

A DIDACTIC ITINERARY FOR THE INTERPRETATION OF THE PHYSICAL ELEMENTS OF THE SIERRA DE GUADARRAMA

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1. INTRODUCTION

In the beginning of the 19th century the Institución Libre de Enseñanza adopted field trips as a fundamental part of their new teaching approach. These afforded the best conditions to achieve a comprehensive education which integrated the whole person (Ortega, 1998, p.81-113). In 1886, Francisco Giner de los Ríos and Manuel Bartolomé Cossío organized the first teaching field trip of the Institution in the mountain range northwest of the Madrid region, the Sierra Guadarrama. This event was the beginning of a renewed regard for the landscape of the area and gave birth to a movement called *guadarramism*.

Since then, numerous authors have highlighted the indubitable educational potential of itineraries and field trips in the teaching of the social sciences in general and of geography in particular (Marrón, 2001; Sánchez, 1995; García, 1994; Gómez, 1986). They all coincide in the idea that visiting the terrain gives the students the chance of understanding and relating the geographical facts that would be hard to attain using any other resources, as it allows for significant learning through the field experience. In our opinion, visiting a geographical space can and should be considered the best tool to interpret, know and value a certain landscape unit. Only through hands-on analysis can we understand in any significant manner the role that each of the parts plays in the whole. That is to say, we will be able to identify the relationships between all the elements that make up the reality we are contemplating. García Ruiz (1994) considers that it is through field work that Geography becomes the best discipline to put the student in contact with spatial reality.

The design of the itinerary we are presenting is the result of our participation as teachers in the program *Madrid, un libro abierto (Madrid, an open book)* organized since 1984 by the Dirección General de Educación y Juventud, Sección de Educación Ambiental, of the Madrid municipality. The program is part of the seminar

Interpretación del paisaje (Landscape interpretation) aimed at students of the second stage of compulsory secondary education (ESO: ages 14-16), Bachillerato (16-18) and post-secondary vocational training (17+). It is composed of six places with a didactic interest. The goal is to allow the direct observation of the physical aspects of the landscape and their relation with the humans who transform it. The proposed stops make it possible to analyse traits of lithology, relief, soils, hydrography and vegetation in the Madrid segment of the Sistema Central mountain system.

2. THE ITINERARY

The locations chosen for this design possess characteristics that qualify them as places of didactic interest. Among them are the clarity with which the phenomena which intervened in the birth of its elements can be appreciated and the ease with which the relationships among them can be identified, such as altitude and vegetation, fracturing and the modeling of the rocky formations, and soil and relief. The itinerary, on the other hand, has as its setting the Bustarviejo and Canencia valleys, both catalogued as high-visual-quality landscapes (Aramburu et al, 2003) in which the degree of human intervention is relatively small.

The itinerary starts at kilometer 2.5 of the road between Miraflores de la Sierra and Canencia and all of it is located within the limits of this last municipality and of Bustarviejo. It ends at Arrollo del Sestil del Maillo, approximately at the 9.5-kilometer marker on the same road. During the first six kilometers we ascend from 1,200 m to a little more than 1,500 m at the Canencia mountain pass. From that point it descends by the North Slope down to 1,400 m, the altitude of the last place to visit.

These are the six places which make up the stops of the didactic itinerary. We also give the goals to achieve and the concepts to develop at each one.

First stop: Melojares de Bustarviejo

- To introduce on the terrain itself the concept of landscape and to identify the elements, both abiotic and biotic, which make it up.
- To learn the concepts of edaphic profile and horizon and to become aware of the fragility presented by the soil system.
- To identify the traits and taxons of the supramediterranean floor.

Concepts: landscape, biotic, edaphology, soil profile, edaphic horizon, humidification, erosion, shady slope vs. sunny slope, marcescence, biogeography.

Second stop: Arroyo Sardinero

- To identify the vegetable species associated with the great water courses.
- To understand the process of alteration of granitic rocks and to identify some of the resultant formations.
- To value and differentiate natural autochthonous forests.

Concepts: bioclimatic floors, potential and actual vegetation, ecological succession, riparian, climatic forest, granitic modeling, tors, fractured domo limb, perched boulder, alteration.

Third stop: landscape in the valley of Bustarviejo

- To value the importance of botanical elements in a landscape.
- To acquire cartographical skills such as: locating elements of the territory on the map, orientation, or interpretation of the map upon reality.
- To make and to interpret landscape charts

Concepts: Cañada Real, drovers' roads, Mapa Topográfico Nacional (National Topographical Map), scale, orientation, contour line, landscape interpretation charting, foothills, hydrographic basin, stream, spheroidal weathering, and alluvial fans.

Fourth stop: Canencia mountain pass

- To identify human intervention in the Canencia mountain pass landscape through the modification of plant cover.
- To appreciate the fragility of this natural space and to identify the problems generated by the pressure of tourism.
- To define the term bog and to know both its origin and its ecological and scientific value.

Concepts to work on during the stop: bog, quaking bog, granite disaggregation, mountain pass, hill, rivulet, visual impact, compactation.

Fifth and sixth stops: Canencia birch forest - Sestil del Maillo stream

- To understand the concept of relict forest and its fragility when faced with changes in the local environment or climate.
- To value natural spaces and to acquire sustainable behavior patterns that contributes to their preservation.

- To value the presence of unique trees and their importance for the landscapes in which they live.

Concepts: relict forest, biogeographical areas, unique tree, rounded boulders, blocks, deciduous, evergreen, biodiversity.

3. WORK IN THE CLASSROOM

As happens with other field activities, the results of the itinerary can be optimized if after the field trip other activities are carried out that consolidate the concepts that have been introduced. Marrón (2001, p.307-335) proposes three phases in the organization of the work: "classification and analysis of the information and materials collected during the fieldtrip, interpretation of their significance and establishment of interconnections and material expression of the results achieved". In relation to the last point, there are diverse resources that allow us to synthesize and express the information that has been gathered. Here a few of them are described briefly:

3.1. Cartography

This consists of mapping the different elements that have been studied: vegetation, lithology, topography and hydrographic network, among others, and then superimposing the maps in order to discover the relations extant among them. This activity develops spatial and cartographical skills and constitutes one of the best tools for understanding the structure and dynamic of a landscape.

3.2. Altitudinal zonation

Graphical expression of the altitudinal zones of both slopes of the itinerary, sunny and the shady, which allows us to relate vegetation with altitude and orientation. Icons can be used to represent the vegetable species that are significant for the landscape and their location on one or the other slope.

3.3. Photographic series

This is the graphical and synthetic expression of everything that has been studied on the terrain. It makes use of the material gathered during the itinerary and applies it to the interpretation of the visited space. The images can be both panoramic views and close-ups of the elements found at the different stops.

3.4. Presentations and interpretative murals

As a work of spatial synthesis murals can be made either dedicated to specific elements or to the landscape as a whole. The same contents can be used for classroom presentations either for the group participating in the activity or for a different group of students.

3.5. Landscape guide

Taking visual travel guides as a model, we can draft a document which using all the resources available, such as photographs, drawings, silhouettes, graphs and maps, will constitute an interpretation guide of the whole.

3.6. Topographical scale model

The landscape that was visited can be represented through a model that superposes layers following the contour lines. As in any other form of cartography, we can include information about vegetation, water courses, lithology and soil utilization in order to expose the relationships between the components of the geographical space.

4. CONCLUSIONS

Didactic itineraries constitute a first-order tool for the discovery, understanding and inter-relation of the physical elements that make up landscapes. Through these learning experiences, these elements and their role in the landscapes are understood as a functional unit. Through them we can approach concepts, procedures and attitudes in such a way that, based on the synthesis work in the classroom, they will provide significant learning without taking up any more time than other activities done exclusively in the classroom. Therefore, we believe that didactic itineraries –as well as other field work–can be the best starting point for attaining a comprehension of geographic facts within the teaching-learning process. As proof of the excellent results afforded by this type or resource we can refer to the numerous itineraries that have been published during recent years in different journals and congresses on geographical didactics (Cruz, 2011; Mínguez, 2010; Ruiz, 2002).

In our case, we have designed the itinerary with the foremost goal of developing skills for the recognition of the elements that make up natural landscapes in the Sierra de Guadarrama, as well as understanding of the relationships among them. Directly from the interpretation and knowledge of the systems that make up landscape stems a second goal: to value geographical spaces as an important part of the natural and cultural heritage of the Madrid region. These goals, as well as those that have been exposed at the beginning of the detailed description of every stop, have been reached in all the occasions when we have taken the itinerary in recent years.