The Italian *Album dei fari*: between Knowledge and Digitization

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Abstract

It is now well known that digital production has almost completely supplanted the traditional drawing practices in the architectural process. If on the one hand the use of digital representation has interrupted traditional graphic production, on the other, it makes possible an increasingly effective and immersive dissemination of ancient architectural projects that are not sufficiently known, if not unpublished or, still, imagined. In this sense, this contribution aims to investigate and develop the digitization of one of the most important coastal projects put in place by the Ministry of Public Works and concretized through the drafting of the Album dei fari illustrato dalle notizie intorno ai loro caratteri e posizione*, in order to make all those projects fully or partially realized for the growth of our coasts usable. The project proposed in 1873, the day after the unification of Italy, provides for the design and construction of four hundred and sixty-two maritime signals for the eight thousand kilometers of the Italian coast. The digitization of the* Album dei fari, *that is a cornerstone for the history of the construction of these coastal architectures, is therefore configured as the fundamental action to undertake a path of knowledge and digital comparison of past and present coastal structures, according to the dictates interdisciplinarity [Albisinni, De Carlo 2011].*

Keywords: Album dei fari*, Unity of Italy, digitization, enhancement, fruition.*

Introduction. History of the architecture archives

Hand in hand with the vast territorial diffusion of cultural heritage, we can include the immense legacy left to us by the past regarding the architectural archival heritages of our territory. This type of support of material culture represents a fundamental imprint for the memory of history and the past, inherent in both built and never built architecture. In this sense, the public disclosure of architectural archives is configured as a fundamental action for knowledge that is increasingly accessible to all types of users, exponentially multiplying attention to all types of buildings, even the most neglected. In this sense, it is starting from the 1980s that the architecture archives, up to that moment kept in public archives, museums and libraries, became the object of particular attention, with the consequent birth of new centers dedicated to the collection of archival material. The birth of specific cataloging systems entails indisputable benefits for the knowledge related to the places and their history, albeit in turn generating excessive fragmentation and dispersion of data [Tonicello 2014]. It should also be emphasized that, together with databases that are still too fragmented, the often incomplete architecture archives should be mentioned, that is, with only excerpts of the compositional memory: 'silent' fragments awaiting their recognition as examples of the succession of architectural history over time [Albisinni, De Carlo 2011]. For fifteen years now, however, it has been possible to witness a new archival recomposition, thanks to a wide-

Fig. 1. Cover Album dei fari [Regno d'Italia/Ministero dei Lavori Pubblici 1873].

Fig. 2. Map of the Kingdom of Italy indicating the geographical position and maximum range of light from the lighthouses [Regno d'Italia/Ministero dei Lavori Pubblici 1873].

spread collaboration between various Italian institutions, which is responsible not only for the safeguarding of the archives themselves, but also for their sharing through methodologies and access tools and use [1]. The protection and conservation of architectural imprint appear to have a prominent future in the digital world, although the approach for digital cataloging and how this process can interact with the material archives is still not well defined. Moreover, the relative greater fragility of digital data compared to paper documents must be considered, forcing the major international institutions, as well as small museums, to choose how and what to preserve from the immense material that has come down to us [Audisio 2011].
Finally, it should be emphasized that the enhancement of the archive, in addition to its use, depends on the critical interpretation of the documentation, allowing the forward projection of one's past towards a future present [Culotta, Sciascia 2008], by means of transposition techniques digital that can develop a renewed interest in architecture inextricably linked to history. In this sense, it is clear that historical events have clearly conditioned the visions and planning of time, for this reason it is impossible to separate the project from the historical, political and technological context in which it develops and to which it belongs. It is precisely in the connection between history, technology and politics that one of the most ambitious coastal enhancement projects proposed in 1873, after the unification of Italy, is inserted, with the intention on the one hand of strengthening the coastal signaling system, on the other hand, to affirm the power of the nation through monumental and clearly visible structures. In the following section, therefore, we want to define and analyze an archival document that is an example of the magnificence of one of the most fascinating and characteristic military architectures of the Mediterranean and Italian territory: the lighthouses.

Birth of a coastal network: the *Album dei fari illustrato dalle notizie intorno ai loro caratteri e posizione*

The lighthouses, despite the succession of new technologies, have represented and still represent the main navigation tools, as well as being an important example that is part of the coastal military heritage. The lighthouse, like our civilization, was born in the Mediterranean context, heirs of ancient ancestors who, with the fires at their top, lit up the nights and indicated the way to sailors [2]. At the beginning of the nineteenth century, many states felt the need to make navigation along the coasts safer, a consequence of a dense network of increasingly defined and growing commerce [Zanelli 2008]. Furthermore, with the advancement of naval hegemony by England, the nineteenth century became the period of birth and flowering of farology, spectator of technological and engineering miracles, especially along the coasts of England, Scotland and Ireland. The vast production of light towers of significant architectural and engineering interest can be traced back to the considerations made from the late XIX and early XX century regarding the stability and constructive principles of these architectures, creating towers according to the theory of bending, i.e., considering the lighthouses as bodies embedded in their foundations. In the years in which various static analysis tools and construction types follow one another, there is a very strong interest in strengthening the structure of the lighthouses both in an architectural-structural sense and in the territorial landscape. It is precisely in the Italian context that one of the most important and dense networks of coastal lighthouses is created. Already equipped with a network of lighthouses organized by the Kingdom of the Two Sicilies [Radogna 1982, p. 149], it was in 1860, with the unification of Italy, that the Italian State armed itself with all the tools to organize a timely lighting system along eight thousand kilometers of coastline: it goes from fifty lighthouses and maritime signals present in 1861 to five hundred and twelve existing in 1916. This modernization strategy is documented in the first Italian publication dedicated to the governance of lighthouses on all points of view, from the construction their maintenance and organization, in order to create a single signaling network that could unite all the Italian coasts.
The project takes shape with the formalization by the Ministry of Public Works of the *Album dei Fari illustrato dalle notizie intorno ai loro caratteri e posizione non che da quelle intorno alle spese di costruzione e impianto e di annuo mantenimento ed illuminazione* [3] (figs. 1, 2), still available today in the Na-

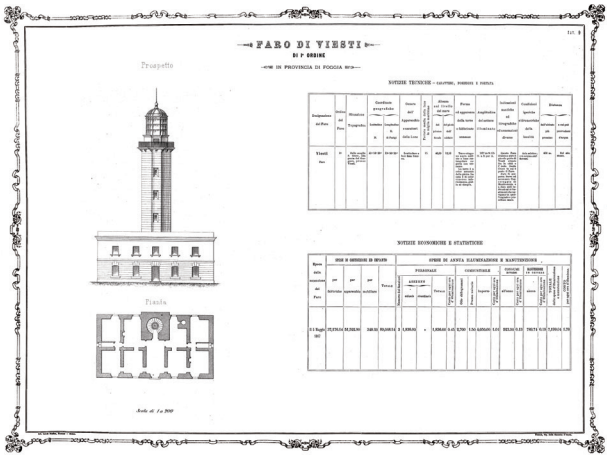

Fig. 3. Table belonging to the Album dei fari bearing the details of the Vieste lighthouse (FG) [Regno d'Italia/Ministero dei Lavori Pubblici 1873, table 9].

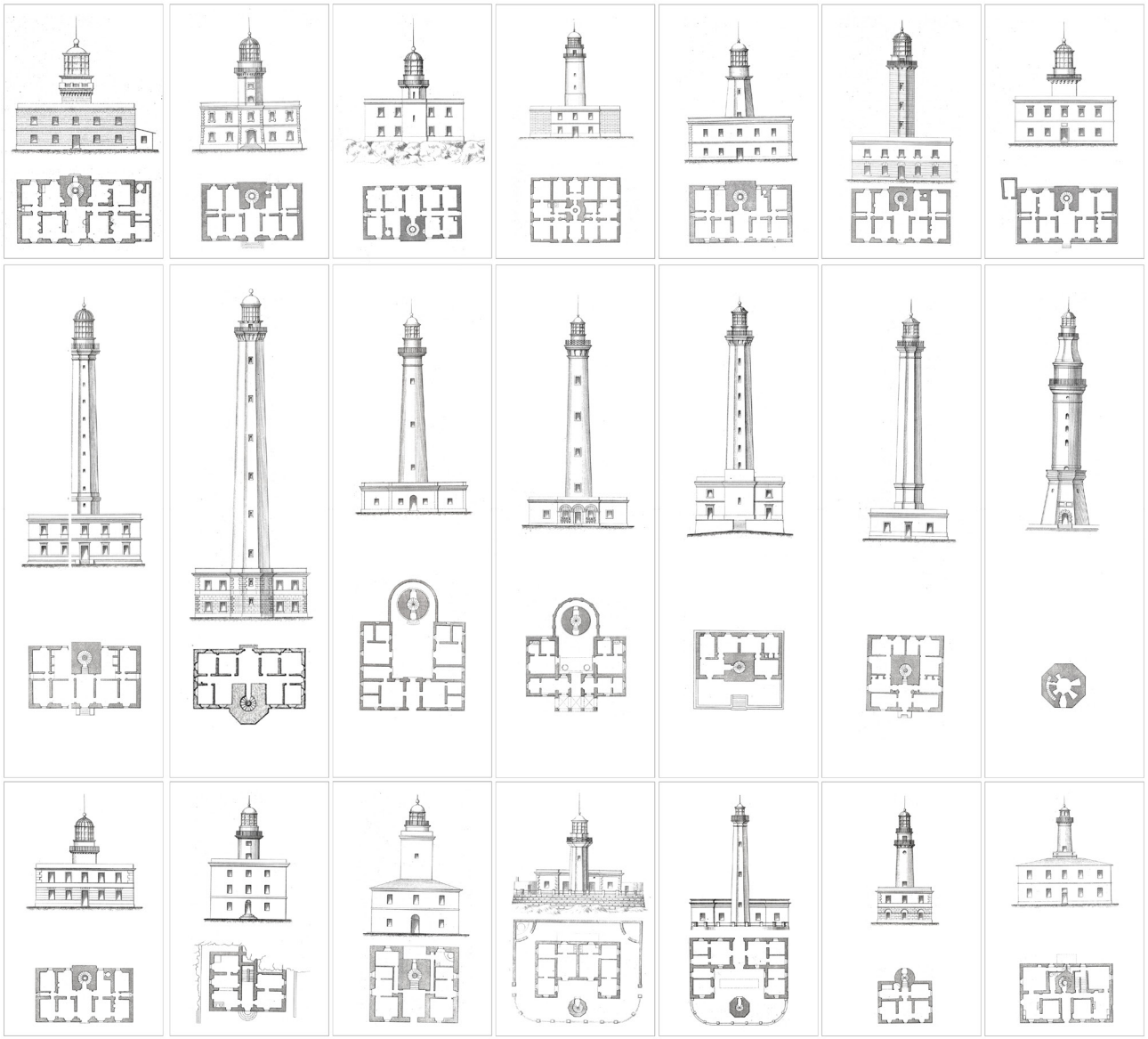

Fig. 4. Summary of some representations belonging to the Album dei fari [Regno d'Italia/Ministero dei Lavori Pubblic 1873] (graphic composition by the author).

tional Libraries and in some State Archives, symbol of the birth of a new era of modern and technologically advanced structures and architectures for coastal signaling [Fatta 2002]. If until that moment the function of the lighthouse had been fulfilled and incorporated by the towers, bastions, fortresses and defensive towers, with this program we begin a new era of modern and technologically advanced structures and architecture. The ambition of this project is to "make known the increase and progress brought about in this service after the constitution of the Kingdom" [Curti 2002, p. 45]. Finally, the greater interest in the construction of lighthouses to the detriment of ports should be considered, probably because, as reported in the same *Album*, the "monuments of general interest and undoubted pledges of the civilization of a people" are identified in the lighthouses [Curti 2002, p. 45].
The *Album* is configured as a collection of drawings depicting the project of numerous lighthouses, developed in plan and elevation, accompanied by the technical characteristics of the systems, maintenance and the economic plan necessary for their construction and management (fig. 3). The geometric-architectural setting of most of the projects featured in the *Album* follows recurring and precise geometries, alternating with sporadic neoclassical style lights with local materials and ornaments such as frames and ashlar, still in use today. Despite the accuracy of the projects, the construction strategy was not completed by the post-unification government: only some of the projects presented came to light, partly modified from the original project or built much later. Nonetheless, the publication makes clear Italy's actual willingness to invest in technology and this type of identity buildings, through which to express the degree of civilization achieved [4].
The illustrations, therefore, are based on the manual representation of all the details corresponding to the building to be built, with related metric ratios and the reduction scales adopted. The projects put in place present for the most part an architectural language in neoclassical style and often recurring geometric-compositional relationships: the regency is characterized by a number of levels not exceeding three; the tower develops in plan according to octagonal, square, circular or hexagonal geometries; the lantern is always circular and proportionate with respect to the dimensions of the rest of the structure (fig. 4). It is therefore possible to outline a real semantics that defines a connection line between all the projects in the *Album dei fari*, designed with the same style of representation. Together with the proportional relationship of the building organisms, the *Album*'s lights are

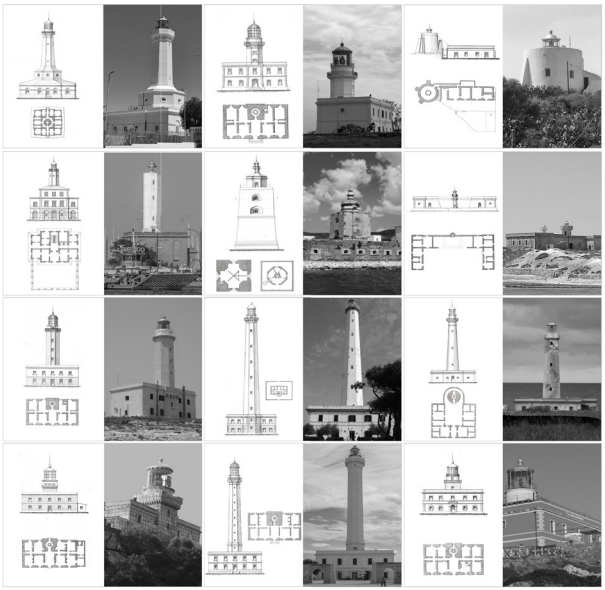

Fig. 5. The existing lighthouses with an architectural composition consistent with the projects in the Album dei fari [Regno d'Italia/Ministero dei Lavori Pubblici 1873] (graphic composition by the author).

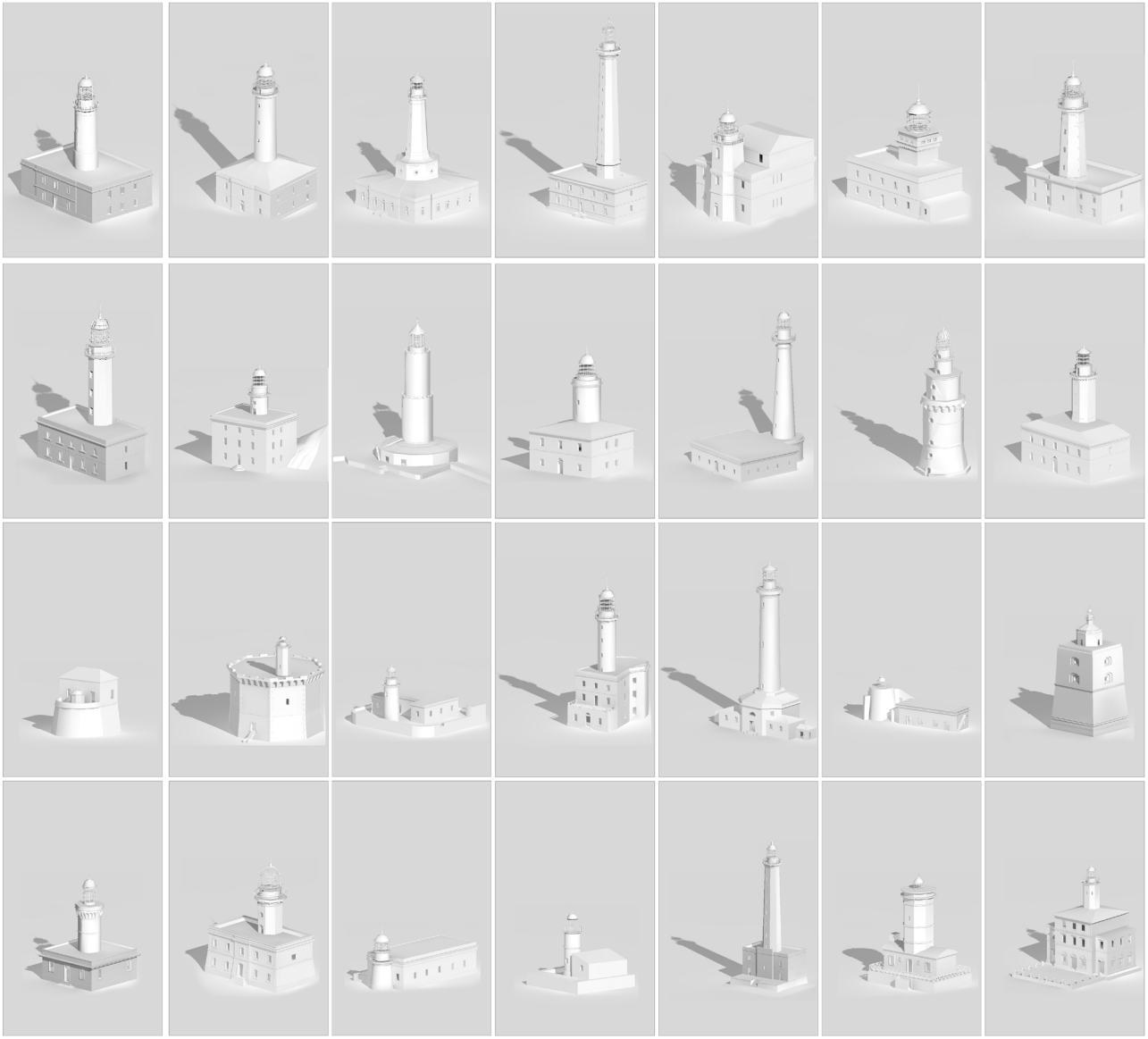

Fig. 6. Three-dimensional models of the lighthouses belonging to the Album dei fari (graphic elaboration by the author).

designed following the morphological characteristics of the territory on which they stand, as well as being classified and divided into six "orders", depending on the range reached by the light emission. As for the compositional typology of these buildings, if the height of the tower depends exclusively on the coastal rise on which the turreted structure is positioned –a low tower corresponds to a high height above sea level, a high tower corresponds to a 'low height above sea level– the height of the building does not depend on external sighting factors, as much as on the use of the lighthouse by the guardians. In fact, as is well known, in the past these buildings have always been inhabited by the lighthouse keeper or several lighthouse workers who, together with the family, maintain and monitor the correct functioning of the light source. The structure of the building, therefore, expressly depends on the spatial needs of families and the area dedicated to offices. In this sense, in fact, starting from the 1970s it is increasingly difficult to witness a coastal construction that includes a building used as accommodation since, with the advent of automation, monumental coastal constructions are being stopped, yielding the step to the construction of lighthouses on metal trusses, with the least economic expenditure and simpler maintenance.
To date, these structures are still present along the entire coast of our territory, although they are in conditions of extreme deterioration. In this sense, in fact, the maintenance of the architectural apparatus is often reserved solely for the tower, as a structure supporting the light emission and the lantern. With regard to the architectural composition, a substantial number of lighthouses find its genesis in a subsequent period with respect to the *Album dei fari,* while maintaining its characteristics and style. Another part of them, on the other hand, is structurally configured in a coherent way with respect to the project of the *Album* of the headlights, confirming the magnificence of this programming, with extremely current geometries and enormously efficient geometric-structural relationships. With regard to the lighthouses still existing today in which the geometric and architectural structure can be traced back to the period forming part of the Unification of Italy, it is possible to mention some of the most significant lighthouses including the lighthouse of: Cozzo Spadaro (SR); Capo Bellavista (CA); Capo Colonna (CZ); Capo Granitola (TP); Capo Milazzo (ME); Capo Santa Maria di Leuca (LE); Capo Spartivento (CA); Della Formica (TP); Isola delle Correnti (SR); Livorno (LI); Porto Corsini (RA); San Cataldo (BA); Capo Spartivento (CA); San Rainieri (ME) and Vieste (FG) (fig. 5).

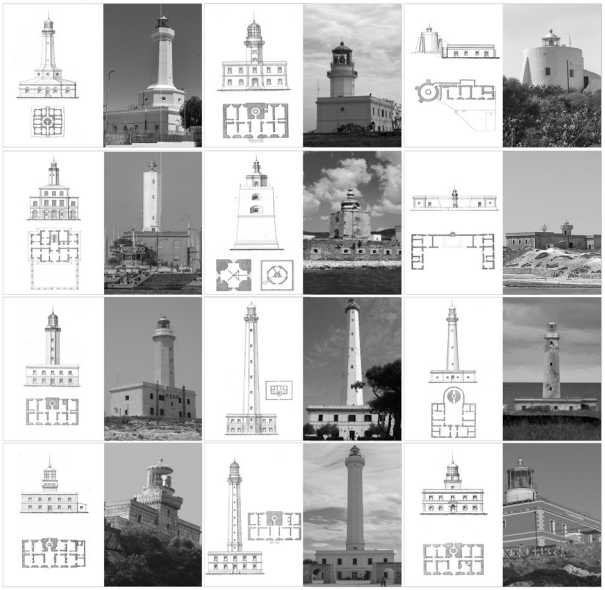

Fig. 7. QR-code for the three-dimensional and interactive use of the three-dimensional models of some lighthouses belonging to the Album dei fari (graphic elaboration by the author).

The digitization of coastal archives

Recent years have seen the intertwining of increasingly innovative and pressing dynamics in the field of cultural heritage, often subject to sudden changes in the field of use and dissemination. In this sense, cultural institutions, in order to overcome the gap existing between fruition and proposed offer and to create ever new and imaginative visions, can use ICT, which is a valid tool for digitization and the connection between hard science and soft science. The latter are configured as fundamental in the connection between knowledge [5], in order to improve accessibility, communication and understanding. The issue of accessibility [6] and of the enhancement applied to art and cultural and artistic heritage are today columns brought into the context of the different topics relating to the main regional and national programs, among which we recall the 2030 Agenda [7] and the main ERC sectors. In order to effectively implement all the actions proposed for the protection of the archival heritage, the figure of the archivist is born today, necessary for the cataloging of the asset, equipped with the knowledge and fundamental skills for the use and management of cataloging and historical knowledge, to be supported by the subject or group of people in charge of digitizing historical material [Audisio 2011].
In fact, digitization proves to be a great inspiration for initiatives capable of making projects usable, through which to generate tourist-cultural flows and give voice not only to silent fragments but also to projects that have never been realized or partially realized according to archival configurations. This is because the three-dimensional transposition of archive projects makes it possible to imagine and visualize in an immersive way excerpts of past and present memory, or the testimony of the succession of countless unique and characterizing architectural styles. Therefore, the cataloging and digitization of architectural archives are fundamental assets for the conservation of historical memory, in which the perfect synergy between the figure of the archivist and that of the modeler architect becomes fundamental. It is in fact known how the digitization of cultural assets in the museum and library context is configured as the flagship of European strategies in terms of enhancement and communication of the same assets. In this sense, communication and mediation between more or less fragmentary archival sources can be identified as the right strategy to involve the public, establishing a greater interest in culture and its relative safeguarding, enriching the common identity [Niccolucci 2006].
The intent of digitizing the *Album dei fari* is explicit with the implementation of a coastal reinterpretation based on the two-dimensional redesign of the geometries making up the ninety-four lighthouses present in the official documentation. The redesign, on the basis of archival documents and photographic supports of the projects carried out and in part still existing, turns out to be a preparatory action for the development of three-dimensional models through which to understand the volumetric and spatial relationships that existed belonging to the coastal military architecture of the post-unitary period according to unprecedented perspectives (fig. 6). The three-dimensional models reproduced according to a faithful trace of the official documentation –whether they have been created and no longer exist, created and still exist or never created– can be enjoyed three-dimensionally and immersively by all types of publics, by uploading them to an open source website or app to be used by means of a QRcode or by simply searching by type of lighthouse (fig. 7). The three-dimensional models, in addition to being an interactive object of knowledge for the user, lend themselves to different uses aimed at the dissemination of architecture in their historical and archival configuration. It is in fact possible to project the three-dimensional model of the architecture obtained from the three-dimensional digitization of the archive drawings on the prospect of the existing lighthouse-architecture, generating as a result a perfect *continuum* between virtual space and real space, between ancient and contemporary history.
In a hypothetical museum context, on the other hand, the preparatory creation of three-dimensional models makes it possible to print 3D objects, ensuring use and accessibility not only from an intellectual point of view but also for people with sensory-perceptive disabilities or children (fig. 8). In this sense, it should be remembered that "cognitive activity cannot be understood except by taking into account its plasticity, its becoming interactive, its continuously redefined relationship with the environment" [Lévy 1992, p. 5]. It is precisely in compliance with what Lévy argued

that, through the three-dimensional production of the lighthouse models belonging to the *Album dei fari*, it is possible to develop a type of knowledge resulting from concrete events and experimentation, facilitating the analysis processes, enhancing learning and facilitating the sharing of ideas and social space [Mori, Niewint-Gori 2019], towards the consequent dissemination of otherwise silent archival material. The construction of three-dimensional 'decomposed' models to be subsequently recomposed can, for example, be configured as one of the effective tools to ensure the knowledge and dissemination of historical archives, in full compliance with the rules on which edutainment is based, as well as a suitable solution for all types of museum structures as low cost, for museum structures of all sizes and for all types of users.

Fig. 8. Plate for the use of the three-dimensional model of the lighthouse in the museum context (elaboration by the author).

Conclusions. The importance of archival sources: between past and present

The *Album dei Fari illustrato dalle notizie intorno ai loro caratteri e posizione non che da quelle intorno alle spese di costruzione e impianto e di annuo mantenimento ed illuminazione* it still appears to be a virtuous example in the context of the theme of architectural archives. The interest on the part of the Kingdom of Italy in strengthening the coastal network of Italian lighthouses in an architectural and structural sense, through the design and partly construction of four hundred and sixty-two maritime signals for the eight thousand kilometers of coastline, is an example of the political importance technology reserved for this type of coastal architecture. The eighty-one tables of the *Album dei fari*, still available today in the National Libraries and in some State Archives, are configured as the prerequisite through which to start a new reinterpretation of the archives and the lighthouses themselves, towards an indissoluble union between history and innovation to be implemented according to the dictates of interdisciplinarity. The question of the dissemination and analysis of archives in architecture, in fact, in addition to being a mere cataloging carried out by architects, today opens up and is understood as an anthology of the architectural stylistic process to be implemented in a multidisciplinary context, though not only architects but also computer scientists, experts' conservation, digitization, graphics, etc. [Albisinni, De Carlo 2011]. The dissemination of the lighthouse through the study and archival dissemination becomes today the key element through which to undertake a path aimed at the historical and technological knowledge of the entire Italian coastal system, or a privileged asset for the innovation and development of the entire community. In accordance with the guidelines promoted by the European community and UNESCO [8], in fact, the culture-oriented growth models have the objective of increasing the value of the common good in its multiple characterizations, aimed at the development of devices and systems of conjunction capable of re-connecting communities through knowledge. The digitization of the archival heritage, therefore, represents the only escape route for the protection of the same heritage [Audisio 2011], although it should not be forgotten how the authenticity and importance of the archival document is configured as the only source original and original from which to draw information for cataloging and digitizing it. In this context, the dissemination of data through digital and figurative support represents the ideal tool through which to organize and disseminate this vast cultural heritage, allowing it to adequately legitimize its value-utility, incorporating its validity into contemporary ways of life and giving voice to otherwise silent archival fragments [Montella 2009].

Notes

[1] The National Association of Archives of Architecture, founded in 1999 with the specific intention of grouping archival material in a single system, and MAXXI, developed in 2002 with the same intent, are part of the organizations aimed at safeguarding and sharing archives.

[2] Already Homer, in the 19th book of the Iliad, compares the Achilles' shield shimmering to one of those fires that rise from heights and make the way safe for seafarers, but the concept of a "lighthouse" did not arise until 300 B.C. with Colossus of Rhodes and lighthouse of Alexandria [Simonetti 2006, p. 3].

[3] This is how the introduction of the *Album* reads: "If there is a country where lighthouses can be said to be indispensable more than anywhere else, it is certainly Italy, not so much for its topographical position, but for the development of its so rugged coast" [Regno d'Italia/Ministero dei Lavori Pubblici 1873].

[4] In the field of archival design of lighthouses, we recall the projects and surveys of the *Historic American Buildings Survey* (HABS) and the *Historic American Engineering Record* (HAER), which document the successes achieved, not only in the farological field, by the United States [Amoruso 2005, p. 81].

[5] The profoundly pervasive ICT technologies have a direct impact on expanding our real experience of space, be it physical or digital.

[6] It should be emphasized that accessibility does not merely mean the physical use of the archival source but also the sense-perceptive one. In this sense, there are numerous projects carried out by MiBACT aimed at overcoming these barriers for universal accessibility, as highlighted by point 8 of the *London Charter*: "knowledge, interpretation and management of cultural heritage". To know more: <http://www.londoncharter.org/index.html>(accessed 13 February 2022).

[7] The 2030 Agenda defines the points for sustainable development to be achieved by 2030, identifying 17 Sustainable Development Goals (SDGs) and 169 targets.

[8] UNESCO, World Conference on Cultural Policies, Mexico City, 26 July-6 August 1982. For further information: <https://unesdoc.unesco.org/ark:/48223/pf0000052505> (accessed 16 February 2022).

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