MOUNTAIN WARFARE: THE NEED FOR SPECIALIST TRAINING

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This study focuses on the need for specialist training for mountain warfare. It analyzes the special characteristics of mountain and high altitude terrain which affect conduct of military operations. It identifies the differences between low and high mountain environment.It also discusses training prerequisites with regards to physical conditioning, acclimatization, living and operating in these environments . The study uses FM 3-97.0(Mountain Warfare Manual) as a primary reference as well as the Pakistani Army's experience in mountains of Kashmir, the Russian experience in Afghanistan and the performance of specially trained mountain troops in the Second World War including the elite German "Gebirgsjagger" Corps and the U.S. 10th Mountain Division. The study also reflects upon that recent U.S. Army operations in Afghanistan to highlight some old issues and some new solutions . The study identifies the need for acclimatization training, specific leadership challenges to deal with the physical and psychological effects of mountain terrain, and the need for all arms and branches to train for mountain combat.It recognizes the value of specially trained mountain troops and the prerequisites for maintaining such a trained force. The study analyzes the training techniques of the Pakistani Army, U.S. Army and contemporary armies to synthesize the most essential training requirements for maintaining a mountain trained force. It concludes by providing specific recommendations for training and maintaining a truly mountain warfare capable force by the United States Army. It also provides certain recommendations with regards to organization and equipment and areas for inclusion in FM 3-97.0.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

MOUNTAIN WARFARE: THE NEED FOR SPECIALIST TRAINING, by Major Muhammad Asim Malik, 57 pages .

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CHAPTER 1

INTRODUCTION

Mountain warfare is a specialist field with its own characteristics. The conduct of combat in mountains requires specialized training for the soldiers. In addition, the nature of the terrain has significant effects on the logistics support to forces operating at high altitude. It also significantly affects the health of the troops and their ability to conduct sustained combat. Health problems increase correspondingly with the increase in altitude and become especially pronounced at elevations above 8,000 feet.[1] The first peculiarity of fighting in mountains is that a soldier's most dangerous adversary is the mountain itself and its weather. Mountain terrain is extremely unforgiving to those unprepared for it.

Although mountains are found in many parts of the world, ranging in heights from a few thousand feet to more than 29,000 feet, they have different impact due to their height and the nature of the terrain. At low altitudes weather is generally not severe and may not significantly affect the soldiers; however, generally at heights above 8,000 feet soldiers need to acclimatize. Mountains also present significant challenges in terms of the requirement for special equipment and special climbing and survival skills. A unit cannot be selected at random and put into mountain combat without proper mountain warfare training. Mountain warfare training is a continuous process that can be severely degraded by individual and unit transfer, relief and rotation.

Mountainous terrain has significant effects on the soldier's physical and mental health. There are a variety of symptoms and diseases peculiar to this environment. The first thing that may strike even physically fit soldiers is breathlessness and the difficulty

of climbing steep slopes. This does not indicate physical inefficiency; rather it reflects the need for proper acclimatization and building of correct muscle groups needed for the mountains. Many individuals will experience altitude sickness. High altitude pulmonary edema and high altitude cerebral edema are also peculiar to this environment.[2] These can be effectively tackled by screening individuals before deployment in the mountains by adopting suitable precautionary measures and by training individuals and commanders to recognize their symptoms early. Other problems, such as frostbite, snow blindness, and sunburn, are also common at high altitudes. Soldiers need to be taught precautionary measures to prevent unnecessary exposure, which may result in a needless loss of fighting strength, as well as a cumbersome evacuation. There are other less-threatening symptoms, such as sleeplessness and weight loss, which can also significantly reduce the fighting potential of soldiers.

In addition, the sustenance of soldiers in the mountains is also much more difficult. The rugged mountain terrain limits road transport and weather imposes serious restrictions on air mobility and logistics support. Casualty evacuation and medical support are extremely important in mountains. Since the nature of terrain can delay casualty evacuation, soldiers need to be adept at identifying and treating symptoms becomes important. There is also a need for more doctors and medical personnel closer to the troops, because normal evacuation procedures may not be possible at high altitudes. The rugged mountain terrain limits road transport and weather imposes serious restrictions on air mobility and logistics support.

Leaders also need training in identifying and addressing the physical and psychological symptoms of high altitude and how this affects the performance of their

soldiers. This not only enables them to make correct tactical decisions, but also ensures proper personnel management. During prolonged employments these symptoms increase significantly and lead to command and control and morale issues. If leaders are not trained to deal with such issues, it will adversely affect the battle worthiness of their outfit.

The importance of mountain warfare training aimed at preparing soldiers for high altitude combat cannot be overemphasized. Different armies have evolved different methods and techniques to attain and maintain an operational readiness for high altitude warfare. The Pakistani Army, having been involved in Kashmir for the last fifty years, has had long experience fighting in mountainous, as well as on glaciated terrain. The rugged terrain in Kashmir provides opportunities for soldiers and units to be trained and acclimatized before being committed to actual combat on the line of control betweeen Pakistan and India. The Pakistani Army can also draw upon the local population, who are much more suitable and physically capable of operating in such terrain. Due to continuous operation in such an environment, the Pakistani Army has been able to learn from its experiences and incorporate these into the training.

The U.S. Army also has quality institutions for mountain warfare. It does not, however, have many troops with extensive and current experience of mountain fighting. It also does not have the entire range of mountain and high altitude environments needed to train troops for all kinds of contingencies. This study will analyze the need for specialized training for mountain warfare, based on the experiences of the Pakistani Army in Kashmir, the recent U.S. Army opeartions in Afghanistan and relevant examples from other armies. It will draw conclusions about high altitude training. It will also

analyze the current U.S. Army publication on mountain warfare (FM 3-97.6, *Mountain Operations*) and highlight specific areas which need further elaboration and augmentation.

Limitation

Although the research on the above mentioned issues is based primarily on the environmental conditions in Kashmir, an effort will be made to draw lessons from other historical experiences and also from the training methods and techniques being followed by other contemporary armies. These methods and techniques will then be compared with the current U.S. Army and Marine Corps mountain warfare training in order to draw relevant conclusions.

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[1]Lester W Grau and William K. Jorgensen,"Medical Implications of High Altitude Combat," *U.S. Army Medical Journal,* April 2002

[2]Ibid.

CHAPTER 2

ANALYSIS

This chapter discusses the special characteristics of mountain and high altitude environment in order to differentiate between these two environments from the perspective of maintaining forces and conducting military operations. This is followed by an analysis of the various facets of mountain warfare in the light of historical experience. The thesis uses the framework in FM 3-97.6 for ease of understanding. The thesis draws on experiences of the Pakistani Army in Kashmir, which has been engaged in mountain warfare along a 776-kilometer stretch of mountain terrain ranging from low mountains to glaciated peaks in Siachen,the highest battleground in the world at 20,000 feet and above.[1] The thesis refers to German alpine troops operations in the Second World War, especially the operations in the Caucasus and the Balkan regions, which provide a useful insight into the operations of specialized mountain troops. The Russian experiences in the mountains of Afghanistan are interesting, not only because of the inhospitable terrain but also because of the nature of troops employed by the Russians against the Afghan resistance and some of the lessons they learned during their prolonged campaign in the country. The thesis also includes comments about the current U.S. military operations in Afghanistan, as these are the most recent and significant mountain operations conducted by the U.S. forces. This chapter draws conclusions on training prerequisites for successful conduct of combat in mountain and high altitude environment.

Difference Between Mountain and High Altitude Environment

Mountains are characterized by their altitude and the peculiar nature of terrain and weather conditions. FM 3-97.6 defines low mountains as those under 3,000 feet and high mountains as those above 3,000 feet. This definition does not do justice to the high-altitude environment, which exists generally above 13,000 feet, for there is a great difference in their mountain environment at higher altitudes. Despite the fact that the Pakistani Army has been fighting in Kashmir for a long time, operations at high altitude were not fully understood before the emergence of the Siachen conflict between India and Pakistan.

Located on the northernmost extremity of Kashmir, the Siachen glacier and the surrounding region is a desolate landscape of peaks ranging from 15,000 to 23,000 feet, and extreme climate which can plummet to -50 degrees Centigrade. Despite the fact that the fighting in Kashmir started as early as 1947, this area was considered inhospitable for any kind of military operations. It all changed in 1984 when the Indians moved into Pakistani territory after having attained cold weather survival capability.[2] The Pakistani Army responded quickly and was able to prevent further incursions; however, the main passes that had already been occupied by the Indians remained in their hands. The conflict has continued in the area since then, with both armies learning to survive and operate in such inhospitable terrain.

One of the very important observations from operating in this area has been the fact that there is a great difference in fighting in mountain and high-altitude environment. The Indians lost thirty of their fifty soldiers that they sent initially to Siachen.[3] In all these

years of conflict, the weather and terrain have claimed more casualties than enemy action, despite the fact that both armies had vast experience of operating in mountains before venturing into Siachen Glacier.

The high-altitude environment differs from the lower mountain terrain mainly due to the increased effects of the terrain and weather. The high altitude mountains are generally most steep, requiring special mountaineering skills. The weather is much colder, and snowstorms and blizzards are common. Various problems associated with mountain terrain, such as frostbite, snow blindness, mountain sickness, and edema, occur more easily and frequently. In such an environment survival becomes a battle in itself. All kinds of military activities are affected. I had already served in Kashmir for three years where the altitude ranged from 8,000 to 11,000 feet, before being assigned to Siachen. I realized that, despite the fact that I had basic knowledge of mountains, the high-altitude environment required special skills and a greater commitment to stay focused on the task both mentally and physically for a prolonged duration.

Training Prerequisites for Mountain Warfare

Physical Fitness. This is the first prerequisite of mountain warfare. In mountains, climbing and walking long distances is normal. This, coupled with the effects of cold weather and unforgiving terrain, demand a high level of physical fitness. The German Army mountain troops were generally between eighteen and thirty-five years old and selected for their physical and mental abilities.[4] Many of the the pioneers of U.S. 10th Mountain Division were also adept at mountaineering skills.[5]

In the Pakistani Army, individuals remain in the same unit for their entire service. Because of the difficult nature of mountain terrain, the units deployed in mountains are normally rotated to softer locations after one, two, or three years, depending on the altitude at which they had been deployed. Before every deployment to the mountains, the physically weak individuals are segregated and either posted to other units or assigned to base camps at lower elevations. The shortfall in manpower is made up by posting officer and soldier volunteers from other battalions. There have been instances where enthusiastic commanders took some unfit individuals to high elevations to maintain the manning level or because they thought that these individuals were avoiding the harsh environment. It often resulted in unnecessary casualties and the associated problems of evacuating these individuals from difficult and inaccessible mountain posts.

Another aspect of physical fitness required for mountain terrain is that it has to be developed at altitude. An initial high standard of physical fitness is good but not necessarily an indicator that the individual will be able to perform adequately at higher elevations. U.S. soldiers, attending a course at the mountain warfare school in Kakul, Pakistan, were fit and tough but required additional climbing in mountains to attain the desired level of physical fitness required in mountains. This is due to the fact that not only do muscles have to be developed for climbing in mountains but also the body has to adjust to the thin mountain air.[6]

People from mountain regions are generally better suited for operating at high altitudes. In the Pakistani Army, the troops of the Northern Light Infantry (NLI) come from the high mountain regions in Kashmir. Over the years, they have displayed

tremendous abilities to stay at tough mountain posts longer than other soldiers without experiencing any great deterioration in physical and mental abilities. They are also less prone to some of the effects of cold weather and mountain illnesses. From the training perspective, however, it is interesting to compare their performance with that of the bulk of the troops who do not come from mountain regions. NLI troops are only a fraction of the total number of troops operating in Kashmir. Many of the other troops come from the plains of Punjab or the desert regions and may never even have seen a small hill before coming to the mountains. But it is worthwhile to note that they adapt fairly well to the terrain after appropriate training and acquit themselves equally well.

The difference in performance of individuals is more due to the quality of the leadership and training of their units. In 1993, the Pakistan Army conducted a major exercise, *Al Areesh.* Some of the troops were mountain trained and conditioned.Others came at the last moment from other areas of the country. The physical fitness and endurance of the mountain-trained troops were clearly decisive factors in their performance and their ability to achieve the assigned missions. Many of the troops who had not trained in mountains were unable to reach their objectives and suffered more casualties due to accidents and fatigue.

Familiarization with the Terrain. Knowledge of the terrain and characteristics of local weather are equally important for soldiers and commanders. At the individual level, soldiers have to understand the very basics of mountain and high altitude environment, especially if they have not experienced mountain environments before. They tend to

commit simple mistakes which can be avoided with training and experience.Some of the common problems for new troops follow:

Flash floods are common in mountains after heavy rainfall, yet there are always instances when individuals and equipment cross a causeway or footbridge just after a heavy rain and are lost in a sudden flood.

German soldiers observed in the Caucuses that the mountains were very primitive and people still used a single tree trunk to cross deep ravines.[7] In places like Afghanistan, it is quite similar.It is an altogether different experience for the U.S. soldiers used to the well-developed infrastructure of their own mountain ranges.

Lightening is another hazard in the mountains. Many soldiers have been injured or lost their lives because they were traveling on a ridge line during a thunderstorm or talking on a telephone.

The Germans encountered a lot of fog and mist in the upper reaches of Caucasus Mountains. In many parts of Kashmir this phenomenon is also very common. It can influence all movement and tactical actions. For drivers who have to negotiate narrow winding roads with hairpin turns, it is a nightmare.

At higher altitudes, snow blindness and sunburn can happen very quickly. A little bit of exertion builds perspiration inside the clothing, which can freeze and cause frostbite. Sunny weather does not always spell good news, as it may lead to snow slides if the snow has been piling up on the slopes for some time.

There is a great difference between the summer and the winter season. Routes which can be used in summer generally close due to snow in winter. Conversely, the

routes for winter travel may have to be abandoned because new crevasses open up on the glacier daily as the weather warms up.

Sudden changes in weather influence helicopter use. Valleys may remain inaccessible for days. Pilots have to be adept at navigating through narrow valleys and landing on mountaintops with very little maneuver space.

Soldiers used to moving with the help of global-positioning systems may find that it is more difficult and time consuming in mountains because of the terrain configuration. It is also worth remembering that in mountains, unless absolutely essential, it advisable to use an established track. Even in remote places there are many tracks crisscrossing the ridges and valleys made by shepherds and their animals. They are always easier to climb; although they may take a little longer, they generally avoid potential locations of landslides and avalanches.

Acclimatization Training. Mountain terrain can be an ally or a dangerous adversary, depending on the training and preparation of troops. In Kashmir, thousands of new troops are introduced to the mountain environment every year. One of the important training aspects is to make them understand this environment. There is a marked difference in the performance of units that have conducted a vigorous familiarization and acclimatization training and those which have not. The number of casualties suffered due to weather and terrain-related hazards are a big indicator. It is interesting to note that the U.S. 10th Mountain Division suffered more casualties due to weather during training at Colorado than they did in actual mountain combat in Italy.[8] This is because the soldiers learned to take care of themselves in harsh environment during training, which helped

them in actual operations. In the early years of the Siachen conflict, there were a large number of casualties due to frostbite, sunburn, and other high altitude sicknesses. Such incidences are rare now because troops and commanders are thoroughly briefed and trained to take all possible precautionary measures.

The mountain terrain is unforgiving and punishes those who take a chance. Sometimes soldiers and officers considering themselves extra fit, skip staging camps en route to higher elevation. They end up being evacuated because there is a greater chance of developing high altitude sickness when the individual has not spent the prescribed amount of time at the intermediate heights.

During my stay at Siachen, a young captain came as a replacement for one of officers at a post located at 20,000 feet. He was in extremely high spirits when he arrived at the sector headquarters, located at 18,000 feet. From here to the final destination he was supposed to stay one night at an intermediate base camp at 19,000 feet. When he reached that location, he urged his party to push on and reached his destination the same night. But within about five hours of his arrival, he had developed all the symptoms of acute mountain sickness. He had to be brought down by a platoon of soldiers across extremely hazardous terrain. Not only did his action cause a medical evacuation mission, but the officer that he was supposed to relieve, who had already completed his required tour at the post, had to wait another ten days before a suitable replacement could be found and moved to this location .

Individuals have to acclimatize every time they return to a higher altitude after a period of leave. In a high-altitude environment, acclimatization is a major issue. It has to

be taken into account every time before planning an action, as it is not possible to bring in fresh troops from other areas at the last moment and expect them to perform well in this environment.

The Kargill conflict between India and Pakistan in 1998 took place at high-altitude.[9] It is interesting to note that the Indian Army's elite mountain and high altitude commandos,the,'White Devils' conducted physical fitness and acclimatization training for their reinforcements as they were brought up from other parts of the country and were about to be sent into action in the theater.[10]

Living in the Mountains. The Pakistani Army has been fighting in Kashmir for a very long time. Over the years, living conditions have improved considerably, but life there is still difficult because of the harshness of the weather and terrain. In mountain areas below 13,000 feet, generally there are stone or wooden bunkers which may double as living accommodations and fighting bunkers. They are useful because they are easier to maintain during the winter. The living and sleeping quarters are generally sited on the reverse slopes to avoid enemy observation. A good site takes into account the likely direction of enemy indirect fire and also provides security against artillery and mortar shells. It is practical to have living quarters with good overhead protection because most of the time there is no warning of artillery shelling, and soldiers often prefer to stay inside rather than rush to another bunker in the midst of heavy snow and cold weather.

At high altitudes, stones structures are not practical, as cement does not bind and the glacier is always moving. Here prefabricated dome-shaped structures 'igloos' made out of fiberglass, are used.[11]They are easy to carry and assemble at the highest posts, that

is, 18,000 feet and above. Since there is a lot of snowfall, they can be dug out of the snow and set up again pretty quickly, if required. Although they are well- insulated, they do not provide any protection against mortar and artillery shells or sharpenel. In such an environment the post commander must ensure that the troops move to a more protected site during shelling, even if it is snowing heavily.

Mountain structures are bleak and filled with the smell of kerosene oil. Prolonged stays in these cramped quarters can lead to boredom and disorientation. This is especially the case in winter, when the troops may be confined for weeks. In this environment, maintenance of soldiers' morale and readiness is directly dependent on the quality of junior leadership.

Proper clothing is another essential part of surviving in the mountains. Soldiers have to be trained to wear proper clothing at all times. Some soldiers may unfasten their front buttons while walking, thinking that the weather is sunny and fine. Such individuals often find themselves with chest infections as the cold wind chills their chests. Loose-fitting layers of clothes are always advisable. Gortex and polypropylene clothing are a great advantage, as they do not let perspiration accumulate close to the body.[12] At high altitudes, it is important to wear gloves and mittens at all times. Soldiers sometimes develop frostbite by touching metal equipment with bare hands when the temperature outside may be as low as minus thirty-to-forty degrees centigrade. Pressurized sleeping bags are also very handy at high altitude. These are helpful in stabilizing soldiers suffering from altitude related sickness.[13]

Basic Mountaineering and High-Altitude Skills. These skills are vital for soldiers to develop confidence and survive in a mountain environment. They are also essential for conducting successful combat. As the height of the mountain increases, so does the required skill level. At altitudes below 13,000 feet, it may be enough for soldiers to understand climbing techniques, navigation, route selection, the use of the ropes, and procedures to avoid landslides and snow avalanches.[14] At high altitudes, soldiers have to learn more complex techniques, such as those required by professional climbers, because many times the environment is same as that for mountain expeditions. For example, the route to Conway Saddle, the highest post in Siachen, follows a part of the same glacier that leads to K-2, the second highest mountain in the world.[15]

Movement on the glacier is extremely hazardous, as there are many hidden crevasses. Soldiers have to move as a party with a rope tied around each individual, and all members of the party must be aware of the drills and procedures if someone falls into a crevasse or if the party encounters a snowslide. The rock faces are generally very steep and at many places there are patches of ice. At such places soldiers require D-rings, ropes, and crampons. They also have to be cautious not to dislodge loose stone and boulders to prevent any injury to the person following them. These climbs are very tough and demanding, both mentally and physically. Sometimes the only way to rest is by clinging to the rope with both hands and digging one's heels into the rocks face.

Since it is also not possible to transport all material by helicopter, troops often have to carry awkward loads during these climbs. Loads may include kerosene oil cans, rations, or building materials for the bunker. Many times it is also necessary to evacuate

casualties from inaccessible posts located on mountaintops. Those individuals who have never been exposed to mountain environments find these heights very disconcerting. It is therefore important to train individuals in rock rappelling and crevasse crossing.

For the U.S. Army, which relies on air assets to place troops at the place of action, it is even more important to train soldiers thoroughly in such techniques, because these troops do not spend the same amount of time negotiating mountain hazards as the mountain troops do. One of the important lessons learned by the Soviets in Afghanistan was the necessity of combat by dismounted infantry in difficult terrain.[16]

The Use of Weapons and Equipment. Once the troops have learned to survive and move in the mountains, they need to understand the capabilities and limitations of their weapons and equipment in this environment and how they can best utilize them. At high altitudes, it is difficult to keep weapons functioning all the time. They are exposed to harsh weather effects and often will not operate when required. Weapons have to be covered and protected against snow and ice. Sometimes barrels have to be heated before they can fire. Batteries often do not perform optimally in the cold. Complicated mechanisms, such as those in surface to air missiles, can easily malfunction due to the cold.[17] Artillery shells behave erratically due to the thin mountain air and gusty winds.[18]

Nutrition. Surviving and operating in mountain terrain requires more energy than normal. A soldier who may need 3,000 to 4,000 calories under normal circumstances will require 6,000 or more calories in the mountains. To complicate the situation, high altitude has an adverse effect on a man's appetite. Soldiers generally tend to eat and drink much less, which reduces the morale and fighting capability of soldiers and makes them more

susceptable to mountain related illnesses.[19] U.S. soldiers conducting mountain warfare training at Abbotabad (4,000 feet above sea level) lost approximately twenty to twenty-five pounds during three weeks of training.[20] My personal experience of Siachen is that soldiers lose an average of fifteen to twenty pounds at the end of a three-month tenure at forward posts, which are generally 15,000 to 20,000 feet high.

Long mountain treks are common. Since soldiers generally do not feel like drinking much water, treks can very quickly lead to dehydration and other complications. The common remedy to this problem in Kashmir is that while trekking, parties regularly stop and drink "Energile," which is a flavored glucose drink. Not only does it provide energy, but it is also easier to drink than plain water. Among Pakistani soldiers, tinned rations are not very popular. The soldiers are not used to this kind of food in normal circumstances. Therefore, even at high altitudes the troops prefer some kind of fresh meat or vegetables in their diet. It is not only a morale booster but also helps supplementing their nutritional requirements.

Mountain Illnesses. This is one of the very important aspects of mountain environment that soldiers and commanders need to understand and prepare for. At heights above 8,000 feet, the physiological and psychological effects of mountain terrain become pronounced.[21] Soldiers not only need to understand preventive measures but also should be trained to detect signs of such illness in their colleagues. Some of the common symptoms are a severe persistent headache or coughing and difficulty in breathing. Sometimes an individual may be aloof and taciturn. On other occasions the symptom

might be obvious, such as swelling around the eyelids, incoherent speech, and intolerance and even outright aggressiveness.[22]

There are patterns associated with these illnesses. Many problems, such as high-altitude sickness, occur in the initial stages of a soldier's arrival at high-altitude. The two biggest killers, cerebral and pulmonary edema, are more difficult to detect; however, these often develop if the soldiers stay too long at high-altitude.[23]

The normal practice in Siachen is to keep soldiers above 19,000 feet for three to four weeks and then return them to lower elevations. Detection of illness depends a lot on the environment at a particular post and how commanders deal with their men. Soldiers often take their symptoms lightly or may even hide them in order not to look soft in front of their colleagues. At other times, however, commanders may not evacuate an individual because they do not have enough men or, even worse, feel that the soldier is malingering. Commanders need to know that if a soldier experiences any signs of such illnesses he must be evacuated promptly. In most mountain illnesses, reduction of elevation to at least below 3000 feet is the first prerequisite for saving a person's life.[24] Delay may not only cost a life, but also in bad weather conditions could require stretcher evacuation across extremely difficult terrain. This would not only jeopardize the lives of eight to ten other soldiers but also take away valuable manpower.

Many of these illnesses can be prevented by proper acclimatization. Commanders also need to know that winter will bring many more cases of such illnesses. The high-altitude environment is not like other places where replacements may be airlifted into the area of operation. Airlift is done if those afflicted have been in the area for at least ten to

fifteen days and have operated at heights similar to those to which they are being sent. If this is not done, these replacements would quickly end up becoming casualties themselves. Once in Siachen, a commanding officer wanted to be close to the troops at a post which had been a under attack and had suffered casualties. During a lull in the fighting, he was airlifted and dropped near the post. The change in altitude between his headquarters and the post was about 3,000 feet. Within minutes of landing he became disoriented, developed a headache, and started vomiting. He was not much help and had to be evacuated. This was despite the fact that he had been living at 13,000 feet and was fairly acclimatized.

A pool of well-trained and acclimatized troops available to replace those at higher altitudes is a must, especially during the winter season. This allows commanders to rotate individuals between tough and relatively easy assignments and to replace casualties.

Psychological and Mental Conditioning. The high-altitude environment takes a heavy physical and mental toll on soldiers. The German experience in the Caucasus was that troops wore down much faster in mountains. This was despite the fact that these troops were elite, picked for their mental abilities and physical prowess.

Operations in such an environment involve extreme physical exertion. In the defense there may be many days before soldiers see any sunlight, while manning posts perched on inhospitable mountaintops and razor-edge cliffs. The weather is extremely cold, and blizzards rage on for weeks.[25] Living conditions are difficult. Many times all movement is stopped. Soldiers do not receive any mail. Their relief may be stuck at some

base camp while they wait impatiently. All these factors can lead to depression and boredom and a sharp decrease in the fighting spirit. Simple tasks, such as manning weapons, sentry duty, and patrolling, require will and determination.

Offensive actions are very difficult and costly. Not only do soldiers have to fight the enemy but they also brave the elements of this harsh terrain, which are equally formidable. Such conditions call for strong leadership by the junior leaders, who have to lead physically and be mentally tough.

Leadership

Leadership is the primary element of combat power in FM 3-97.6.[26] This being quite true, mountain and high-altitude environments are extremely demanding and require a high level of leadership both at the direct and organizational level. Leaders need to understand some of the constraints imposed on the soldiers' performance due to the nature of the terrain and weather. Unless these constraints are well understood and included in the planning and execution of actions, there is always a chance of grossly miscalculating the time frame, logistic requirements, and capability of troops.

Direct Level Leadership. Direct leadership is the level of leadership that can greatly influence the outcome of combat. The nature of mountain terrain is such that combat tends to be more decentralized, and often takes place at the small-group level rather than being a massive coordinated affair. In such circumstances the quality of junior leadership is decisive. The Russians observed in Afghanistan that even a small unit maneuvering boldly can decide the outcome of the whole battle.[27] Bold and imaginative

officers and noncommissioned officers (NCOs) can take independent decisions and motivate their soldiers into continuing well beyond their limits of endurance.

One of the hallmarks of German alpine troops during the First and Second World Wars was the quality of this leadership. Field Marshal Rommel was a young officer in a German mountain regiment in World War1.The exploits of these troops in the Italian mountains sometimes seemed unrealistic and unbelievable. His small detachment advanced relentlessly, capturing one hilltop after another other in difficult terrain, which could sap the energies of the most determined soldiers.

Mountain environment demands that junior leaders set personal examples of physical fitness and endurance. During the Kargill war in 1998, Captain Sher Khan was posthumously awarded the 'Nishan -E- Haider', Pakistan's highest military award , for his extraordinary courage and leadership. At the peak of the battle, the officer conducted a series of daring raids with a handful of men on enemy patrols and convoys. His last action included a successful counterattack to recapture a post held by a larger enemy force. Such leadership not only inspires subordinates but also raises the morale of the entire outfit.

Junior leaders play a vital role in defensive battles. In Kashmir, a young captain may be holding an isolated post with a handful of men under his command. When the post is attacked he may be cut off from his battalion and left alone to face wave upon wave of attacking enemy forces under the cover of a heavy artillery barrage. At such times, when the ammunition is running out and many soldiers are injured and dying with no chance of relief or reinforcement, it is the personal leadership of the officer that holds

the post together. After one such attack in 1999, which left twenty-six Indian soldiers dead, Colonel Sing, the Indian Commander, grudgingly admitted "the Pakistanis prefer to fight it out rather than surrender."[28]

Bold and audacious officers can create opportunities in this forbidding terrain. In Siachen, there is a 22,185 foot high mountaintop called Naveed Top by the Pakistani Army. At the height of the conflict, when both sides were jostling to secure more dominant locations, this feature remained unoccupied because of its difficult accent and the problems of sustaining any position on it. In April the Indian Army launched 'Operation Ibex' to secure this peak.[29] There was no way that a party could be dispatched to preempt this Indian move. At this time Captain Naveed volunteered to be slung from a rope tied to a helicopter and carried across the glacier to be dropped on this peak. Such a maneuver, called a"running drop," had never been tried before. The French *Lama* helicopter is not even designed to fly above 21,000 feet. Additionally, there was no logistic support or survival equipment for this officer and a handful of other men who would follow him. Despite all the odds, they proceeded with the plan. Since the helicopter could not land on that peak, Captain Naveed was tied with a rope and the helicopter dropped him on the top with only his personal weapon. Subsequently another few soldiers were dropped in a similar fashion.Over the next forty days another eighty-six soldiers were dropped. The force managed to survive and hold the location. Many of them lost limbs to frostbite but they achieved the impossible.

The direct level leadership has to be trained to recognize and address signs of physical and psychological fatigue in their soldiers. Loneliness, depression, and violent

mood swings are common in the high-altitude environment. The relationship between an officer and his men has to be much more intimate than under normal circumstances. He should be able to identify signs of deterioration in a soldier before they become pronounced. When a soldier becomes more quiet than usual, does not talk with his colleagues, and does not eat properly, he needs attention. Simple changes, such as sending him to a lower elevation or changing his routine may be helpful. Under no circumstances should leaders ignore these symptoms.

High altitude can adversely affect mental capabilities, and many times soldiers have turned violent or incoherent, thereby threatening the security and safety of their colleagues. It is important to preempt a situation rather than react to it. At high altitudes some tasks are more demanding than the others. An individual performing these tasks must be recognized and given appropriate rest. For example, guides open up routes for movement and patrolling. They are more exposed to snow avalanches and crevices and suffer tremendous fatigue. They have to be rested and rotated frequently.

Organizational-Level Leadership. Decisions made at this level directly influence the conduct of tactical actions. Ambitious and ill-conceived plans have proved very costly. Operation 'Meghdoot', the move of the Indian Army into Siachen in 1984, is one example.[30] The Indian Army sent in troops to occupy the high mountain passes on Siachen Glacier, assuming that the troops were capable of holding these in bad weather. They also assumed that aerial resupply would be able to take care of logistics. By badly miscalculating the effects of terrain and weather on the conduct of operations, they got themselves into a position where troops suffered horrendous casualties due to glaciated

terrain and the extreme weather. Logistics could not be sustained by air due to the bad weather, and they had to resort to carrying all these loads across an icy wasteland to support their troops. Now, almost twenty years later, the Indian Army is still holding onto the same positions, which requires almost $420,000.00 daily to maintain.[31]

The Germans repeatedly emphasized the importance of meticulous planning and preparation even for small-scale operations.[32] FM 3-97.6 talks about the need for realistic timetables based on thorough reconnaissance and the commander's practical knowledge of the mountain battlefield.[33] Planners have to understand that mountains adversely impact the time and space calculations, which may be otherwise quite reasonable. This was one of the important lessons learned during exercise 'Alpine Warrior', conducted by the U.S. Marines at Fort McCoy in 1986.[34]

One of the major setbacks suffered by the Pakistani troops in Siachen was a counterattack by one of the battalions on a 19,000-foot ridge across a glaciated valley. The action had not been planned earlier, but after the troops on the post reported enemy movement and then lost contact, it was decided to launch a company-size counterattack. While launching this operation, two important factors were not fully understood. First, the ridge overlooked the valley and dominated it from the only direction possible for counterattack, and second, the time required for the counterattack force to reach the objective was well beyond the few night hours available which might have provided a degree of secrecy and surprise. As a result, when the force approached the objective, the enemy had already occupied the high ground and could easily observe their movement across the valley floor. The fight failed, with more than thirty casualties. Although there

have been many more casualties in other actions, this fight was different. The force did not have a realistic chance of success even before it was launched because of poor and inadequate planning.

Cost effective mountain combat requires skilled and well trained troops. Troops cannot be picked up at the last moment and sent into a fight. One example of such an action is the employment of 7th Indian Brigade against the Chinese in the 1962 Himalayan conflict.[35] The brigade was not stationed in the mountains earlier, and when things started going bad, it moved from plains straight into combat. The troops were not acclimatized or equipped to fight in the mountains and suffered heavy casualties due to frostbite, edema, and other mountain illnesses.

Communication

At high altitude, the terrain and unpredictable weather conditions affect communications. Wire is the primary means of communication in the mountains of Kashmir. It is reliable, but there are certain drawbacks. It can break due to snow slides, wear and tear, and even because of animals grazing on the hillsides. The signalers have to be trained to identify the safest possible routes for laying the line and, more importantly, for maintaining it. This is a tough job because wire communications have to be maintained even in the most adverse weather conditions. This requires fit and determined individuals. If the environment in the rear areas is hostile, due to infiltrators or guerillas, these maintenance parties can become ideal targets for ambushes and raids.

Bulky radio equipment is a major encumbrance on the troops. Hands-free radio sets can be a great help. Satellite communication and the use of C2 aircraft can help

offset some of the terrain limitations. Retransmission stations often require siting at the highest peaks in the area to provide adequate range and coverage. Such peaks seldom have any road or track leading to them and are not very hospitable. The communication crew responsible for their installation and maintenance has to be well- trained in mountain survival techniques. Such isolated stations are the favorite targets for bands of guerillas. The Soviets had great difficulty in providing protection to such sites in Afghanistan.[36]

Since communication is so vital for synchronizing combat, especially for U.S. forces, involving assets not only from the Army but also the Air Force and satellite communication, there is a need to carry out extensive field training involving all the assets along with the ground troops in mountain environment in order to truly understand the problem areas.

Fire Support

Artillery fire support is significantly influenced by mountain terrain. Targets are located on peaks, in ravines, and on reverse slopes, and there is no continuous front. In addition, weather conditions are unpredictable. Observation is another major issue. Many times it is the individual party commanders and post commanders who call in fire because they may be the only ones for whom the target is clearly visible.

The undulating terrain and intervening crests require a large number of observers at different dominating heights to cover the entire area of operations. In Kashmir, the artillery observation posts are located on some of the most inhospitable and dominating

peaks. This, in turn, requires young artillery officers to be as fit as their infantry counterparts.

Deployment of guns in mountain terrain is difficult. The roads and terrain greatly influence the availability of gun positions. The gun position, which may be ideal from the point of view of range and coverage, may not be suitable because of intervening features and masking fire. In other instances the location may be tactically sound but located in an area prone to snow slides or flash floods.

There is also a problem of ensuring that the guns provide adequate coverage for projected combat, because once they have been deployed it may require major engineer and logistics efforts to shift them to an alternate location within a acceptable time frame.

In Kashmir, artillery fire exchange takes place almost daily. Both sides employ guns of various calibers and ranges. In the first six months of 1998 alone there were more than 1.53 million shells fired by both sides.[37] Training artillery crew for mountain combat needs to consider following: Firstly, mountain terrain provides great protection against artillery shelling if the soldiers are trained to select their positions well. In Kashmir, the units have adjusted well to the environment and generally do not suffer heavy casualties unless a defensive position is directly hit by a heavy caliber shell. The key to survival is siting positions on the reverse slopes and digging into the mountain itself.

From the fire support perspective, air burst and variable time fuses are much more effective than point-detonating artillery rounds. When employed with an element of surprise, they have greater chance of catching individuals in the open on the reverse slopes. Howitzers and mortars are generally more effective because of their ability to fire

from behind concealed positions and engage targets on the reverse slopes. During the current U.S. operations in Afghanistan, the Taliban have used mortars to hit U.S. troops quite successfully.[38].

Artillery fire at high altitude is less predictable.Observation plays a vital role in directing artillery fire in the mountains. In Kashmir some of the fierce battles have been fought for the possession of dominating heights, which can provide observation across intervening features. In Siachen, there are some dominating heights which provide observation across the entire valley on clear days and moonlit nights. One Indian observation post located on particularly dominating terrain keeps the Pakistanis vigilant whenever the sky is clear. They keep the Indians under constant observation and harrassing fire. It is like a cat and mouse game. If the Indian observer manages to climb and stay at that post long enough, he can bring effective and observed fire on many locations. Once he can see the shells landing, it is just a matter of time before they can be adjusted onto the target despite all the inaccuracies. The same is true if an observer can see a party moving on the valley floor. In one instance an officer and ten men were moving towards a particular post. The lay of the ground was such that the party would be visible to the Indian observer for about ten minutes during their journey. The instructions for this move stipulated that it should be always undertaken at night. The officer, however, wanted to push on, assuming that bad weather would hopefully prevent any observation. To their bad luck, the clouds cleared when they were halfway through. Shells started landing right and left, creeping closer with every salvo. The helpless party could do nothing on the open glacier. Although more than twenty friendly guns opened

up to cover their movement, it was sheer good luck they managed to pass unscathed through that area.

Successful operations generally require longer preparatory bombardment and covering fire. In Kargill, the Indians bombarded posts round the clock before they could actually launch an attack, and even then they were not able to take out all the defenders.[39] For some of the post they had to resort to precision-guided munitions fired from Mirage-2000 aircraft.

Artillery officers need training in selecting of appropriate gun positions, observing, and understanding the capability, limitations and behavior of various types of ammunition and fuses in a high altitude environment.

Maneuver

Defense Mountain terrain is ideally suited for the defense. Some of the heaviest casualties suffered by the Allied troops in the Italian theater during World War Two occured during the attempt to overcome German defenses at Mount Casino. The Russians made numerous attacks to clear the strategic Panjshir Valley in Afghanistan but were unable to do so, despite their preponderance of firepower and mobility.[40] The line of control in Kashmir in 2003 is not much different from the cease fire line after the India-Pakistan war in 1949.[41] This is because both parties have found that an assault on well-defended dominating positions is extremely costly. Defense revolves around control of dominating heights, passes, and lines of communication.

When training, soldiers and commanders need to understand the techniques of constructing and maintaining defenses with all round protection, and emplacement and

employment of direct fighting weapons. As highlighted in FM 3-97.6, commanders need to place reserves closer to important defense locations, because the timeframe for reaction in mountains is much more than normal.[42] This might require having a number of smaller reserves rather than one large centralized reserve.

Since the terrain offers great opportunities for infiltration, defenders need to be aggressive all the time. Aggressive patrolling not only enhances security but also is extremely valuable in keeping soldiers active and sharp. In Kashmir it is a great help in preventing a 'bunker mentality' in the soldiers. Although sophisticated early warning devices can provide a degree of protection, the terrain is too diverse to be surveilled. The Indian Army, despite having more than 250,000 troops on the Kashmir border, is unable to prevent movement across the line of control by Kashmiri fighters.[43] From the defensive standpoint, this means that the rear areas are vulnerable to raids and ambushes.

The combat support service elements need to ensure their own protection. They have to be trained in patrolling and perimeter defense, and, even more importantly, they have to develop a mindset focused on constant vigilance.

Offensive operations Because of the inherent strength provided to the defender by mountain terrain, offensive operations require meticulous planning and preparation. Training, therefore, plays a vital role in ensuring an edge for the attackers. Commanders need to be cognizant of the limitations imposed by mountain terrain and the opportunities which can be exploited. Since the defender has an advantage, successful attacks should have the ability to isolate the defender and to keep him under constant pressure.

In Kashmir, defenders have been able to hold to precarious positions until they could be resupplied and reinforced. In June 1987, the Indian Army attacked a dominating observation post called 'Quaid OP', located on a 21,600 feet peak . Despite losing a lot of men, they were able to capture the post after five days.[44] The defenders, led by Subedar (Junior commissioned officer) Muhammad Atta, held on until they ran out of ammunition and died to the last man. The success of this attack can be attributed to meticulous planning and the ability to sustain the momentum of attack and to isolate the post. The costly Pakistani counterattack was launched in September and secured 'Tabish Post," which is still lower than the lost position.[45] For planners, attacks in mountain terrain are generally costly and time consuming since elevation dominates distance.

In mountains, combat tends to be more decentralized because of terrain compartmenting. The Soviets laid great emphasis on junior leaders and company level operations in the mountains. Based on their experience in Afghanistan, they advocated envelopment by smaller, autonomous groups.[46] Even the recent Operation Anaconda by U.S. forces in Afghanistan has been more decentralized than combat on normal terrain. The initiative and skill of junior leaders is often vital for the success of the mission, especially when conducting security and reconnaissance missions. Mountain terrain and bad weather can provide the opportunity for small forces to concentrate and achieve surprise. Russian and Afghan government forces suffered heavily whenever they neglected this aspect[47]

Lead climbing teams, evacuation teams, and technical equipment installing teams are essential for offensive combat.[48] Though not designated as such, most of these teams

exist in Kashmir and are useful for all kinds of operations. Such teams require individuals with superior training and physical abilities. These individuals provide a pool of specialists who can augment the regular infantry troops in carrying out some of the more technically advanced tasks.

The Soviets extensively employed helicopters in Afghanistan for lifting of troops into battle and for supply.[49] Helicopter Gunships were extremely effective in supporting ground operations before the Mujahideen received Stinger missiles, which tilted the situation in their favor. U.S. forces also rely upon helicopters for transportation and movement in the mountains. Aviation planners need to be invlved early in the planning. They have to train with mountain troops so that everyone understand each other's capabilities and limitations. To an aviator the distance between two ridge lines may only be 1,000 meters. However for infantry soldiers who have to go down the valley and up the next mountain, it may be a grueling day's work. Similarly, the steep mountains and the narrow valley floors limit the availability of landing zones. This, coupled with the range of enemy direct and indirect fighting weapons, will dictate how quickly avaition can bring troops in and support them.

Since mountain combat tends to be decentralized, control of supporting fire is that much more difficult. Tight control of jet aircraft and helicopter gunships is necessary to avoid fratricide.

Engineers are required to maintain mobility. The defender has many options for delaying an attacking force. Bridges and sharp bends on the roads can be easily blown up to create major bottlenecks.Engineers are also required to improve existing roads and

maintain them. In Kashmir, firing on the roads close to the line of control necessitates the frequent construction of bypasses and alternate routes. These roads have many problems due to mudslides, heavy snow, and avalanches. Construction and maintenance of these tracks provide valuable training and experience to the engineers.

Aviation and air assets, with beyond- line-of -sight and precision-guided munitions, have provided means to neutralize many of the inherent problems of the offensive in mountain warfare. They have, however, not eliminated the need for specialized training. In fact, troops require more training to fully utilize the potential of these assets in treacherous terrain. Similarly, commanders have to understand the limitations imposed by mountain terrain in order to synchronize all the battlefield operating systems.

Logistics

Logistics support in mountains is difficult and time consuming. The terrain imposes restrictions on the types of transport and options available to the logisticians. Logistics support is vital for the success of any action.If planning is not thorough and meticulous, it may not be possible to supply troops in the mountains at a crucial time because of the terrain and weather .

In the Kashmir, a variety of tarnsport is used for logistic support. Road transport is the most reliable and cost effective. At higher altitudes where tracks cannot be maintained because of snow and difficult terrain, mules are a preferred means of transport.[50] For higher altitudes, where even mules cannot go, porters can. These porters are locals, capable of carrying heavy loads across very difficult terrain. In the Caucasus

campaign, the German Army utilized sleds, mules and horses in addition to the trucks.[51] Despite technological advancement, the U.S Army had to use horses and mules at selective places in Afghanistan. Helicopters are a very versatile and quick means of transportation, but at higher altitudes their lift capability is severely affected.The French 'Alouette' can fly higher than U.S helicopters but even it can only deliver eighty kilograms at 20,000 feet and above.[52] Helicopters are also dependent on fair weather .

The road network in the mountains is generally a logistician's nightmare. Main supply routes are limited and often do not support big vehicles with a large turning radius. The roads often do not permit two-way traffic. While tactical plans take into account the main roads, tactical engagements do not necessarily take place close to the road heads. This is the real problem for logisticians. In order to support troops fighting over inhospitable terrain, they need to ensure that the supplies reach the troops at the forward locations. This means that they have to be transported from the road head across terrain consisting of high peaks and valleys. It may require breaking up loads into animal loads or man pack loads. The key is to understand and plan for this movement, which may well be decisive for success of an action. At Siachen, the Pakistani Army has built roads/ tracks close to the forward defenses, but the real challenge always lies in transporting supplies across those last few miles from the road heads to the forward posts. Whereas supplies can be brought forward hundreds of mile on roads or by air transport within days or even hours to a logistic base or road head, it may take an equal or longer time to reach the forward troops.

The need for having logistics as far forward as possible has been recognized in the analysis of the operation in Afghanistan by the Center for Army Lessons Learned (CALL), whose report points out: 'It may require additional staff work from the logisticians to deploy the logistics to the work area (like rations to the platoons, mortar rounds to the mortars) but the advantage is reduced expenditure of energy for those on ground.'[53]

Helicopters can overcome many of the limitations of ground transportation. The Soviets used them successfully in Afghanistan, and US forces are also now using them there. The availability of suitable landing zones (LZ) is an important logistics precondition. These are often to the rear of battle positions for security, so that the remaining distance has to be covered by the soldiers themselves. Depending on the height difference between the LZ and the forward locations, this can be a very tough task.
In the Kargill Conflict, the Indian Army had to use porters to support troops at battle locations. These porters climbed near vertical rock faces at 13,000 feet and higher, to supply the troops.[54]

The unpredictability of weather in mountains and the long spells of bad weather, especially in winter, can easily upset logistic support. It is therefore necessary to have a mix of resources, to ensure reliability and flexiblity.[55]

In the Kashmir from a user's perspective is that combat service support (CSS) planners need to be aware of the conditions at the front; otherwise there will be always conflict and confusion. A person sitting in a valley or at a road head cannot visualize the

conditions on a windswept mountaintop at night. The idea of having CSS liaison officers with forward elements is, therefore, very practical.

Logistic estimates and loads have to be customized for a mountain environment. For example, if mules are involved, loads have to be broken- up properly according to carrying capacity of the mules. There is also much more overage, which has to be built into the estimates. Mules carrying rations and supplies can easily be lost over a treacherous mountain trail. There are fewer open spaces to store rations, and often one artillery shell destroys a large amount of supplies. Packages often break and leak and sometimes simply get buried under snowstorms and avalanches. It is not uncommon in Kashmir to come across buried supplies and ammunition from previous years.

Clothing items, such as boots, down jackets, gloves, and mittens wear out very quickly. There is always a need for a large reserve supply of such items, because if soldiers use improper or worn out clothing, even for a very short time, the chances of developing altitude- and cold-related sicknesses increase significantly. Soldier efficiency also decreases very quickly. Planners need to identify requirements for such supplies and equipment and ensure that these are available to the soldiers at the time and place needed, as it may not be possible to send such supplies forward at a short notice. Similarly, ammunition boxes lying at the base of a mountain may be of no use because the fight might well be decided before they can be taken to the battle.

Appropriate shelters and heating arrangements are necessary for any sustained operations in the mountains. Based on my experience, high altitude tents are suitable for a short duration but should not be used for lengthy stays.

Combat and support present numerous challenges for casualty evacuation. Air evacuation remains the preferred method. Because of the dispersed nature of troops, expert medical help may not be available instantly. Therefore, self-aid, buddy help, and the availability of more combat life savers in the unit is very important[56]

There are some useful observations from the current US operations in Afghanistan.Equipment such as the Canadian small unit support vehicles (SUSV), specially designed for restrictive terrain, was particularly useful for logistics at high altitude during combat in Afghanistan. Other equipment, such as the bulky *ground held laser designating system,* did not prove very handy. The personal load of more than fifty pounds also was too much for the soldiers at high altitude. Equipment need to be upgraded for future mountain warfare.[57]

CHAPTER 3

TRAINING FOR MOUNTAIN WARFARE

The performance of mountain divisions in the Second World War has amply demonstrated that the achievements of these troops justify their special training.The 10th U.S. Mountain Division was involved in the capture of Riva Ridge in northern Italy (5,500 feet clearly demonstrating their superior skills in mountain warfare.[58] A study conducted by the U.S. Army historical section concluded that the special mountain training given to the 10th Mountain Division was extremely beneficial.[59] Similarly, the Germans 5th Gebirgs Division marched more than 400 kilometers, crossed mountain passes above 2,000 meters, and secured well entrenched Greek defenses on the Mestksas Line against a determined opposition.[60]

The need for specialist training has also been highlighted in the thesis, 'Mountain Infantry- -Is There a Need.'[61] One of the important conclusions by the author is that light infantry can also gradually adjust to the mountain environment but would require extra time and training. The recent operations of U.S. forces in conjunction with other allied armies have only confirmed the need for specialized training for mountain warfare and high altitude combat. An analysis of these operations by CALL clearly recognizes that soldiers with mountain experience exhibited exceptional morale, physical stamina, and technical competence in decisive combat operations. It also recognizes that coalition forces specially trained in mountain environment are better trained.[62]

Acclimatization Training

The purpose of acclimatization is to prepare troops mentally and physically for mountain and high altitude environments. This activity can only be carried out in mountain terrain. Acclimatization is only effective while the soldiers remain in the environment. The recent experience of British commandos who operated in Afghanistan is a classic example. After completing a tour of duty in Afghanistan, they went back to the UK. The same troops found that they needed to acclimatize again to train with the U.S. Marines in the mountains of California after this period of leave.[63]

Mountain troops are generally stationed at high altitudes, where they can maintain a high standard of physical fitness. The German alpine troops in World War Two were stationed at the alpine regions of Bavaria.[64] They were able to carry out extensive route marches and other training activities, which prepared them for fighting in mountains. Soviet troops in the Transcaucasus region have an ideal terrain, where soldiers train at 2,500 meters.[65] Pakistan and India maintain a large number of troops on the line of control in Kashmir, which automatically provides ample opportunities for acclimatization. However, the U.S. 10th Mountain Division is stationed at Fort Drum, NY which is not in the mountains.

Although troops need to be acclimatized for any kind of mountain terrain, the duration and need depend upon the altitude at which the unit is required to operate. Acclimatization training for mountains below 13,000 feet can generally can be conducted successfully within three to four weeks. In the Pakistan Army, such training consists of the unit bivouacing at high altitude, where soldiers conduct routine administrative

activities, route marches, and hill climbing, which increases in altitude every successive week. This allows troops to increase their ability to function in the thin air environment and helps identify individuals with medical problems. Training is flexible and depends on the commanding officer's style. However, the key factor is increasing the attitude and intensity of training gradually to provide sufficient time for soldiers to acclimatize.

Acclimatization training for a high altitude environment is generally more rigid and cannot be abbreviated without serious consequences. Although the pattern of training remains the same, troops stay and train at an altitude between 8,000 and 10,000 feet for at least two weeks, followed by one month’s training at 11,000 feet. Here the troops carry out not only route marches but also conduct weapons firing, rock climbing, crevasse crossing, and other activities essential for functioning successfully at high altitudes. Thereafter the movement from 13,000 feet to forward posts, which are located at heights up to 21,000 feet, is carried out in stages. The basic principle followed is a one-night stay for every thousand meters increase in the altitude. In case an individual does not feel good at any particular stage, he stays there till his condition improves. He may even be recalled if his condition does not improve. All troops returning from leave have to repeat the acclimatization process. For these troops, it consists of at least ten days at 8,000 to 10,000 feet and subsequently one day for every thousand-meter ascent.

The important issues linked with acclimatization training are the availability of high altitude terrain and enough troops at any time in the operational area to ensure readiness without going through the lengthy process. From the U.S. Army perspective, the fact that the 10th Mountain Division is not stationed in a high altitude environment

and the soldiers are not acclimatized implies that any deployment to high mountains would require an additional two to three weeks of acclimatization. This is equally applicable to those units which have conducted mountain warfare training but currently are not stationed at a high altitude. Thorough physical conditioning was key to U.S mountain combat in Afghanistan.[66]

Leadership Training

Leadership training is extremely important for mountain warfare. The German alpine troops displayed strong leadership traits, based on their culture of 'aufstrieg'.[67] In the case of the Pakistani Army, it is considered a part of the overall training. The Soviet Army recognized the critical importance of junior leader initiative during its experiences in Afghanistan.[68] The U.S. Army focuses a lot on leadership but there does not seem to be any package designed specifically to train different levels of leadership in a mountain environment. Keeping in view the unique characteristics of the mountain terrain, leadership training needs to be built around the demands placed on different level of leaders in such environment.

Junior leader training Some of the essential traits required in junior leaders for mountain environments are initiative, personnel management, and mental toughness. In the Pakistani Army, most of these skills are learned through experience and exposure to the tough environment. During the combat deployment on the line of control in the hostile and active operational environment, junior leaders often to take out patrols,lead expeditions, and command posts despite heavy artillery shelling and adverse living and weather conditions. This helps in developing some of the leadership skills. The problem

with such training is that, since it is not identified as a separate and major area of training, the proficiency of junior leaders depends upon their individual experiences and the emphasis put into this training by their senior officers. At the U.S. Army Mountain Warfare School the emphasis is more towards gaining mountaineering skills rather than training combat leaders for mountain warfare.

The first step of leadership training should be to make leaders aware of issues and problems unique to mountain environment. Practical exercises and case studies based on historical experiences can help increase their awareness. This should be followed up by outdoors exercises, where they are placed in command of troops and assigned specific missions. Navigation, patrolling, raids, and ambush exercises should be conducted at an altitude above 8,000 feet. Tough choices and a time-compressed environment are ideal for building initiative and leadership skills. When a leader has the option to choose from various courses of action, he has to decide whether to take a rest or push along. If these exercises are carefully crafted, they should be able to test the limit of physical endurance of the participants. Moral dilemmas that force junior leaders to make tough choices between the physical capabilities of their soldiers and the mission accomplishment are essential for mountain warfare training.

Leadership training for the senior leaders Generally, senior leaders consider themselves well equipped for planning and conducting operations in any kind of environment. This is unfortunately not always true. From my personal experience, on the whole, commanders who served in the mountains as young leaders are far better at understanding and planning for this environment. War games and live exercises are

valuable tools in making senior leaders understand mountain warfare. Live exercises can especially illustrate human limitations in such an environment.

Individual/Team Training

Most of the armies from countries with mountain terrain have well established training institutions. These schools generally train select individuals from various branches in a variety of courses designed for winter and summer.

The location of these training institutions is the first important consideration for mountain training. The Pakistani Army High Altitude School is located at Rattu in Northern Kashmir, an ideal location on the confluence of three mighty ranges, the Hindukush, Himalayas, and Karakorum. This advantageous location facilitates the conduct of a wide variety of training, including mountain climbing at peaks ranging from 15,000 to 20,000 feet, survival on glaciated terrain, and survival on snow and icy conditions most of the year. The Indian Army has a number of schools for different specialities, including the high altitude warfare school at Gulmarg (8,000 feet).[69] Another recently established Indian high altitude commando school is located at Tawang (15,000 feet) in Arunchal Pradesh. It is interesting to note that this new school was established after the Kargill conflict, which clearly demonstrated the need for specialized training for high altitude warfare.[70] The U.S. Army Mountain Warfare School is located in Vermont, while the Marine Mountain Warfare School is located in Bridgeport, California.

The purpose of all these training institutions is to train individuals who can not only survive but also take advantage of the extreme terrain and weather conditions in the mountains. Such individuals provide a nucleus of trained manpower for their units. The

U.S. Army Mountain Warfare School is a premier institution which trains individuals for all weather conditions

Physical conditioning is the first prerequisite of mountain warfare. Keeping in mind acclimatization requirements, physical training should be progressive, starting from light physical exertion, followed by route marches and mountain climbing, and culminating in test exercises in difficult terrain. Most of the schools have similar programs for this purpose. Although a lot can be achieved by training individuals at heights up to 10,000 feet, in order to develop high altitude skills some part of this training should be conducted above 13,000 feet.

Mountain mobility Any trained individual should be at ease when negotiating mountain terrain. The ability to navigate and move across difficult terrain not only builds confidence but also enables individuals to plan and execute maneuvers across seemingly impenetrable and inhospitable terrain. The small unit mountain operation exercise conducted by the U.S. Army Mountain Warfare School is a good example.[71] The class is required to navigate to six different sites within a time limit. It incorporates a variety of skills needed to carry out successful actions in a time-compressed and competitive environment. Some of the skills that are frequently required during mountain warfare include use of rope bridges and vertical haul lines, and medical evacuation. Mobility in winter has additional prerequisites, including using snow shoes, skiing, and ice climbing. Crevasse crossing techniques and dealing with avalanche hazards are probably the most important safety skills. Summer training cannot fully impart the same value as winter training because the harshness of the elements cannot be experienced by the trainees.

Recognition and prevention of cold weather injuries Training in the proper use of winter clothing, weapons , equipment and the ability to recognize and prevent cold weather injuries is a key training objective. This skill is especially very important for officers and NCOs as they are the ones who enforce these practices in their units. Lectures, demonstrations, and practical experience can help oveercome these problems. In the Pakistani Army, based on numerous past experiences, standing operating procedures have been formulated for most issues, such as prevention of frostbite, high altitude sickness, high altitude pulmonanary edema, and high altitude cerebral edema. TheseSOPs have been very helpful for new students.

Another important learning tool is the personal experiences of the instructors who not only are experienced mountaineers but also have varying degrees of combat experience at high altitude. One of the recent commandants of the Pakistani Mountain Warfare School was Colonel Sher Khan, a world class mountaineer who has climbed some of the world's highest peaks, including K-2. The instructors at the U.S. Army Mountain Warfare school are topnotch mountaineers with vast experience; however, they have not been involved in actual mountain combat.[72] This is a limitation because they cannot fully appreciate or impart training which is specific and necessary to mountain warfare.

Winter sustainment . The U.S. Army Mountain Warfare School teaches winter sustainment through the use of the Akhio tent and stove group. The Akhio Sledge contains a ten-man arctic tent, a diesel-fired stove, fuel, and other basic supplies. Students conduct route marches and overnight bivouacs.[73] The commonly observed problem with

tents in Kashmir is that they are only good for a short time because of the greater wear and tear and the effects of blizzards and heavy snowfall. They are not the preferred means for living at high altitude. Semi- permanent structures, such as fiberglass igloos, are more comfortable and can be shifted easily, which is often required at high altitudes. Other permanent structures, such as those made out of stone and corrugated Iron (CGI) sheets, provide protection against small arms and artillery sharpenal. Since the duration of combat cannot be predetermined, winter sustainment training must also incorporate construction of rudimentary stone shelters, as well as the installation of fiberglass igloos. Soldiers should also be trained to carry awkward loads, such as CGI sheets, wire, gas stoves, wood, and steel girders, across difficult terrain and steep slopes.

Protection is another important consideration, along with shelters and sustainment. In the Pakistani Army, soldiers are proficient in constructing shelters out of stone and CGI sheets. Kerosene oil cans, when filled with water and allowed to freeze, provide ideal protection by creating an effect similar to sandbags. The Finnish Army also improvised very well during the Soviet-Finnish War in 1939 by constructing underground heated shelters, which provided secure and comfortable bases for their ski patrols.

Unlike in other terrain, protection trenches are difficult to dig and even more difficult to maintain in the snow season because of the difficulty of keeping them open . They are also exposed to extreme weather conditions unless covered. This means that more often than not the living shelters will be the only suitable place available to soldiers. In a noncontiguous and nonlinear battlefield environment, soldiers have to be adept at

utilizing available resources to build some sort of protection around their winter shelters. Unless these are protected against artillery sharpenal and small arms fire, they can be very lucrative targets for raiding parties and artillery fire.

Conduct of small unit combat Once the trainees understand the peculiarities of mountain terrain and its effects on combat, the next logical step is small exercises involving patrolling, raids, and ambushes. This should help them understand the relation between mountain terrain and tactics. These exercises should incorporate use of mountaineering skills gained by the trainees and an enemy situation which tests their ability to modify traditional tactics to mountain terrain. These exercises will help build leadership skills, including initiative and flexibility, as well as team spirit, which is so important in a tough environment. Although there is no dedicated opposing force in the Pakistani or US Army Mountain Warfare School, I feel strongly that it is absolutely invaluable to incorporate one in order to help create a realistic environment and bring out very useful lessons.

Collective Training

Collective training provides an opportunity to test units and formations in an actual mountain environment. It reinforces and builds upon the skills gained through acclimatization and individual training. More importantly it allows commanders to check the viability of their assumptions and plans in a realistic setting. Another key element of this training is the synchronization and coordination between fighting and supporting arms and among all the battlefield operating systems.

Collective training is a regular part of training for the mountain troops in the Pakistani Army. It is carried out both in the winter and summer. Since altitude is an important consideration, units in reserve train at heights similar to those at which they are expected to fight. For the units which are already deployed in defensive positions, this training includes communication, adjustment in defensive positions, and counterattacks by reserves . The level of training varies from battalion to corps . Primarily it is mission-centric, based on the nature of tasks assigned to the units; it includes both offensive and defensive tasks, as well as many small unit actions.

The exercises are conducted with and without an opposing force. I believe that the real essence of mountain warfare cannot be fully assimilated without an active opposing force. Not only does it bring reality to the training but it also forces commanders to make difficult decisions.

The U.S. Army does not conduct collective training specific to mountain warfare, but rather it focuses more on survival training rather than high altitude combat.[74] The Marines conduct training at battalion level at the Marine Mountain Warfare Training Center. However, this training does not include artillery, engineers, and other supporting arms, nor do Air Force and aviation assets participate.[75] Keeping in view the unique requirements of mountain and high altitude environments, this can be a serious limiting factor for coordination and synchronization of all participating units and assets. It can easily lead to wrong assumptions about each other's capabilities and limitations and faulty planning.

Collective training can only be useful if all battlefield operating systems are incorporated. As Operation Anaconda clearly demonstrated, fighting in the mountains is not a special operation or exclusively a domain of infantry.[76] It involves logisticians, avaition, artillery, communications, and air assets. With the level of sophistication in all these branches and services, there is an even greater need for collective training in order to fully utilize their unique characteristics.

Branch Specific Training

As discussed earlier, advanced technologies are not necessarily in mountain terrain as in other environments. All branches and services need to train for this environment to understand the capabilities and limitations of their equipment. As an infantryman, I am not really qualified to talk about training requirements of other branches and services; however, based on my experience of their operations and interaction with infantry, I would like to highlight certain areas of training.

Aviation is critical to mobility, timely logistics, and precision firepower. Pilots should be well- trained in mountain flying and in understanding an infantryman's problems in mountain terrain. The Pakistani Army's 8th Aviation Squadron supports operations in Kashmir. Pilots have hundreds of hours of combat flying experience. They not only understand the mountain environment but also train new pilots. With the enhanced capabilities of Apache helicopters to acquire and engage targets beyond visual range, U.S Army pilots need to conduct firing in the mountains in conjunction with ground troops to fully utilize this capability. The Russians recognized the need for close coordination between avaiation and ground troops during their war in Afghanistan.[77]

The U.S. experience in Afghanistan highlighted the need for attack aviation to train with special operations forces and to practice using night vision devices.[78] Similarly, the pilots for cargo and troop carrying helicopters also need to train in mountains in different weather conditions. High altitude training combining AH 64 and CH 47 helicopters is an essential part of training for high altitude combat.[79]

The U.S. Army has a variety of sophisticated communication equipment. Although some equipment works well in the mountains, other requires improvisation and alternatives. FM communications are ineffective due to high altitude and operating distances.[80] Shifting retransmission stations and using the equipment in different weather conditions is essential to provide a variety of options to communication providers and users.

Engineers are the key to mobility, countermobility, and survivability. Engineers need to train and work in mountain and high altitude conditions. Constructing shelters, laying mine fields, providing clean water supply arrangements, and constructing bridges and road all are different in the mountains. The type and quantity of materials and equipment required can only be ascertained by training in a mountain environment.

Artillery units need to train in mountains to ensure optimum fire support under all circumstances and all weather conditions. The selection of gun positions and the shifting and readjustment of guns by air, as well as ground transport, to support various tactical contingencies require training and experience. Observation and fire direction in mountains also require training. practice and experience determinest the advantages and disadvantages of using various types of ammunition in mountain terrain.

CSS elements also require training for mountain environments. They need to understand how best to utilize a mix of transport, including trucks, aircraft, porters and mules. By training under real mountain conditions, they can identify the differences in logistical calculations for mountain environments. Other issues, such as protection of logistic bases are equally important , since Soviet logistic bases in Afghanistan were often successfully attacked and destroyed by theMujahideen.[81] Training of drivers to negotiate steep mountain roads can be addressed through such training.

Doctors and medical staff also need special training to recognize and treat mountain and high altitude related injuries and illnesses. In the Kashmir, doctors see all kinds of patients and are fairly confident dealing with them. The medical personnel accompanying German mountain troops were experts at treating frostbites, snow blindness and other problems.[82] The Soviet Army instituted more than one hundred hours of training through a special course for their doctors and medical staff.[83]

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

Training for mountain warfare not only prepares troops and commanders for harsh mountain conditions but also develops those essential qualities which are useful in many other fighting environments. There are certain areas which the U.S. Army should consider in order to create a truly mountain-trained force in a short period of time. Certain recommendations in this regard are listed below.

Additions to FM 3-97.6. The manual for mountain warfare is quite detailed, but there are some areas which still need to be addressed:

1 The need to differentiate between the relatively low mountain and high altitude environment The first requirement is to clearly define the mountain and high altitude environments. Since combat above 13,000 feet require additional skills for infantry, as well as supporting arms and logistics, there is a need to discuss the peculiarities of high altitude environment separately. This would help planners and operators to understand the true nature of actions they are likely to undertake. They would be able to identify the planning constraints at the outset, especially with regards to limitations on employment of infantry and mechanized forces, battlefield operating systems, and logistics. It would also help in putting in the right resources to the task at the outset.

2. Emphasis on leadership issues in mountain environment Since leadership is the the most important factor in winning battles, there is a need to stress the leadership challenges in mountain and high altitude environments and training which can help

leaders to meet these challenges. At the junior level the areas which need to be highlighted are:

a. Leading by personal example, which requires both physical and mental stamina.

b. Understanding the effects of mountain terrain on an individual's mental and physical capabilities and leadership challenges related to such situations.

c. Understanding specific health and hygiene issues and how to deal with them.

At the organizational level, there is a requirement to highlight the effects of mountain terrain on the soldiers physical and mental capabilities and the need for detailed and meticulous planning. This would help senior leadership plan realistic operations and resource them properly. Historical vignettes, as included in other parts of the mountain warfare manual, should also be used to substantiate these aspects of leadership.

Training at the US Army Mountain Warfare School This training is extremely professional and effective. The skills and techniques used for mountaineering and survival are the latest and most advanced. There is, however, a need to establish greater linkage between these skills and tactical combat at high altitude. Some of the areas that need consideration are:

1. Minor tactical exercises. Platoon and squad exercises should be included in the training program. These exercises should involve both mountaineering skills and minor tactical actions, such as patrolling, raids, and ambushes. The participants should be able to coordinate and call for artillery, air, and aviation support. The exercises should be

designed to test the physical and mental capabilities of leaders and soldiers and their ability to adapt their tactical skills to the unique mountain environment.

2 Combat Experienced Instructors. The instructors at the Mountain Warfare School are expert mountaineers but lack combat experience in mountains. This is a serious limitation when training troops for mountain and higher altitude combat. This limitation can be addressed by posting officers to the Mountain Warfare School who have served in Afghanistan. They would be able to highlight the impact of mountain environment on individuals, as well as weapons and equipment. Their own experiences would be useful in making the training more focused on mission-essential skills.

3. Cross Training With Allied Armies. The US Army Mountain Warfare School should conduct training with allied armies, such as Pakistan, which are involved in mountain warfare and have officers and men with years of combat experience. Instructors can visit training schools of these armies to gain valuable input from veterans of mountain and high altitude combat. Similarly, instructors and students from friendly countries can benefit immensely from the latest mountaineering techniques and equipment being used by the US Army.

Collective Training. In order to develop mountain warfare capability, the U.S. Army needs to conduct mountain warfare training at the brigade and higher level. This training should incorporate all the battlefield operating systems and should be conducted in a high altitude environment. This training should be designed to achieve the following:

1. Test the ability of units and formations to conduct sustained combat operations in a high altitude environment.

2. Involve all battlefield operating systems, including communications, artillery, engineers, and aviation. They should be involved in conducting all those activities and movement in the mountains that they are required to undertake to support maneuver.

3. Include close coordination with aviation during movement and fire support.

4. Incorporate all aspects of logistics, including supplying the troops with a variety of resources plus casualty evacuation, using both air and ground resources.

5. Include doctors and medical staff in training to evaluate and address symptoms of high altitude and mountain sickness.

Creation of a dedicated opposing force. Realistic mountain warfare training is only possible with a dedicated opposing force which is trained for mountain warfare. As in any other training, this could provide valuable lessons and highlight the weaknesses in planning and execution of operations. Even a company sized force with suitable resources can be very useful in depicting a realistic enemy situation up to brigade level exercises.

Maintaining operationally ready mountain troops. The 10th Mountain Division in its current organization and training is not really trained for mountain warfare. In case the U.S. Army decides to maintain this division as a truly mountain warfare capable and readily available force, the following aspects need to be considered:

1. Location. The 10th Mountain Division is presently stationed at Fort Drum. Although this location is well suited for cold weather training, it does not meet all the training requirements of mountain warfare. This location is not suitable for acclimatization training, without which the division cannot be expected to be

operationally effective in a high altitude environment at short notice. The ideal location for the division would be at a post located in the vicinity of mountains which are above 13,000 feet. This would provide opportunities for troops to be trained in a high altitude environment and maintain their combat effectiveness at high altitude. In case the entire division cannot be garrisoned at such a location, an alternative would be to keep at least one brigade at such an environment at all times and rotate the brigades between a high altitude environment and a standard post. This would allow the U.S. Army to have at least one readily available brigade at all times while the other equally trained brigades can be available within a short period after acclimatization.

2. Maintaining the level of expertise. This would be another issue in the U.S. Army, as the troops do not have permanent affiliations. If the 10th Mountain Division is to be a true mountain elite force, there is a need for more permanent affiliations for both officers and men. Ideally sixty to seventy percent of the units should be mountain trained at any time. Such a pool of well trained officers and men would be very useful for maintaining a high level of expertise and training. This requirement is equally applicable to the artillery, engineers, aviation, and all others affiliated arms and services in the division.

Changes in organization and equipment. Certain equipment should be included in the organization of the mountain divisions. Equipment such as the Canadian Small unit suport veichle is particularly useful for logistics at high altitude. The bulky GHLDS needs replacement. The U.S. Army needs to maintain at least one animal transport regiment of mules with its own trainers and handlers to augment existing logistic support.

Operation Anaconda demonstrated that a soldier carrying up to fifty pounds of weight cannot function efficiently at high altitude. There is a need to reevaluate and reduce the combat load for the soldier in the mountains.

CONCLUSION

The U.S. Army has a distinguished history of mountain operations during the Second World War. The 10th Mountain Division proved its utility as an elite mountain trained outfit in the Italian Campaign. More than half a century later, the experiences of Operation Anaconda in Afghanistan again highlighted the need for specialized training in mountain warfare. As the events in Afghanistan demonstrated, the United States cannot rule out operations at high altitude in the contemporary operating environment. The United States Army has already embarked on an impressive transformation program which is intended to meet the challenges of the twenty-first century; expert mountain troops available for deployment at a short notice should be a part of this transformation. The United States Army already possesses the necessary prerequisites for creating such a force. Maintaining well trained mountain specialists is a sound investment for the future.

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