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Architectural Draughtsmanship

From Analog to Digital Narratives

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Graphical Analysis of the Landscape in and Around the San Francisco de Borja Fontilles Sanatorium

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Abstract San Francisco de Borja's Sanatorium of Fontilles was founded in 1905 for the treatment of leprosy. In its current configuration, the Sanatorium consists of a set of 29 buildings from different ages and styles. This large heritage has been promoted to join the *International Coalition of Historic Sites of Exclusion and Resistance* project, and aims to declare it as Heritage Site by UNESCO. The graphical analysis allows the definition of the set and the characterization of landscape, as a previous step to the formulation of a '*Landscape Program*' that articulates the set of measures and actions in order to preserve, improve and enhance the outstanding quality of the set.

Keywords Graphical analysis · Landscape interpretation · Digital model elevation

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1 Introduction

Within the framework of the rich architectural tradition that caters to the needs of medicine, there is a very singular case, namely the treatment of infectious diseases. They were hospital complexes that called for the complete isolation of the patients, the only guarantee to stop the propagation of the diseases, and with no hope of patients being cured, were synonymous with strong social rejection. One of the most extreme cases since these hospital complexes used to isolate patients with an incurable illness were created was leprosy.

The isolation strategy, seen as the only way to eradicate the disease and avoid it spreading throughout the endemic areas, continued through until the end of the 19th century (Alcaide González and Rafael 1999; Bonastra Tolás and Joaquim 2006). Even in 1909, at the Second International Leprosy Congress held in Bergen, it was recommended that through segregation, children should be separated from their leper parents as early as possible. The suggestion was to isolate the ill in specific areas, the underlying directive being to isolate as far as possible an incurable disease, providing patients with basic levels of hygiene and healthcare, while at the same time establishing social structures and creating microsocieties where patients would be able to live a life that was as close to normality as possible.

This is the case of places like the San Francisco de Borja Fontilles Sanatorium in Spain, surrounded by the ever-present boundary wall, not to mark the limitations of the complex, but rather to stop patients from leaving and cut them off from having any interaction with the outside world. This was also true for Spinalonga Island, located on a former Venetian island fortress or the *Leprosario Nacional de Rovisco Pais* (Portugal), and located in the middle of an isolated forest.

Once a cure was found for the disease, these sites went into a slow decline, which at times resulted in the complex being fully abandoned, and in the case of Spinalonga Island, it led to the whole of the residential building disappearing completely. Elsewhere, in sites such as the Fontilles Sanatorium, the buildings have lasted the test of time, and continue to be used as was their original purpose within the framework of development cooperation programmes, applying their experience and expertise in countries where diseases that lead to social exclusion and are associated with poverty are still quite prevalent.

This is why in 2012, an initiative was launched to draw attention to these spaces and to promote, disseminate and preserve them. The *International Coalition of Historic Sites of Exclusion and Resistance*,¹ organised by the IDEA (*International Association for Integration, Dignity and Economic Advancement*),² the aim of which is to create and international network of leprosy heritage sites; sites that are

¹The International Coalition of Historic Sites of Exclusion and Resistance promotes the recovery and promotion of sites of exclusion <http://www.leprosyheritage.com/>.

²The IDEA (*International Association for Integration, Dignity and Economic Advancement*) is an advisory Non-Governmental Organization of the UN Economic and Social Council (ONG) <http://www.idealeprosydignity.org/>.

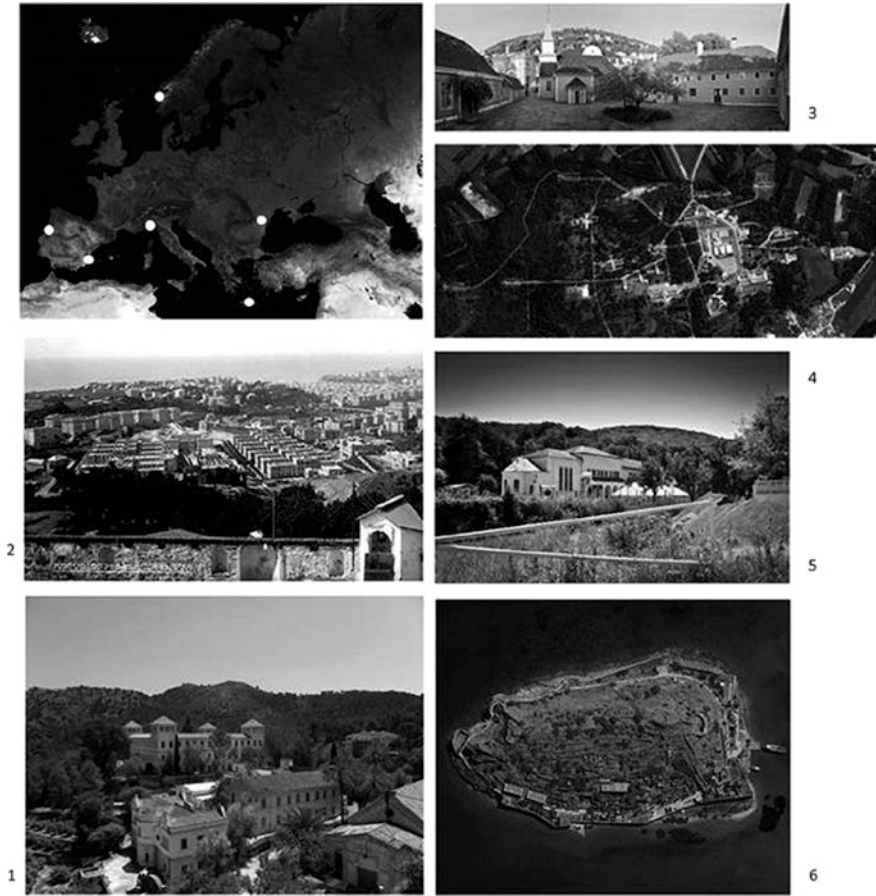


Fig. 1 Leprosy heritage sites in Europe: 1 Fontilles Sanatorium (Spain); 2 San Martino Leprosy Hospital in Genoa (Italy); 3 St. Jørgen Hospital in Bergen (Norway); 4 Leprosaria Nacional Rovisco Pais (Portugal); 5 Tichilesti Leper Hospital (Rumania); 6 Spinalonga Island in Crete (Greece)

characterised by their importance in getting an overall understanding of this phenomenon, and whose specific heritage assets enables us to appreciate their importance as sites that warrant being declared a UNESCO World Heritage Sites. Currently, the *International Coalition of Historic Sites of Exclusion and Resistance*, has identified more than 100 sites in 60 countries, 18 of them, 5 of which are in Europe, are considered significant at a global level (Figs. 1, 2).

2 The San Francisco de Borja Fontilles Sanatorium

The San Francisco de Borja Fontilles Sanatorium comprises a set of buildings founded in 1905 to treat leprosy (Bernabeu Mestre 1991). Currently, the heritage complex in Fontilles comprises a total of 29 buildings from different time periods and architectural styles, even though the number and the purpose for which the buildings were used have undergone a number of changes since it was first opened over a century ago, with a variety of different demolition and rebuilding activities, and this gradually changed the architectural configuration and how it blended into the landscape.

The hygienic and climatic conditions that this site and its buildings should comply with according to medical experts should be as follows: located in dry areas, separated from the sea and a potential for farming land to make them self-sufficient, in addition to a fresh water supply in sufficient quantities for a new sanatorium, with a number of pavilions, a large garden area and allotments. The search for a suitable spot on which to build the complex which began in 1902, lasted just over a year, when the decision was made to build the sanatorium in an isolated valley located within the municipalities of Murla, Orba and Laguar (Chias Navarro 2013). Father Ferris, the main instigator behind the initiative, stated that “it would be difficult to find anywhere in Spain that so perfectly fits its purpose”, while at the same time, praising the plant life and vegetation of the valley with its abundant water supply and wonderful views from the valley towards the sea (Bonilla 2011) (Fig. 3).



Fig. 2 San Francisco de Borja Fontilles Sanatorium. Partial view of the valley and its buildings

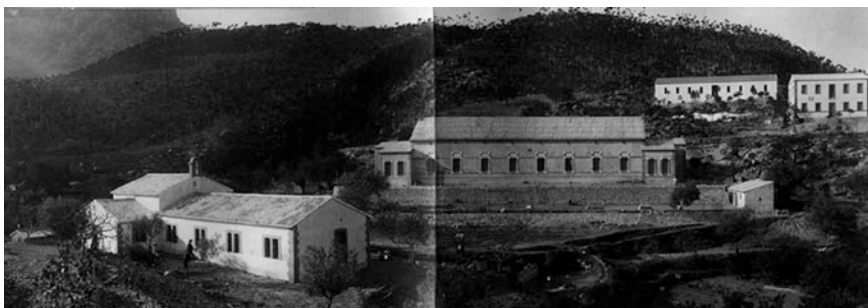


Fig. 3 The founding of Fontilles. Distribution of the blocks (approx. 1906)

The medical requirements were in line with way of thinking at that time for this type of building, namely erecting independent blocks to ensure that patients were isolated, separating patients from the staff, and the men from the women.

The first blocks were opened in 1906, but the complex underwent a constant series of expansion and renovation projects, which went practically uninterrupted until the 1960s, at which point it had acquired the look that we now see today (Pérez Igualada 2013).

3 Landscape Study of the Complex. Heritage Assets of the Landscape

The architectural sites that are part of the *International Coalition of Historic Sites of Exclusion and Resistance*, boast a rich material heritage comprising the buildings themselves plus their integration into the urban or country landscape of their surroundings.

In the case of the Fontilles Sanatorium, the modest buildings that are part of the complex acquire a different heritage dimension when they are part of a complex that is intimately linked to the surrounding area. The valley where the sanatorium is located, as seen today, is the result of process of transformational landscaping that goes far beyond the original intentions of the founders of the complex and of the original architects that shaped it (Recatalá and Sánchez 1996). It is a result of the daily activities carried out by the patients, and this desire to create for them a social environment where they could live a normal life as far as possible. The complex was conceived as a microcity to satisfy the needs of a population that was unable to leave the confines, with a church, theatre, laundry, carpentry workshop and even its own cemetery.

The hillsides and dells were turned into allotments and animal pens and were even replanted with trees to turn a Mediterranean valley of low brush into the woodlands that we see today, where in addition to the indigenous plant life, we also see araucarias. The re-forestation was just another one of the jobs given to the patients, the scale of which can be seen in the words of Rafael Ferris, brother of the founder and a forestry engineer, who in 1922 said "... work continues with the tree planting, where each year sees the planting of a variety of different types of tree that are suitable for this soil. Up to now, we have planted 4000 Aleppo pines ... 100 stone pines, 100 casuarinas and 100 eucalyptus ... 40 strawberry trees and hundreds of rosemary shrubs around all the borders for decoration and of course, the hedge ...".³

The research project aims to carry out a comprehensive graphical analysis of the natural surroundings and of the value of the landscape at the Fontilles Sanatorium. The location of the pavilions in the Laguar Valley was in response to both topographical criteria and the suitability of the landscape for both functional and

³Fontilles Magazine. January 1922, p. 2284.

sanitary reasons. The aim is to examine the architectural and structural aspects such as the sun exposure and the ventilation of the pavilions and their suitability given their particular medical requisites, as well as the more general aspects such as the spatial planning of the land, the circulation of people and how they relate to the uses and functions of the different buildings over the course of the years. The idea is to accurately define the structure of the terraces, gardens, irrigation systems and other man-made spaces, and then to generate a database containing the primary elements of the architectural and natural heritage assets of the complex (Fig. 4).

4 Implementation Strategies, Location Selection

The site where the Fontilles Sanatorium complex was set up is configured, from its access by road from the CV721, and the set of buildings that occupy the valley which can be accessed via a single road. The valley acts as an autonomous unit from the functional and visual perspective, and favours as such this type of spatial segregation from its immediate surroundings. Its proximity to the inhabited urban hubs of Orba and El Campell, is negligible due to its choice of location where spatial segregation is achieved by the topography and bolstered by the construction of a boundary wall around the complex. As for the valley where the Fontilles Sanatorium is located, there are, given its spatial enclosure, slopes in all directions, with those facing east being the steepest. This favours the position of the very first buildings of the complex, taking advantage of the east facing slopes, not only for its better topographical conditions, but also for the added advantage of receiving a direct sea breeze, as the building is east facing on the hillock and the source of the stream that flows along the valley floor (Fig. 5).

The north-south orientation of the buildings favours the reception of solar radiation on the East-West façades, while a sufficient gap between the buildings stops the shadow of one being cast over another. The graphical analysis of the exposure to sun of the valley slopes was carried out using the gvSIG_Desktop software. In order to detect areas that are excessively shady, and not suitable for the development of the hospital programme, irradiation maps were obtained using the Digital Elevation Model provided by the Valencia Cartographic Institute. The Digital Elevation Model shows the topography of the valley with a resolution of 1 point/m². The software used produces a raster graphic in tones of greys, where the tone corresponds to the total number of hours of sun over a specific time period. In order to be able to study the exposure to sun, two different shade maps were created; one corresponding to the summer, the other to the winter.

The solar radiation maps show that during the summer, that the exposure to sun of the whole valley is acceptable, borderline excessive, given that the solar height during this period limits the amount of shadows cast by the hills that surround the valley. With the solar radiation map for the winter period, on the other hand, it can be seen that although there is a certain fall in the amount of exposure to the sun during the winter, the sun exposure conditions of the east slope, where the buildings

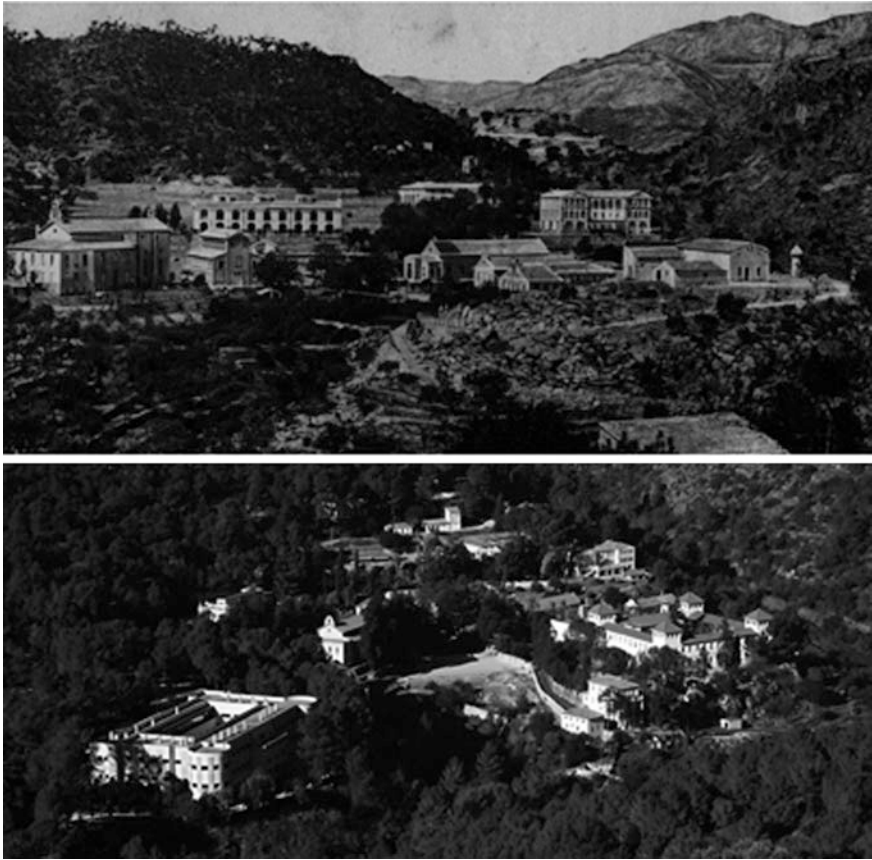


Fig. 4 The process of “landscape creation” via the transformation of the vegetation of the valley after the Fontilles Sanatorium was first founded (approx. 1920) and a present view of the valley

were constructed have values that are in keeping with the medical and hygienic requirements of the hospital programme (Fig. 6).

The original nucleus of the Fontilles Sanatorium was built on the east slope, and the buildings it comprised of; the guesthouse, the Joaquín Ballester Residence, the Laundry House, have a predominantly north-south orientation, running horizontal to the slope. As the nucleus grew, it included the building of a Church, the Theatre, the House of the Volunteer Sisters, and these new buildings were added to the original complex using mechanisms to ensure that formal and spatial continuity was maintained. These mechanisms comprised a system of paths, and the building of terraces to make the most of the farming potential of the valley.

The aim of the system of paths was to generate, as far as possible, an internal network within the complex with easily manoeuvred slopes for both vehicles and pedestrians, giving a certain unity to the complex, interconnecting all the buildings,

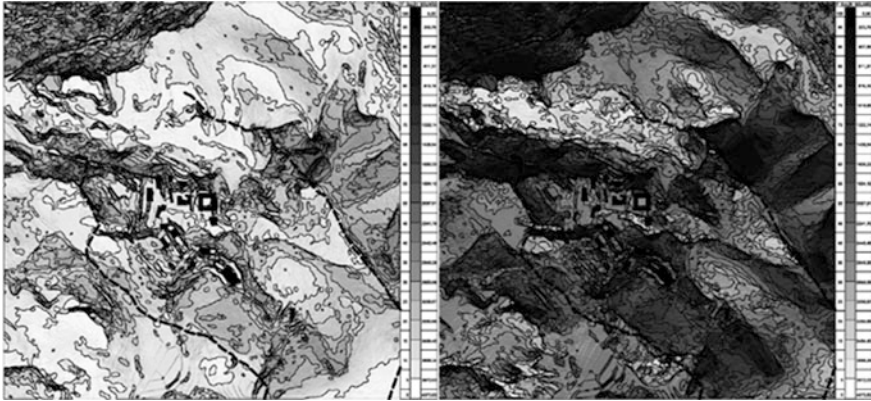


Fig. 5 Irradiation maps corresponding to the summer and winter seasons. Scale: 5000 scale



Fig. 6 Section of the Fontilles valley with the buildings on the east slope

while buildings in the later stages of growth, were somewhat remote from the nucleus. The other element that allows us to understand the mechanisms for occupying the valley and its process of anthropisation are the system of terraces that were used for farming and the irrigation channels for watering them. In this way, the land implementation strategies at the Fontilles Sanatorium stemmed from a combination of concepts based on hygiene and landscape issues, giving it an extremely unique heritage asset status.

5 Landscape Units, Visual Impact and Perception of the Complex

The visual perception of the complex comprising the natural scenery and the buildings that are part of the Fontilles Sanatorium has a unitary nature in how it is perceived, forming a so called *Landscape Unit* (Quijano de Rincón et al. 2013) given its particular autonomy from its immediate surroundings.

From the perception perspective of the complex, the relief of the land means that perception from the outside is kept to a minimum. Nevertheless, the complex,

especially the older buildings, enjoy great views to wards the sea. The line of the valley where the sanatorium is built is such that you can not get a unitary perspective of it until you are actually within the complex. The views from the interior allow one to see the valley walls, with the boundary wall encroaching upon the visual field.

In order to determine these visual relationships, we relied on a viewshed study using gvSIG_Desktop software on the Digital Elevation Model provided by the Valencia Cartographic Institute. Viewsheds can be determined by locating on the Digital Elevation Model the specific point from which you wish to check the visibility. The software used outputs a raster file where each pixel that represents a portion of the land has a value of 0, if it is not visible, and a value of 1 if it is visible. To analyse the visibility of the complex formed by the valley, a path was defined starting at the entrance to the premises, and ends just in front of the Padre Ferris Hospital. The visibility of the itinerary was analyzed based on 25 points, integrating all the raster images into a single file. The shade of grey of the archive indicates the frequency with which the specific pixel is seen, where the values closest to white indicate a greater frequency of visibility. Lastly, the resulting image has been superimposed on a 1:5000 scale map supplied by the Spanish National Geographic Institute (Fig. 7).

To the images acquired through this process, contextualized to a regional scale (1:50,000 scale) and on a municipal scale (1:5000), one can appreciate the two mechanisms used to configure the perception of the complex and define its visual impact.

In the regionally scaled image, it can be seen that the interior of the valley is represented by a north-east facing opening providing wide views. The territory perceived from within the valley extends across the flood plain, stretching as far as Denia and the foothills of the Montgó nature reserve. Nevertheless, there are no points in close proximity to the complex from where the interior of the valley can be observed. This implies that the inside of the complex has views of the outside, while on the contrary, the vision from the interior of the valley is made difficult by the distance of the points from where the valley is observable.



Fig. 7 Viewsheds towards the exterior of the Fontilles Valley. 1:50,000 scale. Viewsheds from the interior of the Fontilles Valley. 1:5000 scale

In the municipal scaled image, it can be seen that the landscape unit defined by the Fontilles Valley presents with a high degree of autonomy, given that the areas marked as visible are continuous, the upper limit of which coincides with the position of the boundary wall. Within the walled compound, two distinct, invisible areas can be seen which are visually disconnected from the landscape unit: the southern limit of the complex, which is south-facing, and the bottom of the gully, which, given the slope of the hillsides, can not be observed. As such, the interior of the complex is practically invisible from its immediate surroundings. The only views of the interior of the valley are from points in the far distance, as appears on the regional scale visibility plan.

The fact that the valley has a practically enclosed landscape unit, with views towards the outside, but difficult to observe caters to the needs of a hospital complex where the patient care programme requires isolation from the surrounding area, while being able to see the sea and benefit from the sea breezes.

6 Diachronic Study of the Evolution of the Fontilles Landscape

The abundance of photographic documentation of the Fontilles Sanatorium, allows us to appreciate how much the architectural complex and the landscape have evolved, practically from the day of its founding through to the present day. In order to show the transformations that both the buildings and the landscape have undergone, a diachronic analysis was carried out based on a comparison of old photographs and photographs showing the present state (Figs. 8 and 9).

So that the comparison between the historical images and the current conditions are accurate and intelligible, an analysis of the antique photographs will be carried out to precisely reconstitute the viewpoint from which they were taken, so that comparable photos of the present day can be taken from the same position and in the same direction. A graphical procedure will be used to analyse the photographs



Fig. 8 Different perceptive strategies. Views towards the outside (opening) and towards the inside (privacy)

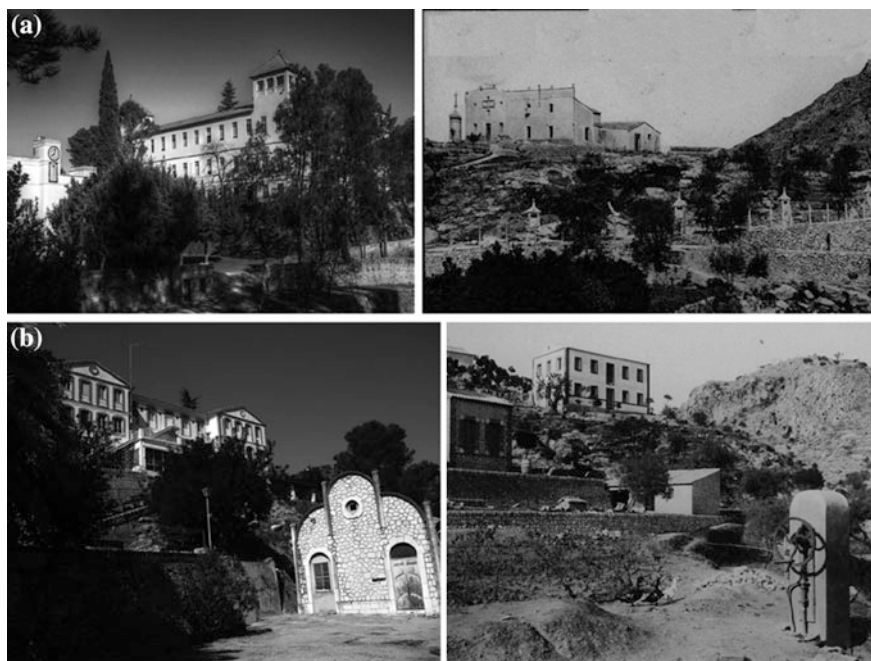


Fig. 9 Image **a** two concurrent views of the Padre Ferris Hospital. Image **b** Two concurrent views of the guest house



Fig. 10 Master plan indicating the position from where the images *A* and *B* were taken

by applying the geometric fundamentals of perspective. As a first stage, the photographs were digitized eliminating any radial distortions so that the images could be assimilated through a conical projection. To restore the main elements of the projection, we can use some of the known geometric relations of the scene, such as the perpendicularity between edges, and the angle that these form. Furthermore, determining the horizon, based on the vanishing points of some of the horizontal edges, tell us the height of the camera.

Current photographic techniques and virtual reality allow us to create totally immersive panoramic images into which the historic photographic images can be integrated, as layers, to show viewers how the buildings and the landscape of the complex have evolved over the years. This can all be achieved by taking spherical panoramic photographs from the restored view points, that can be viewed interactively from any computer connected to the Internet, or using individual virtual reality goggles that provide an even more immersive visual experience (Fig. 10).

7 Conclusions

The original landscape implementation project at the Fontilles Sanatorium, and its subsequent evolution during the 20th century constitutes an extremely singular heritage asset. This rich heritage has been proposed to form part of the *International Coalition of Historic Sites of Exclusion and Resistance* project, comprising eighteen former leper colonies, both in Europe and in the rest of the world, with the aim of having these sites declared UNESCO World Heritage Sites.

An exhaustive cartographic survey, of both the interior spaces of the complex, and the interior of the existing buildings highlight its heritage value. With the regionally scaled graphic analysis of the complex, we are able to characterize the landscape by identifying and describing the Landscape Units that go to make up the Sanatorium. The analysis of the viewsheds that display the relationship between the inside and outside of the complex show its unique nature with respect to its immediate surroundings. All this graphic information is used prior to the formulation of a Landscape Programme which will contain the set of preservation measures and activities and improvements, highlighting the landscape in order to achieve the landscape quality objectives formulated in the project.

References

- Alcaide González, Rafael. 1999. *La introducción y el desarrollo del higienismo in Spain durante el 19th century. Precursores, continuadores y marco legal de un proyecto científico y social.* Scripta Nova. Revista Electrónica de Geografía y Ciencias Sociales. Universidad de Barcelona [ISSN 1138-9788] N° 50, 15 de octubre de 1999.

- Bernabeu Mestre, Josep, and Teresa Ballester Artigues. 1991. *Lepra I Societat En La Primera Meitat Del Segle XX: La Colònia-Sanatori De Fontilles (1908/1932) I La Seua Intervenció Per La Segona República*, 49–86. Aiguats.-7. Tardor. Valencia.
- Bonastra Tolás, Joaquim. 2006. *Ciencia, sociedad y planificación territorial en la institución del lazareto*. Tesis doctoral. Universitat de Barcelona.
- Chías Navarro, P. 2013. *Territorio y Paisaje en el Entorno del Monasterio de San Lorenzo de El Escorial: Planos y Vistas desde el Dibujo de Hatfield House a Guesdon*. EGA. Revista de Expresión gráfica Arquitectónica; Num. 22, 38–49. doi:[10.4995/ega.2013.1687](https://doi.org/10.4995/ega.2013.1687). Valencia.
- Comes Iglesia, V.E. 2009. Cuidados y consuelos. *Cien años de Fontilles*. Valencia: Generalitat Valenciana.
- Pérez Igualada, J. 2013. Patrones formales en el proyecto paisajista. *EGA. Revista de Expresión Gráfica Arquitectónica* 22: 100–111. doi:[10.4995/ega.2013.1689](https://doi.org/10.4995/ega.2013.1689). Valencia.
- Quijano de Rincón, O.A. et al. 2013. *Análisis cuantitativo de color en Ecosistemas de montaña en Colombia*. Libro de Actas del X Congreso Nacional del Color. Comité Español del Color. Valencia: Sociedad Española de Óptica.
- Recatalá, L., and J. Sánchez. 1996. *Metodología de evaluación de la calidad ambiental del paisaje para planificación de los usos del territorio y evaluación de impacto ambiental en el ámbito mediterráneo*, 137–151. Granada: Sexto Congreso Nacional y Conferencia Internacional de Geología Ambiental y Ordenación del Territorio.
- Rodríguez Toro, Gerzaín, and Rafael Pinto García. 2007. *La lepra. Imágenes y conceptos*, 148. Colombia: Editorial Universidad de Antioquía—Universidad de La Sabana.
- Sanchez García, Rosa. 1986. *Algunas Ideas sobre l'Origen del Sanatori de Fontilles*, 79–86. Murcia: Actas del VIII Congreso Nacional de Historia de la Medicina.
- Serrano Giné, D. 2014. *Unidades de paisaje naturales y unidades de paisaje artificiales. Comparación mediante SIG y métricas de paisaje*, GeoFocus (Artículos), n° 14, 23–54. ISSN: 1578-5157.
- Vila Valenti, José. 1984: *La formación del concepto de paisaje en la geografía contemporánea. Actas del 1 Coloquio Paisaje y Geosistema*, 21–41. Barcelona.

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