

Surrounded by Water

Surrounded by Water:

Landscapes, Seascapes and Cityscapes of Sardinia

Edited by

Andrea Corsale and Giovanni Sistu

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PREFACE

This collective work aims to give an insight into the physical and human geography of Sardinia, the second largest Mediterranean island, with its complex, varied, changing and often hidden features. The title, “Surrounded by Water”, recalls the identity of a land whose coastlines and surrounding seas have symbolically represented social, economic, political and cultural bridges or walls, meeting or colliding places, over its long and difficult history. Landscapes, seascapes and cityscapes will be presented and analysed, together with other aspects, through a descriptive focus and the original contributions provided to the research by some local experts, in order to offer worldwide scholars and students a complex and multi-dimensional view of the Sardinian reality through the lens of its geographical features.

Each chapter of the book offers an in-depth and concise analysis of a specific theme, through the description of its characteristics and current variations within the island territory. These descriptive aspects will complement insights related to the experiences and findings provided by the authors during the research.

This work will be introduced by a contribution on the cultural heritage and identity of Sardinia through travel literature, preceded by two key political maps of the island, symbolically leading the foreign reader to re-approach it.

The first part of the book (“Elements”) will cover the main aspects of physical geography, with some chapters on geology, soils, hydrogeology and climate. The physical characteristics will combine with complex phenomena such as desertification, pollution and climate change.

The second part (“People, territory and policies”) will deal with human geography, through chapters on demographics, migration, foreign population, landscapes, coastal planning, urban areas, economy, agriculture, tourism, environmental policies, water management and energy, analysing their main characteristics and the complex responses of stakeholders, institutions and civil society on vital, critical issues such as the management of natural resources, democratic participation and local autonomy.

A broader angle will be finally offered, covering the connections and relations between Sardinia, Europe and the Mediterranean area, leading

the reader to the end of this symbolic journey through ever-changing identities and perspectives.

The authors' common and shared aim is to raise a new, modern interest in Sardinia, in further regional geographic studies, in academic, scientific and cultural exchanges, among peoples and countries with both similar and different histories, identities, issues and hopes.

Andrea Corsale, Giovanni Sistu

PROLOGUE

CHAPTER ONE

CULTURAL HERITAGE AND IDENTITY: IMAGES IN TRAVEL LITERATURE

CLARA INCANI CARTA

The history of Sardinia dates back to remote times, and, just as with any other territorial entity, Sardinia's own identity is rooted in a specific culture, by which is meant, according to UNESCO as well, the whole of the spiritual, material, intellectual, and emotional features marking a specific society or a social group. A whole which is not only composed of art and literature, but also of ways of living, of the fundamental rights of human beings, of value systems, of folklore and beliefs. All this comes across as a notably complex notion, which cannot but take into account cultural assets, as they are considered to bear identity/diversity, to which a particular sense or meaning is attributed, and values, either material or non-material – natural events included – which are placed within time and space, and which therefore become a symbol, i.e. a sign to be interpreted. It is an attribution stemming from a community – therefore within a social scope – which is confused and disoriented in itself, due to the damage suffered from modern times by the socio-cultural inheritance, local knowledge and uses, the tradition and historical memory defended by people and places. This, in turn, leads to the very same community needing to find itself again, to isolate its landmarks in order to recognize and identify itself with a specific place, history, culture, society. In order to avoid this disorientation, the community needs to seek their roots, to revalue their past and memory, to restore the deepest social relations within better-shaped groups – never confined, nor isolated – more close-knit and united. The community needs a research that, from a geographical point of view, prompts the desire to have closer relations with the area, with its nature and its place; to get acquainted with their features and properties; to rediscover knowledgeable and virtuous relations between nature and man; to recover and learn the diversity and peculiarity of those same places and areas; to re-establish a “sense of place”, a devotion, and a feeling for one's own horizons on Earth.

Generally speaking, it is a matter of re-implanting a process of identification, claiming diversity and specificity, to which a great contribution is provided by the articulate complex of each cultural heritage, as it is inserted and localized within a certain area. Therefore, it would be advisable to preserve each piece of cultural heritage in all its shapes, to enhance it and to pass it over generations. Thus, the originality of a people and an area can be recovered or re-established, preserved and guaranteed – also by considering that this originality is representative of an indefeasible richness, i.e. culture, which takes different shapes in time and space, shapes that are disclosed through scientific aspects and through different group identities. Being a source of exchange, innovation, and creativity, cultural diversity is necessary for mankind just as much as biodiversity is necessary to every form of life. Cultural diversity is mankind's shared heritage; therefore it has to be acknowledged and asserted, through a far-sighted and appropriate vision.

In order to acknowledge and protect cultural heritage and identity, the first step is to undertake fundamental activities of documenting, registering and censusing, which imply not just a mere collection of data, but a historical evaluation as well, to be connected to a judgement of their value, and not just to a reworking of the past. It seems obvious that such activities should be the first step to be undertaken – in order to build a prior knowledge – through a systematic and solid methodology, so as to obtain tools to achieve a suitable state of preservation, protection, and enhancement of the environmental, social, historical, and cultural heritage. Moreover, it has to be pointed out that such knowledge should be a detailed and analytical one, i.e. on a local basis, which is not in connection with a dimensional concept of a small and peripheral somewhere, rather something viewed through a geographical perspective concerning a geographic space and a people, provided with significant specialties, and symptomatic differences.

In relation to this, an activity of productive and peculiar documentation can be conducted on travel literature in general, and specifically on travel literature on Sardinia, which, as far as the 19th century is concerned, is rather extensive and comparatively accessible to a wide audience, due to the increase in translations and reprints. Among other functions, these could play a leading role in recovering and protecting historical memory and identity, which in turn could be enhanced and protected by the safeguard of their connected environmental and cultural heritage. Also the regional Government of Sardinia appreciates heritage itself, as an inalienable resource that can be traced back and retrieved, if not even

located and recovered from a distant past, through travel writings.

Among the accounts gathered and conveyed by those who observed and represented the island and its inhabitants from several angles, often with high quality outcomes, Alberto Ferrero Della Marmora's works are worthy of particular attention. He authored a *Voyage en Sardaigne de 1819 à 1825* (1826, 1839-1840), and an *Itinéraire de l'île de Sardaigne* (1860). Also worth studying is M. Le Lannou's *Pâtres et paysans de la Sardaigne* (1941). These works stem from long stays in Sardinia, and show remarkable scientific insights, where nature and society, history and geography, places and economy, language and human kinds, territorial organization and demo-ethno-anthropological assets are systematically analysed and presented in detail. This is a precious resource for Sardinia, aiming to defend its cultural heritage against homologation and globalization, and re-establishing its own identity/diversity, while restoring continuity and communication between times and generations, linking and harmonizing past, present, and future. Ignoring one's own origins, like relinquishing awareness and subsequent elaboration, would mean having no future at all.

Several other writings were produced by Italian, English, French, and German people who visited the island for various reasons between the second half of the 18th century and the first decades of the 20th century, and who gave accounts on its natural and anthropic reality both to a European and a Sardinian audience. All this from an external point of view framing Southern Europe as a unique reality, from a point of view which was ethno-anthropological, naturalistic, political-economic, and social at the same time. A Southern Europe that the on-going tradition described through 'different' unknown lands, which were original and 'wild', uncontaminated and rich in resources, systematically and actually 'discovered' only in the 19th century by conscious voluntary and autonomous travelling experiences. These led to the disclosure of Sardinia, through the tracks, routes and contexts of the European traditional *Grand Tour* of the 17th and 18th centuries.

Exploring Sardinia became increasingly frequent for middle-class travellers, meeting their needs of study, entertainment, escape, and sometimes economic investments which were fostered by a more widespread supply of money, by the progress in transportation and communication systems, by an increased freedom of movement within a continent, Europe, willing to 'explore itself' in order to achieve complete control over its territory, to which some territorial realities actually seemed elusive. The new Italian national reality, after recently achieving governmental unity, could have overcome the atavistic fragmentation of its

territory; but on the contrary, it seemed to mark this new national entity and divide it among different social, economic, and cultural realities, caused by the various historical experiences the several areas of the peninsula had faced over the centuries.

Within such a context, Sardinia seemed to remain a marginal space – unknown and mysterious – for a long time, despite its becoming, during the 19th century, the destination of several journeys: an intentional destination at that, as it could be included neither by improvising an excursion within another itinerary, nor by arriving there by chance, but only by choosing it specifically. Such a choice resulted in considering the island as neglected by progress and civilization, according to the large majority of travellers, so different from Central and Western Europe; the island was referred to in relation to the responsibilities of the Piedmontese government, which seemed to be doing very little to make it advance and develop from a socio-economic point of view. Nonetheless, the island offered its generous, wild, and uncontaminated nature, and its long and unique history, where time seemed to have stopped, and where the laws of beauty, the sublime, the picturesque, and the exotic perfectly matched. Exploring Sardinia was a search for diversity, for primeval harmony between mankind and nature, for the stages or the routes of natural history, and a spirit of adventure, a sense of freedom, an escape from everyday life could thus be satisfied. But it was not just this. Indeed, it should be remembered that, first of all, Sardinia also came to attention as an economic space for the middle classes' investments, who used to request and fund journeys, and to gather information on potential resources to be collected, transformed and traded, as is emblematically demonstrated in the journey to the island (1884) made by R. Tennant “chiamato a far parte di una Commissione incaricata di studiare iniziative economiche in Sardegna [...] per ottenere informazioni autentiche circa le varie risorse della regione in materia di agricoltura, miniere, foreste, pesca, ferrovie, industrie ed il commercio nel suo complesso” [“who was asked to be part of a board in charge of studying economic initiatives in Sardinia [...] to gather first-hand information on the various resources of the island, as far as agriculture, mines, forests, fishing, railways, industries, and trade in general were concerned”] (2006, p. 29). Secondly, the political-military interest in the island cannot be underestimated, as it was expressed by foreign powers, such as, for instance, Britain, to which Sardinia represented an excellent base in the Mediterranean Sea. Indeed, Lord Nelson, who had been in La Maddalena between 1803 and 1805, heartily recommended keeping an eye on the French fleet blocked off in Toulon,

and who had hoped for the island to be acquired on several occasions.

Anyway, it should be remarked that Sardinia represented an ideal dimension for travellers, i.e. a historically and spatially ‘different’ dimension both for its insularity, which is one of the most evident in the Mediterranean Sea, and for its comparative distance from the continental mass and from the so-called ‘central’ locations, all of which made it a reality which was ‘distant’ even in time. This distance was also due to its socio-economic backwardness, which seemed to have ‘preserved’ it at an archaic stage, and to the poorly anthropized territory, which led a primeval and untouched nature to be still widespread, as a symbol of an ‘other’ world, pre-existing and alien to ‘civilization’, a world which was sought in order to come into contact with it.

On the island, it was possible to travel backwards in time while advancing in space, as it was archaic and primitive, with this adjective not always used in a negative sense by travellers, who meant it as a synonym of ‘genuine’, ‘natural’, or ‘authentic’. It seemed to them that people unanimously thought Sardinia to be the repository of a specific and peculiar culture, untouched by modernity. Indeed, all this was the outcome of observations stemming from the lesson taught by that same romantic historicism that had been a resolute supporter of the European nationalism, which, in turn, had found its expression in the search for origins, ethnical roots, traditions and folklore. Such a search considered the peculiarities and the spirit of several peoples who, just like the Sardinians, seemed to have left a “profonda impronta della loro identità sul nostro globo! Questa impronta non è ormai cancellata come si crede. La Sardegna è [...] il paese che meglio l’ha conservata” [“deep trace of their identity on our globe! Such a trace has never been deleted the way we think it has. Sardinia is [...] the country which has preserved it best”] (Domenech, 1997, p. 20). In addition, it was a search that had mobilized resources and people with diverse interests and projects, and that had prompted in particular 19th-century travellers, in accordance with the indications provided in the 17th-century *science de l’homme* by ethnography and anthropology, which had increasingly taken shape throughout the 19th century.

According to the new human sciences, as well as to the needs of European nationalism, travellers on the island started to carefully and extensively collect habits and customs, folklore traditions and uses, social organizations and knowledge, practices and rituals, language and institutions, cults and beliefs, feasts and ceremonies of the Sardinian people, who, “per la singolarità dei suoi costumi, per l’indipendenza dell’animo, per l’alta opinione di sé medesimo, per la sua ospitalità generosa e cordiale, forma da sé solo una nazione distinta che fa parte

della grande famiglia europea” [“for the uniqueness of their customs, the independence of their soul, their high opinion of themselves, their generous and warm hospitality, represent a distinct nation themselves within the great European family of nations”] (de Gregory, 1847, p. 4). Such a collection was surely stimulated by nationalisms and by the process of shaping national identities through the detection of diversity, but nonetheless it was carried out to satisfy scientific needs, in particular ones of social science, which was stabilizing its own assumptions just at that time, as mentioned above. Moreover, it has to be highlighted that ethno-anthropological observations were useful both to the agenda and the projects of the European political-economic powers, claiming their need to acquire fair knowledge about the peoples living in the Old Continent, a knowledge that was provided by travel literature.

This literary genre has contributed to retracing and developing a Sardinian historical memory, thanks to the surveyal of demo-ethno-anthropological heritage, in order to retrieve and preserve such an antique and peculiar culture. Furthermore, this same literature could not but highlight the existence of a considerable artistic and monumental heritage that was traced in the two most important Sardinian cities, but also in lesser towns and in some villages, with an utmost meticulous care, including painting, architecture, churches and cathedrals. It seems that the travellers’ attention was mostly caught by the archaeological sites and prehistoric *nuraghi* for their evident uniqueness, but also by the monumental sepulchres, as represented by the “tombs of the giants”, by the hypogean structures, sacred wells and temples, or by precursor stelae such as the menhirs.

Even the surveys on techniques, knowledge, working procedures and practices – in particular agriculture, farming and crafts – are useful to retrace the Sardinian socio-economic world, which was neglected by the Savoy government, leading to poverty and backwardness. Its adequate revaluation would be functional to recognize not only the origins and cultural identity in general, but also, in particular, to retrieve arts, crafts, skills and resources that have been either forgotten or despised by modernity. Such retrieval would be positively confirmed if it took historical memory and identity assets into proper account, and if “se come portatori di una eredità, di un patrimonio ereditato dal passato, vigili, sappiamo cogliere al varco le occasioni di realizzarne le possibilità rimaste inesprese” [“since bearing a legacy, a heritage from our past, we will be able to catch all the opportunities to fulfil their unexpressed potentialities”] (Quaini, 2006, p.106), which may have been either latent or ignored. This would be a favourable acknowledgement, especially for

those communities dwelling in rural and mountain territories, in small villages, in lesser towns, in hamlets and peripheral small towns in Sardinia, which have all increasingly lost their inhabitants and competitiveness, due to traditional activities disappearing and being outdated by the modern economy. Activities that could witness a new life for their socio-economic fabric – especially from a tourism point of view – by retrieving and increasing the heritage value, which could create new employment possibilities, revitalise areas while preventing their inhabitants from moving elsewhere, thus avoiding migration, abandonment and neglect.

Further meaningful records offered by travel literature, relating to contemporary initiatives of urban restoration and regeneration, refer to the two main Sardinian cities, in particular to the description and representation of Cagliari and Sassari, as well as their supposed antagonism. Cagliari is constantly mentioned as the “capitale della Sardegna” [“capital city of Sardinia”] (Domenech, 1997, p. 44), “la sua città principale e più bella” [“its main and most beautiful city”] (Corbetta, 1981, p. 298), as “dove pulsa la vita della Sardegna [...] il principale ganglio nervoso che anima l’isola” [where Sardinian life throbs [...] the main centre animating the island”] (Delessert, 2001, p. 111). Sassari, on the contrary, is seen in a subordinate position, therefore presented as the “seconda città della Sardegna” [“second Sardinian city”] (Domenech, 1997, p. 24). Both have been outlined by travellers through several features: their site; the structure of their districts – distinctively described; their architecture and monuments; the available services; their artistic, historical and architectural heritage; the features and occupations of their inhabitants; their feasts, ceremonies and diverse events; their social life, etc.; as well as the peculiarity of the territory around their original and central nuclei. Although travellers contributed some significant remarks, it was not a period where urban issues could be properly dealt with, like in some large and most developed European cities at the time, issues which would become largely widespread only after World War II, with the burst of urban agglomerations, the success of industrialization, the urbanization of the territory, and the progressive concentration of population in the cities.

Travel literature also provides rich and accurate observations on the Sardinian flora and fauna and on its forests and woods – which were heavily compromised by 19th century speculation on wood. Such observation would help to locate environmental traces, which could be useful to several local communities wanting to give a new value to their territory from a naturalistic standpoint, and introduce it to their tourists. To that end, travel writing also provides descriptions of several landscapes

and views – in line with Romantic inclinations – belonging to sites that could be given new value, and therefore considered in view of redeveloping the territory. Clearly, even in this case, the ability and the will of the local communities are fundamental to promoting their own cultural and environmental potential, as well as their heritage of identity and peculiar resources, in terms of quality and originality, according to a common life project which, drawing from the past and living the present, will be invariably oriented towards the future. Therefore, it is those local communities that – due to the chronic lack of public funds and the related limits of intervention by the private sector – should aim to revive and give new value to their own heritage and territory, persuading institutions about the high value of their projects.

References

- Anonimo Piemontese. *Descrizione dell'isola di Sardegna (1759)*, Cagliari: Comune di Cagliari, 1985.
- Artizzu, Lucio. *Lord Nelson e la Sardegna*. Cagliari: Edizioni della Torre, 2008.
- Bechi, Giulio. *Caccia grossa. Scene e figure del banditismo*. Nuoro: Ilisso, 1997.
- Bennet, James H. *La Corse et la Sardaigne. Etude de voyage et de climatologie*. Paris: Asselin, 1876.
- Bianchi, Elisa (Ed.). *Geografie private. I resoconti di viaggio come lettura del territorio*. Milan: Unicopli, 1985.
- Borofsky, Robert. *L'antropologia culturale oggi*. Rome: Meltemi, 2000.
- Botta, Giorgio (Ed.). *Cultura del viaggio. Ricostruzione storico-geografica del territorio*. Milan: Unicopli, 1989.
- Bresciani, Antonio. *Dei costumi dell'isola di Sardegna comparati cogli antichissimi popoli orientali (1850)*. Nuoro: Ilisso, 2001.
- Carta, Maurizio. *L'armatura culturale del territorio. Il patrimonio culturale come matrice di identità e strumento di sviluppo*. Milan: FrancoAngeli, 1999.
- Ceawford Flicht, John E. *Mediterranean Moods. Footnotes of travel in the islands of Mallorca, Menorca, Ibiza and Sardinia*. London: Grant Richards, 1911.
- Cecchi, Roberto. *I Beni Culturali. Testimonianza materiale di civiltà*. Milan: Spirali, 2006.
- Claval, Paul. *La geografia culturale*. Milan: DeAgostini, 2002.
- Corbetta, Carlo. *Sardegna e Corsica*. Milan: Brigola, 1877.
- Cuchen Denys. *La nozione di cultura nelle scienze sociali*. Bologna: Il

- Mulino, 2006.
- D'Austria - Este, Francesco. *Descrizione della Sardegna (1812)*. Cagliari: Edizioni della Torre, 1993.
- Davey, Mary. *Iconusa; or Pleasant reminiscences of a two years residence in the Island of Sardinia (1861)*. Sassari: Magnum, 2002.
- De Gregory, Gaspare. *Isola di Sardegna*. Venice: Antonelli, 1847.
- Delessert, Edouard. *Six semaines dans l'île de Sardaigne (1855)*. Sassari: Delfino, 2001.
- Dematteis, Giuseppe, Fiorenzo Ferlaino. *Il mondo e i luoghi: geografie delle identità e del cambiamento*. Turin: Istituto di ricerche economico-sociali del Piemonte, 2003.
- Domenech, Emanuel. "Berges et bandits. Souvenirs d'un voyage en Sardaigne (1867)". In *Viaggiatori di Sardegna*, edited by Francesca Pineider. Cagliari: Demos, 1997, pp. 13-130.
- Edwardes, Charles. *Sardinia and the Sardes (1889)*. Nuoro: Ilisso, 2000.
- Fabietti, Ugo, Vincenzo Matera. *Memorie e identità. Simboli e strategie del ricordo*. Rome: Meltemi, 1999.
- Forester, Thomas. *Rambles in the Islands of Corsica and Sardinia, (1858)*. Cagliari: Condaghes, 1996.
- Fuos, Joseph. *Nachrichten aus Sardinien von der gegenwärtigen, (1780)*. Nuoro: Ilisso, 2000.
- Grasselli Barni, Annibale. *A caccia in Sardegna*. Sassari: La Nuova Sardegna, 2004.
- Hannerz, Ulf. *La diversità culturale*. Bologna: Il Mulino, 2001.
- Incani Carta, Clara. "Il viaggio in Sardegna. Spunti di riflessione geografica". In *Studi di geografia e storia in onore di Angela Terrosu Asole*, edited by Luisa D'Arienzo. Cagliari: AV, 1996, pp. 149-187.
- Magnaghi, Alberto (Ed.). *Il territorio dell'abitare. Lo sviluppo locale come alternativa strategica*. Milan: FrancoAngeli, 1990.
- Magnaghi, Alberto. *Il progetto locale*. Turin: Bollati Boringhieri, 2000.
- Mantegazza, Paolo. *Profili e paesaggi della Sardegna (1869)*. Sassari: La Nuova Sardegna, 2004.
- Mori, Alberto. *Sardegna*. Vol. XVIII of the collection "Le Regioni d'Italia", founded by Roberto Almagià, directed by Elio Migliorini. Turin: UTET, 1966
- Posse Brazdova, Amelie. *Interludio di Sardegna*. Sassari: La Nuova Sardegna, 2004.
- Prunas Tola, Giuseppe. *Il Barone di Maltzan in Sardegna*. Milan: Brigola, 1886.
- Quaini, Massimo. *L'ombra del paesaggio. L'orizzonte di un'utopia conviviale*. Reggio Emilia: Diabasis, 2006.

- Scaramellini, Guglielmo (Ed.), *La geografia del territorio. Raffigurazioni individuali e immagini collettive nei resoconti di viaggio*. Milan: Unicopli, 1993.
- Schweinfurth, Georg A. *Journal de mon excursion à travers l'île de Sardaigne (1884)*. Cagliari: Le Volpi, 1992.
- Sciolla, Loredana. *Sociologia dei processi culturali*. Bologna: Il Mulino, 2007.
- Sibley, David, Peter Jackson, David Atkinson, Neil Washbourne (Eds.). *Cultural Geography: A Critical Dictionary of Key Concepts*. London: Tauris, 2005.
- Smyth, William H. *Sketch of the present state of the Island of Sardinia, (1828)*. Nuoro: Ilisso, 1998.
- Tennant, Robert. *Sardinia and its resources (1885)*. Cagliari: Edizioni della Torre, 2006.
- Thomas, John E. *Sardinia and Rome*. London: Macmillan, 1925.
- Tyndale, John W. *The Island of Sardinia (1849)*. Nuoro: Ilisso, 2002.
- Valery, Antoine C. P. *Voyages en Corse, à l'île d'Elbe et en Sardaigne, (1837)*. Nuoro: Ilisso, 1996.
- Vallega, Adalberto. *Geografia culturale. Luoghi, spazi, simboli*. Turin: UTET, 2003.
- Vuillier, Gaston. *Les îles oubliées: Les Balears, La Corse et la Sardaigne (1893)*. Nuoro: Ilisso, 2002.
- Wagner, Max L. *Das ländliche Leben Sardiniens im Spiegel der Sprache Kulturhistorisch-sprachliche Untersuchungen (1921)*. Nuoro: Ilisso, 1996.
- *Immagini di viaggio dalla Sardegna*. Nuoro: Ilisso, 2001.
- *La lingua sarda. Storia, spirito e forma (1950)*. Nuoro: Ilisso, 1997.
- Zarrilli, Luca (Ed.). *Lifescapes. Culture Paesaggi identità*. Milan: FrancoAngeli, 2007.

Appendix A

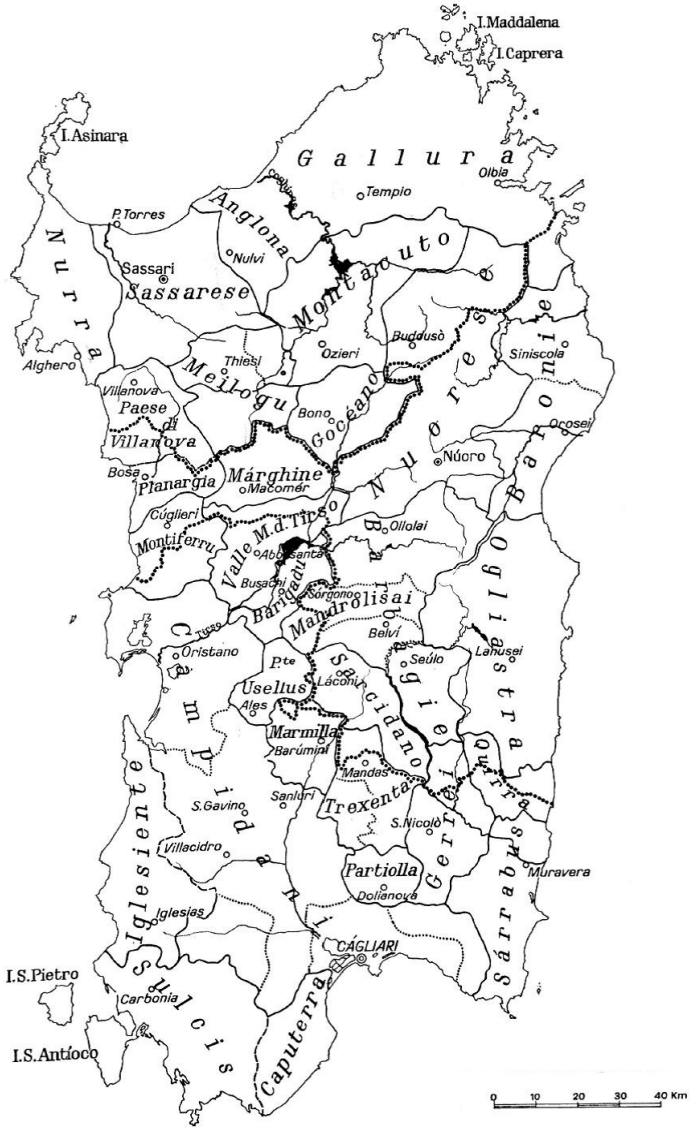


Figure 1.1. Historical-Geographical Regions of Sardinia
Source: Mori, A. (1966)

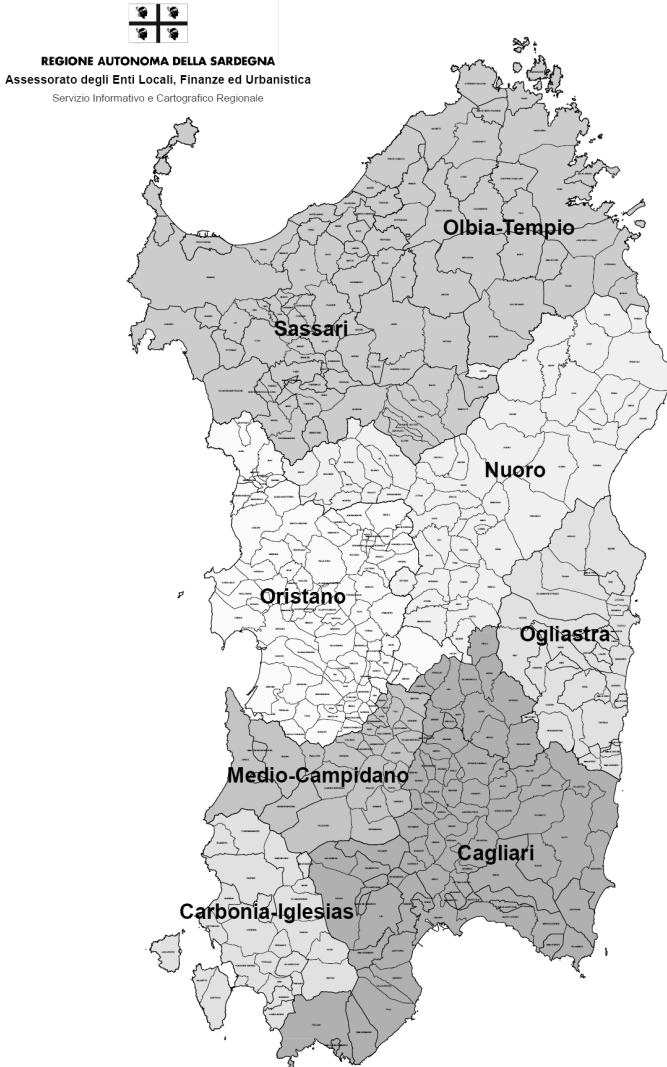


Figure 1.2. Administrative map of Sardinia
Source: Regione Autonoma della Sardegna, 2014

PART I
ELEMENTS

CHAPTER TWO

“GEODIVERSITY” OF SARDINIA

ANTONIO FUNEDDA

The island of Sardinia is a 30 km-thick crustal block, N-S oriented, located at the boundary between two basins made by stretched and thinned continental crust up to the pelagic crust: the Central (Tyrrhenian sea) and the Western Mediterranean (Sardinia Sea). Its “geodiversity” has fascinated many geologists since the mid 19th century, because it represents a puzzle of very different geological features: the tectonic, the stratigraphic, and the palaeontological ones for instance, assembled over more than 500 million years. Furthermore, from the historical point of view, the geological importance of Sardinia for human beings, because of the presence of important ores, mainly metal ones, could be dated back up to the Phoenician civilization and even to the 2nd millennium B.C.

This marked geological diversity, which is evident also in the remarkable diversity of its landscape, is demonstrated by the presence of rocks from every Period of the Phanerozoic Era, which onshore crop out in an island which is about 24,000 square kilometres wide (Carmignani et al. 2008; Carmignani et al. 2012). These rocks prove some of the most important geological global events occurring in the last 540 Ma and that can be summed up in the following description: the evolution of the passive margin of Gondwanaland palaeo-continent after the disruption of the older one, the 1 Gigayear old Rodinia supercontinent (Pre-Cambrian - Lower Palaeozoic), the opening and closure of the Rheic ocean (Middle Palaeozoic), the Variscan orogeny and the consequent assembling of Pangea (Upper Palaeozoic-Lower Mesozoic), the opening of the Tethys ocean (Mesozoic) and its closure related to the Alpine orogeny (Upper Mesozoic-Lower Cainozoic), the raise of the Algero-Provençal and Corsica basins (Middle Cainozoic) and, finally, the still on-going opening of the South Tyrrhenian basin (Figure 2.1).

In the island, in synthesis and with a rough oversimplification, two big ensembles can be identified:

i) a *Variscan crystalline basement* made up of rocks sedimented during the evolution into the passive margin, the origin and disappearance of the Rheic Ocean and the consequent new passive margin, that were deformed and metamorphosed during the Carboniferous period and then intruded on by a huge amount of granitoids related to the subduction and continental collision between Gondwanaland in the south and the Armorican Terranes Assemblage in the north (Rossi et al. 2009).

ii) A *post-Variscan cover*, not affected by regional metamorphism, constituted by several composites, thick volcano-sedimentary successions that can be related to the Tethys and Alpine-Apennine evolution, unconformably lying on the Variscan basement and separated by regional angular unconformities (Carmignani et al. 2001).

The Variscan basement

The Variscan basement is characterized by a polyphasic deformation and metamorphism related to the continental collision and increasing from SW to NE. A tectonic-metamorphic zoning, typical of collisional chains, is still recognizable (Carmignani et al. 2001): i) an External zone, considered the foreland of the chain, crops out in the SW (Sulcis-Iglesiente) and is affected by a very low metamorphic grade; ii) a Nappe zone, characterized by a stack of several tectonic units internally deformed with low-grade metamorphism, in turn subdivided into the External nappes (Sarrabus unit, Gerrei unit, Sarcidano unit, Arburese unit, etc.) and the Internal nappes (Barbagia unit, Anglona units, Nurra units, etc.); finally iii) an Inner zone (Gallura, northern Anglona, Island of Asinara), highly deformed under a mid-grade metamorphism. Both in the foreland and in the Nappe zone (mainly in its External nappe zone) the lithostratigraphic succession can be subdivided into three main synthems (Carmignani et al. 2001): 1) a Cambrian-Lower Ordovician succession (mainly siliciclastic except for the thick Cambrian limestone in the Foreland) cut at the top by an angular unconformity well recognizable in the field (“Sardic unconformity”).

Some of the oldest Phanerozoic fossils (Archeocyata and Trilobita) are in the Foreland zone (Sulcis-Iglesiente) (Pillola 1990); 2) a Middle Upper Ordovician calc-alkaline volcanic suite lays unconformably to this, but just in the Nappe zone (Oggiano et al. 2010), later followed by an Upper Ordovician terrigenous succession (Leone et al. 1991), a Silurian black shale and Devonian-Lower Carboniferous carbonatic deposits (Corradini et al. 1998); 3) finally, a Culm-like siliciclastic deposit of Lower Carboniferous age can be found on this succession. By contrast, in the Inner zone, the lithostratigraphic succession cannot be reconstructed, since

for the combined effect of deformation and metamorphism the most characteristic rocks are micaschists, paragneisses, orthogneisses and migmatites, but the ages of protoliths are unknown, except for some eclogite for which an age of 800 million year has been suggested (Oggiano and Di Pisa 1992).

The oldest deformation event recognized in the Palaeozoic basement of Sardinia is marked by the Sardinic nonconformity taking the name of Sardinic phase, recognizable also in other segments of the South Variscan Realm (i.e. Pyrenees), which involved rocks up to Lower Ordovician that were generally folded and faulted in a non-metamorphic condition. The relationship between this tectonic and complex evolution of the peri-Gondwana terranes, of which the current Sardinia basement was part, is still poorly defined (von Raumer et al. 2012; Gaggero et al 2012).

Then, the whole succession up to Lower Carboniferous was involved in the Variscan orogeny and deformed with ductile and brittle-ductile thrusts developed with a tectonic transport direction “top towards the SW”, and low- to high-angle normal faults developed during the collapsing of the thickened crust that occurred in the final orogenic stages (Conti et al 2001; Funedda 2009). This last phase was partially concurrent with the emplacement of a composite plutonic complex, extended in an outcrop for more than 6,000 square km, whose age ranges from Upper Carboniferous to Permian, the dyke complex and development of a volcano-sedimentary complex of the Upper Carboniferous-Lower Triassic age (Casini et al. 2012).

The Variscan crystalline basement is the bone-structure of onshore Sardinia, and forms different landscapes as a product of more recent events. For this reason it constitutes many flat areas, generally in the southern part, as a consequence of several erosive events occurring in different periods. Besides the so called “Hercynian peneplane” in the Gerrei and Sarcidano, on which the Mesozoic cover rests, other flat surfaces involved both Variscan and Mesozoic (again in the Gerrei-Sarcidano zone), highlighting a post-Mesozoic erosive event. Again, the highest areas, in the Gennargentu (up to 1,800 m a.s.l.), are made up of the Variscan basement, because of recent (Pliocene) uplift and erosion. North Sardinia is deeply characterized by the typical granitoids landscape, with rounded shapes produced where the erosion of the intrusive rocks was influenced by fractures related both to the low cooling of the plutons during their emplacement, and to the Cainozoic brittle tectonics.

It should be underlined that the metamorphic basement hosts large metallic ore deposits, bearing different kinds of sulphides (with zinc, lead,

barium, but also silver and, though not mined, gold) of “sedex type” or related to hydrothermal fluids coming from the late-orogenic plutons (Marcello et al. 2008). They were intensely exploited up to the sixties of the 20th century, but now mines have all been decommissioned and the several mine districts (Sulcis-Iglesiente, Arburese, Sarrabus, Nurra, just to quote the most important ones) are characterized by the occurrence of a huge volume of tailings that are potential sources of pollution for the surrounding environment.

Post-Variscan covers

Nonconformable to the Variscan crystalline basement, there is a composite and thick Permian to Mesozoic and Cainozoic volcano-sedimentary succession. It consists of several sedimentary and volcano-sedimentary complexes, separated by angular unconformities, linked to the evolution of the present-day Mediterranean area. Following geodynamic criteria, the following five geological ensembles could be identified:

i) The oldest deposits non-affected by the Variscan orogeny are clastic continental sediments with pyroclastites and lava flows of the Late Carboniferous to the Permian age (Cassinis et al. 1999). They are hosted in small basins scattered around the whole island, generally in depressions bounded by normal to transtentional faults that enhance structural lows inherited by the Late Variscan deformation (Pittau et al. 2008). These deposits could be basically considered as the “Variscan molassa” (i.e. the product of the destruction of the relief built up after the continental collision and consequent erosion).

ii) Later on, with the drifting of the Pangea and the opening of the Tethys Ocean, an “Autochthonous cover of the ancient South European passive margin” developed. It consists of transitional to marine successions of Middle Triassic-Lower Eocene age. Among them the Mesozoic carbonatic succession that crops out in the NW (Nurra), SW (Sulcis), central (Sarcidano) and E (Baronie and Supramonte) should be particularly considered. This succession shows the typical facies of the ancient S-European margin, different from the coeval formations cropping out in the Alps and the Apennine that were deposited on the opposite southern margin of Tethys instead, along the palaeo N-Africa margin.

Three different Mesozoic sub basins have been described so far, with differences in the lithostratigraphy that also highlight really different landscapes. The most complete succession appears in the Nurra (Jadoul et al. 2010), starting with the terrigenous to carbonatic up to evaporitic sediments of the Middle-Upper Triassic, from continental to marine, up to

340 m thick. Later, alternating types of dolostone and limestone and less marls and shale deposited from the Jurassic to the Upper Cretaceous crop out. They are up to 1,300 m thick and witness a progressive change from littoral to open shelf environment, with an erosive angular nonconformity between the Lower and Upper Cretaceous, marked by bauxite ore deposits related to a marine regression probably linked to the early Alpine tectonics. Two systems of upright kilometre-sized folds, gently close, with a rounded hinge, involved the Mesozoic succession. The landscape of the NW side of the island is deeply influenced by these rounded reliefs (Monte Doglia, M. Timidone, etc.). Thus in the Nurra area there are isolated rounded hills, 100-200 m above the mean topographic level, that correspond to the antiforms, separated by flattened areas, generally the synforms covered by the Cainozoic cover.

In the eastern zone (Baronie and Supramonte) the succession starts from the Middle Jurassic up to the Upper Cretaceous, with coarse arenites at the base, then dolostone and finally some carbonatic formations that again show the progressive change from littoral to an open shelf environment (Dieni and Massari 1987). They are about 700 m thick. In the Supramonte and Monte Albo, the landscape is strongly influenced by blocks with a monoclinical, east-dipping attitude, deformed by NE-SW to N-S trending left-sided strike-slip faults and related to north-trending folds (Oggiano et al. 2009). The landscape is thus really varied, with abrupt high cliffs alternating with some flattened versants, often reassembling a Dolomite-like landscape (although reliefs do not reach 1,300 m a.s.l.).

In Central Sardinia the Mesozoic cover is reduced to several flattened, mesa-like outliers (local name: "Tacchi"), consisting of dolostone and limestone less than 100m thick (Costamagna and Barca 2004), that testify to an original widespread platform now only preserved in small pieces rejected by Cainozoic normal and strike-slip faults.

All the above-described carbonatic succession is affected by karsting, strongly developed in the eastern side (Supramonte) where their macro-features have been thoroughly investigated for several years by speleologists. These thick successions are also noteworthy for water resources, still not adequately investigated for an appropriate use for civil and industrial purposes.

The Mesozoic succession is unconformably covered by a Lower Eocene succession, regressive from littoral to paralic up to the continental environment in the SW (Sulcis-Iglesiente), where the most outstanding formation is the Ligniferous, a carbonaceous paralic succession, mined for lignite. In the central east a littoral to marine succession prevails, made