



For information:

*Region Friuli Venezia Giulia
Central Direction for Agricultural, Natural
and Forest Resources*

*Department for Natural Environment and
Fauna Protection*

Via Sabbadini, 31 - 33100 Udine
tel. +39 0432 555290 fax: +39 0432 555757
s.tutelambienti.fauna.agrifor@regione.fvg.it

Forest Department of Duino Aurisina
vicolo Forestale 78/E - 34011 Duino (TS)
tel. +39 040 2070153 fax: +39 040 2071412
sf.duino@regione.fvg.it

Municipality of Duino Aurisina-Devin Nabrežina
Aurisina Cave, 25 - 34011 Aurisina (TS)
tel. +39 040 2017372 fax: +39 040 201307
protocollo@comune.duino-aurisina.ts.it

IAT - Municipal Tourist Information Point
Sistiana 56/B - 34019 Sistiana (TS)
tel/fax: +39 040 299166
iatsistiana@marecarso.it

How to get there

To reach the car-park by the junction for Sistiana mare, where the Rilke path is signposted, follow the A 14 road from Trieste to Monfalcone. The Rilke path can also be reached from Duino.

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Text: Paolo Lenardon, Roberto Lenardon,
Damijana Ota, Alessandro Rondi.

Drawings: Jurij Mikuletič, Elena Missio.

Photographs: Marino Sterle, Kajetan Kravos,
Paolo Lenardon, Damijana Ota, Mauro Ventin,
Glauro Vicario, Felcher Luigi.

Historic prints: Roberto Lenardon, Igor Tuta.

Collaboration: Massimo Barbo, Lorenzo Fogale.

Translation: Key Congressi s.r.l.

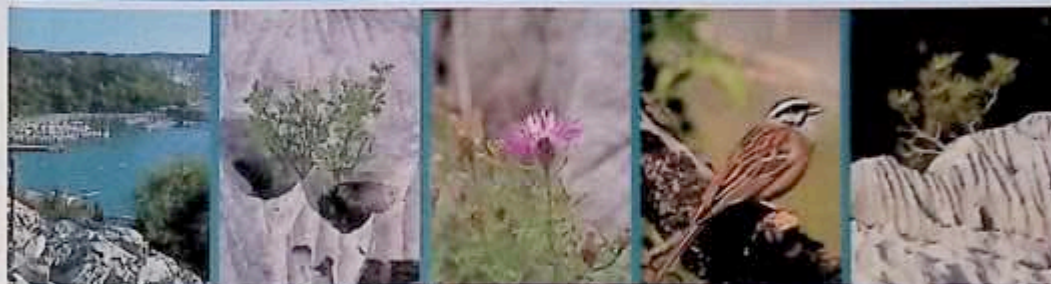
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Riserva naturale regionale delle
FALESIE DI DUINO
Deželni naravni rezervat
DEVINSKE STENE



Comune di Duino Aurisina
Občina Devin Nabrežina



Regional Nature Reserve THE DUINO CLIFFS



REGIONE AUTONOMA
FRIULI VENEZIA GIULIA



FRIULI
VENEZIA
GIULIA

Parchi e riserve naturali

PRESENTATION

The Cliffs of Duino are a good example of legal recognition of environmental protection, but above all they are an example of natural balance, preservation of the environment and tourist attraction.

A hearty welcome to anybody who wants to share their great values together with what surrounds them and makes the area of Duino Aurisina- Devin Nabrezina really worth visiting: beauty, history, culture and the big effort to create an ideal environment in order to offer the best hospitality.

MAYOR OF THE MUNICIPALITY OF
DUINO AURISINA - DEVIN NABREŽINA
COMM. GIORGIO RET

The Regional Nature Reserve of the Cliffs of Duino is not only the superb entrance point of the municipality of Duino Aurisina but it is also a unique place from where you can enjoy the enchanting beauty of the Gulf of Trieste. The management of the Reserve is a concrete example of how the preservation of nature should and has to go hand in hand with conscious and modern tourist fruition. Anybody who is going to visit the Reserve is also invited to explore the remaining part of the municipality of Duino Aurisina, which is rich in nature, history and high quality enogastronomic products.

THE COUNCILLOR FOR THE
ENVIRONMENT AND NATURE RESERVE
FULVIO TAMBURINI



THE RESERVE

The Duino Cliffs Regional Nature Reserve was set up with Regional Law No 42 of 30th September 1996. It includes a high steep limestone coastline, the sea band in front of it and a narrow band of the Carso plateau, covering a total surface of 107 hectares. The Reserve belongs to the Municipality of Duino-Aurisina (Občina Devin-Nabrežina) and is in the jurisdiction of the Duino-Aurisina station of forest rangers.

The Reserve is set in an area of outstanding natural beauty. The passage from Middle European biogeographic domain to Mediterranean domain takes place along the Trieste coast, which includes the Reserve. Beside this, the Carso plateau is a transition area between two regions of the Middle European domain: Alpine and Illyrian. Central European, Illyrian-Balkan and Mediterranean animal and plant species thus live here. The area shows a high biodiversity, that is a high number of species in proportion to the size of the area. The Duino Cliffs are

The cliffs
from the sea.

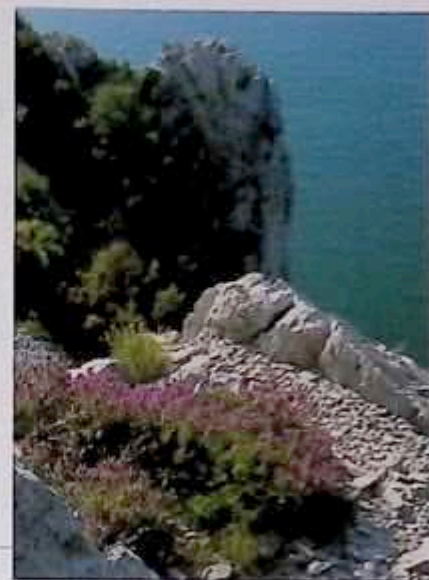
P. LENARDON

the only world location of the blue-bonnet *Centaurea kartschiana*, a plant which grows on the cliffs closest to the sea.

Highly interesting are also land-

Sage (*Salvia officinalis*) in
flower on the
Duino cliffs.
The cliffs from
the sea.

P. LENARDON



scape features: the white limestone rock is one of the main features of the Reserve, both in the form of single towers along the coast and rocks surfacing along the edges shaped by superficial karst phenomena such as grooves.

Along the cliff edges between Duino New Castle and Sistiana Bay, running alongside the remains of military emplacements, winds the Rilke path, opened in 1987, which offers

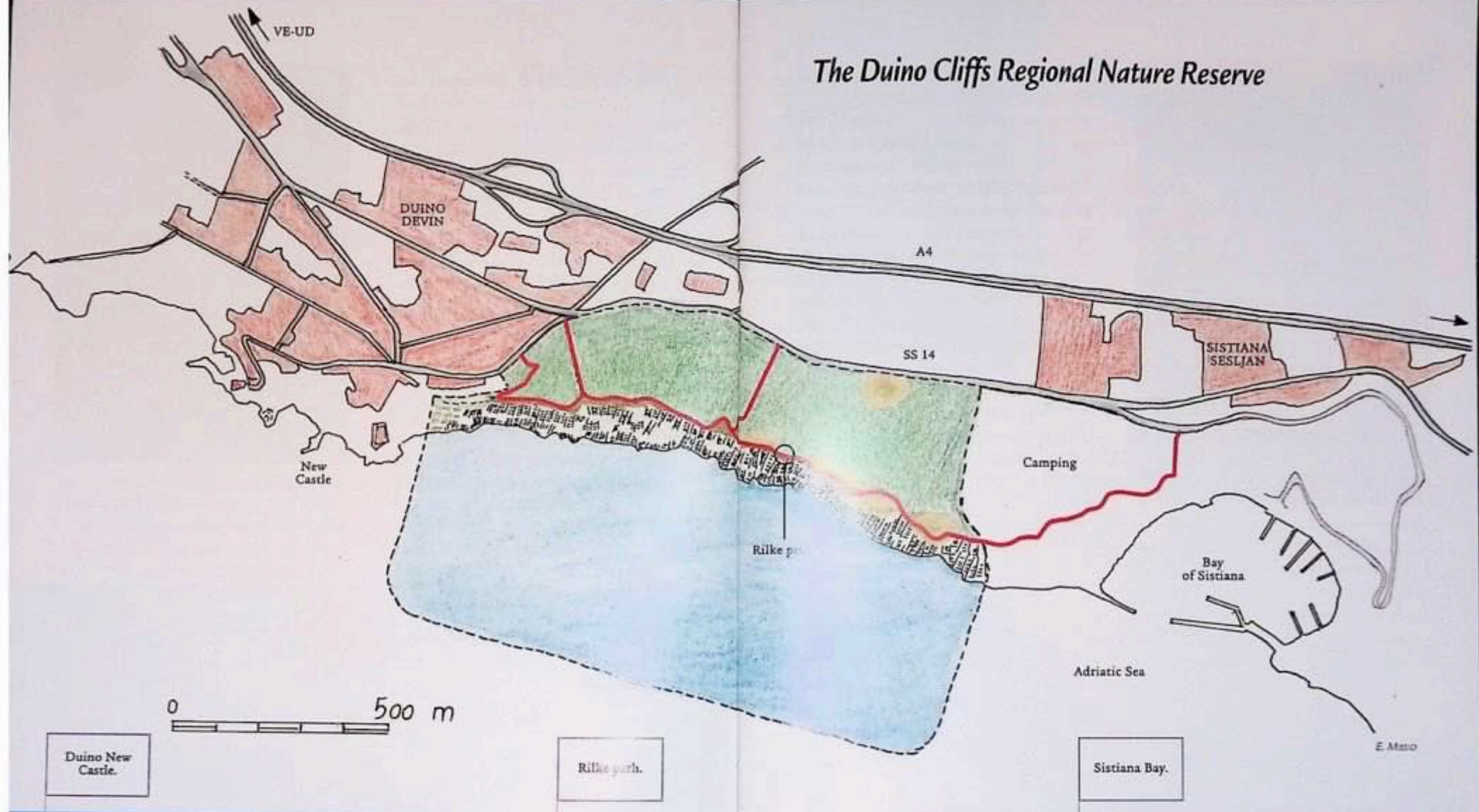
a broad view of the Gulf of Trieste, from the mouth of the Isonzo River to Cap Savudrija in Croatia.



*Centaurea
kartschiana*

J. MINUETIĆ

The Duino Cliffs Regional Nature Reserve



PROTECTION

The Duino Cliffs are one of the areas of outstanding natural beauty designated by national law No 442/1971 (the Belci law) and were proposed as a protected area.

In 1978 the Duino Cliffs were included in the "F.4 Coastal Strip" protected area of the General Regional Town and Land Plan which proposed to the Regional Administration the setting up of 76 protected areas and 14 regional parks - a proposal hitherto not acted upon.

Article 49 of regional law No 42 of

1996 set up the Duino Cliffs Regional Nature Reserve, including the area already outlined by the Belci law. According to art. 3 of regional law 42/96 a Regional Nature Reserve includes an area marked by its high natural value and it has mainly conservation objectives. Art. 55 of the same law envisages the setting up of a national and international protected nature area in the Carso, which will also include the Duino Cliffs Regional Nature Reserve.

The Duino Cliffs Regional Nature Reserve, together with the shoreline of the Sistiana Bay, has been

proposed as a Site of community importance (SCI). These sites are envisaged by European Community Directive 92/43 which lays down that Union Members States designate areas in their territories hosting animal and plant species and habitats listed in the Directive enclosures. The conservation of these species and habitats is considered an European priority. Sites of community importance will belong to an European network of protected areas called Natura 2000.

The Duino Cliffs were included in these areas because they are the only example of high cliffs in the Italian Northern Adriatic Coast and the only world habitat of the endemic plant *Centaurea cartischiana*.

As regards animals, the Duino Cliffs are the northern geographic limit of the distribution area of some bird species typical for the Mediterranean, such as the Sardinian warbler (*Sylvia melanocephala*), the Subalpine warbler (*Sylvia cantillans*) and the blue rock-thrush (*Monticola solitarius*).

The Duino Cliffs are also the westernmost point of the distribution area of the cat snake (*Telescopus falax*).

Access to the part of the Reserve comprised between the Rilke path and the seashore was forbidden in 1984 by a series of orders from the Mayor of Duino-Auris-



na. Among other things, these forbid vehicle transit on the Rilke path, disturbing wild animals in the area crossed by the path, taking dogs off the leash and the use of radios, tape recorders and the like in the Duino pine-wood.

A grooved limestone rock wall.



View on the Duino Cliffs at the beginning of the 20th century

A. TUTA COLLECTION

The nature of the Duino cliffs.

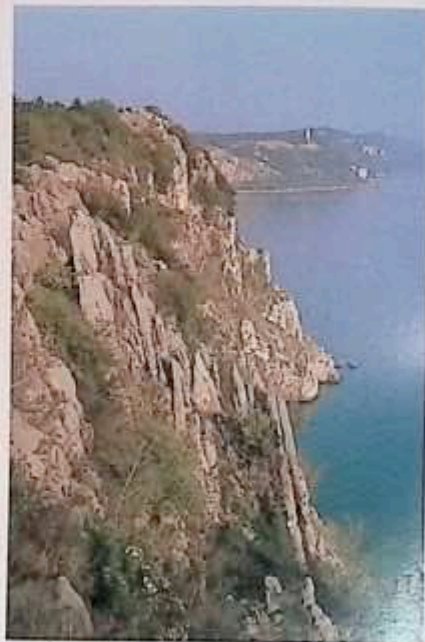
J. MURATTE



GEOMORPHOLOGY AND LIMESTONE

The limestone of the Duino Cliffs formed in the Cretaceous (approximately 100 million years ago), when shells of planktonic animals deposited on the sea bottom, which then petrified. Approximately 30 million years ago earth thrusts and movements caused the sea bottom to rise and emerge. Petrified layers rose inclined or vertically, as happened along the Trieste coastline. Vertical rock layers along the underlying coast, some of them in the form of single towers, can be observed walking along the Rilke path in the Duino Cliffs.

When exposed to air and rain, limestone undergoes dissolution and, according



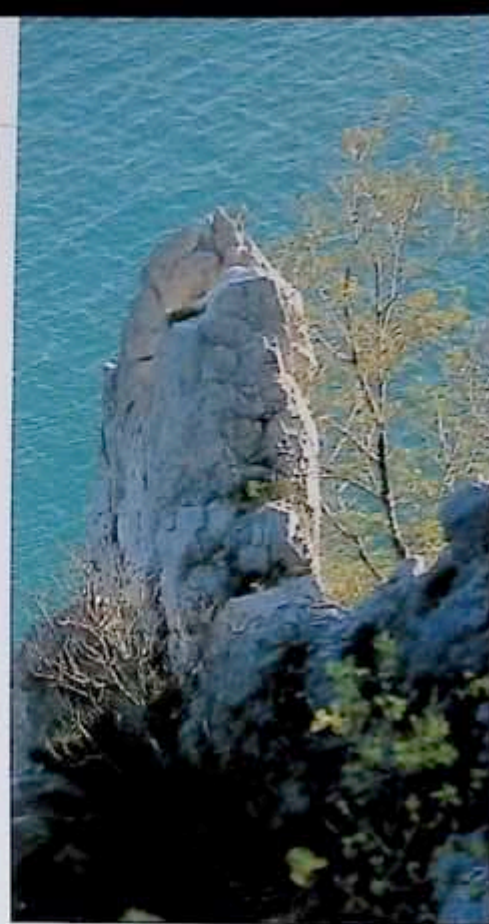
Vertical layers of limestone.

to its composition, either dissolves or fragments. Between vertical layers and smooth walls there are screes and

posed of material of various sizes deriving from the fragmentation of the rocks above.

A limestone tower along the cliffs.

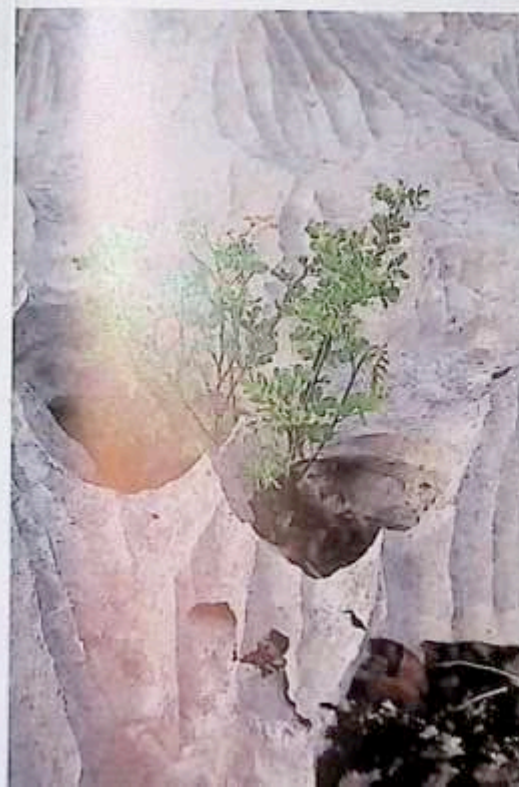
Along the path rock fields can be observed, flat areas covered in pieces of fragmented rock. These rock fields are set along compact rocks which do not break but are slowly dissolved by water transforming insoluble (limestone) into soluble calcium carbonate. Rain combined with carbon dioxide corrodes limestone. Where water flows quickly on the surface of limestone rocks, it forms grooves. Where rocks are flatter and water stays longer, corrosion pools form. In some parts water manages to perforate the rock, forming holes. The effects of rain on limestone



(grooves, corrosion ponds, holes) are called superficial karst phenomena and can be observed closely along the whole Rilke path.



Grooves in the limestone.



Limestone with holes.

VEGETATION

There are two principal environments in the Reserve: a) the cliffs with rock walls and screes; b) the flat part on the plateau. The two environments differ in terms of both climate and soil conditions. The part of the Reserve on the plateau is colder, as it is exposed to the Bora, the cold east-north-east wind. The cliffs enjoy a warmer climate as they face south towards the sea and are sheltered from the wind.

As a consequence, the two environments have different types of vegetation. On the warmer cliffs there is Mediterranean vegetation, while on the flat area there is an artificial wood of black pine with Illyrian-Balkan species (from the East) widespread

tinguished by their soil types. The cliffs are characterised by vertical or inclined rock walls, towers and screes. The soil is poor in water and earth and undergoes strong summer insolation. The flat plateau has a more evolved soil which withholds humidity, thanks to the protective action of the black pine foliage. As a consequence, woods developed here whereas on the cliffs there are only few strips of scrub alternating with screes, scantily covered by grass and shrub.



The Reserve
screes.



on the whole Carso plateau. The passage from one environment to the other takes place along the edge of the cliffs, where the Rilke path was built. From the path both types of vegetation running into each other and intertwining and meshing can be observed.

The two environments are also dis-

Vegetation on the cliffs



The part near the sea with rock vegetation.

P. LENARDOV

On the cliffs there is Mediterranean maquis, whose main species is the holm-oak (*Quer-*

cus ilex), an evergreen oak of Mediterranean origin. On the Trieste coast, alongside the holm-oak is the European hophornbeam (*Ostrya carpinifolia*), a thermophile deciduous species of Illyrian-Balkan origin. This plant combination is called holm-oak and hophornbeam wood (*Ostryo-Quercetum ilicis*) and includes both Mediterranean and Illyrian-Balkan plants. This plant association can also be found on the eastern Adriatic coast, from Greece to the Limski Kanal in Istria. It disappears from the Limski Kanal to the Gulf of Trieste and reappears on the Trieste coast from Grignano, near Miramare Castle, to Duino - the northernmost limit of diffusion of this type of vegetation. The holm-oak and hophornbeam wood is isolated from the main body of this vegetation on the eastern Adriatic

The holm-oak and hophornbeam wood.

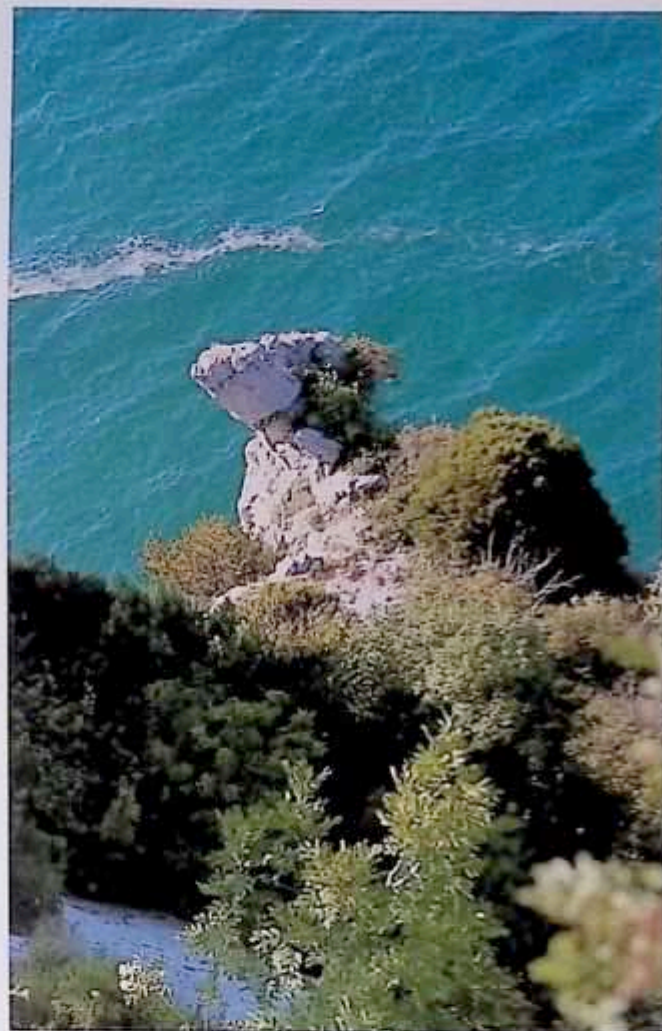
D. Ota



coast and is considered a separate body, which has survived thanks to the favourable local climate, its leeward position, the heat-reflecting effect of limestone rocks and the temperate influence of the sea.

The species of Mediterranean origin found in the holm-oak and hophornbeam wood of the Trieste coast grow on the cliffs till the edge and, apart from some individual holm-oaks, do not spread on the plateau, where the climate is too warm. The following are some species of plants found in this

wood, which are considered the most representative and easily observable in the Reserve. The first is the holm-oak (*Quercus ilex*) which can grow to considerable heights. Another tree on the cliffs is tree phillyrea (*Phillyrea latifolia*), while shrubs include the turpentine-tree (*Pistacia terebinthus*) and Christ's-thorn (*Paliurus spina-christi*). Along the Rilke path it is easy to spot sarsa-



Vegetation on the cliffs.

D. Ota

parilla (*Smilax aspera*), a Mediterranean creeper. The thermophile Illyrian-Balkan species living in this plant association and growing both on the plateau and the cliffs are the hophornbeam, manna-ash (*Fraxinus omus*), Montpellier maple (*Acer monspessulanum*) and mahaleb cherry (*Prunus mahaleb*).

It is to be noted that some black pines (*Pinus nigra*) grow even on



The Reserve
screes.

D. Ota

Christ's thorn
(*Paliurus spinosus*)

D



Turpentine-tree
(*Pistacia terebinthus*)

D. Ota

the cliffs closest to the sea. Besides strips of holm-oak and hophornbeam wood, there is the characteristic rock vegetation, growing on compact rocks and screes. Limestone soil is poor in water and earth and the heavy summer insolation implies high temperatures. Plants growing on rocks and screes have adapted to survive these extreme ecological conditions: leaves are wax-coated or hairy to protect

plants from high temperatures and insolation. In order to retain water some plants have succulent leaves. These include sage (*Salvia officinalis*), *Sedum montanum* ssp. *orientale* and *Teucrium flavum*. A plant that can be noticed on the Rilke path for its late summer-early autumn blooming is the *Campanula pyramidalis*, an Illyrian-Balkan species widespread on the eastern coast of the Adriatic sea. Its stems can be over 2 metres high.

The endemic plant of the Duino cliffs, the blue-bonnet *Centaurea kartschiana*, is also found in this rocky envi-

ronment. A plant is endemic when it grows spontaneously only in a given region of which is characteristic.

Centaurea kartschiana can only be found on a limited part of the Trieste coast.

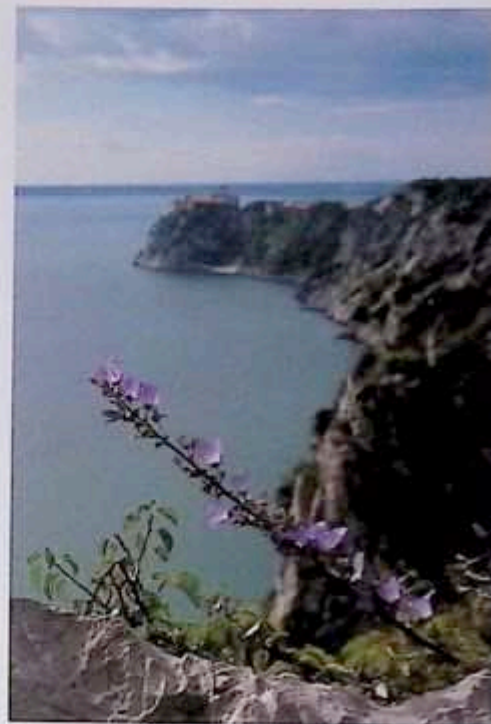
Along the Carso edge, where there is the passage from Mediterranean to Illyrian-Balkan vegetation, there are rock fields derived from the crushing of limestone and compact limestone rocks where bushes

Smilax aspera

D. Ota



are starting to grow: mainly Illyrian species characteristic of Carso wood, such as hophornbeam, manna-ash, smoke tree (*Cotinus coggygia*) and mahaleb cherry and some Mediterranean species such as the turpentine-tree and Christ's torn. Rock fields on the most exposed side still lack vegetation, but the mahaleb cherry and a few single black pines have started to grow on their edges.



*Campanula
pyramidalis*

D. Ota



*Sedum
montanum
ssp. rupestre*

D. Ota



A mahaleb
cherry (*Prunus
mahaleb*) in
bloom on the
rock field.

D. Ota



*Centaurea
kartschiana.*
P. LINDNER

Centaurea kartschiana (Scop.)

The blue-bonnet *Centaurea kartschiana* was described for the first time right on the coast between Sistiana and Duino by Giovanni Antonio Scopoli in *Flora Carniolica*, published in 1772.

It belongs to the *Compositae* or *Asteraceae* family on the basis of its flower characteristics. The name of the family shows that the species have many flowers joined in a flower head. The single flowers of the head are tubulous or ligulate according to the type of corolla. *Centaurea kartschiana* only has tubulous flowers.

The plant reaches 40-50 cm, its stem is lignified at the basis, erect and branched. The pink-purple flowers bloom from June to August. It lives both on the rocks by the sea exposed to sea sprays and in the cracks of limestone rocks which are higher above the sea.



Pine-wood

The flat part of the Reserve comprised between the cliff and the A 14 road is covered by a large pine-wood

View of the castle
at the beginning of
the 20th century.

I. TUTTA collection

which was planted at the beginning of the 20th century. It is mainly made of Austrian black pine (*Pinus nigra* ssp. *austriaca*) and

some examples of Aleppo pine (*Pinus halepensis*).

Today the pine-wood has reached its mature stage and some trees are already dying. Dead pine-trees are replaced by local species, mostly helm-oak (*Quercus ilex*) and manna-ash (*Fraxinus ornus*) which have been able to settle thanks to the protection of the pine-trees foliage. There is a natural replacement of the man-planted species with local species, which was the objective of the reforestation with coniferous trees carried out on the whole Carso more than 100 years ago.



Black pine
(*Pinus nigra*).

D. ORA

ANIMALS

The fauna in the Reserve is also of great interest thanks to the environmental diversity with different ecology, as already described in the paragraph on vegetation. Reptiles, such as lizards and snakes, are most commonly found on the rocks. Land mammals, such as squirrels and other rodents, prefer the bush and pine-wood, while cetaceans (aquatic mammals) such as the bottle-nosed dolphin (*Tursiops truncatus*) and the porpoise (*Stenella coeruleoalba*) have been seen in the sea in front of the Reserve.

Birds are present in all the environments of the Reserve.



Yellow-legged gull (*Larus cachinnans*).

G. VICARIO

Over 150 species have been seen, mostly migrants, which stop at the Reserve to rest and feed. Sedentary species nest on the rocks and in the wood. The most famous species which successfully nested in the Reserve is the peregrine falcon (*Falco peregrinus*), included in the Red List of endangered animal species and considered vulnerable. The peregrine falcon nested on the Duino Cliff from 1987 to the mid-nineties.

In the following pages some species living in the Reserve will be described, chosen among those considered the most representative for each environment and the most easily observable.

Sea

The sea along the rocky coastline of the cliffs is few meters deep. Sunlight penetrates this limited depth well, which makes it possible for many plant species, both algae and higher plants (phanerogams) which adapted to sea life, to grow. There are also many benthonic animals (which live attached or bound to the sea bottom), such as sponges, sea anemones and shellfish. There are also many species of benthonic fish, such as the painted comber (*Serranus scriba*), wrasses (*Labridae* family), gobies (*Gobiidae* family) and blennies (*Blennidae* family). The rocky coast areas are gen-



Painted comber (*Serranus scriba*).

M. VOMVI

Black headed gull (*Larus ridibundus*) with winter plumage.

D. ORA

erally visited by good swimming fish such as the bass (*Dicentrarchus labrax*) and various sparids species (*Sparidae* family).

From the edge of the cliffs some birds can be observed on the sea surface. The most common are yellow-legged gull (*Larus cachinnans*) and black-headed gull (*Larus ridibundus*). From autumn to winter species which winter here grebes can be observed, that are diving birds which swim quickly underwater. The most frequent is the black-necked grebe (*Podiceps nigricollis*).

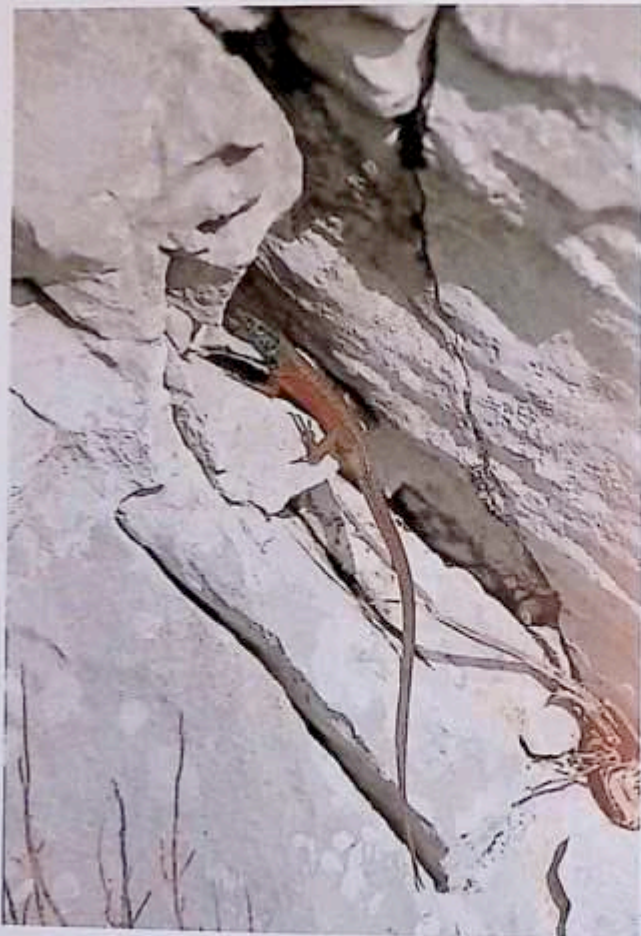


Peregrine falcon.

J. MARGIOTI

Rocks

Cliffs and leeward rock fields are ideal environments for reptiles which use the rocks to warm themselves in the sun but also take refuge in the cracks if need be. Snakes include the Aesculapian snake (*Elaphe longissima*), western whip snake (*Coluber viridiflavus*) and nose-horned viper (*Vipera ammodytes*). Lizards include the common wall lizard (*Podarcis muralis*) and Italian wall lizard (*Podarcis sicula*).



Male of
Dalmatian
algyroides
(*Algyroides
nigropunctatus*)

D. Ota

The most common reptile which can easily be observed on the cliffs is the Dalmatian algyroides (*Algyroides nigropunctatus*), a dark-brown lizard with small black spots. In spring males have black backs, turquoise throats and orange bellies. The Dalmatian algyroides feeds on various invertebrates, in particular insects. This species only lives on the eastern Adriatic coasts, from north-western Greece and the Ionian islands to the Isonzo river and Mount Sabotino above Gorizia, the western limit of its area of distribution.

The warm rock walls are suitable for nesting for some bird species connected to the Mediterranean environment. These include the bluerock thrush (*Monticola solitarius*), a bird which is the same size as a blackbird and has a dusty blue plumage. It can be seen from the cliff edge looking towards the sea. The male's song is distinctive and melodious and

can be heard early in the morning and late in the afternoon when the heat subsides. Other bird species nest on the cliff rocks but are more difficult to see. They include the black redstart (*Phoenicurus ochorhynchus*) and Sardinian warbler (*Sylvia melanocephala*) with red eyes and a black head, a Mediterranean species whose area of distribution reaches its northernmost limit here.

Ravens (*Corvus corax*), larger and completely black, nest in the cavities of the rocks.



Bluerock
thrush.

J. Muzic

Sardinian
warbler (*Sylvia
melanocephala*)

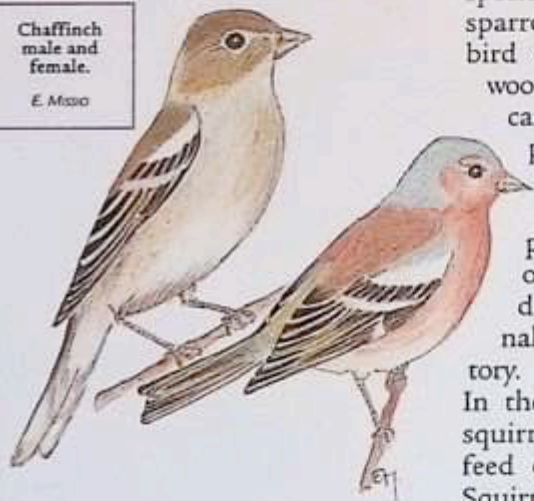
K. Knaus



Bush and pine-wood

Bush and pine-wood are the areas where most animals live. The easiest to see are birds, in particular those of the passerine group. The most widespread is the chaffinch (*Fringilla coelebs*). Females are mainly brown, whereas males are more brightly coloured, with blue heads, black backs and pink-purple bellies. Both display a white and a black stripe on the wings. Chaffinches feed mainly on seeds

Chaffinch
male and
female.
E. Miso



and have short, strong beaks.

Tits are also widespread: the great tit (*Parus major*) and blue tit (*Parus caeruleus*) in the bush and the coal tit (*Parus ater*) and crested tit (*Parus cristatus*) in the pine-wood.

In both environments there are jays (*Garrulus glandarius*), which belong to the passerine group, even though they are larger. Jays are strong multi-coloured birds which produce hoarse and well-audible sounds.

In the pine-wood, besides the two

Great tit.
E. Miso



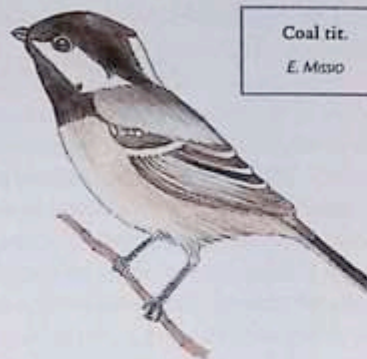
species of tits, there is also the sparrow-hawk (*Accipiter nisus*), a bird of prey, and great spotted woodpecker (*Picoides major*), which can be easily recognised by its pointed beak and undulating flight. Woodpeckers seek food in dry trunks and pine-cones. At the beginning of spring they can be heard drumming on the trees, a signal they use to mark their territory.

In the pine-wood there are also squirrels (*Sciurus vulgaris*), which feed on black pine-cone seeds. Squirrels are rodents which have specialised in living on the trees and have become good climbers

Blue tit.
E. Miso



Coal tit.
E. Miso



and jumpers. They cannot be seen very often as they prefer quieter areas inside the Reserve, as shown by the remains of pine-cones on which they feed.

Crested tit.
E. Miso



Remains
of squirrel's
food of black
pine cones.

D. Ota

DUINO NEW CASTLE

At the northern border of the Reserve, but outside it, there is Duino New Castle. It was built in the 15th century, not far from the Old Castle, whose ruins can still be seen today. The New Castle has changed owners many times, but since the end of the 19th century it has belongs to the noble family of Torre e Tasso - Thurn und Taxis. Over the centuries the castle has

undergone various restructuring after wars. The most serious damage was caused during the 1st World War when it was almost completely destroyed by Italian heavy artillery. The current appearance of the Castle is due to the restructuring which took place in the 1920s, respecting the original architecture. Today the red and blue flag of the Torre e Tasso - Thurn und Taxis princes flies on the main tower.

Duino New Castle
before the 1st
World War.

R. LENARDON COLLECTION



DUINO CLIFFS AND WARS

During the 1st World War the front line between the Kingdom of Italy and the Austro-Hungarian Empire stretched for over 600 Km, from the Stelvio Pass in the Alps to the Adriatic Sea, where the karst hills with Mount Hermada and the Duino coastline were the extreme Austrian defence of the sector on the way to Trieste.

The rocky coast near Duino was fortified in view of a possible landing of Italian troops in Sistiana Bay and many pillboxes and look-outs were built to monitor the movements of ships in the Gulf of Trieste.

The garrison was manned by Austro-Hungarian K. u. Kriegsmarine (marine) in which the k. k. Tri-

estiner Jungschützenbarallion (Trieste young riflemen's detachment) - volunteers aged 16 to 19 - stood out.

During the 2nd World War, after the armistice of 8th September 1943, this land was annexed to the Third Reich with the name Nord Adriatischer Kustenland (North Adriatic Coastal Area). As Sistiana Bay became the base for a group of pocket submarines of the German Navy, the old Austrian-Hungarian fortifications on the coast were used again and adapted as anti-aircraft emplacements.

Recently, with the creation of the Rilke path, look-outs and gun emplacements have been upgraded and modified, and converted into panoramic points.

Sailors
garrisoning
the extreme
limit of the
coastline above
Sistiana Bay.

R. LENARDON
COLLECTION





Sailors building a fortified look-out in the same area as the previous photo.

R. LENARDON COLLECTION



Looking point remains of bunker.

VISIT

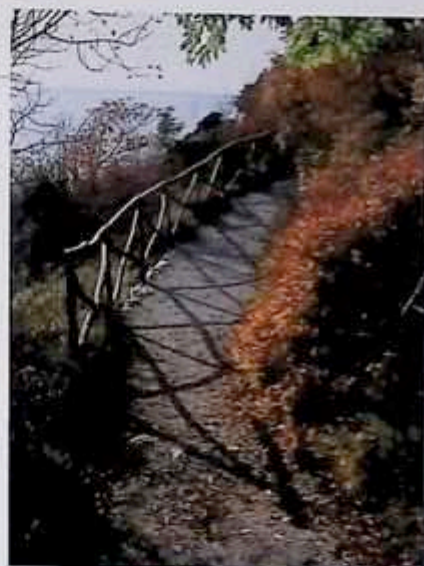
The number of visitors to the Duino cliffs has greatly increased since the opening in 1987 of the path named after the poet Rainer Maria Rilke, who in 1912 was a guest of princess Marie's at Duino New Castle and wrote the Duino Elegies, making Duino and its cliffs famous the world over. The Rilke path was created by the Trieste Provincial Administration and Duino-Aurisina Municipal Administration, restoring an old path. Under the project the path was enlarged, covered with gravel for over 1,700 m and the most dangerous points were fenced off. Some panoramic points - two of which are built on 2nd World War military bunkers - have been restored and adequately protected.

In the year 2000 the connection between the path and Duino was realized.

Then, at the end of the year 2000 a new 250 m path accessible to disabled people was realized: from Duino it leads to a new panoramic point on the sea.

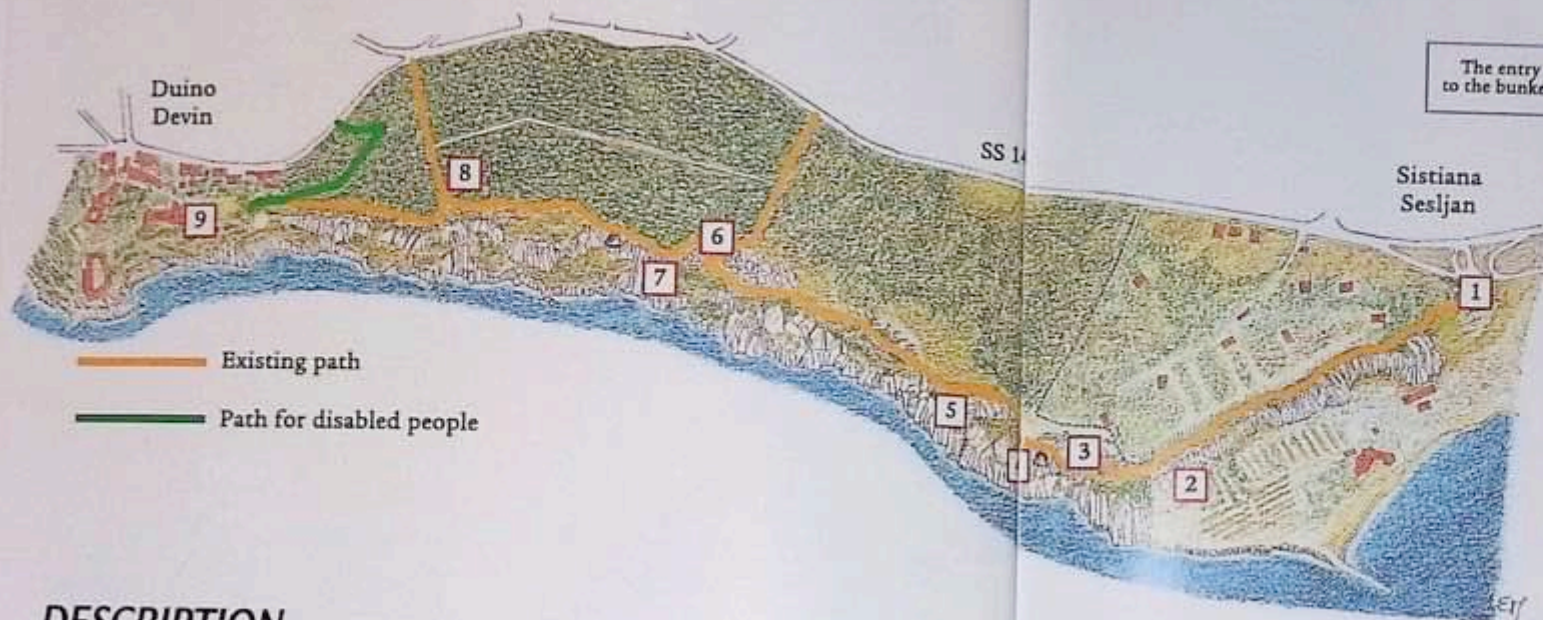


Black pine.



The path.





DESCRIPTION OF THE RILKE PATH

Starting the path from the side of Sistiana near the Tourist Office IAT (1) the camp-site to the right and the abandoned quarry near the sea to the left (2). At the end of the quarry the path crosses a rock field (3) with outcrops of grooved limestone rocks and strips of rock fields with fragmented rocks. Here low, gnarled black pine-trees can be seen which endure extreme temperatures and water conditions. After the rock field one reaches the 2nd World War bunker (4) which is used as viewing point. It is possible to walk along a corridor through the cliffs to a terrace where the coast can be observed below. The path continues among thin bush and grooved rock fields to a higher point which is sign-

posted as viewing point (5). This is the highest point of the path, 90 m above sea-level. From the view of the Carso plateau and the carsic hills with Mount Hermada (323 m) can be enjoyed. After this panoramic point the path follows the cliffs overlooking the sea among single black pine-trees and rocky outcrops where bushes are growing. After entering the planted pine-wood, one reaches a junction (6) from which the A 14 road can be reached. The main path continues along the edge of the cliffs, among bush and rocks, and reaches a viewing point on the ruins of another 2nd World War bunker (7). From here the path continues to a junction (8) from which one can reach the A 14 or continue on the new part of the path and reach Duino (9). The path runs alongside military excavations and continues through the

dense vegetation of pine-trees and holly-oaks to Duino. The path for disabled people starts in Duino and reaches the lay-by on the cliff edge.

The entry to the bunker.



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