

# THE SANATORIUM TYPOLOGY, ITS RELATIONSHIP WITH NATURE AND ITS INFLUENCE ON BERLIN'S URBAN MORPHOLOGY

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## ABSTRACT

During the Second Industrial Revolution in the late 19th century, tuberculosis spread rapidly in slum-filled European cities. In the context of frequent health crises, great progress was being made in science and technology, following the discoveries of Koch and Pasteur and the studies of Brehmers on the therapeutic role of climate and environment. As a result, sanatoriums became a building typology of spatial and functional experimentation, effective for the treatment of patients suffering from pulmonary diseases.

Many sanatoriums were built in Europe, one of the largest being the Beelitz-Heilstätten near Berlin. Within a few years, the benefits of green spaces, sunlight and healthy air for patients was transferred from healthcare areas to urban areas and finally included in social housing policies. These elements have become part of typological experiments with great socio-spatial consequences.

In Germany, the Siedlungen consisted of one of these experiments, which led to the improvement of living conditions for the lower middle class. Here, communal and private green spaces became a part of people's lives in the

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city. This transformation was thanks to the commitment of authors such as Taut, Wagner Gropius, and Migge.

This contribution analyses the relationships of these 19th century sanatoriums with nature and how they influenced the spatial organization of contemporary cities. These experiments can provide architects with the opportunity to rethink the social role of architecture in helping to prevent future health crises.

### **Aims of the research and methods**

This contribution aims to investigate the relationship between nature and the sanatoriums of the 19th century and how these experiments have influenced the way people live, both then and now. These typologies can be used to reflect upon the social role of architecture and how certain architectural features can help prevent future crises in an effective and lasting way.

The crisis caused by tuberculosis at the end of the 19th century in Europe intersects urbanization and industrialization, challenging the combined forces of medicine and hygiene, influencing literature and, finally, testing the state's ability to implement adequate policies. The study of the socio-spatial consequences of this epidemic in Berlin provides interesting examples of design and technological approaches in the

*Figure 1. Representation of Dubrovnik with lazareths from the 18th century.*

*Source: Liber Viridis, Dubrovnik State Archives.*

search for effective solutions to improve the quality of the spaces humans inhabit.

Through the comparative method, this contribution will analyze the relationships between the spatial and technological innovations of sanatoriums and the typological and morphological innovations of housing design, particularly the Berlin Siedlungen. These different typologies will be compared in order to individuate similarities with respect to solar orientation and the relationship between living space and nature, thereby demonstrating that these health centers influenced social housing policies in Europe in the 19th century.

### **From spaces of isolation to those of care, or from the lazareth to the sanatorium**

Ever since humanity began to encounter health crises, it has always tried to find weapons of defense against their spread. Among the main forms of defense, isolation has been the most successful. It is a method which was used both in ancient times and modern times, as the COVID-19 pandemic shows.

Half a millennium ago, the Republic of Venice implemented a quarantine to combat the plague, confining individuals to two islands of the lagoon. At that time, Venice, which was a port of trade between the East and West, understood the contagiousness of plagues in general, and locations where designated where the sick could be isolated in order to preserve the safety of the rest of the community. In 1423, with a resolution of the Senate of the Republic of Venice, the island of St. Mary of Nazareth, was chosen to shelter people and store goods from countries infected by the plague, (Naphy and Spicer, 2004), which was soon accompanied by a second lazareth known as New Lazareth.

This model of epidemic containment, which Venice developed, quickly spread to the other powers of the time, especially to those orbiting the Mediterranean sphere of influence, and, in particular, the port cities on the Adriatic, which collaborated by building a network of hubs and regulations to manage the epidemic problem. For example, the city-republic of Dubrovnik decided to build the lazareths of Ploče just outside the city walls, between 1590 and 1642 (Fig.1).

As the years passed, especially in Europe, other methods were implemented to attempt to stem the damage caused by pandemics, but the basic idea remained isolation (Naphy and Spicer, 2004). Only in the 19th century would sanatoriums be tested. These buildings were constructed not only to isolate infected people and interrupt the chain of contagion, but also to promote healing. Several structures were built at seaside locations or where the quality of the air allowed a greater



chance of successful recovery against various diseases, especially pulmonary maladies. Colonies and sanatoriums were built all over Europe until the first half of the 20th century (Lindner, 2004). Inside them, doctors and scientists attempted to fight some of the deadliest epidemics, basing their therapies on wellness and curative treatments from a hygienic, social, and medical point of view.

*Figure 2. Historical photos of a Berlin slum on Spreestr 6, 1910. Source: Deutsches Historisches Museum, Berlin.*

### **European historical background and urbanization in the German Reich**

Industrialization, accompanied by the immigration of labor, especially during the second half of the 19th century, led the population in Europe to grow rapidly and to urbanize without any prior planning. In Germany, from 1871, the year of the unification under Prussia and the founding of the German Reich, to 1910, the population grew from 41 to 65 million people (Silvestri, 1915). After the unification, Berlin became the capital of the empire; it was the largest city in the Reich with 412,000 inhabitants. The city quickly developed into the largest industrial conurbation in Germany, comparable only to the Ruhr area. Under the pressure of immigration, the construction of housing in the capital could not keep up with the demand. Moreover, high residential density forced people to live in precarious conditions, i.e., in small apartments, thus increasing the risk of spreading diseases (Fig.2). In response to Berlin's rapid population growth, the Prussian Interior Ministry established a planning commission in 1858,

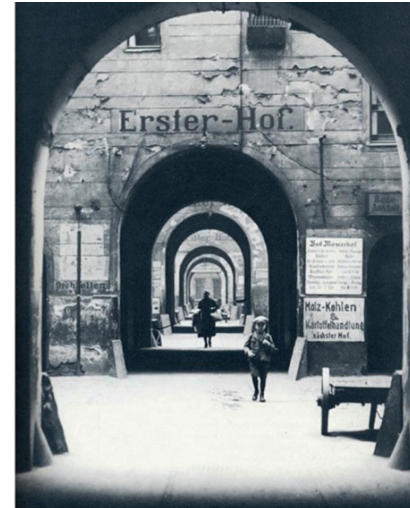
which was charged with developing an extension plan for the city, including improving infrastructure and extending the rail network so that the suburbs would be connected to the city center. Based on a projected population growth of two million, a master plan for the following decades was made, similar to the work of G.E. Haussmann in Paris (Kuck, 2010). In order to regulate the growth of the city, the Baumeister J. Hobrecht was commissioned with drawing up the development plan for the environs of Berlin in 1862. Hobrecht's plan was devised with the goal of reorganizing Berlin's urban fabric and road infrastructure in order to improve road conditions and hygiene. In this project, Hobrecht used the grid of a new street network by creating regular lots, within which residential complexes were built, mainly with rental houses, known as Mietskasernen (Kuck, 2010).

These "rental shacks", which emerged as an urban block, were buildings on a single plot, separated by small courtyards; they were intended to accommodate as many tenants as possible. These courtyards were mostly built and dimensioned for fire safety as they had to be min. 4.95 by 4.95 meters, which was the radius of a mounted fire hose (Bernet, 2004). They were also supposed to guarantee a better quality of life by providing healthy air and greenery. However, the reality was quite different and the plan, which provided only general guidelines, resulted in prolific development, favoring the interest of profit (Fig.3). By 1900, a dense belt of social housing had already formed around the center of Berlin. In the era of industrialization, a large part of the working population lived in the crowded Mietskasernen. Similar to the German Mietskasernen, tenements were built in the UK and USA, and caserne locative in France. Therefore, in a miserable and unhealthy Europe, in which masses of peasants poured into the cities in conditions of widespread precariousness, but also in the middle of industrial progress, epidemics and sanitary crises were rampant.

### **Epidemics, architecture, and nature: the typology of sanatoriums and the sanatoriums of Beelitz**

At the end of the 19th century, tuberculosis was one of the most contagious and widespread diseases in the large cities of Europe. Around 1880, the epidemic broke out in the courtyards of Berlin's Mietskasernen and was so widespread that almost one in three Berliners died from this lung disease.

In those years, there was great progress in science and technology, notably the discoveries of R. Koch and L. Pasteur and the studies of H. Brehmer on the therapeutic role of climate and environment in the treatment of tuberculosis (Seeli-



ger,1987). Despite these efforts, the possibilities of medical treatment remained limited and thus, the construction of dedicated spaces became a contemporary solution to attempt to overcome chronic diseases which were difficult to treat. The sanatorium became a building typology of spatial and functional experimentation.

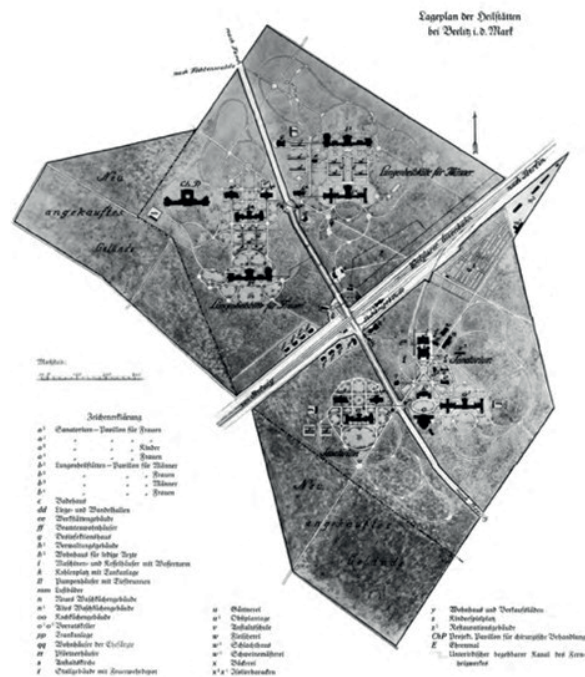
It was the physician Brehmer who, in 1854, founded the first sanatorium in Görbersdorf, in the Krkonoše Mountains of Silesia. It eventually became internationally renowned, thanks to the treatment of patients, who had access to a nutritious diet, therapeutic baths and favourable climatic conditions (Langerbeins,1979). In 1882, after Koch's discovery of the pathogenic agent of tuberculosis, stays in sanatoriums, initially accessible only to the upper classes, were also guaranteed to the poorest strata of the population. The Congress of Berlin in 1889 was extremely important from a scientific and organizational point of view as it was stated here in the concluding resolution that tuberculosis was a widespread disease and the fight against it had to be conducted with the means of the people. (Ilvento,1933).

Thus, in addition to sanatoriums for the wealthy classes, such as the one described by Thomas Mann in his 1924 novel, *Der Zauberberg*, the Magic Mountain, a network of popular sanatoriums reserved for the sick of modest status spread, especially in Germany and Switzerland, and began to appear in the vicinity of large cities. The sanatorium was no longer an alternative to the city but had become a cog in the urban machine and therefore, like factories, cemeteries or prisons, it was necessary for the functioning of the city.

In the German Reich, the largest complexes were the Beelitz sanatoriums, 40 km from the center of Berlin (Fig.4). The Berlin state insurance institution (LVB) opened them at the beginning of the 20th century as a general and pulmo-

*Figure 3. Meyer Hof in Ackerstrasse, Berlin, 1870. Section and ground plan of the largest Mietskaserne in Berlin, plot length: 141.32 m. Source: Geist, J. Archives.*

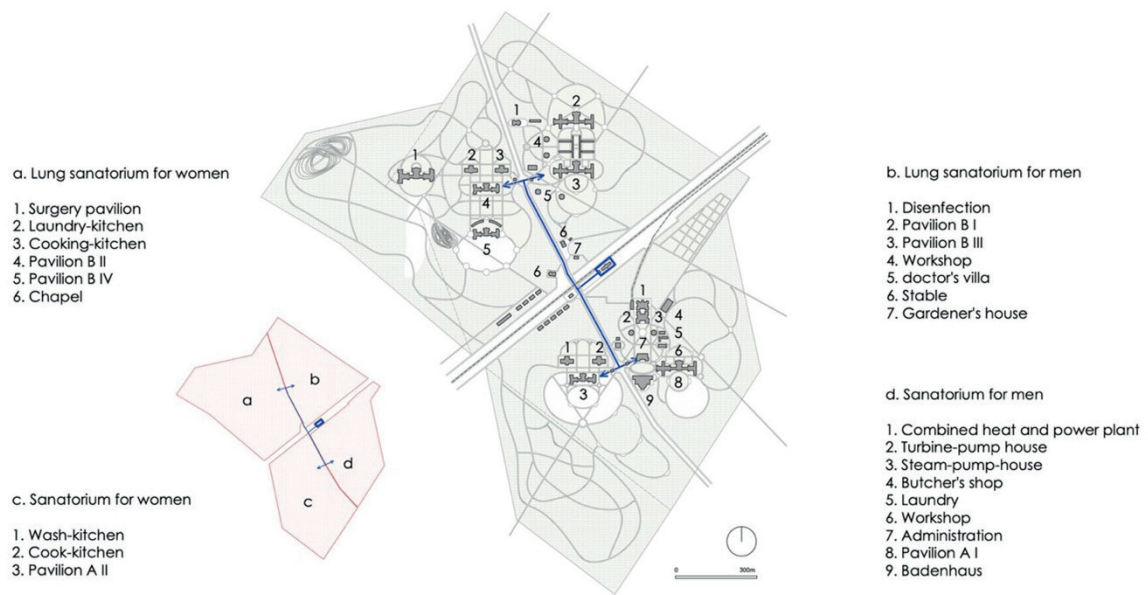
Figure 4. Site plan of the Beelitz sanatoriums, 1927, and Historical photos of the buildings into the extensive park forest. In the foreground the women's sanatorium, 1935.



nary sanatorium. They were in an area of forest covered with old pine trees northwest of the city of Beelitz and were conceived as “workers’ sanatoriums,” which served to treat and contain widespread tuberculosis among the poorer classes (Freund, 1902).

Treatment methods required adaptations to the buildings both architecturally and technologically: for example, absolute priorities were the salubriousness of the rooms and the highest well-being of the patients. Thus, sophisticated ventilation systems were designed for the first time to provide patients with fresh forest air in their rooms, while a completely new type of district heating plant produced hot steam for heating systems and cooking appliances in kitchens.

The urban structure, owed to H. Schmieden, a building con-



sultant in hospital construction, and his colleague J. Boethke, was defined by two intersecting axes: the Chaussee and the railway line. The complex was divided into four separate sections. To the north of the railroad, were two pulmonary sanatoriums, to the south, two other sanatoriums for more general afflictions. Female patients were housed to the west of the Chaussee and male patients to the east. This strict separation of patients served to limit infections (Freund, 1902) (Fig.5). Patients were housed and treated in the center of the quadrants in elongated pavilion buildings, oriented in a north-south direction; the purpose of this orientation was to give the patient rooms and corridors a southern orientation to obtain maximum sunlight (Freund, 1902).

The spatial principle of the north-south orientation of the buildings also served the organization of the open space near the buildings. In fact, an important component of the concept of therapy was recreational time in clean, open air. The design of gardens, parks and their equipment played an important role in the efficacy of treatment as much as the architectural and technological choices. For example, therapeutic walks in the old forest were possible via paths located in the large clearings in the vicinity of the buildings. As metaphors for idealized scenery, miniature landscapes referred to as "Alps" could be encountered along the paths (Fig.6).

As the largest sanatorium complex in the German empire, the Beelitz sanatoriums were of great cultural and historical significance. They set innovative standards for this type of construction and were already recognized by the experts of

*Figure 5. Urban planning and functional organization of the Beelitz sanatoriums, 2022, Source: Author's elaboration.*



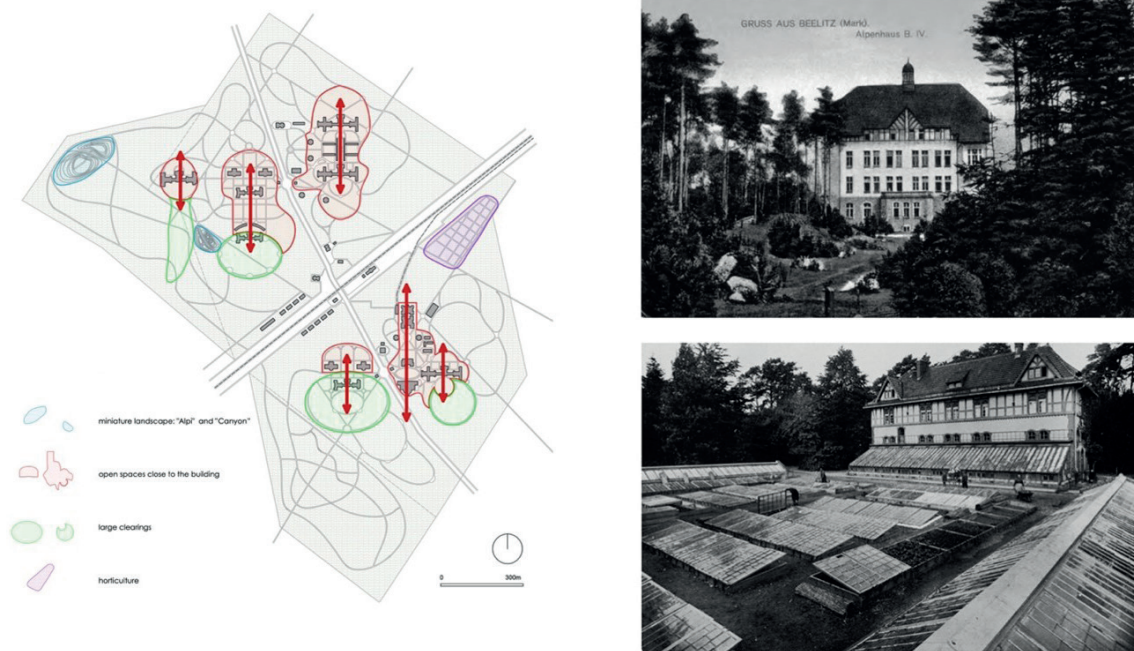


Figure 6. Spatial principle of the north-south orientation and open space organization, with gardens and parks and historical photos (1910) of the forest park, with horticulture of the Beelitz sanatoriums, 2022. Source: Author's elaboration.

the time as a particularly successful example. They not only document the efforts and resources deployed to combat tuberculosis at the end of the 19th century, but also open up interesting reflections on the subsequent typological investigations and morphological modifications of the city.

### From sanatoriums to Siedlungen

Many of the reflections on the relationship with nature and the attention paid to the benefits of sunlight and healthy air on patients were transposed from care spaces to residences and were eventually included in social housing policies. At the European level, the healthiness of spaces, direct sunlight and green areas began to be an integral part of typological experiments, aiming to improve the lives of the working masses. The biggest problem in German cities at that time was housing for newcomers and the establishment of adequate standards of living. There was sharp criticism of the compact urban development model of 19th-century Berlin and the Mietskasernen, a criticism that was echoed in the International Exhibition of Urban Planning in Berlin in 1910, and in numerous writings by W. Hegemann, K. Scheffler, P. Wolf, as well as many of the future protagonists of the Wohnungspolitik of the Weimar Republic. In this context of experimentation on residential spaces and urban renewal, the residential architecture of the 1920s in Germany, and in particular the creation of new settlements or Siedlungen in the suburbs of large cities, led to the improvement of living conditions of the lower middle class. Architects such as B. Taut, A. Loos, M.



Schütte-Lihotzky, E. May, M. Wagner, W. Gropius, O. Haesler and L. Fischer made innovative proposals and significant interventions both in Germany and Austria.

In the space of a few decades, Berlin moved from the *Mietskasernen* to the *Siedlungen*, where green communal areas or private gardens, became a part of the city and the lives of its citizens. From a typological point of view, the free-body constructions that characterize the rationalist *Siedlungen* proposed a substantial change to 19th-century urban development. Their position, which requires a completely free division of the land, depends on heliothermal conditions rather than on the general form of the neighborhood. The construction of these bodies is completely unconstrained by the street and common and private green spaces are of particular importance (Rossi, 1966). At the beginning of the 20th century, these typological experiments led various architects to design *Siedlungen* no longer along the street but freely arranged in green areas. Emblematic projects in Berlin were the *Hufeisensiedlung* in Britz, the *Onkel-Toms-Hütte*, and the *Weißer Stadt* or the *Siemensstadt*, in which architects such as Wagner, Taut, Scharoun and Gropius worked.

The *Siedlungen*, as for the sanatoriums, imitated the metaphorical paradigm of a village, towards which research on the design of new urban areas gravitated throughout the twentieth century (Gravagnuolo, 1991). Within this context, green spaces had a fundamental role in generating a healthy and autonomous life for residents. Moreover, green areas were not only important hygiene for urban planning, but

*Figure 7. Historical photo, Hufeisenvorplatz with Fritz-Reuter-Allee promenade, 1926. Source: Arthur Köster, Berlin State Archives.*

they were also a political choice for L. Migge (Migge, 1999), a German landscape architect, who collaborated with many important architects of the time from Vienna to Berlin, passing through Frankfurt, Breslau and Dessau. He proposed a territorial reorganization according to which industrial cities would incorporate agricultural plots for each family, allowing them to be close to nature, purifying the urban environment, and providing the capacity to withstand future health crises. Migge's ideas were not limited to individual dwellings but extended to collective housing and even to the entire city, as he stated in his text *Deutsche Binnen-Kolonisation* (Migge, 1926). Migge tried to integrate the spatial concept of the *Stadtland Kultur*, city-territory culture, (Migge, 1924), into the residential development of some German cities. He succeeded in collaborating on several *Siedlung* projects, such as the *Britz Siedlung* (1925-31) in Berlin. In this *Siedlung*, also known as *Hufeisensiedlung*, Migge, invited by the GEHAG company, collaborated with Bruno Taut in designing the productive gardens for 1,285 houses (679 single-family houses) (Fig.7). The shape of the "horseshoe" plan, was a response to the topography of the land and a social idea by Taut, which grouped rows of three-story houses around a large shared interior space, organizing the more than one thousand houses according to four typologies.

Another example of *Siedlung* experimentation is the *Carl Legien* housing complex, which was designed in 1925 by F. Hillinger, then head of the GEHAG planning office. It included 1,145 apartments and was built between 1928 and 1930 according to the design of Taut and Hillinger himself. *Wohnstadt Carl Legien* is the most urban and compact of the social housing complexes of the Weimar Republic. As this was part of Hobrecht's plan of 1862, the architects did not create a free and open settlement composition like that of *Britz*, but instead used city-typical spatial planning schemes with city blocks. Taut and Hillinger designed a residential complex consisting of six elongated U-shaped apartment blocks with green inner courtyards. In this way, despite the high residential density, the settlement appeared to be surrounded by greenery. All the apartments were oriented from the street towards the garden courtyards that ran through the main street. (Fig.8).

### **Conclusions and possible implications**

Sanatorium therapy combated tuberculosis with rest, improved nutrition, and fresh air, and remained the only remedy until the development of antibiotic therapy in the 1950s. The sanatorium was an instrument of healing, in which ar-



chitects and doctors collaborated. They designed and built a suitable and distinct environment, which combined architectural typology with hygiene-based therapeutic evolution. Its typological achievements, i.e., the recognition of the importance of green areas and the introduction of technological hygienic-sanitary systems, together with spatial experiments, were integrated into the new social housing buildings in order to improve the living conditions of city inhabitants and prevent further epidemics. These innovations in the design of residential buildings led to the transition from the Mietskasernen with closed courtyards to the Siedlungen with large green spaces and communal gardens, which subsequently optimized the distribution of space inside the house.

Pandemics are nothing new, but the variables are and will be different, e.g., demographic, technological resources, speed of transmission. Exploring the reasons that linked a disease such as tuberculosis to the need to rethink spaces through the design of architecture and the city promotes reflection on how effective and lasting solutions to health crises cannot be entrusted only to pharmaceutical advances and technology in general. An accurate consideration on the spatial situation of cities and habitat is essential. Health crises will need to be confronted by architects with the awareness that the places in which humans live are a small portion of the entire planet, and the evaluation of the transformations for which humans are responsible cannot but cross different scales, from a microscopic virus to macroscopic habitats.

*Figure 8. Postcard of Wohnstadt Carl Legien, 1930.*

*Source: Berlin Central and State Library.*

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