Miguel Nogueira and Renato Pinto, Landscape context of Hospital dos Covões. Hospital Rehabilitation Design Studio, Department of Architecture, University of Coimbra, 2018-2019.

Seven notes on the program and design of healthcare buildings' rehabilitation

BY PAULO PROVIDÊNCIA

One of the characteristics of the 20th century heritage hospital is the permanent remodeling of its spaces, a sign of the frequent changes in clinical practices which, in turn, bring about functional, construction and spatial changes. This characteristic, due to the functional prevalence of health facilities, generates forms of environmental and territorial consumerism.
Contrary to any conservation or crystallizing idea of the heritage hospital, this present reflection seeks to find the aspects of this heritage that may be preserved in the remodeling processes, informed by the recent trends in the design of healthcare facilities, which ultimately constitute opportunities for their rehabilitation, reuse or restoration.

Considerations for remodeling: medical, scientific and social values versus architectural, landscape and urban values of hospitals[1]

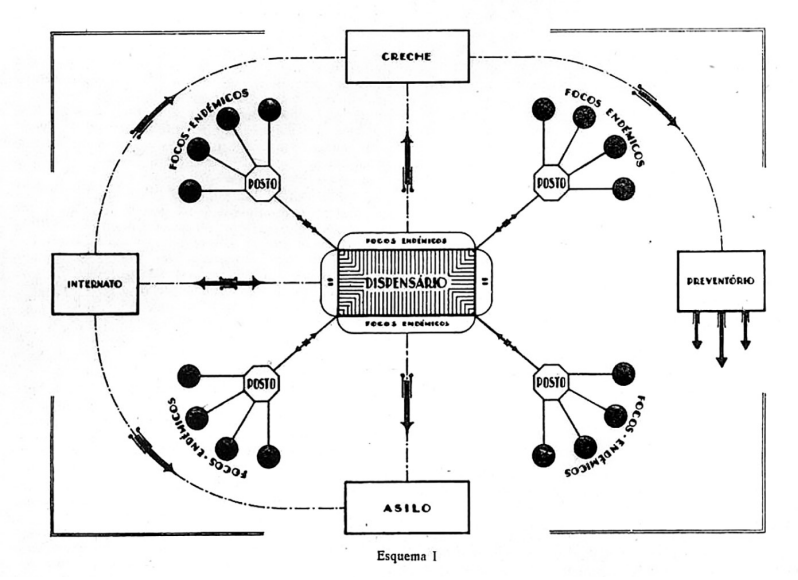
Climate change, environmental sustainability, and spatial depredation are themes that compel us to rethink the relationship between societies and buildings, as an activity that consumes large amounts of energy, environmental and territorial resources. Among the various building activities, health installations with their demanding renovation may generate the greatest spatial depredation. However, when thinking about the rehabilitation of this heritage, contrary to the negative aspects mentioned, one must consider the reluctance towards the rehabilitation of the facility.

Several factors seem to contribute to an unequal assessment between a social appreciation for historic buildings, and the reluctance inherent in their appropriation for health. First, there is the association between the novelty of the installation and updated scientific and clinical knowledge and practice, in view of the steady progress that Medicine has made since the beginning of the 20th century. This constant progress also translates into continuously new spatial and programmatic requirements which, in turn, generate an almost instantaneous obsolescence of facilities. Other factors could be the degradation of facilities due to lack of maintenance, the change in clinical and building paradigms, the additions or extensions caused by new facilities, distorting the initial design.

Therefore, the question arises as to how to proceed to design new vocations for old facilities, considering them as part of new strategies for social, economic, environmental sustainability in a building dedicated to healthcare. Not forgetting the opportunity that the profound changes in the role of hospital facilities,[2] and, in particular, the importance of functional programs in the context of these changes,[3] we propose a brief reflection on the potential that the programs may have in the rehabilitation of heritage hospitals, looking for an answer for their future. There is, however, no answer without an in-depth knowledge of these installations, their particularities and vicissitudes, their purposes and ambitions, their scientific and clinical value. Only this knowledge will allow a correct interpretation of the facilities, the attribution of patrimonial value, and through it, a definition of the possibilities, opportunities and strategies of reuse of the facilities.[4] It is, therefore, urgent to interpret the architectural heritage of health in order to repurpose it.

A primary characteristic of health facilities in the 20th century is precisely their insertion into a system, their belonging to an extended system that includes other elements and other facilities, configuring a network.[5] The facility is an instance of a given health system, be it the corporate health system in which the State has only an articulating role for the good will of corporations or civil charity, be it a health system that considers family health as the basis of a national healthcare system, or part of a Welfare State.[6] But even in the first case, in force in Portugal until the 1974 Revolution, the health facilities were conceived as belonging to an extended system that implied other facilities upstream or downstream as it were.

A health system composed of dispensaries dedicated to prophylaxis and inserted in an urban environment (Lisbon, Coimbra, Porto), clinical treatment spaces associated with School Clinics of Medical Schools and dedicated to "curable" cases, with spaces for the concentration of "incurable patients" (Hospital-asylum-colony) located outside urban areas, "in the middle of large areas where the three sections can be installed," occurs in the first half of the



01 Uriel Salvador, *Elementos e sugestões para a organização do combate à Lepra em Portugal* [Elements and suggestions for fighting the Leper in Portugal], published in Leprosaria Nacional, Porto, Dafne Editores.

20th century for tuberculosis and Hansen's disease, but also for mental illnesses, extending the scope of action beyond contagious diseases.[7] The current health system, organized into primary health care with the respective Family Health Units, secondary or hospital care, and continuous health care, although with nuances and greater sophistication, is still derived from the rationalities proposed already in the 1930s.

In this regard, the debate on the construction of the National Leprosarium is instructive, described in detail in the chapter *Programs, Typologies, Paradigms* in the book dedicated to it.[8] In the absence of models for organizing a Hansen's patient monitoring and treatment service, the debate revolved around two possible solutions to the problem: the adoption of the "fight against tuberculosis" system for the treatment of leprosy, consisting of the creation of a network of disease screening dispensaries,[9] separation between contagious and non-contagious cases, and sending contagious patients to treatment centers or hospitals; and another that considered the census of patients and their subsequent concentration in a hospital organized between clean and dirty spaces, between preventive and personal areas, and the so-called dirty areas, with the hospital as a reception and investigation unit, inpatient wards for functionally active patients, rooms for patients' families and asylum wards for incurable or advanced patients.[10] The adoption of the second model at the Hospital-Colony Rovisco Pais, was built and based on a program defined by the General Director of Health José Alberto Faria (1888-1958) and developed by the Surgeon Bissaya Barreto (1886-1974) and the Architect Carlos Ramos (1897-1969). It led to a building organized into autonomous pavilions, some with logistical functions (such as kitchen and laundry), others with inpatient functions (workers' houses, asylum, family homes), others with reception, quarantine, observation, diagnosis and investigation functions, the hospital. The spatial structure of organization of the set, although less clear than in the Previous Study version, maintained a spatial identity.[11]

A second characteristic refers to the landscape values in the conception and design of health facilities, including the urban landscapes in which they operate. If, in the first half of the 20th century, sanatorium construction favored specific landscapes for specific curative effects, such as the coastal sanitariums dedicated to the cure of bone tuberculosis, or the high mountain sanitariums for pulmonary tuberculosis, in the second half of the century, due to the implementation of a network of regional hospitals in the district headquarters, the hospitals sought locations in an urban environment but with certain orientation characteristics – usually with the main internment body facing south –, clear views, and elevation in relation to the surrounding urban environment. The association between an orientation towards the south for the inpatient wards or the view of beautiful landscapes for hospital cure, stems from the ideal of "nature cure" that runs throughout the 19th century.[12] More recent studies of "evidence based design"[13] have reached the same conclusion, that healing is facilitated (faster) in a ward with openings to a natural outdoor space, or that a waiting area in proximity to gardens predisposes patients to healing. Thus, natural light, visual relationships to gardens and landscapes, both in nursing and waiting spaces, induce predispositions that facilitate healing; this is now "scientific evidence", that is to say, what was inducted has now been demonstrated.

One of the best examples of this would be the magnificent Regional Hospital of Viana do Castelo (1970-1984), designed by Raúl Chorão Ramalho (1914-2002), whose location on the slope of the Santa Luzia hill, slightly elevates it in relation to the urban center, with the wards opening to the south allowing magnificent views over Viana, the mouth of the Lima and Darque Rivers. Advantage of the surroundings was taken by its internal organization and further accentuated by the horizontality of the building's precast concrete elements; landscape sensitivity that translates into a real qualification of the installation and its use. Another example, although in a more complex context, is the Regional Hospital of Guimarães Senhora da Oliveira

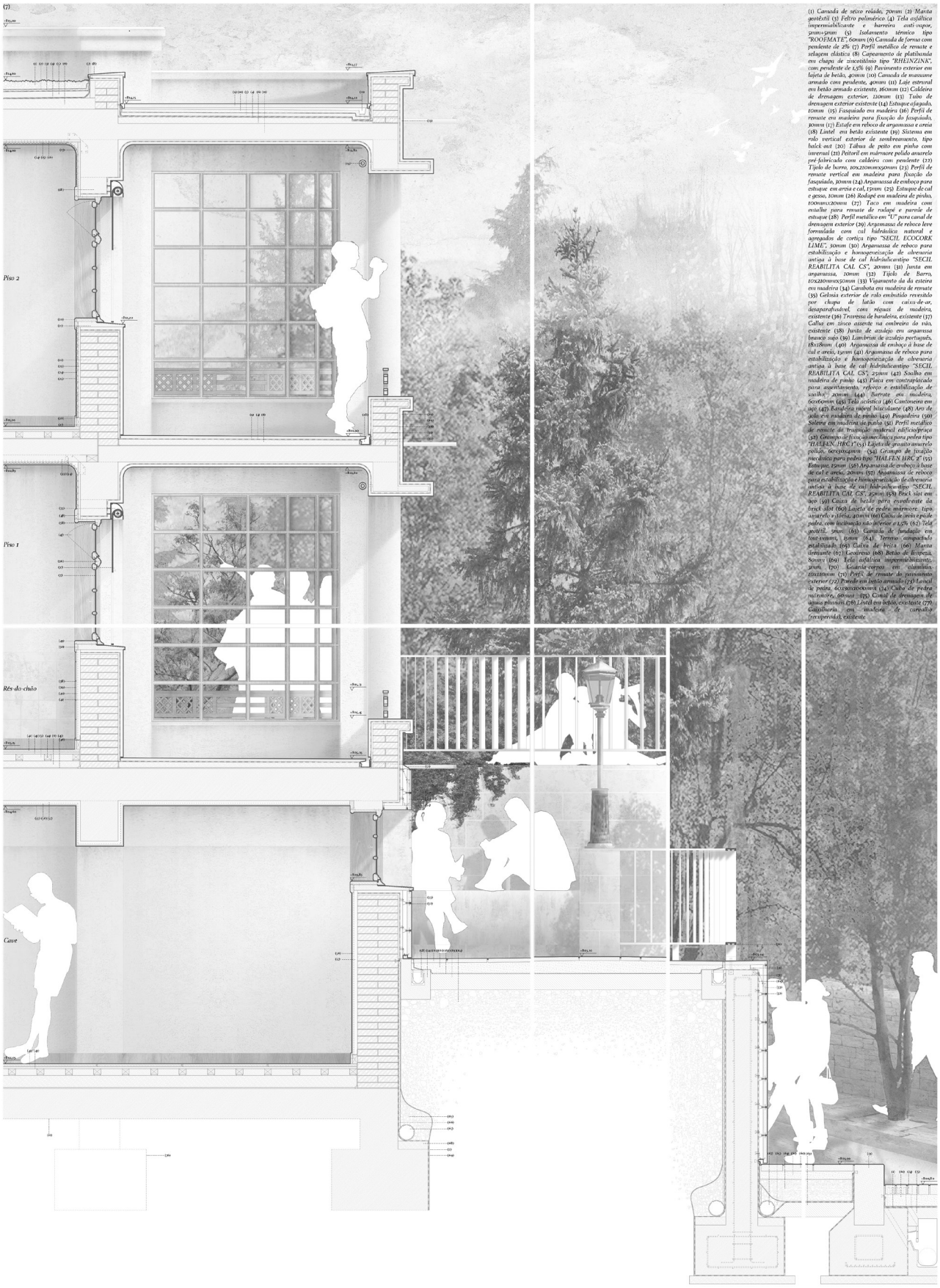
(1975-1991), a project by Celestino de Castro (1920-2007), located on a small elevation of undulating terrain at the entrance to the city. Vertical building and wards oriented toward the south, characterize the ground level floor as a space for receiving and distributing urgent and diagnostic programs. In this case too, one can affirm a conviction of the importance of landscape for the hospital, in dialog with a careful implementation.

A third characteristic arises from the type of facility. The repetition of a model of spatial organization over a period of time, one or two decades allows the determination of necessities, norms and design, leading to the integration of functional experiences and their optimization, thus for finding the right materialities for the elements that constitute it. Take, for example, the construction of sanatoriums throughout the 1920s, 1930s and 1940s.[14] After the initial versions of construction in stone masonry, in reinforced concrete, or mixed construction, which would translate into a successively refined expression of the convalescent gallery, between slender pillars and reinforced concrete slabs. The construction of the San Maria Sanatorium in the Senatorial resort of Caramulo,[15] opened in 1926, is perhaps a paradigmatic example of this organization. The openings of the infirmary walls in stone masonry do not align with the rhythm of the reinforced concrete porticoed structures of the galleries, and, unlike the galleries of the Sanatorium of Guarda,[16] there is no continuity solution between wards and the convalescent gallery. Access to the gallery was made in a disciplined way, through a closed mediation space, in iron and glass, coinciding with the entrance to the sanatorium on the ground level floor, allowing total medical control for accessing the galleries, that is, the control of "exposure to air" for the patients. This access control system would be repeated in the Surgical Pavilion of the same resort, a building with a sophisticated design carried out at the height of Caramulo's curative activity, coinciding with the start of activity by the Spanish tisiologist Manuel Tapia (1895-1971)[17] as medical director of the resort, in 1937.[18] A solution for a connection between the infirmary and convalescent gallery was fully studied by André Tavares (1976-), through the Heliântia clinic.[19] A very different solution appears at the Sanatorium of Ferroviário or Penhas da Saúde (1927-1936), in Covilhã, a project by Cottinelli Telmo (1897-1948) restored by Eduardo Souto de Moura (1952-) in 2014, then converted into the Pousada [inn] of Serra da Estrela. The convalescent galleries are a strong element in the composition of the rising elevation and appear alternating with the batteries of rooms, allowing them to receive direct sunlight. The repurposing project maintains the original character of the convalescent galleries, proposing a possible contemporary use, as available space in association with the blocks of rooms.[20]

The functional specialization of health installations during the 20th century has often led to an approach to new problems, requiring research for new technical solutions. This fourth characteristic of healthcare facilities is sometimes revealed in construction techniques and materials, or in detailed functional organizations, or in the incorporation of air conditioning and ventilation mechanisms and systems. On the one hand, comfort in hospitalization, avoiding direct sunlight while still valuing natural lighting, or allowing for cross ventilation of spaces; on the other hand, new means of diagnosis, such as X-rays, or more recently, computed axial tomography, require construction elements to protect patients from the radiation emitted by the devices. Only detailed knowledge of the requirements and programs on which the architectural projects were based makes it possible to understand the design and design options present. In this type of installation, the architectural heritage is not separate from the technological affirmation of the building, which is sometimes placed above the values of design and composition. On the other hand, these technical specifications and materials, in cases where they still remain, raise great difficulties in the restoration processes, where production needs to be resumed for out of stock products which may have been suspended or forgotten for several years.[21] The Radio Pavilion of the Portuguese Institute of Oncology, a project by Architect Carlos Ramos, is perhaps one of the architectural works that most strongly marks a rational conception of a health facility as an element of programmatic and technological research; its restoration is imperative. Another example is the Alcoitão Rehabilitation Medicine Center (1956-1966), a pioneering project by Sebastião Formosinho Sanchez (1922-2004).

Program for making the heritage values compatible with the new health facility design requirements

Referring to four points about the heritage value of health facilities to be respected in the restoration, rehabilitation and reuse processes, the question arises concerning its ongoing maintenance through changes in the program and paradigms in health facilities. These changes consider the appearance of a vast set of Family Health Units, whose programs have been the object of review and deeper study, making further developments likely. The autonomy of specialty consultation services, creating outpatient consultations, both in school hospitals and in district hospitals, requires rethinking not only the hospital's accessibility and urban presence, but also the internal structuring of services, abandoning the spatial organization model based on Humboltian organizational teaching. Similarly, in this sense, the progressive importance of outpatient services, of which surgery is an exponent, reinforces the importance of the hospital's urban presence and access. On the other hand, the relative autonomy of hospitalizations as well as the means of diagnosis, where users can be served from other areas, reinforce an understanding of quite different hospital facilities which, until recently, predominated. Finally, a strong trend towards dimensioning that does not exceed 500 beds, imposes a certain scale and dimensional limit, which has implications for their design and presence. These changes in the programing of hospital facilities allow another appreciation of heritage hospitals, allowing for a rehabilitation that values them and can be synthesized in three programmatic

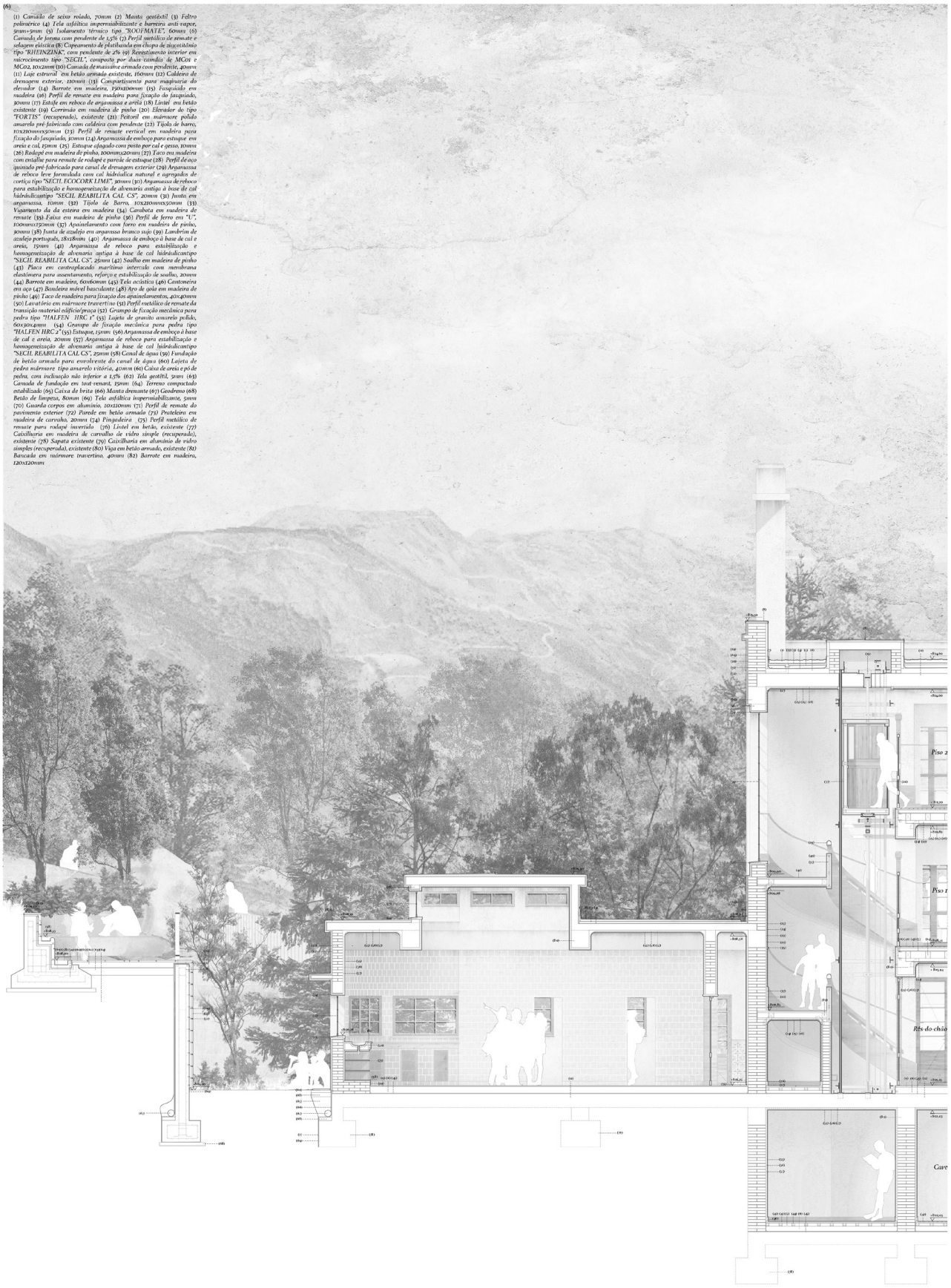


Corte
Cotagem
Legenda

Pavilhão Cirúrgico do Caramulo. *Conservar A Memória: Restaurar o Passado para habilitar um Futuro*
XIV. *Perfil Transversal Noroeste (7), esc. 1/30. Pormenorização construtiva e material*

Universidade de Coimbra, Faculdade de Ciências e Tecnologia, Departamento de Arquitectura. *Dissertação Final de Mestrado em Arquitectura, sob a orientação científica do Professor Doutor Paulo Providência. Por João Pedro Sarzedas Moura, nº 2013153151*

02 João Pedro Moura, Detail – Gallery, Restoration of the Pavilhão Cirúrgico at Caramulo. Master Thesis, Darq-UC, 2020.



03 João Pedro Moura, Detail – Lift and Kitchen Detail, Restoration of the Pavilhão Cirúrgico at Caramulo. Master Thesis, Darq-UC, 2020.

aspects: their presence and urban articulation, the adaptability of the facilities, and a design that focuses on the user rather than on merely service.

Firstly, in the proximity and urban integration of the facilities and in the new role that outdoor spaces can play, considering the opening of the spatial segregation of health facilities. In fact, and perhaps due to the establishment of a sanitary cordon around the hospitals that treated contagious diseases at the beginning of the 20th century, or the determination of optimal spatial distances in the relation between the area where the facility is implanted and the site area, hospital facilities often have surrounding exterior areas that distance them from the urban area. Sometimes used as areas of reserve or for future expansion of facilities, these areas, often bordered by fences, they are rarely used beyond being a kind of buffer between the noise and bustle of urban traffic. In the buildings constructed during the first half of the 20th century by Bissaya Barreto, the paradigm of self-sustainability of hospital facilities was associated with the idea of perfect sanitary control of the agricultural production necessary for the maintenance requirements of the program. This led to consideration of the ownership of large, agricultural production areas or simply maintaining the surrounding ecosystems, as occurred with the Hospital of Sobral Cid, Chelas, National Leprosarium, and others. The programing and qualification of these areas, allowing the articulation between hospital facilities and urban spaced is a challenge that is not unrelated to the new understanding of the installations, the privilege of pedestrian accessibility, or arrival by other lighter means, and collective areas for the facility, and the role that these spaces may have for a situated use of the facility. The differentiation between the formal garden and the park, or the differentiation between the park and the ecological environment near the installation, are programing aspects for the surrounding spaces that need further definition, and which will allow clarification of the role of a hospital's natural spaces as a service to the community, and not just to its users.

Second, the new forms of project qualification highlighting future adaptability is a significant aspect. The ideal of spatially flexible hospital facilities has been recurrent in its design – as opposed to excessive functional specialization, but also, especially since the 1970s, due to the influence of metabolic architectural trends, among others. A paradigmatic example of this concept is the Canadian hospital designed by Eberhardt Zeidler (1926-), McMaster University Medical Center in Hamilton, Ontario, opened to the public in 1969. The Hospital is characterized by a set of infrastructure towers (elevators, stairwells, ducts), which form a grid available for various uses – wards, consultation offices, etc. The open character of the structure is an analog of a city layout; the atrium, for example, is designed as a public square. But in addition to the functional flexibility, more appreciated now after years of functional specialization by Modernism; this adaptability introduces a set of requirements of great relevance when we think about the processes of remodeling of a heritage hospital. Adaptability, in the repurposing processes of hospital installations, is designed to last for a time. It is planning that must take ten, thirty or fifty years into account, contradicting short-term options and planning (which has had such bad consequence in hospital construction in Portugal over the last thirty years). Adaptability can be measured by a design that favors infrastructure adaptability, modular planning and functional adaptability. The changes that adaptability permits are, in view of changes in the type of patient, changes in clinical practice models, staff training standards, the progressive incorporation of information and communication technologies, or the diverse relationship in the redistribution of health services, diagnosis and treatment.[22] Particularly the impact of technological developments in health care processes, and thus also in the buildings that house them, need to be considered in the adaptability of restoration.

Finally, we can think about the profound change that a concept of facilities centered on the user, and not on the service, has on rehabilitation programs. This profound change, the consequences of which we have not yet fully seen, implies the selection of an individual room during hospitalization, significantly increasing the dedicated areas if the capacity in number of beds is maintained, or on the contrary, greatly decreasing the capacity if the area is not maintained. On the other hand, this refocusing implies rethinking ways of displacing or expanding existing means of diagnosis, surveillance and the visiting of the patient-user, favoring new concepts of mobility of equipment and means of diagnosis (when possible), yet to be explored.

Resulting from a conception that seeks hospitalization as a last resort, favoring external consultation services, ambulatory surgery services, or even the day hospital, imply a new understanding of the equipment that favors the permeability in the relationship with the outside, profoundly changing the understanding of "single door" equipment. These permeabilities and external services imply an increase in the interface areas, and more specifically the service and waiting areas. The new spatial and architectural models of the large distribution hall with high ceilings, elevated and diffused lighting, with ample space, allows the diversification of service areas and comfortable conversation areas, for patients waiting for consultation or exam results. This is perhaps the concrete physical image of this new understanding of hospital facilities, opposed to the labyrinthine system, tight undifferentiated corridors, and interior waiting areas, now rarely equipped with a TV and where patients are compacted and concentrated, sometimes without proper regard for necessary air renewal or a hygienic distance.

In summary, the new understanding of hospital equipment may allow the qualification of heritage installations, for which it is necessary to have a deep knowledge of their equipment and an assessment of its potential and suitability for the new programs.

Notes

1 As the following notes referring to Hospital Heritage of the 20th century in Portugal, result from the research project *Cure and Care_ the rehabilitation* (FCT-PTDC/ATPAQI/ 2577/2014), coordinated by Professor Ana Tostões, from IST-CiTUA.

2 See Susan Prasad (ed.), *Changing Hospital Architecture*, London, RIBA Publishing, 2008, and Stewart Brand, *How Buildings Learn – What happens after they're built*, London, Penguin Books, 1994.

3 Regarding the elaboration of programs, protocols and procedures, including evaluation, in health equipment, we refer to: *The Design Brief Framework for PFI Public Sector Comparators at OBC Stage*, October 2004, NHS Estates, Department of Health, UK.

4 Adaptive reuse is considered by US hospital managers. Although they do not share the strictly economic view of the authors, they refer to: James K. Elrod and John L. Fortenberry Jr. "Adaptive reuse in the healthcare industry: repurposing abandoned buildings to serve medical missions", in *BMC Health Services Research* 2017, 17.

5 The system has a double meaning here, as much as it refers to the relationship between pieces of a set in which each has a specific function, as it refers to the strategy of organizing public health in the contemporary state. The attribution to the state of the responsibility of organizing the health of citizens, stems from the Enlightenment vision that attributes "the greatest wealth of a nation, the health of its people", as António Ribeiro Sanchez says in his "Treaty on the Conservation of the Health of the People," published in 1756, anticipating 19th century hygiene treaties.

6 On health policy, or its absence, during the Estado Novo, see Luís Graça (2000), *The old policy of the Estado Novo on health*, and the master's thesis presented to FLUP by Daniela Cristina da Costa Ribeiro, *Saúde no Estado Novo (1933-1974)*, FLUP, 2018, supervised by Professor Jorge Alves, and Francisco Ferreira, *History of Health and Health Services in Portugal*, Lisbon, Fundação Calouste Gulbenkian, 1990.

7 Bissaya Barreto, in a 1935 article, describes this model of organization of mental health services, which would later be the origin of Law No. 2006, of April 11, 1945. See the detailed description of the "system" in Ricardo Jerónimo Silva, Hospital and Assistance Architecture promoted by Bissaya Barreto, PhD thesis presented to the University of Coimbra, Coimbra, 2013, I volume, 213.

8 See Sandra Xavier and Paulo Providência (coord.), *Leprosaria Nacional - Modernidade e Ruína no Hospital Colónia Rovisco Pais*, Porto, Dafne editora, 2013.

9 The appearance of the dispensary as an element of screening for disease in an urban environment arises from the proposal of the French bacteriologist Albert Calmette (1863-1933), when he created in 1901, in Lille, the anti-tuberculosis dispensary Émile Roux. In Portugal, despite the construction of the Popular Dispensary of Alcântara financed by Queen D. Amélia in 1893, the coverage of tuberculosis screening occurs with the construction of ANT's dispensaries, from 1934 on in the district capitals, according to a project by Carlos Ramos.

10 These two models of organizing the "fight" against the disease reflected two attitudes towards the problem of a disease whose transmission was not consensual, oscillating between considering it by contagion or by heredity. See Sandra Xavier and Paulo Providência, ibid.

11 The recent rehabilitation of this building for the Center for Rehabilitation Medicine in the Centro Region, however, is indifferent to the intentions of organizing the complex, not establishing a design strategy for the complex and managing the building's rehabilitation based on partial and punctual options.

12 On the relationship between 19th century positivism, hospital construction and nature healing, see Paulo Providência, *A Cabana do Higienista*, Coimbra, Darq, 2000.

13 See the section "Healing by Architecture", in Cor Wagenaar (ed.), *The Architecture of Hospitals*, Rotterdam, NAI Publishers, 2006.

14 About Sanatoriums in Portugal, see José Carlos Avelãs Nunes, *A Arquitetura dos Sanatório em Portugal 1850-1970*, PhD thesis presented to the Universidade de Coimbra, 2017.

15 See Cristiane Passinho, *Estância Sanatorial do Caramulo: a Aculturação Experimental da Expressão Moderna*, Final Exam Bachelor's Degree, FCTUC-Darq, 2005.

16 The healing galleries of the early 20th century, already existed in the Sanatorium Sousa Martins in Guarda, a project by Raúl Lino from 1907, with metal pillars and slabs in plastered brick vaulting. The works to create the Parque da Saúde da Guarda did not proceed to the restoration of the old wards of the sanatorium, and are in decay.

17 António Pinto Santo, *O Combate à Tuberculose uma Abordagem Demográfico-Epidemiológica – O Hospital de Repouso de Lisboa (1882-1975)*, master's thesis presented at the History Department, Faculty of Letters of the University of Lisbon, 2010, 43, "Manuel Tapia, Spanish doctor and Director of the 'National Hospital for Infectious Diseases and Tuberculosis' in Madrid, and the 'Sanatorium of Fuenfria'", 52, highly influenced by German anatomical-clinical medicine, in a few years he gathered vast clinical and radiographic material that served as the basis for the elaboration of a treatise that would, for about a decade, be the reference textbook in the study of Pulmonary Tuberculosis.

18 In addition to sharing this restriction to galleries access, the Surgical Pavilion shares the location of the kitchen on its rear facade, to the north, like both the Santa Maria Sanatorium or the Abraveses Sanatorium in Viseu, built between 1932 and 1941 (see José Carlos Avelãs Nunes, 105). But contrary to the examples of Caramulo (Santa Maria and Cirurgico), the convalescent galleries of Abraveses have direct access from the wards, like the Sanatorium-Type model designed by Vasco Regaleira and adopted by Lopo de Carvalho in 1934, in João de Almada Sanatorium in Madeira and the D. Manuel II Sanatorium in Gaia.

19 André Tavares, *Arquitetura Anti-Tuberculose – Trocas e Tráficos na Construção Terapeutica entre Portugal e Suiça*, Porto, Dafne Editores, 2005.

20 The management has had some difficulty finding a use for the convalescent galleries to customize the experience of staying at the Hotel.

21 The most paradigmatic cases are the restoration and adaptive reuse carried out by Wessel de Jonge with Bierman Henket Architects, at the Sanatorium Zonnestraal (1928-1931), or the most recent restoration work carried out by Franz Graf and published in Franz Graf and Giulia Marino, *La buvette d'Évian: Maurice Novarina, Jean Prouvé, Serge Ketoff*, Gollion, Infolio Editions, 2018. Also, in this context, one may refer to the master's project by João Pedro Moura, *The Restoration of the Surgical Pavilion of Caramulo – Anchor project for the rehabilitation of the Sanatorial Estancia of Caramulo*, Master's Thesis presented to the University of Coimbra, 2020.

22 See Douglas Olson, "Changing hospital design in the USA", in Prasad, S. (ed.) *Changing Hospital Architecture,* RIBA Publishing, 2008, 194-196.

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