

AR

2011/3

Arhitektura, raziskave
Architecture, Research

UDK 712.24:622.35
COBISS 1.04

ROMANA KAČIČ
MATTIAS LIDÉN

63 - 70

REVITALISATION OF VINEYARDS
IN THE TERRACED LANDSCAPE ON
THE KARST RIDGE OF TRIESTE

*OŽIVLJANJE VINOGRADOV V
TERASASTI POKRAJINI TRŽAŠKEGA
KRAŠKEGA ROBA*



Fakulteta za arhitekturo
Inštitut za arhitekturo in prostor
Ljubljana 2011

ISSN 1580-5573

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ISSN 1580-5573
ISSN 1581-6974 (internet)
<http://www.fa.uni-lj.si/ar/>

revija izhaja trikrat letno / published three times a year

urednik / editor
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prelom / setting
Astroni d.o.o.

lektoriranje, slovenščina / proofreading, Slovenian
Karmen Sluga

prevodi, angleščina / translations, English
Milan Stepanovič, Studio PHI d.o.o.

klasifikacija / classification
mag Doris Dekleva-Smrekar, CTK UL

uredništvo AR / AR editing
Fakulteta za arhitekturo
Zoisova 12
1000 Ljubljana
Slovenija

naročanje / subscription
cena številke je 17,60 EUR / price per issue 17,60 EUR
za študente 10,60 EUR / student price 10,60 EUR
dekanat@fa.uni-lj.si

revija je vpisana v razvid medijev pri MK pod številko 50
revija je dosegljiva in ali indeksirana na naslednjih mestih:
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revijo sofinancirata / cofinanced
JAK, Javna agencija za knjigo RS
MŠS, Ministrstvo za šolstvo in šport

tisk / printing
Tiskarna Bograf

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This **special issue of AR 2011 3** bears the special stamp of the Karst: it deals primarily with stone. It is primarily devoted to the conference papers of the Karst2011 conference which took place on December 20, 2011 at the Hotel Maestoso in Lipica. The conference was organised as a Promotion of Science by the Slovenian Research Agency (ARRS) within the framework of the Karst2011 project, which is supported by UNESCO, SASA (Slovenian Academy of Sciences and Arts), the University of Ljubljana, the Mediacarso company and Kras magazine. On the occasion of the proposed establishment of the Dry Stone Wall Organisation of Slovenia, letters of support were received from professional organisations from around the world:

The introductory plenary lectures were by Professor Juvanec and Assistant Professor Zupančič. Prof. **Borut Juvanec** presented an outline of architecture in stone, of the types of constructions for which it can be used and the objects that people have assembled from stone. The title is **Stone, the Karst, architecture**. Stone is one of the earliest materials to be used by humans in the construction of dwellings. Yet stone structures are not merely dwellings; they can also be sanctuaries, sites of miracles or divination, tombs, traps, practical structures for storing water, improving soil fertility, health, or for protection, even against plague. In the paper **A general outline of economics from the viewpoint of inventing spatial forms**. Economics is Assistant Prof. **Domen Zupančič** presents economics as one of the parameters in the construction of stone elements. Economics is more important than is generally believed: it has a particular influence on shaping compositions in stone. An analytical presentation of a structure has to provide a critical assessment so that we can objectively confer it a place in architecture.

Lectures:

The significance of the Karst for karstology by Prof. **Andrej Kranjc**, member of the Slovenian Academy of Sciences and Arts (SASA), Ljubljana

Prof. Kranjc's lecture is exceptionally important for presenting issues connected to the Karst. A review of names and identities of the area extends back to pre-historic times, as the Romans, in fact, adopted the existing name, *Carsus*; its first Slovene version dates back to at least the ninth century. Hohenwart (1830) defined the karstic region as extending from the Udine area across the Slovenian Karst, Dalmatia, Herzegovina, Albania to Greece, and ending in Zakintos.

The policy of the Karst: landscapes of integration, Dr. **Jadran Kale**, University of Zadar, City Museum of Šibenik

The characteristics of the karst landscape have changed little since the Roman occupation, feudalism and the recent past of enforced industrialism: it is all a matter of stone and economics, the technology of agriculture and animal husbandry. Today, we are witnessing a revitalisation of tangible and intangible cultural heritage, which is why activities regarding the organisation of preservation are so much more important.

Prehistoric forts: forms of settlement in the Karst, Prof. **Mitja Guštin**, University of Primorska, Institute for Mediterranean Heritage

Significant information about the number of stone structures in the prehistoric period comes as a surprise: not because of the number of such structures, but because of our ignorance. The walls marking the culture of the former inhabitants are still standing and should, first of all, be presented to a wider public.

Posebna številka AR 2011 3 nosi posebni pečat Krasa: obravnava predvsem kamen. Objavljeni so predvsem nastopi na konferenci Kras2011, ki je tekla 20. decembra 2011 v hotelu Maestoso v Lipici. Konferenca je bila organizirana kot Promocija znanosti ARRS, Javne agencije za raziskovalno dejavnost Republike Slovenije, v okviru programa Projekta Kras2011, ki ima pokrovitelje: UNESCO, SAZU Slovensko akademijo znanosti in umetnosti, Univerzo v Ljubljani, družbo Mediacarso, revijo Kras. Ob predlagani ustanovitvi Organizacije za suhi zid Slovenije so poslale pisma stanovske organizacije v svetu:

CERAV, Centre d'Etudes et de Recherches sur l'Architecture Vernaculaire, Paris

ARTE, Asociacion por la Arquitectura rural Tradicional de Extremadura, Caceres

4 Grada - DRAGODID, Komiža Hrvatska

AMPS, Alleanza Mondiale per il Paesaggio Terazzato, Arnasco Genova

ISIS Symmetry, Int. Society for the Interdisciplinary Study of Symmetry, Melbourne - Budapest

Uvodni plenarni predavanji sta imela profesor Juvanec in docent Zupančič. Prof. **Borut Juvanec** je podal oris arhitekture kamna, kaj vse je v kamnu mogoče in kaj vse je človek s kamnom sestavil. Naslov je **Kamen, Kras, arhitektura**. Kamen je eden prvih gradnikov človekovega bivališča. Kompozicije iz kamna pa niso le bivališča, so tudi svetišča, objekti za prikazovanje čudeža ali napovedovanja sreče, so grobnice, pasti in uporabni objekti za pridobivanje vode, pa za pospeševanje plodnosti tal in zdravja, zaščite, celo pred kugo. Docent **Domen Zupančič** je predstavil ekonomiko kot enega vodil pri konstruiranju elementov v kamnu. Naslov njegovega nastopa je bil **Splošni oris ekonomike z vidika izumljanja prostorskih oblik**. Ekonomika je pomembnejša kot mislimo: posebej vpliva na oblikovanje kompozicij v kamnu. Analitična predstavitev objekta mora zagotoviti kritično presojo, da ga lahko objektivno umestimo v arhitekturo.

Predavanja:

Pomen Krasa za krasoslovje, akademik prof. dr. **Andrej Kranjc**, SAZU Ljubljana

Za odstiranje problematike Krasa je predavanje akademika Kranjca izjemnega pomena. Pregled poimenovanja in umeščanja prostora sega v predzgodovino, saj so jo že Rimljani povzeli kot *Carsus*, prva slovenska inačica pa sega vsaj v deveto stoletje. Prostor kraškega sveta sega po Hohenwartu (1830) od Vidma preko našega Krasa in Dalmacije, Hercegovine, Albanije do Grčije, na Zakintosu.

Politika krša: krajobrazi integracije, dr. **Jadran Kale**, Univerzitet u Zadru, Gradski muzej Šibenik

Krajske značilnosti kraškega sveta so se od antičnih centurij, skozi fevdalizem do polpretekle dobe prisiljenega industrializma le malo spreminjale: gre za kamen in za ekonomiko, za tehnologije agrikulture in živinoreje. Danes smo priča oživljanju snovne in nesnovne kulturne dediščine, zato so posegi v organizacijo ohranjanja toliko pomembnejši.

Prazgodovinska gradišča – oblika poselitve na Krasu, prof. ddr. **Mitja Guštin**, Univerza na Primorskem, Inštitut za dediščino Sredozemlja

Pomembna informacija o številu kamnitih struktur iz predzgodovinske dobe preseneča: ne zaradi števila, pač pa

The methods of using stone for defensive purposes (walls, forts) should be included in a system representing the karstic world as having the oldest stone constructions.

Bioclimatic Architecture, the symbiosis between people and water in Bosnia and Herzegovina, Prof. **Ahmet Hadrović**, Dean, University of Sarajevo, Faculty of Architecture

Water is the key element in the symbiosis between people and nature. Architecture enacts this symbiosis. Examples in Herzegovina corroborate this statement.

Wells in the Karst: the phenomenon, construction types, forms, **Eda Belingar**, ZVKDS (Institute for the Protection of Cultural Heritage), Nova Gorica

A review of karstic water wells requires a system involving technological, formal and usage criteria. Wells in the Karst are either open or closed, for private or public use, and their content and ownership are more or less indicated.

The Karst in the heart and eyes, **Jadran Sterle**, RTV Ljubljana
The Karst has a particular visual image, in which rustic identity and today's 'urban-rural' culture intertwine, a composition of both. This composition has to provide a higher value. With the aid of today's technologies, we must cultivate it, develop it and above all publicly show it. All factors must be taken into consideration: the virtual and the physical, and the spiritual values of the people who with their way of seeing and feeling continue to enrich this heritage. A presentation must include all these elements.

Dry stone wall – a habitat, Dr. **Andrej Gogala**, Museum of Natural Science of Slovenia

An exceptionally interesting presentation of life among the stones as only a dedicated biologist could produce - one who discovers, sees and knows the secrets of life which usually remain hidden from the average person. The presentation of this modest life also illustrates human efforts to survive among the stones from pre-history to the present.

Oral traditions about the Karst landscape, Assistant Prof. **Katja Hrobat Virloget**, University of Primorska, Science and Research Centre (ZRS)

There is an important area of human culture which is linked with space (death, for example, is linked with boundaries) which is all too little investigated and known to the public, including researchers. The other world, oak and cadastral boundaries, bear witness to this fact. An example is Baba, a figure from the karstic world, who is also an archaic pan-European mythical figure.

Creating Karst cultural heritage between theory and practice, Dr. **Jasna Fakin Bajec**, Research Centre of the Slovenian Academy of Sciences and Arts (ZRC SAZU)

Understanding cultural heritage also involves the significance of preserving and protecting cultural artefacts of our forebears.

Solitary rocks in the popular tradition of Lokev, **Boris Čok**, master builder of dry stone walling, Lokev

Solitary rocks are particularly shaped stones or stone structures whose shapes have prompted people to adopt them and bestow with special characteristics; these may be physical (their extent), mythical, quite practical (water, survival) or merely visual (height, similarity, form). The values of these characteristics were generated by people, and their understanding of the values represented by shapes, names and beliefs. Around Lokev, evidence for this phenomenon is abundant.

The cultural heritage of North Velebit – characteristics, interpretation, models of revitalisation and sustainable use, **Rene Lisac**, architect, trainee researcher at the University

zaradi našega neznanja. Zidovi, ki označujejo kulturo nekdanjih prebivalcev, še stojijo in bi jih bilo treba predvsem predstaviti širši javnosti. Način uporabe kamna v obrambne namene (zidovi, gradišča) moramo kot najstarejše kompozicije vključiti v predstavitveni sistem kraškega sveta.

Bioclimatic Architecture, the symbiosis between people and water in Bosnia and Herzegovina, prof. dr. **Ahmet Hadrović**, dekan, Univerzitet u Sarajevu, AF

Voda je ključni element simbioze človeka z naravo. Arhitektura to simbiozo udejanja: s svojimi elementi ji omogoča delovanje, istočasno pa spreminja krajino, da ta postane še pomemnejši element človekovega posega vanjo. Primeri iz Hercegovine to potrjujejo.

Vodnjaki na Krasu, pojav, načini gradnje, oblike, **Eda Belingar**, ZVKDS Nova Gorica

Pregled kraških vodnjakov zahteva sistem po tehnologiji, po oblikah, po uporabi. Vodnjak na Krasu je odprt ali zaprt, za javno ali za zasebno rabo, z bolj ali manj označeno vsebino in lastništvom.

Kras v srcu in očeh, **Jadran Sterle**, RTV Ljubljana

Kras ima svojevrstno vidno podobo, kjer se prepletajo kmečka istovetnost in današnja 'meščansko-podeželska' kultura. Sestav obeh mora zagotoviti višjo vrednost. S pomočjo današnjih tehnologij moramo to gojiti, razvijati in javnosti predvsem pokazati. Upoštevanje vseh: navidezne in dejanske, fizične predstavitve in duhovnih vrednot človeka, ki s svojim videnjem in čutenjem bogati to dediščino tudi danes, v predstavitev je treba vgraditi vse te elemente.

Suhi zid – življenjski prostor, dr. **Andrej Gogala**, Prirodoslovni muzej Slovenije

Izjemno zanimiv prikaz življenja med kamni, kot ga lahko prikaže le predan biolog, ki odkriva, vidi in pozna skrivnosti življenja, ki so navadnemu človeku običajno skrite. Predstavitev skromnega življenja ponazarja napore tudi preživetja človeka v kamnu, vse od prazgodovine do danes.

Ustno izročilo o kraški krajini, doc. dr. **Katja Hrobat Virloget**, Univerza na Primorskem, ZRS

Pomembno področje kulture človeka, ki je povsem presenetljivo vezano na prostor (smrt na primer na razmejnice) je vse premalo raziskovano in v javnosti - tudi v strokovnih - premalo poznano. Onostranstvo, hrast in katastrske razmejnice so dokaz še danes. Primer je baba, ki kaže v vseevropskem prostoru arhaičen mitski lik, ne le v kraškem svetu.

Ustvarjanje kraške kulturne dediščine med teorijo in prakso, dr. **Jasna Fakin Bajec**, Znanstveno raziskovalni center SAZU

Razumevanje kulturne dediščine vključuje tudi pomen ohranjanja, zaščite in varovanja kulturnih stvaritev prednikov.

Kamniti osamelci v ljudskem izročilu Lokve, **Boris Čok**, mojster suhega zidu, Lokev

Kamniti osamelci so kamni ali kamnite structure posebnih oblik, ki so jih zaradi tega ljudje posvojili in jim dodali posebne lastnosti. Te so lahko fizične (doseg, razkorak ...) ali tudi mitske, povsem uporabne (voda, preživetje ...) ali le vizualne (višina, podobnost, oblikovanost ...). Vrednote so si ljudje ustvarili sami, razumevanje vrednot pa je podkrepljeno z oblikami, s poimenovanjem, z verovanjem. Okolica Lokve je s temi dokazili izjemno bogata.

Kulturna baština Sjevernog Velebita - karakteristike, interpretacija, modeli obnove i održivog korištenja, **Rene Lisac**, arhitekt, mladi raziskovalec Sveučilišta u Zagrebu, AF (**Martina Ivanuš, Grga Frangeš**)

of Zagreb, Faculty of Architecture (**Martina Ivanuš, Grga Frangeš**)

The theoretical system of the culture of North Velebit, with its pastoral life-style and traditional high-mountain architecture is the outcome of a serious scholarly investigation of architecture, ethnology and landscape architecture. Interesting graded transitions are described, which above all define architecture: size, form and details, which are the result of the available materials and environment, as well as people's requirements and skills. The objective of the proposed model is to produce an active system for preserving cultural heritage which will operate harmoniously from interpretation to implementation.

Karst2011: the significance of vernacular architecture in training and education, Assistant Prof. **Beatriz Tomšič Čerkez**, University of Ljubljana, Faculty of Education

The school system has usually ignored vernacular architecture and never mentions it. Endeavours to present the culture of our forebears should be included throughout the whole of a person's education, from nursery school to university if we wish to keep our culture alive. In the case of stone, the task is simple, as students are exposed to both theory and practice in the natural environment. The Karst2011 project has produced some good results in this context.

The Karst and Lipica, **Nataša Kolenc**, architect, Lipica Stud Farm

The Karst and Lipica Stud Farm are linked together by the landscape and karstic phenomena. Hence, issues which at the Stud Farm are additionally linked to economics, tourism and technological processes. The Lipikum Museum adds the cultural component. The Museum is an example of good practice in terms of museology issues, presentations and the arrangement of space.

The conference concluded with the adoption of conclusions on the process for establishing the Dry stone Organisation of Slovenia and by setting up the organisation of the Karst2011 project. One of the first sub-projects of Karst2011 will also 'The cultural landscape of the karstic world', a kind of live museum of the karst from the historical perspective from Udine to Zakintos.

The current issue mainly contains conference papers. I hope you enjoy them.

Editor

Teoretski sistem kulture severnega Velebita s pašniškim načinom življenja in planšarsko arhitekturo je plod resnega znanstvenega in raziskovalnega arhitekture, etnologije in krajinarstva. Zanimivi stopničasti prehodi definirajo predvsem arhitekturo: velikost, oblikovanost in detajle, kar je plod dosegljivih materialov in okolja, pa potreb in možnosti ljudi. Cilj postavljenega modela je postavitev aktivnega sistema ohranitve kulturne dediščine, ki teče od interpretacije do izvedbe skladno.

Kras2o11: pomen vernakularne arhitekture v vzgoji in izobraževanju, doc. dr. **Beatriz Tomšič Čerkez**, Univerza v Ljubljani, Pedagoška fakulteta

Šolski sistem je do zdaj praviloma vernakularno arhitekturo prezrl in je sploh ni omenjal. Naporji za predstavljanje kulture naših dedov že od vrta in vse do univerze so nujni, če hočemo ohraniti kulturo tudi na tem področju. Na primeru kamna je to še najbolj preprosto, saj dobijo učenci teorijo in prakso prikazano v naravi. Projekt Kras2o11 kaže v tem kontekstu že kar nekaj rezultatov.

Kras in Lipica, Arhitektka **Nataša Kolenc**, Kobilarna Lipica
Kras in Kobilarna Lipica sta povezani s krajino in s kraškimi pojavi. Od tod problematika, ki je v Kobilarni vezana še na ekonomiko, na turizem in na tehnološke procese. Kultura je vključena z muzejem Lipikum, ki je vzorčen primer dobre prakse, tako v problematiki muzealstva, predstavitev in urejanja prostora.

Konferenca je končala delo s sprejetjem sklepov: o začetku postopka za ustanovitev Organizacije za suhi zid Slovenije in z oblikovanjem organov Projekta Kras2o11, v okviru katerega bo eden prvih podprojektov tudi 'Kulturna krajina kraškega sveta', nekak živi muzej krasa v zgodovinskih okvirih med Vidmom in Zakintosom.

V reviji so pretežno članki z nastopov konference. Upam, da vam bodo všeč.

urednik

Članki / *Articles*

REVITALISATION OF VINEYARDS IN THE TERRACED
LANDSCAPE ON THE KARST RIDGE OF TRIESTEOŽIVLJANJE VINOGRADOV V TERASASTI POKRAJINI TRŽAŠKEGA KRAŠKEGA
ROBA**izvleček**

Starodavna krajina terasastih vinogradov v Kontovelu je zelo dragocena. Pomen celovitosti te kulturne krajine je povezan z bližino miramarskega gradu in parka ter s hkratno prisotnostjo dveh področij, vključenih v Naturo 2000. Leta 2010 smo za Tržaško deželo izdelali krajinsko poročilo, v katerem smo analizirali in ovrednotili projekt oživitve obstoječih poti z namenom izboljšati dostopnost do kmetijskih zemljišč in s tem pospešiti obdelovanje teras. Deželno poročilo vsebuje zahteve za pripravo podrobnejšega načrta. V poročilu je posebej naznačeno, da mora končni načrt upoštevati vrednost izvornih suhozidov, ki prispevajo k avtentičnosti kulturne krajine. Ker zamenjava starega kamnitega zidu z novim ne bo nikoli dosegla izvirne avtentičnosti, priporočamo skrbno preverjanje možnosti, da na novo zgradimo suhozide z uporabo enakih tehnik in istih materialov, kadar je to potrebno zaradi razširitve poti. Uporabljeni kamni morajo biti izključno iz porušeni obstoječih zidov znotraj področja posega. Uporaba kamnov iz krajevnih leg zagotavlja popolno spoštovanje izvornosti in barv kraja ter povečuje okoljsko vzdržnost posega.

ključne besede

obalna krajina, terase, vinogradi, suhozidi, Kras, Trst

abstract

The ancient landscape of terraced vineyards in Contovello is of great value. The importance of the integrity of this cultural landscape is linked to its proximity to the Castle and the Park of Miramare and the simultaneous presence of two Natura 2000 areas. We elaborated a landscape report for the Province of Trieste in 2010, analysing and evaluating a project aiming at recovering the functional features of the existing routes to improve access to agricultural land and thereby enhance the cultivation on the terraces. The landscape report include requirements for the preparation of detailed design. In particular the report indicates that the final design must take into account the value of the original dry stone walls which contribute to the authenticity of the cultural landscape. Since the replacement of an old stone wall with a new one will never reach the original authenticity it is advisable to check carefully the possibility of rebuilding the dry stone walls using the same techniques and the same materials where it is necessary to widen the path. The stones used must derive exclusively from the demolition of existing walls inside the area of intervention. The use of stone from the site ensures full respect for its original and the colours of the place and increases the environmental sustainability of the intervention.

key words

coastal landscape, terraces, vineyards, dry stone walls, Karst, Trieste

This article is based on the landscape report we elaborated for the Province of Trieste in 2010. The report was prepared for the application for approval of the project "Infrastructuring the Karst ridge of Trieste - First Phase" in accordance with the Italian law of 2005. The mentioned project proposed a way to recover the hillside of Contovello, Trieste, giving this area the infrastructure deemed necessary for accessibility and irrigation.

The ancient landscape of terraced vineyards in Contovello is of great value. The importance of the integrity of this cultural landscape is linked to its proximity to the Castle and the Park of Miramare and the simultaneous presence of two Natura 2000 areas: the Habitats Directive Site (SCI) "Carso triestino e goriziano" and the Birds Directive Site (SPA) "Aree carsiche della Venezia Giulia".

The project aims at recovering the functional features of the existing routes to improve access to agricultural land and thereby

enhance the cultivation on the terraces. The extraordinary cultural landscape would otherwise be doomed to disappear as a consequence of the process of reforestation. Since it is a highly vulnerable landscape it requires the utmost respect for the characteristics of the site.

Analysis of the current situation**Territorial and landscape overview**

The project site is located in the region of Friuli Venezia Giulia, Province of Trieste, Municipality of Trieste, locality Contovello. The province of Trieste can be represented by two neighbouring bands of variable thickness: the Karst plateau and the coastal strip. The built environment consists of the city of Trieste and a number of smaller towns of ancient formation, based on predominantly agricultural or fishery related activities, located immediately around the scattered Karst plateau and the coast



Figure 1: Terraced vineyards are associated with the villages on the edge of the Karst ridge. The area of context and the area of study are highlighted in the drawing.

Slika 1: Terasasti vinogradi so povezani z vasi na obrobju Kraškega roba. Na risbi sta poudarjeni okolno območje in proučevano območje.

and connected by widespread newly formed buildings. The landscape context identified by the centre is bordered to the east, west of the village of Duino, the countries that border the Karst ridge to the north and south of the sea. The centres included in this area have historically been characterised by being tied to the sea, despite the great differences in altitude. The villages situated on the ridge, Visogliano, Aurisina, Santa Croce, Dulanjavas and Contovello, thus form a group characterised by direct connections with the coast, such as by passing fishermen to reach fishing spots, which still mark the area.

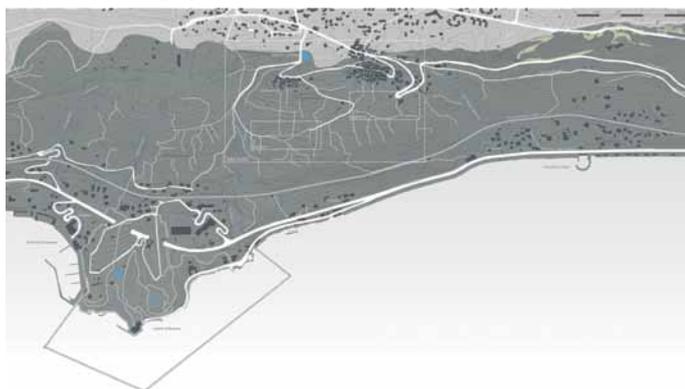


Figure 2: The network of paths shows a few connections between the Karst ridge and the sea, overcoming the barriers formed by the coastal road and the rail routes which have interrupted many of these connections.

Slika 2: Mreža poti prikazuje nekaj povezav med Kraškimi robom in morjem. Premagujejo ovire, kot sta obalna cesta in železniška proga, ki sta prekinili mnoge teh povezav.

Landscape context and area of study

The landscape is characterised by widespread and extensive terraces testifying the presence of ancient agricultural cultivation. In the study the partition walls and support of the terraces are made of dry sandstone and host crops mainly of vine. Among the terraces there is a network of access paths, also bordered by stone walls. The project proposes the recovery of these artefacts related to the landscape features of the area.



Figure 3: View of vineyards on the terraces above the Miramare Castle and Park.

Slika 3: Pogled na vinograde na terasah nad miramarskim gradom in parkom.

Geomorphological character

The study area extends along the sides of the coastal town of Trieste under the locality of Contovello, above the railway line

from Trieste to Venice. The altitude is approx. 100-250 m.a.s.l. The area has developed gradually in the transition zone between the limestone formation, the band of sandstone and, towards the sea, the area of the flysch. Limestones generally have low erodibility due to its compactness, and high permeability, characteristics that lead to a landscape with rounded hills. This is the case of the Karst plateau north of Contovello. Flyschlike geological structures, however, have a medium-high degree of erodibility, caused by the intense stratification and the presence of soft and non permeable marl layers, resulting in a much more rugged landscape with steep slopes and deep grooves. The morphology of the ridge is intimately linked to the type of rock. The border of the Karst ridge is of limestone, the lower band consists of sandstone with rather sweet slopes, while from an altitude of 130-170 m.a.s.l. a layer of flysch evolves with a more pronounced inclination.



Figure 4: Authentic path paved in stone connecting the Karst ridge to the Adriatic coast.

Slika 4: Prvotna, s kamni tlakovana pot, ki povezuje Kraški rob z Jadransko obalo.

Hydrological character

On the versant of the coast of Trieste there are many brooks containing high quantities of water during periods of heavy rains. Apart from areas in the valley, there is no real underground water and the presence of some sources is connected to local groundwater flow into the fissures of the rock. In the past wellsprings were exploited on a small scale, by collecting water in tanks.

The area examined is crisscrossed by four valleys crossed by small rivers of torrential character: Rio Grignano Prosecco Rio, Rio and Rio Miramare Cedras and Marinella. Within the area of study we find one of these brooks, the Rio Miramare, as well as the pond of Contovello. This pond is an element of landscape value, environmental as well as recreational. This is a small overrun of water created by sealing the bottom with clay in order to accumulate a reserve of water that was once used for grazing animals. The pond is fed by small springs from the overlying layers of flysch. It appears in the cadastral maps from 1822.

Vegetational systems

The vegetation of the study area consists of Mediterranean shrub species, woodlands, vineyards and olive groves on terraces. Many cultivated areas situated on the terraces have been abandoned and therefore there is an ongoing natural process of reforestation.

The forest associations on the side of the Trieste coast consists of oak woods, dominated by Downy Oak (*Ostrya-Quercetum pubescentis*) or Sessile Oak in most areas with acid soils (*Sesler-Quercetum petraeae*). In both cases, the undergrowth is compact and rich *Sesleria autumnalis*. The phase of reforestation following abandonment of crops or pastures is often characterised by the abundance of common broom (*Spartium junceum*). On the terraced areas there are crops, especially of vine (*Vitis vinifera*), and a minority of olive (*Olea europaea*) and fruit trees.

Agrarian landscapes

The project area is part of that portion of the Karst ridge which is characterised by steep slopes shaped into terraces. These are made up of agricultural lots of small size and quadrilateral shape, elongated perpendicular to the maximum gradient of the slope. The cultivated lots are usually separated by stone walls of sandstone. A large part of this abandoned agricultural land is currently presenting different stages of overgrowth with shrubs and stability problems, due to lack of maintenance.

The historical and cultural value of the terraced landscape is considerable and it also contributes to the formation of a habitat containing species of Community interest.

The cultivation of vine in the past has been an important element in the economy of the territory of Trieste, an outstanding example is the valuable *vinum pucinum* in Roman times.

In the period between 1400 and 1500 the Empire and the municipality aimed at containment and control of the vine cultivation and the commerce of wine, so the first agricultural rules were established. The situation remained unchanged until the proclamation of the free port of 1719 which led to an increase in the population and a renewed interest in investing in wine production. The best vineyards are concentrated mainly in the Karst area between the ridge and the sea, on arenaceous-marly layer corresponding to the villages of Santa Croce, Contovello and Barcola.

Around 1630 a system of planting vine called "Friuli" was introduced, in which the plants were neatly arranged, often in rows, allowing a rational exploitation of the land.

Especially in the area of Prosecco, Santa Croce and Contovello the quality of the wine was exceptionally high and it was appreciated by the upper classes throughout Europe, especially in Carinthia, Styria, Carniola and up in Graz, Linz and Prague.

Historical territorial fabric

An important iconographic source to understand the transformation over time of the terraces of Contovello is the historic land register Franceschini of 1866; cartography indicating individual lots, urban and rural areas.

In 1866 the urban centres and their boundaries were clearly legible: Contovello, San Girolamo and Dolagnavaz. There was more water, the pond of Contovello was enlarged and divided into two basins, sinks, fountains and water troughs for animals were present. The map also indicates the existence of two English gardens.

The predominantly agricultural area was cultivated with vineyards and only a few parts were used as orchards, left fallow or covered with wood. The paths between the terraces were narrow and thin to maximise the acreage.

Very interesting is the comparison between historical and current panoramic photographs. The first case is a shot from the Strada Napoleonica prior to 1857: the terraces extend almost

to the coast, while today you see the effects of overgrowth and urbanisation. The second case is a historical picture from a viewpoint at Contovello in 1952: the terraces are plenty and the border between urban and rural area is clear, a number of houses and a mass of cedars planted after World War II capture the view, weakening the identity of rural simplicity of the site (see Photo 6).



Figure 5: The height and proximity of the bordering stone walls form narrow and shady corridors in some sections of the paths.

Slika 5: Višina in bližina razmejitvenih kamnitih zidov na nekaterih odsekih poti tvorita ozke in senčnate koridorje.

Distribution and differentiation of the artefacts in the area of study

The project "Infrastructuring the Karst ridge of Trieste" contains a typological study of the existing stone walls of the area. These artefacts are listed by function, period of construction, type of binder material, condition and possible causes of degradation.

According to the typological study of the walls we can make some important considerations. The two major types of wall represented are dry stone walls of sandstone and walls of concrete. These two materials are the cheapest ones in each period. In order to make the paths accessible for even small mechanical agricultural vehicles a substantial part of the original tissue of dry sandstone walls has to be replaced or supplemented by elements in concrete. The area of the project corresponds to the area with the most important historical artefacts.

historical dry stone walls

The materials used in the past for built elements were obtained from the cleaning of stones from the fields and from the construction of trails. Unlike the Karst plateau, where the prevailing stone was limestone, the Karst ridge, up to an altitude of about 150 m.a.s.l. consists of sandstone. This sedimentary stone, grey and yellow ochre, comes in slabs with a thickness that can vary from a few centimetres to several metres. The farmers of the past have found it particularly convenient to split the sheets slotting, in order to get enough regular blocks with a characteristic elongated shape suitable for walls.

In the dry stone wall there is no collaboration between the block of material and binder, which means that the structure can withstand stress due solely to its own weight. These structures are used for the containment of the land as a division between agricultural lots.

Flooring: Historically, the paving of the paths of the study area was made of clay mixed with elements of stone. The same treatment was reserved for the access ramps and terraced

properties. With the use of cars and mechanical surfaces driveways have been paved or covered with gravel. The traits in the project are still in gravel or grass and weeds.

Steps: In ancient times, where it was necessary to overcome a large slope, steps were built of slabs of sandstone. In later periods the existing stone was replaced and integrated with concrete.

Fences and gates: The oldest fencing fences were made of local wood, untreated and usually put in place directly by the farmers. The existing fences of today are made of various materials: metal, plastic and wood. Even the gates were originally made of wooden strips or wrought iron but today various materials are used, often impacting with the context.

Water collection: To cope with water scarcity in the summer months rainwater tanks were arranged, later supplemented by metal tanks and plastic bins.

Relation to scenic routes

The network of paths that crosses the area of terraces is indirectly connected to a larger system of touristic interest. Four trails of historical and natural interest wind through the Karst ridge and affect the area of study.

The re-qualification of two sections of paths of Contovello provided by the project, increases the use of paths in the area of study and improves the connection with the extensive network of trails on the Karst.

The degradation of the environment and the landscape

The recent development of settlements on the Karst ridge has reduced the open view towards the sea and interrupted the continuity of ecological corridors.

The abandonment of traditional cultivations on the terraces results in the loss of the qualities of the rural landscape and of biodiversity together with an increased risk of erosion.

The large single-family buildings in the historical centre of Contovello have greatly reduced the visual quality of the historical settlement from many viewpoints east of the site. Next to the historical settlement cedars (*Cedrus* spp.) were planted in the fifties. The growth of these trees, extraneous to the context of the vegetation of the area, has greatly altered the visual perception of Contovello, first characterised by the contrast between the historical centre, well-defined on top of the hill and the terraced vineyards below.

The reduction of open spaces in favour of the forest and the urban sprawl around the old historic core are attacking the structure of the traditional landscape, characterised by sharp boundaries between different land uses, including settlements, cultivated areas and wooded areas.

Summary of significant historical events

The promontory of Contovello has always been the object of attention for its dominant position, with an open view of 360°, and for the characteristics of its agricultural land.

The presence of spring water, the slopes descending to the sea exposed by the sun, protected from the cold Bora winds, the good quality of the marly soils, have inspired the construction of terraces and the cultivation of wine and olives, since remote times.

On the site there is evidence of a proto-historic settlement, with remains dating from the end of the Bronze Age and from the Iron Age. In addition, there are Roman remains discovered a hundred metres south of the top of the hill.

On top of the peak of Contovello there are remains from the castle of Moncholano. The first documentary sources regarding the fortification are from 1308. Next to the castle the existence of a church dedicated to San Gerolamo is documented from 1338.

Contovello is probably the only known case in which one can determine precisely the birth of a village on the Karst. On July 30, 1413 it was decided in Trieste to create a village near the castle of Moncholano where only the church of San Gerolamo existed. At first the new settlement was called Villa di San Gerolamo, and later, in 1437, the name Contovello appeared for the first time.

A pictorial representation of Contovello interesting for the landscape aspects is the etching by Gaetano Merlato, dated 1820, entitled "View of the village of Contovello from the heights of Greta". It is a perspective representation of the hill of Contovello. In the foreground there is a road that borders the sea. On the left, two sailing boats, probably fishing boats, are delineated on the gulf. In the background emerges the Karst ridge that culminates with a rocky ridge on the right and pointed steeple of the church of Contovello in the centre. The terraces abundant with vineyards are clearly represented in this picture. Valleys traversed by brooks which descend from the mountain and groups of trees that are concentrated mainly in the roughness of the slope.

Functional and visual analysis

Visual and symbolic relationships

The project was evaluated from an analysis on a regional scale, identifying the terraces that stretches from the outskirts of the city of Trieste until Aurisina, between the sea and the Karst plateau.

The extent of the Karst ridge reaches an altitude of about 250 metres above sea level, on whose line contains there is a number of important landmarks and scenic lookouts (Belvedere Italia, Monte Grisa Sanctuary, Church of San Gerolamo).

In the aerial photo the extension of the terraces in Contovello is shown, above the railway line. From the sea they form the backdrop to the Park of Miramare, since the plateau behind is not visible.



Figure 6: The vineyards on terraces located between Contovello and Miramare are visible from the sea, from some points of the coast and from panoramic viewpoints in the city of Trieste.

Slika 6: Vinogradi na terasah med Kontovelim in Miramarom so vidni z morja, z nekaterih točk na obali ter z nekaterih panoramskih razglednih točk v Trstu.

Panoramic photos were taken from different points of the coast of Trieste, which highlight the profile of the Karst ridge, corresponding to the terraces and the village of Contovello.

It is therefore very important to take into account that the transformation of this part of the ridge is visible from a distance and can alter the quality of the coastal landscape.

Functional relationships

Very important is the system of roads and pedestrian paths. The main vehicular roads are the Viale Miramare, which follows the coastline, the Salita Contovello and the Strada del Friuli, reaching the villages of Contovello and Prosecco, and the Strada Napoleonica.

The ridge is a very important tourist attraction for its high cultural value and environmental qualities. For this reason many tourist itineraries have been created connecting the Slovene and the Italian Karst. Significant for the cultural history are the pedestrian paths running along the boundaries of rural lots, some of which reach the coast: the old paths once used by fishermen.

Analysis of levels of protection in the operating context and study area

The area is part of the context of the Karst designated as a site of the ecological network "Natura 2000" under the Habitats and the Birds Directive.



Figure 7: Terraces of Contovello seen from the port of Cedas. (around 1950, M. Magan).

Slika 7: Terasa v Kontovelu iz pristanišča v Čedasu (okoli 1950, M. Magan).

The SCI "Carso triestino e goriziano" and the SPA "Aree carsiche della Venezia Giulia". ZPS extend within the provinces of Trieste and Gorizia. On the north the site borders on the Republic of Slovenia. The SCI/SPA, contains all types worthy of protection and conservation: Karst lands, wetlands (lakes, Karst ponds), cliffs and scree slopes, caves, fragments of vegetation (sub) Mediterranean extrazonal, limestone plateaus, rivers and halophilic area. Thanks to the fact that it is here the Mediterranean, the Alps and the Balkans converge, the Karst has an extraordinary wealth of flora and fauna.

Photographical documentation

The views towards the area of study are analysed from particularly significant viewpoints from the surrounding area. The relationship between the current situation and the past is analysed through two sets of images. The first one highlights some elements that characterise the morphology of the territory and the culture of the past.

The second establishes a direct comparison between past and present using pictures taken from a similar view in different ages.

If you compare two photographs, one from 1952 and one from 2010, transformations undergone in the area during about sixty year emerge. In particular, the loss of the definition of boundaries is noted, the disorderly building growth, the overgrowth, the loss of identity of the historical settlement of Contovello and the consequent weakening of the hierarchy between buildings and open spaces. Through the juxtaposition of two images taken near the Strada Napoleonica, the phenomenon of overgrowing is evident: the terraces which once extended to the sea are hardly visible (see Photo 6).



Figure 8: Comparison of a historical photo and a current photo from the lookout Trmadevec. The settlement of Contovello dominates the underlying areas with vineyards. (1952, M. Maganji). In the current image the urban sprawl is reducing the quality of the cultural landscape and a grove of cedars hides the settlement of Contovello partially.

Slika 8: Primerjava med staro in sedanjo fotografijo z razgledišča Trmadevec. Naselje Kontovel obvladuje nižje ležeča področja z vinogradi. (1952, M. Maganji). Na današnji fotografiji širjenje mesta zmanjšuje kakovost kulturne krajine, cedrov gaj pa delno zakriva naselje Kontovel.

Project: Description of the works to be performed

The project aims at recovering the degradation of existing interstate routes and bordering walls. The planned intervention aims at increasing the accessibility of the area, enhancing agricultural activities and ensuring the possibility of easy maintenance of the built elements.

During the final design a typical agricultural vehicle has been identified, currently used in the country, which enshrines the average characteristics. The total width of this vehicle is 1050 mm. The operations to be undertaken in accordance with the final project are of two types. The first type includes the recovery of the routes, the consolidation works of the terraces and the enlargement of the interstate roads to allow the passage of farm agricultural vehicles. The final design provides for a minimum width of 1.5 metres of the interstate roads in straight paths. In critical situations, in the presence of curves this width is increased. The second type of works, includes the demolition, excavation and restoration of paths for the installation of a water system and underground conduits for future installation of electrical cables. Along the route there will be pitches for the exchange and for the parking of agricultural vehicles, for temporary storage of materials and seating and information will be provided for tourists. For the retention of rainwater runoff along the route of the project will feature works reducing the water flow speed and accumulating water in underground tanks.

Identification of the project compared to the existing situation overlap

The project has been overlaid on the regional cartography and aerial photos to identify the network of paths. Historical research making use of photographic documentation and literature available and tables of the Franceschino land register was also carried out.

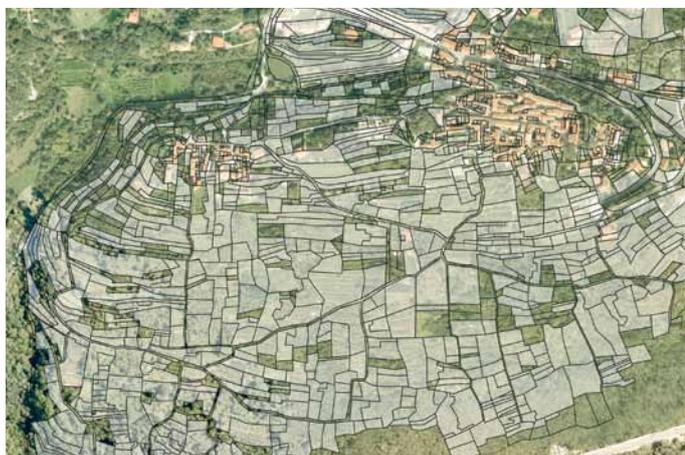


Figure 9: Comparison of areas cultivated by vine - overlap between aerial photo of 2005 with the Franceschino land register 1866. White areas in the drawing correspond to vineyards of 1866. From the overlap is noted that the network of paths has remained almost unchanged while the surface of vineyards is very reduced.

Slika 9: Primerjava vinorodnih območij – prekrivanje zračnega posnetka iz leta 2005 s Franciscejskim katastrom iz leta 1866. Beli predeli na risbi označujejo vinograde leta 1866. Prekrivanje pokaže, da je mreža poti ostala skoraj nespremenjena, medtem ko se je površina vinogradov zelo skrčila.

Comparison and identification of the project compared to the existing situation

The project has been compared with the existing situation with particular attention paid to the historical paths existing in the territory.

Comparison and identification of works in relation to the Franceschino land register

The current topographical structure given by the dry stone walls, and the division in terraces has been compared to the situation in the middle of the nineteenth century, recreated by means of the drawings of the land register of 1866. A remarkable state of preservation of the original structure emerges, while the change in land use has led to a progressive reforestation of the area.

The proposed intervention, following the divisions of the agricultural lots respects the subdivision of the area. The width of current paths winding within dry stone walls, is in some cases very narrow (50-80 cm) a direct consequence of the morphology but also of the original function.



Figure 10: Long stone stairs between the dry stone walls of the terraces.
Slika 10: Dolge kamnite stopnice med suhozidi teras.

The project analysed proposes, for functional reasons, an extension of the width of the paths replacing existing partitions with reinforced concrete coated with sandstone.

The project provides some pitches for operation of mechanical equipment, pitches that also serve as a resting place and panoramic terrace. These points now have a form dictated primarily by functional requirements, in contradiction with the topography of the territory.

The reasons for the architectural language adopted in reference to local tradition

The proposed intervention will connect to the network of nature trails of the Karst, thus helping to enrich the offer. Special attention is being given to the points of junction with the existing paths.

Elements for assessment of landscape compatibility Compliance with the intervention compared to the levels of protection in the operating context and study area

The proposed intervention complies with the levels of protection as indicated in urban plans regarding the area.

The effects of the intervention on the surrounding landscape and on the area of intervention The evaluation of landscape compatibility concerns both the area of intervention and the surrounding landscape, both during construction and after construction. In the evaluation it is important to take into account the improvements which the realisation will bring to the entire system of terraces through the resumption of cultivation. The preservation of this cultural landscape requires active cultivation. The abandonment of cultivation and subsequent reforestation are the main causes of the process, going on for years, which is reducing the extension of the cultivated landscape of the terraces.



Figure 11: Comparison between the existing situation and the proposal. The visual impact of the pitches is clear.

Slika 11: Primerjava med obstoječo situacijo in predlogom. Vizualni vtis strmin je jasen.

The authenticity of the route before and after the intervention has also been evaluated, authenticity being considered the value of preservation of historical artefacts that contribute to landscape value.

The intervention inevitably affects the points just mentioned. The realisation of the project does not substantially alter the visual perception considering the points of view distant to the area of study (Colle di San Giusto, Viale Miramare, Faro dela Vittoria, Belvedere Italia and Strada Napoleonica). Considering scenic routes near the area of intervention, there is a disturbance of the visual perception due to the interruption of the continuity of linear walls created by the lay-bys.

Thanks to the use of photomontages the effects of the realisation were compared with the current situation, both for phase 1 and phase 2. The images show the enhancement of the site as a result of maintenance, in particular recovery compared to the current situation of degradation with walls overgrown by weeds. The enlargement of the path alters the proportions between the path and the bordering walls.

The coating of the walls is an important aspect for the evaluation of landscape compatibility. The final design is based on a solid documentation of the existing situation through a typological study of the walls, an accurate and precise documentation of the state of preservation and stability of existing walls. The maintenance of existing walls is assessed where it is possible. In short, the existing walls are demolished and rebuilt only in the units considered unsafe, and in the collapsed sections of wall

sections where it is necessary to widen the roadway to achieve the width of 1.5 m which is considered necessary. According to an audit of the project it was noted that in phase 1 approximately 60% of existing walls are maintained, while in the area of phase 2 around 54%.



Figure 12: The authenticity of the current network of paths is high.
 Slika 12: Današnja mreža poti je zelo podobna prvotni.



Figure 13: The authenticity of the network of paths will be reduced following the implementation of the project.

Slika 13: Avtentičnost mreže poti se bo po izvedenem projektu zmanjšala.

The landscape transformation is irreversible in the case of demolition of ancient walls. Other interventions are reversible. Regarding the visual quality the effect will be more significant in a short term, while in a medium- and long-term the development of the vegetation will make a less obvious contrast between walls and rebuilt existing walls. The effects of the transformations during the construction will be substantial but, given that the work will be concentrated over a limited time, the operation should not be too burdensome. The effects of the intervention when built will provide benefits for the maintenance and recovery of traditional agricultural activities in the area.

The most significant changes to the landscape are those concerning the pitches. Considering the system of paths and the settlement of Contovello, any change will have an impact, however small, on the landscape as a whole.

The works of mitigation and compensation provided

The area of study deserves a management plan considering the high landscape values, the natural and historical-cultural values. The most significant values are those of vine cultivation

on terraces, documented in the area since the year 1308, but probably existing in the site already in the Roman period. Some routes passing through the cultural landscape may also be advertised, routes exploring the peculiarities of local and fostering a better knowledge of the territory by citizens. As a compensatory measure to the inevitable changes related to the project an intervention on the sections of walls made of concrete in the post-war period is proposed, currently of scarce value, through an operation of coating the wall with stones retrieved for better visual integration.



Figure 14 and 15: Comparison between the existing situation and the proposal. Simulation based on photographs showing the visual impact of the intervention. Sliki 14 in 15: Primerjava med obstoječo situacijo in predlogom. Simulacija s pomočjo fotografij prikazuje vizualni vtis posega.

Requirements for the preparation of detailed design

In particular, the final design must take into account the value of the original dry stone walls which contribute to the authenticity of the cultural landscape. The replacement of an old stone wall with a new one will never reach the original authenticity of the existing wall. It is advisable to check carefully the possibility of rebuilding the dry stone walls using the same techniques and the same materials where it is necessary to widen the path. It is important to specify in the final project the need to employ skilled labour and stress that the construction supervision will control the good correspondence between new and ancient artefacts. In the event that the construction of new concrete walls is absolutely necessary in some section, the coating must be done with utmost care and respect of traditional methods of laying. The stones used must derive exclusively from the demolition of

existing walls inside the area of intervention. The use of stone from the site ensures full respect for its original and the colours of the place and increases the environmental sustainability of the intervention. In this regard, it is not necessary to resort to external supplies with consequent reductions in costs of supply and transport of materials.

As for the paving of the paths compacted soil or local sandstone without concrete should be used. In addition it is recommended not to use concrete on the access ramps to the lots. For particularly pronounced slopes it is advised to use steps of sandstone, without the use of concrete. For fences and gates local handcrafted wood is indicated, possibly made from twigs on the ground, wrought iron elements and materials tied to tradition. It is suggested not to carry out the project providing the conduits for the subsequent installation of electrical cables. The landscape value of the study area is given largely by the cultivation of the vine on terraces with traditional eco-friendly techniques which do not require a fixed power supply. The availability of water and electricity could be an incentive to a future urbanisation and to the introduction of non-traditional crops and therefore cause a degradation of environmental quality.

Suggestions for territorial planning

Considering the high landscape value, environmental, historical and cultural features of the ancient terraced slope around Contovello, the development of an integrated plan to recover the values that are disappearing due to abandonment of cultivation and subsequent reforestation is suggested.

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