

Royal Navy & Royal Marines Mountaineering Club

Report
of the

Joint Service East Africa Expedition

(Mounts Kenya & Kilimanjaro)
1987



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SECTION ONE

ADMINISTRATIVE & LOGISTICAL REPORT

by

*Lieutenant S K JACKSON, FRGS, Royal Navy
Expedition Leader*

GENERAL COMMENT

- 1 The potential for disaster in taking 22 people who do not know each other well, along with all of their concomitant accoutrements required for a five week climbing expedition, to two countries in East Africa, between whom the border was only recently re-opened following a period of conflict, must be great. Add to this a Medical Research Programme viewed by one Doctor, respected world-wide for his knowledge and experience of exactly this subject, as being highly ambitious and that potential is magnified. The fact that the expedition did not meet with disaster either in its climbing or research programmes probably adds weight to the opinion that any reasonable plan executed with zeal and enthusiasm will eventually succeed. The team were enthusiastic and morale was always high even when arrangements fell over which is not an uncommon feature of life in post-colonial Africa. It needed a great deal of self discipline and perseverance by all of the subjects to complete the research, particularly when one of the requirements was to have blood taken at 0300 every morning for the first week. Thus restricting movement on the hill and most unwelcome at a time when many felt below par anyway. I hope that this report will give the reader a feel for the area and transmit some of the excitement we felt whilst there.

- 1.1 The Royal Navy and Royal Marines Mountaineering Clubs' proposal to mount an expedition to East Africa was endorsed by the Joint Services Expedition Trust in October 1986. The expedition left the UK on 7 January 1987 and returned on 9 February 1987.

AIMS

- 1.2 The aims of the expedition were:

1.2.1 To introduce club members to high quality climbing at very high altitude.

1.2.2 To give varied and exciting expedition experience to as many club members as possible, in preparation for future expeditions particularly the British Services Everest Expedition 1988.

1.2.3 To carry out medical research to increase medical data which may be relevant to the development of acute mountain sickness, high altitude pulmonary oedema and high altitude cerebral oedema.

PATRONAGE

- 1.3 The expedition was honoured by the patronage of ;

Admiral Sir Nicholas HUNT, GCB, LVO, Commander-in-Chief Fleet.

ROYAL GEOGRAPHICAL SOCIETY

- 1.3.1 The Expedition was approved by the Royal Geographical Society.

MOUNT EVEREST FOUNDATION

- 1.3.2 The Expedition was approved and supported by the Mount Everest Foundation.

PERSONNEL

- 1.4 The climbing team was selected by the Expedition Leader and Deputy Leader. Their selections were based on the information given on the individuals application form, personal knowledge of the applicants and by reference to third parties. No interviews were held and the fact that the team gelled so quickly and so well was quite a surprise. Invitations were extended to the Army and Royal Air Force Mountaineering Associations and the Research Team was chosen by the Research Team Leader. The team selection achieved a fair balance between officers and ratings and represented a good cross section of club membership.

- 1.4.1 The final team comprised:

RN	OFFICERS	7
RNR	OFFICER	1
RM	OFFICER	1
WRNS	OFFICER	1
RN	SENIOR RATINGS	5
RN	JUNIOR RATINGS	2
ARMY	OFFICER (CCF)	1
ARMY	JUNIOR RANK	1
RAF	JUNIOR RANK	1
CIVILIANS		2

TRAINING

- 1.5 Three training meets were held during the period July to December 1986. These were on Lundy Island for one week in July, a weekend in N. Wales in October and a weekend in the Peak District in December. The main objective on these occasions was for the team members to get to know each other and to form climbing pairs. In addition it gave the expedition leaders the opportunity to assess the capabilities of the team. By the date of departure the only team member we had not met was L/CPL ALLISON, who was stationed in Gibraltar. The RAFMA member managed to attend the Lundy meet having driven all the way from West Germany!

- 1.5.1 During the Lundy Meet Captain Pat PARSONS RM showed slides of his recent visit to Mt Kenya and Kilimanjaro with Charles HATTERSLEY.

FINANCE AND FUND RAISING

- 1.6 A Statement of Income and Expenditure is at Section Five.
- 1.6.1 A total of £33,300.20 was raised by the Expedition and breaks down as follows:
- | | | |
|------------|------------------------------|-------|
| £13,916 | Individual Contributions | 41.8% |
| £ 5,300 | Sailors/Fleet Amenities Fund | 15.9% |
| £ 3,600 | Drug Companies | 10.8% |
| £ 2,500 | RNRMMC Loan | 7.5% |
| £ 2,300 | DNPTS/JSET | 6.9% |
| £ 2,250 | RNRMMC Grant | 6.8% |
| £ 1,914.20 | CILOR | 5.7% |
| £ 500 | Mount Everest Foundation | 1.5% |
| £ 500 | Huffield Trust | 1.5% |
| £ 250 | Recreational Funds | 0.75% |
| £ 250 | Schroders' | 0.75% |

THE ADVANCE PARTY

- 1.7 During December 1986 the opportunity arose to make use of RAF flights to Nairobi, to send out a small advance or recce party who would be able to spend a few days in East Africa. Subsequently John BROOME and John LEONARD flew from Brize Norton on 11 December and returned to Lossiemouth on 19 December. All of our rations and some stores accompanied them on that flight. They were able to deliver a very useful report on many aspects of expedition planning of significant help to the expedition leader. Whilst in Nairobi they were accommodated by the British Army Training and Liaison Staff Kenya (BATLSK) at Kahawa Barracks, the Aldershot of East Africa.

TRAVEL, TRANSPORT & FREIGHTING ARRANGEMENTS

- 1.8 Application was made by DNPTS, to Mov6a(RAF), for Concessionary Non Fare Paying (CNFP) Passage to Nairobi, giving a wide span of dates during January 1987 for departure. Whilst CNFP Passage was approved, the conditions attached to the offer made it impossible to plan an expedition as logistically complicated as ours so the decision was made to fly with British Airways.
- 1.8.1 All travel arrangements to and from Kenya were handled by Mrs Anna McLEOD of WESTRAVEL LTD, 19 Mill Street, Ottery St Mary. Anna was able to negotiate a group rate air fare because of the numbers involved. In addition she was able to arrange for 1200 Litres of cargo space to be made available for our equipment at a cheap rate.
- 1.8.2 Thanks to the kind offices of Dr. F S PRESTON, FRCP the Director of Medical Services, British Airways, the most important item of medical equipment, the cryostat, was transported free of charge.
- 1.8.3 All travel arrangements in Kenya and Tanzania, including Car Hire; obtaining visas for Tanzania; confirming flight details, etc were handled by Rhumie KHOSLA of Geographical Travel Ltd, Kimathi Street, Nairobi, Tel: 21056/29619 who was particularly efficient in a country not noted for this trait.

PORTERS

- 1.9 A total of 105 porters were used on Mount Kenya, 70 for the ascent and 30 for the descent. Another 5 were used at odd times to collect victuals, fuel, take messages etc. They are best organised through Daniel NDORIA, at the Waro Moru River Lodge (Tel: Waro Moru 23). He will also arrange hut bookings and issue all necessary Park Permits.
- 1.9.1 The porters will only carry 18kg for the first two days and 16kg subsequently. In addition one has to provide the means of carriage (rucksack) as they do not carry loads on their heads as the porters in Tanzania do. They provide their own food and accommodation. In addition one has to either provide transport for them from the Porters Village to the Met Station or pay for two extra days on the ascent and two on the descent. The fact that they can actually walk from their village to Mackinders in one day doesn't seem to enter the equation! Transport will be provided by Waro Moru River Lodge, at a price.
- 1.9.2 The porters were actually very good and the quickest managed the journey from the Met Station to Mackinders in around 2 hours. They are not the best time keepers in the world but are generally reliable. Only official porters who are registered with the Park Warden were used and the method used to control the movement of such a large number of loads proved successful. Every sack was numbered and the contents of each were recorded on separate pages of a log. When a porter collected a sack his name was recorded on that page of the log. On arrival at Mackinders all the sacks were mustered. One load containing vital medical research equipment was mislaid on the ascent but eventually turned up. It is wise to have only one person dealing with the porters to prevent any possible misunderstanding. If any porters give trouble they should be reported to the Park Warden who will remove their official status which makes it difficult for them to obtain portering work.
- 1.9.3 Porters on Mount Kilimanjaro are compulsory, the number allocated to any group depends on the size and objectives of the group. The porters carried sacks belonging to a particular individual which meant that control was very much easier though the individual was expected to reward the porter accordingly. This was where the remnants of ration packs came into their own!.

CLIMBING STANDARDS

- 1.10 A numerical system of grading is used on the mountains of East Africa. This operates from grade I to VI, with an additional grade of VII for the very technical rock routes recently climbed on Mount Kenya. The system works best for rock routes and is based on the most difficult pitch on the route. Ice routes require a little more explanation as many of them follow steep couloirs which are subject to frequent rock and ice fall. Subsequently the climbs have been graded according to the overall seriousness of the route rather than the technical difficulty.

1.10.1 The gradings correspond approximately as follows:

<i>East Africa</i>	<i>French</i>	<i>English</i>	<i>American</i>
I	F	Mod	5.2-5.2
II	P.D	Mod/Diff	5.3
III	A.D	Diff/V Diff	5.3-5.4
IV	D	V Diff/M Sev	5.5
V	T.D	S/V S	5.6-5.7
VI	E.D	V S/Hard V S	5.8
VII	E.D+	Extreme	5.9-5.11

GUIDE BOOKS AND MAPS

- 1.11 There are two major guide books on the area these are:
- Guide to Mount Kenya and Kilimanjaro*-Iain Allan-Published by the Mountain Club of Kenya.(ISBN 901516 55 4)
 - East Africa International Mountain Guide*-Andrew Wielochowski.(ISBN 0 906227 29 1)
- 1.11.1 It is advisable to use both books as each contains useful information which the other does not.They are available from West Col Productions,Goring, Reading ,RG8 0AP.The maps in both books are adequate.
- 1.11.2 John BARTHOLOMEW & Sons Ltd,Duncan Street,Edinburgh EH9 1TA,produce a good map of Kenya (1:1 250 000) World Travel Series No 38,which includes the Kilimanjaro Area.This map also incorporates a street map of Nairobi (1:27 500).
- 1.11.3 Other maps such as the BP Road Map of Kenya (1:1 000 000) are available in Nairobi from the bookshop adjacent to the New Stanley Hotel(off Kenyatta Ave).It is possible to purchase other maps from Waro Moru River Lodge when ordering porters.

MOUNTAIN HUTS

- 1.12 Details of all the huts are shown in both guide books. There are many huts on both mountains all of which are habitable to some degree and almost all are close to a good water supply,the main exception being the Kibo Hut on Kilimanjaro.
- 1.12.1 On Mount Kenya the best huts are undoubtedly those at the Met Station and Mackinders Camp.Both are clean,large,have a radio nearby and have a permanent Warden who is also a Guide.All other huts on Mount Kenya are in need of repair and would not be suitable for use as a base for a lengthy period.There are also many excellent bivouac sites around the mountain.
- 1.12.2 All of the huts on the Marangu Route of Kilimanjaro are in excellent condition,have a radio and a permanent Warden.Water supply is a problem at the Kibo Hut as it has to be carried up by porter.

DIPLOMATIC CLEARANCE

- 1.13 Diplomatic Clearance was applied for using Form AT4 in accordance with BR 4024 Annex 2E. Clearance was received from FCO in October 1986.
- 1.13.1 On arrival in Nairobi we payed a courtesy call on the Defence Advisor, Colonel SUTHERS. He was able to brief us on the do's and dont's of East Africa as well as providing valuable local information and a number of useful contacts.

CUSTOMS AND IMMIGRATION PROCEDURES

- 1.14 The procedure for British Passport holders on entering Kenya is relatively simple. Visas are not required. On arrival in Nairobi a number of entrance forms are filled out and most importantly one has to declare how much currency one is carrying. The Currency Declaration Form should be retained whilst in Kenya and surrendered on exit.
- 1.14.1 Entry into Tanzania is a more complex procedure. Visas are required by British Passport holders and cost 585Ksh, (approx £25). They can be obtained from the Tanzania Tourist Office, 77 South Audley Street, London W1Y 5TA. Alternatively they can be obtained from the Tanzanian Embassy in Nairobi. Visas are not available on the border between Kenya and Tanzania. Once again currency declaration forms are required.

CURRENCY REGULATIONS

- 1.15 The currency regulations for both countries require one to declare the amounts of all currencies being taken into the country. There is no limit. In Kenya bills can be paid in Kenya Shillings (Ksh), US\$ or £ Sterling. When changing money into Ksh an encashment certificate should be obtained. This means that only the official exchange rate (approx 23Ksh to the £) can be obtained. A better exchange rate can be obtained on the black market, however no encashment certificate will be provided, and if discovered legal action can be expected. Ksh can not be taken out of the country and body searches are carried out at the border with Tanzania if smuggling is suspected.
- 1.15.1 Exactly the same procedure applies in Tanzania except that Tanzanian currency (Shillings) will not be accepted for payment of bills even if accompanied by an encashment certificate! It is advisable to carry only travellers cheques in either Sterling or Dollars which are equally acceptable, though change will only be given in Tanzanian Shillings.
- 1.15.2 Ksh are highly prized in Tanzania as the locals can use them to purchase goods which are otherwise unavailable to them at the many border markets. However there is a statutory seven year prison sentence for currency offences.

MEDICAL ARRANGEMENTS

- 1.16 The Expedition Medical Officers Report is at Section Four of this report.
- 1.16.1 All expedition personnel had the following immunisations prior to departure:
- a.Yellow Fever
 - b.Cholera
 - c.Hepatitis B
 - d.TABT
- 1.16.2 Although no longer service policy we employed the once weekly course of anti malarial prophylaxis

RESCUE FACILITIES

- 1.17 The Iain ALLAN Guidebook gives details of the Accident Procedure to be used on Mount Kenya.The situation on Mount Kilimanjaro is simpler as it is compulsory to have a guide and porters and they are trained in mountain rescue techniques and are aware of the location of rescue equipment.
- 1.17.1 It became necessary to evacuate one member of the expedition from Mackinders Camp who was suffering from Acute Mountain Sickness with an intercurrent chest infection.
- 1.17.2 On this occasion a radio message was sent from the permanently manned Ranger Station at the head of the Teleki Valley (10 minutes from Mackinders),to the Park Headquarters at Naro Moru.They in turn radioded the Police Station at Nanyuki which is across the road from the British Army Training Camp known as the Showground,where 2 Para were encamped.They arranged for 2 Para's Scout Helicopter to evacuate the casualty from the Meteorological Clearing at 10,000' as poor visibility precluded flying to any greater altitude.
- 1.17.3 Subsequently the casualty walked (and was carried a very short distance) by seven porters and five team members from Mackinders to the Met Clearing which took 7½ hours.The porters in fact only going as far as the top of the vertical bog.The rescue team was met near the bottom of the vertical bog by Captain Chris PARKER RAMC,2 Para's Medical Officer,armed with a broken rucksack and a cylinder of oxygen.The casualty was evacuated by helicopter to the Showground where he made a good recovery returning to Mackinders a week later.

VICTUALING AND RATIONS

- 1.18 A combination of Cash in Lieu of Rations (CILOR) and 24 Hour Ration Packs(GS) were used to alleviate the anticipated boredom of five weeks on compo.BATLSK were able to provide us with two Passes to enable the purchase of fresh victuals in the NAAFI shop in the Kenyan Moi Airforce Base.There are many stores in both Nairobi and Tanzania (Moshi or Arusha) where fresh food can be purchased.

- 1.18.1 GS rations were taken rather than the available Arctic ration packs as it was envisaged that finding water would be a problem, particularly on Kilimanjaro. Large volumes of fuel would have to be carried by a team out on a long route in order to melt snow for cooking thus adding to the weight of their sack. Additionally GS rations can be eaten cold in an emergency or should a stove become inoperative. In the event this proved to be exactly the case.
- 1.18.2 The GS compo rations were generally found to be satisfactory if a little boring. Noticeable improvements have been made in recent times but it was felt that more variety is required in the packs. It is appreciated that they were not designed with mountaineering expeditions in mind and it may be that the solution would be to have a supplementary pack for expedition use. One of the most frequent suggestions and probably the simplest to implement would be the inclusion of a selection of herbs and spices with the rations .

EQUIPMENT

- 1.19 It is not my intention to list all of the equipment used but the following points may be useful.
- a. 11mm ropes were quite unpopular, most pairs preferring to climb on double 9mm.
 - b. Walking ice axes from the Club store were taken and rarely used.
 - c. A pair of hand held Sony ICB 180 Radios were purchased and proved very useful. They have a range of around 5Km but 'line of sight' is necessary.
 - d. 11 Coleman Peak Stoves were purchased, one between two, they were adequate though temperamental. Probably due to the petrol, obtained in Nairobi blocking the jets. They also burned fairly efficiently using dry cleaning fluid purchased in Woolworths in Nairobi!
 - e. Goretex Bivouac Bags proved to be superb pieces of kit when bivvying in the open , even in temperatures as low as those experienced at night on the summit of Kilimanjaro. Those with cheaper bivi bags spent many uncomfortable nights.
 - f. Footfangs do not remain on 'bendy boots' when attempting the " Ice Window"!

MEDICAL RESEARCH PROGRAMME

- 1.20 The preliminary report on the scientific projects carried out during the expedition is at Section Three.
- 1.20.1 It should be stated that the success of the Medical Research Programme is due in no small way to the skill and professionalism of Bill SAMPSON, who was recruited into the team only a few days before departure when another scientist dropped out of the team.

SECTION TWO

CLIMBING REPORT

by

Surgeon Lieutenant Commander

Alistair R O MILLER Royal Navy

Deputy Expedition Leader and Climbing Leader

MOUNTAINEERING AIMS

2.1 The mountaineering aims of the expedition can be summarised as:

2.1.1 To get as many members as possible to the summits of Mounts Kenya and Kilimanjaro.

2.1.2 To climb rock , snow & ice and mixed routes of varying and increasing technical difficulty on both mountains.

2.1.3 To introduce club members to high altitude expedition mountaineering.

2.1.4 To increase the number of club members with expedition experience who will be available for selection for future expeditions.

2.1.5 To assist in the preparation and selection of climbers for the Joint Service Everest Expedition 1988 as stated in DCI JS 63/86.

SUMMARY OF ACHIEVEMENTS

2.2 The expedition was generally successful in achieving all of these aims and a synopsis of these achievements is listed below.

2.2.1 All 22 members reached the summit of Point Lenana(4985m) which is the third highest peak of Mt Kenya and is the highest point which can be attained without technical climbing.

2.2.2 Twenty out of 22 members reached the summit of Nelion(5188m) which is the second highest peak in the range,being a mere 11 metres lower than its neighbour Batian.The ascent involves rock climbing up to Severe standard.Of the two members who did not reach the summit of Nelion,one was there purely as a member of the medical research team and had minimal mountaineering experience and the second had had to descend from base camp in the early stage of the expedition with acute mountain sickness.He subsequently made a good recovery and got within a few hundred feet of the summit before being driven off by bad weather.

2.2.3 Eight members reached the summit of Batian (5199m).

2.2.4 Sixteen of 21 members (Dr MILLEDGE having left after Kenya) reached Uhuru Peak (5895m) which is the summit of Mount Kilimanjaro and the highest point in Africa.A further 3 members reached Gillmans Point (5685m) which is on the rim of the crater of Kilimanjaro and is considered "the top" by most tourists.The remaining two members were suffering from intercurrent gastrointestinal illness.

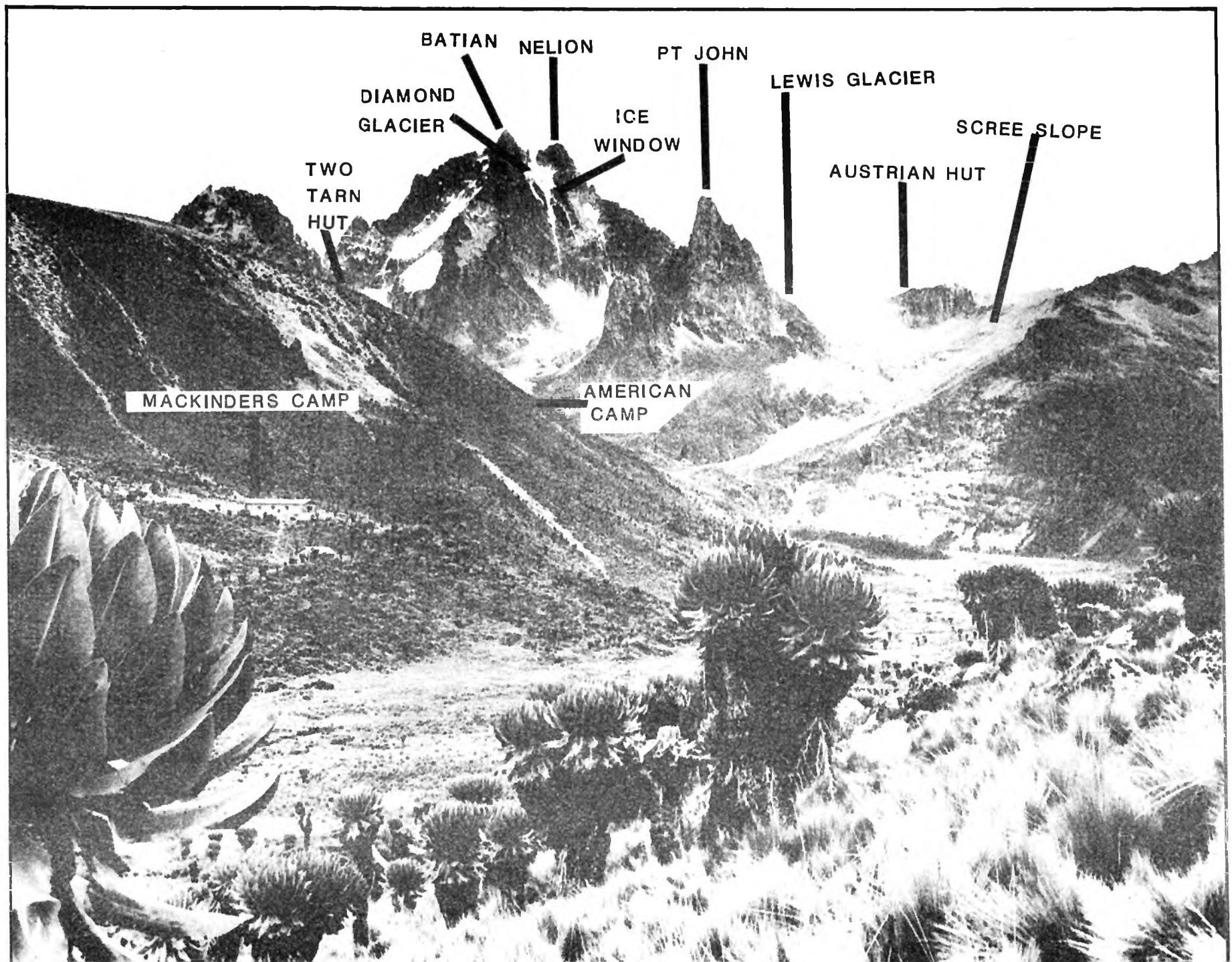
2.2.5 Four main routes were climbed on the peaks of Mt Kenya:

1.Normal Route	Grade IV	20 pax.
2.Traverse from Nelion to Batian	Grade III	4 pax.
3.Ice Window	Grade V inf	8 pax.
4.West Face Route	Grade V	4 pax.

2.2.6 In addition several other routes were done including:

1.North Couloir on Pt John	Grade III	13 pax.
2.South Ridge on Pt John	Grade III	4 pax.
3.South Ridge on Pt Piggott	Grade III	2 pax.
4.Circumnavigation of Peaks	Walk	19 pax.

2.2.7 On Mt Kilimanjaro 8 members climbed the Heim Glacier Original Route (Grade IV)and 2 members climbed the Barufu Route(Grade III).



CLIMBING ON MOUNT KENYA-12 TO 29 JANUARY 1987.

- 2.3 Mount Kenya is a serious mountaineering undertaking with no easy route either onto or off its twin summits of Nelion and Batian. Contrary to one expedition members' comment that "there is nothing to do on Mount Kenya" there is in fact a multitude of rock climbing, ice climbing, mixed climbing, scrambling and walking to be had in the area.

- 2.3.1 The easiest access to the mountain is by the Haro Moru route which leads to Mackinders Camp at 4200m. There is a recently built stone hut here which will sleep about 80 people in bunkhouse accommodation. There are toilet facilities (primitive) and a plentiful supply of water. Camping is fairly comfortable, the main problem being the ubiquitous Hyrax, a rodent like creature the size of a cat, which will enter inadequately secured tents and steal food.

- 2.3.2 This area was chosen as base camp on Mount Kenya as we required the use of the hut to carry out the medical research programme. The camp gives good access to routes on the South face of the mountain and has the advantage that porters can reach it in one day from the Met. Station. Two alternative sites for a base camp on this side of the mountain would be the American Camp (4300m). This a pleasant area with a stream but no other facilities (about an hours walk from Mackinders) or Two Tarn Hut (4490m) which is beautifully situated although the hut itself is small and rather scruffy

WEATHER AND CONDITIONS

- 2.4 The climbing seasons on Mount Kenya are from Christmas to mid-March, following the "short rains" and from July to October following the "long rains". The South side is basically in summer condition in the early season and winter condition in the later season whilst the North face follows the reverse pattern. However, some of the South facing ice routes such as the Ice Window were in reasonable condition in January although sadly the Diamond Couloir was never really feasible.

- 2.4.1 The weather pattern tended to be fairly constant with generally clear mornings and cloud building up during the early afternoon, depositing a variable amount of rain, hail, sleet or snow depending on altitude and then clearing with the temperature dropping dramatically at night. We did not endure any prolonged bad weather.

HARO MORU ROUTE

- 2.5 On Monday 12 January the expedition moved by vehicle from Kahawa Barracks to the Meteorological Station (3050m) which is about 5 miles inside the Mt. Kenya Park Gate. We spent the night there in bunkhouses and the next day awaited the arrival of the 70 porters we had ordered. When they did not appear John LEONARD and Steve BELL volunteered to descend to the porters' village where after some delicate negotiations the porters were secured and transported to the Met. Station.

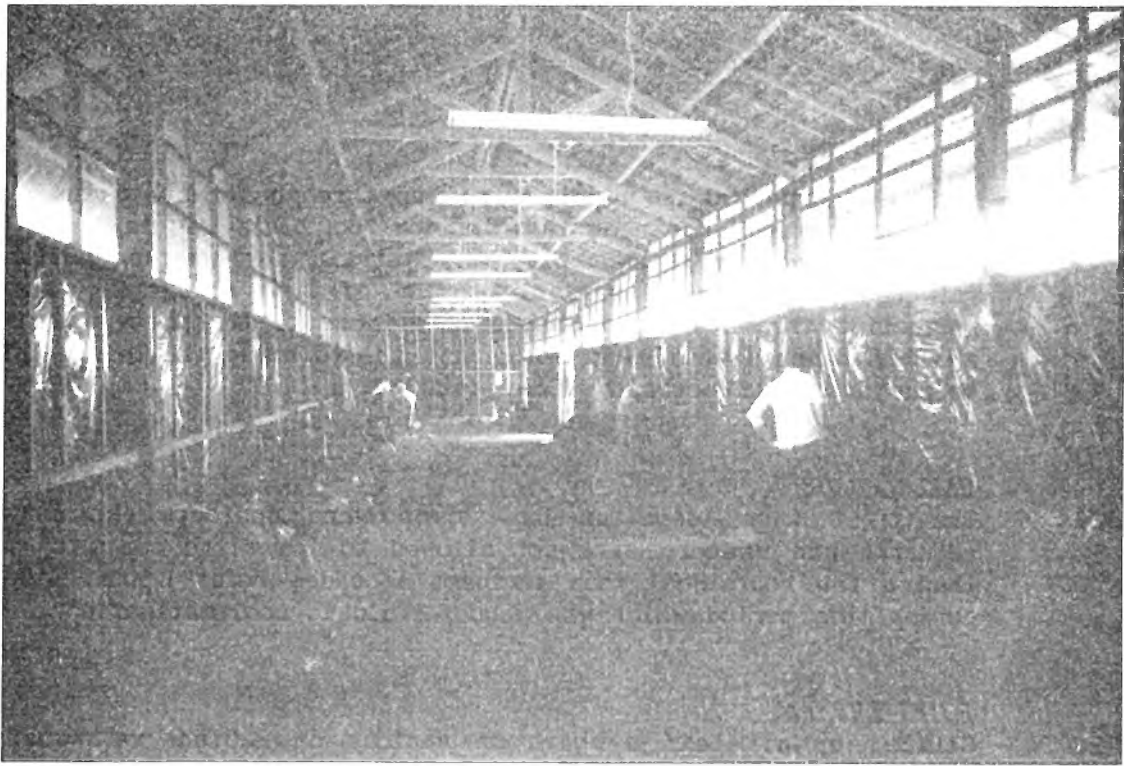
- 2.5.1 From the Met. Station a path winds up through forest to the start of a steep marsh known as the "vertical bog". This was in fairly dry condition and was reasonably easy terrain for walking, although rather tedious. After a variable period of time (range 2-7 hours), reflecting the varying standards of fitness of the party, expedition members reached the Teleki Ridge and then followed the Teleki Valley to our base at Mackinders Camp (4200m).

EARLY PHASE

- 2.6 The first three days at base camp were dedicated to medical research and members were not allowed to leave the camp for more than a few hours. Most team members ascended Point Lenana (4985m) during this period which was a useful aid to acclimatisation.

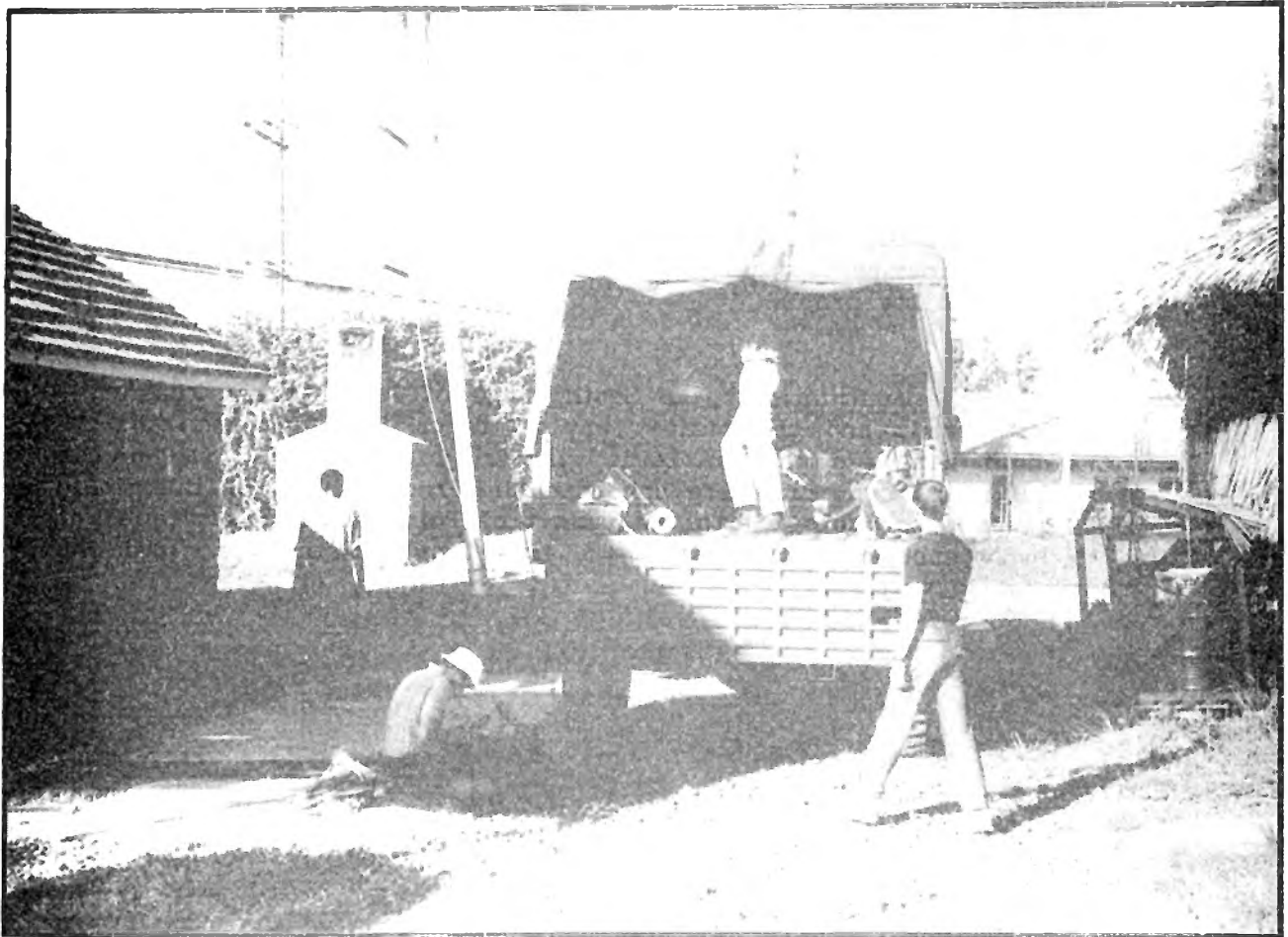
POINT LENANA

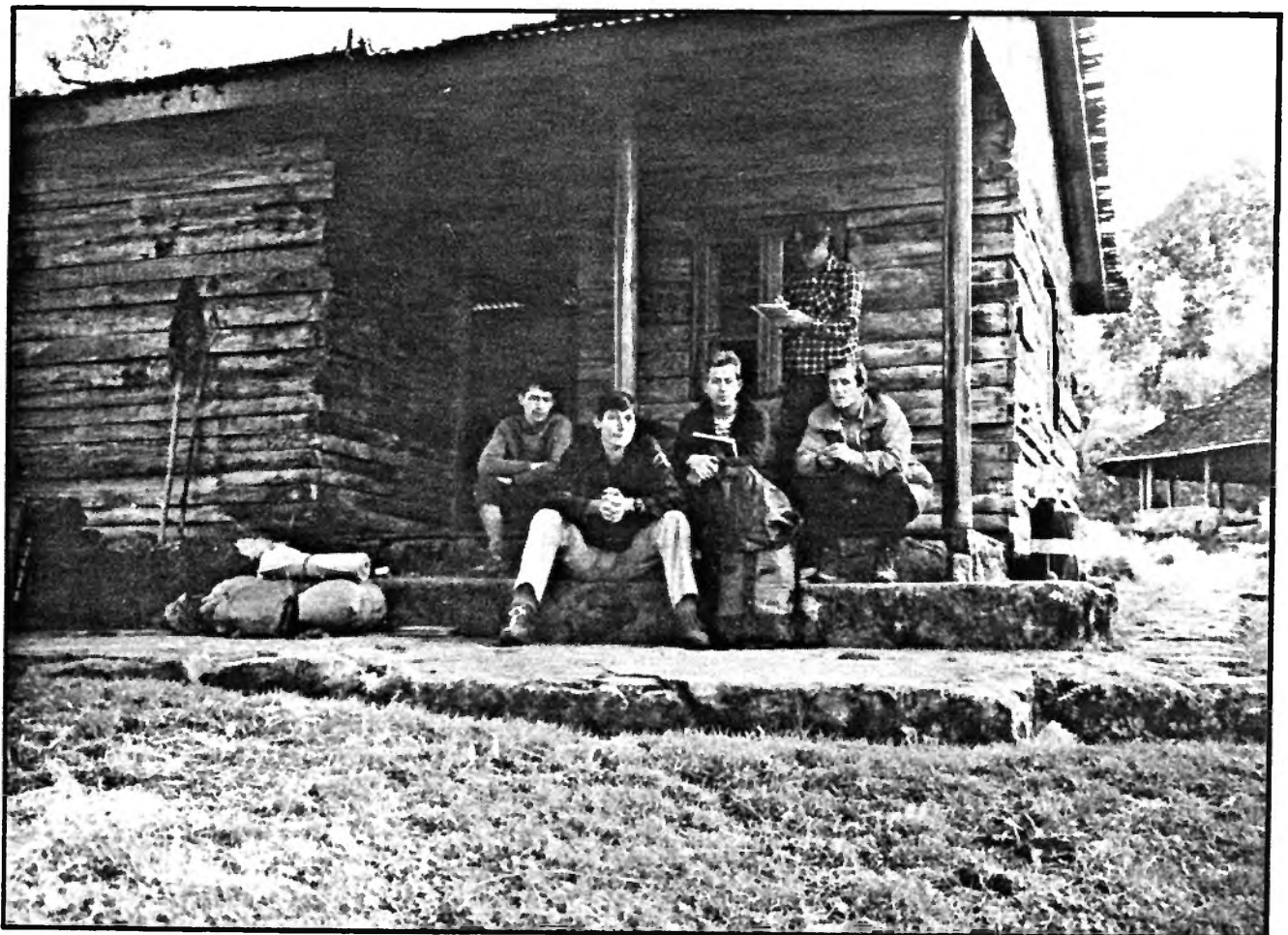
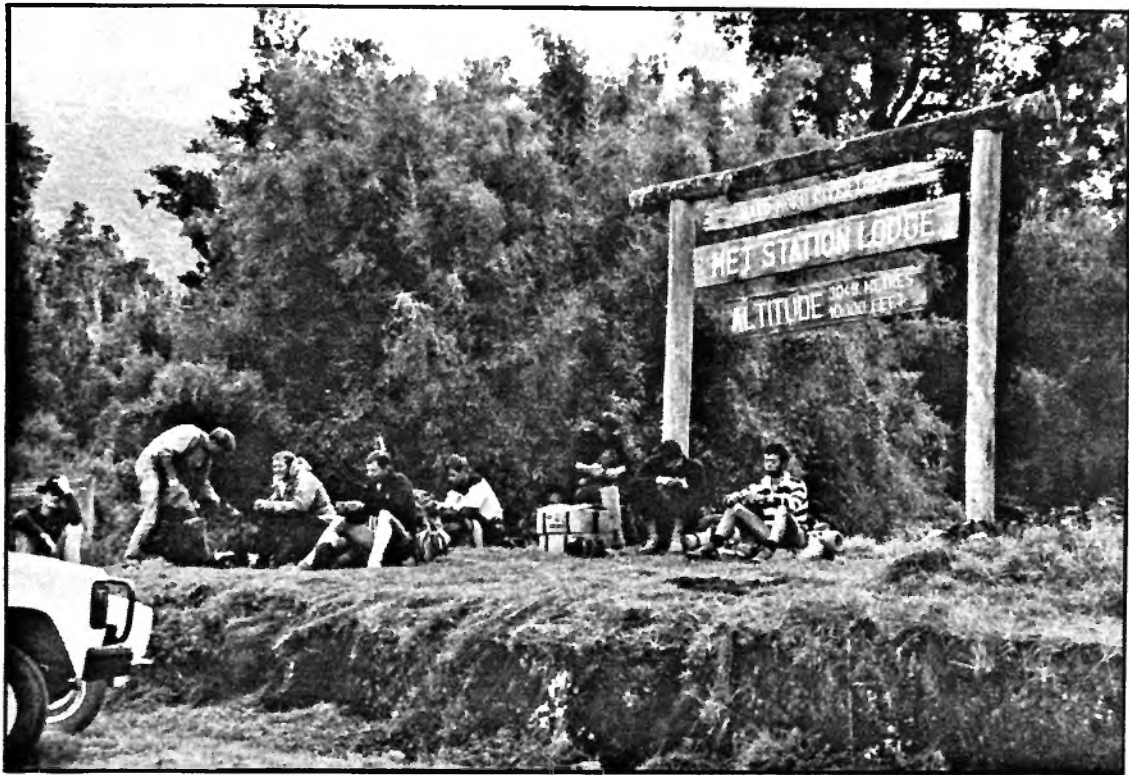
- 2.7 Climbed by all team members on various dates. Grade-walk (some on glacier).
- 2.7.1 From Mackinders Camp a path led up the left side of the Teleki Valley and then crossed very marshy ground in its upper reaches to gain the scree slope below and to the right of the Lewis glacier. A dry route through this area was very difficult to find and various ways were used by all members on different occasions.
- 2.7.2 The scree slope was long and monotonous and eventually led to the Austrian Hut at 4790m. This was very scruffy, rat infested and some reported having been bitten by fleas when using this hut. It was also very distressing to note how much of the extensive graffiti carved into the walls had come from previous British Service Expeditions, particularly Royal Navy Ships. The hut can accommodate about thirty people.
- 2.7.3 From the Austrian hut the South ridge of Point Lenana runs up to its summit and the easiest way to reach it was to walk up the right hand side of the Lewis glacier which was at quite an easy angle and crampons were not essential. From the top of the glacier an easy scramble led to the summit of Point Lenana. Few people were lucky enough to get much of a view from here as the clouds had usually gathered.



BATLSK NATROBI

(J GRIMLEY)







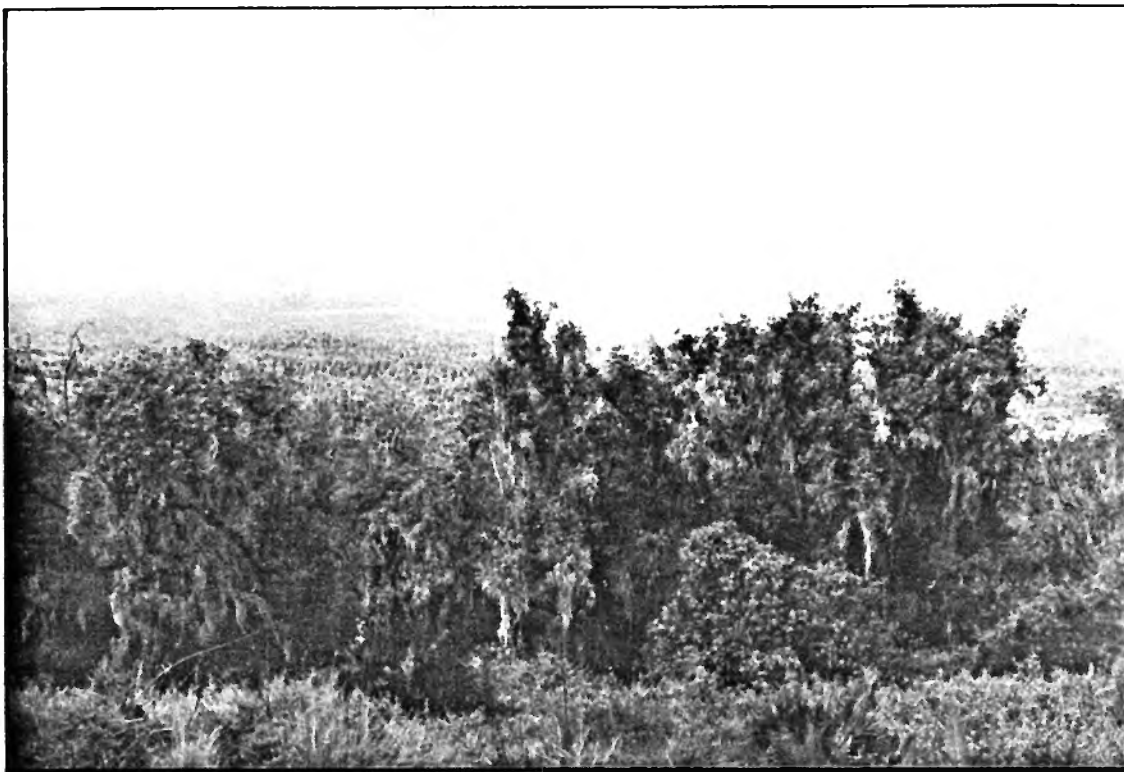
MET STATION

(JG)



COLOBUS POLIKOMOS

(JG)



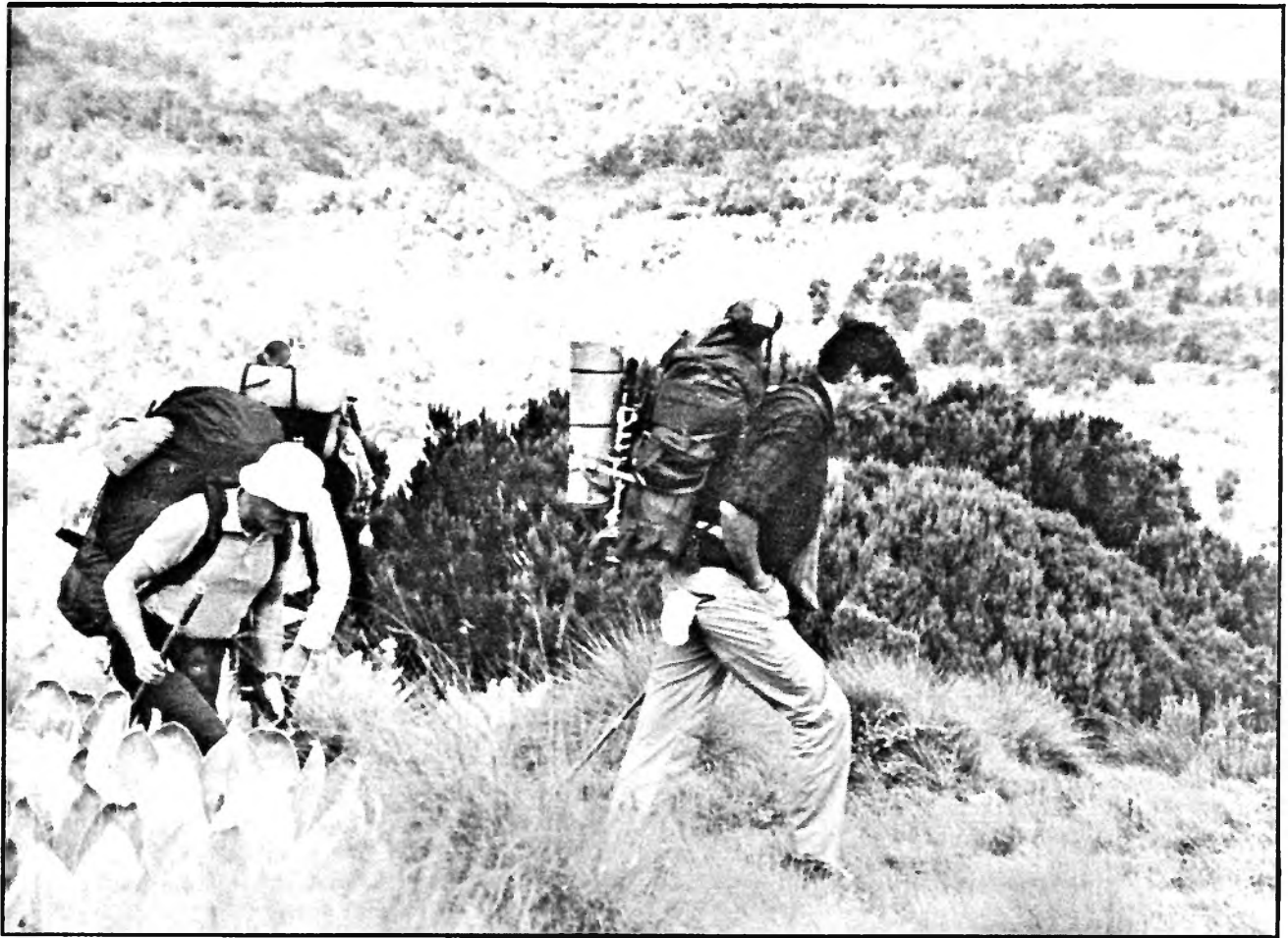
START OF VERTICAL BOG

(JG)

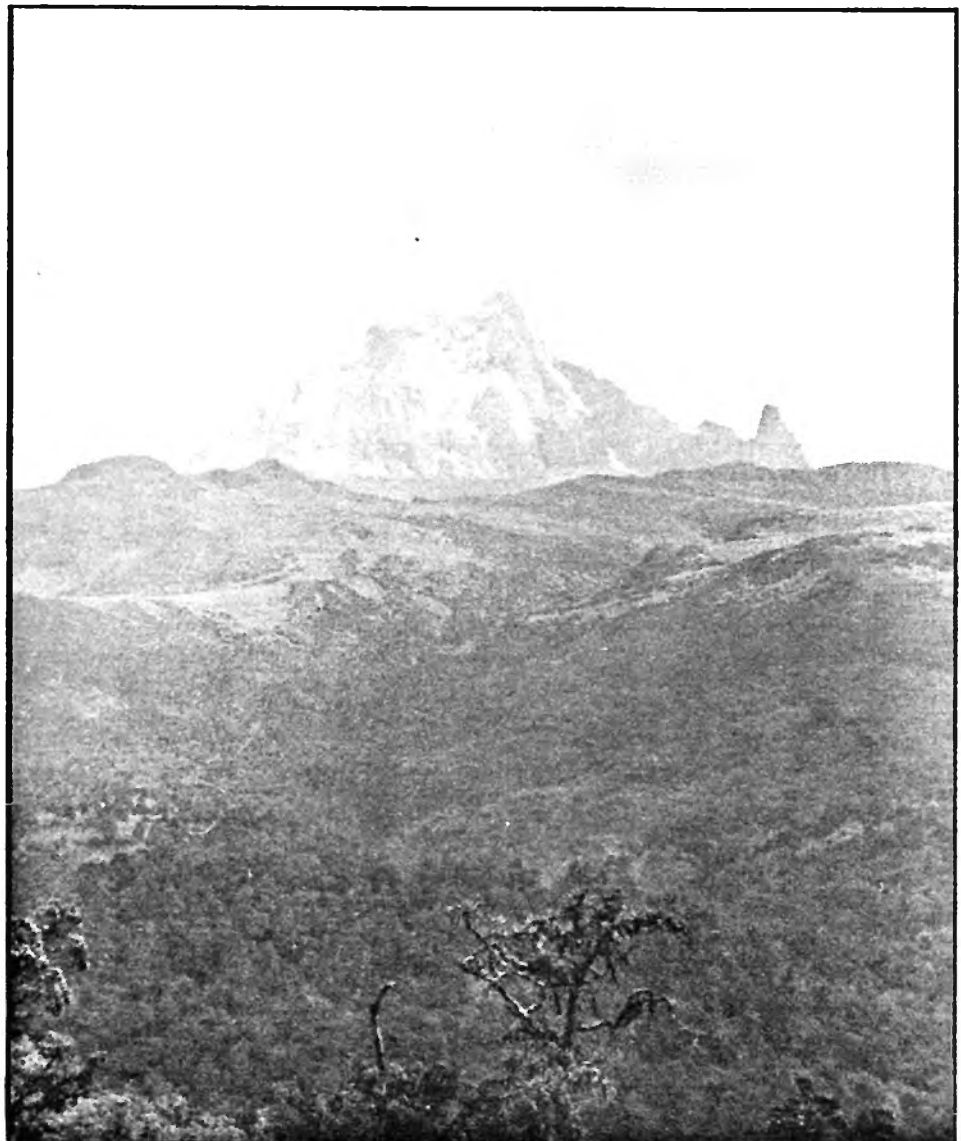


VERTICAL BOG

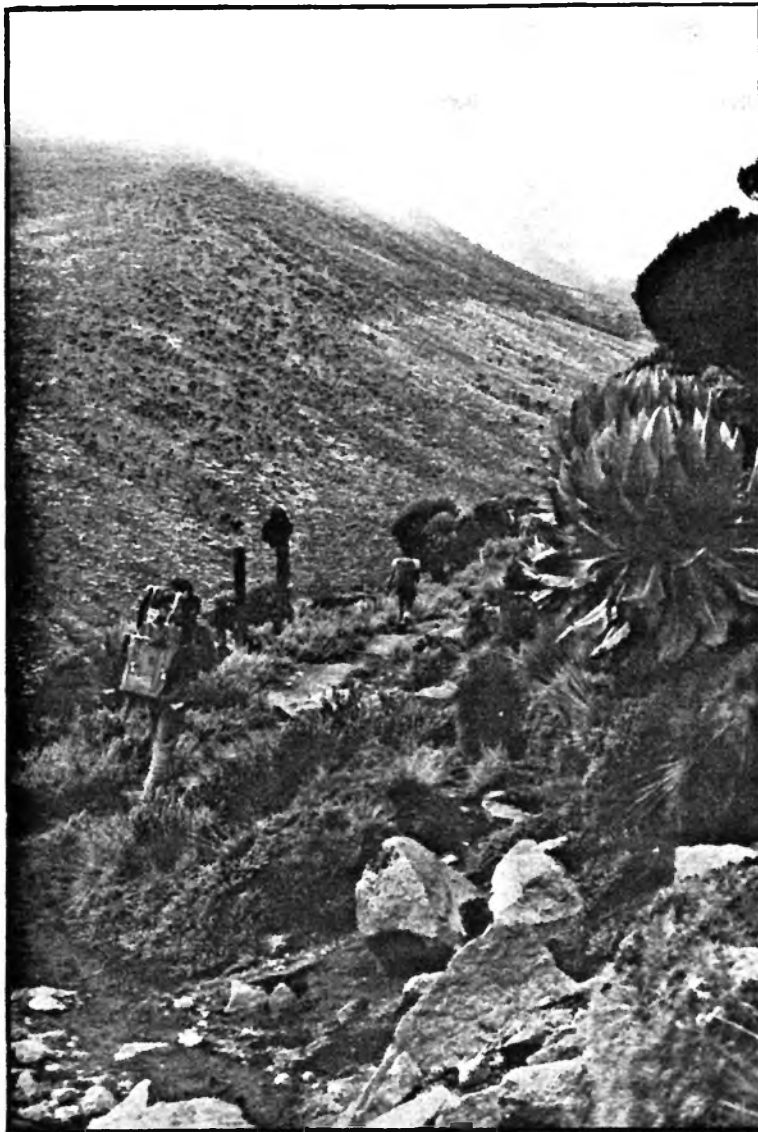
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VERTICAL BOG

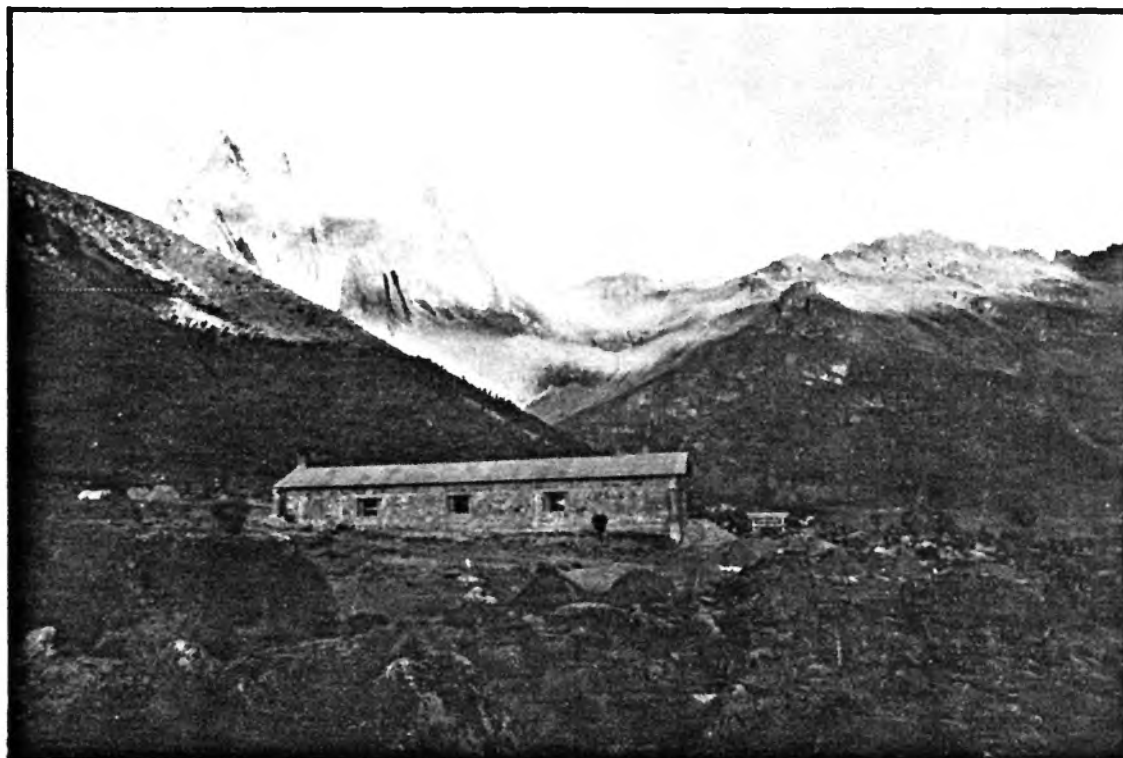


FIRST VIEW



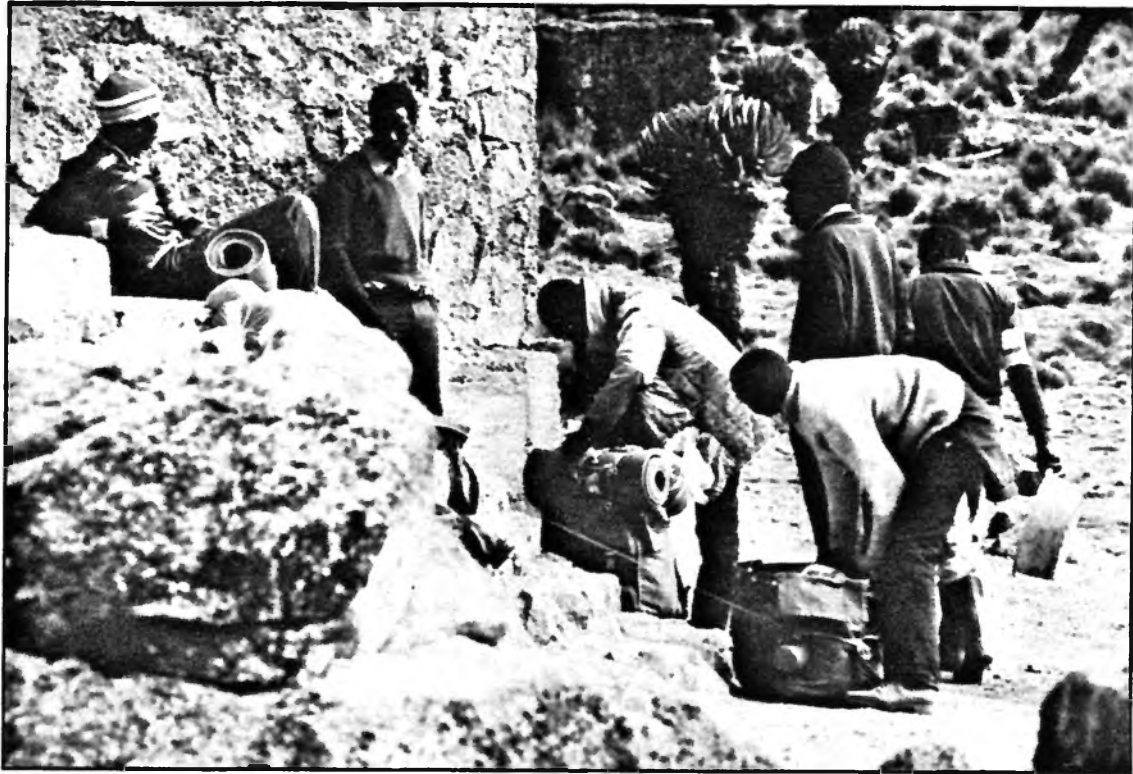
TELEKI VALLEY & GIANT TREE GROUNDSEL
(SENECIO KENIODENDRON)

(JG)



MACKINDERS

(JG)



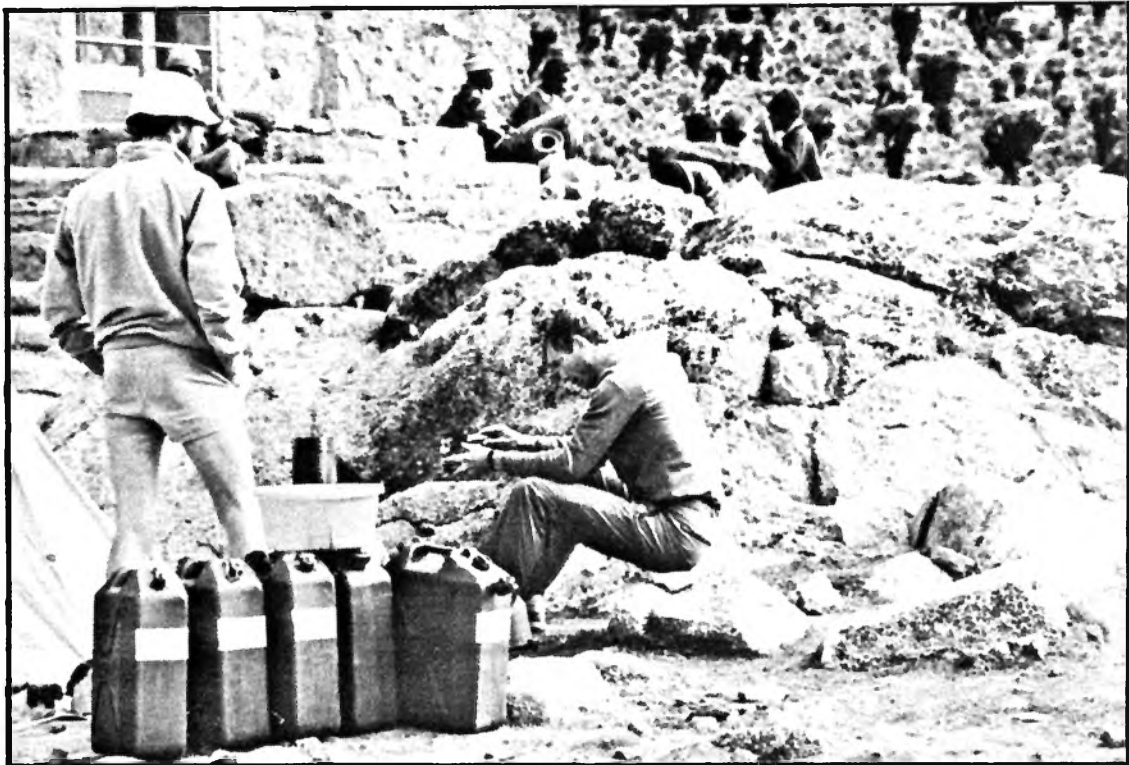
PORTERS ARRIVE MACKINDERS

(JG)



MACKINDERS - BASE CAMP

(JG)



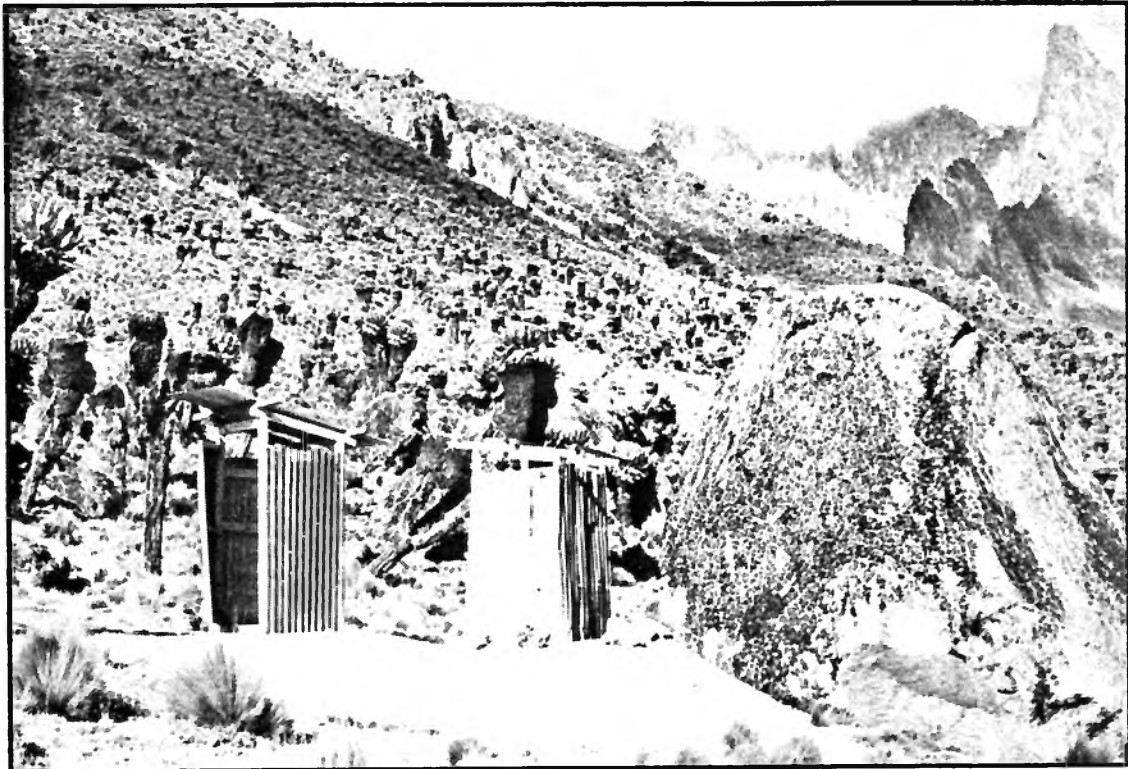
STOVE MAINTENANCE

(JG)



MT KENYA ROCK HYRAX
(PROCAVIA JOHNSTONI MACKINDERI)

(SKJ)



HEADS

(SKJ)

AND



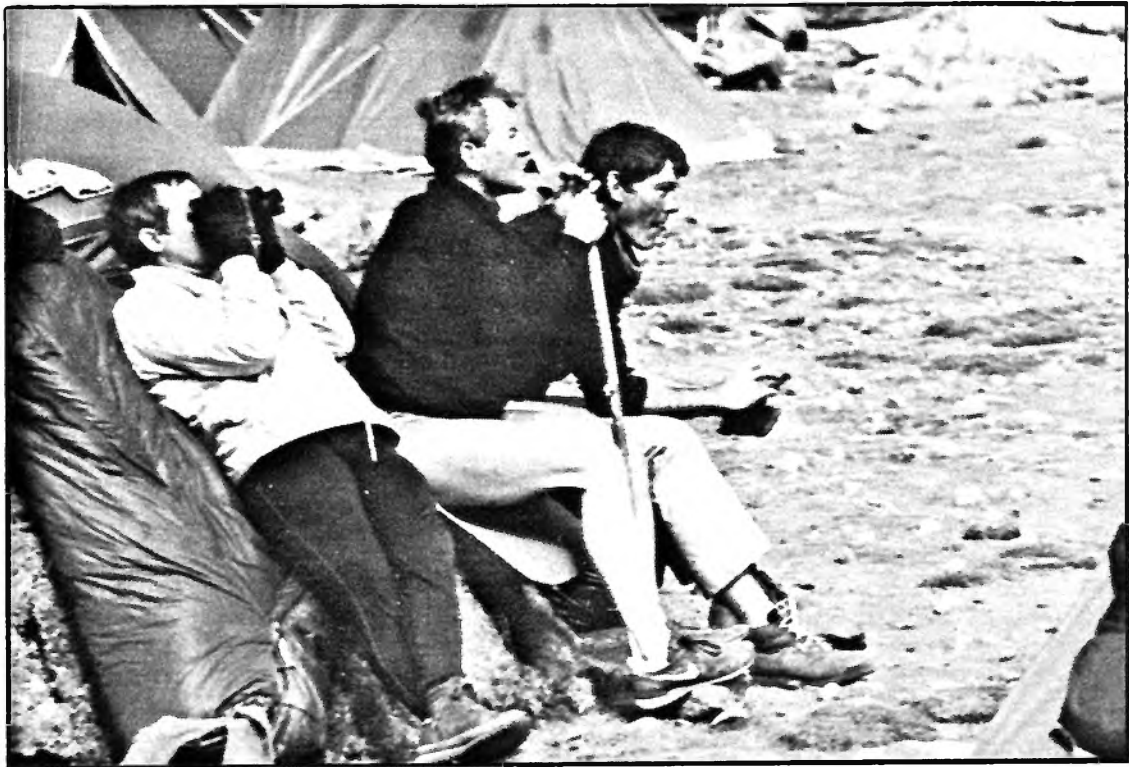
BATHROOM

(JG)

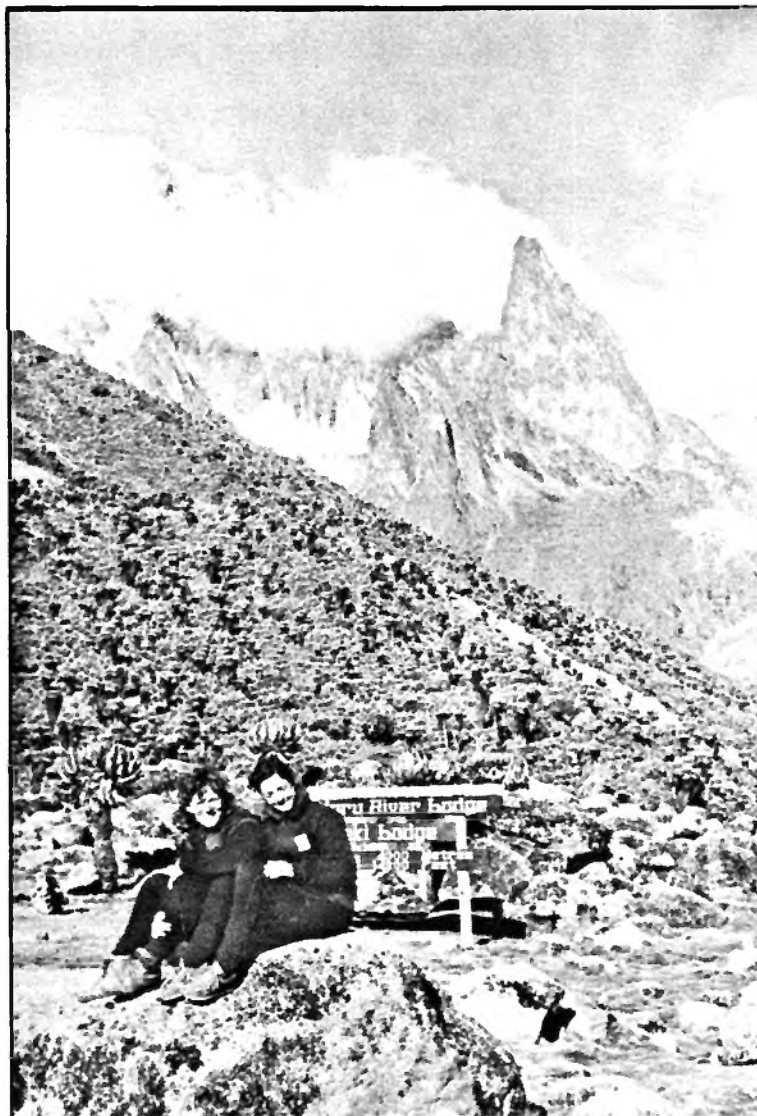


DAILY 'O' GROUP ALIAS 'SHAREHOLDERS'





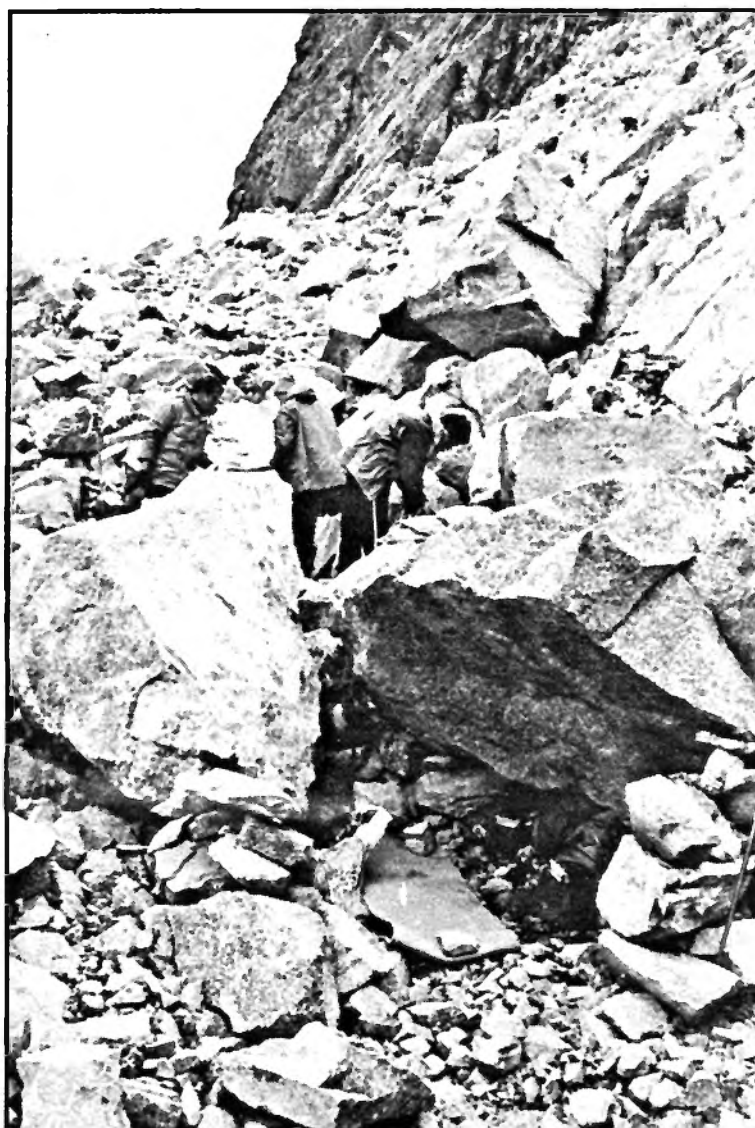
WAITING ANXIOUSLY



BEAUTY AND THE BEAST?



MACKINDERS CAMP



BIVVI SITE - NORMAL ROUTE

MT. KENYA

from S.E.

BATIAN

NELION

EAST FACE

S.W. RIDGE

BROCHEREL COULOIR

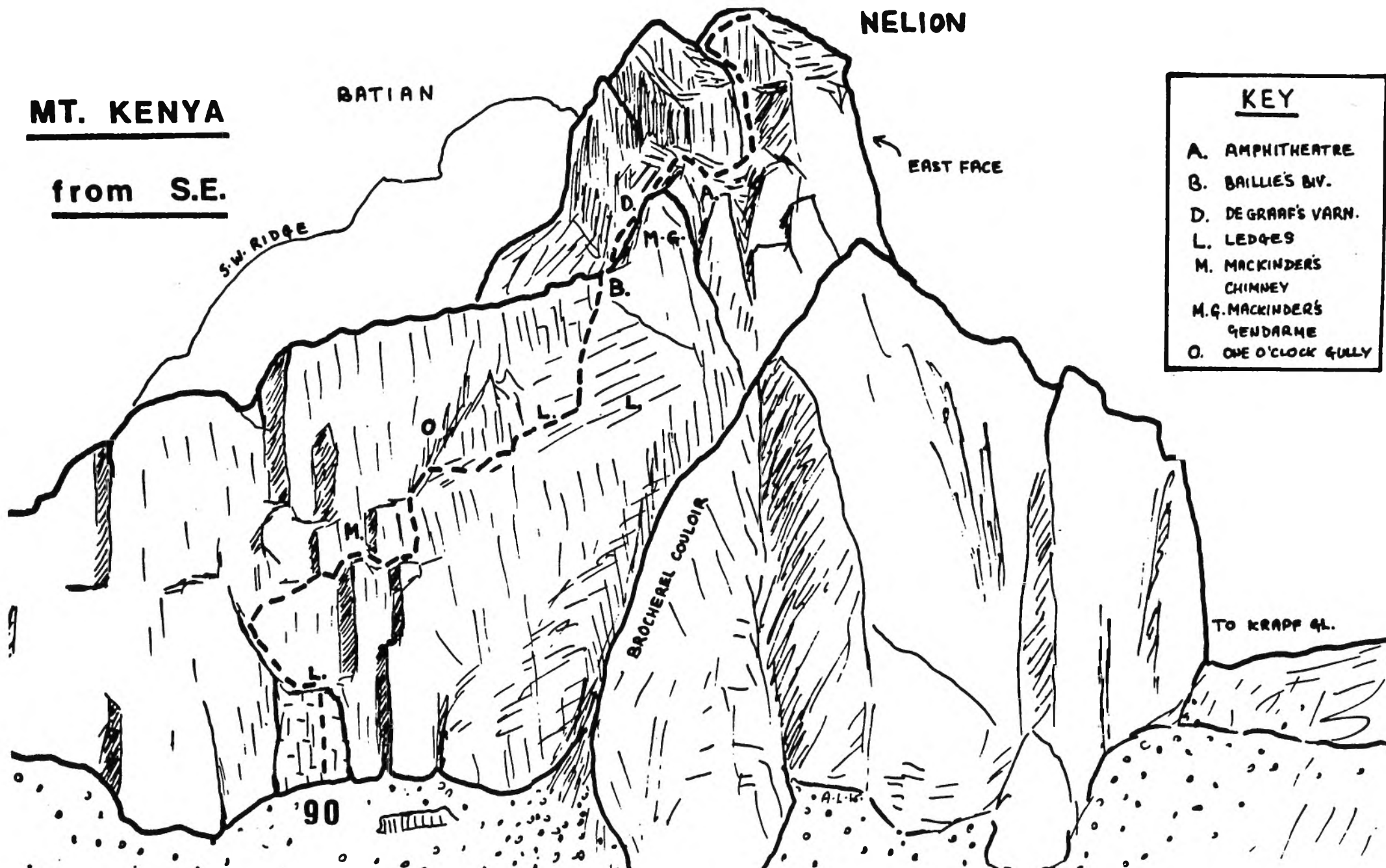
KEY

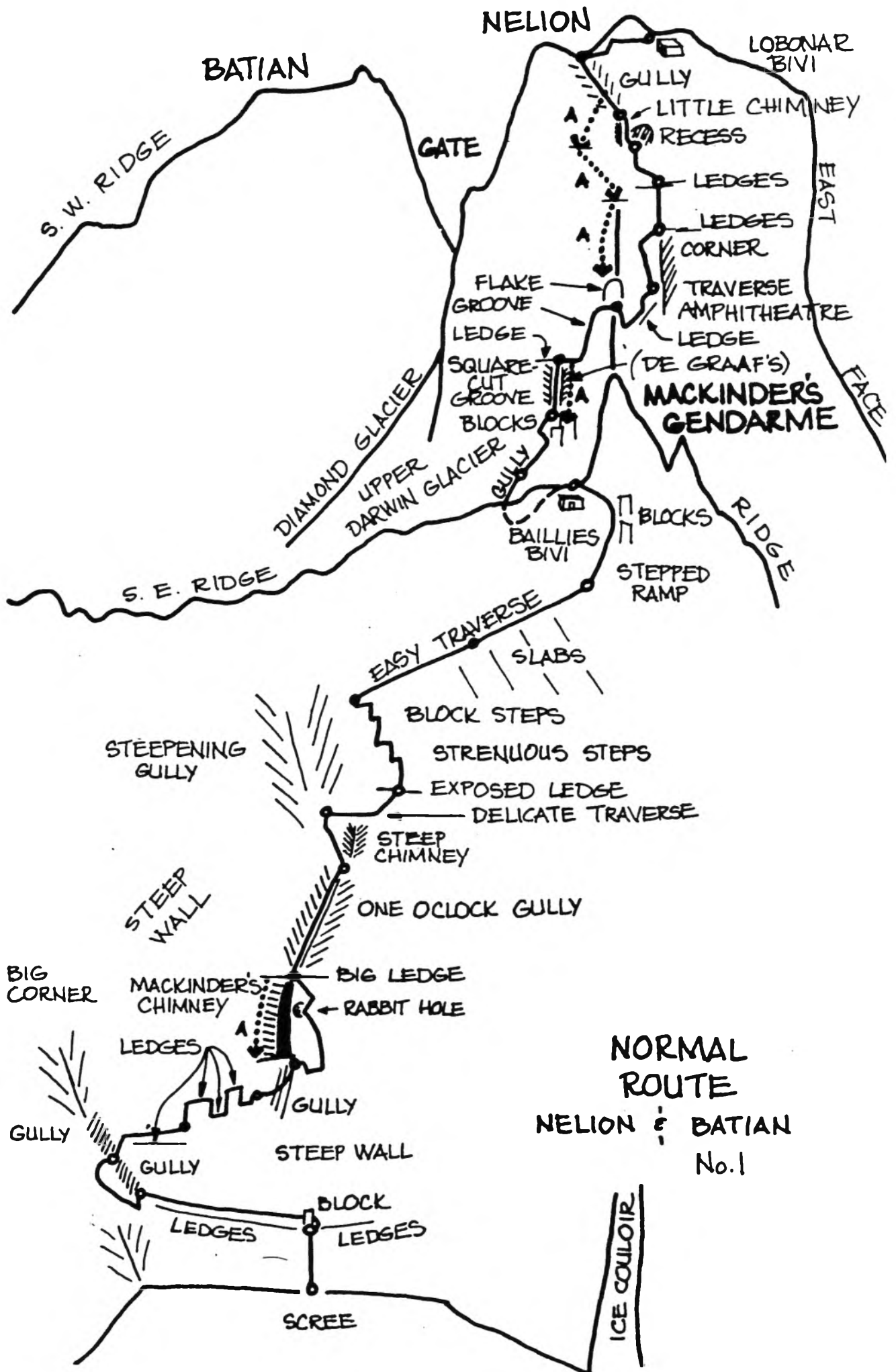
- A. AMPHITHEATRE
- B. BAILLIE'S BV.
- D. DE GRAAF'S VARN.
- L. LEDGES
- M. MACKINDER'S CHIMNEY
- M.G. MACKINDER'S GENDARME
- O. ONE O'CLOCK GULLY

TO KRAPF GL.

90

A.L.W.





NORMAL
ROUTE
NELION & BATIAN
No.1

NORMAL ROUTE ON NELION Grade IV

Climbers: John ALLISON)
Paul JIGGINS)17 January

Peter BAKER)
Peter JOHNSON)
Philip REED)
Alan OLIVE)19 January

Dennis ROBINSON)
Kevin ARNOLD)18-20 January (inc.traverse to Batian)

Angie MILLER)
Alastair MILLER)
Jim MILLEDGE)
Steve JACKSON)
Steve BELL)
Peter MALLALIEU)21 January

Jim MILLEDGE)
Jane GRIMLEY)
John ALLISON)
Nigel GATES)25 January

Mike BEELEY)
Chris COLLIN)27 January

John LEONARD)
John BROOME)28 January (forced off by bad weather)

- 2.8 As can be seen most expedition members did this route and particular thanks are due to Jim MILLEDGE and John ALLISON who did repeat ascents in order to guide less confident team members.
- 2.8.1 Most teams started from the Austrian Hut although some bivouaced at the foot of the route. It is a pure rock route and there was no requirement to carry ice axe or crampons unless one was intending to cross the Gate of the Mists to Batian. Bivouac gear was carried by some teams and if carried was often used! Kev ARNOLD and Robby ROBINSON took the prize for the longest ascent but they were the only ones who completed the ascent of Batian by this route. They spent a night in Baillies Bivi on the ascent and descent.
- 2.8.2 From the Austrian Hut one crossed the Lewis glacier (good path, ice axe and crampons not necessary) to the scree slope below the South-East face of Nelion. The route finding can be quite complicated as witnessed by the fact that the guide book description covers over two pages. The first few pitches were generally soloed as they were about Difficult standard. Most parties roped up to traverse right (V.Diff) to the bottom of Mackinders' chimney. From here a delicate move round a corner led to the Rabbit Hole.

This had an awkward move (Mild Severe) which was even more awkward with a sack and the in-situ peg was probably used as often for aid as for protection.

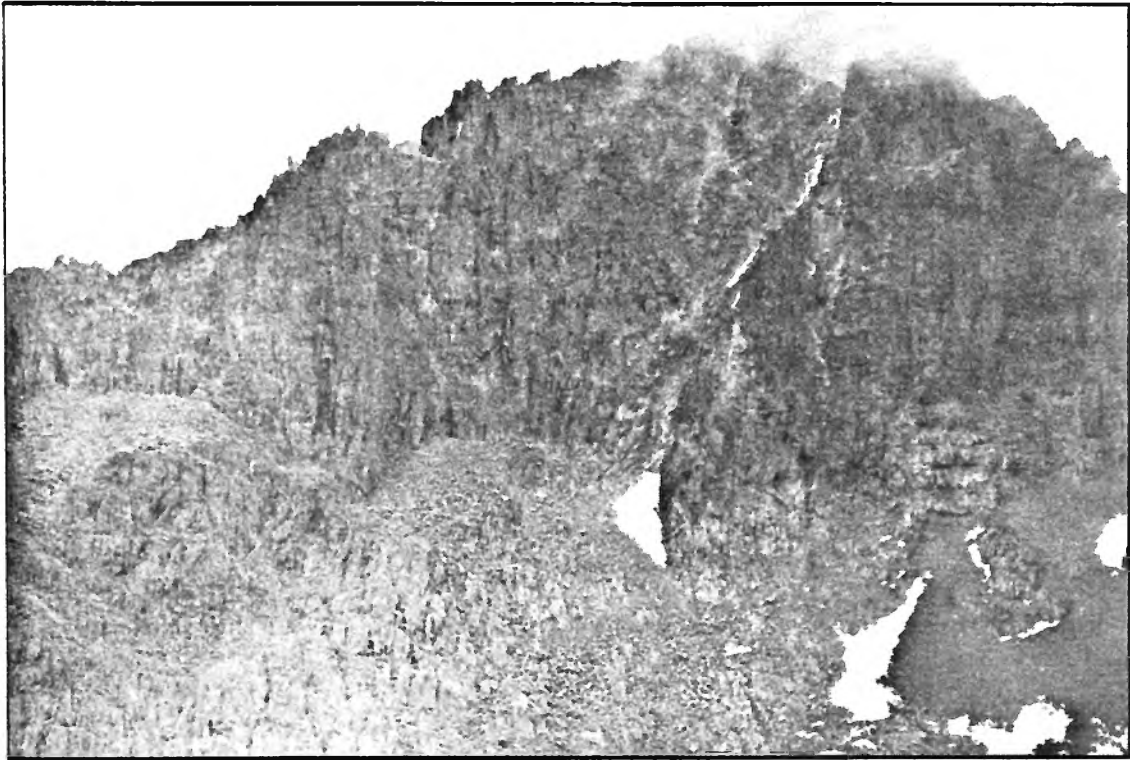
- 2.8.3 From here the climbing became easier to a platform at the top of Mackinders chimney from where there were two easy pitches leading up to One o' Clock gully to another platform. From here there was an obvious traverse line (possible to solo or move together) leading right to below a tin shack known as Baillies Bivi. One pitch (Diff) led up to the bivi where many parties left most of their heavy kit. From here one climbed over the ridge (sensational views down the South Face) and traversed under Mackinders Gendarme to the crux of the route which is known as De Graafs' Variation, a Severe corner crack of about 30m. This was adorned with a fixed rope which was used to varying degrees by different parties. Thankfully it was subsequently removed by one of the guides.
- 2.8.4 From the top of De Graafs' the climbing was fairly simple for another two pitches to the Amphitheatre. From here an exposed traverse (Mild Severe) led across into a gully which was followed, with one steep section, to the Summit of Nelion. Many of the less experienced climbers found the traverse quite intimidating but if double ropes were being used it was possible to arrange very adequate protection.
- 2.8.5 Howells Hut is a metal shelter just below the summit which provides adequate accommodation for four or luxury accommodation for two.
- 2.8.6 The descent of Nelion was achieved by abseiling down the Normal Route. Plenty of abseil anchors are in situ and a minimum of seven abseils of around 40-50m were required to reach the bottom of the route. Most parties took about 6-7 hours to climb the route and 2-3 hours to descend but there was a large degree of variation.

TRAVERSE FROM NELION TO BATIAN Grade III+

Climbers: Kevin ARNOLD)
Dennis ROBINSON) 19 January

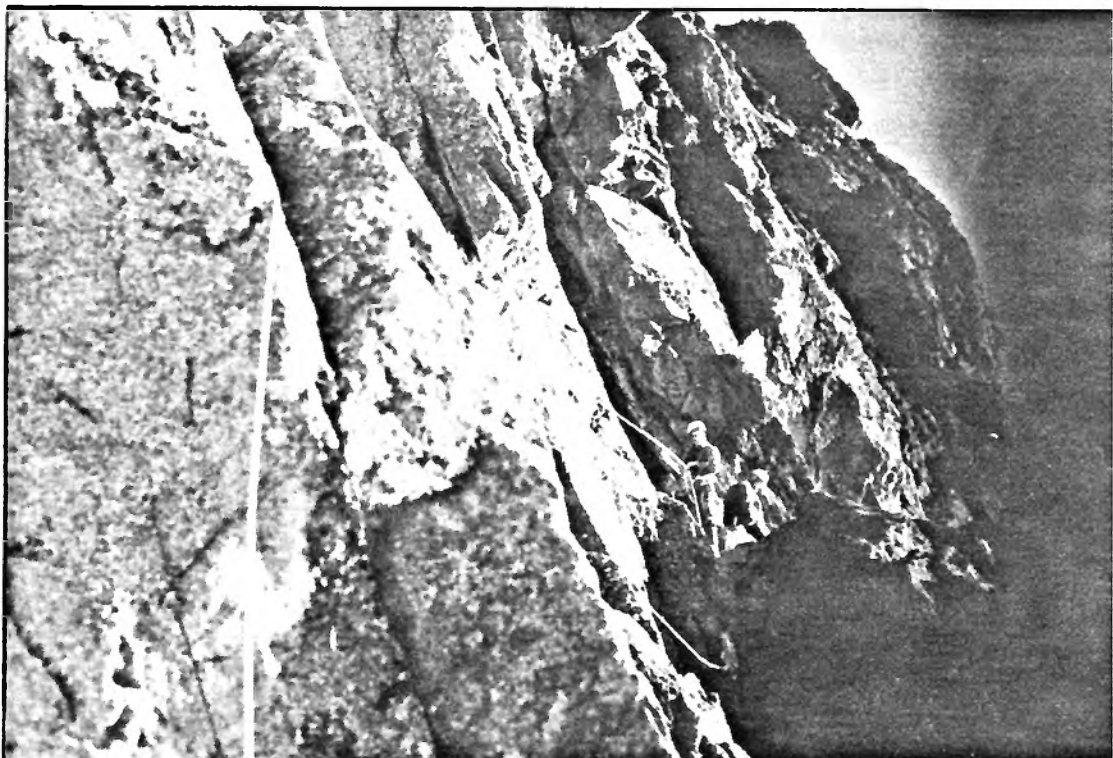
Alistair MILLER)
Phil REED) 25 January

- 2.9 The traverse of the Gate of the Mists and ascent onto Batian followed by the return to Nelion is given a guide book time of three hours but took the two parties significantly longer to do it (about 5-6 hours). The descent into the Gate of the Mists is made by a 40m abseil and it was possible to traverse the Gate on the same abseil rope. The East ridge of Batian coming out of the Gate was crossed from the North to the South side and several pitches of V Diff or less were followed to the summit of Batian. The return journey was made by abseiling/climbing down the ascent route into the Gate of the Mists and then climbing a steep snow slope on the North side of Nelion to regain its summit.



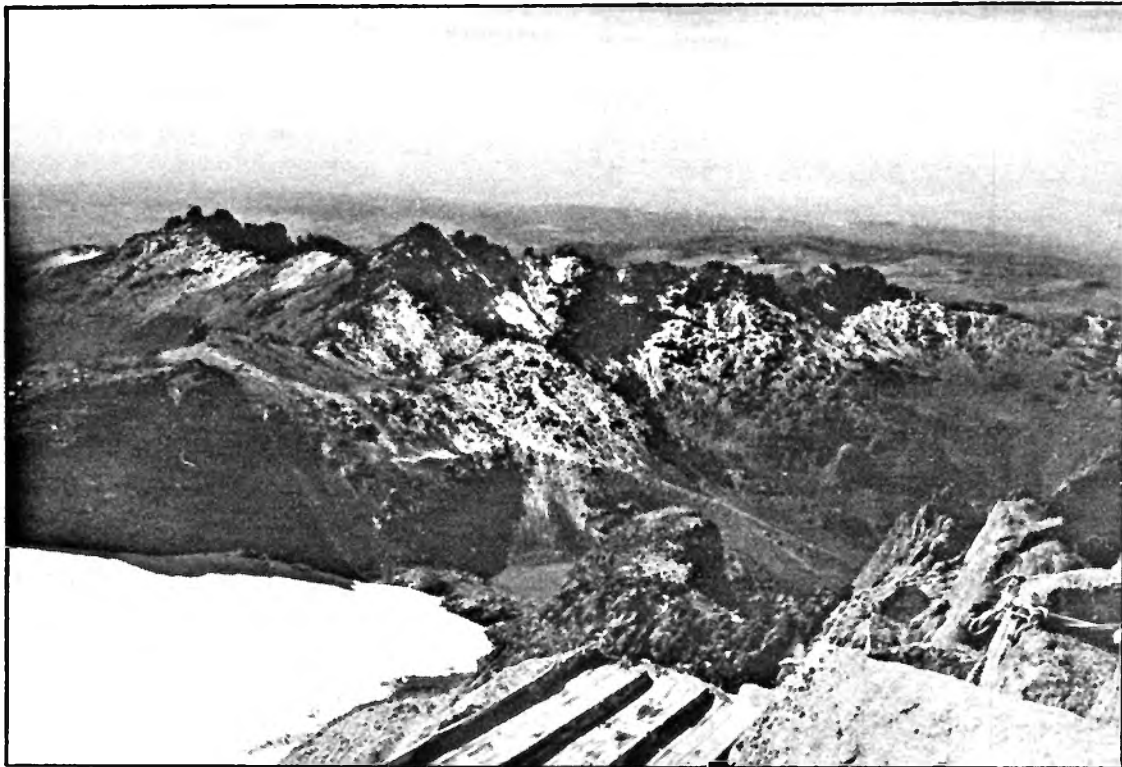
SOUTH EAST FACE MT KENYA
BROCHEREL COULOIR EASILY VISIBLE

(JG)



TRAVERSE TO MACKINDER'S CHIMNEY

(SKJ)

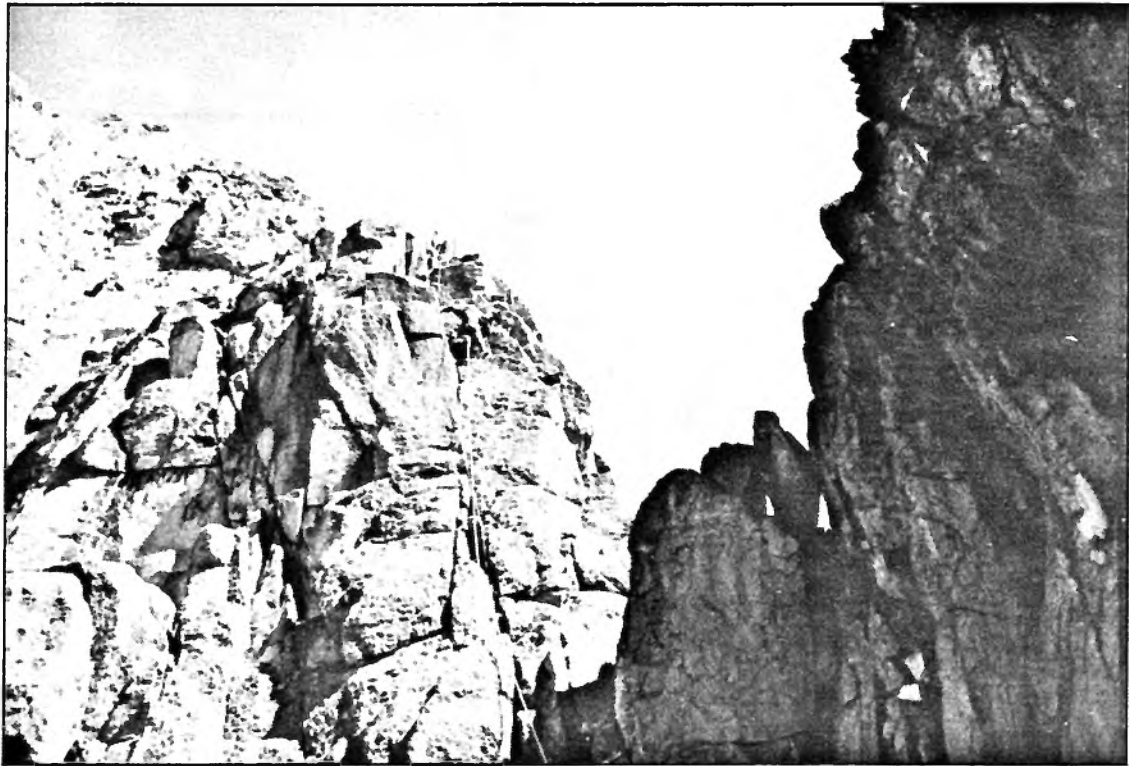


VIEW FROM BAILLIES RIVI



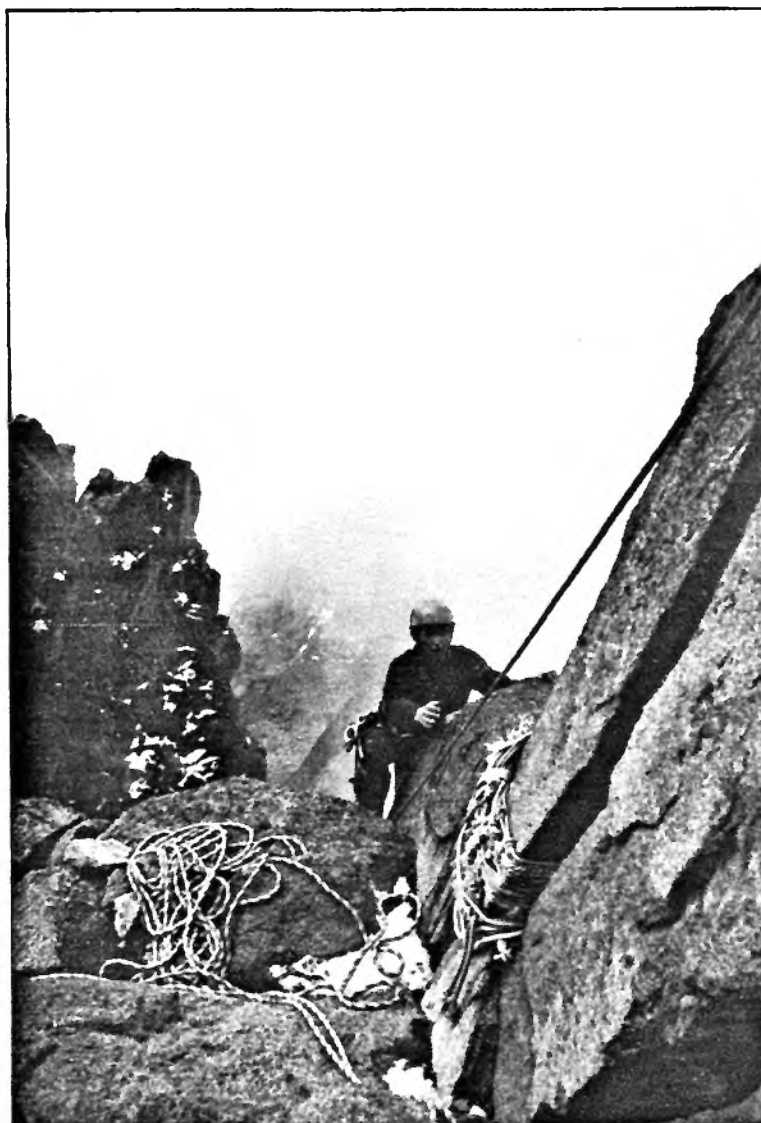
TRAVERSE FROM MACKINDER'S CHIMNEY TO DE GRAAF'S
(NOTE FIXED ROPE)

(JG)



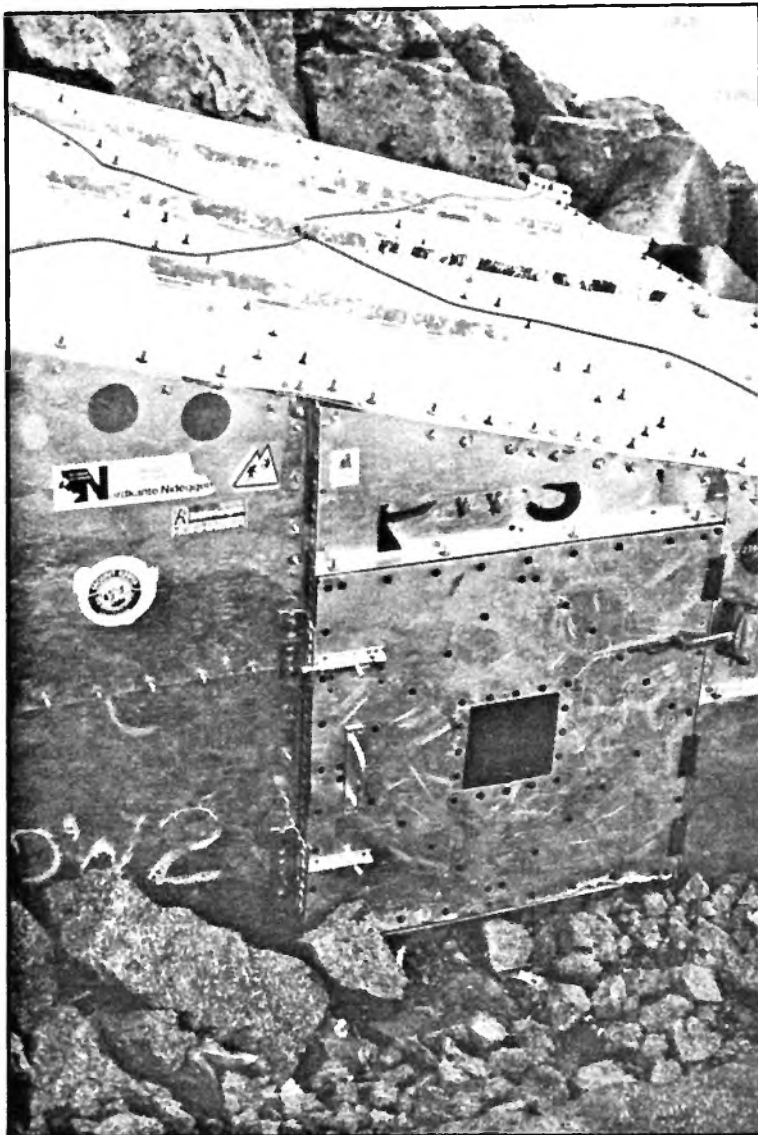
2nd PITCH DE GRAAF'S
(CLIMBER J MILEDGE)

(JG)



TOP OF 2nd PITCH SHOWING ABSEIL ANCHORS
(CLIMBER J ALLISON)

(JG)



HOWELL'S HUT ON SUMMIT OF NELION

(SKJ)

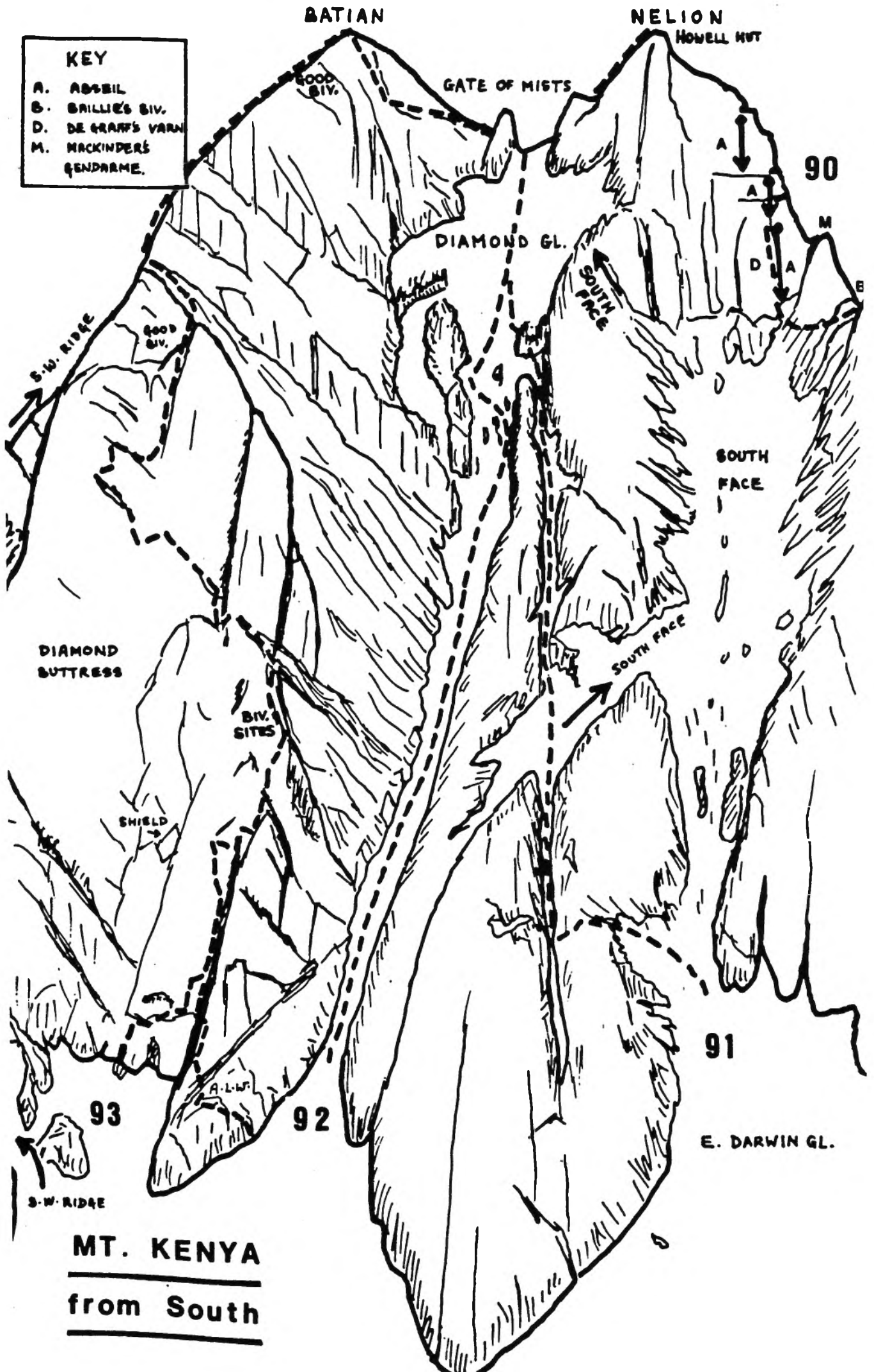


PT LENANA FROM NELION
(NOTE AVALANCHE)

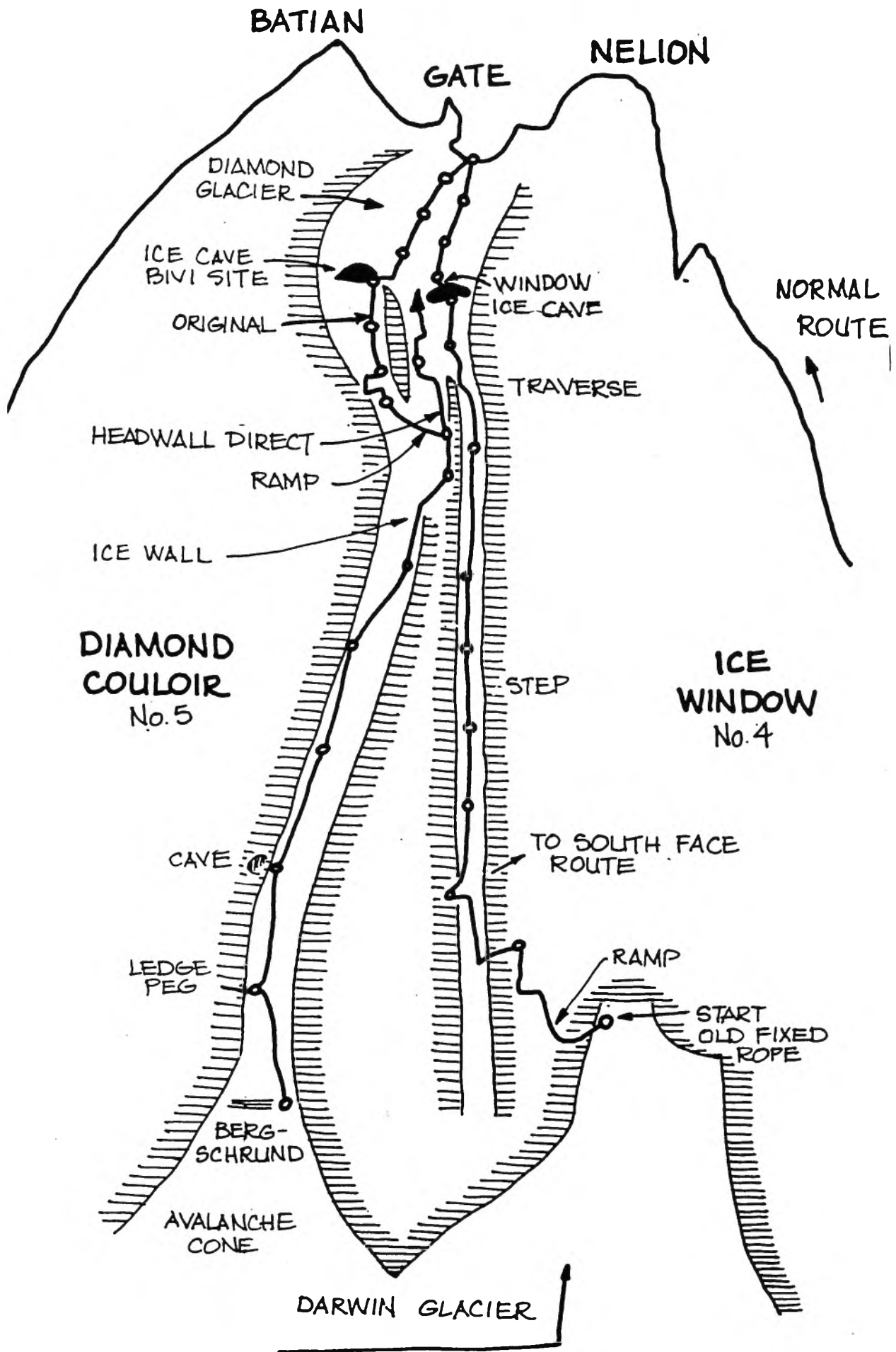
(JG)

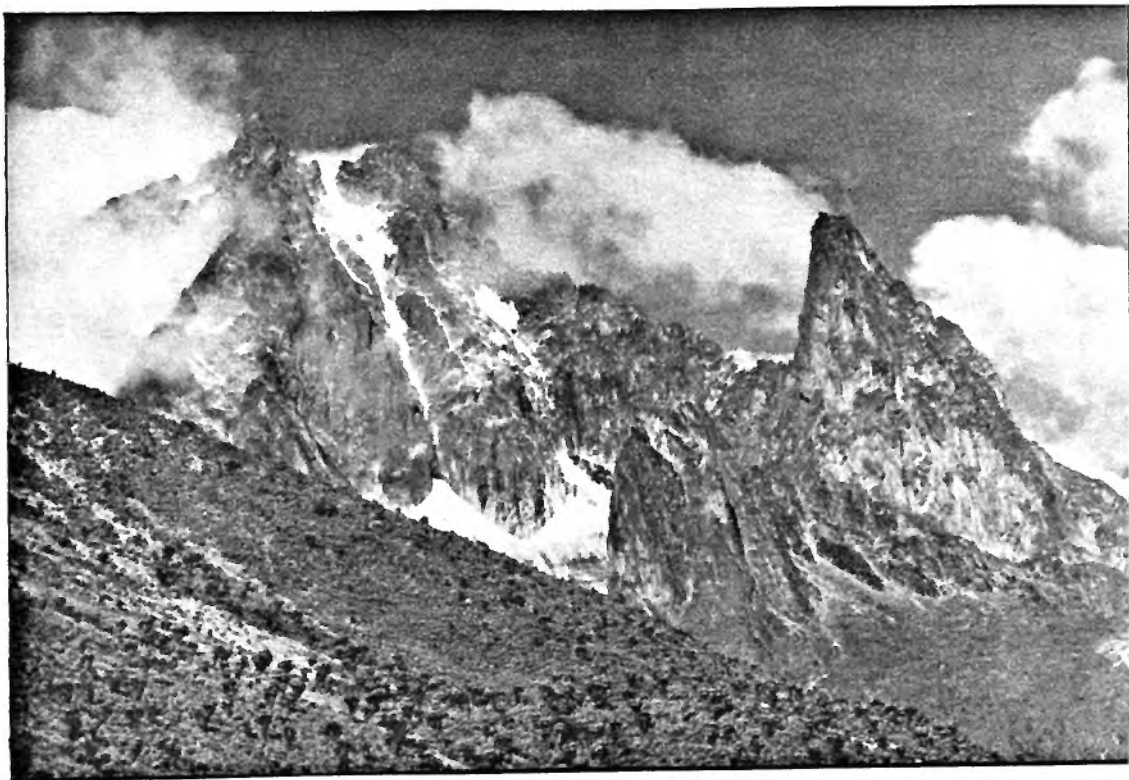
- KEY

 - A. ADSEIL
 - B. BRILLIÉ'S BIV.
 - D. DE GRAFF'S VARN
 - M. MACKINDER'S GENDARME.



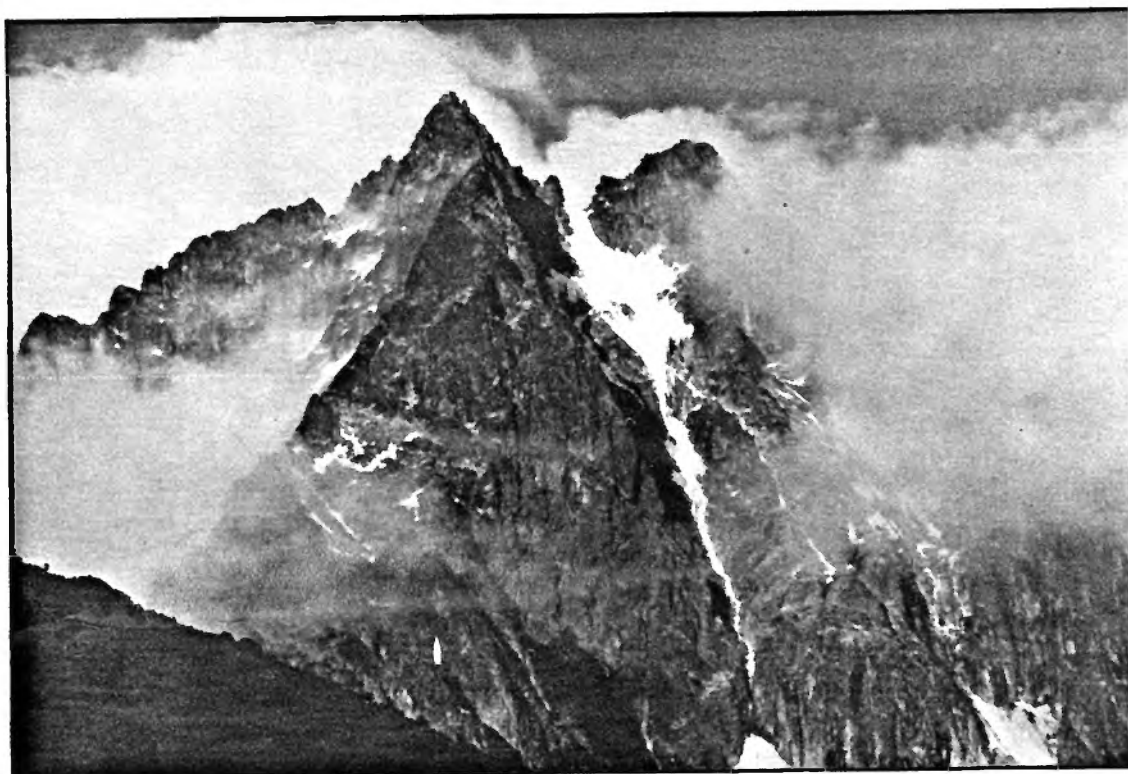
MT. KENYA
from South



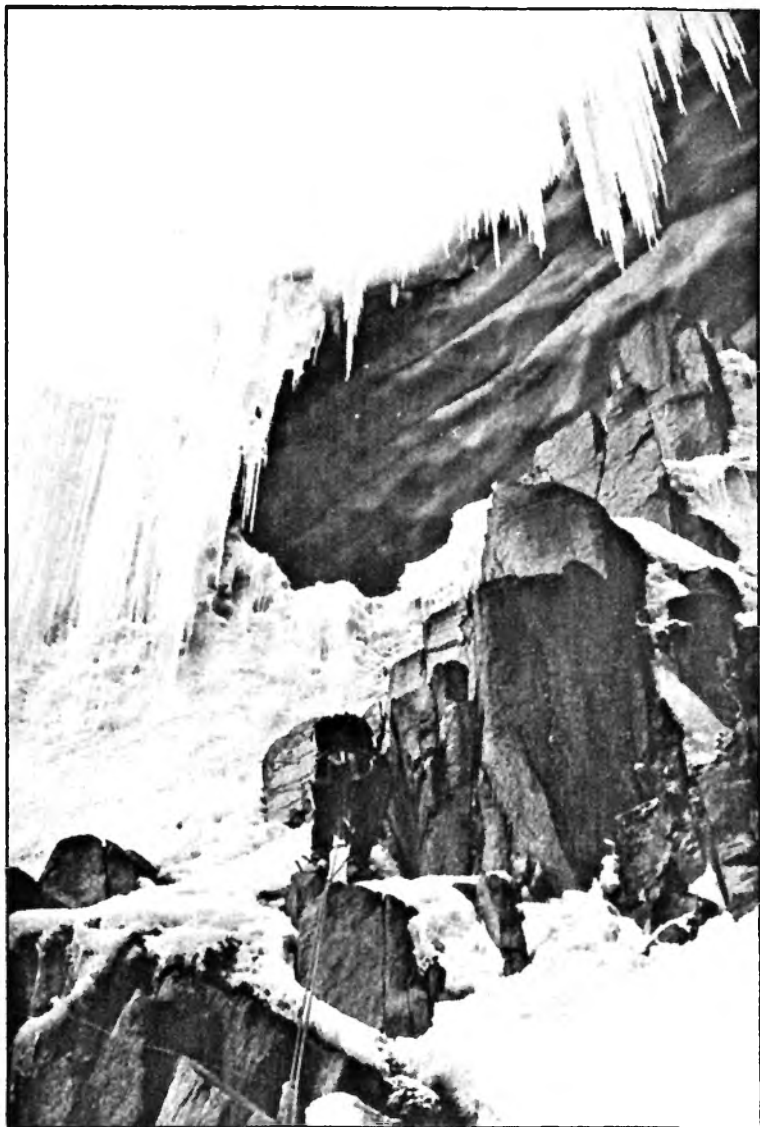


MT KENYA FROM SOUTH

(SKJ)

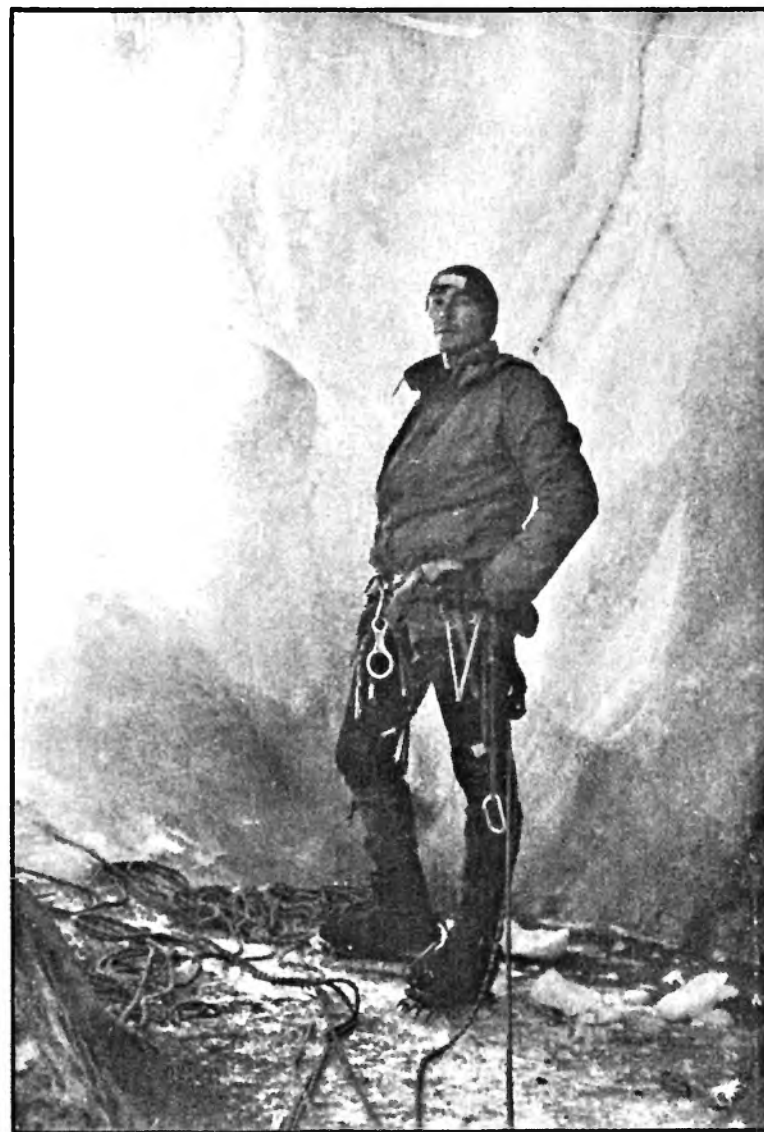


DIAMOND GLACIER & COULOIR SHOWING ICE WINDOW AT BOTTOM RIGHT OF DIAMOND GLACIER



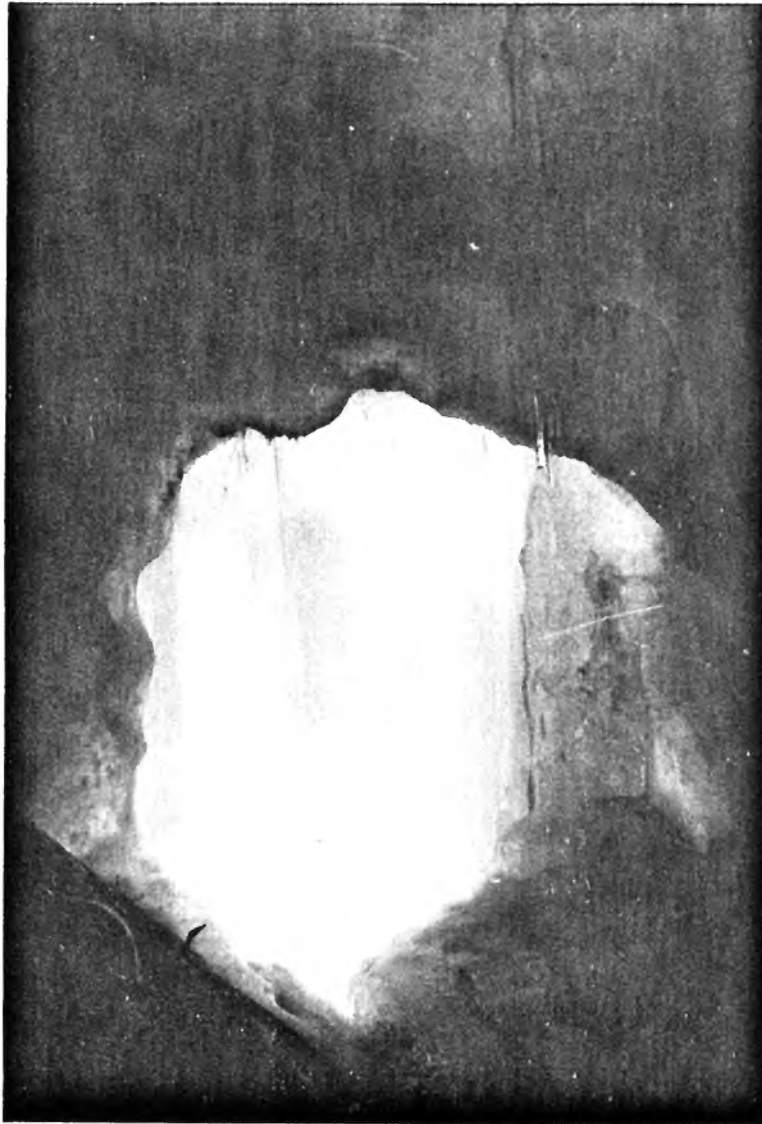
ENTERING 'ICE WINDOW'

1



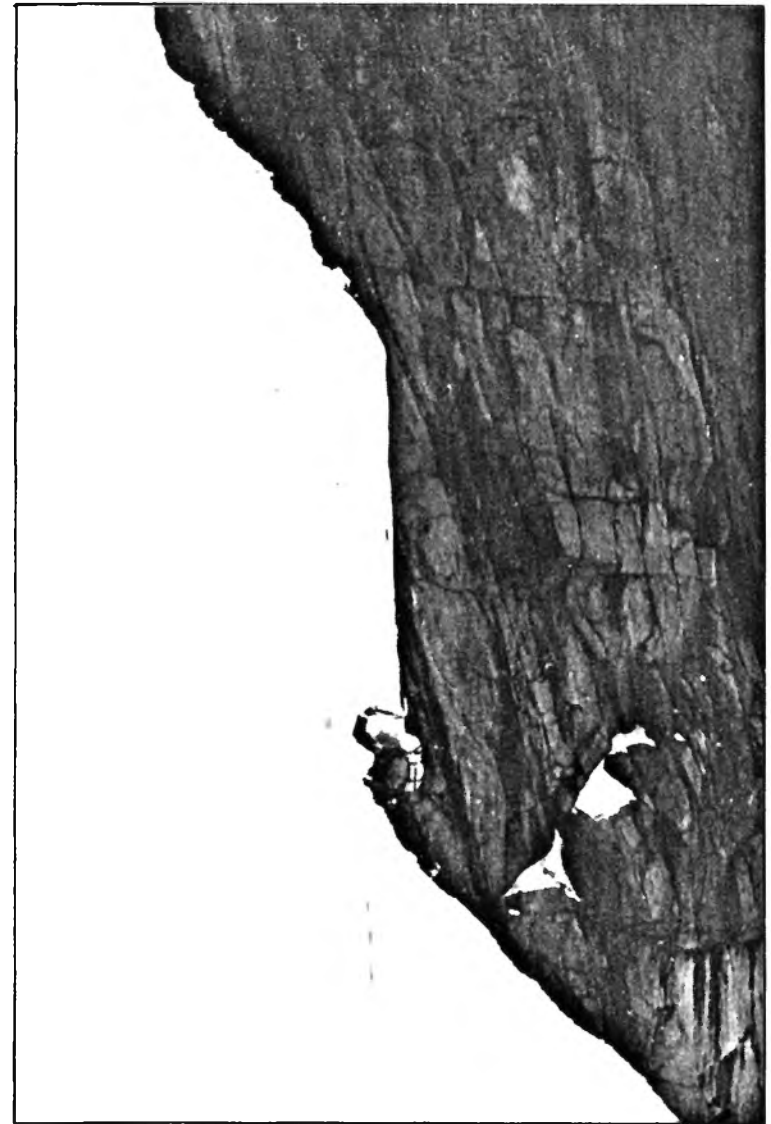
INSIDE ICE CAVE

2



EXIT VIA 'ICE WINDOW'

3



ONTO DIAMOND GLACIER

4

ICE WINDOW ROUTE Grade V inf

Climbers: Steve BELL)
Chris COLLIN)19 January

Peter JOHNSON)
Peter BAKER)22 January

Alastair MILLER)
Philip REED)24 January

Dennis ROBINSON)
Kevin ARNOLD)25 January

2.10 As previously stated the post Christmas period is not ideal for ice climbing on the South face of Mt Kenya but the Ice Window was actually in reasonable condition although with a lot less snow than is present later in the year.

2.10.1 All parties bivouaced in a comfortable boulder shelter just below the North couloir on Point John and made early starts in soloing up the right hand bay of the Lower Darwin glacier. At the apex of this an old fixed rope marked the start of the difficulties. From here a delicate traverse led into the "hidden couloir" which can be climbed quite easily at Scottish grade III with occasional steeper sections of grade IV. The crux was a short vertical section to enter a vast ice cave (big enough to accommodate the entire expedition). From the ice caves' left end one descended about 4m in an enclosed "ice tube" and then stepped left onto the bottom of the Diamond glacier. From here four rope lengths led to the Gate of the Mists. The condition of the Diamond glacier varied from day to day and some parties found it easier than others although everyone found it a most impressive and enjoyable route.

WEST FACE OF BATIAN Grade V

Climbers: John LEONARD)
Alan DAVIES)
Paul JIGGINS)
John ALLISON)20-21 January

2.11 This was probably the most serious route climbed on Mt Kenya. It was complicated by problems of route finding, difficulty with the stove and the accidental loss of two litres of water.

2.11.1 The route climbed the Tyndall glacier easily and then ascended a hanging snow ramp between the Heim and Ford glaciers. Four rock pitches (last two were Severe) led to an ice field which was crossed to a rock band and thence up a wet gully (Severe) to a rather poor bivi site with no water and an inoperative stove!

- 2.11.2 The following day the route continued on very mixed ground with some quite loose ice and rock leading to the summit ridge of Batian. The summit was reached at 1600 and the party then crossed the Gate of the Mists in gathering darkness and spent the night in the Howell Hut before abseiling down the Normal Route on the following morning.

POINT JOHN-NORTH COULOIR Grade III

Climbers: Peter BAKER)
Peter JOHNSON)16 January

Philip REED)
Chris COLLIN)
Steve BELL)17 January

John LEONARD)
Alan DAVIES)18 January

Dennis ROBINSON)
Kevin ARNOLD)
Alan OLIVE)22 January

- 2.12 This route was reported as a straightforward Scottish Grade III Gully climb of about 4 pitches and taking only a few hours.

SOUTH RIDGE POINT JOHN Grade III

Climbers: Peter BAKER)
Peter JOHNSON)
Steve JACKSON)
Alan OLIVE)26 January

- 2.13 An excellent 200m rock route with good protection and sound rock- apparently cluttered with Americans!

SOUTH RIDGE POINT PIGGOTT Grade III+

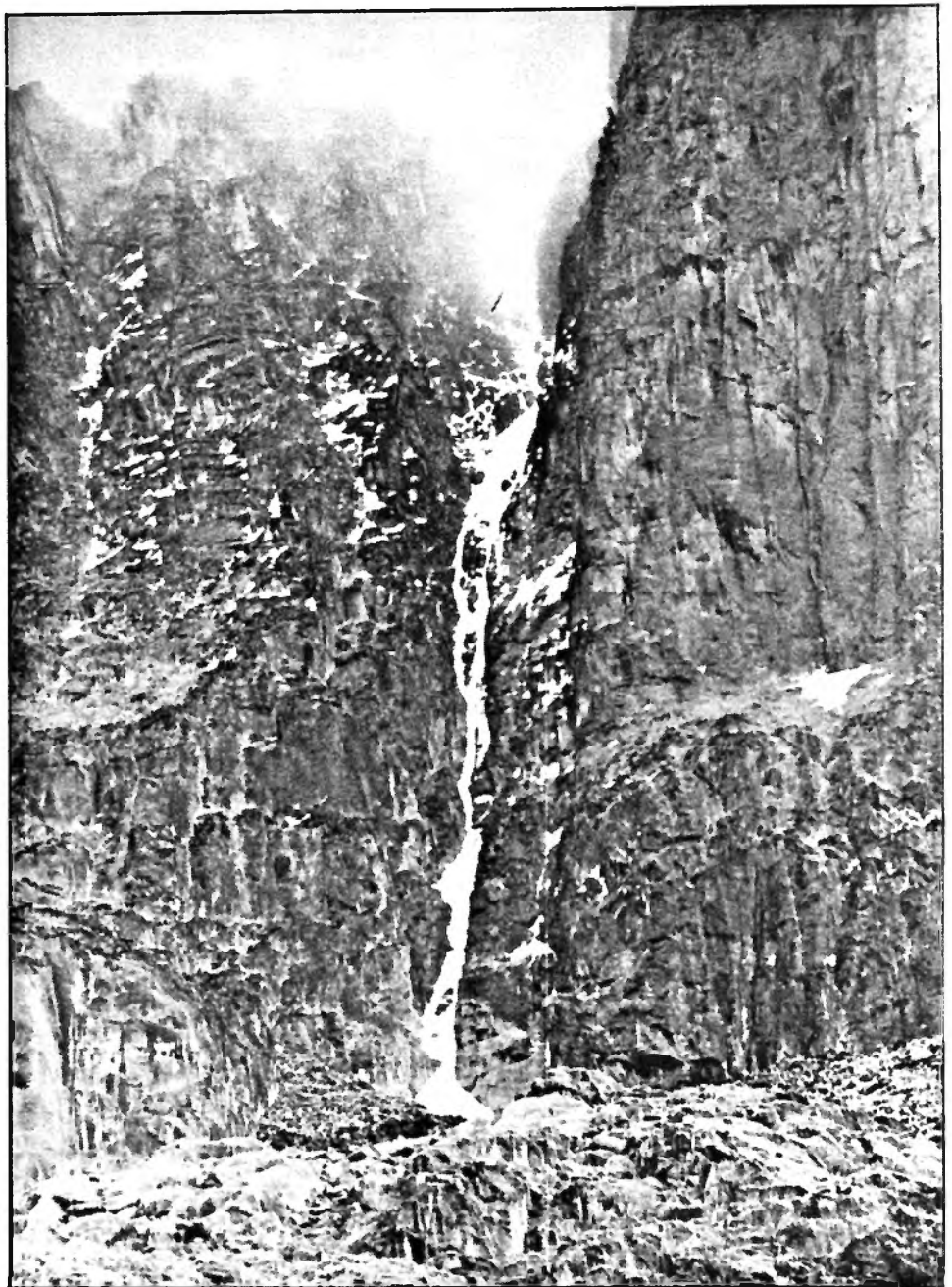
Climbers: Peter BAKER)
Peter JOHNSON)27 January

- 2.14 Another excellent rock route with spectacular situations.

RECOVERY PHASE

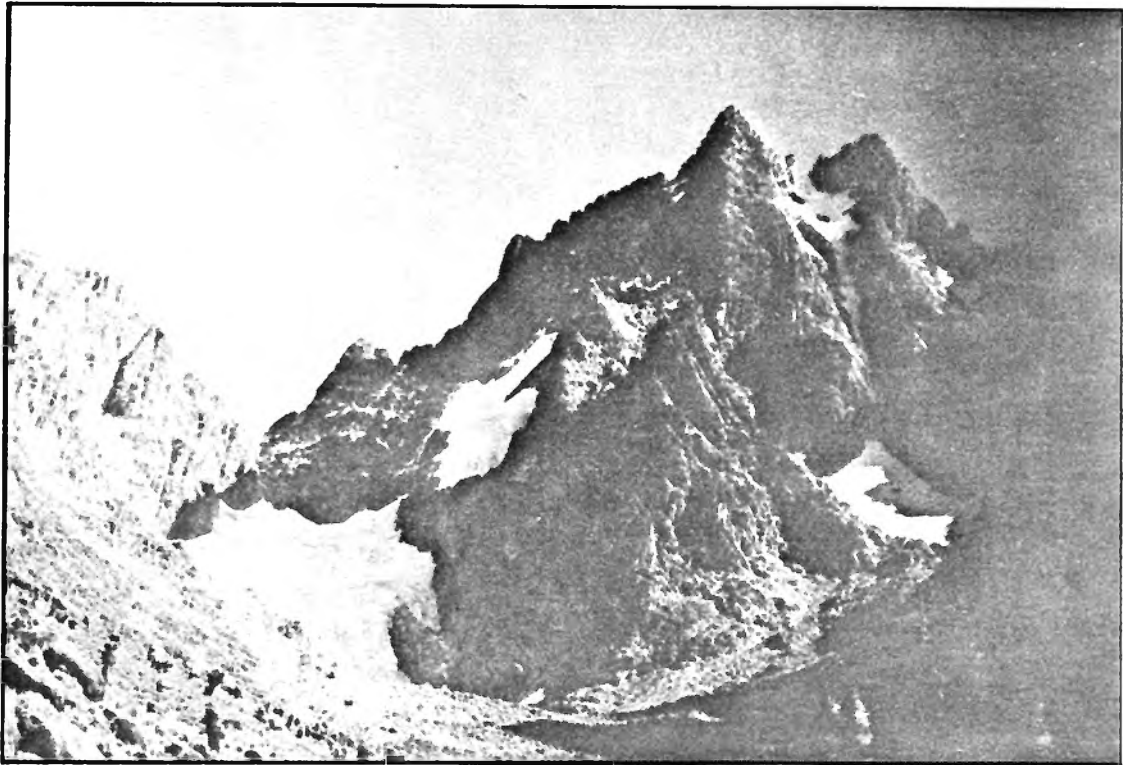
- 2.15 Wednesday 28 January was spent in re-sorting porter loads for the descent. Perhaps in an effort to make up for their late arrival at the Met. Station our 30 porters turned up on Wednesday afternoon instead of Thursday morning. About half of the party descended that evening and the rest followed down through the Vertical Bog on Thursday morning to the Met. Station where everyone stayed overnight before being collected by transport and returning to Kabawa Barracks.

POINT JOHN
COULOIR



AUSTRIAN HUT





WEST FACE SHOWING TYNDALL GLACIER (BOTTOM LEFT) AND HEIM GLACIER
ABOVE, LOWER DARWIN GLACIER FURTHEST RIGHT

(SKJ)



PT LENANA AND LEWIS GLACIER

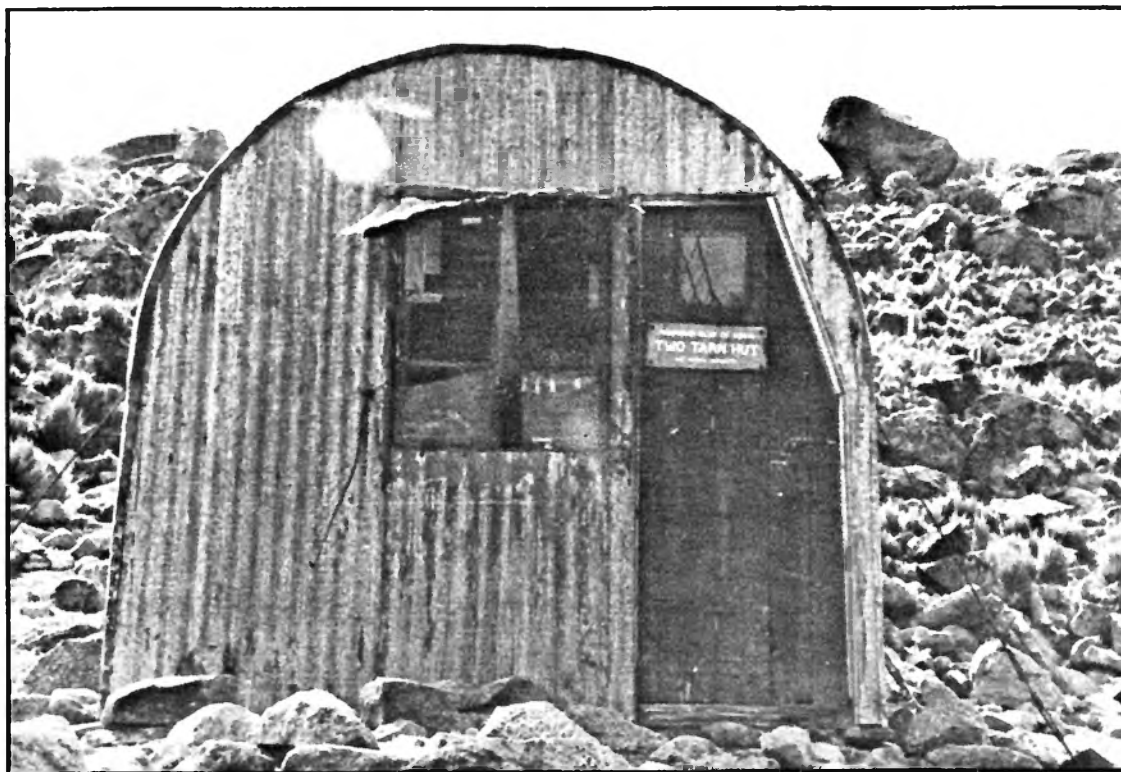
(SKJ)



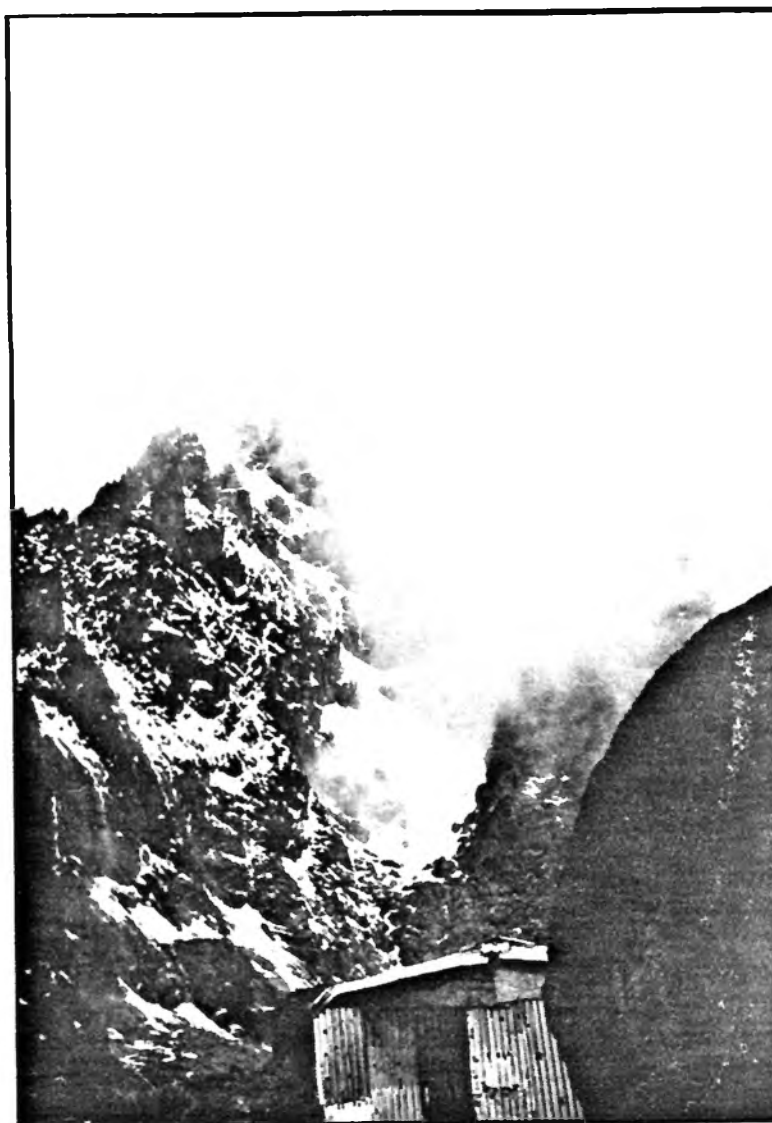
POINT LENANA

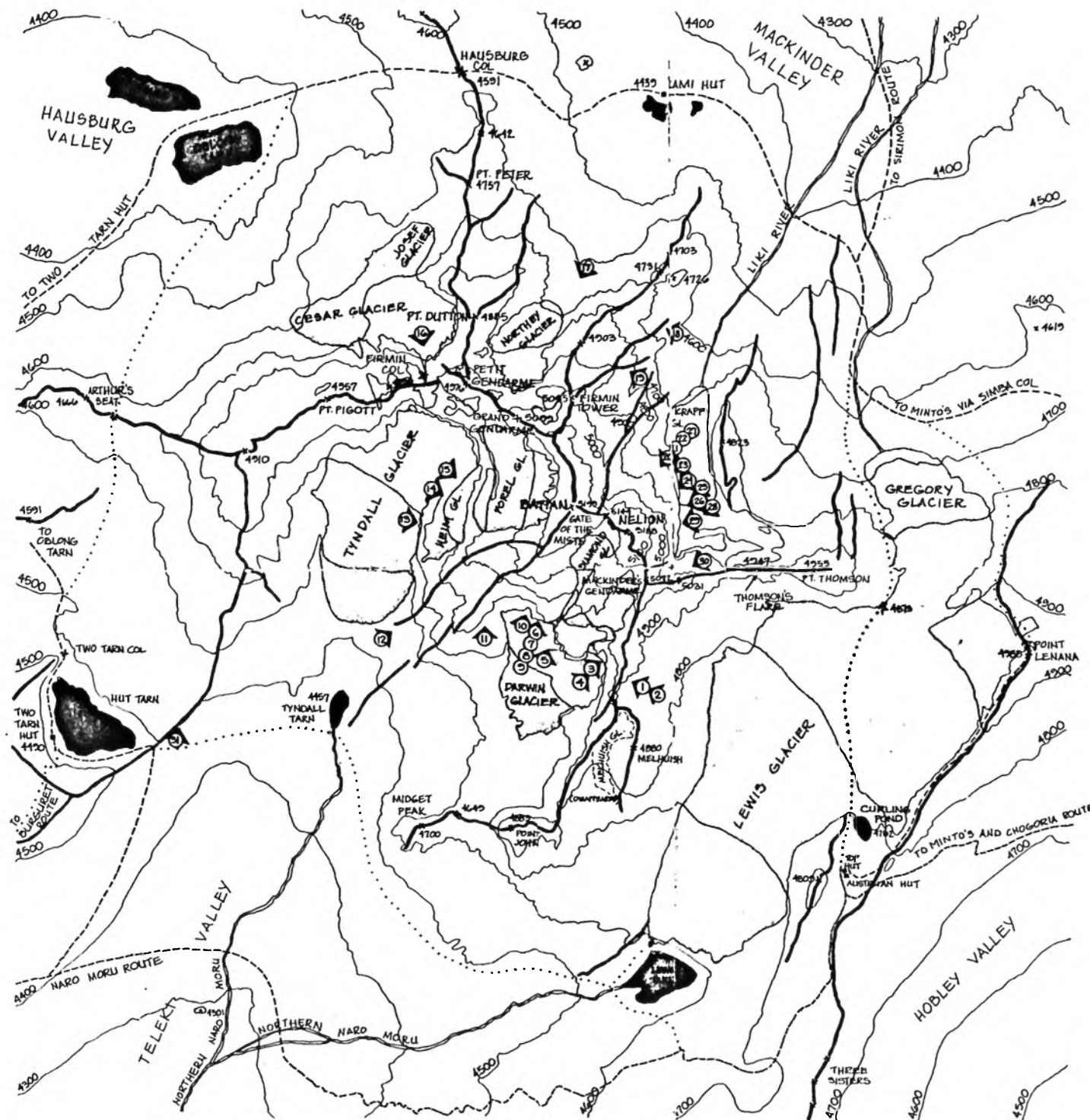


WEST FACE
MT KENYA



KAMI HUT





Climbing Routes

- 1 NORMAL ROUTE
- 2 MACKINDER
- 3 SOUTH FACE
- 4 ICE WINDOW
- 5 DIAMOND COULOIR
- 6 SOUTHERN SLABS
- 7 DIAMOND BUTTRESS ORIGINAL
- 8 EQUATOR
- 9 DIAMOND BUTTRESS DIRECT
- 10 MEDITERRANEAN ROUTE
- 11 SOUTH-WEST RIDGE
- 12 TOWER RIDGE
- 13 WEST FACE
- 14 UNTRAVELLED WORLD
- 15 MISTY MORNING COULOIR
- 16 WEST RIDGE
- 17 NORTHEY GLACIER
- 18 NORTH FACE STANDARD ROUTE
- 19 FRENCH ROUTE
- 20 NORTHEAST BUTTRESS OF BATIAN
- 21 NORTHERN SLABS
- 22 NORTH GATE
- 23 EAST GATE
- 24 NORTHEAST PILLAR OF NELSON
- 25 EASTERN GROOVE
- 26 SCOTT-BRAITHWAITE
- 27 NORTH-EAST FACE OF NELSON
- 28 EAST FACE OF NELSON
- 29 EAST-SOUTH-EAST OF NELSON
- 30 MACKINNON'S COULOIR
- 31 GRAND TRAVERSE

Key

- RIDGE
- PEAK
- WALKING ROUTE (MARKED)
- WALKING ROUTE (UNMARKED)
- RIVER
- GLACIER
- TARN OR LAKE
- 100 m CONTOUR LINE
- HUT
- COL
- START OF CLIMBING ROUTE

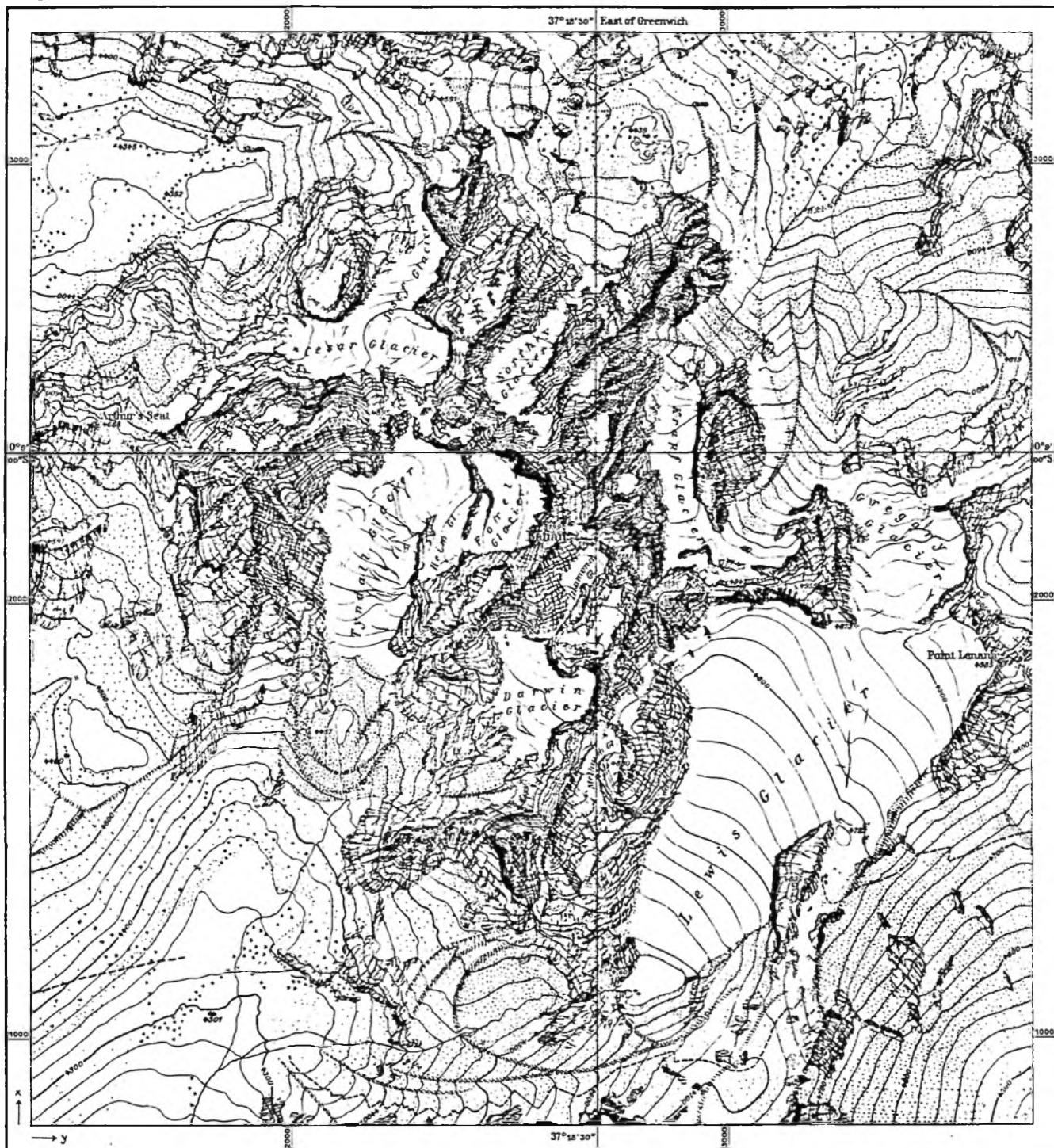
MOUNT KENYA PEAK AREA



CONTOURS FROM MT KENYA 1:5,000 BY
ERWIN SCHNEIDER, 1963.
APPROX GLACIER OUTLINE FROM STEFAN MASTENRATH
AND ROBERT CAUKWELL, 1979

MOUNT KENYA

1:10 000



Trigonometrical Starting Points from the IGY Mt Kenya Expedition 1957/58, (F. E. Charnley): Arthur's Seat and Point Lenana.

Edited by: Research Scheme Nepal Himalaya and sponsored by: Fritz Thyssen Stiftung, Deutscher Alpenverein and Österreichischer Alpenverein.

Survey January 1963 by Terrestrial Photogrammetry: Hubert Schriehl and Erwin Schneider, Innsbruck. Elaboration of the Photogrammetrical Work by Erwin Schneider, Innsbruck. Representation of Rocks by Fritz Ebner, Innsbruck.

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ZEICHENERKLÄRUNG:

- Hütte / Hut
- Fußweg / Route
- Senecian / Giant Groundsels
- Bach / Stream
- See / Lake or Tarn

REFERENCES:

- Gletscher und Schneefeld / Glacier and Snowfield
- Gletscherspalten / Crevasses
- Moränenwall / Moraine
- Schutt / Scree
- Felsen / Rock

Höhenlinienabstand 20 m Contour Intervals
Verstärkte Höhenlinien 100 m Stressed Contours
Höhen in Meter, Altitudes in Meters

1 Meter = 3,280 370 Feet
1 Foot = 0,304 797 Meter

CLIMBING ON KILIMANJARO 2-5 FEBRUARY 1987

- 2.16 After an eventful journey from Nairobi the party arrived at the Kibo Hotel on the evening of Sunday 1 February to find that the hotel had run out of beer! Our compulsory porters and guides had been organised via the Tanzanian travel company handling arrangements for us in that country and our first problem was persuading the hotel manager, who controls the guides, that we could get up and down the mountain in only 4 days. Having succeeded we split into two groups: 9 intending to do the Normal Route and 12 intending to climb the glacier routes on the South face of Kibo. We were again required to do some very fast talking to the Park Warden in Charge to persuade him that we were competent to go on the glaciers; he kept wanting to see our qualifications!

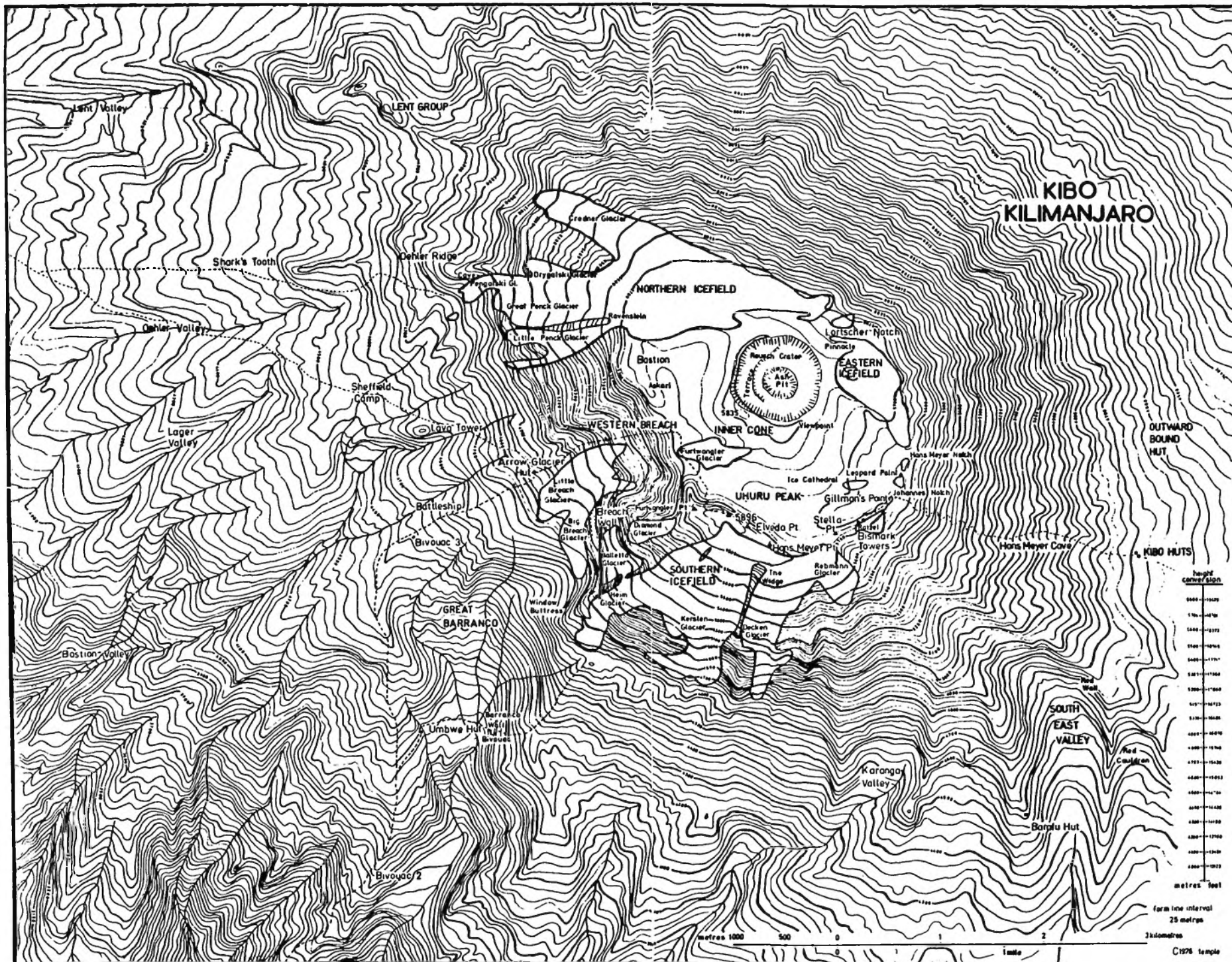
THE WALK IN

- 2.17 Once again for ease of access we took the standard tourist route to the mountain, in this case the Marangu Route. Climbing on Kilimanjaro is particularly expensive but well organised. The park entrance fee includes payment for guides and porters who are compulsory, accommodation and food in the huts, even if you do not utilise all of this. The guides will accompany parties who do the "tourist" route to the top of the mountain but on any other routes they will only come to the bottom of the climbing. As the glacier climbing party had a tighter schedule than the walking party they were allocated all twelve (convenient) porters so that they did not have to carry sacks on the first day when they were to cover the distance normally completed in two days.
- 2.17.1 The Marangu Route starts at the Park Gate at 1800m. One then walks through a forest trail to the Mandara Hut at 2700m. After a night here in the comfortable dormitory accommodation there is a 9 mile walk across alpine moorland to the southern slopes of Mawenzi to reach the Horombo Hut at 3720m.
- 2.17.2 The following days' walk is about 8 miles across alpine desert and climbs onto the saddle between Mawenzi and Kibo and then turns West across the saddle to reach the Kibo Hut at 4703m below the scree slopes of Kibo. The ascent of Kibo is made after an early start the next day followed by descent to the Horombo Hut for the night and finally down to the park gate on day 5. As we were all fit and acclimatised we had arranged to be at the Kibo Hotel on Thursday evening thus giving ourselves 4 days in which to complete the climb.

WALKING GROUP

John LEONARD
Paul JIGGINS
Mike BEELEY
John BROOME
Angie MILLER
Jane GRIMLEY
Peter MALLALIEU
Nigel GATES
Bill SAMPSON

- 2.18 It was originally intended that this group would follow the usual schedule and then come down from the summit directly to the Hotel on Thursday, missing out the night normally spent at the Horombo Hut on the descent. As the climbing group had been allocated all of the porters this group had to carry all of their kit. They spent Monday night at Mandara Hut as planned but then decided to combine the next two legs in one and so had a very long day on Tuesday climbing 2000m, over a distance of 17 miles and arriving pretty exhausted at the Kibo Hut.
- 2.18.1 Many spent a sleepless night and (apart from John BROOME and Mike BEELEY) left the hut at 0400 to plod up the remorseless scree slope to Gilman's Point, at 5680m on the edge of the crater. This took between 4 and 5 hours and after a rest here most of the party continued along the crater rim to Uhuru Peak at 5896m the highest point in Africa. Unfortunately Jane, Angie and Peter were suffering from the effects of altitude and did not feel able to continue past Gilman's Point.
- 2.18.2 John and Mike left the Kibo Hut at about 0900 and had a more leisurely stroll to the crater as they were intending to spend the night on the summit. They reached Uhuru Peak at about 1800 where they met Phil REED and Chris COLLIN who had just arrived from the Barufu Route. The four of them bivouaced together for the night. Meanwhile the remainder of the walking group descended to the Horombo Hut for the night.





EN ROUTE TO HOROMBO HUT



EN ROUTE TO KIBO HUT



KIBO

MAWENZI

(JG)



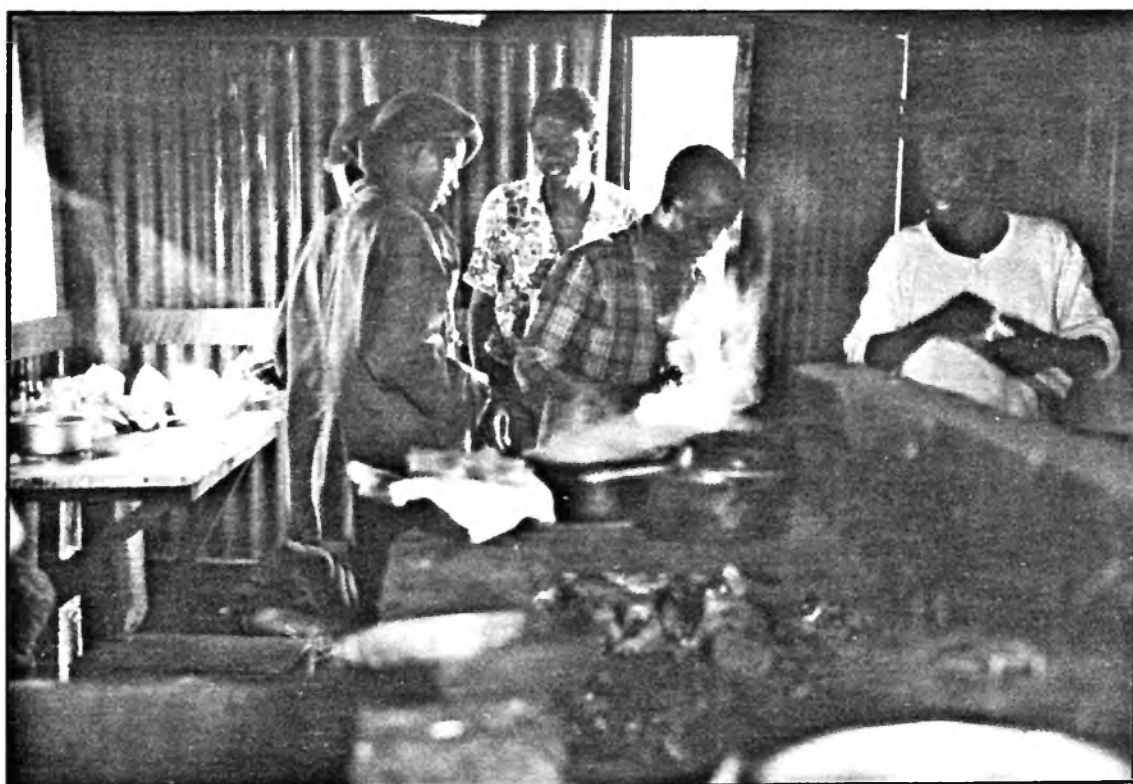
PORTER ON KILIMANJARO

(JG)



PORTER AT HOROMBO HUT

(JG)



PORTERS PREPARING MEAL AT HOROMBO

(JG)



GUIDES AT GILMANS POINT

(JG)



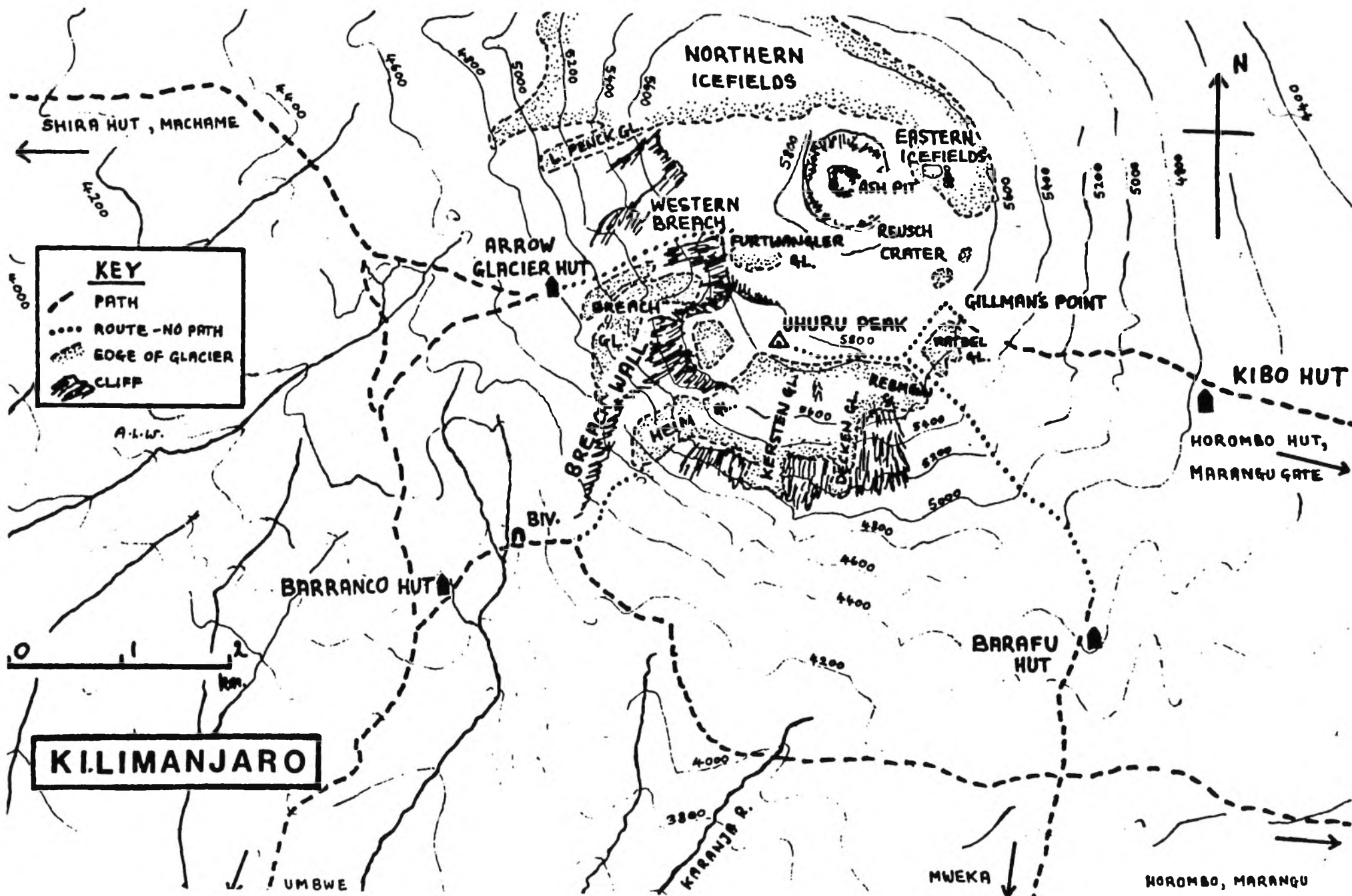
UHURU PEAK

CLIMBING GROUP

Steve	JACKSON
Alastair	MILLER
Steve	BELL
Phil	REED
Chris	COLLIN
Peter	BAKER
Peter	JOHNSON
Alan	DAVIES
John	ALLISON
Alan	OLIVE
Kevin	ARNOLD
Dennis	ROBINSON

- 2.19 This group had quite a stiff walk from the park gate to the Horombo Hut on Monday. They arrived at the Hut late in the afternoon having travelled very light with porters carrying their sacks. They then spent a cold couple of hours as darkness approached awaiting the arrival of the porters with the kit. On their arrival the porters/cooks prepared an excellent supper supervised by the two guides Frederick and Wilson.
- 2.19.1 It was not very clear from either of the two guide books how long it would take to get to the bottom of the glacier routes and the group were rather despondent when Wilson said that it would be at least 6 hours walking. The intention at this stage was for Steve BELL and Alan DAVIES to do the Kirsten glacier; Phil REED and Chris COLLIN to do the Decken glacier and for the rest of the group to do the Heim Glacier.
- 2.19.2 The group left the hut at 0700 after breakfast which had been prepared by the guides. The reality of walking in plastic boots and carrying heavy sacks after the previous day of training shoes and no sacks was soon evident and we began to believe that it would indeed take 6 hours.
- 2.19.3 Initially the route followed the main path up towards the saddle between Mawenzi and Kibo, which did not appear to be getting any closer. The route then turned West along the South Kibo circuit. This was an undulating track which depressingly switchbacked over the spurs leading down from Kibo. After about three hours of walking the route crossed the Barufu route to the summit and Wilson stated that the group may be halfway to the Heim. It was around this stage that Peter BAKER succumbed to the gastro-intestinal illness from which he had been suffering and with the prospect of a further four hours walking and then a two day climb ahead decided to return to the Horombo Hut.
- 2.19.4 The rest continued their weary way and after crossing the Karanja river split into two parties, those heading for the Heim continuing along the Kibo circuit and the others striking straight up the scree slopes towards their respective objectives.

- 2.19.5 By this time the cloud had accumulated and visibility was poor. After several more hours the group heading for the Heim arrived at the Breach Wall which was then followed up to the bottom of the glacier. The guides bade farewell at this point as they had to return all the way back to the Horombo Hut that night! The bivouac boulder below the start of the climbing was reached after another 30 minutes, at about 1600. They were surprised when Steve BELL came sprinting across the scree shortly afterwards at his usual manic pace with the news that his partner Alan DAVIES had also gone down with a combination of fatigue and the "dog" and had returned to bivouac at the Karanja River. (In fact the two guides found him there and persuaded him that he risked being eaten by a lion unless he accompanied them to the Horombo Hut).
- 2.19.6 The 8 members of the group bivvied and spent a relatively comfortable night. Steve BELL was first away the next morning, starting to climb at 0315 and reaching the top at 0715! An amazing 4½ hours to complete a route that one guide book describes as taking 2 days and the other 12 hours. The rest went a little more sedately starting off at 0600. The first 800 feet to the top of Window Buttress were interesting climbing: 2 pitches of steep ice (Scottish grade III/IV) alternating with 2 pitches of loose rock. John ALLISON is rumored to have taken a 10m fall on the latter onto an ice screw which held so the ice must have been reasonable!
- 2.19.7 At Window Buttress the group unroped and started the relentless 1000 metre (Scottish Grade II) plod up the glacier to a final very loose rock band, not mentioned in the guide book, which led to the summit. They arrived on the summit at around 1800 and just missed Chris, Phil, Mike and John who were on their way down. However Phil had generously left some Bishop's Tipple behind.
- 2.19.8 Chris and Phil had reached the Decken glacier and found it in terrible condition with severe stonefall and bits missing. After a nights bivvi they returned to the Barufu Route and followed this to the top—a very long plod!
- 2.19.9 Alan, John, Steve and Alastair slept on the summit whilst the others ran down to the Kibo Hut arriving at about 1930.
- 2.19.10 The next day (Thursday) everyone descended to the Kibo Hotel at various speeds and once again they had run out of beer!



SECTION THREE

MEDICAL RESEARCH

by

*Surgeon Captain J M BEELEY, FRCP, Royal Navy
Director Of Naval Medicine and Research Team Leader*

PROJECT TITLE: Physiological responses and problems during the exertion of ascending to altitude on mountains.

OBJECTIVE

- 3.1 The deployment of over twenty subjects during the Royal Navy and Royal Marines Mountaineering Club Expedition to Mount Kenya and Mount Kilimanjaro in January 1987 presents a unique opportunity to increase medical data which may be relevant to the development of acute mountain sickness (AMS), high altitude pulmonary oedema and high altitude cerebral oedema. A scientific programme has been constructed which addresses a variety of inter-related physiological changes, each of which may influence the likelihood of medical complications at altitude.
- 3.1.1 The early movements of the expedition members on the mountain will be similar to those undertaken by tourists who climb Mount Kilimanjaro (approx 20,000 ft) and in whom medical problems associated with exposure to altitude are well recorded.

RESEARCH PROTOCOLS :

Ventilatory Responses to Hypoxia

- 3.2 There is some evidence from a study in trekkers and two studies in climbers (Ref. 1) that a brisk increase in ventilation in response to hypoxia protects against high altitude sickness in lowlanders ascending to altitude, though residents at high altitude have a blunted response (Ref. 6). This expedition presents an opportunity to study ventilatory responses to hypoxia and carbon dioxide by well authenticated methods (Refs. 7 & 8) at the Clinical Research Centre Harrow and subsequently record symptom scores for Acute Mountain Sickness (Ref. 9) in over 20 subjects during ascent of Mounts Kenya & Kilimanjaro, altitudes 17,000 and 20,000 feet approx. This data is required to authenticate the limited data presently available.

Capillary Fragility at Altitude

- 3.2.1 Haemorrhagic phenomena in various organs including the eye are known to occur on exposure to altitude. A short report has recently described increased capillary fragility in three subjects ascending to 21,000 feet using the method of mucosal petechiometry (Ref. 10). It is intended to study 20 subjects during ascent of Mounts Kenya & Kilimanjaro to provide the necessary further data in this field. Application of negative pressure (200mmHg) for one minute to the buccal mucosa will be followed by a count of petechiae; this test will be applied during a control period at sea level and subsequently repeated during ascent of the mountain and the results related to symptom scores of acute mountain sickness.

Plasma Volume Response to Exercise and Altitude

- 3.2.2 Indirect methods of calculating plasma volume from Haematocrit (Hct) and Haemoglobin (Hb) measurements have yielded conflicting results; this has recently been attributed to a failure to adequately standardise the posture and its duration before measurements are made (Ref. 11). Indirect measurements of Hct and Hb will be made under strict control conditions at sea-level and repeatedly during the rapid ascent of Mounts Kenya and Kilimanjaro in all members of the expedition in an attempt to provide valid data on changes in Hct and Hb during rapid ascent to altitude. This data will be compared with that reported in Service Personnel exposed to a combination of exercise and low ambient temperatures (Ref. 2); it will also complement studies in which plasma volume has been measured at sea-level and altitude using the reference technique of radio-iodine tagged albumen and compared with other data (Ref. 3).

Fluid Retention and Acute Mountain Sickness

- 3.2.3 Symptoms of Acute Mountain Sickness have been reported to correlate with water retention assessed by weight gain (Ref. 12). Weights of expedition members will be recorded during the expedition at increasing altitude and compared with similar data reported in Ref. 2.

Blood Pressure Responses to Exercise at Altitude

- 3.2.4 A pilot study was undertaken on Pike's Peak at 14,000 ft by Beeley J M, Milledge J S, Ward M P, et al (Ref. 14) in which blood pressures were followed using random-zero sphygmomanometers in 7 subjects at sea-level during a three week period of acclimatisation at 14,000 ft and subsequently at sea-level. The results suggested that exposure to altitude raises the blood pressure rapidly to a plateau which does not significantly alter during a three week period of intermittent exercise. Blood pressures will be recorded during the forthcoming study for two weeks at sea-level, repeatedly during the expedition and again on return to sea-level. A search will be made for any marked fluctuations at altitude which have been suggested as a cause of cerebro-vascular accidents in mountaineers.

Atrial Natriuretic Peptide (ANP)

- 3.2.5 Dr J S Milledge is cooperating with Professor Bloom's Unit at the Royal Postgraduate Medical School. Serum will be collected under carefully controlled conditions from a number of expedition members for subsequent measurement of ANP at Hammersmith Hospital. This hormone has been assayed in blood from subjects exposed to low environmental pressures in chambers but not from subjects at high altitude on mountains. Blood will be taken at appropriate times in appropriate postures and centrifuged to yield plasma samples which will be preserved in cryostat and transported back to UK.

High Altitude Headache

- 3.2.6 A double blind cross-over comparison will be made between the efficacy of Paracetamol and Ibuprofen in relief of high altitude headache. Though anecdotal reports suggest that prostaglandin synthetase inhibitors are highly effective (Ref.15), no scientific study has been made.

RED CELL MORPHOLOGY

- 3.2.7 Abnormalities of red blood corpuscles develop during exposure to altitude (Ref 16) and may, by increasing blood viscosity, contribute to the development of acute mountain sickness. Blood films will be prepared from all subjects at sea-level and at altitude to further investigate changes described by Reinhart and Bartsh (Ref 17).

PRELIMINARY RESULTS

3.3 This is a preliminary report on the scientific projects carried out during the RNRMMC led, Joint Services Expedition to East Africa, 1987 compiled shortly after returning to the United Kingdom. Much of the analysis of blood samples and data has yet to be undertaken but preliminary results and a survey of what was achieved is contained in this report. Seven projects were attempted all with a bearing on acute mountain sickness.

3.3.1 Ventilatory response to hypoxia (HVR) and CO₂ (CO₂ VR) related to AMS.

3.3.2 Capillary fragility response to altitude and AMS.

3.3.3 Plasma volume response to altitude, posture and AMS.

3.3.4 Fluid balance and AMS.

3.3.5 Hormonal response to altitude and AMS.

3.3.6 Drug trial in high altitude headache.

3.3.7 Red Cell Morphology.

Acute Mountain Sickness

- 3.3.8 Since all the projects bear on AMS the scoring of symptoms was crucial. Members were asked about symptoms and were scored on pre-prepared questionnaire forms. Symptoms of headache , loss of appetite , nausea , sleep disturbance , Cheyne-Stokes breathing and photophobia were scored each morning after arrival on the mountain on a 0-3 scale for the following six days.
- 3.3.9 Few subjects scored at all for the last two symptoms. Therefore , taking the first four symptoms for the six days (one at the Met. Station and five days at Mackinders Camp) out of a possible 72 points subjects ranged from 1 to 30 with a mean of 13. If we take a score of 4 for one day as indicating definite (if mild) AMS , 14 out of 22 subjects had at least this degree of AMS on at least one day. Two subjects were virtually unaffected (total score of 1) and one was sufficiently sick to require evacuation to low altitude. He recovered quickly at 2000m and returned with no ill effects.
- 3.3.10 We were fortunate , therefore, to have a good spread of severity of AMS against which to compare our other observations.

Hypoxic Ventilatory Response

- 3.3.11 21 members of the expedition visited Northwick Park Hospital during the 2-3 months before the expedition. Their routine pulmonary function was measured and their ventilation (breathing response) to a few minutes hypoxia (oxygen lack) and also to CO₂ was measured. Preliminary analysis indicates that there was no correlation between either HVR or CO₂ VR and AMS. This negative finding in a prospective study is of interest as some previously published data had suggested a high HVR would be protective.

Capillary Fragility

- 3.3.12 It has been reported that capillary fragility is increased at altitude and it has been suggested that this might be part of the cause of AMS. The test consists of applying suction (-200mmHg) to the inner surface of the lower lip for 1 minute. This causes a few pinhead size haemorrhages or petechiae. These are then counted. We planned to confirm this report and relate changes to AMS scores. Measurements were carried out at BATLSK (Nairobi) on all members on two occasions using two sites on each occasion. These were repeated on the morning after arrival at Mackinders Camp (4300m) and 24 hours later.
- 3.3.13 The mean number of petechiae per site at BATLSK was 2.8. This figure dropped to 1.7 on the first day and to 0.6 on the second day at altitude. There was no suggestion that those subjects with the most AMS had any increase in the number of petechiae. It would seem that altitude, sufficient to cause AMS, does not cause any increase in capillary fragility.

Plasma Volume Response to Altitude, Posture and AMS

- 3.3.14 Plasma Volume (PV) change was inferred from the haematocrit assuming a constant red cell mass, an assumption probably valid over a short period of a few days. Haematocrit rose in the group as a whole as expected but preliminary analysis shows no correlation between the degree of increase (and therefore decrease in plasma volume) and AMS scores.
- 3.3.15 The effect of posture was tested by comparing the 0400 blood sample with the 0900 when the subjects had been up and about for at least an hour. The PCV was significantly higher at 0900 compared with 0400 both at BATLSK and at Mackinders Camp. That is PV was reduced by the upright posture at both low and high altitude to about the same degree.

Fluid Balance

- 3.3.16 Urine outputs and daily weights were recorded. On going to altitude (and following a fairly strenuous day's walking) the urine volume was diminished over the next three days, as expected. However, there was no correlation between urine output and AMS scores (previously published work suggested AMS was associated with an anti-diuresis). Similarly there was no correlation between body weight and AMS (previously published work suggested that AMS was associated with gain in body weight).

Hormone Response to Altitude and AMS

- 3.3.17 Samples of blood for later analysis were successfully taken at 0400 and 0900 on two control days and on the first two days at altitude from 15 subjects. From a subset of five of these subjects samples were also taken at 1600 and 2100 so as to give more detailed data on circadian rhythm. The hormones to be analysed from these samples are renin, aldosterone, and atrial natriuretic peptide (ANP). These hormones are important in regulating sodium excretion and therefore in the fluid balance of the body.

High Altitude Headache

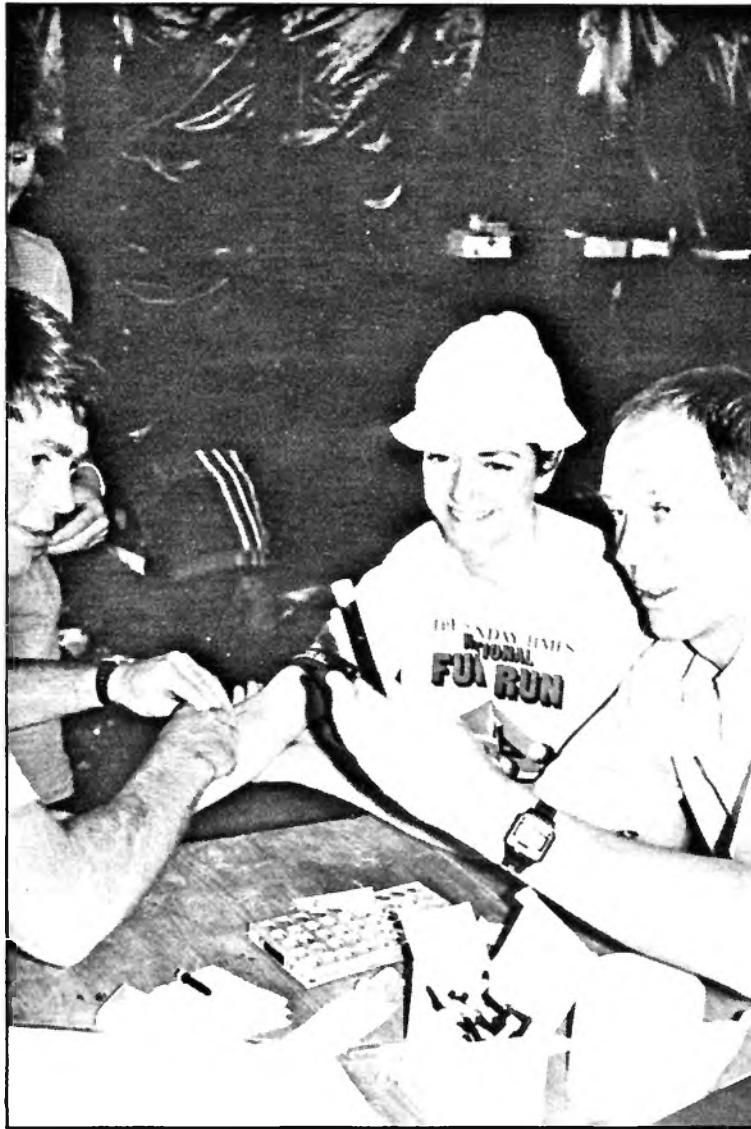
- 3.3.18 A drug trial for treatment of altitude headache was carried out. There have been anecdotal reports that Ibuprofen (Brufen) was successful in relieving these headaches. The trial was between Ibuprofen and Paracetamol and was double blind. Members who experienced a headache were entered into the trial and having scored the severity of the headache took one tablet. They scored the headache again at 30, 60 and 120 minutes later. If unresolved, they took a second (different) tablet 2 hours after the first and again repeated the scores as before. For another headache they could have another tablet (s) with similar scoring. 20 members took part in the trial using a total of 53 cards.

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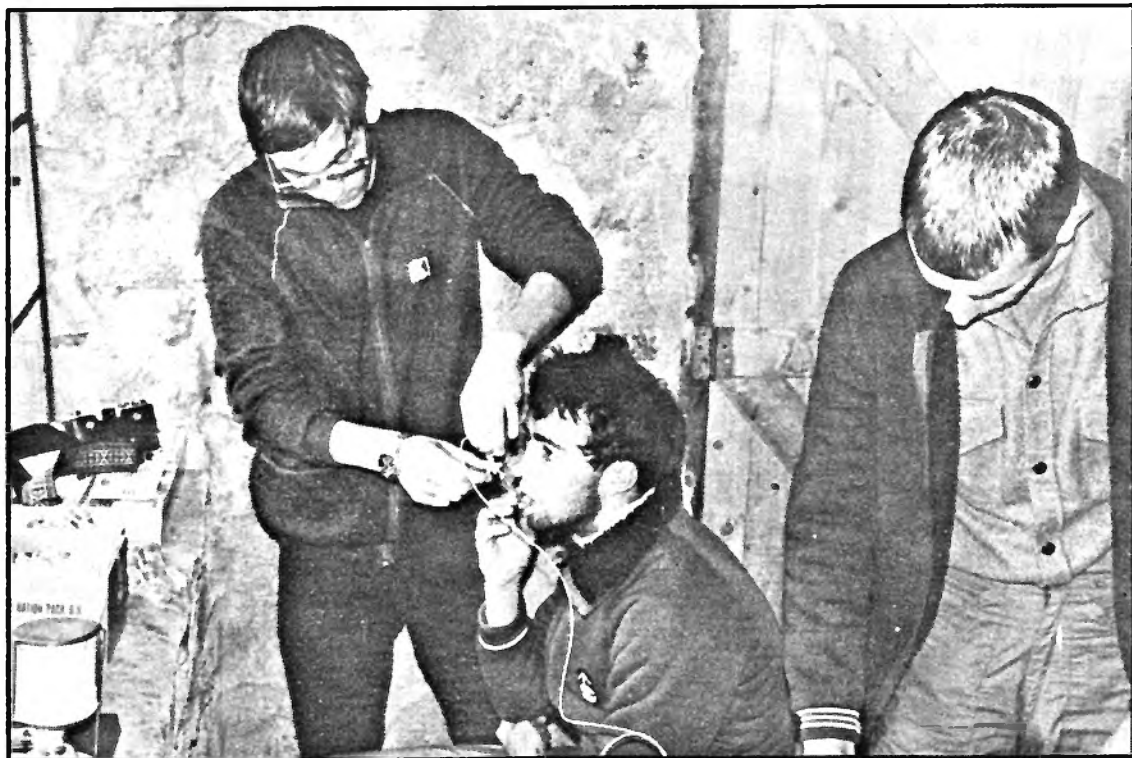


MEDICAL RESEARCH





(JG)



PETECHIOMETRY

(JG)

SECTION FOUR

MEDICAL REPORT

by

Surgeon Lieutenant Commander J R BROOME, MRCP, Royal Navy
Expedition Medical Officer

- 4.1 The health of expedition members throughout the period in East Africa was generally good except for a few individual instances. Specifically there were no cases of significant traumatic injury sustained due to climbing.
- 4.1.1 The majority of the party suffered transient symptoms attributable to altitude sickness following the initial ascent to Mackinders' Camp on Mount Kenya. These symptoms were combinations of headache, insomnia, vivid dreams or nightmares, anorexia, nausea, vomiting or general malaise which typically resolved over two to three days. Only one case of acute mountain sickness severe enough to require more than symptomatic treatment, that being descent, occurred and this was associated with an intercurrent chest infection. The case responded rapidly to descent and erythromycin treatment and subsequent re-ascent produced no further symptoms.
- 4.1.2 Diarrhoea without systemic upset was the commonest recurring condition but this usually responded rapidly to treatment with Imodium. Sadly, in one case, diarrhoea was sufficiently severe to prevent an attempt on a glacier route on Mount Kilimanjaro but generally the affliction was not debilitating.
- 4.1.3 Anti Malarial prophylaxis in the form of once weekly Maloprim and Chlorquine was taken by all without incident except for one case of a photosensitive excematous skin eruption which may have been associated with the Maloprim. The sufferer had a previous reaction to sulphonamide containing drugs.
- 4.1.4 Overall, no insurmountable medical problems were encountered and the medical stores proved more than adequate.

SECTION FIVE

STATEMENT OF INCOME AND EXPENDITURE

INCOME

a. Personal Contributions	£13,916
b. Fleet Amenities Fund Grant	£ 3,200
c. RNRMMC Grant	£ 2,250
d. Sailors Fund Grant	£ 2,100
e. Cash in Lieu of Rations (CILOR)	£ 1,914.20
f. Upjohn Ltd Grant	£ 1,500
g. DNPTS Grant	£ 1,300
h. Joint Service Expedition Trust Grant	£ 1,000
j. Northwick Park Research Grant	£ 1,000
k. Wuffield Trust Grant	£ 500
l. Mount Everest Foundation Grant	£ 500
m. Jansen Pharmaceuticals Grant	£ 500
n. Smith Kline & French Laboratories Ltd Grant	£ 250
p. The Boots Company PLC Grant	£ 250
q. Portsmouth Command Rec Fund Grant	£ 250
r. Schroder Financial Management Ltd Grant	£ 250
s. Allen and Hanburys Ltd Grant	£ 100
t. 14/20 Kings Hussars Grant	£ 20
u. RNRMMC Loan	£ 2,500
TOTAL INCOME	<u>£33,300.20</u>

EXPENDITURE

a. Flight Costs		£10,922.00
b. Equipment		£ 3,404.86
b. Park Entrance Fees	(Mt Kenya)	£ 518.13
c. Hut Fees	(Mt Kenya)	£ 949.38
d. Hire of Porters	(Mt Kenya)	£ 1,418.00
e. Hire of Rucksacks for Porters	(Mt Kenya)	£ 161.67
f. Rescue Charge	(Mt Kenya)	£ 213.05
g. Accommodation Waro Moru		£ 180.00
h. Transport-Met Station/Waro Moru/Wanyuki		£ 160.00
j. Transport for Porters	(Mt Kenya)	£ 240.00
k. Vehicle Hire (Kenya)		£ 1,466.93
l. Visas (Tanzania)		£ 511.88
m. Fuel (Vehicles and Stoves)		£ 177.39
n. Insurance (Flight Cancellation)		£ 241.50
p. Insurance-Equipment (£4,000 indemnity)		£ 54.00
q. CILOR		£ 1,914.20
r. Bank Charges (Nairobi)		£ 52.08
s. Park Entrance Fees (Mt Kilimanjaro)		£ 1,856.47
t. Hut Fees	(Mt Kilimanjaro)	£ 1,092.00
u. Porters/Guides	(Mt Kilimanjaro)	£ 1,363.22
v. Camping Fees	(Mt Kilimanjaro)	£ 587.29
w. Rescue Fees	(Mt Kilimanjaro)	£ 1,284.70
x. Transport-Nairobi/Namanga/Nairobi		£ 1,449.00
y. Transport-Namanga/Marangu/Namanga		£ 1,449.00
z. Accomodation Kibo Hotel 1&5 Feb		£ 452.00
a1. Training Meet Costs		£ 432.50
a2. Production of Report/Photographs/Slides		£ 400.00
a3. Miscellaneous		£ 248.00
a4. Returned to JSET		£ 100.95
TOTAL EXPENDITURE		<u>£33,300.20</u>

SECTION SIX

ACKNOWLEDGEMENTS

We are greatly indebted to the many individuals, organisations and authorities without whose assistance, help and advice the expedition would not have been such a success. I think it only fair to single out Commander Thomas BUNN Royal Navy, the Deputy Director of Naval Physical Training and Sport, for special thanks. He gave me an enormous amount of advice and encouragement during the planning of the expedition and fought hard on our behalf to obtain funds. In addition we are also extremely grateful to the British Army Training and Liaison Staff, Kenya for the tremendous help and assistance they gave us.

PATRON

Admiral Sir Nicholas HUNT, GCB, LVO Commander-in-Chief Fleet

ORGANISATIONS & AUTHORITIES

Directorate General of Naval Personal Services
Director of Naval Physical Training and Sport
Commodore CLYDE
Royal Geographical Society
Mount Everest Foundation
Section 6A2, Principal Supply and Transport Officer (Navy) Portsmouth.
Royal Naval Victualing Depot Botley
Fleet Amenities Fund
Sailors Fund
Huffield Trust for the Forces of the Crown
Medical Officer-in-Charge Institute of Naval Medicine
Medical Officer-in-Charge RNH Haslar
Royal Navy and Royal Marines Mountaineering Club
Joint Service Expedition Trust
Upjohn Ltd
Northwick Park Respiratory Research Fund
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The Boots Company PLC
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British Army Training and Liaison Staff Kenya
HQ 1 Group RAF
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HQ UKLF
RAF HENDON

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Commander MB THOMAS RN (Rtd)
Colonel SUTHERS
Lieutenant Colonel GDB KEELAN RM
Colonel R P MILLER
Major G McKECHNIE
Dr FS PRESTON,FRCP
Mr A PIGGFORD
Lieutenant A WILLIS RN
Mr J BLACKMORE
Miss Rhumie KHOSLA
Mr Daniel NDORIA
Lieutenant Commander M PEARCE RN
Mr WH RUTHVEN
Captain P PARSONS RM
Mr C HATTERSLEY
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PO(R) DL YARKER
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CWREWPT M EDSON
Mr A THOMPSON
Mr A R McINTOSH
Cpl KC FLETCHER
Mr J LEONARD
Mrs M LEONARD
Miss K LEONARD
Captain C PARKER RAMC
S/SGT ROGERS
LWREN RODGERS & WRENS of Vis Aids Section,RNPS

SECTION SEVEN

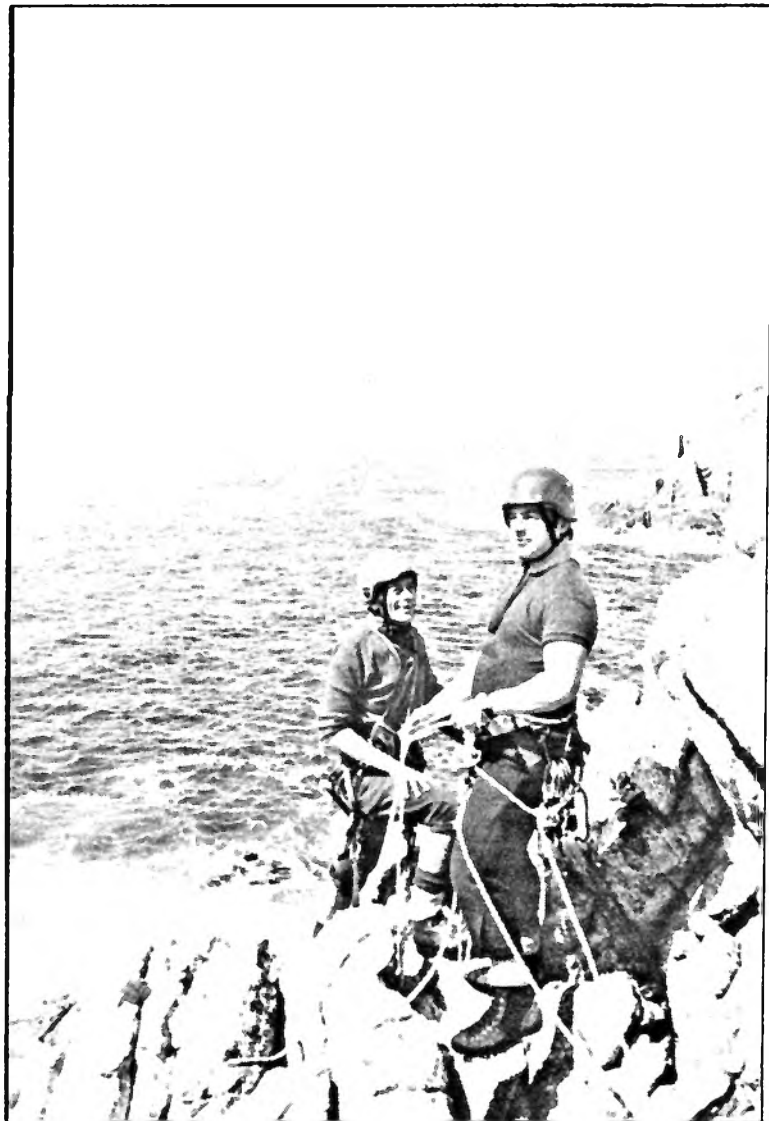
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Mr D NDORIA
Miss R KHOSLA
CO BATLSK
AMA
RAFMA
SPARE (5 COPIES)

Whilst climbing on Lundy the Expedition leader (disguised as a thrombosed red corpuscle) gazes whistfully out to sea whilst absent mindedly paying out rope. In the background, and unknown to him, the Medical Research Team leader gropes for his spectacles which are in fact in his car in Bideford.

CAPTION COMPETITION

Suitable captions are invited, they should be forwarded, together with a cheque for £5.00 (payable to RNRMMC PERUVIAN EXPEDITION 1989). 1st prize will be a place as a subject for the Medical Researchers on that expedition.



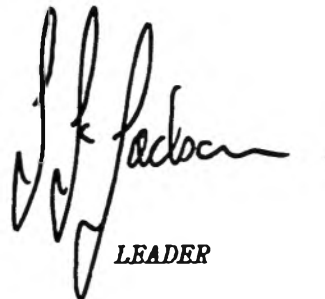
Introduction

The idea of mounting a major Royal Navy and Royal Marines Mountaineering Club Expedition developed after the Club's 1984 Annual General Meeting when the Expedition Secretary commented that whilst the current expedition scene was very healthy, it consisted mainly of small, elite teams and that there was little on offer for the majority of club members.

The decision to go to East Africa was based on the need to find a mountain range of sufficient severity and altitude to achieve the laid down aims. Both Mount Kenya and Kilimanjaro met these requirements and it seemed sensible that any expedition to this area should take the opportunity to visit both mountains. In their separate ways each has much to offer; Mt Kenya with its multitude of climbing routes, enough to satisfy even the most voracious climbers' appetite and Kilimanjaro with its superb ice routes and sheer size demanding the utmost commitment.

During subsequent discussions with the Director of Naval Medicine the idea of grafting (sic) a Medical Research Team onto the party to carry out research into high altitude medical problems evolved. The Medical Research Data that we obtained should provide much valuable information and insight into the many physiological problems associated with ascent to altitude. It is anticipated that our findings will be published in various learned journals and will also be incorporated in a new textbook on High Altitude Medicine and Physiology by Dr's MP WARD, JB WEST and JS MILLEDGE.

This report outlines how the team was chosen, trained and gives an account of our achievements in the field. The fact that the expedition was successful in achieving all of our stated aims was mainly due to the excellent team spirit which pervaded and also to the assistance and co-operation of the many authorities, organisations and individuals who are listed in Section 6.



LEADER

HMS NEPTUNE
Faslane
Dunbartonshire

April 1987

*THE ROYAL NAVY AND ROYAL MARINES MOUNTAINEERING CLUB
EAST AFRICA EXPEDITION (MOUNT KENYA AND MOUNT KILIMANJARO)
7 JANUARY TO 9 FEBRUARY 1987*

PATRON: Admiral Sir Nicholas HUNT, GCB, LVO Commander-in-Chief Fleet

EXPEDITION MEMBERS

Lieutenant	SK JACKSON, FRGS, RN	Leader
Surgeon Lieutenant Commander	ARO MILLER RN	Deputy Leader
Surgeon Lieutenant Commander	JR BROOME RN	Expedition Doctor
Lieutenant Commander	NC GATES	RNR
Lieutenant	PH REED	RN
Lieutenant	S BELL	RM
Sub Lieutenant	D ROBINSON	RN
Sub Lieutenant	A OLIVE	RN
Second Officer	MJL GRIMLEY	WRNS
Chief Marine Engineering Mechanic (Electrical)	P BAKER	
Petty Officer Physical Trainer	PJ JOHNSON	
Petty Officer (Aircraft Handler)	K ARNOLD	
Petty Officer Air Engineering Mechanic	C COLLIN	
Leading Medical Assistant	A DAVIES	
Able Seaman (Mine Warfare)	J LEONARD	
Major	P MALLALIEU CCF	(AMA)
Lance Corporal	J ALLISON	(AMA)
Senior Aircraftsman	P JIGGINS	(RAFMA)
Mrs	A MILLER	

MEDICAL RESEARCH TEAM

Surgeon Captain	JM BEELEY RN	Leader
Doctor	J MILLEDGE	
Chief Medical Technician (Laboratory)	WFD SAMPSON	



Steve JACKSON
33 Naval Officer
KIONGOZI



Alistair MILLER
33 Doctor
TATU DAKTARI



Peter BAKER
39 Electrical Mechanic
BARAFU MTU



Peter JOHNSON
37 Physical Training Instructor
MLIMA MTU



Phil REED
24 Helicopter Pilot
CHOO MTU NAMBA MAJA



John LEONARD
24 Able Seaman
MTU TENGENEZU



Jane GRIMLEY
30 Photographic Officer
MBILI MWANAMKE



Alan DAVIES
34 Medical Assistant
DAKTARI DOGO

DOGO KWA UMRI AU CHEO



Paul JIGGINS
21 RAF Groundcrew

KIUJI



Steve BELL
28 Royal Marine Officer

MNYAMA MTU



John ALLISON
24 Soldier



Mike BEELEY
53 Doctor
MAJA DAKTARI



Jim MILLEDGE
56 Doctor
MBILI DAKTARI



37 Dennis ROBINSON
Engineering Officer
DINGHY DAKTARI



26 Chris COLLIN
Air Engineering Mechanic
TENGENEZA CHA EROPLENI



28 Kev ARNOLD
Aircraft Handler
VUNJA CHA EROPLENI



John BROOME
30 Doctor
NNE DAKTARI



32 Angie MILLER
Registered General Nurse
MAJA MWANAMKE



48 Bill SAMPSON
Laboratory Technician
DAWA KUUKUU MTU

MTU EUPE



49 Peter MALLALIEU
Physics Teacher

CHOO MTU NAMBA MBILI



22 Alan OLIVE
Helicopter Observer

MTALII



44 Nigel GATES
Geography Teacher

SWAHILIENGLISH

KIONGOZI

Leader

MAJA DAKTARI

No 1 Doctor

MBILI DAKTARI

No 2 Doctor

TATU DAKTARI

No 3 Doctor

NNE DAKTARI

No 4 Doctor

BARAFU MTU

Iceman

MLIMA MTU

Mountain man

MTU TENGENEZU

Mr Fixit

MAJA MWANAMKE

No 1 Woman

MBILI MWANAMKE

No 2 Woman

DAKTARI DOGO

Little Doctor

DOGO KWA UMRI AU CHEO

Junior

KIUJI

Killer

MNYAMA MTU

Animal man

DINGHY DAKTARI

?

TENGENEZA CHA EROPLENI

Fixer of aeroplanes

VUNJA CHA EROPLENI

Breaker of aeroplanes

DAWA KUUKUU MTU

Old Medicine Man

MTU EUPE

White man

CHOO MTU NAMBA MAJA

No 1 Toilet Boy

CHOO MTU NAMBA MBILI

No 2 Toilet Boy

MTALII

Tourist

