Hypoxanthum)
26. Brown Hill Warbler (Suya Criniger)
27. Black and Yellow Grosbeak (Perissospiza Icteroides)
28. Bullfinch (Pyrrhula)
29. Rosefinch (Carpodacus Roseatus)
30. Cinnamon Tree Sparrow (Passer Rutilans)
31. Crested Bunting (Melophus Lathami)
32. House Martin (Delichon Urbica)
33. Red rumped Swallow (Hirundo Daurica Nepalensis)
34. Eastern Grey Wagtail (Motacilla Cinerea Melanope)
35. Simla Yellow-back Sunbird (Aethopyga Gouldiae)
36. Himalayan Pied Woodpecker (Dryobates Himalayensis)
37. Brown-fronted Pied Woodpecker (Dryobates Auriceps)
38. Slaty-headed Parakeet (Psittacula Himalayana)

39. Blyth's White-rumped Swift
(Micropus Pacificus Leuconyx)

40. Collared Scops Owl
(Otis Bakkamoena)

41. Himalayan Griffon Vulture
(Gyps Himalayensis)

42. Lammergeier (Gypaetus Barbatus)

43. Upland Buzzard (Buteo Hernilasius)

44. Wedge-tailed Green Pigeon
(Sphenocericus Sphenurus)

45. Snow Pigeon
(Columba Leuconota)

46. Rufous Turtle Dove
(Streptopelia Orientalis)

47. Himalayan Monal Pheasant
(Lophophorous Impejanus)

48. Chukor (Alectoris Graeca)

49. Himalayan Snowcock
(Tetracgallus Himalayensis)

50. Grandala (Grandala)

51. Blue Fronted Redstart
(Phoenicious Frontalis)

52. Cuckoo (Cuculus Canorus)

53. Simla Black Tit
(Lophophanes Rufonuchalis)

54. Meadow(?) Bunting
(Emberiza Cia)

55. Upland Pipit
(Oreocorys Sylvanus)

List of Indian Plain Birds (Salim Ali) observed by Major G F Owens, WFR

1. House-Crow (Corvus Splendens)
2. Grey Tit (Parus Major)
3. Common Babbler (Argya Candata)
4. Large Grey Babbler (Argya Malcolmi)
5. Yellow-eyed Babbler (Chrysomma Sinensis)
6. Red Vented Bulbul (Molpastes Cafer)
7. White Cheeked Bulbul (Molpastes Leucogenys)
8. Red Whiskered Bulbul (Otocomosa Jacosa)
9. Indian Bush Chat (Saxicola Torquata)
10. Indian Red Start (Phoenicurus Ochurus)
11. Indian Robin (Saxicoloides Fulicata)
12. Magpie Robin (Copsychus Saularis)
13. Blackbird (Turdus Simillimus)
14. Malabar Whistling Thrush (Myophonus Horsfieldii)
15. Paradise Flycatcher (Tchitrea Paradisi)
16. Grey Shrike (Lannis Excubitor)
17. Bay Backed Shrike (Lanuis Vittatus)
18. Wood Shrike (Tephrodornis Pondicerianus)
19. Scarlet Minivet (Pericrocotus Speciosus)
20. Drongo (Dicrurus Macrocercus)
21. Tailor Bird (Orthotomus Sutorius)
22. Golden Oricle (Oriolus Oriolus)
23. Black-headed Myna (Temenuchus Pagodarum)
24. Common Myna (Acridotheres Tristis)
25. Bank Myna (Acridotheres Ginginianus)
26. Pied Myna (Sturnopastor Contra)
27. White Throated Munia (Uroloncha Malabarica)
28. House Sparrow (Passer Domesticus)
29. Large Pied Wagtail (Motacilla Maderaspatensis)
30. Crested Lark (Galerida Cristata)
31. White-Eye (Zosterops Palpebrosa)
32. Purple Sunbird (Cinnyris Tasiatica)
33. Crimson-breasted Barbet (Xantholoema Haemacephala)
34. Rose-ringed Parakeet (Psittacula Krameri)
35. Indian Roller (Coracias Benghalensis)
36. Green Bee-eater (Merops Orientalis)
37. Blue-tailed Bee-eater (Merops Superciliosus)
38. Kingfisher (Alcedo Atthis)
39. White-breasted Kingfisher (Halcyon Smyrnensis)
40. Hoopoe (Upupa Epops)
41. House-Swift (Micropus Affinus)
42. Spotted Owlet (Athene Brama)
43. White-backed Vulture (Pseudogyps Bengalensis)
44. Egyptian Vulture (Neophron Percnopterus)
45. Kestrel (Falco Tinnunculus)
46. Pariah Kite (Milvus Migrans)

47. Blue Rock Pigeon
(Columba Livia)

48. Spotted Dove (Streptopelia Chinensis)

49. Peacock (Pavo Cristatus)

50. Black Francolin (Francolinus Francolinus)

51. Sarus Crane (Antigone Antigone)

52. Red-wattled Lapwing (Lobivanellus Indicus)
Indicus)

53. Spoonbill (Platalea Leucorodia)

54. Black-necked Stork
(Xenorhynchus Asiaticus)

55. Painted Stork
(Mycteria Leucocephalus)

56. Grey Heron (Ardea Cinerea)

57. Pelican (Pelecanus Onocrotalus)

58. Greater Flamingo
(Pheonicopterus Ruber)

ORNITHOLOGICAL REPORT

by

Major A J Muston, RAOC

INTRODUCTION

This report is limited to the species seen North of the Rhotang Pass and takes no account of those seen to the South of the pass. It should be borne in mind that these notes are the result of a very amateur birdwatcher whose primary aim was mountaineering and who only observed the birds as and when opportunity permitted. It is within these limitations that this report is offered.

1. **RAVEN** (Corvus corax) Fairly frequent sightings up to about 14000 ft. Sometimes seen singly, at other times in pairs.

2. **CHOUGH** Both the red-billed (Pyrrhocorax pyrrhocorax) and the yellow-billed (Pyrrhocorax graculus) or Alpine Chough were seen daily in the Chandra valley and right up to almost the highest camps. The highest sighting noted was at about 18400 ft. on Menthosa. Both the red and the yellow-billed were seen in about equal numbers. Apart from the redstarts they were the specie most frequently seen.

3. **WHITE-CHEEKED BULBUL** (Molpastes leucogenys) A pair of these were observed during a days walk down the CHANDRA valley below ARAT at the end of the expedition. They appeared to be rather smaller than indicated by Salim Ali but the white cheek was very obvious.

4. **INDIAN BLUE CHAT** (Luscinia brunnea) A single example was seen in the CHANDRA valley between SISSU and TANDI on 15 May.

5. **DARK GREY BUSH-CHAT** (Rhodophila ferrea) A single bird was seen just above the village of ARAT on 17 June.

6. **WHITE-CAPPED REDSTART** (Chaimarrornis leucocephalus) Together with the Plumbeous Redstart the most common specie seen. I doubt that a day passed below about 14000 ft. without seeing ten or a dozen of these delightful and lively birds. Most usually seen near a stream it was not averse to rocky or vegetated hillside away from water.

7. **PLUMBEOUS REDSTART** (Rhyacornis fuliginosus) Seen in almost equal numbers to the White-capped Redstart although without the white cap it was not so noticeable.

8. **RUFOUS-BREASTED HEDGE-SPARROW** (Prunella strophiata) Seen quite frequently at and just below the advanced base camps at about 14000 ft. In spite of the rufous breast it tended to be a nondescript bird and not very obvious. It would be seen early in the day but seldom after that.

9. **RED-BREASTED FLYCATCHER** (Muscicapa parva). One seen near SISSU on 14 May.

10. **BLACK-HEADED SHRIKE** (Lanius nigriceps) One seen in the CHANDRA valley between SISSU and TANDI on 15 May.

11. **YELLOW-BELLIED WILLOW-WARBLER** (Phylloscopus affinis) One possible sighting at about 12000 ft. when descending from the Menthosa Advanced Base on 12 June. It was certainly a warbler, the problem is which? The most likely appeared to be the Yellow-bellied variety.

12. **MEADOW BUNTING** (Emberiza cia) One example seen between CHAMRUT and KARPAT in the MIYAR NALA valley. Another was seen by another member of the expedition in the CHANDRA valley.

13. **CRAG MARTIN** (Riparia rupestris) Frequently seen in the CHANDRA valley especially in the UDIAPUR area. They were also seen in the lower reaches of the side valleys although not so prolifically.

14. **WAGTAILS** These were not easy to differentiate and the problem was not eased by the conflicting descriptions and pictures in Salim Ali's book. As far as could be determined Hodgson's Pied Wagtail (Motacilla alba alboides), the Indian Blue-headed Wagtail (Motacilla citreola calcarata) and possibly the Black-headed Wagtail (Motacilla feldegg melanogriseus) were seen. Mostly they were seen near the many mountain streams which were encountered.

15. **HOBBY** A nest was discovered halfway up the rock face behind the monastery at GUMBA in the MIYAR NALA valley. It proved to belong to a pair of Hobbys but despite watching the birds it was not possible to decide whether they were Indian Hobbys (Falco severus rufipediodes) or Central Asian Hobbys (Falco subbuteo centralasiae). There was clearly one youngster in the nest but no more were seen although the position of the nest made observation difficult.

16. **HIMALAYAN GOLDEN EAGLE** (Aquila chrysaetos hodgsoni) A pair were observed at KHOKSAR in the CHANDRA valley. Two more eagles, presumed to be of the same specie were seen near CHAMRUT. At the time they were circling over the surrounding peaks so were at least at 16000 ft.

17. **SNOW-PIGEON** (Columba leuconota) Seen first on 13 May in the CHANDRA valley between KHOKSAR and SISSU. Other examples were also seen between KARPAT and GUMBA.

18. **RUFOUS TURTLE-DOVE** (Streptopelia orientalis) A pair were seen at about 9000 ft. at TANDI in the CHANDRA valley on 15 May. Another pair were seen near KURCH also in the CHANDRA valley but at about 8000 ft. some 6 weeks later.

19. **CHUKOR** (Alectoris graeca) A pair were flushed at about 13000 ft. as the expedition moved up from GUMBA to the MENTHOSA Advanced Base on 21 May. They rapidly flew over a nearby ridge and were not seen again.

20. **HIMALAYAN SNOWCOCK** (Tetraogallus himalayensis) Shortly after leaving the BAIHALI JOT Advanced Base I flushed the bird from its nest and it promptly gave a superb 'broken wing' distraction display. The reason for this soon became evident when three chicks broke cover and disappeared up the hillside. The adult bird also flew off once the young had got

clear. The altitude was about 14000 ft. and the weather good at the time.

The only field guide carried during the expedition was Salim Ali's 'Indian Hill Birds'. This does not compare with the standard of field guide now available for UK but appears to be all that is available. It is published by the Oxford University Press at £4.50.

COMMUNICATIONS REPORT

OPERATORS: Lt PR WEST, RA and LCPL M LANE, 22 SAS

REQUIREMENTS

1. The radio requirement of the expedition was two fold:

   a. To provide a link between the two parties and in case of emergency to be able to call up outside help if required.

   b. To provide a link between the various camps on the mountain being climbed.

2. To meet this requirement, two separate sets were needed, one a lightweight H.F. man-pack radio capable of operating over ranges in excess of 80 miles with mountains rising up to 20,000 ft. separating the ground stations, and the other a lightweight VHF set with a range requirement of approximately 4 miles.

EQUIPMENT

3. Inter-party: The set chosen for inter-party communications was the H.F. Manpack Radio UK/PRC - 320, part of the new Clansman family. This is a simple-to-operate transmitter/receiver weighing only 20 lbs complete, and although primarily an SSB radio, it has also full AM and CW capabilities. The radio operates from a clip-on 24 volt secondary battery with a lightweight, effective hand generator. Alternatively, a metal-air primary battery with a life of 24 hours could be used. The expedition used both types of battery, and although both were equally effective, the metal air batteries, once expended were of no further use, and several had to be available when setting up a station for any length of time. There was a considerable saving in weight by using two secondary batteries and the hand generator.

4. The INDRASAN station was situated at the base camp at an altitude of 12,500 ft. A standard dipole antenna was always used. The MENTHOSA/BAIHALI JOT station was operated from various locations on the march-in and at the basecamps from altitudes ranging from 9,500 ft. to 14,200 ft. Both dipole and end-fed antennae were used. Both parties sets were kept under cover when not in use, and voice was always used in transmissions, although CW was available in the event of not being able to communicate on SSB. Schedules were infrequent, averaging one per four days, either at 0800 hrs or 1600 hrs expedition time.

5. Inter-camp: Two sets were used, the UK/PRC - 350 VHF man-pack radio, again, part of the Clansman family, and the Pye "Bantam" walkie talkie set.

   (a) The PRC - 350 is a lightweight sealed transmitter/receiver with a range of three miles using a 4 ft whip antenna. The set is powered by a 15 volt primary battery with a life of 12 hrs. The set is very simple to tune and operate, but the main disadvantages are the weight of 8 lbs, and the fact that there is no side-tone when the set is switched on. This often resulted in drained batteries when the set was left switched on when not in use, there being no noise to remind the user that the set was on. This was expensive on weight with batteries weighing 2½ lbs to be carried up the mountain. Two sets were used by the MENTHOSA/BAIHALI JOT party.

(b) The Pye "Bantam" is a lightweight sealed transmitter/receiver with a range in excess of 5 miles using a 4 ft whip antenna. The set is powered by a secondary battery with a life well in excess of 24 hrs. The set weighs approximately 4 lbs, the battery approximately 1 lb. This set is also very simple to operate, having 4 channels. No disadvantages were encountered with this set, except for the delicate lugs used in connecting the handset to the set, some of which broke in transportation. These sets were used successfully by both parties.

CONCLUSIONS

6. The PRC 320 H.F. set proved a reliable 'base camp-to-civilisation' link. Once set up, anyone can use the set on SSB, and changing to alternate frequencies is quite simple. The set was lightweight, SSB was clear, and the generator was easy to use and effective.

7. The PRC 350 VHF set is too robust a set for use on the mountains. Making it 'soldier proof' means extra weight, and this, with the limited range of 3 miles, makes the set impracticable. It is, however, available through Army sources.

8. The Pye 'Bantam' VHF set is light and easy to use. It is a popular mountain rescue set, but is not available through Army sources apart from borrowing from mountain rescue teams. A supply of batteries to last the duration of the climb must be available as a charging unit would not be available. Care must also be taken with the delicate lugs on the handset/radio connection.

REPORT ON PORTERS

by

Major J W Fleming, PARA

1. The expedition was lucky in that initially the porters for both the Indrasan party and the Menthosa party were arranged by Tara, Jimmy Johnson's foreman. Mail runners were similarly arranged; once a week for Indrasan, once a fortnight for Menthosa.

2. There was no requirement to either feed the porters from expedition rations or funds or to insure them. If they were going to spend the night out on our behalf, as for instance they did in the Ur Gad Nallah, there was a requirement to house them in an airborne shelter. The only time that our porters asked for high altitude clothing was for going over the Rhotang Pass in early May. It should be noted that before the Rhotang Pass is open at the beginning of the summer there are very few mules available in the Chandra Valley. This is because the muleteers take their animals into the Julu Valley, on account of food for them being more readily available there for the duration of the winter.

3. It should be pointed out that in this part of India the distance of a day's march for porters is very strictly laid down by the State Government concerned, and their fees are calculated accordingly. The fact that a party can do a certain distance in a shorter time does not mean that they can save on their wages bill. In India you pay by distance not by time.

4. In terms of sheer carrying capacity mules are cheaper to hire than porters.

5. It must be realised that once a porter has been given a piece of equipment or an article of clothing to carry out his part of the expedition he regards it as his own from that time on, it is 'backsheesh' and it is a cardinal sin to ask for it back.

6. Porters fees varied, as did the weights they were prepared to carry. The table at Appendix 1, relevant to the Menthosa party only, illustrates this.

DETAILS OF PORTER AND MULE LOADS AND COSTS ON MENTHOSA

Srl	Dates	From	To	Qty	Cost/Day	Loads	Remarks
1	11 May	Rhalla	Koksar	109	50 rupees	60 lbs	Rhotang Pass
2	12 May	Rhalla	Koksar	11	50 "	60 lbs	All from Manali area.
3	13 May	Koksar	Sissu	16	15 "	60 lbs	Koksar area
4	14 May	Koksar	Sissu	23	15 "	60 lbs	Double trips
5	15-17 May	Sissu	Udaipur	48 Mules	15 "	180 lbs	5 stages + 2 days return
6	18 May	Udaipur	Chamrat	10	10 "	60 lbs	Niya Nullah
7	19 May	Udaipur	Chamrat	42	10 "	60 lbs	villagers
8	20/21 May	Chamrat	ABC	53	10 "	60 lbs	
9	22-25 May	ABC	Udaipur & return	3	10 "	60 lbs	Extra rations
10	29 May	Udaipur	ABC	18	10 "	60 lbs	Extra rations
11	12-14 June	ABC	Udaipur	34	10 "	60 lbs	
12	15 June	Udaipur	Arat	27	10 "	56 lbs	
13	16-18 June	Udaipur	ABC	26	10 "	56 lbs	Carrying own rations for nights out.
14	19/20 June	Arat	ABC	9	10 "	56 lbs	
15	26/27 June	ABC	Udaipur	19	10 "	60 lbs	3 days paid + 2 days extra.
16	29 June - 3 July	Udaipur	Manali	20 Mules	15 "	180 lbs	

NB In all cases except for srl 15, 1 day's return journey at 10 rupees was paid for the trips to/from Udaipur and Menthosa.

TRAVEL IN INDIA

by

Major J W Fleming, PARA

1. The alternative to travelling from Delhi to Raisan by bus would be either by air from Delhi to Bhuntar (Kulu) via Chandigarh - this service does not operate during the monsoon, - or by train from Delhi to Simla and then by Express bus to Raisan. No transport exists from Naggar to the Indrasan/Deo Tibba area. As far as the Menthosa area is concerned once the Rhotang Pass is opened, normally mid-June, and once the road from Koksar to Thirot has been cleared of avalanches and landslides, buses ply from Manali to Koksar and from Koksar to Keylong and Thirot. From August 15th this year, after the narrow bridge at Thirot has been widened to take buses, these will go beyond Thirot to Udaipur. The buses are very cheap to ride in, but they are also extremely crowded, next cheapest is by air, whilst the most expensive, and the slowest, method of travel is by train.

2. It is worth remembering that foreigners in India are expected to pay their Hotel bills and all air fares by either Travellers Cheque or foreign currency.

3. Paraffin in India is treated as a military commodity, therefore one should not expect to get it in any quantity in the remoter parts of the country. Moreover a permit is required to draw it from anywhere if a lot is needed. The permit has to be obtained in Delhi.

PUBLICITY REPORT

by

Major J W Fleming, PARA

1. The Team held a Press Conference, organised by Owens in conjunction with the Ministry of Defence PR 10, at The Alpine Club on Monday 16th April. Useful Press and Radio coverage resulted from this. Fleming appeared on Southern TV the same evening.

2. Before the Expedition left New Delhi for UK at the end of the venture the Indian Press and TV took an interest in our activities, largely at the instigation of the Press Secretary at the British High Commission.

3. On our arrival back in this country a further Press Conference was held, this time in the Ministry of Defence, on the 17th July. This accrued a certain amount of useful Provincial Press coverage, as well as that on BBC radio, both at home and overseas.

4. Numerous lectures continue to be given by expedition members to Universities and Schools. Articles have been written for not only climbing and expeditioning magazines but also for such publications as 'Soldier', The British Army Review etc.

5. These lectures and articles generate a great deal of interest among the general public, and in the writer's experience the public is right behind us in our aim to climb Mount Everest.

ACKNOWLEDGEMENTS

1. An Expedition of this size and complexity cannot be mounted, executed or concluded without the generous and unstinting help of a large number of individuals and organisations. To them all the Team owes a deep debt of gratitude; we thank them all for all their support so unselfishly given.

2. To this end I would like especially to thank:

a. Major General C W Dunbar, CBE, who at the time of the expedition was our Chairman and who gave me such helpful guidance during the planning stages.

b. Major Bob Rutherford who has helped and guided every single AMA Expedition since 1968 and through whose industry we are now in a position to plan and execute our Everest venture.

c. HQ 46 Group Royal Air Force for their great help in transporting the Team to and from New Delhi.

d. The Nuffield Trust, The Director of Army Training, The Mount Everest Foundation for financial support and for their continued interest in and encouragement of our activities.

e. Major General L Scott-Bowden, CBE, DSO, MC, Major John Graham and the Defence Adviser's Staff in New Delhi for their hospitality and help whilst we were in India.

f. Mr Jimmy Johnson for his generosity, hospitality and comradeship when we were in that beautiful Kulu Valley.

g. Wing Commander Ernsting and the Members of the Institute of Aviation Medecine for their efforts in providing the oxygen and other specialised equipment.

h. Our fellow member Mr Cyril Cooper and his colleagues in the Stores and Clothing Research and Development Establishment for their continued help and advice on clothing and equipment matters.

i. Bells Whisky and W D & H O Wills for their very generous gifts which made life just that little bit more pleasant when things were getting tough.

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