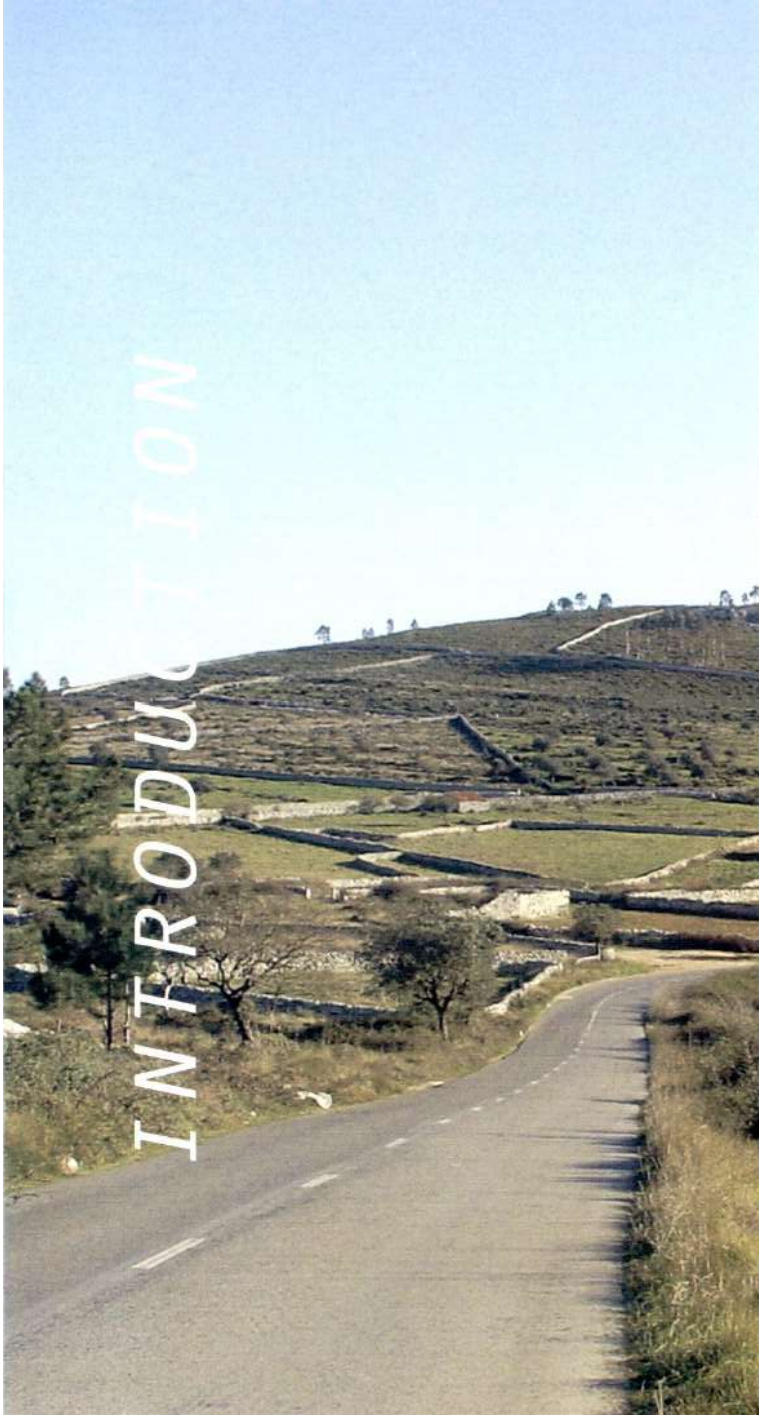


*Guide to*  
Walking  
Tours

*In the Aire and Candeeiros*  
*Mountain Ranges*  
*National Park (PNSAC)*







*GEOGRAPHICAL AND  
ADMINISTRATIVE AREA*

The geological and geographical individuality of the Aire and Candeeiros Mountain Ranges National Park (PNSAC) led to the creation of this Protected Area in 1979, with the passing of Law No. 118/79, dated May 4. This was not only as a result of the large number of limestone formations occurring there but also, and above all, because they are the most remarkable in Portugal. Later, in October 1996, the palaeontological remains of dinosaurs' footprints in the Serra de Aire were declared a Natural Monument.

The main aim of the National Park is to protect existing natural features as well as the architectural and cultural heritage, together with promoting local crafts and the renewal of the local economy in addition to offering opportunities for rest and relaxation in the open air.

The PNSAC covers an area of around 38,900 hectares, comprising 7 municipalities: Alcobaca and Porto de Mós in the district of Leiria; and Alcanena, Rio Maior, Santarém, Torres Novas and Ourém in the district of Santarém.

The Regulations covering the PNSAC and the Classification Plan were published in Law No. 91/98 dated January 12 and Order No. 21/88 dated January 12, respectively.

Law No. 140/99 dated April 24 revises the transfer to Portugal's juridical system of the Habitats Directive (92/43/EEC, dated May 21) which includes the site PTCON0015 - Aire and Candeeiros Mountain Ranges, passed by Cabinet Resolution No. 76/2000, dated July 5, 2000.



Arrabal

*GEOLOGY AND GEOMORPHOLOGY*

Except for small adjacent areas, the entire PNSAC is included within the Mesozoic limestone massif and the main geological constituents are almost all from the Jurassic period, in particular the limestone formations relating to the Dogger (mid Jurassic) period. There are also Cretaceous and Miocene formations on the south eastern and southern edges of the National Park that are part of the series of Miocene plateaux in the River Tagus Tertiary Basin. There are non-differentiated Plio-Pleistocene formations in the south west part of the Serra dos Candeeiros, modern and detrital formations and formations in "terra rossa" in the valleys and in enclosed depressions, with present day alluvia along some water courses and outcrops of eruptive rock, such as dolerite and similar rock, basalt and volcanic fissures.

From a morphological point of view, three sub-units can be differentiated in the Estremaduran limestone massif, corresponding with raised compartments - the Serra dos Candeeiros to the west, the Santo António Plateau to the centre and south and the São Mamede Plateau and the Serra de Aire, north and east respectively. By separating these sub-units, three depressions are revealed, caused by major fractures - the Mendiga depression, the Minde-Mira poldje and the Alvados depression, respectively.

For all these reasons, this is an area where the most remarkable and typical karstic phenomena are found in Portugal, for example dolinas, uvalas, poldjes and fields of lapiaz (limestone surfaces eroded by rainwater) in relation to the modelling of



Serra de Aire



Santo António Plateau



the surface and the existence of innumerable caves (more than 1500) that cross the interior of the massif.

Despite the absence of surface water-courses in this region, they exist in abundance in the subsoil, constituting one of the largest - if not the largest - freshwater underground reservoir in Portugal stretching between Rio Maior and Leiria.

Of the various karstic springs existing in the region, the best known and most important in terms of discharge is the Olhos de Água at Alviela that has been supplying Lisbon with water since 1880.

#### CLIMATE

The climate in the PNSAC region is characterized by displaying an unusual transition between Mediterranean and Atlantic weather conditions, being humid, with average temperatures and suffering from major water shortages in the summer.

#### FLORA AND VEGETATION

The area of the PNSAC is almost entirely located in the chanco-Mediterranean soil and climate zone. Of the existing vegetation, the most important is the Portuguese oak – a species found only in the Iberian Peninsula and North Africa but mainly in Portugal – where the best examples are found in wooded areas between the Rivers Mondego and Tagus where there is also black oak and very limited quantities of holm oak, cork oak, elm and chestnut. Basically speaking, as a result of man's action, the forest is gradually being destroyed, leading to the emergence of scrubland with a large number



Sink-hole



Mira-Minde Poldge



Doline



*Inula montana*

## □ INTRODUCTION



Portuguese Oak Copsse



Wild Rose



Lily

of flowers and a predominance, in terms of spontaneous vegetation, of shrublands with cocifera oak and areas of low-level shrubs that include rosemary.

The trees, bushes and grasses that grow spontaneously in the National Park are in themselves a target for conservation. Up to the present time, around six hundred plant species have been noted which means that in an area of around 39,000 hectares it is possible to observe approximately one fifth of the plant species occurring in Portugal. Some exist only in Portugal, others in the Iberian Peninsula and North Africa while others are in a specific distribution area or are protected, which confers on them a special status in terms of nature conservation.

In addition to the importance of the role played by plants in the eco-systems and their potential economic and scientific value, many plants in the National Park have medicinal, aromatic and culinary properties; they are also used for decoration, animal feeds or for forestry purposes.

## FAUNA

The overlap and existence of a large number of biotopes endows the PNSAC with considerable richness in terms of established fauna, essentially by the presence of a remarkable diversity of species, especially vertebrates. A total of 204 species have already been recorded of which 136 are birds, 38 mammals, 17 reptiles and 13 amphibians.

These species include the European wild cat, civet cats, foxes, weasels, badgers, the Bedriagai skink, the vipera latastei, water snakes, several types of salamander and



tritons, etc.

Birds are the group that is best represented in this Protected Area with more than one hundred species being known to nest here. Some are important even in a national context such as the eagle owl and the chough.

The subterranean environment in this National Park is of major importance. Its numerous caves shelter an infinite number of living beings of which the most notable are around ten species of cave bat.

### *FACILITIES*

The headquarters of the National Park is in Rio Maior but visitors can make use of other facilities such as the *Ecoteca* in Porto de Mós, the Craft Weaving Centre in Chãos, the Monument for Dinosaur Footprints in Bairro – Ourém or the Underground Study Centres, the cave where the River Almonda rises in the municipality of Torres Novas, and the Algar do Pena in Vale de Mar, in the municipality of Santarém.

There is also an Eco-Museological Centre in the parish church of Mira de Aire where there is also a Coordination Centre for Visits to the PNSAC; there is a Visitor Reception Centre in Minde, and for those wishing to stay overnight there are four guest houses (two houses in Vale de Ventos and two in Alto da Serra), a hostel in Valverde, a camp-site in Arrimal and a caravan park in Pedreiras, in addition to numerous picnic parks scattered around the entire area of the PNSAC, some of them in incredible locations where the visitor can enjoy tranquillity and the most beautiful panoramic views.



Field mouse



Sardinian warbler



Lizard



Owl

## □ INTRODUCTION



Climbing



Mountain Bikes

### *TOURISM ACTIVITIES IN THE AIRE AND CANDEEIROS MOUNTAIN RANGES*

(Approved on July 26<sup>th</sup> 2001, as decreed by article 5<sup>th</sup> of the governmental decree nº1214-B/2000, of December 27<sup>th</sup>)

In a national and international context, natural areas are increasingly becoming tourist destinies, where the existence of natural and cultural values are intimately associated to nature and tourism.

Protected areas are, then, privileged places considered as new destinies as an answer to different demands proposing recreational activities, leisure and direct contact with nature and local cultures. This knowledge led to the signature of a protocol by the Secretary of State for Tourism and the Secretary of State for Environment with the objective of creating a program for National Nature Tourism, that according to cabinet resolution nº112/98 of July 30<sup>th</sup> "...applies to all National Protected Areas, in pursuit of promoting the values and potentialities of these areas for tourism activities under the designation of Nature Tourism allowing the development of adequate tourist products". Pedestrianism defined "as a sport activity of all types of march without competitive purposes. It can be guided or merely walking, orienteering, among marked trails or not" is one of the activities possible within the program mentioned and being carried out by the Aire and Candeeiros Mountain Ranges National Park (PNSAC) ruled by the Nature Sports Chart recently approved by cabinet resolution nº1465/





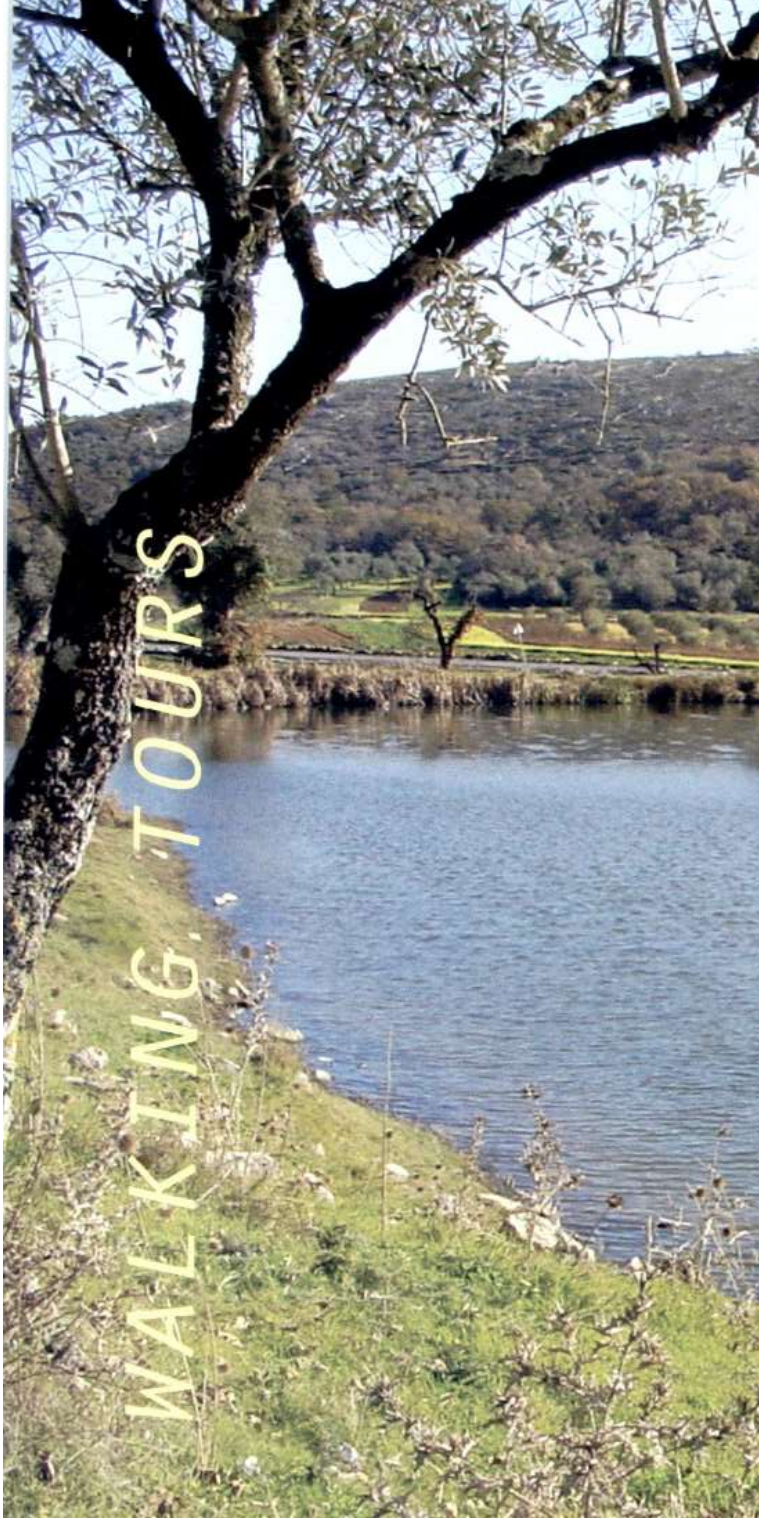
2004, published on December 17<sup>th</sup>.  
In this context, the Aire and Candeeiros Mountain Ranges National Park (PNSAC), in cooperation with other sponsors, has marked and identified 16 tours, according to international rules imposed by the Portuguese Federation of Camping. The tours allow the visitor to enjoy, in a very organised way, some of the most significant aspects that characterize this protected area.



All Terrain Tours



Para-gliding





### SUGESTIONS...

#### equipment

Light rubber-soled shoes, waterproofs & sweaters (rainy season); same type of footwear, cotton T-shirt, sun hat, drinking water (dry season).



#### Marks

All the included tours are marked according international ruling, applied in Portugal by the Portuguese Federation of Camping. During the walks you will find the following marks:



Correct Trail



Wrong Trail



Change of Direction

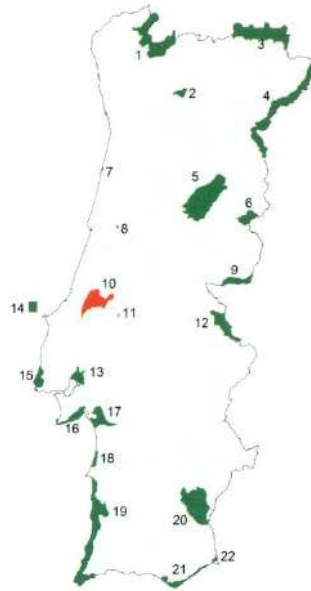


#### Important

In the Aire and Candeeiros Mountain Ranges National Park exists a team responsible for marking and preserving trails, without which it would be impossible to walk orienteered in this protected area.

Organized group activities need previous authorization by the Aire and Candeeiros Mountain Ranges National Park (PNSAC).

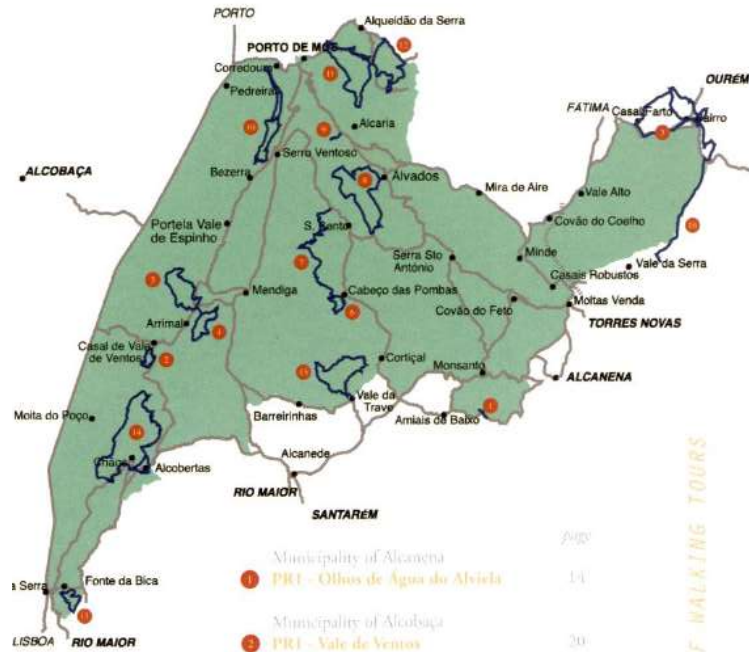
WALKING TOURS



- 1 - Peneda-Gerês National Park
- 2 - Alvão Natural Park
- 3 - Montesinho Natural Park
- 4 - Douro International Natural Park
- 5 - Estrela Mountain Ranges Natural Park
- 6 - Malcata Mountain Ranges Natural Reserve
- 7 - São Jacinto Dunes Natural Reserve
- 8 - Paúl de Arzila Natural Reserve
- 9 - Tejo International Natural Park
- 10 - Aire and Candeeiros Mountain Ranges National Park
- 11 - Púl de Boquilobo Natural Reserve
- 12 - São Mamede Natural Park
- 13 - Estuário do Tejo Natural Reserve
- 14 - Berlenga Natural Reserve
- 15 - Sintra-Cascais Natural Park
- 16 - Arrábida Natural Park
- 17 - Estuário do Sado Natural Reserve
- 18 - Lagoas de Santo André e da Sancha Natural Reserve
- 19 - Císcar-Vicentina Natural Park
- 20 - Vale do Gaudama Natural Park
- 21 - Ria Formosa Natural Park
- 22 - Sapal de Castro Marim Natural Reserve



● OUREM



MAP OF WALKING TOURS

	Municipality of Alcanena	29/30
1	PR1 - Ollus de Água do Alviela	14
2	Municipality of Alcobaca	
	PR1 - Vale de Ventos	20
3	Municipality of Ourem	
	PR1 - Bairro/Casal Farto	26
4	Municipality of Porto de Mós	
	PR1 - Serra da Lusa	32
	PR2 - Arco da Memória	38
	PR3 - Lapa dos Pocilhões	44
	PR4 - S. Bento	48
	PR5 - Castrejo	54
	PR6 - Fôrma	60
	PR7 - Corredoura	66
	PR8 - Serra Galega	72
	PR9 - Estrada Romana	79
5	Municipality of Rio Maior	
	PR1 - Marinhãs de Sal	85
	PR2 - Clãos-Alcobertas	90
6	Municipality of Santarém	
	Gruta - Algar do Pena	98
7	Municipality of Torres Novas	
	Grutas do Almunda	104



## OLHOS D'ÁGUA SPRING (RIVER ALVIELA)

### ☑ FEATURES OF THE TOUR

type of tour: on foot, Linear

approx. length: 0,5 km

approx. duration: 1 hour

starting point: source of the River Alviela at the Olhos d'Água spring, near the EPAL building

end: source of the River Alviela at the Olhos d'Água spring, near the EPAL building

type of terrain: footpaths and tracks

level of difficulty: easy

location: south of the Santo António plateau

main access routes: road linking Alcanena with Amiais de Baixo (leave the A1 at the Torres Novas exit)

facilities: Olhos d'Água Camping Park (River Alviela), restaurant, café, Olhos d'Água (River Alviela) Study Centre.

### ☑ BRIEF DESCRIPTION

The source of the River Alviela at Olhos de Água is Portugal's most important source of water, located with others in the region on the edge of the **Estremaduran limestone massif**. The water from the spring originates



Fluvial Karstic Outflow



Karstic Window



Mediterranean Vegetation



Fluvial Karstic Outflow



Bat colonies

as rainwater that infiltrates the Santo António plateau and is channelled into the spring by a complex network of underground galleries consisting of hundreds of caves that exist in the region.

Amid the most beautiful surrounding countryside, the Alviela spring rises at the foot of an escarpment at a place known as Olhos de Água from which Lisbon has been taking its main public water supply since 1880.

Another water-course – the Ribeira dos Amiais – shares this site. It is a small tributary of the Alviela which by crossing limestone along its course, is responsible for one of Portugal's most interesting karstic fluvial phenomena, resulting in a system of loss and resurgence in conjunction with the Alviela. Starting from a small limestone outcrop, the Ribeira dos Amiais disappears inside the rock via a small cave – **the loss of the stream** – created by the flow of water over thousands of years, now running underground for over 250 metres.

Walking downstream we come across subsidence – a **karstic window** – where, in addition to being able to see from its base the underground bed of the stream, we can also see ancient galleries, abandoned long ago by the waters and which are now a major sanctuary for bat colonies. Following the course of the stream, we can walk down as far as the place where the Ribeira dos Amiais re-emerges into daylight, becoming what is known as the **resurgence**.

It is here, on the left bank of the stream, that we can see the water of the underground Alviela. If it were not separated by a barrier, this exit point of the Olhos de Água spring (being “on the level”) would





form a simultaneous loss and exurgence, depending on the amount of rainfall in the region. It normally runs in particularly wet winters, giving rise to torrential flows.

As for the barrier, its construction was suggested early in the 20<sup>th</sup> century by the Swiss hydrogeologist, Ernest Fleury, one of the early experts in speleology in Portugal and responsible for a survey commissioned by the Lisbon Water Company on the source of the River Alviela.

The Ribeira dos Amiais flows for the remaining 200 metres that separate it from its mouth, over a bed with steep banks that forms the last third of the **karstic fluvial outflow** of the same name.

The Alviela springs are in the middle of exceptionally beautiful scenery and from them water is captured to serve Lisbon. There is an interesting complex of caves surrounded by Mediterranean-style vegetation, in particular the cork oak (*quercus suber*), the stone pine (*pinus pinea*), the arbutus (*arbutus unedo*) and the mastic tree (*pistacia lentiscus*), as well as other varieties. Hypericum, a medicinal plant, is one of the many species to flourish as a result of the varied ecological features of the Alviela's Olhos de Água spring.

In relation to fauna, these caves play an important role in providing a habitat for around 11 species of bat. These animals are highly sensitive to any kind of disturbance and are extremely important from an ecological point of view as they effectively control insect populations (each bat ingests around half its body weight in insects nightly).



Superior part of the Outflow



Alviela Spring



POINTS OF INTEREST

**Spring**

General view of the Olhos de Água spring and the mouth of the Ribeira dos Amiais

**Outflow**

General view of the “Amiais fluvial karstic outflow”. An extremely hollowed out valley with sheer, steep sides.

**Karstic window**

Subsidence of the cave roof over the underground bed of the Amiais. According to the season of the year and the water level, openings to the caves can be seen that are former beds of the underground stream and which are now disused.

**Loss**

Flowing underground of the surface section of the Ribeira dos Amiais water course.

**Poço Escuro**

View over the “on the level” outflow from the Poço Escuro (“dark well”). This is one of the Alviela’s temporary springs which being at a higher level than the permanent one, expels water only at times of very heavy rainfall. The level which was “constructed” at the beginning of the 20<sup>th</sup> century prevents water from the Ribeira dos Amiais mixing with that from the Alviela, upstream of catchment.

**Resurgence**

Flowing of the Ribeira dos Amiais underground water course out on to the surface.



Trail



Ribeira dos Amiais



### Olhos de Água

At the foot of the escarpment situated on the right bank of the Ribeira dos Amiais, a small weir can be seen which is fed by the spring and serves to capture water for public distribution. Above this, the entrance to the cave of the same name can be seen, providing access to the Alviela's collector which is fed mainly by rainwater falling on the Santo António plateau.



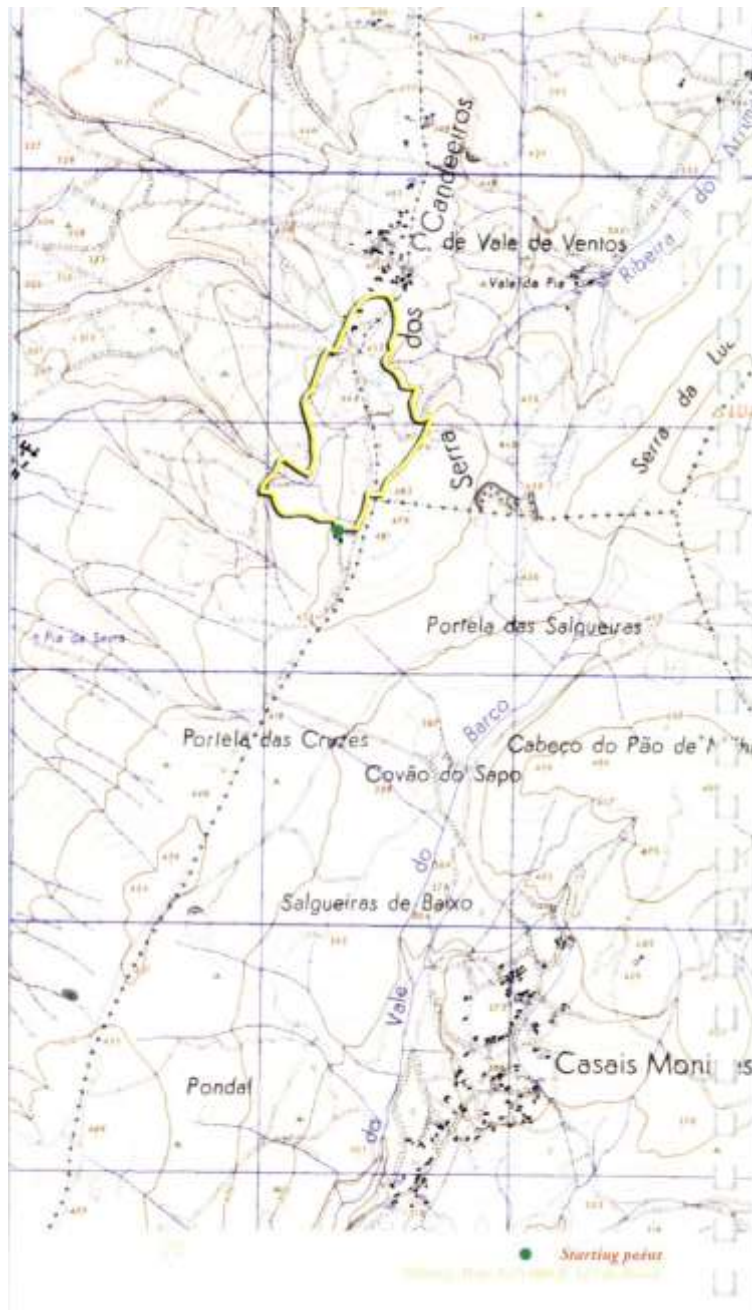
Ressurgence



karstic window



Loss





## VALE DE VENTOS

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 3 km

approx. duration: one hour and a half

starting point: guest houses at Vale de Ventos

end: guest houses at Vale de Ventos

type of terrain: footpaths, tracks and a made-up road selection

level of difficulty: easy

location: Serra dos Candeeiros, near the village of Casal de Vale de Ventos from where the coast can be seen on clear days.

main access routes: EN1, EN362 Porto de Mós - Alcanede, via Mendiga and the Rio Maior - Porto de Mós local road, passing through Alcobertas, Casais Monizes, Casal de Vale de Ventos, Bezerra, Portela de Vale Espinho, Porto de Mós.

facilities: café, public telephone



Traditional Architecture



Orchid

## □ HAVELINE TRAILS

### ▷ BRIEF DESCRIPTION

This short circular trail leads via the ridge of the Serra dos Candeeiros, near the village of Vale de Ventos where the view is dominated by creeping high-level vegetation and non-irrigated agriculture, in addition to pine woods and areas of wild scrubland where a large number of wild animals can be seen.

The Serra dos Candeeiros became part of Portugal's national forestry system in the 1940s. Several forestry reserves were created on the common land of the mountain ranges; this resulted from the application of a policy that was aimed at obtaining the maximum from the nation's land and simultaneously combating its erosion by intensive use. Afforestation took place here during the 1970s with different species of pine. During this walk there will be the opportunity to see woods of Aleppo pine (*pinus halepensis*) and Monterey pine (*pinus radiata*), the result of afforestation. Associated with these pine-woods is a varied fauna that includes the smooth snake, the ladder rat snake, the woodpigeon, the robin, the great tit, the blue tit, the tree-creeper, the common shrew and the fieldmouse.

From time to time along the trail there are also small woods consisting of Portuguese oak where it is sometimes possible to see the stonechat, the Sardinian warbler, the green woodpecker, the jay, the greenfinch and the carrion crow.

The areas of scrubland consist mainly of rosemary, pepper trees, gorse and cocifera oak which are the habitat of a variety of fauna, in particular the green lizard and the Bedriagai skink as well as birds such as the lark, the tawny pipit and the wren.



Pine woods in Vale de Ventos



Robin (young bird)

**\* POINTS OF INTEREST**

**Guest houses at Vale de Ventos**

These are houses that had previously been used by the forestry rangers and were transferred to the PNSAC in 1987, afterwards being restored for use as guest houses. The Casa Grande and the Casa Pequena sleep 8 and 6 people respectively and can be reserved by booking in advance at the PNSAC Ecoteca Centre in Porto de Mós.



Guest House



Casal de Vale de Ventos

**Valley**

Stretching towards the west is a hanging valley in a large expanse of scrubland that contains mainly mastic trees and gorse growing right down to the foot of the mountain; here, with a bit of luck, it may be possible to see certain types of bird of prey, in particular buzzards. Leading away from the trail towards the head of the valley is an exposed escarpment to the west, inhabited by black bullfinches and screech owls.

**Traditional architecture**

There are interesting examples of country houses built in exposed limestone - one of the traditional forms of construction in the mountain areas. The stone-built houses and walls in the village of Vale de Ventos (opposite) take on and document the essential features of man's survival amid an adverse environment.

Nowadays, we are trying to build on to that inheritance by creating new uses for traditional buildings as a means of supporting leisure and tourism, for example, restoring old houses and windmills for use in Rural Tourism.

## **Watering Points**

### **The Lagoa do Casal, Vale de Ventos**

This semi-natural lake, traditionally designated as a clay pit, is one of the many ways of storing water that can be seen in this region.

The great permeability of limestone has led to the existence of surface water courses and so these places for retaining water have assumed major importance in the daily lives of the people of this region, providing reserves of water for livestock, irrigation and domestic uses.

The accumulation of water in depressions of this kind takes place only in the rainy season, being related to the fact that their beds are made waterproof by clay and other sediments. Small oases in a wild landscape dominated by stone, these water reserves are still essential for the reproduction of certain species of amphibians and are equally important as drinking places for a variety of different animals.



Lake of Vale de Ventos



Gorse



Stone-Paving quarry

### **Stone-paving quarry**

On one side of the route, a stone quarry emphasizes the effects of one of the most important industries in the Estremaduran limestone massif.

The most commonly found white stone-paving quarries produce the raw material for the most beautiful pavements in Portugal, the result of hard manual work in which a well-aimed hammer blow results in the familiar stone cubes.

The less prominent quarries, being those producing blocks and large hewn slabs, extract the limestone used in civil construction.

The rehabilitation of the countryside - compulsory in the National Park - will



provide new landscapes that will be useful in a social sense as well as help erase the memory of the scars that are now visible.

**Water tanks (*cisternas*)**

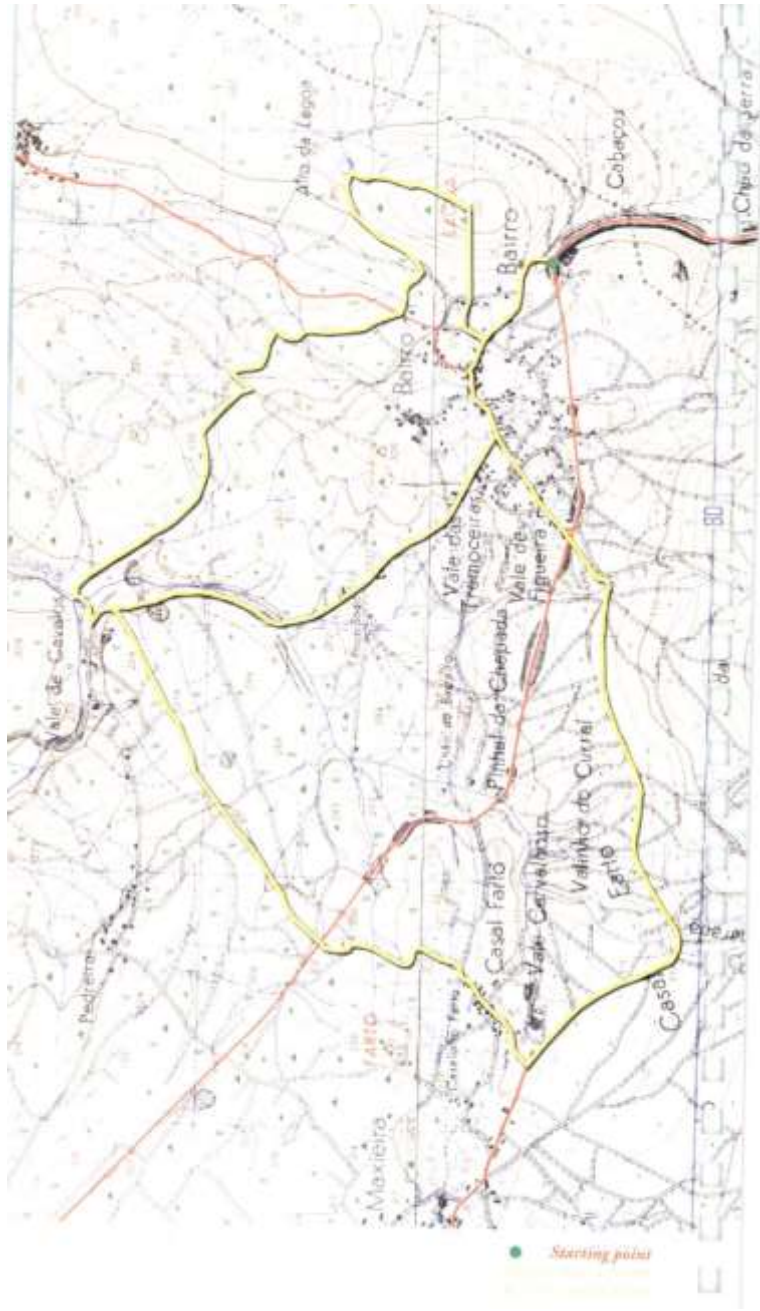
In the absence of surface water, water tanks are a traditional way of storing water. Cut into the limestone in different ways, they can still be seen next to the oldest houses, fulfilling their original function; they are still used to supply water to the guest houses.



Cistern ( Water Tank )



Valley in Serra dos Candeeiros



*BAIRRO/CASAL FARTO*

*☑ FEATURES OF THE TOUR*

type of tour: on foot, circular

approx. length: 13 km

approx. duration: 5 hours

starting point: Natural Monument for Dinosaurs' Footprints (Bairro)

end: Monument for Dinosaurs' Footprints (Bairro)

type of terrain: footpaths, tracks and made up road in sections of less than 1 km

level of difficulty: average

location: north of the Serra de Aire, including part of the village of Bairro and crossing the boundary of the PNSAC to Vale de Cavalos and Casal Farto

main access routes: leave the A1 at Fátima; take the Fátima – Minde EN 360 to the Torres Novas crossroads then turn left and continue into Bairro

facilities: Natural Monument for Dinosaurs' Footprints at Serra de Aire (MNPDSA), cafés and restaurants (Bairro), lecture theatre for local flora or equivalent, Lagoa Picnic Park (Bairro)



Chapel in Casal Farto

## □ WALKING TOURS

### ➤ BRIEF DESCRIPTION

Consisting roughly of a triangle connecting three villages with well-defined differences - Bairro, Vale de Cavalos and Casal Farto, this walking tour could also be done by bicycle without any difficulty for anyone used to such journeys, with an option for a shorter track from Vale de Cavalos, on a made-up road section.



Pine Wood

The tour starts at the Natural Monument for Dinosaurs' Footprints at Serra de Aire crossing the road section and overcoming on a perpendicular the descent that reaches the summit at 360 m of altitude, one arrives at the lake and picnic park, an extremely pleasant spot offering a panoramic view that extends beyond the boundaries of the national park to the north.



Picnic Park

The Study Centre for Flora in the PNSAC is the first unmissable stop on this walking tour, leaving behind the village of Bairro which can be given a closer inspection on the way back.

Vale de Cavalos and especially Rua das Flores, are worth a special look. They are a group of stone-built houses that are remarkable not only because of their traditional architecture but also their colouring.



Traditional Architecture

At Casal Farto there are several unusual features to see, for example, a sun-dial carved into the wall of one of the houses, a chapel that had connections with the Knights Templar set among a group of houses that have been restored for use in rural tourism, including a bar. It is possible to stay here overnight or just pause for a rest.

Continuing along the road towards Bairro, on the right hand side is a group of different

types of water tank (or cisterns) including the well-known “Capucho” cisterns that have been recently restored, another indication of the importance of water in this area.

The return journey to the starting point is again via the pine-wood. Once in Bairro, take the road that runs next to the church and along there some unusual chimneys can be seen rising skyward among the interesting buildings.



Track



Flora Study Center

**\* POINTS OF INTEREST**

**Study Centre for Flora in the PNSAC**

There is a pilot scheme for drying aromatic and medicinal plants as a result of research carried out in the PNSAC by the Association for the Development of the Serra de Aire/Candeeiros (ADSAICA), with the cooperation of the INEGI – Institute of Mechanical Engineering and Industrial Management and financed by the EU’s LEADER programme assisted by the Association for the Integrated Development of the Northern Ribatejo (ADIRN), currently responsible for drying aromatic and medicinal plants. There are plans to complement this with a nursery for indigenous plants, a botanical garden and an exhibition room which will form the future Study Centre for Flora in the PNSAC.

**Traditional Architecture**

In this area known as Vale de Cavalos (“Valley of the Horses”) a magnificent collection of architectural works from this limestone region can be seen, including a dwelling house and agricultural outbuildings

## **Local Traditions**

that stand on the only street, Rua das Flores, also unique because of its colours and aromas.

### **Fátima Regional Equestrian Association**

The Fátima Regional Equestrian Association (in Pedreira) enables visitors to learn the art of horse-riding and also have the opportunity to go trekking, another way of getting to know this region. For more information, contact the Fátima Regional Equestrian Association.



Sun-dial



Cisterns (water tanks)



Equestrian Center

### **Rural Tourism**

The restoration of buildings takes different forms, one of which is the reuse of such buildings for tourist accommodation of which the house situated in Casal Farto is a good example. Rural tourism is an opportunity to get to know this National Park by being fully in contact with the region's most authentic and original aspects.

### **Water Tanks or Cisterns**

The fact that limestone is an extremely permeable rock has meant that the water supply has always been a limiting factor for living in this region.

In this area there are different methods of collecting and storing water therefore stone, being the main raw material, is always present in the use of both natural and man-made containers. In order to keep water clean, the reservoirs were protected by means of small four-sided or circular constructions, often with pitched or conical roofs, as can be seen here. Turning right after about 100 metres, it is possible to

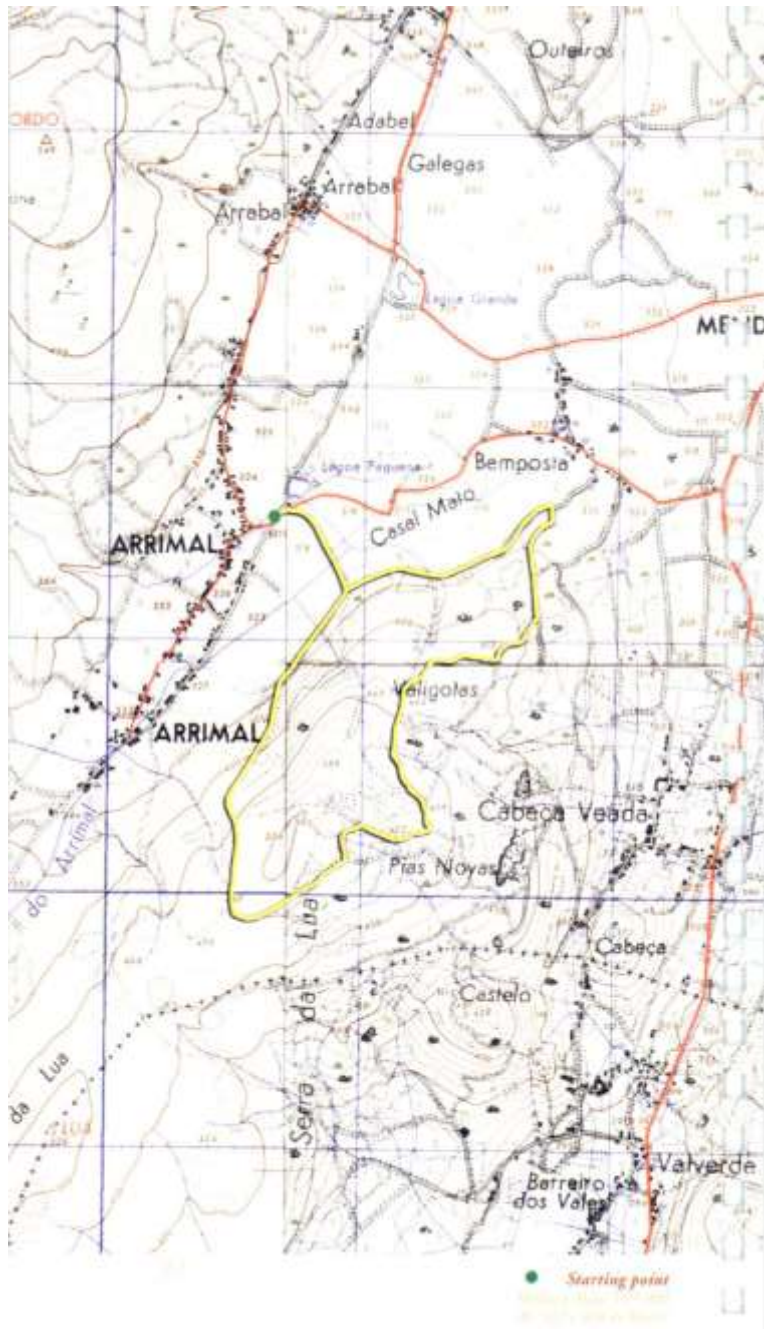
visit another collection of most unusual water tanks known as the “Capucho” tanks because of the hood-like shape of their roofs. These tanks were recently restored as part of the scheme to classify rural buildings in the PNSAC and although private, according to information obtained from the last charter dated 1922, they used to be used in the summer for swimming.



Traditional chimney



Track







## SERRA DA LUA

### FEATURES OF THE TOUR

type of tour: pedestrian, circular

approx. length: 6 km

approx. duration: 3 hours

starting point: country camping park at Arrimal

end: country camping park at Arrimal

type of terrain: footpaths and tracks and made-up road section

level of difficulty: easy

location: Serra dos Candeciros, eastward near to the village of Arrimal, along the Serra da Lua

main access routes: EN1, via Vale de Ventos, to the EN 362 - Porto de Mós-Alcanede, via Mendiga and the Rio-Maior - Porto de Mós local road, passing through Alcobertas, Casais Monizes, Casal de Vale de Ventos, Arrimal

facilities: country camping park, cafés, restaurants, small self-service grocery, public telephone, medical assistance post



Serra da Lua



Chousos (dry stone walls)

**BRIEF DESCRIPTION**

On the eastern slope of the Serra dos Candeeiros, the Serra da Lua walk is something different: there is a spiral form cut into the western slope of the mountain and which stands out from the “lace-edging” effect of the dry-stone walls (*chousos*); this work was done during the Sculpture Competition held at the start of “Stone Week” which was sponsored by the Aire and Candeeiros Mountain Ranges National Park (PNSAC); it took place in 1988 in the the municipality of Porto de Mós.

From the waters of the Lagoa Pequena (small lake) at Arrimal to the dry ridge of the Serra da Lua, plant-life is in evidence in strict accordance with the availability of water.

At times of the year when there is no rain, the lake’s mirror of water is covered by a green cloak consisting of millions of examples of a small plant, commonly known as duck-weed, a sign of excessive organic material in the lake. Growing on the banks are bullrushes, notable because of their large numbers and their cigar-like flowers, among a collection of plants that are characteristic of wetlands. The green frog, the salamander, the water-snake, the water-hen and the small grebe are the most common species to be seen on the lakes.

The farmlands through which the walk passes were once an oak copse of which a strip still remains at the foot of the Serra da Lua. It is worth mentioning that there are two different types of oak here: black oak and Portuguese oak.

This mixed area of oak, abandoned olive groves and scrubland contains a variety of



Small Lake



Traditional Agriculture

birds and animals including in particular the wryneck, the garden warbler, the blue tit, the Sardinian warbler, the robin, the tree-creeper, the chaffinch, the song thrush, the jay, the green woodpecker and the wren.

The slopes and ridge of the Serra da Lua are covered with a type of vegetation that is typical of such areas where the soil is subject to harsh treatment, for example, the clearing of scrub, forest fires and grazing. What remains is a plant community that is dominated by occasional low bushes and a large number of herbaceous varieties, in particular orchids.

This is the kingdom of the chough, the lark, the stonechat, the partridge, the robin and the wren. The area is also important hunting territory for certain species of birds of prey such as the short-toed eagle, the buzzard and the kestrel.



Water Snake



Local View

**\* POINTS OF INTEREST**

**Small lake at Arrimal**

Both this and the large lake (around 200 metres NW) are natural reservoirs, small depressions whose bottoms are made waterproof with clays and other sediments. Traditionally used by the inhabitants of Arrimal, Arrabal, Mendiga and Alqueidão for watering cattle, irrigation and domestic purposes, they are small oases in this kingdom of stone.

### Wells

The wells around the lakes and along the main street are fine examples of architecture. Of indeterminate age, they are built in limestone and not so very long ago were used for domestic purposes.

### Agricultural wind-breaks

In an area where the existence of agricultural soil is confined to depressions and the relief determines the existence of small properties delimited by dry-stone walls or *chousos*, the small stone shelters, built within the property and sometimes with just one opening, are used for storing agricultural implements and providing shelter for smaller animals, especially sheep.



Oak copse



Ranunculus

### Dolina (Doline)

Another of the karstic formations that are typical of this region are dolinas which are depressions that are roughly circular with the base filled in with sediment. They may or may not be associated with potholes or *algares*.

Dolinas frequently take the form of small depressions surrounded by dry-stone walls in areas where subsistence farming is common.

### A strange story

The story goes that "In the Serra da Lua there was just one place from which it was possible to see the towers of three churches - of Serro Ventoso, Mendiga and Monsanto. According to legend, when there was a full moon a *cincaimão* (\*) was positioned there, made of the stems of spurge-laurel or basil and if the three consecutive points of the symbol pointed to the three towers, a golden kid would go and sleep there in



the underground shelter. His arrival was preceded by a short, sharp breeze. If the *cincaimão* was correctly set up and people did not frighten him, the kid would pay no attention to their presence; he would jump right into the middle of the symbol and take shelter there.

According to oral tradition, there were several attempts to catch the kid, all unsuccessful. Whoever tried was always found out by the kid who caused them to lose their memory so that no-one knew his exact whereabouts. It was said that those who went knew the way there but not the way back." (from "Porto de Mós and its customs" by António Martins Cacela, 1977).

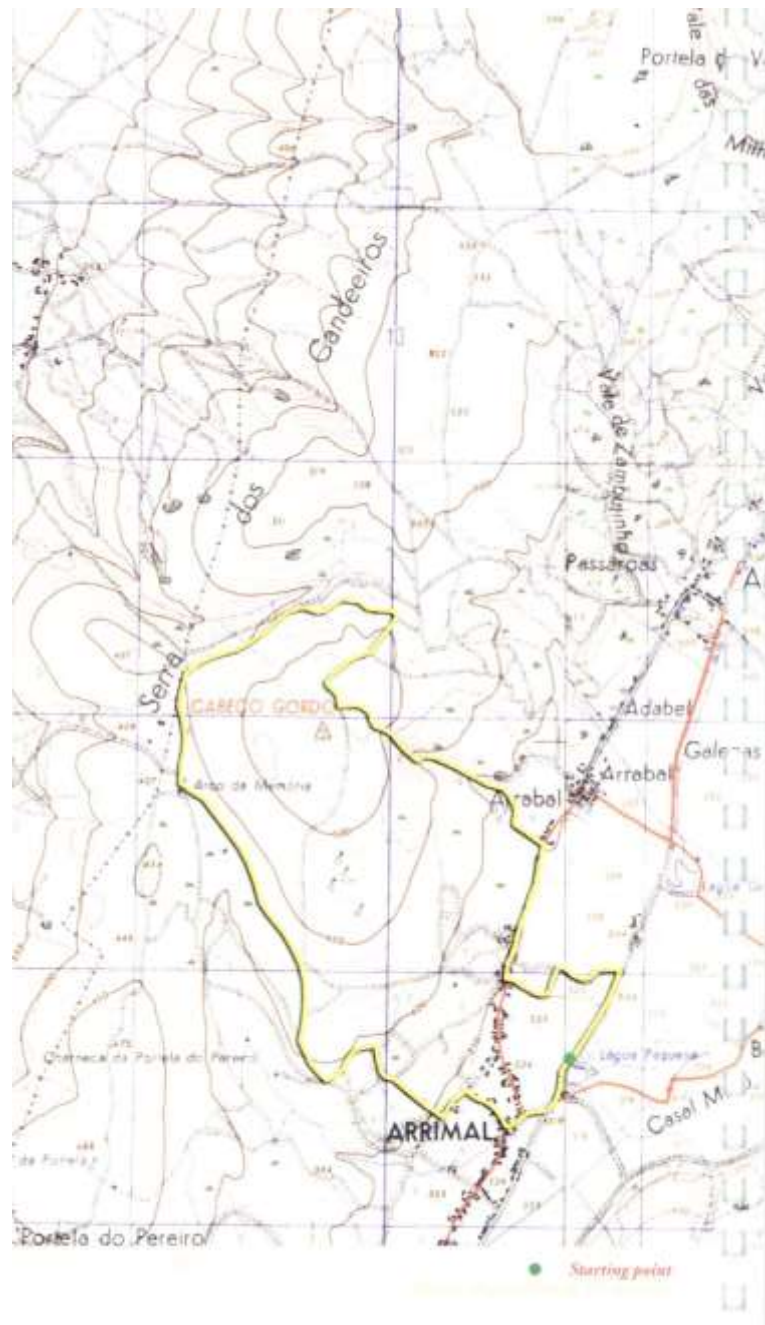


Camping Park of Arrimal



Buzzard

(\*) *Cincaimão*, sign or symbol of Solomon in the geometric form of a five-pointed star. It was largely used in magic rites and superstitions as recorded in the Great Book of St. Cipriano.





## ARCO DA MEMÓRIA (MEMORIAL ARCH)

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 6 km

approx. duration: 3 hours

starting point: Arrimal Country Camping  
Park

end: Arrimal Country Camping Park

type of terrain: compacted earth footpaths,  
tracks and made-up road section

level of difficulty: easy

location: Serra dos Candeeiros, heading  
westward to the village of Arrimal

main access routes: EN1 via Vale de  
Ventos, to the EN 362 - Porto de Mós -  
Alcanede, via Mendiga and the Rio Maior  
- Porto de Mós municipal road, passing  
through Alcobertas, Casais Monizes, Casal  
de Vale de Ventos, Arrimal

facilities: country camping park, cafés,  
restaurants, self-service grocery, public  
telephone and medical assistant post



Memorial Arch

## WALKING TOURS



View of Serra da Lua

### BRIEF DESCRIPTION

This tour is routed around the village of Arrimal and its many interesting features. Forests, scrubland, natural springs, traditional architecture, hills, valleys and the patchwork quilt style landscape are some of the attractions featured on this trail that ends at the Arco da Memória, a major boundary of the land that according to history, was given by King Afonso Henriques to the Cistercian monks.

The diversity - and at times – the overlapping of biotopes (or habitats associated with a particular ecological community) along this walk has led to the presence of a large number of species of fauna.

The fact that the waters of the **Lagoas do Arrimal** never run dry has created a habitat that is ideal for amphibians such as the green frog and the cave salamander. Similarly, it is also possible to find water snake, vipera latastei and bird species that are typical of wetlands, in particular moor-hens and little grebe.



little grebe (offspring)

The **farmland** has also created conditions for the existence of amphibians such as the common frog and the common salamander; for reptiles, in particular the common lizard; and for birds such as the little owl, the hoopoe, the chimney swallow, the wagtail, the tree sparrow, the goldfinch and the corn bunting; there are also mammals, for example, hedgehogs, moles, shrews and field mice.

In the woods that consist mainly of **Portuguese oak**, there are ladder rat snakes, horseshoe snakes, weasels and civet cats, as well as a variety of birds, especially



sparrow-hawk, green woodpecker, wryneck, bullfinch, redcap, wren, titmouse and jay.

The **scrubland** that borders certain parts of the track is the habitat for reptiles such as the green lizard, the sand lizard and the Montpellier snake; birds such as partridge, cuckoo, blackcap and robin and mammals such as rabbits and foxes can all be found here.

In areas where there is low **spreading vegetation** and where rosemary and pepper plants are dominant, species of less common birds can be seen, such as larks, tawny pipit and the notable chough. Reptiles can also be spotted, such as the Bedriagai skink.



Sparrow hawk



Oak copse

**\*** POINTS OF INTEREST

**Lagoa Pequena (small lake) at Arrimal**

This lake and the large one (Lagoa Grande approximately 200 metres to the NE) are natural rainwater reservoirs. They are small depressions with bottoms that consist of clay and other sediments and are therefore impermeable. Traditionally used by the people of Arrimal, Arrabal, Mendiga and Alqueidão for watering their cattle, irrigation and domestic purposes, they are small oases in this kingdom of stone.

The fact that they store water for practically the whole year round makes them important for amphibians as these depend on areas with water for their larval development.

The wells around the lakes and along the main street in the village of Arrimal, are fine examples of architecture built in limestone. Their age is unknown but they bear witness to the presence of water-tables that in former times were closer to the surface than nowadays.



Large Lake of Arrimal

#### **The stone cross**

Cut out of limestone with rectilinear angles, this cross is one of the many examples to be found when walking through the Candeeiros mountain range, particularly at the crossroads after passing Lagoa Grande northwards and in the square near the main road in Alqueidão do Arrimal.

#### **Windmills**

At prominent points in this wild and powerful landscape, windmills punctuate the hilltops, exposed to the north-easterly winds. Mostly abandoned, some are being restored by their owners in order to carry out their function in a symbolic way, simultaneously demonstrating the genius of former times to present day man.



Windmills

#### **The Arco da Memória (“Memorial Arch”)**

On the south-east slope of the Cabeço Gordo, practically coinciding with the administrative boundaries that separate the municipalities of Porto de Mós and Alcobaça, the Arco da Memória is today still an important point of reference for local people and a striking landmark amid the mountain landscape.

According to inscriptions on the neck of its highest part, it was built on the orders of King Afonso Henriques in compliance with his vow to found a convent for the Bernadine monks to whom he gave all the land that can be seen from that point as far as the sea.



Oak

**Vale Grande (“Large Valley”)**

This is the name that was given to this beautiful enclosed valley that drops down towards the west. The valley is almost entirely covered in scrub of various types and has become an ideal habitat for certain birds of prey such as the kestrel and the buzzard. Here, thanks to minimal interference by man, foxes have been observed hunting in broad daylight.

**Pedreira de Laje (“Stone Quarry”)**

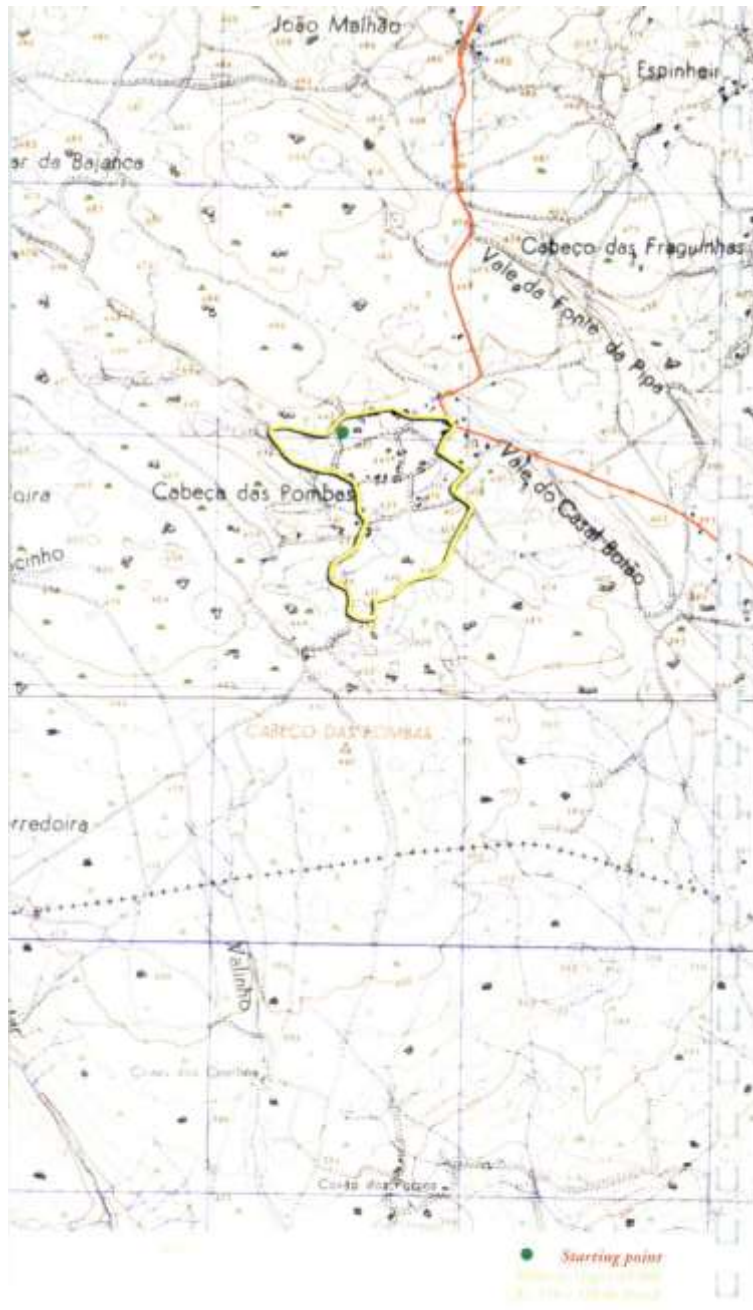
From the quarry that is skirted by the route, limestone is cut in large pieces and after being broken up by hand is cut into large and small slabs for use in the construction of walls and paved surfaces. A little further on, between the path and the stone walls, a former stone quarry has been restored, enabling the area to become spontaneously covered in vegetation as the countryside gradually recovers. Here the steps being taken to restore the original beauty of the scenery can be seen, an obligatory process to create new landscapes and heal the scars that are now visible on the landscape.

**Capela do Arrabal (“Chapel of Arrabal”)**

The present day Arrabal, this place was first known as Arrimal de Cima where there is a chapel dedicated to John the Baptist, with an annual festival on June 24.



Arrabal chapel





## LAPA DOS POCILGÕES (PIG-STY CAVE)

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 3 km

approx. duration: one hour and a half

starting point: Cabeço das Pombas (next to the café)

end: Cabeço das Pombas (next to the café)

type of terrain: footpaths, tracks and sections of made-up road

level of difficulty: easy

location: Santo António plateau

main access routes: road linking Amiais de Cima and Porto de Mós, passing through São Bento and Serro Ventoso towards Cabeço das Pombas

facilities: café (Cabeço das Pombas)



Lapa dos Pocilgões (Pig-sty cave)



Threshing Floor

➤ *BRIEF DESCRIPTION*

The route starts from the café at Cabeço das Pombas. It then passes an **Olive oil press** before bending round to the left along a track that leads to countryside, alternately bearing the stamp of nature and human activity.

The **Lapa dos Pocilhões** (Pig-sty cave) is easy to reach with a horizontal entrance which the visitor should approach with care as it is camouflaged with ivy, fig-trees and viburnum.

It is always the variation of the degree and presence or absence of human activity in relation to the land that enables us to understand the mosaic of plant-life in this National Park. This differentiation will be seen to have a considerable effect on the landscape during this walk. There are olive groves with pastures where the plant layer has been substantially improved in order to graze cattle which is compatible with the growing of olive trees, pruning to keep them out of the animals' reach. In other areas, there are olive groves and creeping scrubland that are tended in order to maintain their production potential and possible use as grazing for goats. These olive groves contain an interesting variety of flowers, particularly because of the presence of orchids. The original vegetation has been preserved in some places; groups of Portuguese oak and large bushes such as arbutus, viburnum, privet and cocifera oak.



Traditional architecture



Field of Lapiaz

**\* POINTS OF INTEREST**

**Olive oil press**

For many years the growing of olive trees and the production of olive oil have been one of the sources of income of the mountain people. This traditional olive oil press is an example of this local activity.



Orchid

**Field of lapiaz**

Lapiaz is a term used to describe the limestone surface that has become modelled with karstification forms. Lapiaz come in different shapes and sizes; the term “mega-lapiaz” refers to varied limestone shapes with the common feature of being larger than normal.



Ring Dove

**Lapa dos Pocilhões**

Lapa” is the popular term for pothole adopted by technical and scientific language in order to designate a surface opening (hole) communicating with developed horizontal cavities of varied typology. These are typical limestone formations frequently associated to old subterranean water outflows, some used in prehistoric times by men as shelter and burial grounds. For safety reasons is inadvisable to visit them.

**Architecture in Cabeço das Pombas**

Long-established village of Cabeço das Pombas where we can see types of construction that are indicative of the dominant rural element in this region, particularly the existence of the “loja” or cellar on the ground floor where the animals sleep.





S. BENTO

 FEATURES OF THE TOUR

type of tour: on foot, linear, with two alternative routes

approx. length: 12 km

approx. duration: 6 hours

starting point: around 800 metres to the west after passing the café of Cabeço das Pombas

end: Amiais de Cima/ Serro Ventoso crossroads north of Casal de Santo António (formerly called Azelha)

type of terrain: footpaths, tracks and sections of made-up road

level of difficulty: Average

location: Santo António plateau and São Bento Moubtain Range (Serra de S. Bento)

main access routes: road linking Amiais de Cima and Porto de Mós, passing through São Bento and Serro Ventoso

facilities: café (Cabeço das Pombas) and public telephone



Dry Stone walls



Track

> **BRIEF DESCRIPTION**

In the heart of the Aire and Candeeiros Mountain Ranges National Park, the São Bento Route centres on the Santo António plateau, crossing the Serra de São Bento in a south-north direction.

This is a linear walk (the starting and finishing points are different) that can be taken as three circular routes, connecting with the São Bento road if the entire course is not being attempted.

This is a particularly rewarding and interesting walk from a geomorphologic point of view, enabling a wide variety of structures to be seen that are typical of karstic topography, such as lapiaz and dolines.

Another interesting feature of this trail is the opportunity to observe several cavities that have developed vertically – potholes or *algares* as they are known locally which is a term of Arab origin with “*gar*” meaning crater. Several potholes along the route are open to visitors. Near the Alecrineiros triangulation point (altitude 541 metres) the Algar das Bocas Largas opens up and set into the doline known as Cós Carvalhos – around 60 metres deep – is another pothole of the same name. Also interesting are the microforms of disintegration, well-represented in the different lapiaz along the way.

Following the route northward, between high, dense scrubland, whitish forms



Fern



Track



Mountain Ridge

punctuate the mountain ridges giving the appearance of snow; to the east the horizon opens up suddenly and stretches as far as the Tagus tertiary basin.

In terms of vegetation, the use of the soil deposited in the bottom of the dolines has brought about changes to the landscape that are evident throughout the route, both by the introduction of tree species such as eucalyptus and wild pine and the coexistence of bands of spontaneous vegetation consisting of Portuguese oak, privet and mastic with agricultural activities carried on in these areas.

Following the trail between the sheep-pens (“*chousos*”) formed by dry-stone walling - largely responsible for the labyrinthine compartmentalization of the landscape - it is easy to get lost in the entanglement of paths if we fail to note the red and yellow marks on the dry-stone walls.

Near to Covas, the trail sinks into depressions in the ground that are more or less circular and delimited by the sheep-pens; most of these depressions are dolines with green-carpeted bases, from which fantastic rocky peaks emerge topped by crowns of ivy, resembling giant mushrooms - the “mega-lapiaz”.

After passing the small village of Santo António the last part of the walk is through scrub and groves of eucalyptus and oak that conceal fields of true sculptures fashioned entirely by nature.



Doline



Mega-lapiaz in Covas

S. BENTO

## □ TRAIL SIDE STONES



Choughs

## ★ SOME POINTS OF INTEREST

### **Montado de Sobro (Cork Oak)**

The cork oak is an indigenous tree protected by local population for economical reasons, here associated to agricultural areas of deeper soils. It is possible that presently it occupies soils where once existed oaks. Even though it is a plant that does not absorb calcium (intolerant of limestone), it finds red soils, among some areas of limestone that are calcium free.

### **Algar da Bajanca and Algar do Cofelo**

The Algar da Bajanca and its close neighbour are potholes that are 35 and 50 metres deep respectively and are morphologically different, having resulted from different evolutions. The first is home to several species of cave and rock-dwelling fauna, also having been a major roosting place for choughs. It is now used for training potholers.



Wind flower

### **Lapiaz Field – limestone benches**

Lapiaz is a term used to describe the limestone surface that has become modelled with karstification forms. Lapiaz come in different shapes and sizes; the term “mega-lapiza” refers to varied limestone shapes with the common feature of being larger than normal



Lapiaz field

### **Algar das Bocas Largas (Wide mouth cave)**

Potholes are cavities resulting from erosion, typical of limestone areas and similar to pits or surface cavities linked to vertical cavities,

in this case 12 metres deep. It is advisable to use maximum caution and above all do not visit them without proper equipment and guidance.

#### **The Cós Carvalhos lapiaz**

With different dimensions and origins, lapiaz are also a constant feature on the trail, including the Cós Carvalhos formations which form part of an interesting field of embedded lapiaz.

#### **Dry-stone walls (*chousos*)**

Following the trail between the dry-stone walls of sheep-pens that are largely responsible for the maze-like appearance of the countryside, at a certain height the walls appear to be topped by large stone slabs pointing outwards which, according to ancient records, were a form of defence against attacks by wolves.

#### **Covas (“mega-lapiaz”)**

Near the small village of Covas, the trail runs into small depressions that are roughly circular in shape and mostly dolines, delimited by stone walls and the soil covered by a green meadow with fantastic rocky peaks – **mega-lapiaz** – sometimes topped by crowns of ivy.

#### **Traditional architecture (Azelha)**

The small village of Casal de Santo António, previously known as Azelha, is the last settlement to be seen on this walk and where it is possible to find some unusual examples of traditional stone architecture. (houses, threshing floors, water tanks)



Cós Carvalhos Lapiaz



Traditional House





## CASTELEJO

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 12 Km

approx duration: 6 h

starting point: Open Air Activities Centre, Alvados

end: Open-Air Activities Centre, Alvados

type of terrain: footpaths, tracks and section of made-up road

level of difficulty: average

location: Santo António plateau (*planalto*) which contains three interesting geomorphologic structures: the Alvados depression, the formation at Castelejo and the Fórnea amphitheatre

main access routes: road linking Porto Mós to Mira de Aire

facilities: Open-Air Activities Centre, café, craft shop, picnic park and restaurant (Alvados)



Alvados Depression



Oak copse



Doline

➤ *BRIEF DESCRIPTION*

The Castelejo walking tour crosses the northern part of the Santo Ant3nio plateau, a perfectly self-contained geomorphologic unit, bordered to the west and north east by the Mendiga fault and in a NW-SE direction by the Alvados /Mira de Aire faults. This is an area of considerable natural interest because of the variety of plant life and the different geomorphologic aspects presented.



Castelejo Formation

The great richness of biotopes – scrubland, escarpments, olive groves, built-up areas and oak copses – encourages the existence of a variety of birds, in particular hobbies, quails, garden warblers and chaffinches.



Stone chat

The Alvados depression containing the village of the same name, is an arid agricultural area where traditional olive groves flourish. Founded between 1555 and 1559, the parish of Alvados was producing an annual 200,000 litres or so of olive oil up to 50 years ago.



Windmill

The Costa de Alvados is a fault in the form of a well-defined escarpment with a drop in level of as much as 300 metres in relation to the flat base of the Alvados depression. It is largely rectangular in form, interrupted only at its north west end by the entrance to the natural amphitheatre known as the F3rnea. The birdlife here is essentially linked to rocky areas and the chough (pyrrhocorax pyrrhocorax), the kestrel (falco tinnunculus)



and the stone-chat (*oenanthe hispanica*) can all be seen.

The Alvados depression is a formation that was created by tectonic action and consists of a large chamber that subsided as a result of major geological faults, forming an area defined by two raised chambers: to the left is the Santo António plateau, connected via the imposing Costa de Alvados; to the right, the São Mamede plateau, connected by means of an escarpment that is less important from a geomorphologic point of view - the Pena da Falsa. This is the nesting place for birds of prey such as the kestrel and the screech owl.



Alvados Sports Park



Pena da Falsa

**\*** POINTS OF INTEREST

**Alvados Sports Park**

The Open-Air Activities Centre at Alvados has been built to accommodate sports that are orientated towards permanent contact with nature, made possible thanks to the excellent natural open-air sports facilities created by the Alvados depression. Mountain-biking, para-gliding, caving, orienteering or just walking, can all be enjoyed at this leisure centre or started from here.

**Lagoa de Alvados (Alvados Lake)**

The picnic park by the side of this lake is a compulsory stopping place from which to enjoy a view of the surrounding countryside before starting the steep climb up to the



Alvados Lake

Costa de Alvados. This small lake is an important source of water for agricultural purposes and wild animals.

#### **Costa de Alvados**

The steep climb to the top of the escarpment of the Costa de Alvados, offers an unsurpassable panoramic view of the surrounding landscape.

#### **Chainça and Covões Largos**

Once at the top, the landscape changes completely, passing the dry-stone walls that mark out the pastures that dominate the countryside.

Chainça and a little further on, Covões Largos, are two small villages that are notably typical of this mountain region, set in small depressions or dolinas - *covões* as they are known in local toponomy, which are karstic forms resulting from the erosion of limestone rock by water action.



Canada Valley

#### **Vale da Canada**

After crossing the plateau the route starts to descend from Patelo, via the Vale da Canada. At the bottom can be seen the imposing silhouette of the Castelejo, one of the largest and most important escarpments in the Estremaduran limestone massif, not only in geomorphologic terms but also from the point of view of its fauna and landscape.

#### **The oak copse at Orçário**

During the walk several major oak copses

consisting of the variety, *quercus faginea* can be seen, in particular the copse at Orçário which is on the way down to Alvados.

### **Alvados**

In the village of Alvados it is worth visiting the local craft shop and taking a close look at several fine examples of traditional architecture that have recently been restored.



Covões Largos



Chainça



FÓRNEA

☑ FEATURES OF THE TOUR

type of tour: on foot, linear  
 approx. length: 1 Km

approx duration: 1 hour

starting point: by the Café da Bica in Alcaria

end: by the Café da Bica in Alcaria

type of terrain: footpaths

level of difficulty: easy

location: Santo António plateau (*planalto*) which contains three interesting geomorphologic formations: the Alvados depression, the formation at Castelejo and the Fórnea amphitheatre

main access routes: road between Porto de Mós and Alvados

facilities: café (Alcaria)



Fórnea



Gravel/waterfalls

☞ BRIEF DESCRIPTION

The Estremaduran limestone massif (*Maiço Calcário*) that began forming around 200 million years ago essentially consists of carbonated rock that originated in the sea. In fact, during the course of the Jurassic period



Grenfinch



"Dente-de-leão"

there was a major transgression in which the ocean moved in and covered the land, creating the thick deposits that nowadays form the limestone massif.

The trail that has been devised for visitors covers areas that contain mid and lower Jurassic formations. Types of rock can be seen along the walk that form the region's subsoil as well as a geological structure that is unique in Portugal and one of the best preserved in Europe, the **Fórnea** amphitheatre.

During the walk we will see marked differences in vegetation, mainly related to changes in the microclimate and nature of the soil.

Low-level scrubland predominates along the coast consisting of rock-rose (*cistus albidus*), rosemary (*rosmarinus officinalis*) and from time to time the occasional hawthorn (*crataegus monogyna*).

In the background, on the banks of the bed of the Ribeiro da Fórnea (a stream in the wet season) there are some very large fig trees (*figus sp.*) as well as large examples of hawthorn, laurel (*laurus nobilis*) and arbutus (*arbutus unedo*). There are also beautiful examples of two trees that are extremely rare in Portugal, the Montpellier maple (*acer monspessulanus*) with its yellowish green foliage and the bald cypress, both characteristic of Mediterranean vegetation.

On the cultivated land with its olive groves is an abundance of an aromatic plant traditionally used in Alentejo regional cooking - the pennyroyal (*mentha pulegun*), a creeping plant with small light green leaves and blue blossom.

Thanks to its unusual ecological features, the Fórnea enables the existence of a wide

variety of habitats, encouraging the presence of different animal species. The main reptiles found there are the ladder rat snake, the horseshoe snake, the Montpellier snake, the green lizard and the sand lizard. As far as birds are concerned there are kestrels, sparrow hawks, buzzards, stonechats, chaffinches, orphean warblers, greenfinches, partridges, turtle doves and the black-throated finch. The area is also home to foxes, weasels, badgers and hedgehogs.



Hedgehogs

### POINTS OF INTEREST

#### The Ribeira da Fórnea

This is a temporary stream (*ribeiro*) fed by water flowing down the slope of the *fórnea*, producing a considerable flow during winter and completely dry during summer months.

The cement structure at the start of the walk is one of 17 water-testing plants installed in the various natural springs in order to test water originating from the Estremaduran limestone massif (*Maciço Calcáreo*); it is a SIPOLETTI/RECTANGULAR mixed weir for measuring flow in metres per second. Inside the metal chamber is a **limnigraph** that records on a graph the height of the flow and respective time.



Water-testing plant

#### Conglomerates

On the bed of the Ribeira da Fórnea can be seen large blocks of whitish limestone that have an unusual structure. These are a particular type of sedimentary rock known as conglomerates which consist of fragments of rock (clastic rock) that are more or less round in form and joined together with natural carbonated cement. The rounding

## □ Geologic history

of the clastic rock is a sign of having been carried over a considerable period.

In some organic limestone blocks, also known as reef rock (*rochas recifais*), it is possible to see the accumulation of vague forms that are the remains of sea creatures.

### **Waterfalls/ alluvial deposits**

Large deposits of cryoclastic rock and waste mineral deposits are common throughout the Fórnea but are particularly spectacular on the SW and NW slopes. They date from the Quaternary period when the climate here was cold.

### **The Fórnea**

This is a magnificent structure in the form of a natural amphitheatre. It is around 500 metres in diameter, 250 metres high and was formed by the enclosed headwaters of the Ribeiro da Fórnea that hollowed out the marl limestone and marl from the lower Jurassic period to be overlaid with limestone from the mid Jurassic period.

### **The Cova da Velha (“old woman’s cavern”)**

On the slopes of the Fórnea are several small, seasonal outflows. The largest one originates from an accessible cavity known as the **Cova da Velha**. This natural spring that feeds the Ribeiro da Fórnea is a tributary of the River Alcaide and a sub-tributary of the River Lena. Access to this cavity is quite difficult because the ground is unstable, therefore extreme caution is advisable.



Stratum



Narcissi



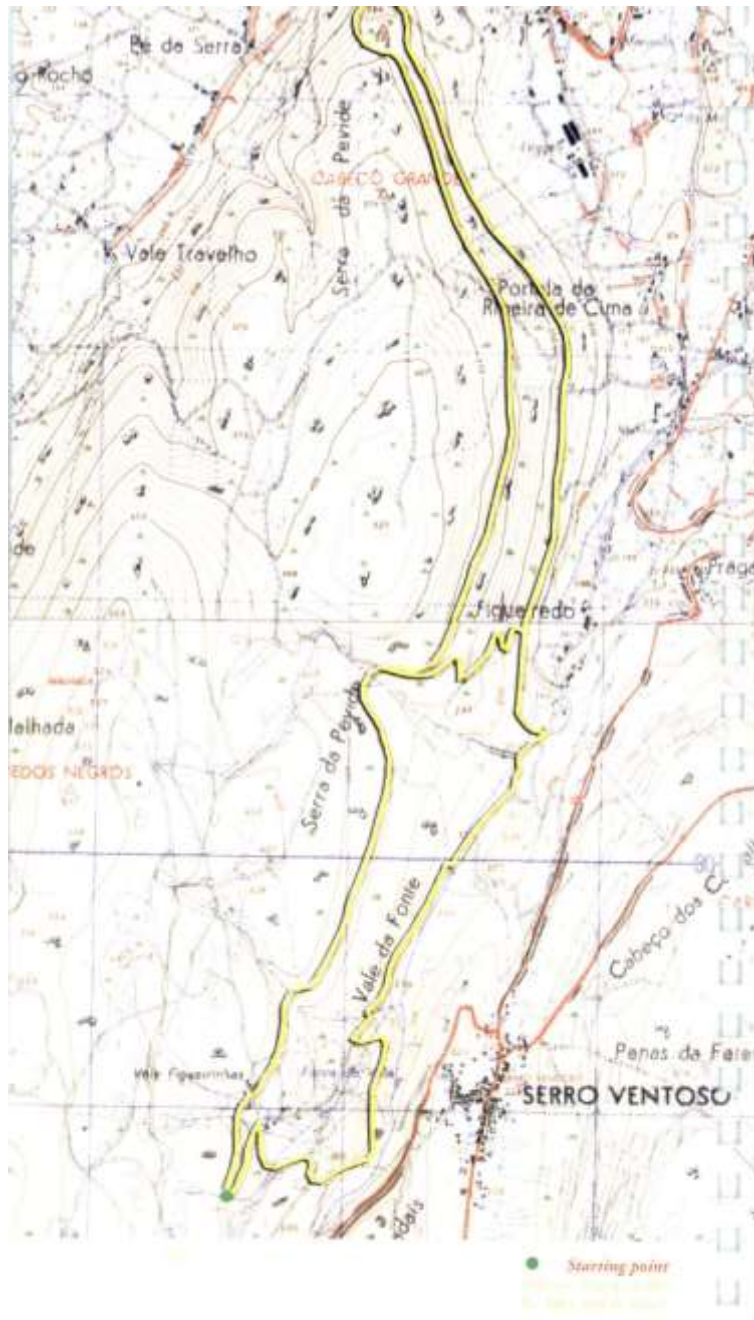


Stream bed



Fórnea

FÓRNEA





## CORREDOURA

### FEATURES OF THE TOUR

type of tour: circular

starting point: Bezerra soccer pitch

end: Bezerra soccer pitch

approx. length: 12,8 Km

approx duration: 6 hours

type of terrain: footpath, tracks and made-up sections of road

level of difficulty: average

location: north of the Serra dos Candeeiros, the route runs along an old railway line

main access routes: the EN1 and the EN 362 - Porto de Mós - Alcanede, via Porto de Mós

facilities: Corredoura picnic park



Old railway line



Figueiredo Valley

## □ WALKING TOURS

### > BRIEF DESCRIPTION

This walk begins a few metres further on from the Bezerra soccer pitch (before entering the village) and mainly follows the track of a disused railway line that transported coal from the mines at Bezerra to Porto de Mós. The route is very varied and representative in terms of flora and fauna, and particularly in geomorphologic terms.

Because it is a disused railway line the ground underfoot consists of coarse shingle, requiring care to be taken when walking.

The first half of the walk is along the upper line during which our gaze is inevitably drawn to the uninhabited area to the east, resting on the slopes of the Cabeço dos Carvalhos, Cabeço Gordo and the Cabeço Vedeiro where the communal water tank at Serro Ventoso, the whitish, rectilinear streaks of bare rock and the geometrical facing of the stone walls can be seen.

To the west, close to the track, the abrupt slope of the Serra da Pevide is covered in bushes which are mainly cocifera oak with some holm oaks, helianthemum and rock-rose with its beautiful, fragile leaves.

The scenery suddenly changes completely: the cuts made in the rock in order to lay the railway line create gloomy corridors on whose walls can be seen plants that have become specially adapted to shade and fissures in the rock are gradually overtaken by rock-loving plants – some ferns such as polipodiceae and spleenwort find suitable conditions there in order to flourish.

At the end of the upper line is the tunnel and then the track comes out into sunlight once



General View



Rockrose

again. The skyline extends towards the sea and at the northern extremity of the Serra dos Candeeiros, the windmills mark its ridge. The nearby picnic park is an inviting spot for a break before starting the descent down to the lower line.

The route crosses a Portuguese oak copse that grows on the slope down to the valley, together with mastic trees and large viburnums. Close to the ground, periwinkles spread their shining green carpet, sprinkled with lilac flowers.

In the valley, the agricultural land reclaimed from the oak copse by the local people is now occupied by olive groves or apple orchards. Here and there near the wood are the winding stems of honeysuckle in temporary partnership with eucalyptus.

Leaving the railway line, the route continues along the bottom of the valley, skirting the imposing Pena Alagada, scattered with gravel and covered by a magnificent oak wood as far as the upper line and the starting point.



Oaks



Agricultural land

**\*** POINTS OF INTEREST

**Coal mines at Bezerra**

Coal mining was a major industry in this region, working seams of lignite from the Upper Jurassic period. The coal was used in industry, for example, to supply the thermoelectric power station at Porto de Mós and the cement companies in Maceira. The mines are now disused and visiting them is inadvisable for safety reasons.

**Bezerra railway**

With the start of coal mining, this railway



Tunnel



Olive grove



Casais hill

was built in 1928 and followed an irregular course in order to accommodate the Serra do Pevide. It was dismantled in 1953 and it is now only these tracks that provide access to this vast landscape.

#### **Diapiric valley in Porto de Mós /Rio Maior**

A constant feature of the countryside throughout this walk is the diapiric valley in the Porto de Mós / Rio Maior area, with detrital and evaporative sediment from the Hetangian period. This valley is interrupted by the hills of the Pena Alagada and the Serro dos Casais.

#### **Geomorphologic formations.**

At a certain point in the walk it is possible to see the confluence of three major geomorphologic formations: the Serra dos Candeeiros (where we are now), the São Mamede plateau (NE) and the Santo António plateau (SE).

The depressions separating these formations are the diapiric valley between the Serra dos Candeeiros and the plateaux, and the Porto de Mós – Moitas Venda tectonic alignment separating the plateaux.

The Santo António plateau is bounded by the bed of the River Lena where its springs are situated.

North east from the diapiric valley are some prominent hills that result from doleritic intrusion – the Castelo de Porto de Mós, the Morro da Capela de Santo António and the Livramento.

#### **Millstone quarry**

The quarry producing sedimentary limestone used for millstones, using the



angular surfaces of the clastic rock of which they consist in order to grind cereals.

**Shingle**

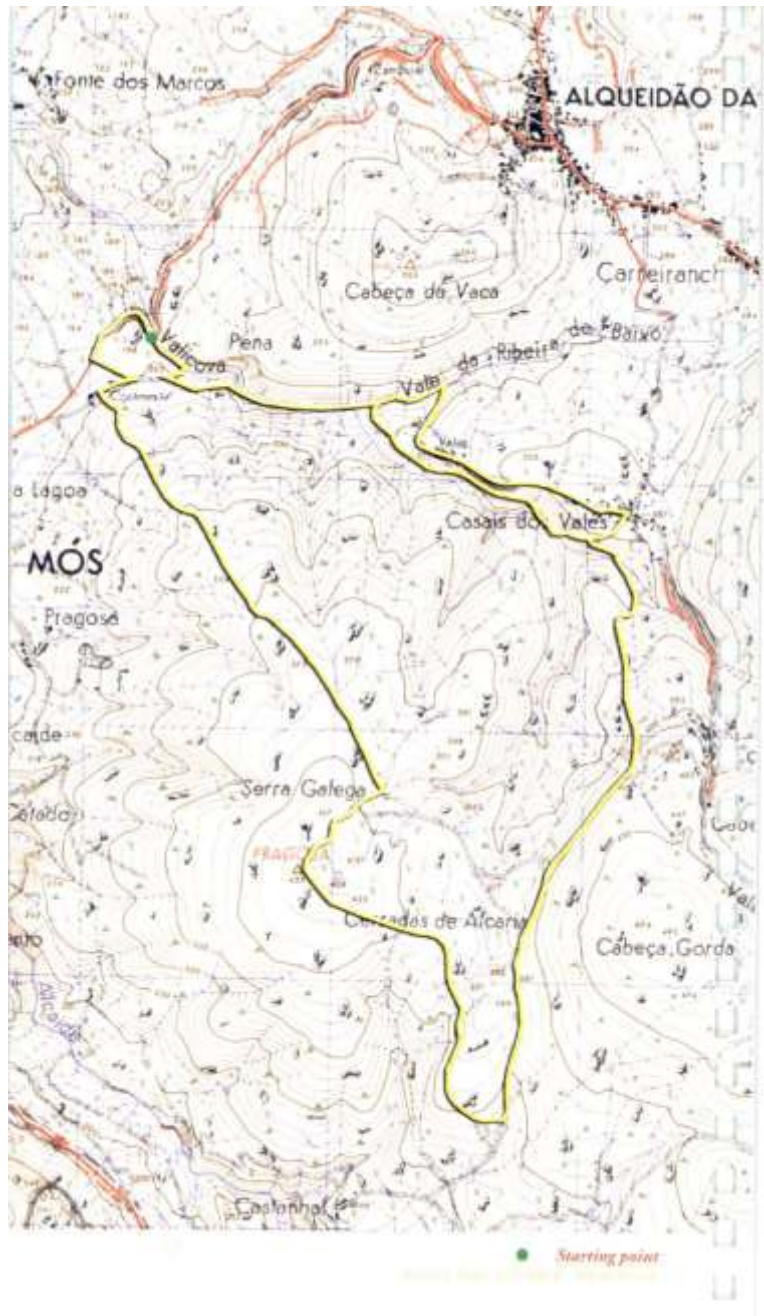
Stabilized deposits resulting from the erosion of rocky escarpments. These are geologically recent, dating from the quaternary period.



Windmills



Pena alagada







## SERRA GALEGA

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 11 Km

approx duration: 5 hours

starting point: Valicova

end: Valicova

type of terrain: footpaths, tracks and made-up road section

level of difficulty: average

location: São Mamede plateau

main access routes: road between Porto de Mós and Alqueidão da Serra

facilities: café/grocery shop in Casais dos Vales



Valicova



Acorn

### BRIEF DESCRIPTION

On the road that links Porto de Mós to Alqueidão da Serra, turn right towards the valley to start the walk in an area known as Valicova. The route crosses the valley among vegetation that consists of oak trees, hawthorn, privet and mastic trees then turns again to the left and up some steps to reach the **caves (lapas)** on the hillside. Returning to the valley via a path, on the



Great tit



Casais dos Vales

right is a spring - the Olhos d'Água da Valicova. Continuing through the valley, we climb towards the main road from where it is possible to glimpse (to the left over the Vale da Valicova) the imposing escarpments known as the Penas that are a prominent feature of this landscape. About 500 metres ahead there is a choice between taking two different sections: via the valley - **Option A**, or 50 metres further on, via **Option B** - which will lead us to the small village of Vales which is very interesting from an architectural point of view despite being virtually abandoned. The two route options meet at the same place - near a cattle farm - before continuing south along the valley, between derelict olive groves and sheep-pens ("chousos") as far as the dirt road. After continuing along here for about 2 km, the trail starts climbing up to the Serra Galega but beforehand it is worth pausing to look at the imposing Costa de Alvalados and the Fórnea (natural amphitheatre) that can be seen to the west. At the very top of the Serra Galega small clumps of thyme cover practically the entire summit. The return is in the direction of the Cortinas and before going back to the starting point, the last stop takes us to a well built in stone so long ago that nobody can remember when. The well is about 4 metres deep and contains water all year round - a very pleasant spot surrounded by an oak copse.

Two distinctive features differentiate the vegetation along this route: the exuberance of the oak woods in the valleys and at the

base of the hillsides, in contrast with the sparseness of the undergrowth in higher areas. The oak woods consist of trees of the variety *quercus faginea* ssp. *broteroi* (Portuguese oak) and there are other species in addition, frequently bushes that are the size of trees - hawthorn, privet and mastic tree. The area under the trees may be poor in terms of plant cover but among the grass that manages to grow despite the absence of light is a white orchid that is typical of this area, flowering from April to July. Higher up, for example, near the Pragosa triangulation point, alternating with rocky outcrops, is vegetation dominated by two small aromatic shrubs: thyme (known locally as *pimenteira*) and a small mountain germander. These shrubs are responsible for the pleasant scent that fills the air when walking through these areas. Other species together with thyme and mountain germander – mosses, grasses, ferns, narcissi and orchids – cover the soil completely, saving it from erosion and enabling the survival of vegetation for more complex communities. These areas also provide a habitat for reptiles such as the green lizard, the *Bedriagai* skink and the *vipera latastei*; also, mammals such as the mole and the badger and various types of birds have been seen here, including the short-toed eagle, the lark, the tawny pipit, the meadow pipit and the wren.

Through the hills and valleys along the route, dominated by woods and scrubland, we will find areas that provide a habitat for various types of Portuguese fauna. On the



General View



Badger

## APPLICABLE TOPICS



Cave



Traditional architecture



Thyme

escarpments the black bullfinch, the kestrel and swallow are commonly found whilst in the oak woods are sparrow-hawks, great tits, blue tits, short-toed tree-creepers, wrens and jays.

## \* POINTS OF INTEREST

### Caves/grottoes

Natural cavities of horizontal development, of different types and sizes, mostly closed due to clay sediments

### Olhos d'Água da Valicova

Spring – an occasional exurgence where de infiltrated waters come to surface

### Penas da Valicova

Important escarpments with very prominent features

### Casais dos Vales

Small mountain village, virtually abandoned, with interesting architectural features.

### Panoramic view over the Fórnea and the Costa de Alvados

The imposing landscape glimpsed from the slopes of the Serra Galega includes the striking escarpment of the Costa de Alvados and the Fórnea – a magnificent structure in the form of an amphitheatre with a diameter of around 500 metres and a height of 250 metres.



### Clumps of thyme

In the high-level scrublands near the Pragosa triangulation point, 423 metres up in the Serra Galega, there is an abundance of aromatic shrubs such as thyme and mountain germander. The powerful scent in these areas, especially in summer, is due to the presence of these herbs.

### Well

On the way back, in the direction of Cortinas, we come across a well built in stone so long ago that nobody can remember when. The well is about 4 metres deep with water all year round.



Casais dos Vales





## ESTRADA ROMANA (ROMAN ROAD)

### FEATURES OF THE TOUR

type of tour: on foot, circular, can also be done by mountain bike

approx. length: 9 Km

approx duration: 5 hours

starting point: Roman road at Alqueidão da Serra (picnic park)

end: Roman road at Alqueidão da Serra (picnic park)

type of terrain: footpaths, tracks and sections of made up road

level of difficulty: easy

location: São Mamede plateau (*planalto*) among rocky hillocks (*cabeços*) and valleys, known locally as *covões*

main access routes: Municipal road between Porto de Mós and Alqueidão da Serra

facilities: Activity Centre of the Roman Road, picnic park, café and restaurant (Alqueidão da Serra)



Roman road



Covão da Nicha

## □ WALKING TOURS

### ▷ BRIEF DESCRIPTION

The ROMAN ROAD WALKING TOUR unfolds, starting in the small town of Porto de Mós, in the very middle of the plateau known as Planalto de São Mamede (also known as Planalto de Fátima) and winding through rocky hillocks and valleys.

Classified as a feature of public interest by Law No. 29/90 dated July 17, the **Roman Road** in Alqueidão da Serra is one of the most remarkable examples of cultural heritage in this region. The tour begins at the roman road with an approximate extension of 500 m.

The trail passes between bare, dry rocky hillocks and fertile valleys or *covões*, as they are referred to in local toponomy, where the dry-stone walls or *chousos* divide up the dry landscape that man has taken over for agriculture.

Set among the rocky hills and valleys, this tour enables us to visit a variety of locations; areas of highland brushwood interspersed with cultivated fields and woodland with oak and pine provide the opportunity to see many different animals.

In the woods the main species of bird are nightingale, wren, stonechat and Sardinian warbler. It is also possible to spot the occasional weasel and civet cat. In the fields, as well as the common frog, are the green lizard and the adder; in addition there are greenfinches, turtle-doves, decoy birds,



Wren



Mushrooms



chaffinches, chimney swallows and at the end of the day, we may also glimpse the little owl.

In a region where surface water is scarce, any occurrence of water, however insignificant it may seem in the visitor's eyes, is of great importance in this kingdom of stone; near the **Lake** we can see species that are rarely seen in these areas and other parts of the Serras de Aire e Candeeiros National Park, for example, the horny-backed toad, the common salamander and the water viper have chosen this spot as their habitat.

In the highland brushwood where rosemary bushes flourish, we can find larks, tawny pipits, wrens and robins and watch birds of prey such as the hawk eagle and the kestrel. Lastly, in the copses of Portuguese oak it is easy to spot the great tit and the blue tit, the short-toed treecreeper, the jay, the bullfinch or even a sparrow-hawk in flight.

To return to the starting point, and leaving behind Covão de Oles. Take de valley left of the made-up road where some caves used to shelter sheperds then turn right up a footpath that winds along the hillside, passing through an abandoned olive grove.



Karstic feature



Covão da Nicha



Chão Nogueira Lake

## \* POINTS OF INTEREST

### **Roman road in Alqueidão da Serra**

Alqueidão is a word of Arab origin that means road or passage.

The parish came into being in 1615, with the name Alqueidão das Contas because of its connection with the Cistercian monks who built a farm here in 1734 and the village gradually developed along the Roman road. The old road ran between Nazaré and Tomar and would have been used mainly by the Romans who mined iron-ore.

### **Stone-crushing plant**

At the end of the roman road we reach de road and find a stone-crushing plant.

This working quarry produces roadstone used in construction, in particular for roads, motorways and buildings. Although mining has a negative impact on the environment it is of major importance for Portugal, therefore since the workings comply with licensing conditions - especially those relating to minimizing environmental impact - extraction is authorized.

### **Chão Nogueira Lake**

A small dolina with a diameter of no more than 6 metres, the **Chão Nogueira Lake** cannot be ignored given the strategic importance of water in the region.

**Covão de Oles**

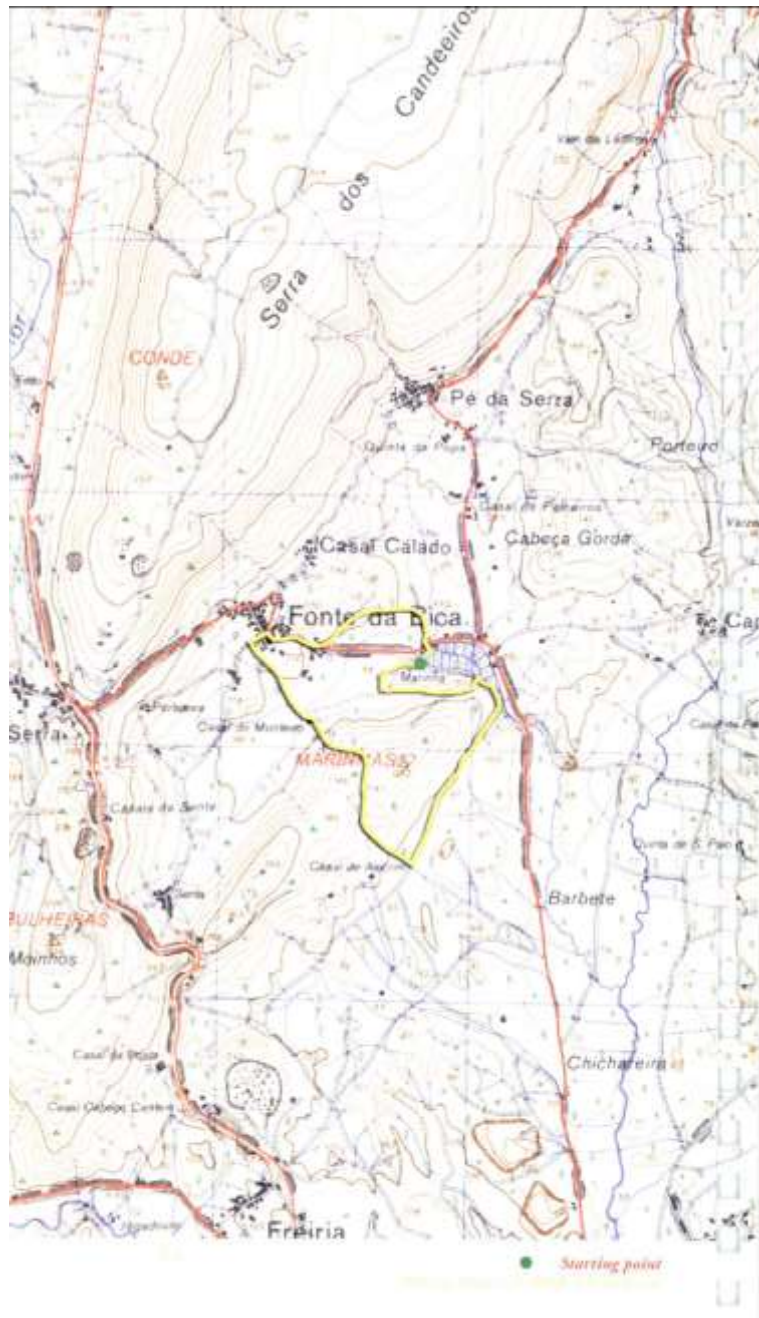
This is a hamlet with scarcely more than 60 inhabitants who are mainly involved in manufacturing. Here we can see several unusual examples of traditional stone buildings that are worth a visit. Before reaching the hamlet, on the left hand side looking northward is a collection of houses nestling in the valley; they are known as the Casais dos Vales (the "valley houses") with the white windmill at Cabeço da Vaca in the background.



Traditional architecture



Roman road





## MARINHAS DE SAL (SALT PANS)

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 3 Km

approx duration: one hour and a half

starting point: salt pans at Rio Maior

end: salt pans at Rio Maior

type of terrain: footpaths, tracks and sections of made-up road

level of difficulty: easy

location: typhonic valley at Fonte da Bica, at the southern end of the Serra dos Candeeiros, around 3 km from Rio Maior

main access routes: via the EN 1 coming from the north, turn right towards Alto da Serra and then left for the salt pans (Marinhas de Sal); via the EN 1, coming from the south, continue in the direction of Rio Maior, Salinas (salt pans)

facilities: tourist office, bars, restaurants and local crafts (salt pans)



Salt pans

## WILDLIFE ZONES

### > BRIEF DESCRIPTION

The salt pans are situated at the foot of the Serra dos Candeeiros, 3 km from Rio Maior. Complying with the regulations that govern the use and management of the area and which have been in force for eight centuries, these are a valuable and unusual example of the natural and cultural heritage, now classified as a feature of public interest.

The traditional production and storage of salt that is still carried on by the local salt producers' cooperative, SOLSALTUR, and all the other associated cultural and anthropological aspects, make the salt pans an unmissable stopping off place for visitors to the Aire and Candeeiros Mountain Ranges National Park (PNSAC).

Skirting the hill south of the salt pans, this short walk passes mainly through agricultural areas in this landscape that has been put to a variety of uses - orchards and vineyards alternating with scrubland, pinewoods and eucalyptus groves. Although not particularly interesting in terms of animals, the area contains a considerable number of species.

On the walls of the salt pans, common lizards and geckos can be seen and during the winter there are mallards in the salt-pans. In the bordering farmland we may be able to spot the rare pointed-snouted frog. There are many birds, in particular, the carrion crow, the blackbird, the greenfinch, the decoy bird and the goldfinch. Around the eucalyptus groves, the giant woodpecker can be heard and jays and starlings may be glimpsed in the scrubland. It is sometimes possible to see tracks left by foxes as well as



Call-bird



Dragonfly



Track

rabbits and fieldmice.

The trail takes us to the village of Fonte da Bica, on the northern slope of the salt pans from which there is a panoramic view of this fertile valley, streaked with innumerable colours and textures where the salt pans (*marinhas de sal*) originate.



"Fonte da bica" (fountain)

### POINTS OF INTEREST

#### **Salt pans (designated feature of public interest)**

The salt pans, symbol of the city of Rio Maior, consist of a salt mine that is wide and deep, crossed by an underground channel that supplies a well so that the water coming out is salty. After being exposed to the sun and wind and following evaporation, rock-salt is obtained (between June and mid September). The salt is stored in strange wooden constructions with locks and keys also in wood, dating back to Roman times.



Marinhas de sal (salt pans)

#### **Eucalyptus groves**

The eucalyptus tree originated in Australia and came to Portugal during the 19<sup>th</sup> century, initially to provide wood for the boilers of locomotives. It is now a major forestry product used in the paper industry. Because of its fast-growing characteristics, the variety has come to be of great importance to timber producers who regard it as their "piggy bank" from which they are able to take dividends every eleven years. Being a



Tanks of Fonte da Bica



Typhonic Valley



Common Salamander

rapidly-growing species it consumes a great deal of water which restricts the areas to which it can spread, especially in limestone regions where problems with underground water are a determining factor.

***The fonte da bica* (“water-spout” spring)**

The “*fonte da bica*” gives its name to the village of the same name further south in the diapiric valley. This spring was formerly an important social meeting place (a source of water and place for washing clothes) and was restored thanks to the Rural Settlements Classification scheme. It has always been an obligatory stopping place for both residents and visitors.

***Typhonic Valley (Vale Tifónico)***

Incidences of Herangian marl that rise to the surface as a result of tectonic diapiric accidents (where the core of rock has moved upwards piercing the strata) and which are easy to excavate because of their fluid nature and regressive erosion, have determined the formation of this deeply carved out valley. Because of the difference in the degree of hardness of the two types of rock present, differential erosion has had a noticeable effect and the depression has naturally worn away more in the areas of marl.

Typhon, the god from Greek mythology who disembowelled his mother when he was born, is the origin of the term, typhonic, which is synonymous with diapiric. The valley that can be seen from this point resulted from the break-up of the surface layer of limestone; this followed the pushing up of its core which consisted of sedimentary





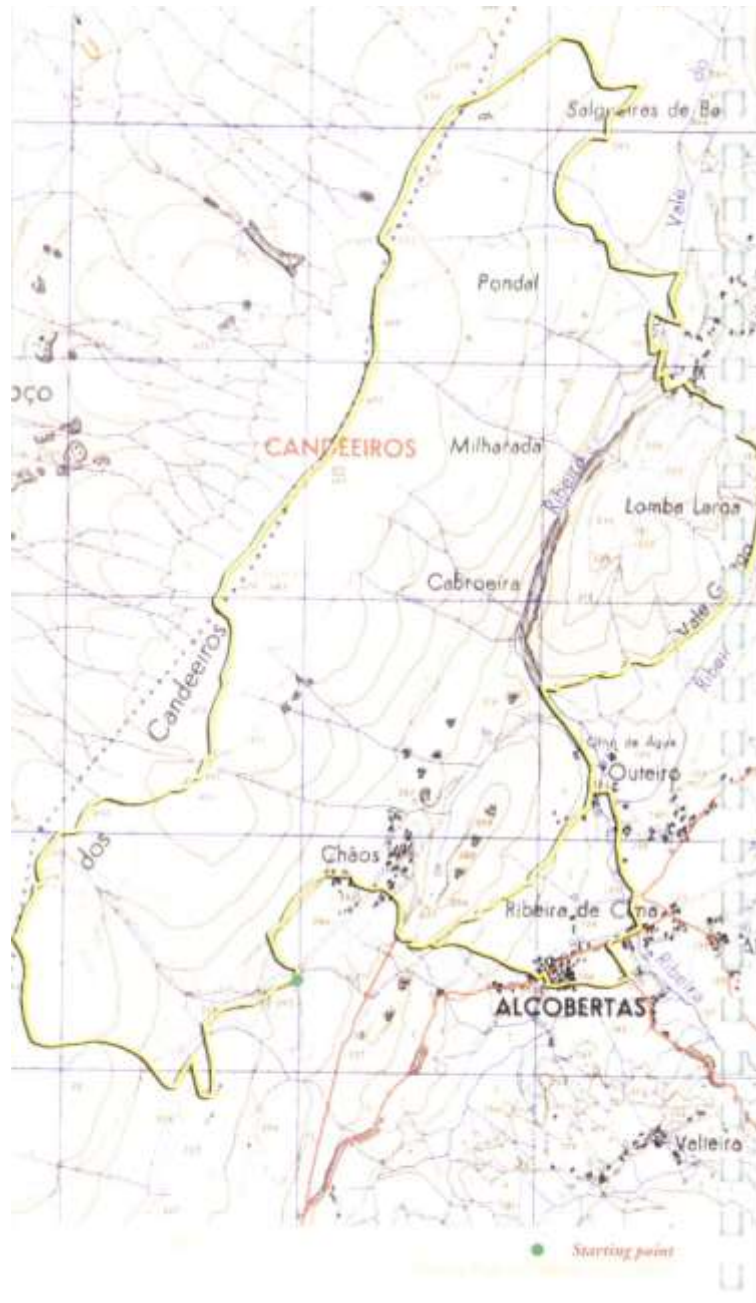
rock that was just like salt and plaster of Paris, formed by the minerals left behind by the lakes and oceans of former times.



Fonte da Bica



Agricultural land of Candeeiros Mountain Range





## CHÃOS - ALCOBERTAS

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: long walk – 17 km

approx duration: 7 hours

starting point: Craft Weaving Centre (Chãos)

end: Craft Weaving Centre (Chãos)

type of terrain: footpaths, tracks, compacted earth roads and made up sections of less than 1 km

level of difficulty: average

location: south of the Serra dos Candeeiros, on the eastern slopes

main access routes: municipal road via Rio Maior - Fonte da Bica - Teira - Chãos - Alcobertas - Casais Monizes (continues on to Arrimal, etc, in the direction of Porto de Mós)

facilities: Craft Weaving Centre, café, restaurant, picnic park (Chãos, Alcobertas and Portela das Salgueiras)



Craft Weaving Center



low bushes

### BRIEF DESCRIPTION

The Chãos /Alcobertas walking tour offers a choice of two routes:

a) The longest route passes through the

## □ Mountain Trails



Orchid



Threshing Floor

villages of Chãos, Alcobertas, Ribeira de Cima and Casais Monizes - charming places that are representative of the cultural heritage of the mountains. There are major geomorphologic features as well as the attractive natural landscape of the eastern slopes of the Serra dos Candeeiros.

- b) The shorter route passes through the villages of Chãos and Alcobertas, both rich in cultural heritage with archaeological remains to be seen in the latter.

Starting at the Craft Weaving Centre in Chãos, a building attached to the former woodland house which was restored in 1993 now a craft weaving workshop, the walk continues through the village of Chãos where cattle-rearing is still one of the main sources of income. Walking down into Alcobertas, a village that has a large number of archaeological remains, in particular the **Neolithic dolmen** and the grain **silos**, the route passes the village fountain and the natural spring (**olho d'água**). From the fountain, the trail climbs steeply up towards Casais Monizes and along the Galego Valley where the silhouette of a kestrel can often be glimpsed. Crossing the terraced valley, the route passes a series of **dry-stone walls** where it is still possible to see evidence of subsistence farming, with the growing of potatoes, beans, pumpkins, peas, etc. The trail reaches the top of the Serra dos Candeeiros where the highest point of 487 metres is marked by the cross and a pothole (*algar*) of the same name located in the middle of a clump of rosemary bushes. These form rounded tufts that are scattered among sections of limestone that have been eroded by rainwater (lapiaz). In a small valley, a recently reclaimed lake tradi-

tionally used as a watering place for cattle, is a compulsory stopping place for all passers-by, both humans and animals.

The variation in soil along the route is a determining factor in the type of vegetation. The soil in the mountain areas is of limestone origin whilst lower down it is sandy. This difference results in the presence of certain features in the natural vegetation as well as the vegetation that has been planted. Because of its suitability, forests of eucalyptus and wild pine have become established in the sandy soil. There are also plants here that are intolerant of limestone (more or less available in the other type of soil) such as *simethis planifolia*, a bulbous plant with stems bearing 4 or 5 small white flowers with sinuous leaves at the base, as well as red heather. By contrast, on the limestone massif there are prominent outcrops of rosemary which dominate the landscape where there is also a natural regeneration of groves of holm oak and cocifera oak. A dense and seemingly impenetrable oak wood can also be seen on the southern slopes of the Galego Valley, a natural response to the absence of soil and to the temperatures that result from the exposed nature of the slope.



Craft weaving



Cistern (water tank)

**\*** POINTS OF INTEREST

**Water tank**

Given the absence of surface water, since the earliest times of human settlement, water tanks or cisterns have been the most traditional way of storing water and are now an integral part of this region's cultural heritage. They exist in a variety of forms, both natural



Mastic tree

and constructed; in this particular case, the natural cracks in the rock were filled in and an extremely unusual brick cover was built. Waterproofing was traditionally by means of painting on a mixture of olive oil and whitewash.

#### **Rocky outcrops**

In the continuation of the Fonte da Bica Valley, these outcrops appear to be the fault-lines associated with the movement of the earth's crust. In terms of landscape, these whitish karstic formations appear to emerge from a green carpet. Down towards the west, the outcrops extend as far as arable land and in the east they form imposing projections that overhang the village of Alcobertas.



Rocky formation

#### **Cova da Aroeira**

Also known as the "Poça da Aroeira" or "mastic tree well", this is a hole in the ground from which water springs practically all year round and where there are mastic trees (*pistacia lentiscus*), a common shrub in the region. The unusual feature of this place, in relation to the surrounding soil, is the presence of clay which being only slightly permeable, enabled the local people to make use of water existing in the soil, namely in the form of wells and ponds, so that they were able to survive in this dry region.



Water-mill

#### **Water-mill**

The water-mill that can be visited (by prior arrangement with the owner) still operates in the traditional way, grinding cereals used to make the delicious bread that you will be able to sample. It is one of the many water-mills situated along the Ribeira das Alcobertas, one of the permanent natural springs of

the limestone massif (*Maciço Calcáreo*).

### **Dolmen – Chapel of Alcobertas**

Declared a feature of public interest in 1957, this is a megalithic funeral monument dating from the Neolithic period (approximately 4000/3500 BC).

Although it is not known when the village was converted to Christianity, the chapel was elevated in status in 1536 to become the first church in the parish. In the 17<sup>th</sup> and 18<sup>th</sup> centuries, the church was turned round into its present position so that the dolmen no longer served as a chapel and high altar and became a side chapel dedicated to St. Mary Magdalene.



Dolmen of Alcobertas



Natural Spring

### **Silos**

At the edge of the village, dug into reddish sandstone on top of a hill is a remarkable group of silos. Although the group is now reduced to just a few examples in good condition, it has been estimated that originally there were between eighty and a hundred silos arranged along an axis of approximately 60 metres. They are thought to have been grain silos although tests carried out on earth removed from inside them failed to detect any kind of seed and it is not known when they were built.

### **Olho d'Água (natural spring) in Alcobertas**

Olho d'Água is the name given to natural springs occurring in the sides of limestone massifs. The Alcobertas spring is one of the several permanent outflows from the Estremaduran limestone massif of which the best known are the Rivers Almonda and Alviela, the mouths of the River Maior, the Alcoa,

## □ **Walking Tours**

the Liz and certain sources of the River Lena.

Its discharge is no more than 100,000 m<sup>3</sup> a day, however it is an important source of water for irrigation, washing and for animals to drink. Attractively set amid riverside greenery, there are tables, chairs and barbecues which make it a pleasant spot to take a rest during this walk.



Escarpments



Montpellier snake



Algar do Cruzeiro (pothole)

### **Escarpments**

At the start of the Galego Valley, parallel with the road between Alcobertas and Casais Monizes, it is possible to see the different layers of limestone that run all along the valley. The different types of limestone are clearly visible because of the different levels of erosion to which they have been subjected by the same agents; the caves at the end of the valley bear witness to this process.

### **Traditional architecture**

Casais Monizes is a small village of around 340 inhabitants where the small-scale industry connected with processing stone is the main source of employment, as well as a few cattle farms. Limestone, the most notable raw material in this region, is widely used in the local architecture, a curious example of Portugal's construction heritage; visitors can see a house with a water tank attached to it and a system for collecting water (stone drainpipe).

### **Algar do Cruzeiro**

One of the few deep potholes (known as *algares*) found at the top of the Serra dos Candeeiros, owes its name to the nearby **cross** (or *cruzeiro*) that was erected in honour of Our Lady of the Conception in



1946. The cavity is around 2 metres deep and so is not really a cave; its significance lies in the fact that it used to be a major roosting place for the chough, a protected species that is symbolic of this National Park.

#### **Lagoa dos Candeeiros**

This natural lake, traditionally used by cattle and animals in general, is also an important source of water for assistance with fire-fighting in the event of forest fires. Recently restored, it is a major rainwater reservoir amid the arid Serra dos Candeeiros.



Candeeiros Lake



Windmill

#### **Calcite quarry**

Calcite is the second most frequently found mineral in the composition of rock and the most important constituent of limestone and so is often seen in this region. It is traditionally used as a raw material in glazing ceramics but is being replaced thanks to the advance of new technologies.

#### **Windmills**

Marking the note-worthy points on the mountain landscape, the windmills used to play an essential role in grinding cereals, particularly wheat. Traditionally associated with bread-ovens, they formed part of a social system in which the miller received payment in the form of a proportion of the flour produced from the cereal. Nowadays most of them have been abandoned but some windmills have been restored to provide tourist accommodation, especially in the Alto da Serra and in Senta.





## GRUTA DO PENA (CAVE)

### FEATURES OF THE TOUR

type of tour: on foot, circular

approx. length: 9 km

approx duration: 3 hours

starting point: Underground Cave Study  
Centre - Algar do Pena

end: Underground Cave Study Centre -  
Algar do Pena

type of terrain: footpaths, tracks and  
compacted earth roads

level of difficulty: easy

location: southern edge of the Santo  
António plateau, characterized by intense  
stone quarrying

main access routes: turn left off the EN 361  
(Rio Maior - Alcanena) at Alcanede for Barreirinhas or on the same road in Amiais de Cima turn left for Cortiçal/Vale Florido, as far as Vale da Trave and Barreirinhas, then follow the signs down the dirt track to the Study Centre car park

facilities: Underground Cave Study Centre  
– Algar do Pena (CISGAP)



Underground Cave Study Center



"Algar do Pena" (cave)

▷ *BRIEF DESCRIPTION*

This walk is centred on the southern edge of the Santo António plateau, starting and ending at the Underground Cave Study Centre - Algar do Pena, one of the main features of this National Park.

This is a region where there is a great deal of quarrying, particularly towards the end of the walk and where rehabilitation work has been carried out by the Aire and Candeeiros Mountain Ranges National Park (PNSAC). The dry-stone walls that divide up the landscape are also a constant feature, resulting from the removal of stone from the land in search of workable soil; the main function of these enclosures on the Santo António plateau is to contain cattle which are widespread, thanks to the excellent natural meadows. Here and there, groups of three or four houses punctuate the land in a haphazard fashion.

Taking a short detour eastward near Cortiçal (approximately 500 metres) it is possible to visit the very first house built in the village.

The last part of the walk is rich in the natural phenomena that are characteristic of the karstic landscape, for example, **fields of lapiaz** (limestone sheets eroded by rainwater) and **dolines**, particularly near the Covão dos Porcos, an unusual group of traditional stone-built houses.



Civet cat



Local Architecture



Rosemary bushes

## \* POINTS OF INTEREST

**Underground Cave Study Centre - Algar do Pena (CISGAP)**

Discovered in 1985 following works to dismantle a paving-stone quarry in the village of Vale do Mar in the parish of Alcanede, district of Santarém, the vast cave known as the Algar do Pena, opens out into a magnificent underground landscape which is the largest chamber of this kind known in Portugal. In addition to its interesting interior and the educational aspect of the cave, inside it has been created an important and unique witness to the study of caves in Portugal, the country's first Underground Cave Study Centre.



Algar da Aderneira (cave)

**Algar da Aderneira**

Inside a small enclosure is the fenced off mouth to the Algar da Aderneira, witness to this cave's importance early in the 20<sup>th</sup> century at the time the survey was being carried out for the capture of the Alviela, carried out by the Swiss hydrologist, Ernest Fleury. For safety reasons, it is not advisable to explore this cave which takes its name from a shrub known locally as the *aderno* (*phillyrea latifolia*), commonly found in the National Park.

**Architecture**

Covão dos Porcos is one of the many small settlements scattered over the plateau. As its name "covão" (or "depression") suggests, this is an area that is topographically sunken where the geomorphology has enabled the

formation of more fertile soil, encouraging settlement. Now although abandoned or largely depopulated, these settlements still retain the traditional stone architecture seen here in the main house, equipped with a roof drainage system into the tank adjacent to a threshing floor.

**Lapiaz and wind-breaks (maroiços)**

Near Covão dos Porcos in the very heart of the Santo António plateau, the mass of paths bordered by dry-stone walls frequently forms sheep-pens or *chousos*.

Also resulting from the removal of stones from the soil are wind-breaks or *maroiços*, small piles of stone placed on the land and very common throughout the Santo António plateau and a frequent sight on this walk. In addition to the wind-breaks, lapiaz are commonly seen in sheep-pens as we climb up to Covão dos Porcos; these stones are the result of erosion by rainwater and take the form of superficial channels in the rock.



Lapiaz



Maroiços (wind-breaks)

**Dolines**

These are one of the basic forms of the karstic systems. They are roughly circular depressions of varying size, ranging between one and one thousand metres wide and between a few centimetres and three hundred metres deep. They may be associated with potholes (*algares*). About 50 metres along the path on the left, two dolines can be seen, completely surrounded by sheep-pens.

### Sink-holes

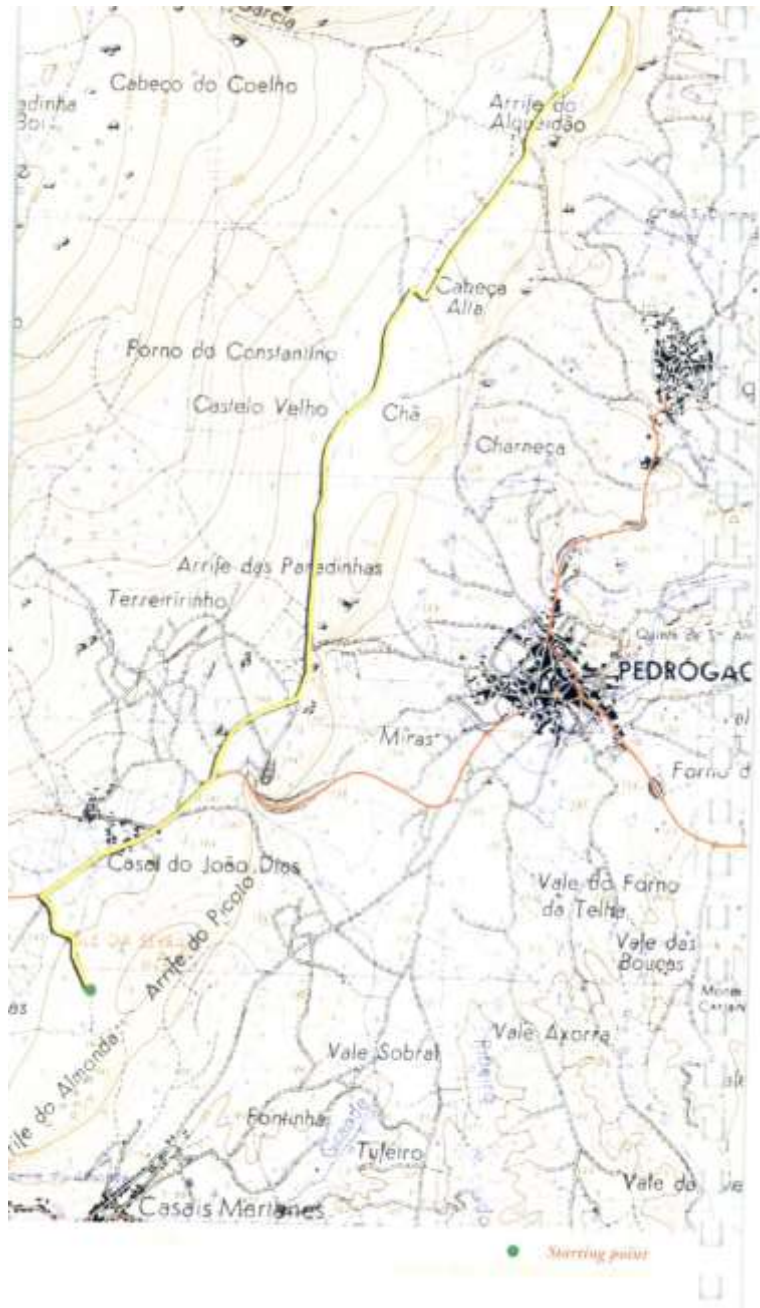
In a region where water is scarce, sink-holes are a traditional way of making use in a natural way of the cavities that result from water erosion and which, having been made waterproof by means of painting with a mixture of whitewash and olive oil, were covered with stone slabs in order to keep the water clean. Their great importance is emphasized by the building of a surrounding wall, as in the case of this one.



Sink-hole



Track





## GRUTAS DO ALMONDA (ALMONDA CAVE)

### FEATURES OF THE TOUR

type of tour: on foot or mountain bike,  
linear

approx. length: 9 km

approx duration: 4 hours

starting point: Almonda Cave Underground  
Study Centre

end: Natural Monument: Dinosaurs' Foot-  
prints at Serra de Aire (MNPDSA)

type of terrain: short section of made-up  
road, tracks

level of difficulty: easy

location: along the north eastern edge of the  
Serra de Aire near the Arrife (escarpment)

main access routes: Municipal road from  
Pedrógão to Vale da Serra

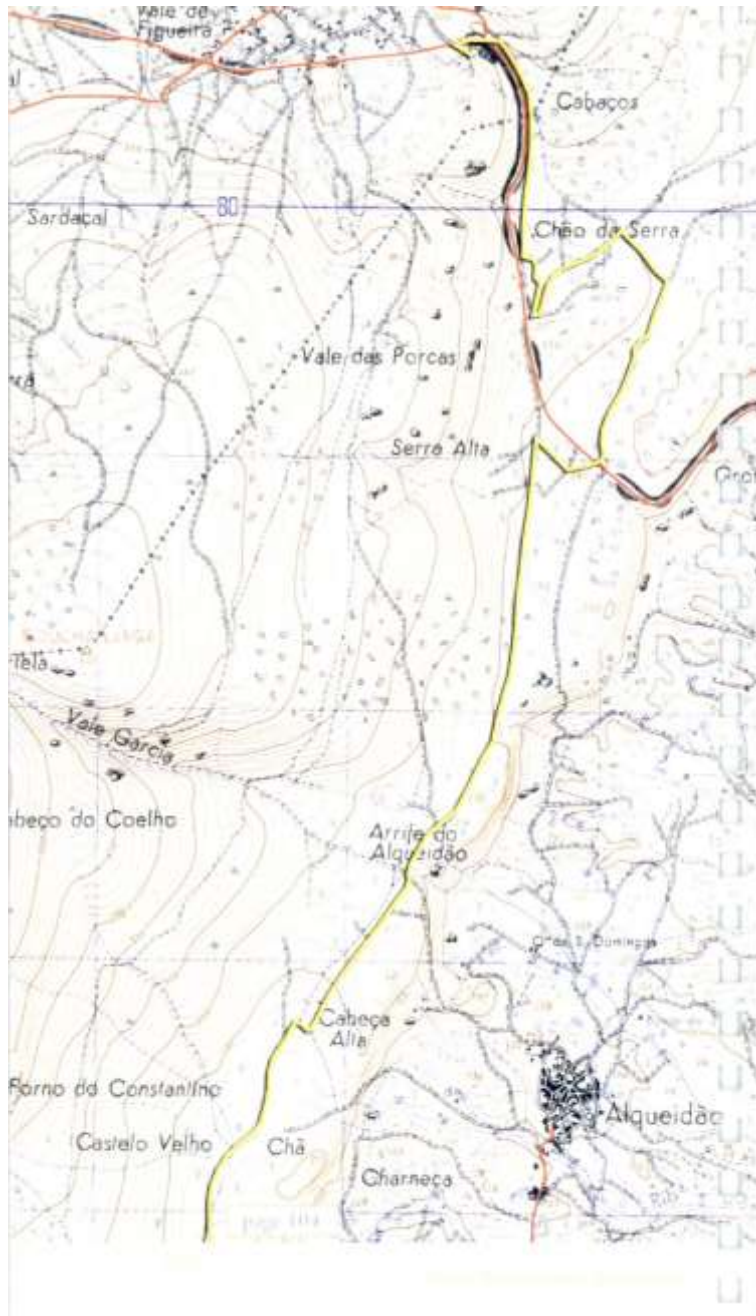
facilities: Almonda Cave Underground  
Study Centre, picnic parks, Natural Monu-  
ment: Dinosaurs' Footprints at Serra de Aire  
(MNPDSA), café (Casal do João Dias)



Almonda cave



Track



➤ *BRIEF DESCRIPTION*

This walk starts at the Almonda Cave Underground Study Centre and ends at the Natural Monument for Dinosaurs' Footprints at Serra de Aire. The route passes between a narrow clearing in the woods and the Serra de Aire. Forest alternates with wild pine or eucalyptus groves and large areas of scrubland. The end of the walk is through farmland with olive groves.

Views of the mountain range or the wetlands, the narrow clearings in the woods or the delicate sculptures formed by the lapiaz are some of the many interesting features that contribute to the unexpected delight of this walk.

There is a wide variety of plant life, especially in the scrubland where rosemary, rock rose, gorse, mastic, spurge-laurel, cocifera oak, etc. are easily found. *Arbutus* and the occasional holm oak emerge from this plant diversity or flourish in the middle of pine woods. There are also some particularly large olive trees but more often they are no more than small bushes that are hardly discernible from wild olive. It is interesting to see recently planted saplings or cuttings, the latter method taking advantage of the fact that olive trees root easily.

Different species of animals can also be seen. Amongst birds of prey there are buzzards, kestrels and short-toed eagle and the cliffs are a nesting area for the eagle owl. The red-legged partridge is frequently seen, especially in cultivated areas. There are many different types of birds from ravens to carrion crows, not forgetting the stonechat and the warblers. In terms of mammals there are



Picnic Park



Track

## 📍 *Points of Interest*



Underground Cave Study  
Center of Almonda

rabbits, civet cats, foxes and the European wild cat. Meanwhile, reptiles are represented by the green lizard, the ladder rat snake and the Montpellier snake.

## 📌 *POINTS OF INTEREST*

### Almonda Cave Underground Study

#### Centre

This building has a large panoramic viewing platform with facilities for visitors. Near the centre is a chamber leading to the underground bed of the River Almonda which a few hundred metres away at the base of the escarpment (or *arriفة*), rises to the surface via an outfall, culminating in large galleries that extend into the mountain for several kilometres.



Lapiaz

#### Former quarry restored by the Scouts

An old stone quarry abandoned a few years ago has been the focus of a restoration project. This is an innovative solution aimed at revitalizing the area, using the space created artificially by quarrying, for scouting activities.

#### Field of lapiaz

**Lapiaz** is a term used to describe the limestone surface that has become modelled with forms of karstification. Lapiaz come in different shapes and sizes; the term "mega-lapiaz" refers to varied limestone shapes with the common feature of being larger than normal.

### **Arrife**

The *arrife* or escarpment that stretches parallel with the mountain range is a vast geological fault that has resulted from the fracture of rigid material at the time of the emergence of the limestone massif.

It forms an imposing boundary that is present throughout the walk and which separates the mountain from the lowlands. Sometimes consisting of cliffs with a difference in level of as much as 40 metres, it is an ideal nesting place for a variety of bird species such as the eagle owl and the raven.

Even when the route takes us away from its borders, its presence continues to make itself felt from time to time, cutting into the space that separates us from the gentle hills below with its steep and well-defined line.



Eagle Owl



Olive grove

### **Olive grove**

Olive trees often take quite bizarre forms. These ancient and sacred trees have always been symbols of Portugal's Mediterranean civilization. There are wild olive trees and others that grow well-tended in the middle of cultivated fields, producing oil and olives to accompany a variety of dishes. Olive wood burns well and unfortunately, some trees have already been reduced to thickets. But respect for this thousand-year-old species continues and new olive trees can be seen planted from cuttings or as saplings in a land where sweat and love flow together.

### **Traditional agriculture**

In this region, agriculture continues in the same way, following the same rhythm dictated by the seasons, temperature and water. There is a perfect understanding with this red earth that is so full of exuberance.

## □ Walking Tours



Vineyard

The tractor has already deposed the yokes of oxen and meanwhile continues to be the implement that traces the history of subsistence farming in these harsh soils. This way of life has passed from parents to children and from grandparents to grandchildren, in the wise and diversified use of the land.



Dinosaurs' Footprints

### **Landscapes**

It is worth stopping awhile and taking a look all around to try and see where the trail runs, making out first the depth of the sky and the last line of the horizon with its diffuse bluish grey - the banks of the River Tagus and the group of white houses that is Chamusca; Lezíria which appears so small; the hills that separate the plateau from the mountains and the prominent incision of the escarpment (*arrife*) like a deep slash. The strange immobility of the mountain resembles a vast slumbering animal.

### **Natural Monument**

#### **Dinosaurs' Footprints at Serra de Aire**

The footprints left by sauropods that strode over this region long before the mountain range existed and which besides being the best-preserved, are the largest collection known.

In addition to this priceless palaeontological heritage there are a variety of facilities to assist visitors and travellers. Guides covering the Natural Monument and the Aire and Candeeiros Mountain Ranges National Park (PNSAC) itself can be purchased and visitors can watch a film on the discovery and importance of these fossilized footprints.

As well as being a magnet for innumerable visitors who come each year, the Natural

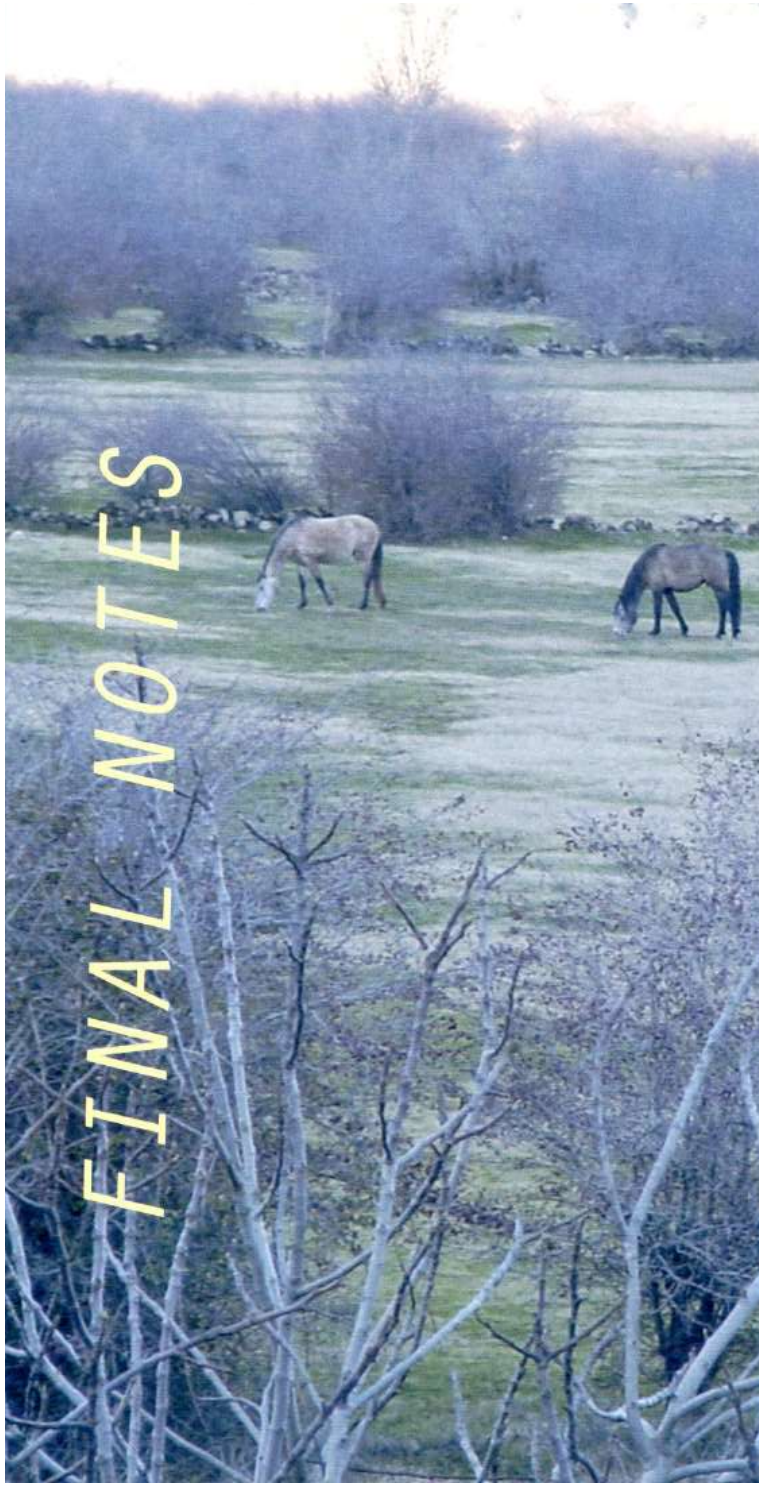
Monument also serves as the dynamic force behind a variety of activities, especially vacation courses, where those taking part are accommodated in the Environmental Study Centre.



Escarpment



Serra de Aire (Aire Mountain Range)

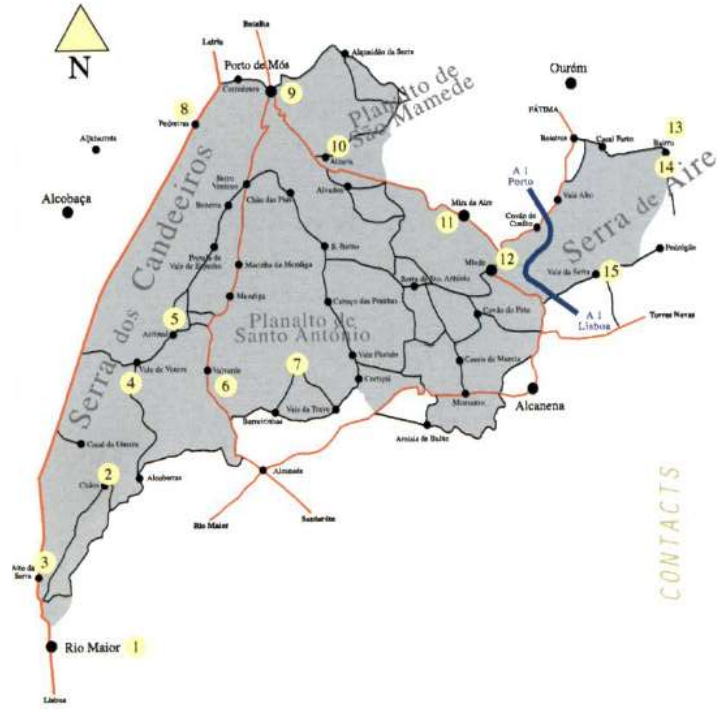


FINAL NOTES





CONTACTS AND FACILITIES  
AVAILABLE IN THE AIRE  
AND CANDEEIROS MOUNTAIN  
RANGES NATURAL PARK  
(PNSAC)



CONTACTS

HEADQUARTERS OF THE PNSAC

- 1 **Aire and Candeeiros  
Mountain Ranges National Park**  
Rua Dr. Augusto César da Silva Ferreira  
Apartado 190  
2040-215 Rio Maior  
Tel. 243 999480 / 7  
Fax 243 999488  
Email [pnsac@icn.pt](mailto:pnsac@icn.pt)

Study Center  
Technical Services  
Information and Sale of Brochures

NATURAL MONUMENT  
DINOSAURS' FOOTPRINTS IN THE  
SERRA DE AIRE  
(Palaeontological remains from the mid  
Jurassic period)

- 14 **Natural Monument**  
Bairro – N<sup>a</sup> Sr<sup>a</sup> das Misericórdias  
2490 Ourém  
Tel. 249 530160  
Fax 249 530169

**Opening Hours**  
Tuesday to Friday  
10am – 12.30pm / 2pm – 6pm  
Saturdays and Sundays  
summer: 10am – 12.30pm / 2pm – 8pm  
winter: 10am – 12.30pm / 2pm – 6pm

Information, Visitor Reservations  
and Sale of Brochures



## ECOTECA

- 9 **Porto de Mós Ecoteca**  
Jardim Municipal  
2480 Porto de Mós  
Tel. 244 491904  
Tel./Fax 244 403555

### *Opening Hours*

Tuesday to Friday

9.30am – 12.30pm / 2pm – 6pm

Alternate Saturdays and Sundays

9.30am – 12.30pm / 2.30pm – 6pm

**Information and Sale of Brochures**

## GUEST HOUSES

- 3 **Alto da Serra**  
Large house - 8 beds  
Small house - 4 beds

- 4 **Vale de Ventos**  
Large house - 8 beds  
Small house - 6 beds

Fully equipped houses, each with a kitchen, fridge, crockery, bed linen, cleaning and maintenance service

*Information and Reservations:*

*Mira de Aire Ecomuseological Center*

## □ FINAL NOTES

### RECEPTION CENTER

- 6 **Valverde**  
House – 14 beds

*Information and Reservations:  
Mira de Aire Ecomuseological Center*

### CAMPING AND CARAVAN PARKS

- 5 **Parque de Campismo Rural do Arrimal**  
(Capacity for 50 people)  
Arrimal  
2480 Porto de Mós

- 8 **Parque de Campismo  
e Caravanismo de Pedreiras**  
(Capacity for 12 caravans and 30 tents)  
Pedreiras  
2480 Porto de Mós

*Information and Reservations:  
Mira de Aire Ecomuseological Center*

### CHÃOS CENTER

- 2 **Craft Weaving Center**  
Chãos – Alcobertas  
2040 Rio Maior  
Tel. 243 405292  
Fax 243 405321



MIRA DE AIRE ECOMUSEOLOGICAL  
CENTER

**11 Exhibition Center and Young Persons'  
Information Point**

Antiga Igreja Matriz  
2485 Mira de Aire  
Tel./Fax 244 449700  
Email [pjmiradeaire@mail.telepac.pt](mailto:pjmiradeaire@mail.telepac.pt)  
[ccv@net.sapo.pt](mailto:ccv@net.sapo.pt)

***Opening Hours***

Tuesday to Friday  
9am – 12.30pm / 2pm – 6.30pm  
Alternate Saturdays and Sundays  
9am – 12.30pm / 2.30pm – 6pm

Visitor Coordination Center  
Information and Reservation for visits  
and Accommodation in the PNSAC

STUDY CENTERS

7 **Underground Study Center in the Algar do Pena pothole**

Vale de Mar  
2025 Alcanede  
Tel./Fax 243 400630

**Opening Hours**

Tuesday to Friday  
9.30am – 12.30pm / 2pm – 6pm  
Saturdays, Sundays and public holidays  
should be booked in advance

**Information and Sale of Brochures**

*Reservations:*

*Mira de Aire Ecomuseological Center*

15 **Underground Study Center in the Almonda Cave**

Cabeço das Pias  
Vale da Serra  
2350 Torres Novas  
Tel. 249 836525  
Fax 249 836524

**Information and Reservations**



## OTHER CONTACTS

### HEADQUARTERS OF LEIRIA/ FÁTIMA TOURISM REGION

Jardim Luís de Camões  
Apartado 1115  
2401-801 Leiria  
Tel. 244 823773  
Fax 244 833533  
Email [info@rt-leiriafatima.pt](mailto:info@rt-leiriafatima.pt)  
Site [www.rt-leiriafatima.pt](http://www.rt-leiriafatima.pt)

### TOURIST INFORMATION OF PORTO DE MÓS

2480-300 Porto de Mós  
Tel. 244 491323

### PORTUGUESE FEDERATION OF CAMPING

Av. Coronel Eduardo Galhardo, 24 D  
1199-007 Lisboa  
Tel. 21 8126891  
Email [info@fpcampismo.pt](mailto:info@fpcampismo.pt)  
Site [www.fpcampismo.pt](http://www.fpcampismo.pt)

## GLOSSARY

*ALGAR* - Potholes.

*CLASTIC ROCK* - Fragments of rock.

*CONGLOMERATE* - Sedimentary rock resulting from the accumulation of fragments or other rocks bound together by natural cement.

*DOLINE* - Closed circular or oval basins that are wider rather than deep. The joining together of two or more dolines is known as an uvala.

*DOLOMITIC LIMESTONE* - Sedimentary carbonated rock formed by calcium carbonate and magnesium.

*FAULT* - Rupture or fracture in the rocky massif along which movement has taken place.

*FÓRNEA* - Morphological feature in the form of an amphitheatre resulting from the drawing back of the headwaters of a river.

*FOSSIL* - Remains or evidence of organisms that lived in a previous geological age and which are now extinct.

*JURASSIC* - One of the periods into which the earth's geological history is divided and which started 190 million years ago and ended 136 million years ago.

*KARSTIC* - Term given to a characteristic morphology resulting from the dissolving of limestone. Some of its most characteristic forms are.





*LAPIAZ* - Limestone surfaces eroded by rainwater.

*LIMESTONE MASSIF* - A group of mountains formed by limestone.

*MARL* - Sedimentary rock consisting of calcium carbonate and clay.

*MORPHOLOGY* - Study of physical features of the earth's surface and their relationship to geological structures.

*POLDJE* - Depression similar to a doline but larger with steep sides and a flat bottom.

*REEF ROCK* - A ridge of jagged rock formed by the remains of organisms (skeletons, shells, etc.).

*SEDIMENTARY ROCK* - Rock formed by material originating from other rocks.

*SINKHOLE* - Small cavity leading deep into the ground.

*TECTONICS* - Process by which the earth's crust is subjected to forces that cause deformation – folds and faults.

*TERRA ROSSA* - Red clay soil resulting from the decalcification of limestone.

*TRANSGRESSION* - Invasion of an area covered by the sea within a relatively short and well-defined space of geological time.



## *INDEX*

2	<i>INTRODUCTION</i>
10	<i>WALKING TOURS</i>
	Municipality of Alcaena
14	<b>PR1 - Olhos de Água do Alviela</b>
	Municipality of Alcobaca
20	<b>PR1 - Vale de Ventos</b>
	Municipality of Ourém
26	<b>PR1 - Bairro/Casal Farto</b>
	Municipality of Porto de Mós
32	<b>PR1 - Serra da Lua</b>
38	<b>PR2 - Arco da Memória</b>
44	<b>PR3 - Lapa dos Pocilgões</b>
48	<b>PR4 - S. Bento</b>
54	<b>PR5 - Castelejo</b>
60	<b>PR6 - Fórnea</b>
66	<b>PR7 - Corredoura</b>
72	<b>PR8 - Serra Galega</b>
79	<b>PR9 - Estrada Romana</b>
	Municipality of Rio Maior
85	<b>PR1 - Marinhas de Sal</b>
90	<b>PR2 - Chãos-Alcobertas</b>
	Municipality of Santarém
98	<b>Gruta - Algar do Pena</b>
	Municipality of Torres Novas
104	<b>Grutas do Almonda</b>
112	<i>FINAL NOTES</i>
113	<b>Contacts and Facilities</b>
119	<b>Other Contacts</b>
120	<b>Glossary</b>

## RECOMENDATIONS

In view of the susceptible nature of some species of fauna and flora, it is recommended that between March and July, independent walking groups should not exceed 10 people. If at any time of the year, groups of more than 15 people (including organized trails) wish to go on one of the walking tours, enquires should be made to the visitor services of the Aire and Candeeiros Mountain Ranges National Park (PNSAC).

For environmental and safety reasons, it is forbidden to enter the caves. The caves are true laboratories where the evolution of living creatures is taking place and should therefore be preserved.

- Stick to the recommended itineraries
- Respect the uses, customs and traditions of the area you are visiting
- Look at the plants and enjoy them... but don't pick them
- Please leave the animals alone
- Stone is not just an inert material
- Make use of the signs
- Do not light fires
- Play games only in designated areas and with due care
- Avoid making unnecessary noise
- Place your litter in the appropriate places
- Camping is permitted... but only where specifically indicated
- Fields have owners