Modern school buildings for secondary education: main principles and design concepts. The Portuguese and the international production of the 1930's.

“The New Architecture is not exclusively the work of architects, for which reason our researchers cannot be conducted from the point of view of architectural and technical considerations alone. Its sphere of action includes all human problems and acquires its ideas and contributions from the most varied sourced provided by science, technics, economy, art, etc.”

Alfred Roth, 1975

Attempting to reflect upon the direction of modern architecture of the 30's, “La nouvelle architecture, Die Neue Architektur, The New Architecture. 1930-1940” published by Alfred Roth in 1939 collected twenty European and American buildings presenting different contemporary understandings of modern examples.

The wide-range examples selected by Roth fulfill the predefined criteria that defined what he called New Architecture. Beyond the criteria of the establishment of social use of each example, Roth refers the need of the perception of architecture as an immediate and clear expression of one's own time in order to consolidate its values. New Architecture should express a clear spatial structure, a clear constructive execution and a proper application of materials, which should ensure the beauty and the frankness of the building, and should incorporate the new contributions from the most varied sources provided by science, technics, economy, art, etc.

The selection of two school buildings for this book, one in Europe and another in USA, allows us to understand how the principles of New Architecture were assimilated in the school building design of the 30's to give an answer to the required educational and economic demands.

The École de Plein Air in Suresnes, Paris (1931-35), by Beaudouin and Lods, is identified as a representative building due to the attention given to the economic claims through the incorporation of industrial manufacturing and standard elements in the construction process.

1 In order to make it more accessible this book was published in three languages: french, german and english. Republished in 1975, the preface of this edition, written by the publisher H. Girsberger, refers the extraordinary success of the work in 1939, expressed by the reviews of The Architectural Review and the RIBA, and by the numerous advanced orders received from all over the world. However, after the publication, the break out of World War II was responsible for the cancellation of many foreign orders, eliminating the awaited impact. Nevertheless, the book was republished as the original version, including the introduction written by Roth “The Reality of Modern Architecture”, with a new epilogue, “Modern Architecture – Today!”.
This open-air school was designed in order to serve a strong social purpose in receiving exclusively unhealthy children that could not go to regular schools. The main block, with two floors and 200m of length, receives the entrances and the common spaces that are organized in an open plan layout with a strong permeability between spaces reinforced by the ramps (replacing the stairs) that link the floors. Running parallel to the main street, its placement reveals a clear understanding of the site’s orientation and morphology, protecting school spaces from the north wind and facing them to the south and to the green outdoor spaces. Separated from the main building, but connected with it by covered walkways, the classrooms and the medical unit are independent pavilions, allowing the required direct contact with outdoor conditions, natural ventilation and illumination of the interior spaces. Entirely glazed folding doors can be opened for the full length of the classroom’s wall and south façades of the main building allowing the fulfillment of hygienic and educational requirements that demanded the permanent contact with the outdoor spaces. The north façades hardly have any windows and the pebble finish standardized parts that build its walls, give an effect of cohesion and harmony with the natural surroundings.

École de Plein Air in Suresnes (1931-35) and Corona Elementary School in Los Angeles (1934-35)

Roth also selected the new building of the Corona Elementary School, in Los Angeles (1934-35), designed by Neutra. With this school Neutra had the opportunity to develop his idea about school building design based on the redesign of the classroom space as the elementary unit of the school building, with the improvement of lighting conditions allowing a more flexible and free use of its space, and on the promotion of the permeability between interior and exterior space. The single floor plan served this purpose and allowed a more simple and economic structural solution (light timber framed construction), using prefabricated elements that permitted a faster construction process and future extension if necessary. At the same time, this solution fulfills the required local earthquake regulations. Other schools built in Germany at the end of the 20’s, designed by May, Schule, Schumacher and Taut, as well as the Groupe Scolaire Karl Marx (Villejuif, Paris, 1929-33), by Lurçat and the Open-air school (Amsterdam, 1927-30), by Duiker and Bijvoet, could also be added to Roth’s
These school buildings underline new principles in the school design in Europe, replacing the monumental scale of the beaux-arts school for more functional and hygienic models. The functional and rationalist principles of modern architecture based on the use of new materials and construction technologies to design a new spatiality were seen as the right expression of the new pedagogical principles developed by the New Education Movement, based on respect for the child’s own individuality and capacity. These principles required a more flexible and open spatial structure, promoting an active methodology in the learning process, co-education, a healthier life and the connection with nature. In addition to new educational demand, also the economic condition required a new architectural solution for school building design based on the development of new technical, constructive and rational solutions.

Friedrich Ebert-Reformschule (May, 1928-30) and ‘Mammoth School’ (Taut, 1927)

‘Type Shuster’ School (Schuster, 1927) and Walddörferschule (Schumacher, 1930)

Seen as the unit of school design, the classroom was redesigned in order to allow a more active learning through the replacement of its traditional rectangular layout to new centralized configurations (based on the square and hexagon) and by the proposal of a new spatial transparency that promoted the direct contact with outdoor spaces. School furniture was also (re)designed in order to serve the new pedagogy, replacing the heavy seats fixed to the floor for tables and chairs of lighter material, easier to move and allow different arrangements. The importance given to the influence of the school buildings in the city areas determined a new social impact and urban lifestyle through the openness of school spaces to the neighborhood community. The open-air school built within a residential courtyard in Amsterdam promoted this idea, as well as in Lurçat’s school for Villejuif through the

2 Taut’s ‘mammoth school’ and Duiker’s Amsterdam school.
separation of the gym facilities allowing its use by the community, and in Taut’s ‘mammoth school’ designed like a small city to occupy the inside of a large residential block, where the community could use all the common spaces of the school.

In Portugal, during the twentieth-century, it is possible to identify different periods in the design and construction of school buildings for secondary educations (liceus), some of them acknowledged with the beginning of the modernist period (30’s). The liceus from the first period (Liceu de Beja (1930-34), C. da Silva; Liceu de Coimbra (1930-36), C. Ramos, Liceu D. Filipa de Lencastre (1932-40), J. Segurado) followed an architectural language marked by the adhesion to the principles disclosed by the Modern Movement. The design of these Liceus was a result of a competition launched by the Portuguese Government in 1930, constituting an opportunity to define the programmatic, pedagogical and hygienic requirements for the secondary buildings. The allocation of the programmatic spaces in different functional clusters that had its correspondence in distinctive and autonomous volumes hierarchically and rationally organized had a large impact in their design. Furthermore, the improvement of existing physical education facilities (gym and swimming pool) by the adding of interior support spaces and exterior facilities; and the definition of the typological organization of the classroom block by its allocation along corridors, influenced school building design.

The school layout followed a classical symmetrical composition where different volumes\(^3\) were organized around a courtyard. This space lost the spatial significance of the traditional collegial courtyard typology due to a new proposal for the circulation scheme. Long and large circulation galleries and a rigid division of spaces characterize the internal space that had no physical permeability between it and the outdoor space, as we can see in the examples from Europe and USA.

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\(^3\) The different volumes housed facilities for physical education, classrooms, workshops and the headmaster’s residence.
The classroom block layout was organized according to a formal teacher-centered learning model, where the classroom was the core unit of the school’s spatial programming. The design of this space followed the traditional rectangular layout of the classroom where students were aligned listening to the lesson given by the teacher. Without questioning or proposing a new educational program for its design, the new approach was aiming at the improvement of physical conditions and hygienic requirements of the buildings. Attention was given to lighting and ventilation of interior spaces through spatial ampleness and large windows permitted by the use of reinforced concrete. However, the bilateral lighting and transversal ventilation of the school buildings built in the beginning of the century were abandoned, thus breaking the permeability between the internal spaces.

The only intention given to the need of a more active learning was expressed in the functional program for the schools, integrating specific classrooms for drawing, chemistry, physical and natural sciences labs; sports facilities (gym, outdoor sports fields, swimming pool); and workshop spaces.

The use of a new material – reinforced concrete - allowed the exploration of a new modernist formal vocabulary based on pure articulated volumes with flat roofs, without decorative elements, expressing rigorous geometry and clarity, underlined by the uniform finish of their plastered and painted surfaces. Also, the integration of new materials in the construction allowed the hygienization of the internal spaces: the use of marble stone in the finishing of the surfaces, chromium plating components, and tiles in the circulation and learning spaces.

These schools were built in new urban areas with the intention of occupying a prominent place. The urban scale of these buildings did not differ from the ones dated from the beginning of the century: the scale of the interior spaces, the lack of permeability to the outdoor spaces, the setting back of the school building and the closing of its outdoor spaces to the urban surroundings. Once again the school building is seen as a representative building and not as an integrated element promoting the meeting of different communities of the school neighborhood.
Regarding the international scene, the principles defined by the new educational requirements in the 30’s were recognized and assumed by modern architects in their school building proposals. Modern architecture allowed a clear, open spatial structure and constructive process, economical and diversified technical possibilities to give an answer to educational requirements. The monumentally of the old schools was replaced by the human scale of the modern school buildings, also changing its role in the urban environment.

In Portugal, the process of school building design in 30’s didn’t assimilate the new educational and architectural modern principles the same way as they happened in Europe and USA. The social and educational reform movement that occurred in Europe didn’t find expression in Portugal, in spite of the improvement that was given to the promotion of a more active learning, to the practice of physical education, and to the improvement of health conditions in secondary schools. Despite the development of a new architectural modern vocabulary based on the potentialities of the reinforced concrete system, the lack of an effective cultural and educational reform and ideology prevented the innovation in school building design that would promote new spatiality expressing the new social consciousness referred by Roth.

References:
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