



THE IMPACT OF MOUNTAINEERING AND CLIMBING ON THE ENVIRONMENT

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ABSTRACT

The purpose of this study is to demonstrate the environmental impact of mountaineering and climbing. In recent years, they have become one of the enticing sports practiced by amateurs and athletes.

The results obtained unequivocally reveal that a commitment of the organizers to the protection of the environment and the natural resources of the mountains and rocks is needed. This includes the protection of endangered plant and animal species, their ecosystems, and the environment.

Conclusion: The joint efforts of various institutions are needed in order to increase the popularity and awareness of the commented sports, which should be realized under optimal environmental conditions and not violate its ecological sustainability. This requires a current environmental policy and education aimed at future development in this direction. Mountains and rocks are a limited resource that must be shared by climbers and climbers with different interests and from different generations.

Key words: mountaineering, climbing, ecology, conservation, environment.

INTRODUCTION

In recent years mountaineering has become one of the enticing sports, which is practiced all year round by amateurs and athletes. On this basis, an organized climbing and securing technique was developed. The active participation of each member of the liaison in the passage of complex and difficult passages, in the organization of bivouacs, precautions, overcoming the harsh climatic and meteorological conditions, as well as in other activities related to the ascent, contributes to the end result (1).

Mountaineering originated before sport climbing and before modern alpine climbing, which requires climbing skills, so it is accepted that mountaineering as a concept includes other types of climbing.

Climbing is a multifaceted sport, different from the others, and each type is distinguished

by its specific features. The motivation for people participating ranges from seeking contact with nature, coping with stress, healthy lifestyle, seeking adventure and risk, etc. It is no coincidence that in recent years sport climbing is extremely popular as a recreational and competitive discipline. While climbing an artificial wall in a gym takes place in a comfortable environment and can be compared to other classic sports, alpine climbing, especially during the winter season and at high altitudes, puts the climber in extreme conditions (2).

Many years before mountaineering became a purposeful activity, people made their first contact with the mountain. At the dawn of human civilization, attempts were made to penetrate the mystical mountain peaks. Almost all ascents to some more accessible peaks are aimed at sacrifices and worship (3). From the very beginning, people's attitude towards the mountains has been emphatically religious, full of awe (1). According to ancient Greek mythology, Mount Olympus, the highest in the imagination of Greek civilization, is inhabited by gods. This cult is even more pronounced

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among the eastern peoples. Despite the fears, people began to enter the mountain peaks, albeit timidly (3).

In antiquity, for various reasons (military, economic, social, etc.) mountain passes in the Alps and the Hindu Kush were overcome, some of which are between 2,500 and 4,000 m above sea level. Many find their death due to ignorance of dangers, underestimation of the difficulties of mountain terrain, avalanches and stone falls, low temperatures, decreased barometric pressure – factors uncharacteristic of plane living conditions. Despite the superstitious fears of religious fanaticism and unexplained natural phenomena, people were heading to the mountains for purely economic and social reasons (3).

During the Middle Ages, the attitude towards mountain peaks gained a pronounced religious character. In the setting of dark church dogmas, people thought that the severe natural disasters – avalanches, floods, ice hazards – were the result of the wrath of God, and therefore, as a „precautionary“ measure, the mountaineers raised crosses to the tops.

With the development of society, scientific interests for the study of natural phenomena and laws characteristic of mountain conditions arise. All this necessitates the establishment of certain rules and norms of behavior in the mountains in view of the safety of human activity (3). Gradually, in the quest to conquer the alpine peaks, a new, up-to-date attitude towards the mountain was born. **These are the main motives for climbing the peaks - strengthening health, enriching human knowledge and spiritual enjoyment of experiences** (4).

The word alpinism comes from the name of the Alps mountain range in Western Europe, where this sport discipline originated (5).

D. Bardarev (1991) gives a broad definition, placing the problem of alpine activity as a whole. „Alpine activity in mountainous conditions is a broad and complex concept. It includes not only the specific exercises for walking on rocks, snow and ice but also the preliminary preparation, approach, reconnaissance and solving of a complex of tasks when climbing the route itself“. (6)

The qualities of a mountain according to the famous mountaineer Reinhold Messner „...are

determined by its danger, dimensions and height. These parameters give us a chance to gain experience, but on the other hand, they are a barrier that protects the mountain from inexperienced climbers and mountaineers“ (7). The mountain is the main object for practicing mountaineering. This confirms that one must be sufficiently acquainted with the peculiarities of the specific conditions to undertake any such endeavors.

Famous passes in the Alps - San Bernard, Brenner, Saint-Gotthard and Mont Seny have been conquered since Roman times. The movement through these passes determines the emergence of a new category of officials - alpine guides. They were the first to use special, albeit primitive, equipment - walking sticks, claws, hatchets (1).

The world-renowned Professor of Natural Sciences from Geneva Horace Bénédict de Saussure (1740 –1799) contributed greatly to the development of mountaineering. He organized a large expedition to Mont Blanc with 18 guides and porters. On **August 3, 1787**, the peak was climbed. This date is considered the **beginning of mountaineering** (1).

The improvement and application of modern technical means (ropes, wedges, ice picks, claws) in the 30s of the XX century allowed the ascent of the world-famous walls in the Alps, some of which were previously considered impregnable (1). Pioneers in the discovery and exploration of our mountains are mostly foreign travelers. Only at the end of the 19th century did the representatives of the young Bulgarian intelligentsia make sense of mountaineering from a scientific and cultural point of view. The scarce material base, the lack of huts and shelters, the many unknowns were serious obstacles for the first mountaineers (1).

At the dawn of the nascent tourist movement in Bulgaria, the young medical student Paraskev Stoyanov, in 1895, with the help of a guide, climbed the Grand Combén peak (4318 m) in the Alps. This is the first ascent of four thousand by a Bulgarian. Later, in 1903, Ivan Maleev, a young physician in Lyon, climbed Mont Blanc.

August 13, 1967 is a historic date for native mountaineering. The 7,000-meter high border was crossed in the Pamirs by six Bulgarians. In

the following 1968, premiere ascents of two unconquered peaks in the Pamirs were made and they were given the names Shipka (6254 m) and Bulgaria (5666 m) (1).

Glorious and dramatic for Bulgarian mountaineering is 1984. The second national Himalayan expedition to the peak of the planet Everest (8848 m) was conducted. The peak is climbed by Bulgarian climbers on one of the most difficult routes - the Western Ridge. On April 20, Hristo Prodanov reached the top late in the evening, without the use of an oxygen machine. In the area of about 8700 m, he died of exhaustion. The second attack was successful, with both liaisons ascending the summit and descending through the South Saddle (1).

Modern mountaineering in all its forms is increasingly tied to environmental problems, thus making a huge contribution to the ecologization of culture and the preservation of mountains. The maxim that the mountains should be kept clean and intact for future generations favors the development of „free climbing“ and improvement of equipment, facilities, sports training (3).

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The mountainous areas occupy a significant part of the territory of Bulgaria. The specific character of the Bulgarian mountains is the relatively low altitude and accessibility. They have a peculiar appearance, differ in height and territorial range (8).

The following two main trends for the development of alpine activity are outlined. The first, as a sports discipline for elite climbers in high mountain areas, and the second, as an amateur activity in mountainous areas of low and medium height (without problems for acclimatization). In low- and medium-altitude mountainous areas, the dominant ecosystem is that of forests, and alpine sites are often found above them. Bare rock formations appear scattered in various places in the mountains. They are special areas

that provide habitat for typical or remarkable plant and animal species of great ecological importance. Alpine activity in the lower and middle parts of the mountain can lead to serious conflicts, as the rocks that are suitable for mountaineering and climbing are scarce. Climbing in these hills is almost always classic climbing, which doesn't require any technical aids, well-known tours are preferred, whose starting points are easily and quickly accessible (9).

One of the alternative forms of tourism is trekking. Suitable for its practice are near and far destinations with pronounced mountainous terrain and exotic landscape, way of life and culture. Depending on the goals, duration and difficulty, trekking can be a suitable activity for people of different ages, genders, functionalities, ambitions and interests (10).

In recent years, trekking has quickly become a preferred form of hiking in the mountains. This kind of organization allows many people, without special Alpine training, to experience exotic corners of the planet, to face the giant peaks, and to admire the grandeur and beauty of nature in full unity with it (11).

According to D. Bardarev (2007), the concept of trekking is the latest evolutionary form of mountain tourism. Its essence is expressed in travel on foot, by ski or by other means - horses, mules, yaks, dog sleds, etc., ie, travel away from civilization without the use of motor vehicles (8).

Around the world and in Bulgaria in recent years, along with the traditional forms of tourist services, new ones have emerged, such as rafting (inflatable boat descent in fast-flowing waters), canyoning (alpine descent in waterfalls), via ferrata (rail - climbing) on secure natural rock routes) (10).

For centuries, the amazing rock formations in the lower parts of the mountains have been relatively intact by man. Thus, natural habitats with a rich diversity of plant and animal communities, which can hardly be found elsewhere in intensively cultivated lands and pastures, have survived here.

Bare rock formations are characterized by harsher conditions (large daily temperature difference, strong winds, intense solar radiation and a number of other unfavorable factors). Plants and animals adapted to such conditions very often appear on the list of

endangered and extinct species. Areas with rock formations, together with several groups of biotopes (natural alluvial ecosystems along rivers, reeds, wetlands, muds and swamps) are the last undisturbed primitive habitats. The rocks and adjacent areas are the only places where many species have survived the ice age.

The following forms of alpine activity in the mountains are susceptible to negative impact caused by climbing and need special protection:

Hill climbing: This is the classic form of Alpine activity. Initially, lower peaks are climbed, after which climbers head to the steep slopes of the high peaks. The European mountains have always been of interest, and subsequently, the eyes are turned to the eight-thousandths of the planet. In this way, high-altitude mountaineering designed for elite climbers is born;

Climbing walls and ridges: This form is an extension of mountain climbing, associated with overcoming greater difficulties, climbing the walls and edges that lead to the peaks of the mountains. Rock walls with crevices along the edges shelter a variety of flora and fauna. Plant and animal communities are very sensitive to external disturbances. The vegetation that is there is particularly susceptible to damage. It is not uncommon for rock birds to nest between rock niches, using these formations for take-off, landing and resting places;

Traverse: A form of alpine activity which is the successive ascent of several peaks along the edges connecting them and of similar technical complexity;

Sport climbing: A form of alpine activity, which is an individual competition on pre-prepared routes on rocks or on artificial structures in a hall, built with a shape and relief similar to natural rocks (1).

Ski mountaineering: Combined form of moving a mountain route with skis and overcoming rock formations by applying climbing techniques and securing.

The following adverse effects on characteristic or important plant and animal species have been identified as a result of:

- **Trampling:** Such direct mechanical action destroys a number of plant species. It can negatively affect the entire habitat in the long term. In practice, the impact is less on the rock wall itself and more in those areas where climbers ascend and descend from it;

- **Tearing and uprooting:** Mechanical impacts affect the unique plant genome (flowers, berries, medicinal plants, mushrooms, grass and wood-shrub vegetation) in mountainous areas and cause a change in the structure of the biotope. The stability of the rocks depends mainly on the properties and features of the rock itself – mineral composition, construction, structure and density. In some places, human activity has caused significant changes as a result of the indiscriminate tearing of plants with poor renewable abilities;
- **Damage and deliberate alteration of the surface of the rocks:** Modification can result from rubbing a rope on the rock surface, activities such as carving grips, steps or removal of organic and inorganic substances when moving on rocks;
- **Ignoring the fragility of rocks:** Weathering and slope processes are directly dependent on climatic and meteorological conditions. They cause freezing and thawing of the surface soil layer, snowmelt, the formation of ice wedges in rock crevices and the course of erosion processes disturbing the eco-balance;
- **Introduction of substances:** Organic (including excrement, campfire ash and camping waste) and inorganic waste can cause soil eutrophication. As a result, rare plant species have been replaced by more easily adaptable and common plants;
- **Disturbances of birds:** The most important for the birds in Bulgaria are the rock massifs with low and medium altitudes (up to 1500 m above sea level) Birds prefer to nest on rocks with diverse relief. A typical example in this regard is the limestone rock massifs, on the plumbs of which niches, platforms and cornices are often observed. During the breeding and nesting season of rock (petrophilous) bird species such as bald eagle, griffon vulture, Egyptian vulture and peregrine falcon, we must comply with seasonal restrictions on climbing and access;
- **Disturbances on snakes:** Climbers and mountaineers demonstrate a significantly greater fear of encountering snakes. *Zamenis longissimus* is a mountain inhabitant over 700 m above sea level, especially in places where the tours pass through deciduous forests. *Vipera ammodytes* is the most common venomous snake in Bulgaria. It is usually on sunlit

climbing sites up to 1300-1400 m above sea level, where it lives in overgrown rocky terrain under the rocks. The viper (*Vipera berus*) is found in humid places above 1400 m above sea level. In case of contact with it, the place should be bypassed. The Caspian whipsnake (*Dolichophis caspius*) can be seen on dry and sunny slopes up to about 1500 m above sea level. This is one of the largest snakes in Bulgaria, which inhabits the base of many of the climbing sites and especially in those located in open and sunny areas. The *Coronella austriaca* is a relatively small and safe snake: it is often found in the areas around almost all climbing sites in Bulgaria. In the mountains it reaches about 1600 m;

- **Disturbances of lizards:** Lizards most commonly seen on and around the rocks are the wall lizard (*Podarcis muralis*) and the green lizard (*Lacerta viridis*). Green lizards are often on rocks in the deciduous vegetation and at the base of the rock massifs. Usually under rocks and fallen leaves, at the base of climbing objects is the legless and completely harmless, similar to a small snake lizard - *Anguis fragillis*;
- **Disturbances of bats:** About 8 species of bats live in rock crevices and their encounter in the massifs of climbing sites is to be expected. In the southern, regularly sunlit crevices of the rocks, bats can live all year round. All bat species are strictly protected by the Biodiversity Act. The midnight bat (*Eptesicus serotinus*) often inhabits rock crevices and interblock joints. It is found all over the country and prefers mountainous areas. The brown bat (*Pipistrellus pipistrellus*) lives in all sorts of rock holes, interblock crevices and joints. Due to its small size, it can enter even very small holes, in which climbers usually place climbing cams, wedges and clamps.

Access and strategies of the organizers about the protection of the rocks:

- full access (in terms of time and space) to these rocks, which can be climbed without causing significant environmental damage;
- prohibition on climbing rocks or directing climbers to artificial climbing walls.

At this stage, attempts are made to determine which rocks are suitable for climbing. It is extremely important to understand which of them can be climbed without causing serious harm to plant and animal communities. Required information is:

- which rock should remain completely banned for climbers (complete ban all year round);
- which rock can be climbed at least in some parts or in certain periods without causing significant environmental damage;
- which rock can be climbed only during certain hours or only in certain areas. It is sufficient to ensure that the activities are coordinated in accordance with the standards of „environmentally friendly“ climbing (without removing vegetation) (12).

The following measures for the protection of the mountains require attention when formulating a schedule for the use of rock areas:

- **Guarantee of the right to defense:** Rock formations are of great ecological importance. They are often an important part of ecological corridors. For this reason, we must make sure that the climbing schedule does not damage the valuable ecological qualities of the rocky areas during the ascent and descent activities (13);
- **Contradiction between organisers and environmentalists:** Disagreement over which changes in nature should be seen as „significant“. Environmental studies must therefore be carried out carefully and any protection measures or policies resulting therefrom must have a scientific basis(13);
- **Role of the organizers in wildlife conservation:** The opinion of the organizers in the planning process makes it possible to make an objective and fair decision. It is important to adopt adequate provisions to make their implementation easier (13);
- **Utilization of the areas that meet the conditions for climbing:** Each rock area must be carefully assessed on-site. The different natural conditions found in a rocky area (such as the quality of the habitats of some species, the extent to which the rock is exposed) must be considered in accordance with the ecological value of the area, its accessibility for climbers and the ascent it offers. The boundary separating the areas where the ascent is permitted and where strictly prohibited must be marked clearly. Rock formations that are free for climbing must be marked in such a way that all other rocks in the area are prohibited (14);

- **Management of climbers:** In order to guide sports enthusiasts away from ecologically problematic rock areas, nearby hiking trails or roads must be closed. They need to be marked, labeled and agreed upon in advance. If they are not designated, then climbers may choose such access as not to damage the soil and cause erosion (14);
- **Awareness and awareness-raising:** Climbers need to raise their awareness of environmentally friendly forms of behavior and realize that mountainous areas are not only places for sports, but also habitats of plants and animals worthy of protection. If they perceive these areas as habitats, they would have more appropriate behavior in nature. Only rocks where the ascent is allowed should be presented. Tourist guides and mountaineering portals must not undermine the objectives of wildlife conservation and the natural state of mountains and rocks (13);
- **Reducing the number of climbing tours:** The removal of existing climbing hooks on rocks and the closure of climbing sites, for environmentally friendly reasons, must be accompanied by information explaining to climbers the reasons for this (14);
- **Protection of rock sites used for climbing:** „Protection“ refers to the care and development of rock formations in a way that eliminates or reduces negative environmental and aesthetic effects on them (12);
- **Measures against waste pollution:** We need to keep the place clean by avoiding making any waste. It is desirable to reduce the use of disposable plastic products. Alpine and climbing equipment (accessories, ropes, tents and oxygen cylinders) must be removed from the mountain. In order to avoid harmful effects on the environment, waste must be collected and returned, incl. those left by others. Unfortunately, expeditions to Everest and other 8,000m show problems in this direction;
- **Providing environmentally friendly alternatives:** Rock sites that can withstand environmental stress and require almost no climbing restrictions, as well as artificial climbing walls, also fall into this category. Today, most climbers use artificial

climbing walls for training or relaxation outdoors, in gyms, shopping malls, high schools, universities.

CONCLUSION

The combined efforts of the organizers in building environmental competence and educating the users of these services are needed. The organizers must bear responsibility for the consequences and be committed to protecting the environment and natural resources. These sports should be realized under optimal environmental conditions and not violate its environmental sustainability.

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