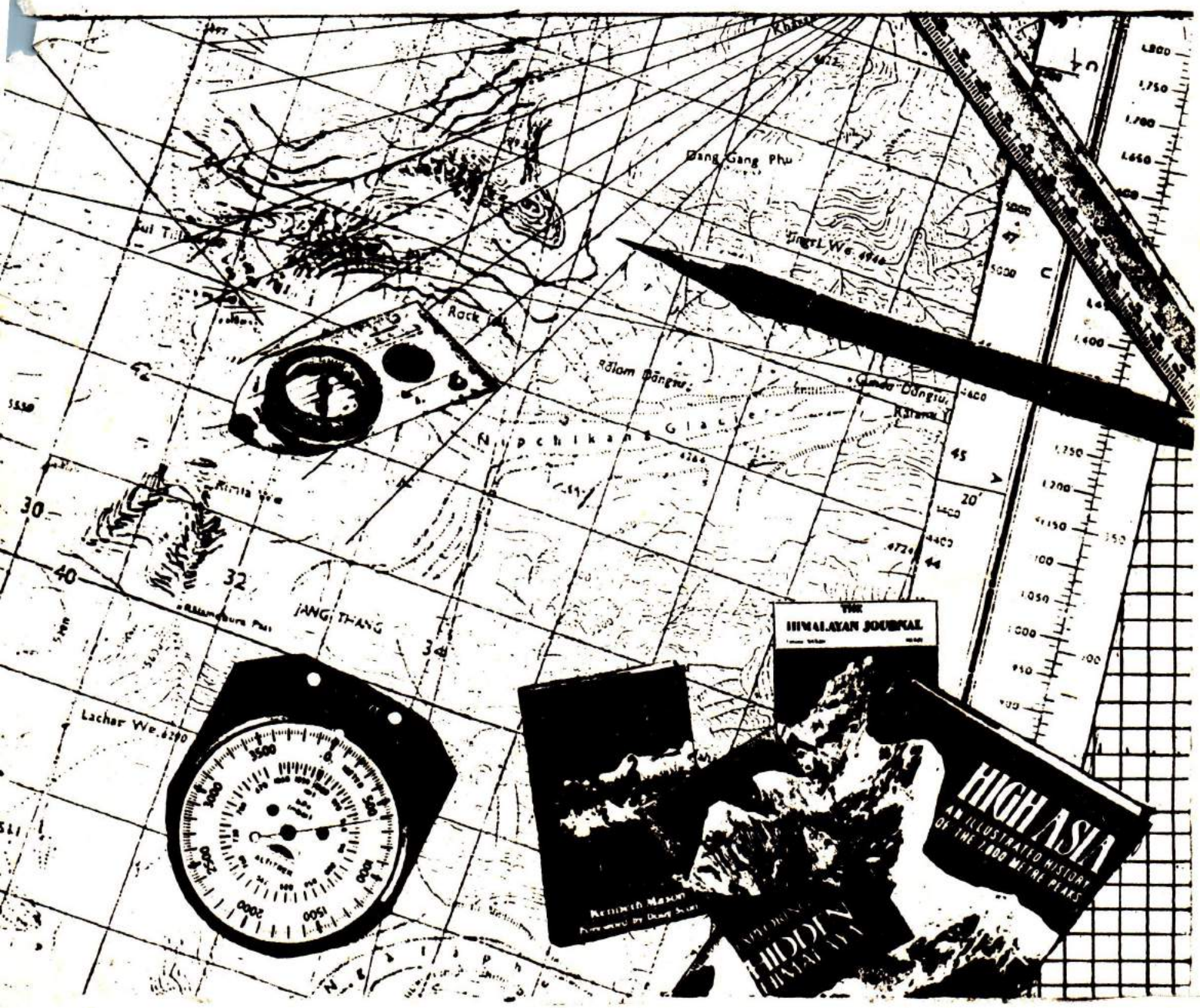
WORKSHOP ON

PLANNING AN EXPEDITION, 1994.

ORGANISED BY THE HIMALAYAN CLUB - BOMBAY SECTION.



THE HIMALAYAN CLUB, 1994

(Founded on 17th February, 1928)

PROCEEDINGS OF
WORKSHOP ON
PLANNING AN EXPEDITION, 1994.

Organised by :

Bombay Section

of

The Himalayan Club

THE HIMALAYAN CLUB
Post Box No. 1905, Bombay 400001, INDIA.

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The contents presented in the proceedings are author's own approach to the planning of an expedition and other subjects. This does not necessarily mean that The Himalayan Club is in agreement with the author's view.

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The Himalayan Club.

P R E F A C E

Organising a mountaineering expedition is not an easy task. It requires careful planning right from the conception of an expedition programme. From Bombay every year many expeditions are organised by a large number of experienced mountaineers. The Bombay Section of the Himalayan Club thought of bringing them together to share their experiences and difficulties in planning of expeditions with fellow mountaineers.

A five day workshop on "Planning an Expedition" was organised at Chhabildas High School, Dadar (West) from January 3 to 7, 1994. About 55 mountaineers participated and discussed various subjects during the workshop for two hours every day. The subjects were divided into five topics. There was a co-ordinator for each topic, who conducted the workshop on that particular day. Detailed questionnaries prepared by Co-ordinators on their respective topics were circulated earlier to the participants and their views were sought. A one day outdoor session was, also, held later to study map reading in the field.

	Topic	Co-ordinator
1.	Pre-expedition planning.	Harish Kapadia
2.	Photo orientation and use of the altimeter in mountains.	J.C. Nanavati
3.	Planning for food, fuel, equipment, porterage and disposal of wastes.	Arun Samant
4.	Recording of a climb photography and presentation of slide shows	Divyesh Muni and Vineeta Muni.
5.	Mountain sickness and medicines	Dr. Ravindra Rupwate.

The notes prepared from the talks given by the Co-ordinators, feed back from the participants and discussions held during the workshop are compiled in this booklet. We hope that this valuable information collected at one place will be useful to organisers of mountaineering expeditions.

We are greateful to The Himalayan Club for giving us necessary help and guidance. Our special thanks to Jagdish Nanavati, Hon.President, Harish Kapadia, Arun Samant, Divyesh Muni, Vineeta Muni and Dr. Ravindra Rupwate, who played important roles of Co-ordinators. We have, also, to thank Anil Chavan, who helped us in the execution of this workshop.

We are, also, thankful to Dr. Geeta Samant and Dr. Pravin Shah for preparing lists of allopathic and homoeopathic medicines. Last but not the least we are indebted to all participants of the workshop, whose discussions and suggestions were most valuable.

Wishing you all happy climbing.

Dhiren M. Pania
Hon. Local Secretary.

Date: 7th July, 1994.

CONTENTS

PLANNING AN EXPEDITION

Dhiren Pania

When and how do we first think or dream of an expedition is difficult to say. But once this restless thought gets implanted it keeps pulling back our wandering minds again and again back to the expedition its planning and its success. There are several aspects of organising an expedition which must be studied throughly to make it a success story. Success does not mean only reaching desired objectives on the ground. It, also, includes bringing back all members safely, happily with sweet memories. Expedition is a joint effort of a team and not a one man show. To make it an enjoyable experience it is desirable to obtain co-operation of all members from early planning stages and it begins with selection of a peak.

1. Area and Peak Selection :

Selection of a peak is the first step in planning an expedition. Selection process may also begin with an area one wants to visit. Depending on interest of climb one may decide on a peak either technically difficult or easy. Height of a peak should never be the only criteria, for selection of a peak. There are a few peaks in the Himalaya which are lesser in height but technically more difficult to climb, whilst some are higher but easier to climb. Selection of a peak should generally depend on strength of a team, budget and duration of expedition. Once an area and a peak are decided upon one has to dwell important factors of availability of transport upto roadhead, approach march and appropriate period for travelling and climbing.

As we know in the Himalaya, monsoon[1] travels from East to West and we have to strictly avoid it, lest we land up at the mountain during continuous spell of bad weather. Following guidelines will help. Suitable periods excluding winter months are indicated here.

Sikkim	-	During April.
Garhwal	-	During May - June (Pre-Monsoon)
	-	During September - October (Post Monsoon)
Lahul, Spiti	-	During July - August.
Ladakh	-	During July - August.

There is saying in Army [2]

1. Mausam ka illaj nahi
   Hukum ka jawab nahi

2. Ladakh ki mausam aur
   Bombay ki fashion ka bharosa nahin

2. **Team :**

After we first cross the hurdle of selection of a peak we have to select the crew. Peak and team both are inter-related. Depending on strength of team we can select a peak or vice versa. There are many ways of selecting a team :-

(a) Among friends (proven to bring out the best result)

(b) Selection by a club

(c) Selection on a national-level basis

Many times we select some new unexperienced friends to help us as supporting team. Some time we can divide a team in two trekking team upto base camp and main team for climbing purpose.

3. **Administration :**

While a peak is selected and a team is also decided it is time for paper work (one of the most boring but unavoidable part of expedition).

Once basic selection work is completed, the next step is to send application to :

Director
Indian Mountaineering Foundation (IMF)
Benito Juarez Road,
Anand Niketan,
New Delhi - 110 021.

I.M.F. has its own prescribed form which is to be duly filled in with correct details with necessary enclosures and sent to I.M.F. well in advance from the scheduled date of departure for mountains.

(a) Inner-line area

As we know the Himalayan range is surrounded by 3 nations - Pakistan, China and Tibet. The Ministry of Defence has marked some areas near the border as restricted areas. Mountaineers are allowed to go but with special permission from the Ministry.

If we want to visit such areas then we have to apply well in advance (about 4-5 months in advance) and send papers with clear objectives. Copies of which should also be sent to:

i) District Magistrate (D.M.) of the state which is to be visited.

ii) Asst. District Magistrate (A.D.M.)

iii) District Head Quarter (D.H.Qr.)

For example if you are visiting Spiti area then copy of application should also be forwarded to :

i) D.M. Shimla

ii) A.D.M. Shimla

iii) D.H.Q. Kaza

and from place of residence Police Clearance Certificates of all members and attested copies of 3 photographs shall be taken along for speedy work.

(b) Other Paper Works :

While we wait for permission from I.M.F. we should start collecting all available information on history of the peak. We should know about area, its history thoroughly. If any team has climbed the peak or visited the area then one should obtain latest information, photographs, slides, etc. from them.

(c) Journals :

For references, following latest journals are mandatory :

1) The Himalayan Journal

2) The American Alpine Journal

3) Alpine Journal

4) Indian Mountaineer.

These are prestigious and authentic journals in the world. They will give correct information about peak area, etc. One should first go through index of these journals. Each issue of journal (except Indian Mountaineer) has its own index which makes it very easy to search for information on peak or area.

Index of these journals are available for sale with respective clubs.

(d) Books :

If any information can be obtained from any of the books published on the desired subject the same should be referred to. To start with following two books give mountaineering history in Himalaya on broad spectrum and are very useful :

1) Abode of Snow by Kenneth Mason

2) Exploring the Hidden Himalaya by Soli S. Mehta and Harish Kapadia.

4. **Maps** :

Maps play an important role during an expedition, specially if the team is visiting new area. Before leaving for expedition the members of the team should familiarise itself with relevant maps of the area, their reading, use of compass, etc. (details are explained in the next chapter).

Gazzettes :

One should also refer to Indian Gazzetters or State Gazzetters available with

Asiatic Society :

Town Hall
Shahid Bhagat Singh Road,
Fort, Bombay - 400 001.

Or

Librarian
Bombay Natural History Society,
Hornbill House,
Dr. Salim Ali Chowk,
Opp. Lion Gate, S.B. Road,
Museum, Bombay.

Indian Gazzetter or State Gazzetters will give information on area, culture geography, earlier explorers, flora and fauna, etc. which will add to the knowledge and will make climbing more interesting.

5. Budgets :

Tilman used to plan expedition on back of envelope, while today we plan on computers.

One should start making budgets and work out expenses on expedition and how to raise funds etc. as early as possible.

Expedition expenses are divided into three parts :

a) Pre-expedition budget,

b) During expedition and

c) Post expedition budget

a) **Pre-expedition budget** :

Expenses start from the conceptual days administration, stationery, printing, postage, typing etc. These are not major expenses.

b) **During expedition** :

The day we set foot for expedition expenses mount steeply like travelling (by bus, train) to the roadhead including porters expenses and food on the way. Cost of food, equipment (hire/purchase) required on the mountain. Cost of porterage to ferry loads from road head to Base Camp & back. HAP's charges. We have to think about unexpected expenses which include natural calamities, landslides, damage of food, equipment, etc. Cost of medicines, photography and insurance of members and porters should be worked out.

We have to work out all above expenses correctly or the expedition may fail. It is generally witnessed that more the duration of expedition less is the expense per day per member.

c) **Post expedition** :

These are minor expenses for instance preparation and printing of reports, photographs, postages, publicity etc.

The team has to sum up all the expenses and put 15% contingencies to be on a safe side.

Once total budget is chalked out various ways of funds raising could be discussed with team members. Some of the following sources could be tapped :

1) Commercial Sponsorship, (difficult to get)

2) Souvenir publication.

3) Charity Show of drama, film.

4) Individual contribution.

5) Grant of IMF, State Govt.

Any other means of donation such as Donation by way of food or medicine or equipment can also be obtained.

Once we start fund raising we will know how the funds are coming. Side by side we should prepare 2/3 different budgets, so that if we raise lesser funds we should know where we have to curtail expenses.

We should always prepare a Cash Flow Statement working on reverse basis to know minimum expenses required during the progress of expedition at various stages.

6. **On the expedition** :

Once we have raised the funds and are ready to go for mountain some last moment preparation is also required to be done like taking insurance policy of your members and porters.

After reaching the mountain city one should leave schedule, names and addresses of our team members and their phone numbers, whom to be contacted in case of emergency etc. with District Magistrate, local police, local I.T.B.P. and army units. The information must contain, day wise itenary, map (with exact location) etc. so that in emergency rescue facility can be sent by these authorities quickly at correct location.

7. **Rescue** :

When we are on mountain if some tragedy or accident occurs to any of the members and injury is very serious like breaking of legs, High Altitude Pulmonary Oedema, etc. we should contact the nearest Army Camp/ITBP Camp and I.M.F. for helicopter rescue. For Indians helicopter charges are free, but if it is considered that rescue by helicopter was not necessary, then we may be charged for the same.

8. **Publicity** :

Publicity is most important part of expedition. Once we are back from expedition, then whatever results comes, we should publish in newspapers, journals, etc. The information given should be authentic because, others, who may follow us are bound to refer to it.

9. **With Foreign Collaboration** :

If one likes to or intends to organise a joint expedition with foreign climbers then first and most important thing is we have to be honest with them. Be clear with them on climbing part, finance part, equipment part, etc. Try to arrange food upto base camp and above base camp let their type of food be there. Even on team members be clear with them.

Foreign climbers are extremely dedicated to the cause of climbing. Most of them are technically highly skilled and prefer to select difficult routes. We have lot to learn from them. However, we should join them on a route only if it is really within our technical abilities.

With all above mentioned points in mind one can plan expedition very well and next time we will not say that our expedition failed because of no match box was available on Summit Camp or no stove pin was carried all the way.

References :

1. Abode of Show by Kenneth Mason - Pg. 45.

2. The Himalayan Journal - No.46 - Pg. 83.

Note: This article is based on the lecture given by Mr. Harish Kapadia during the workshop and experience of the Author.

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PHOTO ORIENTATION AND USE OF THE ALTIMETER IN MOUNTAINS

Jagdish Nanavati

Time and again we come across instances of climbers who make claim of ascent of a certain peak, and yet they do not know where exactly they have been. An ascent of mountain x is claimed whilst actually they were on mountain y. Even on the same mountain a claim of reaching a summit may turn out to be an ascent of a lower point on the same mountain, which may be mistaken as the summit.

Such errors take place primarily due to lack of sufficient preliminary homework before embarking on the expedition. Absence of ground study during the expedition is another contributing factor. To avoid such errors advance collection of information and detailed study of the region through maps, photographs and previous accounts cannot be over emphasised. Important locations in the mountain area should be spotted on the survey map after checking the bearings carefully. On the return from the expedition, the photographs taken could be studied with the survey maps to establish the locations of the other points from where they were taken. Such studies are fruitful to the climbers themselves as it leads to better understanding of the region visited(1).

Mountain Photo Orientation :

At the outset it must be stated that what is being described in this note is the very elementary principle on the subject of photo orientation. The methods mentioned do not boast of any fine degree of accuracy which is needed in map making and surveying. These are best left to the experts in the field. However, mountaineers and trekkers are satisfied with reports of elevation and distances which are expressed correctly within say 50 feet in the matter of elevation and quarter of a mile in distance. Maps used are generally half inch to one mile scale with 200 ft. contour interval. Such descriptions of the routes would be of sufficient guidelines for the readers and others to follow.

In this note we are concerned with the methods to discover the inter-relationship which exists between the vertical image on a photograph and the physical features as recorded on a survey map and through these inter-relationship determine the location from where the given photograph was taken.

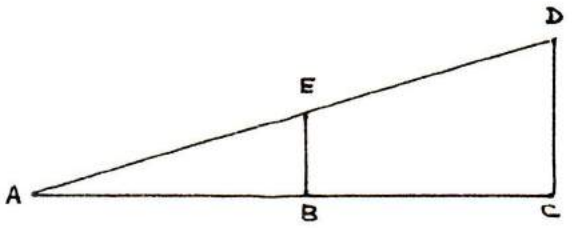
It is assumed that the principles of map reading are fully grasped. However certain relevant aspects may be recapitulated here.

Map can be defined as a diagram showing the details and features which exist on ground. It is a representation on paper of a certain area of land. The survey map also aims to indicate the shape and topographic composition of the ground. It is a miniature representation of selected features recorded through the language of signs. The meanings of these signs are generally given at the bottom of a map. These are few in number and once familiar one can read a map like a book and obtain information on the terrain, distance, heights, and so on.

Scale : Map is a representation of a vast area on a small piece of paper. Therefore one has to restrict the quantity of information reduced on the given span of paper. Relatively speaking, the larger the scale, the greater the details contained and easier for establishing meaningful co-relationship with a photograph of that region. The scale of one inch to two miles is the minimum requirement for such a purpose.

Contours : On a survey map there are series of irregular looking curved lines with some figures shown on them at certain places. These are contour lines. Which are merely lines joining points on ground of the same altitude, as indicated by the figures. The contour lines not only show altitude but indicate the shapes of the ground features. By practice one can visualise the shapes of these features by looking at the contours and thus co-relate them on a photograph.

Inter visibility : The contours also indicate the inter visibility between two points on ground. This is determined by plotting a section of ground between the points on a graph paper. It can also be determined by simple mathematical formulae :



$\frac{AB}{Ac} \times DC$ = line of sight at E.

Point D would be visible from Pt.A, provided the height of any point at distance A.B. does not exceed the height at the line of sight at Pt.E.

Ground position : It is best to determine one's position on the ground with the aid of a survey map and record the same on it. The location of camera position would thus be established.

The ground position can be read from the map by

(i) laying the map and co-relating with visible physical features.

(ii) by reading bearings of known physical features with the use of a prismatic compass and then plotting the location on the map by working out the back bearings.

Just as a map is a representation of ground on a small span of paper, a photograph records the image of the ground from a given camera position. In the case of a photo of a mountain region, the camera records vertical images, as affected by distance between the camera and the objects and the camera tilt. Unlike the map, the photo taken by a camera does not represent a diagram in uniform scale, since the image of objects is affected by both the distances from the camera position and the tilt of the camera itself.

Perspective denotes relative sizes and shape of objects recorded by the camera on a plane surface of the negative. Perspective is altered by moving the camera closer or away from the objects; similarly perspective is affected by raising or lowering the camera and tilting the camera forwards or backwards. If the focal length of lens on the camera is changed without moving the camera location there is no change in perspective. But if the camera position is altered, the perspective is immediately altered. (See fig. 1, 2, 3, & 4).

Camera lenses with varying focal length have specific angle of view which is usually expressed for the diagonal length of the negative. The angle can be obtained for the horizontal dimension, or worked out from the figure given for the diagonal. A particular lens of 50mm focal length on a 35mm camera would accept a view of 45° diagonally, 39° horizontal and 27° vertically. Lens maker's data may be referred for each type of lens and camera.

Thus the full view of the negative would record a known span which could be used for determining bearings provided the camera was levelled when taking the photo. Preferably, use a stand with level indicators. Whilst on location select two well separated bearings from within a particular camera view. For example one may be due north i.e. 360° and the other 20°. The bearings should be selected in such a manner that there are two prominent objects cutting the respective bearings, say a and b on 360° and x and y on 20°.

If the photo was taken with camera levelled the objects a and b would fall on one vertical line on the photo and the objects x and y on another, both vertical lines being parallel on the photo and representing 360° and 20° bearings.

When such a photo is suitably enlarged and placed under a transparent graph sheet with same number of vertical and horizontal divisions as respective angles of view, the lines would indicate horizontal and vertical angles from the camera location. The horizontal centre line would represent the level line.

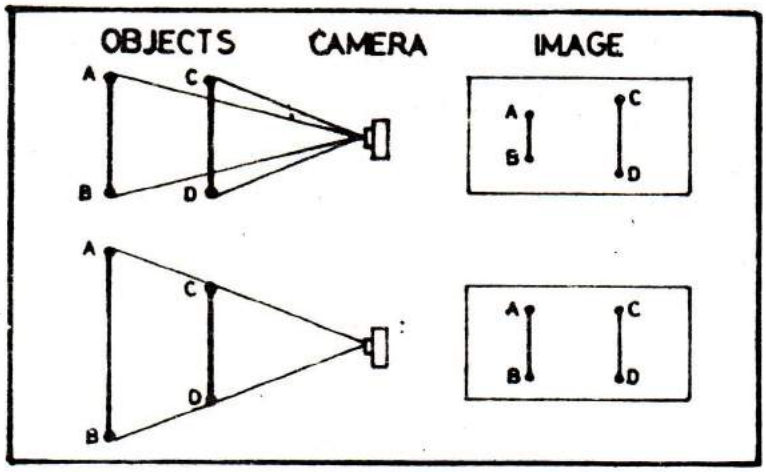


Fig.1 Distance and perspective. Top: Objects AB and CD are of same height, yet in photo AB appears smaller than CD, as CD is closer to the camera. Below: CD is smaller than AB yet in photo appears of same height as CD is closer to camera.

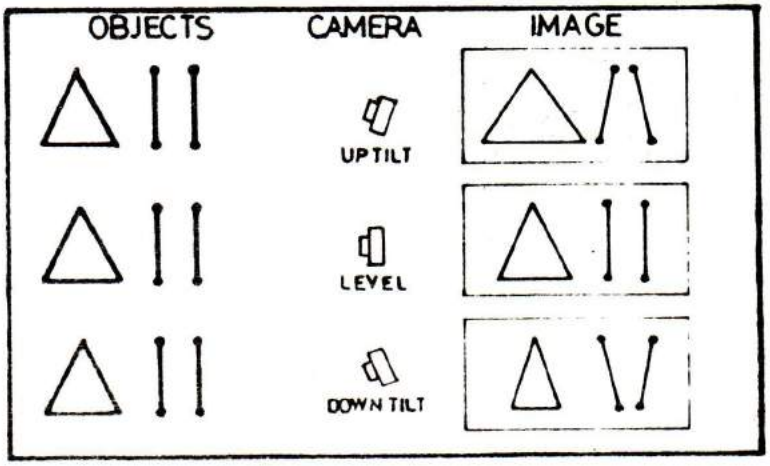


Fig.2 Distortion due to tilt. When camera is levelled there is no distortion in the image. Tilt upward and tilt downwards have opposite effect on the image.

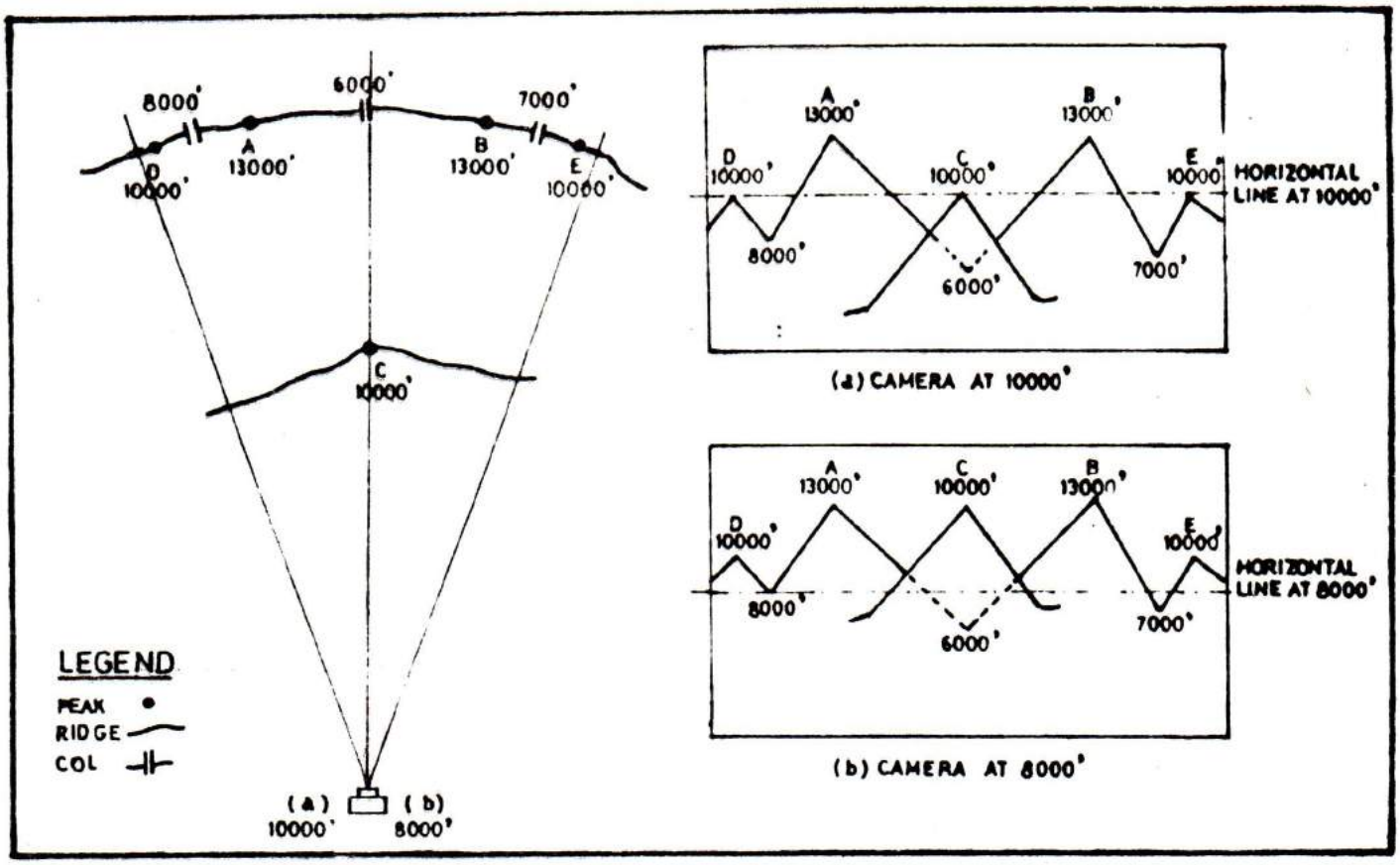


Fig.3 Elevation and Perspective. In the view from (a) at 10000' all the points of equal elevation of 10000', D, C and E are in level. If same location is at 8000' Pt C on the foreground ridge appears in line with Pts A and B of 13000'. Pts D and E of 10000' appears lower to C of same heights.

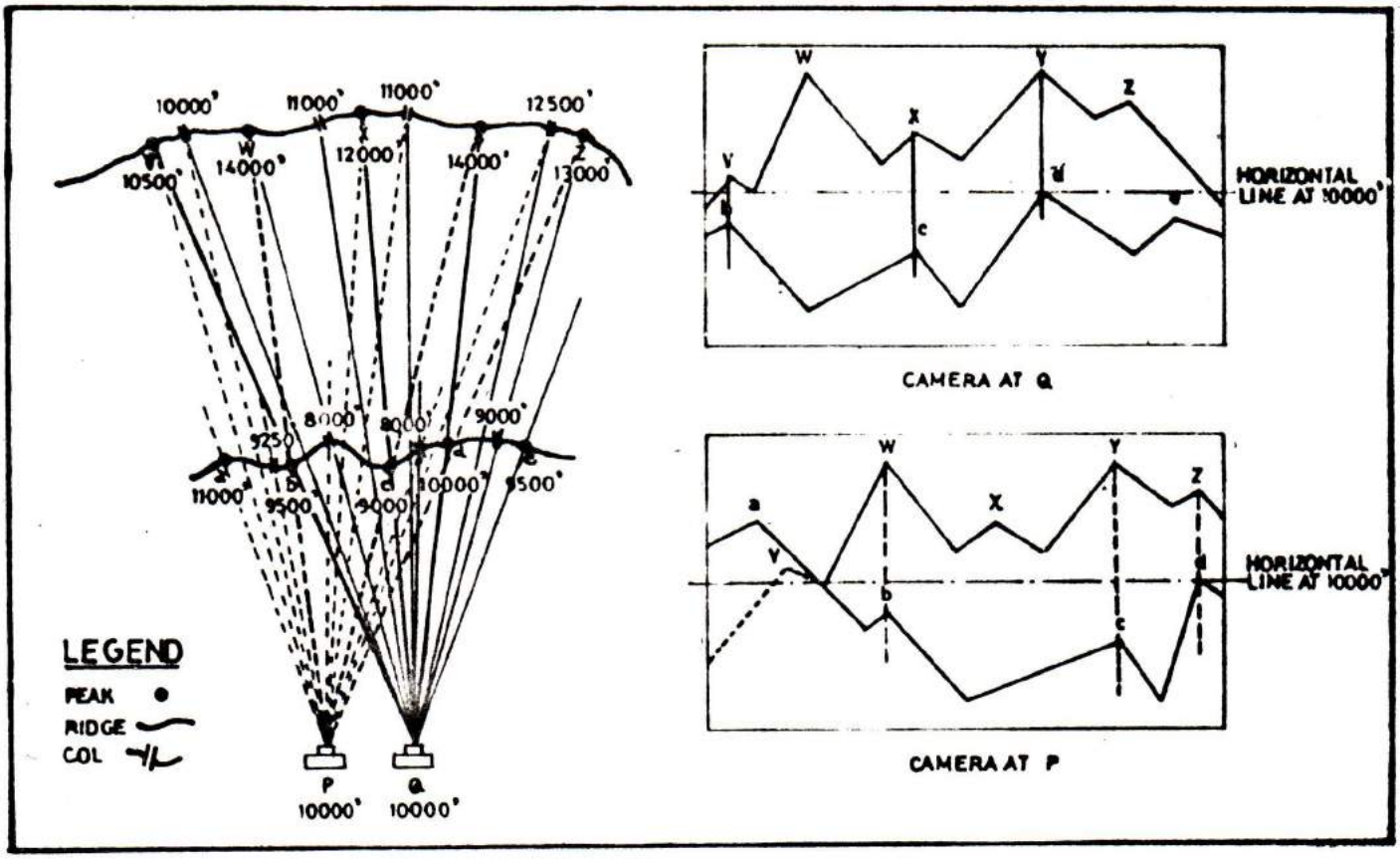


Fig.4 Horizontal shift in camera location. P and Q are both at 10000'. Respective view is seen in two sketches on right. From Q Pts. V and b, X and c, Y and d are in alignment or at same bearings respectively. When camera location is shifted to P, this alignment of peaks vary. Notice converging lines of above alignments lead to camera locations.

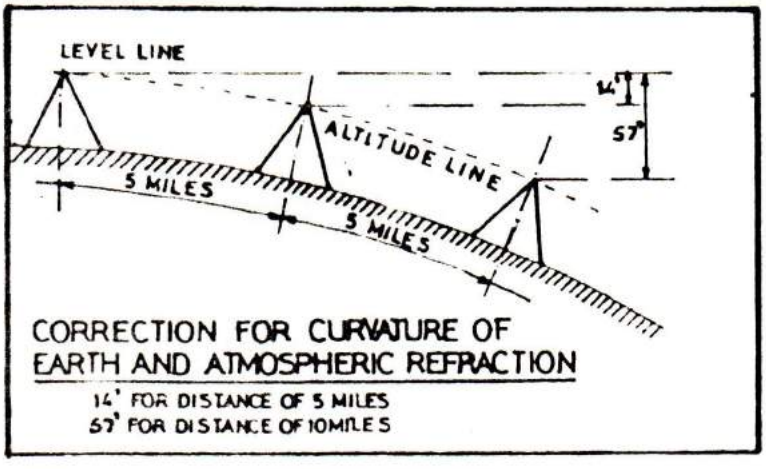


Fig.5 Due to curvature of earth and atmospheric refraction the level and altitude lines at different distances will vary.

It will be seen that to avoid distortion of the image, the camera should be as levelled as possible. Special cameras (photo-theodolites) are fitted with elaborate levelling devices. However, it is not difficult to obtain photographs with camera held in a reasonably levelled position. If the horizon is visible, positioning the same in the horizontal centre line of the view finder will ensure a levelled photograph.

Assuming that the photograph is taken with camera levelled, each vertical line on the photo would represent a bearing in the same way as seen through a prismatic compass. In other words, each object falling on such a vertical line on a photograph would have the same bearing. A levelled photo is thus a true record of bearings and can be used for identifying various points with the use of a survey map. Such a photo will also have a horizon line (whether actually visible or not) which denotes points of equal altitude as that of the camera position. This aspect of the horizon line will not be affected by the tilt or the distances between features of equal heights and the camera. (Except for minor variation due to the factor of curvature of earth and refraction of light, which can be determined with reference to a table of calculations given in a survey book). (See fig. 5)

Keeping in mind the above elementary principles of map reading and the nature of the photographic image, we may now turn to methods of determining the camera position of a given photograph, with the aid of a survey map. It would be helpful to collect photographs of the region taken from various locations. This would assist in identifying important features. Mark on the photograph and the survey map all such features which could be identified. e.g. peaks, spurs, valleys, ranges, glaciers etc. Mark on the photograph the heights of identified points as given on the map. Notice the horizontal space between the points/peaks identified (Greater the horizontal space, greater the angle or the difference of bearings). Notice the vertical space between horizontal lines cutting various points/peaks. (Greater the vertical space does not indicate more relative height or altitude except for points of equal distance from the camera position).

Having marked the identifications of points on the photograph and the survey map it may be possible to select sets of identified points (preferably of varying distances) on the photograph falling on respective vertical lines (each representing a bearing). Join sets of such common points on the survey map and project them to the point of convergence, indicating the camera position.

Identification of points on a photo may reveal that point 'A' of 13000 ft in the distance appears on the photo lower than a nearby point 'C' of 10000 ft altitude. (fig. 3). This indicates that the camera position was lower than the altitude of point 'C'.

To illustrate the actual identification of camera position, we may turn to a photo of the Nilkantha range published in the Himalayan Journal Vol. XVIII opp. Pg.104, taken by J.A. Jackson whilst his party was attempting a peak Pt. 20,330 ft. in the Bangneu Bamak region, which they named as 'Avalanche Peak'. (See fig. 6). The photo was taken enroute, after climbing above Camp 2 (17,000 ft) on the glacier. However, the exact location or its height was not indicated in the article. Identified common points are marked on both, the photo and the sketch map, respectively. (See. fig. 6 and 7). It will be noticed that no two identified points fall in a vertical line on the photograph. Hence direct converging lines pointing to the camera position at their intersection point cannot be drawn on the map. However, from a preliminary examination of the photo it can be safely concluded that the camera position lies demarkated within a triangular boundry of OE'J' shown on the sketch map. This is evident from the following :

(a) In the photo, Pt.D is to the left of Pt.E. As such the camera position should be to the east of line OE' extended from DE.

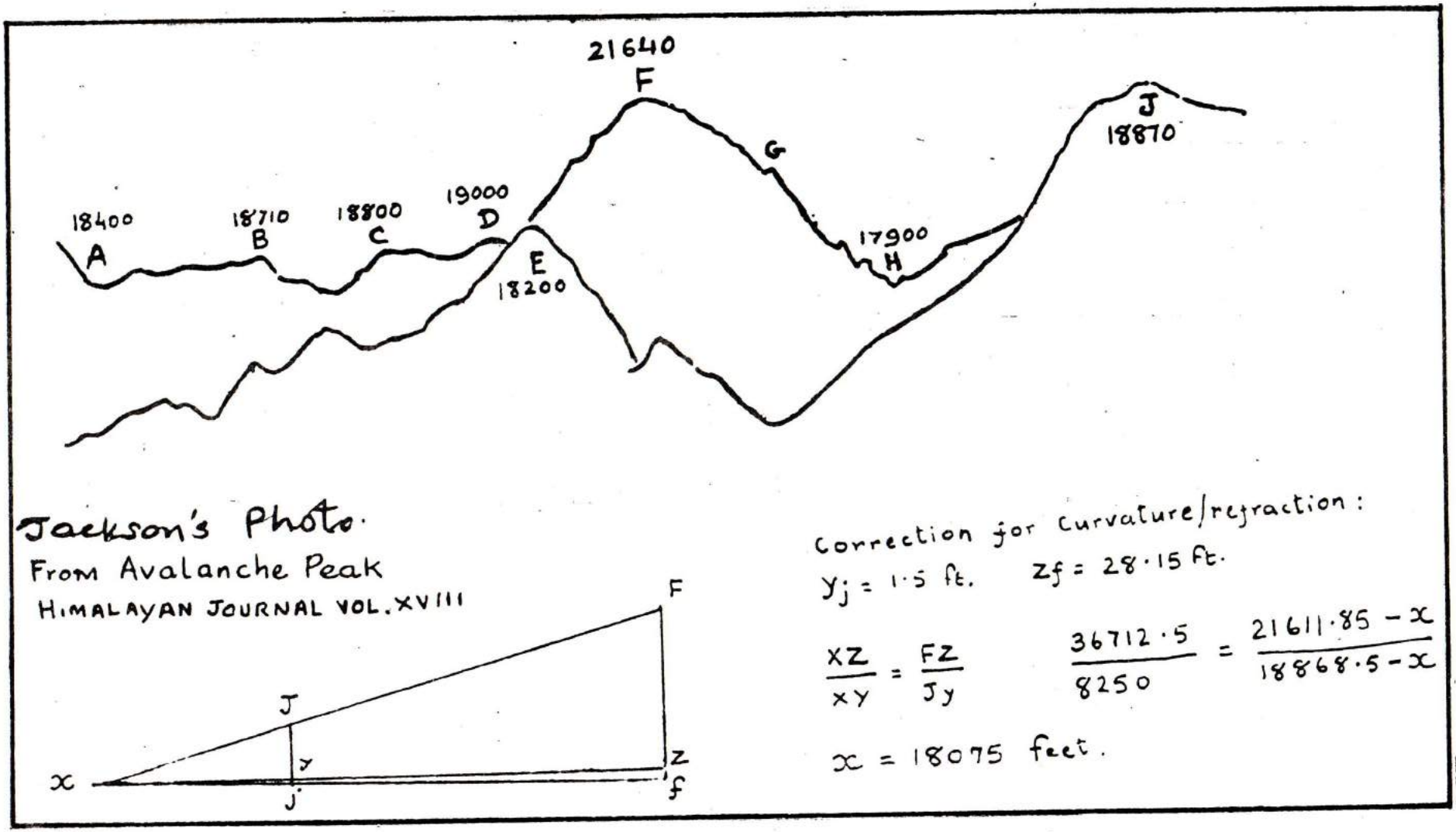
(b) The photo shows only 1/3 of the southwest ridge from west col H leading to Pt.L, as Pt.J blocks the view. Even Pt.K 20,000 ft on the HL ridge is not visible. Thus the camera position would lie somewhere to the west of the line OJ', extended from LJ on the map.

(c) In the photo, since Pt.E 18,200 + ft. appears higher than Pt.D 19,000 ft., the camera position cannot be higher than the altitude of E i.e., 18,200 + Say, 200 ft (contour interval) = 18,400 ft. (E's height is denoted by 18,200 ft contour only).

(d) The extended lines from DE and LJ cut at O. The contour line for 18,400 ft. may be joined between the lines OE' and OJ' forming a triangle OE'J' within which the camera position must lie.

Points B,F, and J are three relatively well fixed identified points on the map and their relative position on the photo represents the co-relation in their horizontal angles from the view point. A supplementary counter check was afforded by points E and H, although these are not intersected points denoted by spot heights.

On careful examination of a series of alternative position within the triangular boundry OE'J' and co-relating horizontal angles to photographic dispersions of various points, an estimated camera position x could be fixed which is found generally satisfactory. It is estimated that the camera position would be within a radius of half a furlong from position x marked on the map. Reading from the contour lines, the altitude of the position x is indicated to be 18,000 + ft.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Jackson's Photo.
From Avalanche Peak
HIMALAYAN JOURNAL VOL. XVIII
F
J
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y
z
J
f
Correction for curvature/refraction:
y_j = 1·5 ft. z_f = 28·15 ft.
$\frac{XZ}{XY} = \frac{FZ}{Jy}$
$\frac{36712·5}{8250} = \frac{21611·85 - x}{18868·5 - x}$
x = 18075 feet.

Fig. 6.

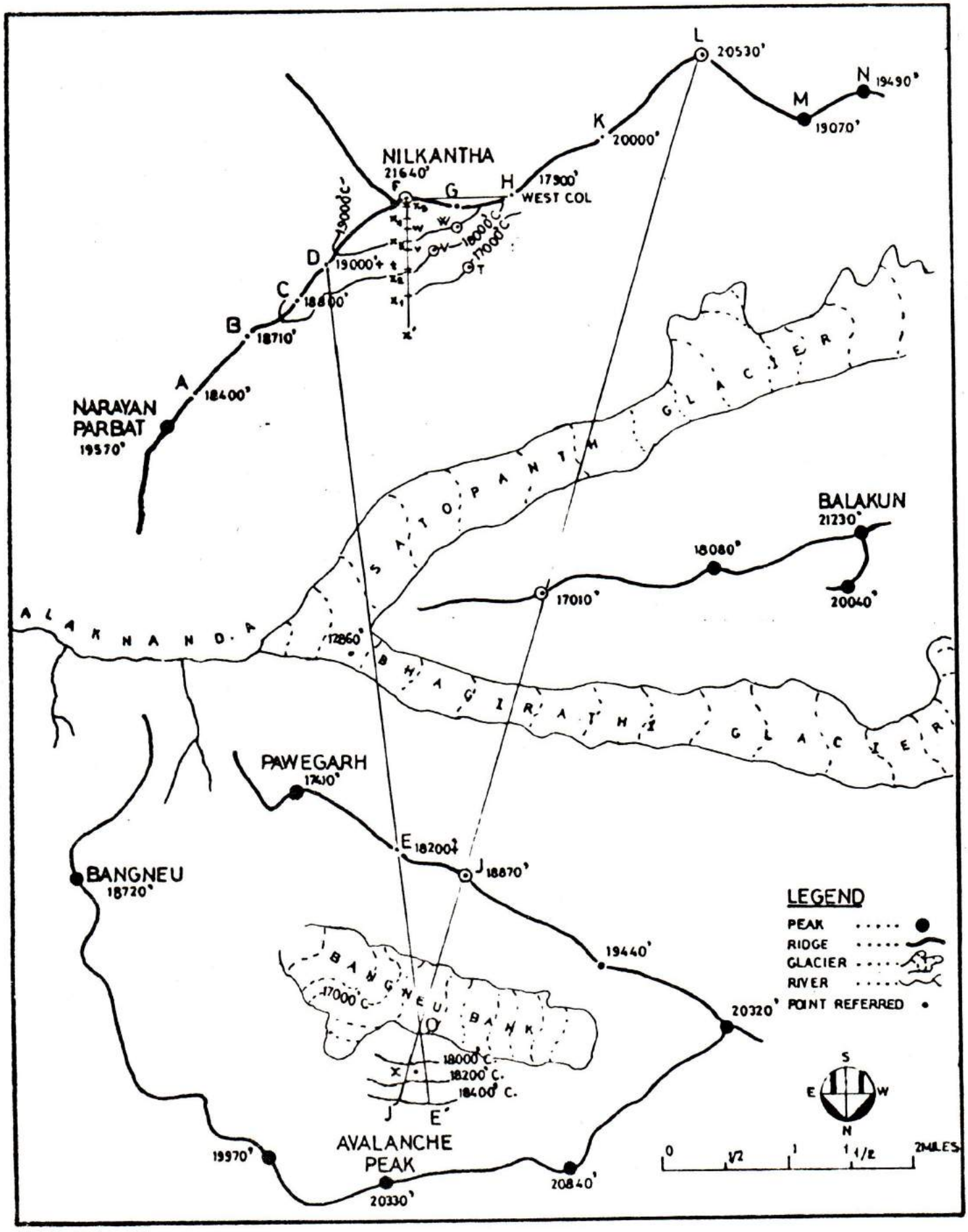
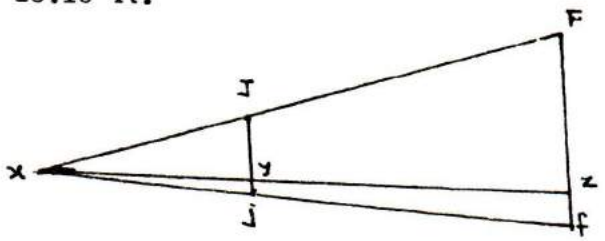


Fig.7 Camera location of Jackson's photo from Avalanche Peak.

Independent of the contour indication, the altitude of the position x (and thus a location on a slope) can be worked out by the following method :

(a) The photo shows Pt.J (18,870 ft) and f (Nilkantha, 21,640 ft.) at almost identical horizontal line, or at nearly identical angles of elevation along their respective lines of sight. The altitude of the camera position can be calculated since the altitude of F and J and their respective distances can be read from the survey map. Correction for curvature/refraction has been applied to the distances to Pts. J and F. i.e. yj = 1.5 ft. and zf = 28.15 ft.



xyz = level line of the camera position.
xjf = curvature line of earth.

In similar triangles xyJ and xzF, $\frac{xz}{xy} = \frac{Fz}{Jy}$

$$\frac{36712.5}{8250} = \frac{(21640 - 28.15) - x}{(18870 - 1.5) - x}$$

$\therefore$ x = 18073.376

The camera position x would be at an altitude of say, 18,075 ft.

Thus it could be safely concluded that the camera position for Jackson's photo was located about 7 miles north of Nilkantha on the southern slopes of Avalanche Peak, at an altitude of about 18,075 ft., within a very small margin of variation.

The above exercise was towards determining the camera position and altitude on a slope whilst climbing a known mountain.

One also comes across summit photographs claimed to have been taken from a mountain x, whilst on closer examination of the summit photos on the same lines as above, indicate that the climbers were on another mountain y. Such gross errors generally take place due to lack of adequate ground

study or faulty map reading. However, determining the camera location of summit photographs would be easier than the one from a mountain slope. A summit, by its very nature, is a high single point. Converging lines drawn on map from identified points would lead to the true mountain or the summit climbed.

An expedition claiming to have made the first ascent of Sudarshan 21,350 ft. in 1972 had taken a number of photographs from the summit showing adjoining peaks. However, Sudarshan itself was seen in one of the summit photo. The climbers mistook it as Matri 22,050 ft. ! Clearing there was a case of mis-identification of peaks seen as well as the peak climbed. Matri is only 700 ft. (213 m) higher than Sudarshan and at distance of 15,421 ft. (4700 m) from Sudarshan. The vertical angle between two points on a survey map can be calculated based on the horizonal distances and the difference of height between two points in question. Such an exercise reveal that Matri should have made a low vertical angle of 2° 36' only from Sudarshan. However, the vertical angle made by the peak as seen in the summit photo, was indeed higher. A reflection on this aspect alone would have indicated to the climbers that the peak seen could not have been Matri, and thus they could not have been on the summit of Sudarshan. From the other excellent summit photos it was easy to establish that the climbers were actually on a peak K 19,800 + ft. which is 1500 ft. lower and 1.5 miles southwest of Sudarshan thus rendering it on the photo to be at a larger verticle angle.

It may be said that photo orientation falls within the technical realms of the science and craft of photo surveying and map making. However with elementary understanding of the survey maps and the nature of photographic image, even a lay climber can also derive valuable data by applying their co-relations and obtaining greater insight into the topography of the mountain world.

Use of the Altimeter in Mountains :

An altimeter like a compass, provides one simple piece of information that forms the basis for a tremendous amount of vital detail. The compass merely points the direction to magnetic north. The altimeter merely gives the elevation. But by monitoring the elevation and checking it against the topographic map, mountaineers keep track of their progress, pinpoint their location, and find their way to critical junctions in the route. Every climbing party should have an altimeter.

An altimeter is basically a modified barometer. A barometer measures air pressure (the weight of air) and displays it on a scale calibrated in inches or millimeters of mercury, or in millibars. Because air pressure decreases at a uniform rate with increasing altitude, a barometer can measure elevation if it is fitted with a scale calibrated in feet or meters instead of units of pressure.

The elevations determined by an altimeter are only approximate because the instrument is strongly affected by variations in temperature and weather. Check the reading whenever you reach a point of known elevation so you can reset it if necessary.

The altimeter helps in deciding whether to continue a climb or to turn back, by letting you calculate your rate of ascent. Let's say you have been keeping an hourly check on time and elevation during a climb. It has taken the party 4 hours to climb 3,000 feet, an average of 750 feet per hour. But you know that the actual rate of ascent has been declining with each hour. In fact, the party gained only 500 feet in the past hour, compared with 1,000 feet the first hour. You know that the summit is at an elevation of 8,400 feet, and an altimeter reading shows you're now at 6,400 feet. So you can predict that it will take roughly 4 more hours to reach the summit. Take that information, courtesy of the altimeter, combine it with a look at the weather, the time of day, and the condition of the climbers, and you have the data on which to base a sound decision.

An altimeter also can help determine exactly where you are. If you are climbing a ridge shown on the map, but don't know exactly where you are along the ridge, check the altimeter for the elevation. Where the ridge reaches that contour line on the map is your likely location.

Another way to ask the altimeter where you are is to start with a compass bearing to a summit or some other known feature. Find that peak on the map, and plot the bearing line from the mountain back toward the climbing party. You now know you must be somewhere along that line. But where ? Take an altimeter reading and find out the elevation. Where the compass bearing line crossed a contour line at that elevation is your likely location. This could lead to an ambigous answer, of course, because the line might cross that contour at several points. That's when you turn to further observations, common sense, and intution.

Knowing all the facts about an altimeter - the plusses and minuses - will make it as valuable as possible in the wilderness. First of all, keep in mind that temperature and weather are always working their will on an altimeter's accuracy. A high-pressure weather area will tend to cause a lower elevation reading than a low-pressure area. Warmer, lighter air will tend to result in a higher elevation reading than colder, heavier air.

There's no need to be surprised if an elevation reading of 5,200 as you go to sleep turns into 5,300 when you wake up the next morning, even though the tent appears to be in the same spot. The elevation hasn't changed, but the weather has, and with it, the air pressure that is the basis for altimeter's determination of elevation. That's just the way altimeters are, and as with any good friend, you've got to accept them despite their bad habits. The best way to keep them relatively honest

is to check the reading at every known elevation point and reset the altimeter accordingly. Topographic maps give the correct elevations of many of the features you encounter on a trip, such as trailheads, lakes and summits.

The altimeter can help in predicting weather. The altimeter and barometer scales operate in opposition to each other. When one goes up, the other goes down. An altimeter reading showing an increase in elevation when no actual elevation change has taken place (such as at camp overnight) means a falling barometer, which generally indicates deteriorating weather. A decreasing altimeter reading, on the other hand, means increasing barometric pressure, generally associated with improving weather. This is an oversimplification, of course, as weather forecasting is complicated by the wind, local weather peculiarities, and the rate of barometric pressure change. Stay observant on climbing trips if you want to figure out the relationship between weather and altimeter readings in your area.

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Booklets :

1. Elementary Map Reading by Captain R.P.Cave (48 Pgs).
2. Surveying and Mapping simplified by Kenneth C.S. Parrow (87 Pgs).
3. Six lectures on Map Reading and Field Sketching Publisher Gale & Polden Ltd. Aldershot (48 Pgs.)

Books :

1. Mountaineering : Freedom of the Hills: Publisher
   The Mountaineers, Seattle (Chapter: Route Finding & Navigation) (56 to 78 Pgs.)
2. Hints to Travellers, Vol.2. Publishers Royal Geographical Society, (Chapter: Meteorology) (257 to 276 Pgs.).

Article/Study Paper

1. Himalayan Journal Vo. 41
   (Mountain Photo orientation by Jagdish Nanavati (122 to 136 Pgs).
2. Nilkantha - Still Unclimbed - by Jagdish Nanavati (70 Pgs.)
3. Encyclopedia Britannica, Ref. to ALTIMETER, WEATHER etc.

Useful Scale References		Metric Equivalent
2½ inch to British 1 mile	= approx.	1/25000
1 inch to 1 mile	=	1/63360
½ inch to 1 mile	=	1/126720
¼ inch to 1 mile	=	1/253440
10 miles to 1 inch	=	1/633600
16 miles to 1 inch (Approx.)		1/1,000,000

PLANNING FOR FOOD, FUEL, EQUIPMENT, PORTERAGE AND WASTES

Arun Samant

It is true that Tillman could plan his expeditions on the backsides of envelopes. But in those exploratory days needs of mountaineers were minimum. The expeditions used to last for 3 to 4 months and sometimes even more. The explorers were prepared to live off the land with menus based on just atta, dal, local vegetables, meat, tea and sugar.

Today the situation is vastly different. Mountaineers plan to climb a specific route on a decided peak, in a short period of 3 to 4 weeks with limited funds and tremendous pressure from sponsorers to succeed. There is no room for faulty food and equipment planning causing failures. Assuming a base camp to be four marching days away an extra food item costs Rs. 20/- per Kg. and an extra equipment, item, which has to be brought back, costs Rs.40/- per Kg. at the current porterage rates in addition to its own cost till a roadhead. Thus unnecessary extra items carried escalate costs directly as well as indirectly. More emphasis need not be made on accurate food and equipment planning viz. selecting and working out quantities, procuring and packing of various items. Naturally the planning will improve with experience gained. The important key word is introspection. Analysis of planning made before an expedition after returning is must and is the only method to reach the optimum and ideal level of planning suitable for a respective group.

1.0 FOOD :

Following notes are prepared keeping in mind a medium size team planning to spend about 3 to 4 weeks above a base camp. Some aspects of food planning mainly like packing may require adjustments depending upon the size of a team-small (2-4 man), medium (5-10) and large (above 10 man) and, of course, style of climbing. Otherwise, the procedure of food planning remains the same.

1.1 **Schedule of Movement** : The first step is to work out as accurately as possible a schedule of movement of members of a team beyond a road head. This enables one to calculate low altitude mandays (below and at base camp) and high altitude mandays (above base camp), which are the crux of planning.

1.2 **Balanced Diet** : A mountaineer seeking information on diet which will guarantee the best physical performance and

protection against nutritional deficiencies, is often told to eat so-called a well balanced diet without really spelling it out for him. A list of general categories of food is often handed out, which is not sufficient. A staple of rice and potatoes accompanied by millets give sherpas their high carbohydrate requirements, rich in all the amino-acids with an alkaline balance which is most needed. However, this simple diet may not be acceptable to a mountaineer used to a different diet at his home.

Accordingly to the research done on the subject it is said that the body needs some 40 odd nutrients to make the human machine work efficiently. These have to be supplied through food and hence are called 'essential nutrients'. These are as follows :

1 Essentially fatty acids called EFA,

10 Amino-acids called Essential Amino Acids,

15 Vitamins-A, B Group, C + P, D, E and K,

14 Minerals including trace minerals.

The important rule is that no essential nutrient is of any substantial value unless accompanied by 39 others. Today most of the ingredients used by us are refined and without their own skins resulting into loss of many essential nutrients. Hence, the selection of the ideal diet has become very complex and help of a competent dietition has become obligatory.

Smt. Matati Karwarkar an eminent dietitian on 'Importance of Nutrition Diet In Mountaineering' (The Himalayan Journal Vol. 39, Page 143) has summarised the subject as under:

"It seems to be practical to have a check on oneself nutritionwise, many days prior to the programme of expeditions. During this period, and even after the expedition is over it is wiser to plan the diets based on most of the natural foodgrains, nuts, tubers and green leafy vegetables and fruits. Oils and fats should also be given a thought as stated earlier. So also to refrain from eating white sugar and flour and all the products prepared from them for some days prior to departure seems a wise investment. Milk and other protein foods based on flesh foods eaten in modernation will pay dividends. During the expedition, fortifying the foods with necessary supplementation seems to be the only answer. Thus these factors must be considered while planning food for an expedition. These thoughts are purely based on the principles of nutrition which do not change whereas diets may change and vary".

1.3 **Selection of menus** : Naturally the menu selected should be as close to home preparations as possible to make them more palatable in mountains. Separate menus should be drawn for low altitudes and high altitudes. At high altitudes increasing number of fully cooked and partially precooked items will minimise cooking period, whereas at low levels menus should be supplemented with green vegetables, fruits, eggs etc. Varieties of drinks should be selected to facilitate high liquid intake to achieve good acclimatization.

Low altitude and high altitude menus should be further broken into subgroups like: (a) Drinks, (b) Breakfast, (c) Lunch/Dinner and (d) Fully cooked items. Depending upon the availability in the market and preferances of team members listing of items selected should be done under each sub-group before working out quantities of each item.

Number of companies are producing varieties of pre-cooked items at present. With introduction of Pepsi Foods, in the market new horizons will soon be reached on the food front.

	Name and Address of the Company	Some of the Important Products
a)	Laija Foods Pvt. Ltd. Shrinath Bhavan, 27, Picket Cross Road, 3rd Floor, Office No.32, Bombay - 400 002.	Vegetable Biryani, Pulao and Khichadi: Sooji Halwa, Upma, Batata Powa Curried Dal etc.
b)	Tasty Bite Eatables Ltd. 135, A. Beasant Road, Worli, Bombay - 400 018.	Alu Chole, Dal Makhani, Palak Paneer, Non-Veg. preparations etc.
c)	The Staple Foods (I) Ltd. Usha Swapna, 10th Cross, Prabhat Road, Poona - 411 004.	Ru-Ru Rotis, Parathas, Packed Lunches etc.
d)	Shubh Aun. Co. 1, Krishi Nagar, Nasik - 422 005.	Instant Dalia, Sheera, Upma; Instant Dal, Usal, Rajma Mutter; Potato-Onion Vegetable, Preserved Rotis etc.

e)	Food Associates, Bangalore No.45, 17th Cross Road, 11th Main, Malleswaram, Bangalore - 560 055.	Vegetable Pulao, Upma, Kheer, Sooji Halwa, Tomato Soup, Rasam, Kadhi, Sweet Chapatis etc.
f)	M.T.R. Condiments No.11, Lalbaugh, Bangalore - 560 027.	Rawa Idli, Pakoda Mix, Khara Bhat, Precooked Rice etc.

Some of the other special items available in the market are: Tea bags, Ready-made Coffee, Tang, Egg Powder, Potato Powder, Dehydrated onions, Dehydrated Mango, Soya products etc.

1.4 **Working of quantities** : From number of mandays worked out as explained in 1.1 and from pre-determined menus, repetitions of each item can be worked out in units of mandays. If consumption rate per manday of these items is known, a simple multiplication will give total requirements of these items.

From this table one can, also find out quantities to be procured at a starting city, at a main bazar on the way, their costs and porterage costs to carry the food items upto a base camp. These rates naturally vary from one team to another team. Each team however should try to conclude its own rates. To have an overall check a rate of consumption of all food items excluding fuel should work out to about 1.00 Kg. per manday for low altitude and 0.75 Kg. per manday for high altitude. For general guidance consumption rates of some of the items are tabulated below:

	Item	Consumption rate Per Manday
a)	**Drinks** :	
	Tea Powder	10 gms.
	Tea Bags	2 nos.
	Milk Powder	25 gms.
	Condensed Milk	15 gms.
	Sugar	80 gms.
	Bournvita or Horlicks	15 gms.
	Soups	15 gms.
	Electral	15 gms.

	Item	Consumption rate per Manday
b)	**Breakfast**	
	Fresh Eggs	2 nos.
	Upma	60 gms.
	Sheera	60 gms.
c)	**Lunch/Dinner**	
	Rice	100 gms.
	Atta	150 gms.
	Thepla	5 nos.
	Tur or Mung Dal	30 gms.
	Ghee	20 gms.
	Salt	10 gms.
	Potatos	150 gms.
	Onions	100 gms.
	Fresh Vegetables	150 gms.
	Pickles	10 gms.
	Chutney	10 gms.
	Jam	10 gms.
	Papad	2 nos.
	Ketch-up	15 gms.
	Luncheon Meat	100 gms.
	Precooked items from market - Consult the producer of the product.	
d)	**Fully Cooked Items**	
	Gol Papadi, Banana Wafers Biscuits, Cakes, Chikki, Dates, Ladoos, Khakhara, Pea-nuts etc.	50 gms. each
	Cheese, Dry Fruit, Chocolates etc.	40 gms. each

1.5 **Packing** : Each group prefers to pack food as per their special style. Some of them pack all items required by the entire team for each day into a separate box. However, it is preferable to divide it into two categories low altitude (below base camp and at base camp) and high altitude, (above base camp) and pack it in cartons in such a manner that at a time only one of the boxes need to be opened. The key word is 'distribute'. Each food item is broken into smaller units (preferably weighing not more than 250 Gms.) and sealed (not stapled) in small polythene bags. Sub-divided items of daily consumption are distributed equally into the prepared and numbered cardboard boxes (size about 0.50 m x 0.30 m x 0.30 m), whereas non-daily items are placed in an alternate box. If a little attention is paid to menus selected while distributing un-common items, the desired results could be automatically obtained. After distribution is over all items in each box should be listed and repacked. The box should be properly sealed in a larger polythene bag, strapped and weighed. Weight of each box should come to about 12.50 Kg. A box of this size and weight is suitable to ferry at higher camps, whereas two such boxes stiched in a gunny bag will make one porter load of 25.0 Kg. during an approach march. This load is acceptable by porters, mules and yaks. Bulk items like atta, rice, green vegetable should be packed separately in units of 5.00 Kg. using cotton and polythene bags. Eggs require special tin boxes to prevent breakage and kerosene filled in good quality 100% leak proof plastic cans of 5.0 Lit./10.0 Lit. capacities. Thus each low altitude food box weighing about 12.5 Kg. should have all items except bulk items and fuel. Supplemented by bulk items it will cater for 22 to 23 mandays. Each high altitude food-box weighing about 12.5 Kg. should have all items except fuel and will last for 15 to 16 mandays. If it is anticipated that load is to be ferried by goats, items in each box will be required to be divided into smaller units placed in cotton bags weighing from 6.0 to 8.0 Kg. Shepherds generally re-arrange items depending upon weight, volume of the items as well as carrying capacity of each goat. Under the circumstances flexible packing will have to be resorted to.

1.6 **Emergency Rations** : Situations, where climbers are forced to bivouac without reaching the camp sites or are forced indoors at higher camps due to storms with depleting food stocks are frequent. One must always carry in his own sack a small package of ready to eat items weighing upto 1.00 Kg. like chocolates, dry fruits, dehydrated coconuts, electral etc. for such emergencies.

2.0 FUEL :

Proper attention has to be provided in selection of fuel, not only from the point of view of cost effectiveness but also from ecological aspects.

2.1 **Below and at Base Camp** : Very few mountaineers use wood nowadays. However, if one is forced to use wood care must be taken to use only dead-wood. Kerosene with ordinary primus stoves is still the best combination to handle today. The rate of consumption of Kerosene is 0.15 lit. per manday, when used only for cooking. Imported stoves are good but require very careful handling. Cooking gas is suitable for large teams. Not many people have tried Solar Cookers. Black polythene sheets spread under bright sun can be used successfully to obtain water by melting snow and to save fuel, if a good source of water is not available.

2.2 **Above Base Camp** : At high altitude solid fuel has been attempted but found to be totally useless. Petrol with petrol stoves is highly inflammable and risky to carry and use. Imported Butane gas in non-reusable cartridges (burning time 5 hrs.) with requisite stove, though costly, is the best fuel. However, kerosene with folding type of stoves work efficiently event at higher altitudes. Rate of consumption of kerosene is found to be 0.25 Lit. per manday when drinking water is, also, to be obtained by melting snow. One may effectively use small aluminium bottles painted black from outside to obtain drinking water by melting snow (about 0.50 Lit. in 2/3 hrs.) using Solar energy.

2.3 **Kitchen** : A set of aluminium pots, sizes depending upon strength of a team should be carried. A good pressure cooker is must for cooking during an approach march and at a base camp. A set of small utensils, which fit into one another is very handy at higher camps. Difficulty arises in deciding upon number of stoves to be carried. Generally, if this number is worked out in such a manner that there are two large stoves at a base camp and one small folding type stove at each higher camp one will not go wrong.

3.0 EQUIPMENT :

Extreme care must be taken in selecting proper and requisite equipment as faulty gear is not only going to cause failures but increase risk factors tremendously. At the same time, tendencies like 'needed just in case' escalate weightage which needs to be curbed.

3.1 **Personal Gear** : One should never compromise on quality of personal gear. A few general observations may not be out of place here. Spare pairs of wollen gloves, socks and goggles, a knife, a whistle, a lighter carried in your own sack is must while going on snow/ice. A silk scarf can be used to protect a face from cold winds as well as ultra violet glare. A folding umbrella is also an useful item. Using helmets while moving on a glacier and while climbing should be made obligatory. Items like gloves, axes, helmets, sacks are easily dropped by climbers from higher slopes. Spare loops of 4/5mm diameter strong nylon strings or tapes should be used to tie off these items on to your body while climbing. These can, also, be used as pursik loops in emergencies. Crampons must be properly fitted to climbing boots before starting out from a base camp. Instead of carrying more sets of clothing carrying a washing soap would be preferable. A small first aid kit, a repair kit, a headlamp can be very convenient.

3.2 **Camping Gear** : A big army tent or a large kitchen space built with stone walls and covered by a waterproof sheet (6.0m x 6.0m) is very useful at a base camp. Small light dome type or valley type waterproof tents serve equally well during approach marches, at a base camp and above its. Number of tents to be carried depends upon the planned movement of members. As a thumb rule a medium size team should plan to provide exact capacity plus a two man tent for each camp above a base camp. Thus, if a six member team is intending to place two higher camps they should carry five 2 = man = tents (i.e. 3 two man tents for 6 members + 1 two man tent x 2 camps). A snow shovel helps in carving out a platform for a tent on a snow slope. It is high time now for climbers to start using snow caves at higher camps.

3.3 **Climbing Gear** : In absence of approved testing procedures here one must use tested imported climbing ropes for climbing. Climbing ropes equal to possible number of formation of internal sub-teams should be taken. Ropes having diameters more than 8 mm and positively known history (less than permitted number of falls taken etc.) only should be used. Only tested climbing gear like pitons, ice screws, dead-man, snow stakes etc. should be selected. For working out quantities of fixed ropes a through study of the route has to be done. A large quantity of excessive fixed rope taken to a mountain creates logistical and financial problems. A bare minimum quantity should be taken. In case of shortage a possibility of fixing unused climbing ropes should not be discarded. Along with climbing gear one should not forget to carry a prismatic compass, an altimeter, a binocular, an alarm clock and marking flags.

3.4 **Packing** : Equipment can be packed in canvas or thick plastic kit bags or drums with good locking arrangement. Polythene bags if used will prevent it from getting wet. If a kit bag carrying all ropes gets lost on the way it would be an end of the expedition. Hence, items should be distributed while packing. No individual kit bag or a drum should weight more than 25 Kg. It becomes too heavy to handle during travel.

3.5 **Care of Equipment** : Utmost care of equipment must be taken by all members throughout an expedition. Equipment should be kept dry and clean. Climbing ropes should be taken inside tents during nights. Plastic sheets should be provided below tents, which should, also, be protected from stone falls and heavy accumulation of snow. Tent zips require delicate and careful handling. Small items, which are likely to disappear under falling snow should be stored safely. At the end of an expedition entire gear should be cleaned, dried and repacked at the road-head itself. Tents and plastic sheets require dusting with talcum powder.

Equipment is likely to get damaged during the use. A stich in time saves nine. A good repair kit must be properly selected and taken to the mountain to carry out most of the repairs on the spot.

4.0 PORTERAGE :

During approach marches, mules, yaks and goats should be preferred as they cause lesser problems and need no food. However, if goats are used a few local porters will have to be engaged to carry heavier and bulkier loads, which cannot be carried by goats. If one has no option but to transfer all loads by local porters it will be better to engage them without food even at slightly higher rates. Otherwise, one has to engaage additional porters to carry food required for porters carrying expedition loads. A permanent cook will be helpful for medium and large size teams. A decision of employing high altitude porters or guides will depend upon the combined exeperience of members. On an expedition one should take their advise but all final decisions must be taken by the leader, or by the most experienced member, whoever is present at the time. One should never overlook the fact that though these guides may be more experienced and more knowledgeable, they have joined the expedition to earn money and their motive need not be same as members.

5.0 WASTES :

Mountaineers, trekkers, who love Himalaya, have always known the value of precious environment and have been taking care of their wastes on the mountains. However, some of the salient features, of how to tackle wastes properly need mention here.

5.1 **Decomposable waste** : Proper toilet locations should be demarcated at each camp site and human waste burried preferably in soil pits. Other decomposable matters like left-over foods should be burried at the end of an expedition. It may be profitable to sale off such extra food items at the base camp if any willing shepherds or locals could be found. Alternatively, one may generously leave them at a prominent place properly packed for the use of needy.

5.2 **Non-decomposable but combustible waste** : Such items like packing materials consisting of cardboard boxes, paper bags, polythene bags should be burnt at the base camp at the end of an expedition.

5.3 **Non-decomposable and Non-combustible waste** : These consist of aluminium foils, glass bottles and metallic tins. It is really difficut to destroy them. Earlier theory was to burry these items in a pit or throw them down a crevice. But with development of new concepts, it is advisable to carry these items back to a nearest township, where facilities are available to either destroy or recycle such materials.

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RECORDING OF A CLIMB

Divyesh Muni

When we are planning an expedition and we read articles or books which describe the climb but are of no use due to lack of relevant information. We realise the importance of recording a climb in a methodical and informative manner.

In many cases improper recording of climbs results in unnecessary doubt on an otherwise commendable climb. Apart from proving the climb, a properly recorded climb also gives guidance to any future expedition in the same area or on the same mountain. It also forms part of mountaineering history and many times forms part of the geographical history of the area.

The three stages to record the climb would be as follows :

1. **Pre-Expedition Preparation** :

   If one is adequately prepared at this stage, only then will it be possible to correctly record the climb during and after the expedition.

   (a) All the members of the team should be familiar with the map of the region to be visited. It is important to know the directions of the peak and how it is situated in relation to other peaks in the area. One could anticipate the views from various points on the route. It is especially important to know the detail climbing route on the map, the major features like rock bands, ridges, etc. If any references are available of previous climbs or attempts, all the members should be familiar with the same. Photographs taken by previous expedition can form the basis of the planning and recording. A photograph of the mountain showing the planned route is very useful to note the actual position of the various camps, and the progress of the climb.

   (b) The team must be equiped with a good sighting compass and an altimeter.

2. **During the expedition** :

   Recording the climb during the expedition has to be a team effort.

Every member should contribute towards this. It is not possible for one member to cover all the aspects of the climb. This may be done in the following manner.

(a) Keeping a Diary. This is the most important and the best assistance to recording the climb. Every member must maintain a diary and note the following points at regular intervals.

i) Activities of the day. This would be the activities of the other members and also his own activities of movement on the mountain.

ii) Timings. The time taken by himself and other members between various points on the mountain. This helps in calculating an average time taken for movement between two points.

iii) Features. Break down the schedule into sections. Describe the natural sections between the points/ camps like rock formations, gendarmes, etc. All features of the mountain noticed by the member should be noted down. It is specially helpful if the member notes down how he has overcome the difficulties of the climb. If it is possible to grade the climb, the grading must be noted down. Here it would be useful to know that what may be very clear to you at the moment, will become hazy memory after a few days and one is left in doubt about your judgement of the grade/difficulty or features of the climb.

iv) Weather Pattern. If a proper record of the weather is maintained, one may be able to notice a pattern which may help during the climb itself. By way of a record, it will be helpful along with the timings recorded for movement on the mountain.

v) Other Incidents. These points go towards making the account of the climb more interesting. It may be in a lighter or serious way.

(b) Photography. This is the best way to record the climb in combination with an informative diary. Take photographs at each key point looking in both the directions on the route and note down the time and location of the photograph. Use of Telephoto and zoom lenses is very useful while recording other climbers on the mountain. It is useful to take photographs of major formations from below and above so that they can be co-related to the other features on the

mountains. It is important to take panoramas from campsites and specially from the summit. A 360' panorama will give absolute proof of the climb. It would be possible to co-relate the nearby peaks with the climb from the panorama. Apart from this panoramas of summit views are cherished memories.

(c) Leave proof of being there. This would be in the form of making a small cairn or leaving some marker, equipment as proof of having reached the particular location. A good example of this is the Chinese tripod on Everest.

3. **Post Expedition** :

All the information generated on the climb needs to be put in a presentable and systematic manner to make an interesting and informative account of the expedition.

(a) Compiling all the data. All the members need to contribute their information collected on the climb to any one person who is good in communication skills to compile the data and record the total climb.

(b) Any differences in opinion between members on the aspects of a) activities of the days, b) timings, c) features and difficulties, d) weather pattern etc. should be reconciled to give the correct perspective of the climb. For example a person who may not be in good health on a particular day will find the climb on that day more difficult than another climber who may be in good health and spirits.

(c) Writing the account. The account should be written with an intention to give maximum information on the climb and to keep the interest of the reader. Depending on the expected readership, the writer must decide the level of technicality to go into. For a mountaineering journal, the writer need not explain mountaineering terminology. It must include details of the climb in a logical and chronological order. The data collected: timings, heights, features, difficulties, must be included in the expedition account.

One needs to be very careful while giving the direction of faces, ridges, glaciers, in relation to the peak. This causes a lot of confusion. You must consider the directions as if you were standing on the summit. From the summit the face going down towards East is the East face of the peak, the ridge going west is the west ridge of the peak and so on.

A similar problem is faced while naming banks of glaciers and river.

The correct nomenclature is as follows. As you look down the river or glacier, the right bank is the true right of the glacier and the left bank is the true left of the glacier and should be recorded accordingly.

A NOTE ON PUBLICITY :

A lot of people consider publicity improper and unethical. Publicity is an important aspect of recording climbs if it is done truthfully. There is a tendency to exaggerate an expedition account to gain news value. In the process one does more harm to the sport by sensationalising events which may sometimes lead to accidents or deaths. However proper and truthful publicity improves the general awareness on mountaineering amongst people and provides support for this activity.

MOUNTAIN PHOTOGRAPHY AND SLIDE SHOWS

Vineeta Muni

There are many modes of communication, but the most powerful medium is the visual. Thus photographs that depict wonders but realities of nature are appreciated.

The basic requirement of photographing any object is a camera. For mountain photography, mechanical shutter cameras are better than electronic cameras. In an electronic shutter camera, the shutter mechanism works only on batteries, at high altitude due to extreme cold, the batteries freeze and the shutter tends to jam. However a mechanical shutter camera can still take pictures by ones own judgement about exposure. While climbing one can also carry an autofocus camera for quick snaps.

Along with the camera, there are few other accessories which help in creating pictures. These are as follows.

1) Lenses: The choice between lenses is very vast but depending on personal liking one has to select the lenses. The normal lens (50mm) gives ideal view. In case of mountain photography it is the ideal lens because it gives the normal perspective of the scene as seen by our eyes. For the details of a particular spot on a peak or for the sake of photographing close-up of its beautiful features, one has to depend on zoom or telephoto lenses.

2) Filters: In the Himalaya for a climber, snow and ice is often a foreground or a background while taking a picture. U.V. (Ultra Violet) or Skylight filter and polorising filter help to give better results. U.V. or Skylight filter cuts down haze produced by reflected light from the snow thus creates a clearer picture. Polorising filter intensifies the blue sky thereby adding depth to the picture.

3) Lens hood: This is a useful accessory to prevent 'flare' in a picture caused while taking pictures against the sun.

4) Tripod and cable release cord: These are of good assistance while photographing with low shutter speeds. Instead of a tripod, one can also use an ice-axe attachment.

4) Cleaning kit: While moving on the moraine or barren landscapes, one often finds a thin layer of dust particles on the lens and even on the camera body. A small blower does the cleaning job fast

and effectively. A cleaning kit is useful for general maintenance of the camera and the blower is useful to get rid of dust on the lens without having to touch it.

Exposure Readings :

Suppose you are taking a picture of a climber on a snow slope, and sky is in the background, in order to get the climber properly visible in the picture, whether one should take exposure reading of the sky or of the snow or of the climber ?

If one takes the reading of snow and/or sky, the figure in the picture becomes very dark. A photographer must choose the correct exposure depending on the results desired by the photographer. A camera cannot think on its own, thus while taking a photograph of a person in such a situtation, the camera is tricked by the glare entering the lens. In order to compensate for the glare, it shows a low exposure reading. Such pictures would come under exposed. In order to get a clear picture of the climber, the photographer should give one to two stops more exposure than what is indicated by the exposure meter of the camera. In case of automatic cameras, one can use the over-ride facility or divide the ASA speed of the film by 4 i.e. if the film speed is 400 ASA, set the camera dial on 100 ASA for that particular picture, retain the correct setting of the dial for the other pictures, and process the film as normal.

Depth of Field :

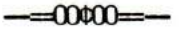
At any given aperture, the range within which the picture is in sharp focus is the depth of field for that aperture. For a high aperture like 16 or 22, you get a good depth of field and for a lower aperture like 1.4 or 2 you get a very small depth of field. This can be used very creatively by a photographer. When you want that the climber, who is very close to you, as well as the mountain in the background remain in sharp focus in the picture, you must select a high aperture. If you want that only the main object of the picture should be in focus and the background should be blurred, you must select a low aperture. The exposure should be compensated by changing the shutter speed.

Slide Shows :

Let us see how to select our photographs while adding flavour to our story for a slideshow. There are many aspects to a slideshow. People who will come to see the slide show, will not be only climbers. The slideshow which covers cultural information, flora and fauna of the area, campsites on the treks and general terrain of the place or even funny incidences on the expedition, is more lively. One can also show any experiment or research done on a trip. Along with slides of the area, if

slides of sketch maps and prominent land marks of the area are shown, it becomes more informative and a climber or a non climbing viewer can comfortably identify the peaks and easily understand movements on the mountain. Showing slides according to the sequence, in which the events occur, builds up the story and also avoids confusion. Repeatition of photographs also mars the effects. Many times a good photograph speaks volumes with just visual impact. Let the viewers feel free to wander into your pictures and experience their own emotions while appreciating the bounty of nature. Little bit of humour also adds salt and pepper.

In mountains the photographer is like an artist who creates images of his or her feelings for the mountains with his or her photographs and shares them in the slideshow with the audience expanding new horizons for all.



MOUNTAIN SICKNESS AND TREATMENT

Dr. Ravindra Rupwate
M.D., D.N.B.E.

HISTORY :

Since World War-II there has been extensive study of many of the aspects of mountain medicine with the results that the causes of the various disorders are much more clearly understood and treatment methods have been developed to minimise their impact. Mountaineers who have spent long periods at high altitude without experiencing serious disorders do not appear to suffer any lasting or long term effects.

During the winter of 1960-61, a team of medical scientists, physiologists and mountaineers carried out an extensive research programme into the long term effects of high altitude on man in the Everest region. Laboratories were placed at Mingbo 13,000 feet, Green hut 17,500 ft. and Silver hut 19,000 ft. for 4 months from December to March. Here it was confirmed that physical and mental conditions of the man deteriorated after a long term residence at 19,000 ft. despite comfortable accomodation and adequate food and fluid intake.

Recently Indian Scientists have made a number of useful contribution in this field, following armed conflict with China in 1965, when high altitude posed a great threat to soldiers.

CLIMATE AND THE ENVIRONMENT IN MOUNTAINS :

(1) **Barometric Pressure and Altitude**: Air is a mixture of gases mostly Nitrogen (78%), Oxygen (21%), Carbon Dioxide (0.03%) and other trace gases (0.97%), which exert their partial pressures to form the total atmospheric (Barometric) pressure of 760mm Hg at sea level. Thus the pressure exerted by Nitrogen is 590mm Hg (78% of 760mm Hg) and Oxygen 160mm Hg (21% of 760mm Hg) at sea level. These pressures decrease as one ascends to high altitude due to low barometric pressure which also depends on changes in weather conditions, season and latitude.

It has been shown that man can adapt to Oxygen lack within a range of atmospheric pressure from normal sea level (760 mm Hg) to 28,000 ft. (246.8 mm Hg) where it is just one third of that at sea level. However he can live permanently only within the range from sea level to 17,500 feet where the atmospheric pressure is about half that of at sea level.

(2) **Temperature**: The temperature falls by 3°F for every thousand feet of ascent which means that independent of latitude the higher the

altitude the colder it will be: e.g. temperature of-40°F can be postulated at 27,000 feet in winter months. With increasing height fall in temperature has both seasonal and diurnal variations. In tropical latitudes the seasonal change is small and diurnal variation is more important but at higher latitudes seasonal change is large and diurnal variation is less important (C = temperature in Celsius, F = temperature in Fahrenheit).

(3) **Wind**: The wind in combination with temperature gives the so called wind chill factor which is of extreme importance. The chilling effect of a 30 mph (48 km/hr) wind at temperature of 30°F causes freezing of human tissues in just 30 seconds (Americans rule of 30-30-30). Wind speeds of 100-200 miles/hour are regular features in the mountain environment. Additionally high wind velocities also interfere with mountain travel causing increased energy utilisation and fatigue.

(4) **Rain & Snow**: Rain & Snow fall in mountain regions is variable. It may be sudden and considerable which can cause land-slides, avalanches and have catastrophic effects on mountain settlements and communications. In Himalaya rainfall is considerable on southern slopes but a few miles away to the north in Ladakh and the Tibetan Plateau rainfall is low and desert conditions prevail.

(5) **Humidity**: Absolute humidity is the amount of water vapour per unit volume of gas at the prevailing temperature. This value is extremely low at high altitude because the water vapour pressure is decreased at low temperature. This low absolute humidity at high altitude frequently causes dehydration.

(6) **Solar Radiation**: The intensity of Solar radiation increases at high altitude for two reasons:

i) thinner atmosphere absorbs less of Sun's rays, especially those of short wave length in the near Ultra-violet region of the spectrum.

ii) reflection of the Sun from snow greatly increases radiation exposure (snow reflects upto 90% of UV radiation compared to 9-17% reflected from ground covered by grass). They can have damaging effects on exposed skin surfaces and unprotected eyes.

ENERGY RELATIONSHIPS :

The most distinctive feature of a living organism is its utilisation or transformation of energy. Man has a dynamic relationship with his

environment and for that reason it is necessary to expand energy continuously. Body movements require energy expenditure over and above basic needs which is met by extra demand for food and Oxygen. In the absence of body movements certain minimum energy is necessary (called basal metabolic rate: BMR) to support life this is gained by assimilation of food and Oxygen. But physical activity, age, sex, climate, diurnal and seasonal variation affect the metabolic rate.

1. **High Altitude and Metabolic Rate:** Basal metabolic rate is slightly increased in both men and women at high altitude. A small increase in metabolism at 12,000 feet is attributed to extra cost of ventilation.

   Exposure to hypoxia and cold in sea level visitors for six weeks brings rise in metabolic rate and on getting acclimatised to hypoxia the raised BMR comes back to normal.

   Long term acclimatisation to great altitude (19,000 feet) is associated with a raised metabolic rate and high altitude natives have a significantly higher metabolism in comparison with sea level visitors.

2. **Acute Exposure:** Acute exposure to altitude results in anorexia (low caloric intake) loss of weight, decreased blood glucose and changes in electrolyte metabolism. These changes are similar to those seen in starvation. More gradual exposure to altitude results in diminution of anorexia and subsequent consequences. A high carbohydrate diet causes reduction in severity of symptoms of high altitude and mountain sickness due to adequate availability of glucose necessary for brain cell metabolism.

   Above 17,000 feet: Continued and prolonged residence at and above this level leads to blunting of appetite and decreased food intake weight loss and muscle wasting.

   The ability to maintain bodyweight is the best index of adequate acclimatisation. At 19,000 feet an average weight loss of 1-3 1b/week is seen in visitors and rapid weight loss can result in mental and physical deterioration.

   Dietary preference at high altitude: At high altitude desire for sugar increases and that for fat decreases. There is craving for fresh rather than tinned or freeze dried food.

RESPIRATION :

At high altitude the main responses to changes in barometric pressure are those concerned with the effects of hypoxia, though low barometric pressure itself, apart from hypoxia, may contribute to these adjustments.

Changes occur at each stage in the transport of Oxygen from atmosphere to the body tissues.

(1) The process of respiration for simplicity is divided into three phases :

i) Movement of air from atmosphere to the lungs.

ii) Transport of Oxygen from the lungs to blood and excretion of carbon dioxide from blood to the atmosphere.

iii) Oxygen intake and utilisation by the tissues of the body.

(2) The composition of atmospheric air and air in the lungs differ for various reasons :

i) Dry atmospheric air that enters the lungs is humidified before it reaches the lungs for gas exchange.

ii) Oxygen is constantly absorbed in the lungs.

iii) Carbon dioxide is constantly exhaled by the lungs.

At normal body temperature (37°C 98.6°F) the partial pressure of water vapour is 47 mm Hg. when fully saturated. This is independent of barometric pressure and thus does not change with altitude. Since total pressure of air in lung cannot rise above 760 mm Hg. the addition of 47 mm Hg. of water vapour reduces correspondingly Oxygen and Nitrogen pressures. Because Oxygen is being continously removed from the inspired air and carbon dioxide is added, the partial pressure of Oxygen (PO2) in alveoli (gas exchanging peripheral unit of the lung) is 100 mm Hg. If this alveolar ventilation fails, the alveolar PO2 falls and if it is increased, the alveolar PO2 rises. This is important because as altitude rises the barometric pressure falls with a corresponding fall in alveolar PO2.

(3) Three structures are involved in the mechanics of respiration viz.:

i) Chest wall.
ii) Respiratory muscles.
iii) The lungs.

The chest wall and lung have an elasticity for which there is a position of rest i.e. if the chest wall is compressed or expanded, it returns to the position of rest.

Normally an adult body consumes about 250 mls. of Oxygen per minute and respiratory muscles use 1-3 percent (i.e. 2.5 to 7.5

ml. minute) of the total Oxygen used by the body. At higher altitude and higher level of work a higher Oxygen uptake is seen and this suggests that Oxygen cost of ventilation is higher. Above certain critical level further increase in ventilation makes no more Oxygen available to the muscles without lowering of partial pressure of Oxygen. The respiratory work is such that Oxygen gained is all used by respiratory muscles and therefore the sherpas trained at a very high altitude are at a distinct advantage due to greater efficiency than others, in utilisation of Oxygen.

Water is constantly being utilised for humidification of air from the upper respiratory tract before it reaches the lungs. At high altitude when ventilation is greatly increased loss of water from the upper respiratory tract is an important factor in dehydration and drying of mucosa of upper respiratory tract and may predispose to infection and bleeding.

The first adjustments to high altitude to be clearly recognised is increase in number of the red cell and hemoglobin content of the blood. The highest increase takes place in seven to fourteen days after exposure and continues for about 8 months later. High altitude natives living at high altitude have a daily red cell production about 30 percent higher than that of sea level subjects.

At tissue level the number of mitochondria (which utilise Oxygen for cellular functions) and myoglobin (present in muscles of the body/for Oxygen utilisation) content is increased at high altitude.

(4) **Ventilatory Response to Hypoxia**: Clinically the most obvious change on ascending to high altitude is an increase in the rate and the depth of respiration. The initial change is in the depth (volume of air moving in and out with each breath) rather than the rate of respiration.

Sudden exposure to altitude in un-acclimatised man an increased rate does not occur till a height of 12-13,000 feet. There is individual variation and in some, increase in respiration can occur even at 3-4,000 feet.

(5) **Hyperbaric Oxygen**: Normal respiration maintains the PO2 around 96 mm Hg. and PCO2 around 40 mm Hg. in the blood even though Oxygen requirement varies from as little as 100 ml/min. in sleep to 2-3 lit/min. on strenuous exercise. Almost all Oxygen is carried by hemoglobin with red blood cells and only 0.3% is carried dissolved in plasma at 1 atmospheric pressure (i.e. 760mm Hg. at sea level). If PO2 rises above 100 mm Hg. (i.e. hemoglobin is fully saturated), the amount of Oxygen dissolved in plasma increases.

CIRCULATION :

The cardiac output is the product of the heart rate (beats/minute) and stroke volume (amount of blood ejected at each beat).

In acute hypoxia or exposure to high altitude there is increase in cardiac output due to rise in heart rate rather than stroke volume. Even at 4,000 feet height increase in heart rate is observed in as high as 25% individuals though there is no hypoxia. At 7-9,000 feet and above, in unacclimatised subjects at rest, the increase in rate is gradual upto 14,000 feet but then rises steeply with every 1,000 feet of ascent. In this there is marked individual variation and in physically fit individuals the rise in rate is smaller. If the subject remains at altitude and atmospheric PO2 remains constant at that altitude, the raised pulse rate (heart rate) tends to revert back to its normal sea level rate. This adjustment is possible till 15,000 feet but above this height even in acclimatised man there is always an increase in heart rate even at rest. The rate returns to normal immediately when the person descends to sea level. However if acclimatisation has taken place, the heart rate may remain lower than normal for some days after return to sea level.

(1) **Cardiac outout (Stroke volume)**: At an altitude above 14,000 feet the cardiac output slowly increases over a period of 4-5 days reaching 50% above its sea level value. It then slowly declines to normal level as hemoglobin concentration increases to compensate hypoxia.

(2) **Cardiac dilation (Heart Enlargement)**: Examination of mountaineers going to very high altitude (26,000 feet) without Oxygen have shown enlarged hearts and changes take 3 weeks to return to its normal level at altitude.

(3) **Blood Pressure**: Individuals with normal health who go to 14,000 feet or higher showed no changes in blood pressure. In contrast the high altitude natives have low blood pressure. But a rise in blood pressure is a sign of inadequate acclimatisation.

(4) **Peripheral Circulation**: The basic function of peripheral circulation is provision of nutrients to the most distal parts of the body. The blood flow in peripheral vessels is determined by internal friction i.e. viscosity of blood. In cold climate and at high altitude due to rise in hemoglobin concentration the viscosity of blood rises and hence the blood flow decreases. Further, velocity of blood flow varies directly with arterial blood pressure.

In both, visitors and natives, the blood flow in the skin of the hands and feet is lower at high altitude than at sea level and the same level persists for months, reverts back to normal on

descent. Administration of Oxygen does not reverse this decrease in blood flow at high altitude. These factors are very important for the development of frost bite.

EXERCISE AT HIGH ALTITUDE :

The most important factor that limits muscular activity is the rate at which the muscles of the body can be supplied with oxygenated blood and this depends on circulation and respiration.

(1) **Tissues:** At the start of exercise tissue need of Oxygen is more than that supplied by circulation and under normal circumstances the limiting factor is the rate at which Oxygen can be supplied by blood stream. In aerobic conditions primary and product of metabolism is pyruvic acid. But if the level of exercise exceeds the Oxygen supply or if there is inability of tissues/cells to use Oxygen, under this anaerobic condition, lactic acid gets accumulated. When exercise begins, Oxygen consumption rises rapidly and continues at raised level when the exercise is over. Under hypoxic conditions (e.g. at high altitude) the maximum Oxygen intake falls and lactic acid formation takes place at a corresponding lower level of work. Therefore, in all conditions lactic acid production reaches appreciable levels when the work load increases above maximum Oxygen intake.

After physical training there is lowering of blood lactate concentration at the same work, and this difference is marked when athletes are compared with non athletes. However, Oxygen uptake, ventilation, heart rate and blood lactate are all significantly higher for intermittent exercise than for continuous exercise for same work output.

TEMPERATURE REGULATION :

Every living organism produces heat and this heat is either retained by the body or dissipitated to the environment. If the heat content of the body increases the body temperature rises and as a result transfer of heat to environment is increased. Thus every animal tends to reach a steady state of heat exchanged with the environment.

Normal rectal temperature is taken as 37°C (98.6°F) and oral as 36.7°C (98.1°F). Variation of 0.5°C from a mean temp. can be expected in healthy individuals.

The modes of heat exchange between body and environment are Convection, Radiation, Conduction and Evaporation.

(1) **Convection:** Transfer of heat by bulk movement depends on temperature gradient between the body surface and ambient air. The rate of heat exchange depends on amount of exposed surface of the body.

i) **Posture:** The exposed surface area of the body is less than total surface areas as parts such as axilla, perineum, inner surface of things do not contribute to heat exchange by convection. Curling up of the body reduces this area and helps conserving heat.

ii) **Wind:** The rate at which convective air currents bring air to body surface is important. Heat loss by convection is much increased by air movements (wind) and is major avenue of heat loss in mountains.

The insulating value of clothes depends entirely on trapped still air which acts as efficient insulator. Despite the use of Wind Proof outer clothing some wind penetration does occur and causes considerable heat loss.

(2) **Radiation:** This is emission of discrete pockets of electromagnetic energy, photons, from a warm surface and heat loss or gain by radiation is independent of air movement. The greatest source of radiation is the SUN. In clear air of polar regions or on the high mountains with snow forming a reflector the radiation effect is enhanced.

Black clothing absorbs 88%, Khaki 57% and white 20% of solar radiation as remaining gets reflected.

(3) **Conduction:** Heat transfer by direct contact. Water is a good conductor of heat and thus loss of heat can be controlled by keeping the clothes dry, as wet clothes can give more heat loss. Drinking hot water will transfer heat to the body. Contact of the body with good conductors e.g. metals, snow causes heat loss. Therefore in an accident when bivouac is necessary, direct contact with snow should be best avoided.

(4) **Evaporation:** Of the total heat loss in man, about 20% is by the evaporation from skin and respiratory tract.

At high altitude the increased respiration of cold dry air causes drying of respiratory passage and injury to mucosa. This is causative factor for dry cough of high altitude and also predispose to respiratory infections.

ACCLIMATISATION & DETERIORATION AT ALTITUDE :

There is great individual variation in the rate and degree of acclimatisation. The ability to acclimatise appears to improve with each successive visit. The newcomer however, fit is more affected than those who had earlier previous visits. The rate of acclimatisation has no bearing on ultimate performance and slow acclimatisers may ultimately become fit.

The rate and degree of acclimatisation seem to be improved by exercise below 15,000 feet and high carbohydrate diet. Age is an important factor and in general early thirties is the best age for very high altitudes. Women acclimatise as well as men, though fat subjects may adapt slowly.

Though acclimatisation occurs upto 23,000 feet the effects of deterioration become more marked for every thousand feet above 17,500 feet. Below 17,500 feet very long periods of stay are necessary for high altitude visitors to have same exercise performance as high altitude natives. Acclimatisation does not persist long after return from high altitude and climbers can suffer same degree of mountain sickness on returning to high altitude within months of their previous ascent.

At high altitude physical performance appears to deteriorate over a period of time. There is increased ventilation, loss of appetite and weight. One of the simplest indications of adequate acclimatisation is the possession of good appetite and maintenance of weight. All these changes are attributed to hypoxia and intestinal mal-absorption.

(1) **Mental Performance** :

i) **Memory:** An increasing impairment of memory occurs with altitude. The inability to remember names and numbers has been noted.

ii) **Mental Ability:** Mistakes in calculations are common and all mental activity requires a greater effort to initiate and carry on work than at sea level. Sleep is accompanied by unpleasant dreams and nightmares.

(2) **Clinical effects of high altitude** :

The clinical effects of high altitude differ with each individual, the rate at which he is exposed to low barometric pressure, the period that he spends at each altitude and the height he attains. In the majority of people successive ascents are associated with less disturbances. At 17500 feet high altitude deterioration starts and becomes progressively more rapid with increasing altitude.

8,000 to 12,000 feet

In majority those ascending on foot the fully developed Acute Mountain Sickness is not seen. About 50% people notice following symptoms :

i) Rise in pulse rate.
ii) Increase in respiratory rate.
iii) Slight headache, light headedness and irritability.

12,000 to 18,000 feet

The acute symptoms are seen as oxygen concentration is considerably reduced. Majority suffer adverse symptoms.

i) Breathlessness.
ii) Muscular weakness.
iii) Lassitude with reduced endurance.
iv) Severe headache, loss of appetite, nausea and vomiting.
v) Craving for certain food.

18,000 to 22,000 feet

i) Physical endurance of climbers is reduced.
ii) Undue muscular fatigue.
iii) Deterioration becomes more rapid.

22,000 to 26,000 feet

i) Weakness, fatigue, shortness of breath are more marked.
ii) Considerable impairment of mental performance with lack of initiation.

Above 26,000 feet

i) Severe air and water hunger thirst.
ii) Physical and mental depression.
iii) Impairment of insight and judgement.
iv) Marked weight loss.

ACUTE MOUNTAIN SICKNESS :

Illness due to hypoxia (less of 02) is due to the result of response to physiological stress rather than a separate disease entity at high altitude.

The term acute mountain sickness is a clinical condition characterised by symptoms of a general nature which include headache, lassitude, weakness, nausea and vomiting which occur within a few hours of ascending to altitude. Sudden exposure to great altitude may cause death.

As one gains height, the rate of respiration increases in 48 hours. After 5 days a deeper breathing (depth) at normal rate occurs. The main complaints are pertaining to CNS (Central Nervous System) and GI (Gastro Intestinal) system. Symptoms occur within a few hours of exposure to an altitude of 10,000 feet and are common if ascent is rapid. Ascent on foot are usually associated with less symptoms. The symptoms reach maximum severity in 24 to 48 hours and then recede over next 2 to 4 days. By the end of the 5th day the individual is usually symptom free.

Headache is usually frontal in location and there is increasing lassitude, fatigue and weakness. This is associated with undue breathlessness on exertion, dizziness and palpitations.

Sleeplessness at night associated with nightmares is a common feature. Sleep is usually not beneficial and the individual wakes up feeling tired.

The hands and feet may feel cold and there is cyanosis (bluish discolouration) of lips and distal fingers of hands and feet.

Some individuals become very depressed and there may be auditory and visual impairment.

Appetite is poor, nausea and vomiting common and the lack of food intake leads to more weakness.

There may be bleeding from the nose or from lungs but this is not a common feature.

Treatment: In general those who ascend slowly do not suffer from mountain sickness. A high carbohydrate and fat diet is advisable. Normal food and fluid intake is to be maintained. The exact cause of mountain sickness is not known but fluid retention in various organs of body plays a major role. Drugs like Acctazolamide (Diamox) in doses either 250mg. three times a day or 500 mg. (low acting preparation) once a day from 10,000 feet onwards is found to be extremely useful. It causes stimulation of respiratory centre in brain by decreasing pH of blood (acidic PH) and increasing ventilation to provide adequate Oxygen to each and every cell of body. Gradual attainment of height is a must. The best treatment is rapid descent and subject is to be taken to as low level as possible at the earliest which helps him/her the most.

Once fluid retention develops (e.g. in lungs - pulmonary oedema) diuretices like Lasix are important for fluid loss. If available, moist nasal Oxygen is started in critical situations.

After 15,000 feet daily height gain should not be more than 1,000 feet. Once a new height is gained at least 48 Hrs. should be spent there before

next higher height is to be gained. Any time if symptoms of altitude sickness develop, subject should come down to 12-14,000 feet for rest before again going back to higher heights.

HIGH ALTITUDE PULMONARY OEDEMA (H.A.P.O.) AND CEREBAL OEDEMA :

The exact mechanism of HAPO is not clear but reduced 02 tension by some unknown mechanism leads to congestion in the lungs (increased fluid content).

Clinically males in early twenties and thrities are at greater risk than females. Sudden exposure with hard exercise is precipitating factor. Most cases occur at 12 to 15,000 feet within 12 to 72 Hrs. of ascent. Individual susceptibility occurs and recurrent attacks in same individual are reported.

Symptoms :-

- Initially irritative dry cough.
- Sudden breathlessness at night on lying down, relieved in upright posture (Paroxysmal Nocturnal Dyspnoea, PND).
- Undue fatigue, weakness and increasing shortness of breath.
- Later cough with blood tinged sputum (hemoptysis)
- Headache, nausea and vomitting.

There is increased heart and respiratory rate with Cyanosis Blood pressure is maintained but auscultation of lungs reveal crepitations (bubbling sounds due to increased fluids in the lungs).

X-ray chest and ECG facility if available show corresponding changes.

Cerebral Oedema can also occure in rare cases. It is due to fluid collecting within the brain.

Symptoms :-

- Irrational behaviour.
- Drowsiness
- Confused state of mind lasting over a period of hours.
- Unsteady gait.
- Double vision. (Diplopia)

Prevention and Treatment for HAPO and Cerebral Oedema: Adequate time should always be allowed for acclimatisation. On arrival at altitude

period of rest and relative inactivity is advisable. Patients with acute respiratory tract infections and with indications of altitude sickness should not be allowed to ascend to higher altitude. Any undue cough. shortness of breath, mental changes, hemoptysis (blood in sputum) must be regarded as having pulmonary oedema and treated immediately.

Curative: Subject is kept in sitting position, He/She must be taken rapidly to lower altitude with available transport to nearest medical centre. Continuous moist nasal 02 is a must. Diuretics like lasix (Frusemide) should be given orally or injectable depending upon gravity of the situation. Food and water intake is maintained throughout.

PERIPHERAL OEDEMA :

Fluid retention causing swelling of an arm, a leg or the face, is sometimes noticed on waking or after a long march. This usually subsidies over several days and does not herald Pulmonary or Cerebral Oedema.

RETINAL HAEMORRHAGES :

Haemorrhages into the retina (minute blood/vessels in the back of the eye) are known to occur quite commonly around 10,000 feet but very rarely cause any problems, being unnoticed by the subject and visible only to trained with specialist equipment. Very occasionally these tiny haemorrhages interfere with vision (causing a "hole in the vision"): descent is advised. Complete recovery is usual.

COLD INJURY :

Local cold injury may be classified under three heads.

i) **Non-freezing:** Temperature above freezing but below 15°C. This immersion hand or immersion foot is often seen when the hands or feet are kept immersed in water above freezing point.

ii) **Freezing:** At temperature below freezing. The tissues of the body freeze and crystals form between the cells. This is called frost bite.

iii) **Variables:** When local cold injury affects the limbs, the degree of cold injury may vary, as more proximal and deeper parts of the limb are warmer than distal and superficial areas. Limbs with severe cold injury therefore show patchy distribution of blackened tissues and nerves are mainly affected.

The climate of mountain area is particularly prone to produce cold injury. The temperature drops 3°F per every 1,000 feet of ascent.

High wind velocity, changes in climatic conditions such as storms, rain, hail are dangerous especially in winter. With care and precautions frost bite can be avoided. Improvement in technique, equipment, clothing have resulted in increasing popularity of winter climbing throughout the world.

High altitude adds more problems due to :-

i) Hypoxia - Leading to forgetfulness, thus vital equipment like gloves may be lost or not worn.

ii) Ability to work is diminished so heat production is inadequate.

iii) Increased ventilation with reduced Oxygen tension can predispose to respiratory muscle fatigue.

iv) Loss of appetite, weight with loss of subcutaneous fat decreases protective cover.

v) Increased red cell number (polycythemia) due to hypoxia, dehydration due to hyperventilation increase blood viscosity. This causes decreased blood circulation and impairment of tissue nutrition.

vi) Cold induced vasoconstriction is an additional factor.

vii) Individual excessive reactivity to cold may enhance frost bite helped by ill fitting shoes.

Accidental Hypothermia: Hypothermia is defined as a lowering of the temperature of the body below 95°F. Whatever may be the external temperature, the body always keeps its internal temperature constant for optimum functioning. Exposure is not a strict term but denotes serious effects that result from exposure to climatic hazards, especially to cold environment.

Most of the persons affected by hypothermia have ony vague complaints and minimal physical abnormalities. Failure to recognise and treat hypothermia can be very dangerous. Mild hypothermia can progress to profound hypothermia with core temperature (temperature of internal vital organs which is 1°F higher than oral temperature) dropping to 90°F and if not managed properly this could be lethal. Diagnosis is only by means of measured body temperature. It is best to prevent hypothermia and cold injuries than to treat them.

Symptoms :

Mild Hypothermia: (body temperature from 95°F to 91°F) feeling of cold, shivering, loss of interest in any activity, clumsiness, stumbling, inability to keep up with the group.

Profound Hypothermia: (body temperature from 91°F to 86°F) Semiconscious, cardiac arrhythmics, muscular rigidity. (body temperature from 80°F to 78°F) unconscious, pupils dilate, reflexes absent ventricular fibrillation (body temperature below 70°F) death. Propound Hypothermia can mimic death.

Adolescent and young people are greater risk as :

i) Emotionally less mature, panic more easily, use up more energy and become fatiqued, forget to take correct measures to combat hypothermia.

ii) They are less willing to conserve energy and so exhaust it more rapidly.

iii) Some have very little subcutaneous fat and are less well innulated against cold.

It is essential that enough warm and wind proof clothing is available. Wet clothing has its insulating value reduced by 90% or more and reserve dry clothing should be available. Maintain adequate food and fluid intake.

Treatment: It should be again noted that hypothermia can kill the person in two hours. The individual is placed sheltered from wind. Dry clothing should be kept next to the skin. Gradual rewarming is preferable, patient should be put in a tent, polythene bag, sleeping bag. If conscious, he should be given warm fluids and easily digestable food such as gluose or sugar. If necessary mouth to mounth respiration. Cardiac message should be tried. (An intensive care unit is the best place to treat these patients).

If sudden lowering of temperature has occured rapid rewarding by immersion in a bath of water heated to 104-100°F if naked, 112-115°F C if clothed is a method of choice. The patient should be kept in bath until he feels warm and then placed in warm bed whenever available, Oxygen should be given. The rewarming should be done very slowly and carefully only by a competent doctor capable of handling such emergencies.

(2) **Frost bite and Immersion Injury:** Frost bite: Occurs when the tissues freeze and ice crystals form. Tissues are damaged more easily by freezing than by non-freezing cold injury. The true freezing point is approximately -0.50°C. The superficial tissues at the site of contact freeze to a depth which depends on the period of contact and degree of cold. Immediately below this zone damage occurs to the wall of blood vessels and plasma exudes out

forming blisters. Increased viscosity and vasoconatriction lead to further blood flow reduction. Crystals effect cellular enzyme mechanism and subsequently cause cell-death. Observations suggest that the dry gangrene of frost bite appears thickest where pressure is more e.g. on heels, tips of the toes where contact with shoes is most pronounced. Tissues vary in their resistance to frost bite. Skin muscles, blood vessels nerves are highly susceptible but bone, tendons, cartilage are relatively resistant.

Certain modifying factors such as wetness of skin surface due to sweat, immersion in water wind velocity, length of time of exposure decide the location of frost bite.

i) **Frostnip**: Frost bite causes permanent damages to the tissues but with frostnip the changes are reversible. The skin blanches and becomes numb with sudden and complete cessation of the cold sensation and discomfort. Tingling sensation occurs on re-warming and with immediate treatment frostnip will not progress to frost bite.

This condition commonly occurs on the exposed portions of the body such as check or nose. Each person should keep a watch for the signs occurring in other members of the team and as soon as whitening occurs, it should be treated immediately. The affected area is rubbed warm by hand and gloves in a sheltered place and normal work is resumed once colour and consistency are back to normal.

ii) **Superficial frost bite:** Only the skin and adjacent subcutaneous tissue are involved. The frozen part though white and frozen on the surface is soft and pliable when pressed gently. After rewarming it becomes numb, mottled, blue or purple and it will then sting, burn or swell for a period. Blisters may occur where tissue is lax e.g. fingers. The blister fluid is slowly absorbed, skin hardens and becomes black giving thick insensitive area. In certain areas blackness occurs without blisters. Throbbing or acting persists for weeks. The black part later peels off bit by bit over months. The nail may be lost and grows again with normal or wrinkled appearance. The area left after peeling of black area is red and abnormally tender with increased sensitivity to heat and cold. In 2-3 months it takes the appearance of normal skin.

iii) **Deep frost bite:** Besides skin and adjacent tissues deeper structures such as muscle, bone, tendons etc. are also involved.

Affected part is cold, mottled, blue or gray and is swollen for months. Initially it may be painless but shooting and throbbing pain occur subsequently. As tendons and muscles are affected late in the process, patients can still move the fingers and joints. Eventually the area sloughs off and cast of finger with nail separates out.

Prevention: Intelligent appreciation of the fact that exposure to cold may lead to frost bite is the best protection. Adequate, dry protective clothing is a must. The fingers and toes should be continuously moved for better circulation. Any injury to them should be avoided. Shoes should not be tight fitting and climbers should avoid dehydration.

Treatment: For many years rubbing the affected part with snow has been advocated but this is now, proved to be harmful as it leads to breaking of skin & subsequent infection. Vasodilator drugs like Pentomyphylline (trental) are found to be useful in improving circulation of the body and can be given as injections or orally.

Giving supplement Oxygen at high altitudes and hyperpatic Oxygen at low altitude is very helpful to prevent cell death. A diagnosed cases should be treated in well equipped camps or in hospitals. Care of a person: Most important factor is to keep his/her moral high. Generalised rewarming is started by giving warm liquids orally. The patient should be kept in a sleeping bag. Adequate food and fluid intake is maintained. Alcohol in small quantity will help by causing vasodilatation and by diminishing pain. Broad spectrum antibiotics for preventing infection are started. Mildanalgesies (pain killers) may be used to mitigate pain in proper doses.

Care of affected part: The affected part should be warmed using a container with water at 112°F (44°C). thermometer should be used to check the temperature as hot water will lead to tissue damage and infection. Rewarming should last about 20 minutes each time. Affected part is kept on abdomen or armpit for warmth. It should never be placed never be placed too close to the open fire. After rewarming the part is cleaned gently. Blisters should never be pricked but left alone as they form a natural covering over the injured area. Swelling may be countered by elevation of affected part. Active movements should be carried out to prevent joint stiffening and if this is not possible, passive movements can be started. Generally it is better to move for a few hours with frozen, feet to a place fo safety than to thaw the feet at higher camp.

Surgical intervention should be minimal. In general, however, provided no surgical intervention occurs, the majority of cases seem to heal in 6 months to 1 year.

After effects: Once a part is frost bitten, it is more liable to cold injury, on subsequent visits. The skin usually becomes dry and cracks easily. Sometimes increased sweating in affected area is seen.

SNOW BINDNESS :

This is a misnomer as it is not caused by the snow but is a direct effect of ultraviolet rays affecting the retina of the eye temporarily. It is very painful but curable.

Precautions :

i) Always wear snow goggles/sunglasses of dark colour from morning till sun set even when there are clouds and no bright sunlight around.

ii) Always keep one spare pair of snow goggles. If you do not have one you can use green piece of cloth over eyes for short duration.

iii) If snow blindness has set in put soothing eye lotions, give cotton padding to the eyes and change it every 4 hours. Complete rest is advised. This treatment should continue for 40 hours.

iv) If eye ointment/drops are not available, wash the eyes with decoction of tea leaves or plain water and then pad them.

SUNBURN :

Severe heat causes sunburn on the face and lips due to direct heating effect of the Sun.

i) Grow beard, for lips use chap stick and do not rub frequently.

ii) Use of anti-sunburn cream is essential. Do not scratch the area if it is itching. Do not use soap to wash face frequently.

Lesions of sunburn heal immediately on return to low altitude.

ACCIDENTS :

The figures for the incidents of accidents and their morbidity and mortality are difficult to obtain. Judgement which depends on experience

plays a large part in accidents. Despite the increase in the number of accidents each year, which is probably explained by the increase in the number of people at risk, the number of casualties has remain the same i.e. the proportion of fatalities has fallen. This is probably due to better equipment, improved technique, use of safety devices, and a general improvement in knowledge. Other factors are an improvement in rescue facilities with help of search teams helicopter, use of more rescue points.

Generally causes of accidents can be subdivided into three categories :

i) Individual, ii) Equipmental, iii) Environmental.

i) **Individual:** The most frequent cause of an accident is fall and is immediate factor in 60-70% cases. Other immediate factors are loss of control while glissading, faulty use of equipment, over confidence, fatigue, poor judgement, contributing factors are inexperience and solo climbing.

ii) **Equipment:** Failure of equipment does occur but is rare, not likely unless improperly checked prior to excursion.

iii) **Environment:** Falling rock, lightening, avalanches etc.

More than half the number of accidents are seen below the age of 25 and as age advances with maturity and skill their percentage decreases.

MOUNTAIN HAZARDS :

There is no doubt that mountaineering like any other sport, has an element of risk and can occassionally lead to fatal outcome. But it does not mean that we should forsake it altogether. Now with the large expereinces gained from organised expeditions, development of new techniques, reliable equipment, with sensible planning the margin of safety has increased to a greater extent.

Mountain hazards can be classified under three headings :

i) Objective, ii) Subjective, iii) Psychological.

i) **Objective:** These are the hazards over which mountaineer has no control whatsoever. These include natural processes like land slides, avalanches, weather, rivers, streams, cascade of stone movements.

ii) **Subjective Hazards:** Subjective hazards are those hazards which are directly connected with the movements and activities of the climber. They are usually caused due to the ignorance of the They include slips and falls, snow blindness, frost bite, fatigue and sunburns etc..

iii) **Psychological Hazards:** They are related to mental and emotional problems of the mountaineer and affect party management, choice of route and companions, selection of equipment, appropriate technique, ignorance in lack of experience, absence or excess of confidence, exhibitions etc.

At the end it must be stressed that before going to the mountains check up for medical fitness is very important. This consists of tests for muscular strength, and cardio-respiratory endurance. On the mountain one must show greatest respect to mountain sickness, its prevention, identification and proper management.

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ALLOPATHIC MEDICINES FOR HIGH ALTITUDE TREKKING AND CLIMBING

Dr. Geeta A. Samant
M.D. (Bom)

FIRST AID KITS

It is not possible to design a really small 'First Aid Kit' which will offer drugs or equipment for all emergencies. The following list is helpful in selecting items for various high altitude programmes, ranging from simple treks to major expeditions. While selecting the drugs it is recommended that you discuss your requirements with your doctor.

INJURIES

Item	Trade Name
Cotton Gauze 2" x 2" squares adhesive dressing	Elastoplast
Crep bandages	Elastocrep 7.5 cm wide
Surgical tape	Zinc oxide strip, Elastoplast, Micropore (Various sizes)
Plaster of Paris	Gypsona
Self adhesive sutures	Steristrip
Silk sutures	3/0 Silk with cutting needles
Needle holder Forceps serrated Scissors	

Generic Name	Trade Name	Use
INFECTIONS		
Amoxycillin 250 mg. Cap. 1 Cap. three times a day.	Mox or Novamox	Respiratory infections, Skin infections
Ampicillin 500 mg. Cap. 1 Cap. four times a day.	Ampilin or Bacipen	- do -
Erythromycin 500 mg. Tab. 1 Tab. four times a day.	E-Mycin or Erythrocin	- do -
Co-trimoxazole 2 Tablets twice a day.	Septran or Bactrim	Respiratory, Skin, Urinary track infections.
Timidazole 500 mg./1000 mg. (D.S.) 4/2 Tabs. a day x 3 days.	Fasigyn-500/DS	Amoebiasis, Giardiasis.
Diloxanide 250 mg./500 mg. Metronidazole 200 mg./400 mg. 2/1 Tabs. three times a day x 5 days.	Entamizole or Entamizole Forte	Amoebiasis.
Albendazole 400 mg. Tab. 1 Tab. at bed time single dose	Bendex or Albezole	Worm infestation.
Mebendazole 100 mg. Tab. 1 Tab. twice a day x 3 days.	Mebex	- do -
Chloroquin 250 mg. Tab. 4 Tab. initially 2 after 6 hrs. 2 on second day. 2 on third day.	Lariago	Malaria

Generic Name	Trade Name	Use
GUT PROBLEMS		
Loperamide 2 mg. Tab., 2 mg. Cap. 2 Tab/Cap initially followed by one Tab/Cap. after every stool. Maximum 8 Cap./Tab. per day.	Lopamide or Imodium	Loose motion
Diphenoxylate HCl (2.5 mg.) + Atropine Sulphate (0.025 mg.) 2 Tabs every 6 hrs. till loose stools are controlled	Lomotil	- do -
Domperidone 10 mg. Tab. 1-2 Tabs. every 4-8 hrs. depending upon the condition.	Domstal or Gastractiv	Nausea, Vomiting, Dyspepsia due to gut problem
Cinnarizine 25 mg. Tab. 1-2 Tab. three times a day 2 Tabs. ½ hr. before starting the journey. 75 mg. Tab. 1 Tab. at bed time 1 Tab. ½ hr. before journey	Cinzan or Stugeron or Stugeron forte	Vertigo, Nausea, Vomiting due to vestibuler problem, Motion sickness
Domperidone (15 mg.) + Cinnarizine (20 mg.) 1 Tab. three times a day.	Stugil	Vertigo, Nausea, Vomiting due to gut/ vestibuler disturbances, Motion sickness.

Generic Name	Trade Name	Use
Mag. Trisilicate (500 mg.) + Alluminium Hydroxide (250 mg.) 1-2 Tab. 4 Times a day.	Gelucil	Hyperacidity, Peptic ulcer
Aluminium Hydroxide 840 mg. Tab. 1 Tab. 4-5 times a day.	Aludrox	Hyperacidity, Peptic ulcer
Ranitidine 150 mg. Tab./300 mg. Tab. 2/1 Tab. once a day at bed time.	Ranitin or Rantac	Peptic ulcer
Bisacodyl 5 mg. Tab. 2 Tabs. at bed time.	Dulcolax	Constipation

RESPIRATORY AND CARDIAC PROBLEMS

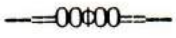
Frusemide 40 mg. Tab. 1-2 Tabs. in a single dose depending upon severity.	Lasix	Pulmomary Oedema, Cardiac failure
Inj. 10 mg. per ml. I.V. Single dose depending upon severity.		

Generic Name	Trade Name	Use
Salbutamol 2 mg. / 4 mg. Tab. 2/1 Tab. three times a day	Asthalin	Bronchial Asthama, Severe bronchitis with wheezing.
Theophylline + Etophylline 1-2 Tab. three times a day Inj. 2cc I.M. three times a day.	Deriphyllin	- do -
Acetazolamide 250 mg. Tab. 1 Tab. three times a day.	Diamox	Cerebral oedema, Prevention of actute mountain sickness.
Chlorpheniramine Maleate Codeine Phosphate Ephedrine etc..	Corex or Piritone expectorant	Cough
Xylometazoline HCl 0.1% sol.	Otrivin	Nasal congestion
Isosorbide Dinitrate 10 mg. Tab. 1 Tab. S.L. four times a day.	Isordil	Angina pectoris.
FEVER PLAIN		
Paracetamol 500 mg. Tab. 1 Tab. four times a day.	Crocin or Metacin	Fever, Muscalo Skeletal pain, Headache.
Dicyclomine HCL + Dextropropoxyphene + Acetaminophene 1 Cap. 3 times a day.	Spasmo proxiven	Biliary-renal ureteric colicky pain.

Generic Name	Trade Name	Use
Pentazocine 25 mg. Tab. 1-2 Tab. 4 times a day. Inj. 30 mg./cc 1cc I.M. 4 times a day.	Fortwin	Sever pain due to cardiac disease, Trauma.
Ibuprofen (400 mg.) + Paracetamol (325 mg.) 1 Tab. three times a day.	Combiflam	Pain due to arthritis, injury, Toothache
Diclofenac Sodium (50 mg.) + Paracetamol (500 mg.) 1 Tab. 3 times a day.	Diclogesic	- do -
SEDATIVES		
Diazepam 5 mg. Tab. 1 Tab. at bed time.	Calmpose	Anxiety, Sleep disturbness
ANTIALLERGIC		
Chlorpheniramine Maleate 4 mg. Tab. 1 Tab. three times a day.	Piritone	Rhinitis skin allergy, Allergic Cough.
Astemezole 10 mg. Tab. 1-3 Tab. once a day.	Astelong	Allergic rhinitis, Skin allergy.
EYE DROPS		
Sulphacetamide 10% 20% 30% Sol. 1-2 drops 4-6 times a day. Concentration dependingupon the severity of the disease.	Albucid	Conjunctivities

Generic Name	Trade Name	Use
Norfloxacin 3 mg./ml. Sol. 1-2 drops 4-6 times a day.	Norbactin or Optoflox	Conjunctivitis, Keratitis.
SKIN OINMENTS		
Soframycin 1% cream	Soframycin Skin cream	Bacterical infections of the skin.
Cofrimazole 1% cream	Condid Cream	Fungal infection
Colrimazole 1% powder	Condid Powder	- do -
Betamethasone 0.1% Cream	Betnovate	Eczema, Contact dermatitis.
Cetrimide	Savlon	Skin cleaning.
Benzyl benzoate 25%	Gammascab or Ascabiol	Scabies, Pediculosis capitis.
Piroxicam 0.5% Gel.	Pirox Gel	Musculor pain, Strains, Sprains and Arthritis.

Important Note: Injections to be administered only by an experienced doctor.



HOMOEOPATHIC MEDICINES FOR HIGH ALTITUDE TREKKING AND CLIMBING

Dr. Pravin M. Shah
L.C.E.H. (Bom) D.F. Hom (London)

Indications	Medicines
1. High altitude sickness or To get acclimatized quicker	(Ars. alb 1m.) 4 pills 4 times a day
2. Minor injuries	(Arnica 200) 4 pills 4 times a day
3. Sprain	(Arnica 200) 4 pills 4 times a day for 2 days, followed by (Rhus Tox 1m) 4 pills 4 times a day
4. Over-exertion	(Rhus Tox 1m) 4 pills 4 times a day

NOTES :

1. Ask for Pills No.20 Size
2. Take medicines till complain persists.
3. For other ailments Homoeopathic medicine will differ from person to person. It is, therefore, advisable to consult an experienced Homoeopath individually.

INSURANCE FOR MOUNTAINEERS

Mr. M.R. Gonda

General Insurance Companies do issue Cover to mountaineers and their porters. However, they have to take it every time they go on the expedition.

Life Insurance Corporation of India normally does not cover risk on the life Policy when the climbing is over 10,000 feet. However, on payment of Rs.5 per Rs.1000 as extra premium, risk of death is covered. As most of you climb over 10,000 feet, it is essential that when taking out a Policy, you must voluntarily disclose that your hobby is Mountaineering, and that you climb a height of over 10,000 feet, and that you are prepared to pay extra premium to get this cover. Under no circumstances, however, Double Accident or Disability Benefit will be available in the event of an accident whilst mountaineering.

L.I.C. of India has got schemes where the entire Policy amount is not blocked up with the Corporation, but substantial part of it is returned to the Policyholder at intervals of 5 years.

If further information is needed, kindly contact :-

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