

Dr. Dipl.-Ing. Maria BOSTENARU DAN
researcher
Department of Urban and Landscape Design and
Centre for Architectural and Urban Studies
"Ion Mincu" University of Architecture and
Urbanism

Graduate of the University of Karlsruhe (1999), Maria Bostenaru Dan spent more than a decade doing research abroad in the field of protection of 20th century heritage from disasters before returning to her home country of Romania.



Academic councelor Dipl.-Ing. Alex Dill, architect
Chair Architecture and Design
Institute of design, art and theory
Karlsruhe Institute of Technology
Germany

Board member and chair of docomomo Germany, and of THICOM, the international board for the conservation of the Tugendhat villa, Alex Dill has more than a decade of experience in research on conservation of Modern Movement architecture.



Prof. Dr. Arch. Cristina Olga GOCIMAN
Department of the Doctoral School
"Ion Mincu" University of Architecture and
Urbanism

Cristina Gociman has made a career in both teaching and architectural practice. In research, her special field is disaster management. 2012 she was the chair of the National Architecture Biennale in Romania, when also the itinerary exhibition on Romanian architects creators of cultural heritage started, focusing on the 20th century.

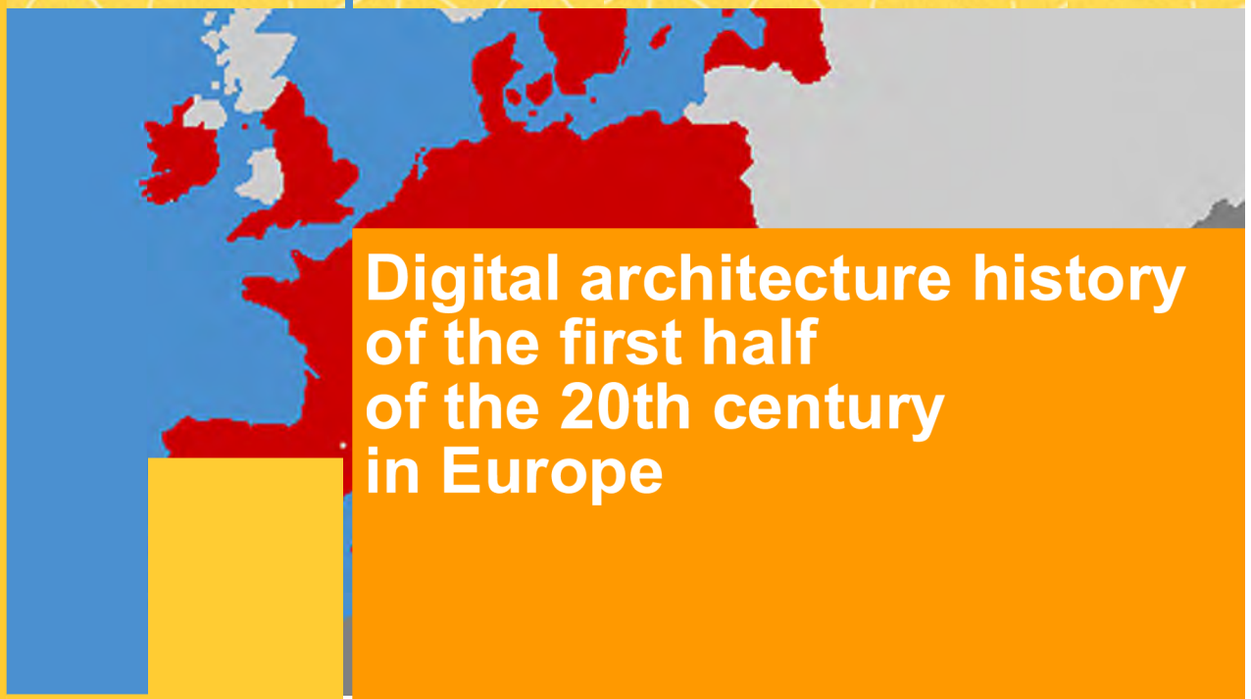
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Centre for Architectural and Urban Studies
"Ion Mincu" University of Architecture and Urbanism

Maria BOSTENARU DAN
Alex DILL
Cristina Olga GOCIMAN



Digital architecture history of the first half of the 20th century in Europe

EDITURA UNIVERSITARA ION MINCU

Digital architecture history of the first half of the 20th century in Europe

Maria Bostenaru Dan

Alex Dill

Cristina Olga Gociman

"Ion Mincu" Publishing House
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About the authors



Maria Bostenaru Dan

Dr. Arch., researcher, Department of Urban and Landscape Planning, “Ion Mincu” University of Architecture and Urbanism

Dr. Dipl.-Ing. M. Bostenaru Dan is Universität Karlsruhe/Germany graduate in architecture (1999), specialisation urbanism. Within the project "Preservation of historically relevant constructions" she did a building survey in Poland and was employed as research assistant for "Strong earthquakes", both CRC at alma mater. With a DFG scholarship/GK “Natural Disasters” in Karlsruhe and a Marie Curie Training Site in Pavia/Italy research was done on "Applicability and economic efficiency of seismic retrofit measures on existing buildings". She was experienced researcher for "Preservation of historic reinforced concrete housing buildings across Europe", a Marie Curie Intra-European Fellowship in Pavia. She returned to Romania with a Marie Curie Reintegration Grant on "The innovation in the plan of the current floor". Since 2008 she is employed researcher at the "Ion Mincu" University of Architecture and Urbanism, permanent position. There she was involved in CNCSIS project "Arts, Urban Communities, Mobilisation" and in two Architects' Stamp co-funded project: Tzigara-Samurcas archive and urban route Virginia Haret. She is project member at the "World Housing Encyclopedia" since 2001 (editorial board 2003-2006), did consulting in a CNMP project of the University of Bucharest "Multihazard and vulnerability in the seismic context of Bucharest city" and was employed in a CNCS project at the same on "Spatial and temporar patterns of vulnerability" as well as co-teaching the course "Risks" at the "Ion Mincu" University. She is MC member at the COST actions "Semantic enrichment of 3D city models for sustainable urban development" and "The EU in the new complex geography of economic systems", spending several months in Portugal and steering committee member of the ESF "Network for Digital Methods in Arts and Humanities". She had Canadian Centre of Architecture support and a DOMUS grants from the Hungarian Academy of Sciences. Currently postdoctoral researcher/EU funds in geography.



Alex Dill

Dipl.-Ing., architect, academic councelor, Department of Architecture and Furniture, Karlsruhe Institute of Technology, Germany

1982 Studies at TU Darmstadt (Diploma Architecture)
1983-89 project architect in the office of Mitschler Architekten, Mannheim, Novotny+Mähner Architekten, Frankfurt, Bucschmann Architekten, Offenbach
1984 member in the "Chamber of Architects Hessen"
1989-92 founding of own office for Architecture+Design in Darmstadt
1992 teaching assistant professor at Faculty of Architecture, TU Karlsruhe / Institute of Building Design / Prof. Rüdiger Kramm
main research: contemporary architecture in France and in Germany
1996 member "Atelier Europeen – Technologe de l'Architecture"
2002 start of the research innitiative on German-Russin Avantgarde Architecture "The architectural heritage of the 20th century – exhibitions and symposia, International conferences, expositions, excursions, workshops, contributions to current building research and refurbishment practice
2002 visiting professor at the University of Bologna
2004 visiting professor at the University of Moscow / MARCHI
2004 member of "docomomo International"
Since 2006 board management of "docomomo Germany"
Since 2007professorship for the chair "architecture + design", institute of design, art and theory at the University of Karlsruhe – KIT
2006-08 curator for book and exhibition project "Rsearch + Preservation of Modern Movement Buildings"
2008 visting professor at the University of St. Petersburg / St. P. State University
2010 member of the "Deutscher Werkbudn / Baden Württemberg"
2010-12 member of the "THICOM – International Commmission of Experts for the Tugendhat House, Brno"
2010-14 Chair of "docomomo Germany"



Cristina Olga Gociman

Prof. Dr. Arch., Department of Advanced Studies, "Ion Mincu" University of Architecture and Urbanism

- Graduated from the Architecture and Urbanism "Ion Mincu", 1977
- Doctorate "Relationship management – architectural ecosystem in the reconstruction of calamitated zones", 1999
- Full professor for architectural design, also teaching the course "Protection of settlements against risks", "Ion Mincu" University of Architecture and Urbanism, scientific secretary (2008-2012), since 2012 president of the professional department of the senate
- Author of numerous articles, essays, architectural chronic, books, interviews and organiser of events
- Journalism award SLAST 1985
- Poetry prize "Alpha 85" – Dacia, Cluj
- Architecture prizes, many of them prize awarded
- Author of urbanism plans and of architectural projects, architecture office S.C. CRIBA DESIGN S.R.L.
- Principal investigator on projects about architecture and urbanism strategies for vulnerability reduction
- Commisioner of the 2012 Romanian National Architecture Biennale
- vice-president of the Bucharest territorial branch of Romanian architects 2001-2010

Abstract

The book proposes a survey of buildings from the first half oft he 20th century in Europe. A first article will give an overview of the spread of the buildings from this time in Europe, focusing on a new construction material: the reinforced concrete, on the basis of a chapter from the doctorate thesis of Maria Bostenaru supervised by Cristina Gociman. For the documentation of these, Maria Bostenaru did study trips to investigate the buildings on site in the past 15 years. At the basis of these study trips was the literature review in the field, from which we highlight the references provided by a study seminar at the University of Karlsruhe about architecture in the first half of the 20th century in Eastern Europe and the series of books on 20th century architecture by Prestel. Apart of this monographs dedicated to the countries subject of the research were consulted. The result of the research on site were mostly the investigation through photography of the facade, which displayed a new language compared to the previous period. Where it was possible, this was combined with the investigation of the interior space. Also, sources of the floor plan were looked for, from the references but mostly from archives. As a result, the book includes a review of the study trips documentation, with example images, references and the connection to the online database of photography. The online database built the subject of a common research of Maria Bostenaru with Alex Dill during a short visit funded by NeDiMAH at the Karlsruhe Institute of Technology and the goal of this publication is to document this database. Browsing the database is predecesed by forms on selected architects, for which we present also the biography, along with main works and visual material. In the idea of forms are also the posters of Cristina Gociman about Romanian architects which created cultural heritage during this time. The research thus started at the University of Karlsruhe, where Alex Dill, chair of DOCOMOMO Germany (The association for the documentation and conservation of buildings, sites and neighbourhoods of the Modern Movement) approached the second pillar of the association apart of documentation: conservation. A series of workshops were dedicated to invite specialists from different countries, thematically organised, who were involved in conserving these buildings. The book contains reviews of these conferences and a chapter by Alex Dill about this conservation.

Acknowledgements

We gratefully acknowledge the support of NeDiMAH (Network for Digital Methods in Arts and Humanities) funded by the ESF (European Science Foundation) in making this collaboration possible between the first and the second author, which builds on more than a decade of separate research, but which started on a common ground in Karlsruhe and led to a NeDiMAH short visit in 2013 in Karlsruhe. In Romania, the research led to the doctorate of the first author under the supervision of the third author.

We gratefully acknowledge the support of NeDiMAH also in making possible to print this book.

The study trips which led to this database of images of the architecture in the first half of the 20th century were seldomly self purpose, but mostly linked to conference and other meetings participation for which funding has been provided to the first author. This way, one can talk about seeing if not the world then Europe, and particularly European architecture of the time, through science. The funding for each particular conference is mentioned at the respective place. This includes COST/ESF, ESF, DFG, the Marie Curie Fellows Association, EGU, and the European Commission through conference and Marie Curie grants.

From this fundind we wish to highlight Marie Curie Reintegration Grant for the project PIANO "The innovation in the plan of the current floor: Zoning in blocks of flats for the middle class in the first half of the 20th century", which contributed also to the doctorate research.

Funding for the projects of the co-authors was separate. The conservation research in Karlsruhe has been funded by Beton Marketing Süd as sponsor. The historic research in Bucharest has been funded by AFCN along with the Romanian Cultural Institute.

The publication at the “Ion Mincu” University Publishing House has been kindly approved by Prof. Dr. Arch. Emil-Barbu Popescu.

Bucharest and Karlsruhe, April 2015

Table of contents

About the authors **3**

Abstract **6**
Acknowledgements 7

1. Introduction **11**
1.2 Methodology 11

2. Modernism in Bucharest / Maria Bostenaru **12**

3. Historic development of 20th century Romanian heritage / Cristina Gociman **26**

4 Geographic spread of early reinforced concrete buildings / Maria Bostenaru, supervision Cristina Gociman **41**
4.1 The emergence and spread of reinforced concrete, from the contribution of industry until the approach to housing 43
4.2 The urban and architectural resonance of the introduction of early reinforced concrete 59

5. 7 years dedicated to the conservation of the Modern Movement heritage The Conference Series "Das architektonische Erbe – zum aktuellen Umgang mit den Bauten der Moderne" (Architectural heritage – about the contemporary approach to the buildings of Modernity Karlsruhe, Germany 2004-2010 / Alex Dill (conference), Maria Bostenaru (review) **63**
5.1 Introduction 63
5.2 Russia and Germany 64
5.3 The Netherlands and Russia 65
5.4 Italy (and Czech Republic) 65
5.5 France 67
5.6 Sweden (and Scandinavia) 68
5.7 Great Britain 69
5.8 Russia (and Germany) 70
5.9 Conclusions 70

6. Technology in the Architecture of Modernism The architectural heritage 10th anniversary conference in Karlsruhe on architecture – theory and practice / Alex Dill (conference), Maria Bostenaru (review) 73
6.1. Introduction.....73
6.2 Conference 74
6.3 Conclusions.....77

7. About use trails and patina – at the end of the conference „Original and replacement“ / Alex Dill.....82

8. ORIGINAL + REPLACEMENT / Alex Dill.....100

9. Modernism in Europe „About the role of Werkbund neighbourhoods in European context“ - Werkbund neighbourhoods in contemporary Europe...../ Alex Dill
9.1 The Werkbund neighbourhoods in Europe 104
9.2 The Werkbund,.....105
9.3 Modernism as (common) cultural heritage in Europe 107
9.4 Building culture in international comparison (European cultural heritage / world heritage) 108
9.5 International exchange and expertise 110
9.6 Chronology.....112
References:.....112

10. Book review: Mendelsohn - Der Einsteinturm. Die Geschichte einer Instandsetzung. Norbert Huse (ed.) / Maria Bostenaru 116

11. Forms / Maria Bostenaru 126
11.1 Branco, Viriato Cassiano (1897-1970).....126
11.2 Bordenache, Richard (1905-1982) 132
11.3 De Finetti, Giuseppe (1892-1952).....137
11.4 Fränkel, Rudolf (1901-1974).....139
11.5 Ponti, Gio (1891-1979) 144
11.6 Cantacuzino, George Matei (1899-1960).....149
11.7 Delavrancea-Gibory, Henrieta (1894-1987).....155
11.8 Creangă, Horia (1892-1943) 163
11.9 Janco (Iancu), Marcel (1895-1984).....170
11.10 Muzio, Giovanni (1893-1982).....176
11.11 Haesler, Otto (1880-1962).....183
11.12 Plečnik, Jože (1872-1957).....189

11.13 Terragni, Giuseppe (1904-1943) 195
11.14 Andreescu Haret, Virginia (1897-1962) 202

12. Forms for architectural guide Eastern Europe – example: Hungary/ Maria Bostenaru 209
12.1 DER NATIONALSTIL 209
12.1.1 Ödön Lechner 1845 Pest - 1914 Budapest 209
12.2 JUGENDSTIL 212
12.2.1 Hungarian architects of Art Nouveau. 212
12.2.2 The Viennaise architects Otto Wagner and Josef Hoffmann build only a few buildings in Budapest. 214
12.3 IRON CONCRETE CONSTRUCTION and HOUSING CUBES 215
12.3.1 István Medgyaszay (original name: Benkó) 1877 Budapest - 1959 Budapest 215
12.4 NATIONAL ROMANTICISM 217
12.4.1 Aladár Árkay 1868 Timisoara - 1932 Budapest 217
12.5 THE FACADE OF BLOCKS OF FLATS AND SHOPS SOCIAL HOUSING 220
12.5.1 Béla Lajta (original name: Leitersdorfer) Budapest 1873 - Wien 1920 220
12.5.2 József Vágó Oradea 1877 - Paris 1947 223
12.5.3 Béla Málnai 1878 Budapest - Budapest 1941 226
12.6 THE AVANT-GARDE IN EXILE 228
12.6.1 Lajos Kassák 1887 Ereskujvár - 1967 Budapest 228
12.6.2 Laszló Péri 1899 Budapest - 1967 London 229
12.6.3 Vilmos Huszár 1884 Budapest - 1960 Paris 230
12.6.4 Fréd Forbát 1897 Pécs - 1972 Stockholm 230
12.6.5 László Moholy-Nagy 1895 Bácsborsód - 1946 Chicago 231

13 Study trips to interwar and turn of the century (forerunners) architecture / Maria Bostenaru 233
13.1 Trips after the reintegration grant 235
13.2 Trips during the reintegration grant 289
13.3 Trips during the main Marie Curie fellowship 313
13.4 Earlier trips 324

Further references 333

1. Introduction

This study is a follow-up of a doctoral thesis in the field, which dealt with the buildings from the first half of the 20th century. There was a pre-study on the preservation of historic reinforced concrete housing buildings across Europe, which dealt with decision in seismic retrofit, while the next one dealt with the European features of the spatio-functional organization of buildings from this period. The focus on seismic retrofit led to questions on intervention on and conservation of these buildings. This led to a successful virtual collaboration supported by short visits on the conservation of the Modern Movement. Along with the geographic differences given by the spread of the building typologies in the first half of the 20th century, characteristics in conservation and in spatio-functional organization were researched, too. While thematic essays feature these aspects, the organization in forms gives the parcour of architect's performance in different countries and of the image of the countries themselves.

1.2 Methodology

The research aimed to document comparatively the spread of mainstream architectural styles along with specifics across Europe. Different typologies, both in their façade and in their interior organization, lead to different needs in conservation. One research method employed was the study on site. For this study trips were organized, as documented in the book. For each study trip an urban route has been designed, based on the information in the literature provided, or on the information from a seminar in Karlsruhe. Apart of the exterior view, to document the façade and style, interior visits were aimed whenever possible. Such tours are sometimes part of raising awareness in the cities towards this heritage and part of the conservation strategy. Along with the geographic tours the vita of the architects active in the respective cities and their main works built material to forms. From urban scale to building scale the interior space was documented in archival research. Another research method was the invitation to experts from the respective countries. For this the second author invited experts to present their conservation approaches in Karlsruhe, both in lecture and in exhibition. The contributions to this book review these approaches. For Bucharest the materials flew into an exhibition related to the historic not geographic development: landmark buildings for each year.

2. Modernism in Bucharest / Maria Bostenaru[1]

The built substance in Bucharest was analysed both typologically and sub-area wide, employing urban area survey methods, which allowed identifying the morphological types in the building stock[2]. The "interwar" building class, that constitutes an architectural landmark, but proved to be the most vulnerable to earthquakes, being founded on alluvial soft soil deposits with high ground water level and having in most cases a seismically inadequate conformation, has potential to prove how early multidisciplinary collaboration resulted in better performance.

Seismic building damage depends on the ground motion (amplitude, frequency, shaking duration) and the building structure (resonance period related to subsoil local transfer) characteristics. The destruction amount in Bucharest was attributed mainly to the so-called "Mexico-city" effect on alluvial soil deposits. This layer amplified the seismic site response in the period range critical for pre-damaged interwar buildings[3], with structures designed for gravitational loads only, altered unfavourably to later function changes. The fundamental period of the flexible Modernism skeleton structure buildings was 0.7-1.6s, a range which corresponds to the spectral maximum obtained for the only reliable accelerogram recorded in Bucharest during the 1977 Vrancea earthquake.

The hydrostatic level varies from 1–5 m in the meadows to bellow 10 m in the plains. Soil-structure interaction is important also for the problematic foundations of these buildings. The architectonic landmarks of Modernism in Romania, located on unfavourable sites according to seismic microzonation, would perform bellow satisfactory in an earthquake with similar spectral content to the 1977 one.

Rules for seismic design were first introduced in Romania after awareness raised by the damage in the 1940 earthquake. A practicing

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1 This chapter represents an improved illustration of a part of an article published in Natural Hazards and Earth System Sciences 5, 397–411, 2005 by Maria Bostenaru Dan, under the title "Multidisciplinary co-operation in building design according to urbanistic zoning and seismic microzonation"

2 M. Bostenaru Dan, F.Gehbauer: ―Applicability and economic efficiency of seismic retrofit measures on historic buildings of mid-XXth century‖, în: Proceedings of the 13th World Conference on Earthquake Engineering, Vancouver, BC, Canada, Paper No. 3347, 2004.

3 Lungu et al (1994)

engineer, leading one of the enterprises which implemented innovative structural and construction management solutions for this building type, documents[4] successful engineer-architect collaboration during the boom-time of constructing in Avantgarde style[5]. Although interrupted during the economic crisis, this was both incentive and opportunity raiser for creative design and technical solutions in constructing with a material new that time. This co-operation made many reinforced concrete building initiatives possible. Far from adopting the simplest ideal conformation, usability and aesthetics strongly influenced the structural solution. An array of success stories is documented in the following.

Bucharest saw 1920–1940, in two decades of intense building efforts, the construction of the buildings which give its face of today, many of them designed by world-class architects. It was a unique time when not the aesthetics governed, but a solution to the problems of the society: the lack of housing suiting the life style. Urban legislation reacted with the 1934 Master Plan to the anticipated impact of economic development in interwar Romania on urban areas. The land-use occupancy ratio was prescribed for the central zone. Numerous multifunctional (housing, office, shops, cinemas) complexes were constructed making maximum land-use, allowed only with 30% of the total admitted building volume at ground level. The multiple usage of the space through building in the height in urban agglomerations is a concretisation form of the "fight-for-space" of "urbanforces"[6] in opposition. The properties of the urban space result from the interaction of social groups modelling it. Bucharest's central luxurious residences illustrate how a move of interests of the social groups in the urban territory has a parcours, which it follows till finding place. The centre is a special case of the character-of-a-zone. A texture completes spatially another texture when, through organised superposition, they generate mixed assemblies with complex character. In subdivisions of the central area either residential/central functions dominate or dominant residence co-operates with central functions. On the N-S boulevard in Bucharest a spatial co-operative superposition of urban textures with complementary character contributes to a specific zonal ambient. The commercial, cultural, administrative, and residential space complexity expresses a necessity. The

4 E. Prager: Betonul armat în România, Editura Tehnică, Bucureşti, 1979.

5 M. Bostenaru Dan: ―Early reinforced concrete frame condominium building with masonry infill walls designed for gravity loads only‖, în: EERI: World Housing Encyclopedia summary publication, Oakland, CA, USA, Report ID 96, 2004a.

6 A. Sandu, course material, "Ion Mincu" University of Architecture and Urbanism

afferent space is conditioned through its occupation reported to the "life-way", with its socio-economic development and the natural environment conditions in the context of a continuous intervention process in time.

The N-S main boulevard in Bucharest is characterised by typological unity. Residential buildings feature the same structural type of reinforced concrete skeleton. Due to their Modernist style, they belong to a common architectural typology. This building class considered displays a socio-architectural type with a certain typology of the housing unit developed that time. Finally there are common characteristics of the type concerning the ownership pattern and eventual economic strategies resulting therefrom.

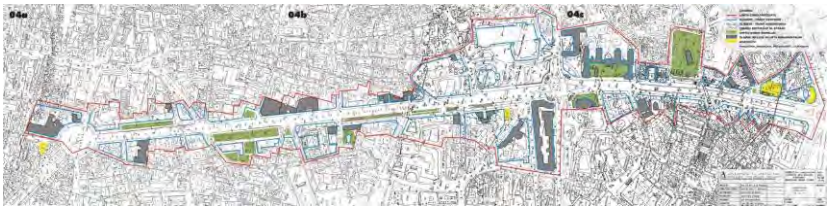


Fig. 1. The plan of the protected constructed zone ZCP 04 "Modernist boulevard" in Bucharest. Grey: listed buildings (http://www.lexcivitas.ro/images/stories/04_bratianu.jpg)

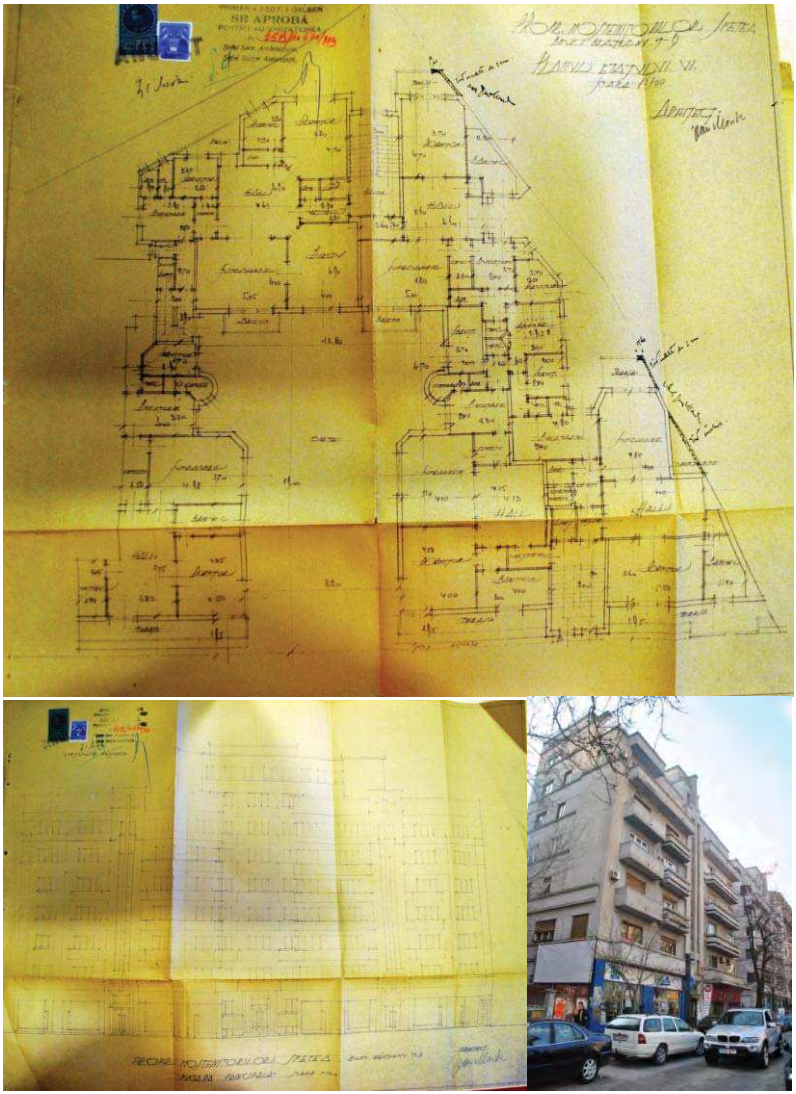


Fig. 2. Bloc of flats, Nicolae Bălcescu 7-9, Architect Jean Monda (1934-35). Facade drawing and plan from the Town Hall of Bucharest city archives (PMB fond ethnic). Photo: M. Bostenaru, 2015. Listed Cod LMI: B-II-m-B-18104.

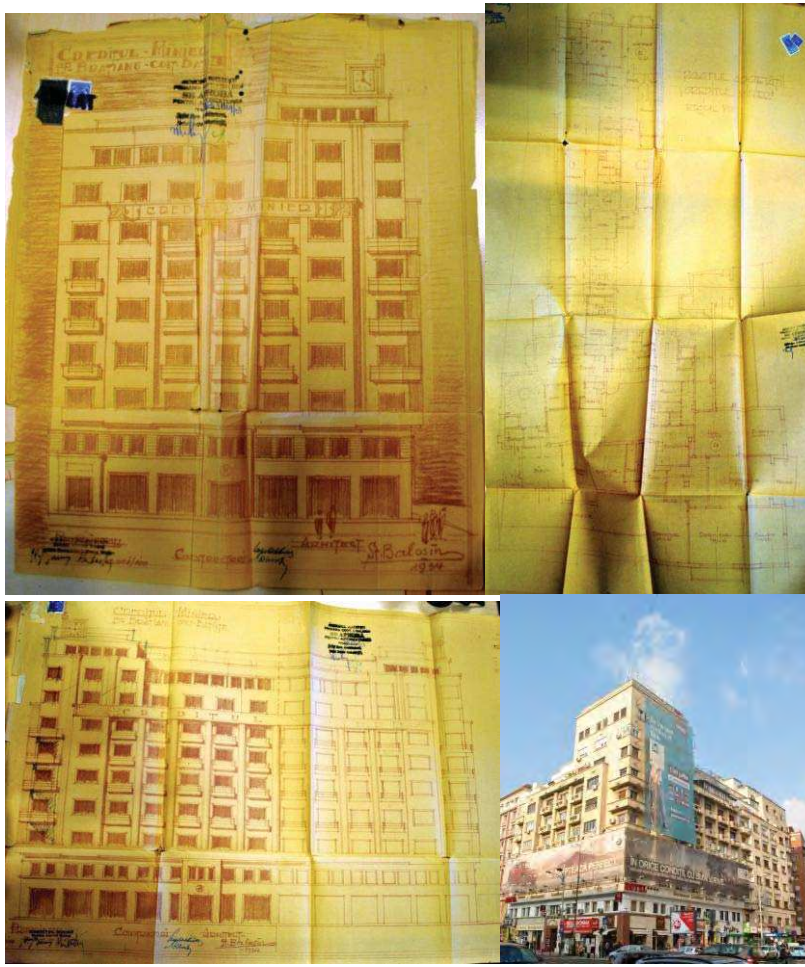


Fig. 3. Creditul minier, architect State Baloșin (1937). Facade drawing and plan from the Town Hall of Bucharest city archives (PMB fond ethnic). Photo: M. Bostenaru, 2015.



Fig. 4. The building on Bălcescu 26 „The palace of the Society fort he Economic Action of Romania“, architect Leon Silion (1925). Archive photo source Rezistenţa urbană (http://rezistenta.blogspot.com), archive image source: Town Hall of Bucharest archives (PMB fond ethnic). Listed Cod LMI: B-II-m-B-18106.

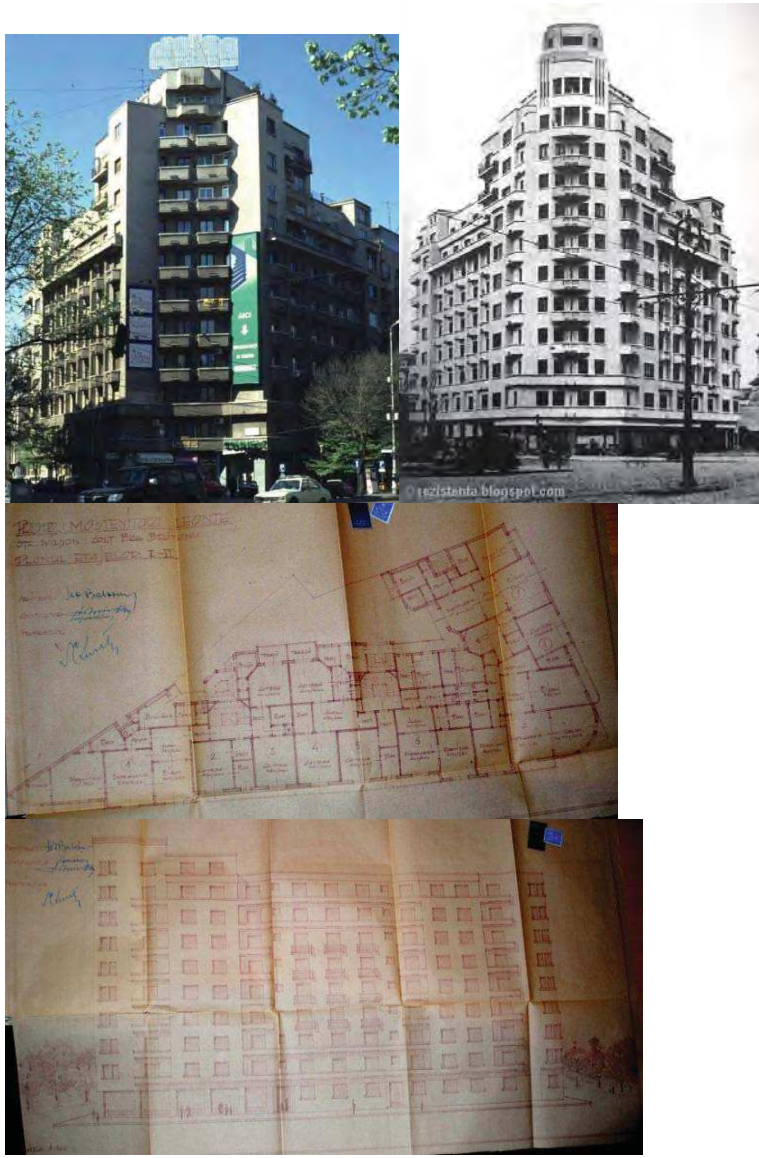


Fig. 5. "Wilson" block of flats (Creditul Rural), architect State Baloșin (1934-36). Foto: M. Bostenaru, 2002, archive photo: Rezistența urbană (http://rezistenta.blogspot.com), archive plans: Town hall of Bucharest archives (PMB fond tehnic).

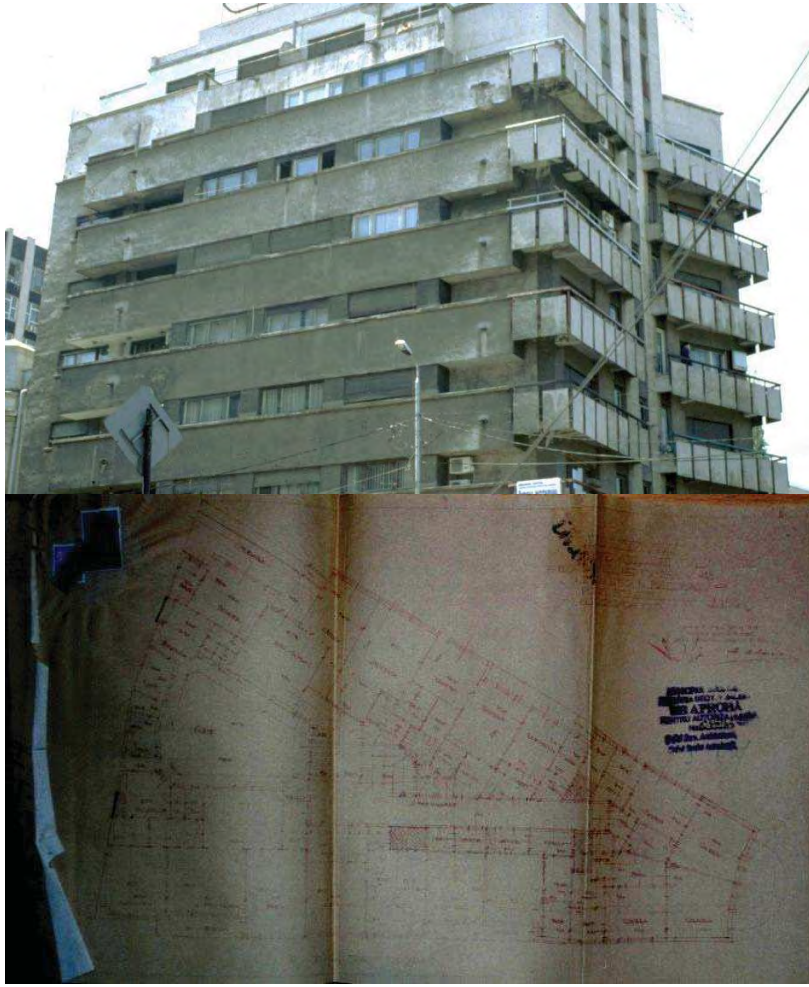


Fig. 6. "Turist" block of flats (former Palladio, Soc. "Creditul Minier"), architect Marcel Locar (1937). Foto: M. Bostenaru, 2002, archive plans: Town hall of Bucharest archives (PMB fond tehnic). Seismic reparation through cutting the corner like in case "Wilson".

Not all buildings behaved badly – some of them displayed a good behaviour as a result of the collaboration between engineer and architect (Fig. 7). We wrote about this in Bostenaru (2005). Here we include a map and a brief naming of the buildings, together with their photographs and plans.

1. C.A.M. (Fig. 8) (architect: Duiliu Marcu, reinforced concrete project Mihail Hangan, execution: -). Listed Cod LMI: B-II-m-A-19871. New technical prescriptions were strictly applied. Architecturally it is characterised by modernist asymmetry and a subtle neoclassicism in the U-shaped plan, as well as high quality finishings.

2. Casa Magistraţilor (Fig. 9) (architect: Duiliu Marcu, reinforced concrete project: Mircea Gheorghiu, execution: Mircea Gheorghiu). Commercial, office, residential use. At the first floor a festivity hall required for Vierendel frames and beams in order to sustain the masonry walls of the upper floors. Carefully made execution. The architecture is related to that of a building by Leopold Medilanski, currently in retrofit.

3. Bloc „Patria" with cinema (Fig. at the form on the architect) (architect: Horia Creangă, reinforced concrete project: Cristea Mateescu and Ştefan Mavrodin, execution: -). Listed Cod LMI: B-II-m-A-19116. There were difficult static problems for the balcony and roof of the cinema hall. The lateral and gravitational loads are carried by frames forming both the walls and the roof (with parabolic arcs) of this hall. Missing other lateral load resistance prescriptions, the frames were computed for wind loads, although the hall, half located in the basement and placed in a building interior was very lightly solicited this way. Cristea Mateescu used the method "Cross", introduced in Romania in that year (1934). These computations leaded to sufficient stability at any lateral forces. The balcony is the most important construction of this kind, executed not just in RC but also steel. The foundation lays higher than at neighbouring buildings. This work was a milestone of modern RC buildings. It marked the begin of reshaping the forms of the boulevards. The expressive composition contributed to the rhythm of the boulevard with a tower, which became a typical Romanian modernist corner solution.

4. Hotel „Ambasador" (Fig. 10) (architect: Arghir Culina, reinforced concrete project: Dumitru Marcu, execution: Tiberiu Eremia). Listed Cod LMI: B-II-m-B-19115. The entire assembly presents a judicious structural solution: side bodies, free façade on the courtyard of the upper storeys, decreasing size of the upper storeys. Recesses above a certain "shade"-height were dictated by the urban regulation. Architecturally the building has a monumental appearance, due to symmetry and presence of vertical elements. Urbanistically is a rhythmic point along the boulevard through the set-back courtyard. It forms an impressive complex with the "Patria" building.

5. Hotel „Union" (architect: Arghir Culina, reinforced concrete project: Emil Prager, execution: Emil Prager). Short terms for execution and

delivery leaded to construction and installation works made simultaneously. The central situation of the parcel generated hard organisation conditions. A special RC work was done because of the higher laid foundation of the neighbouring building: the new foundation was made through a tunnel gallery. Strongly damaged during WWII (4 upper floors and 2/3 of the surface of the building), it could be repaired without further strengthening

6. Fundation Dalles (architect: Horia Teodoru, reinforced concrete project: Aurel Beleş and Dim Marcu, execution: Emil Prager). Listed Cod LMI: B-II-m-B-19114. steel for huge halls

7. Bloc of flats on Calea Victoriei 23 (architect: L. Negoiescu, reinforced concrete project: Jean Hascal, execution: M. Calmanovici). Listed Cod LMI: B-II-m-B-19849. The exterior columns of the skeleton start from the ground floor, being sustained by a concrete wall which constitutes the exterior wall of the basement and which bears the loads from the ground.

8. Bloc of flats on Calea Victoriei 68/70 – "Generala" (Fig. at the form on Richard Bordenache) (architect: Nicolae Nenciulescu, reinforced concrete project: Luigi Cora, execution: Emil Prager). Recently listed, we consulted the dossier. It has two basements and a soft storey. A RC dome over the ground floor widely opened to Calea Victoriei with glass bricks corresponding to the lighting courtyard of the 7 upper storeys. This hole had 10m span. For this purpose a "wall-beam" was constructed within the mezzanine wall of the façade. Other special problems were provided by the functional use, including parking on the whole basement area, residences and offices in the upper floors, commercial use on the ground floor. Executed very carefully, it proved to be easy to maintain.

9. Bloc of flats at the crossing Calea Victoriei – Splaiul Independenţei (architect: Nicolae Cucu, and Gheorghescu, reinforced concrete project: Mihail Hangan, execution: Jean Hascal). Listed Cod LMI: B-II-m-B-19839. It consists of two building wings, one of them next to Splaiul Unirii (the street along the Dâmbovi¸ta River). It was founded on a general mat at ~6m depth, the one of ground water. A special solution was adopted for a ground column which was removed, being replaced by a RC frame element made with fast casted cement, with only 12h of hardening.

10. Bloc of flats on Splaiul Independenţei (architect: Petre Antonescu, reinforced concrete project: Dim Marcu, execution: Tiberiu Eremia). Listed Cod LMI: B-II-m-B-18938. Special solution to avoid having columns at ground floor level: 3 column arrays at upper floors and only 2 at lower floors: RC Vierendel columns over the ground floor in the whole height of the mezzanine – no problems with openings in the party walls of the mezzanine. Columns to the lighting yard were also discontinued at the level be-

tween mezzanine and first floor. They are sustained by a high beam ”macaz cu tirant”. The skeleton of the upper floors was computed after the German circular from year 1925.

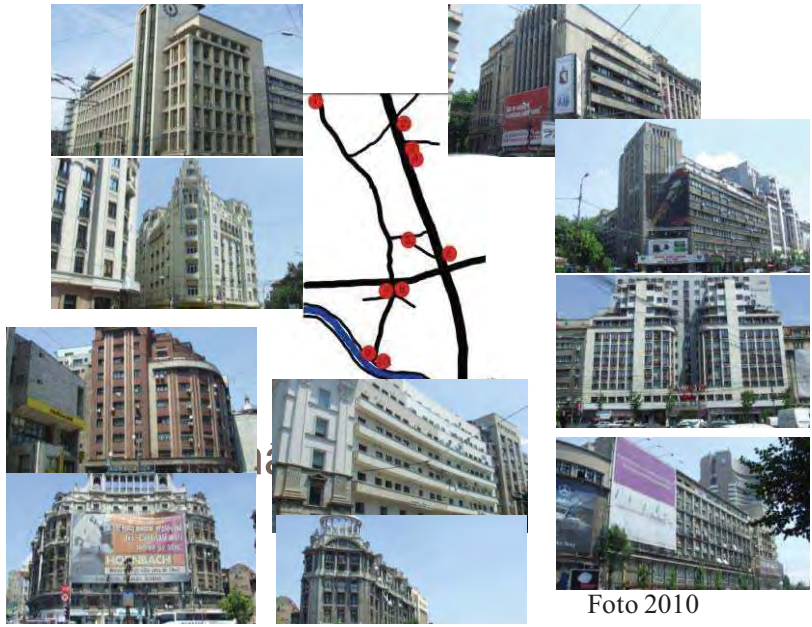


Fig. 7. Buildings wirh reinforced concrete skeleton structure in Bucharest, and special structural solution. Idenfication of the buildings according to Prager (1979). Photo: M. Bostenaru, 2010.

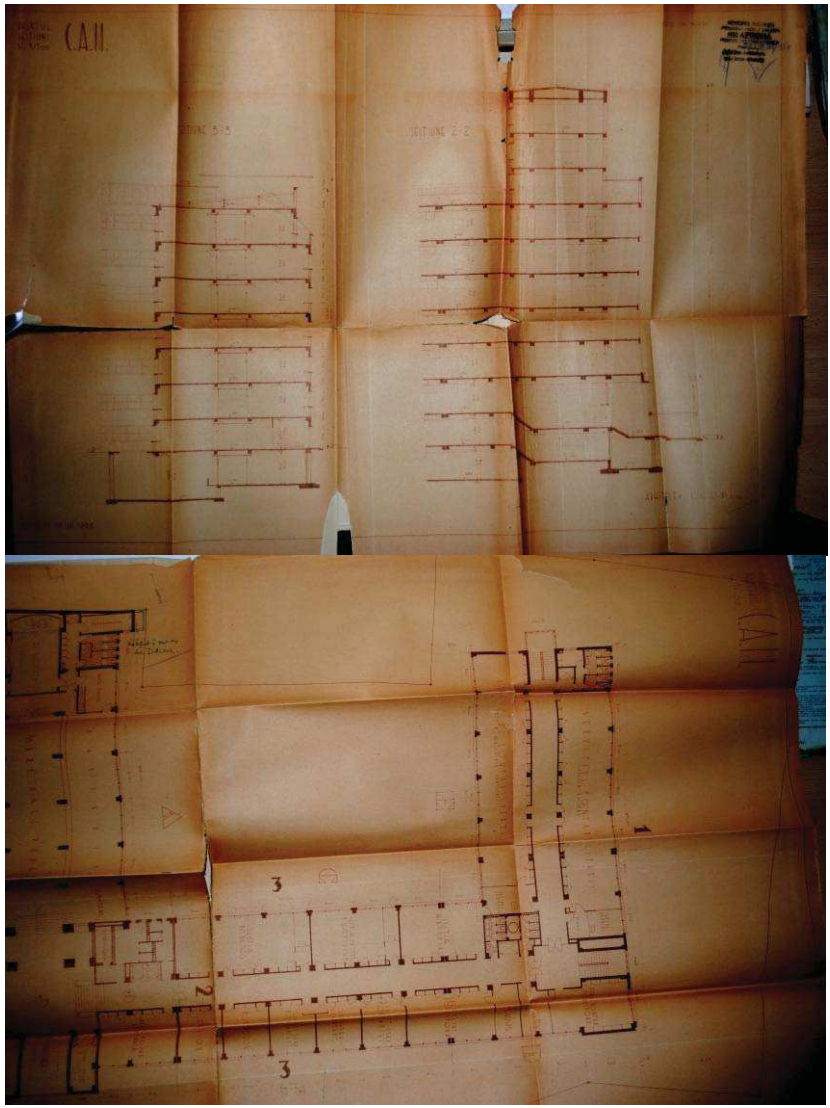


Fig. 8. C.A.M. Palace. Section and plan: Town hall of Bucharest archives (PMB fond ethnic)

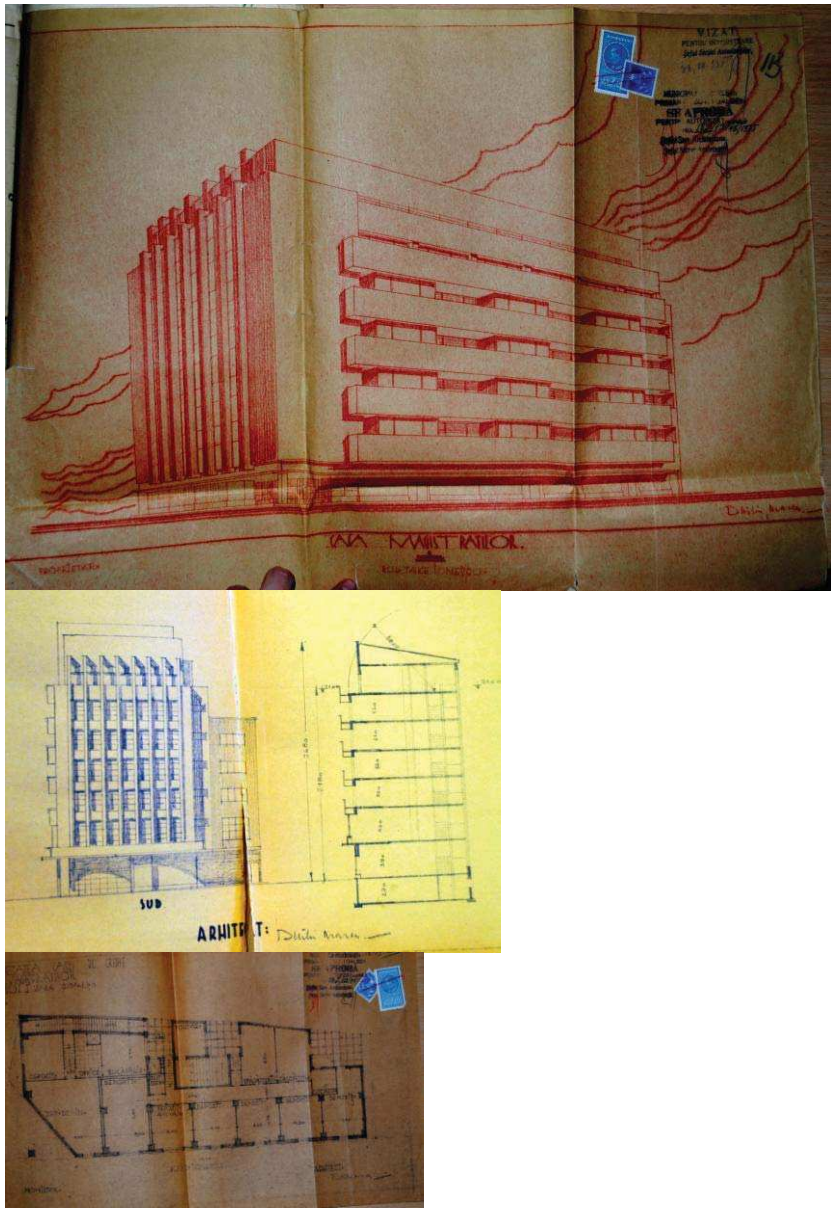


Fig. 9. Magistrates house, architect Duiliu Marcu (1935). Perspective drawing, facade and plan from the Town Hall of Bucharest city archives (PMB fond ethnic).

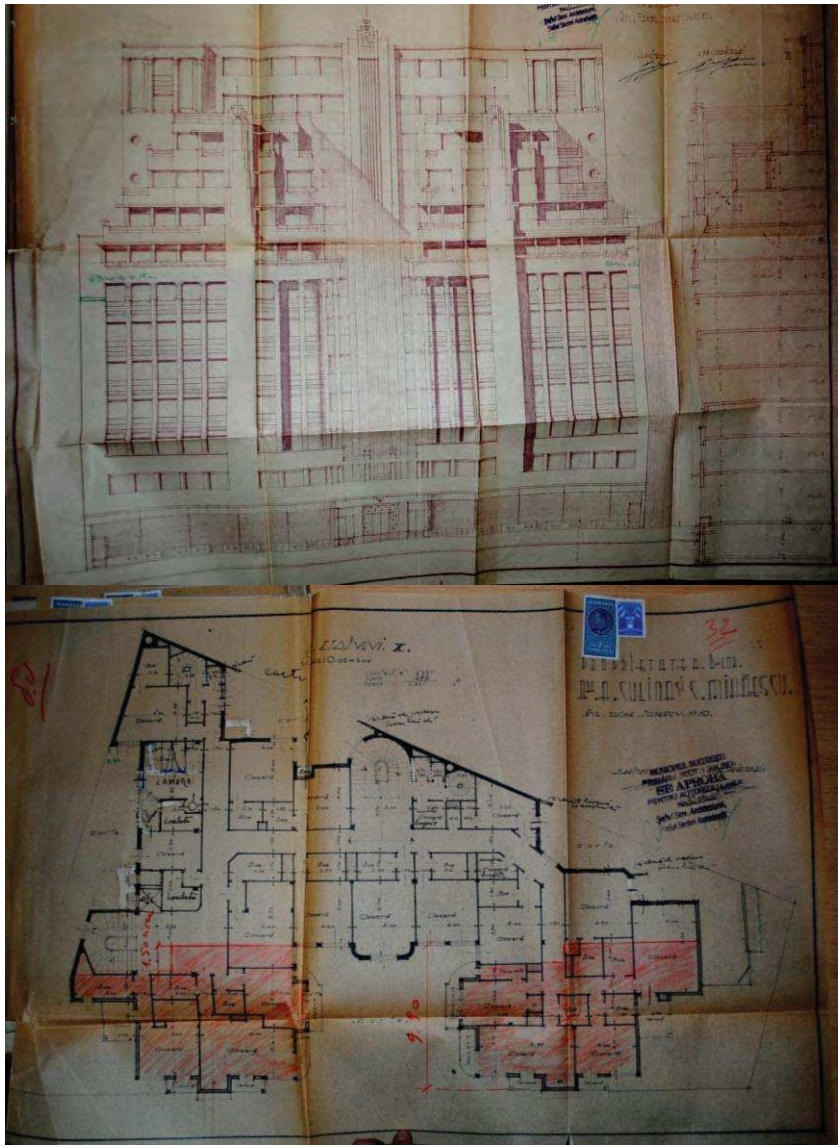


Fig. 10. Hotel "Ambasador", architect Arghir Culina (1935), facade and plan from the Town Hall of Bucharest city archives (PMB fond ethnic).

3. Historic development of 20th century Romanian heritage / Cristina Gociman

The cultural project "Romanian architects – creators of cultural heritage" led by Cristina Olga Gociman, was funded initially for the 2012 National Architecture Biennale by the Ministry of Culture, and continued supported by the Romanian Cultural Institute in an international intinerary. The "Ion Mincu" University of Architecture and Urbanism created a permanent gallery for it. The initial panels can be seen at:

https://www.bnab.ro/2012/expo-arh-rom/

The complete list of the panels is the following:

1869 architect Alexandru Orăscu University palace, Piața Universității, Bucharest

1871 architect Alexandru Orăscu Grand Hotel du Bulevard, Bulevardul Elisabeta, Bucharest

1889 architect Ion Mincu House Monteoru-Catargi, Calea Victoriei, Bucharest

architect Ion N. Socolescu House Ionescu-Gion, Str. Lucaci nr. 33, Bucharest

1890 architect Ion Mincu Central School of Girls, Str. Icoanei, Bucharest

1891 architect Ion D. Berindei House Macca, Archeology Institute „Vasile Pârvan", Bucharest

architect Felix Xenopol Macca-Villacrosse passage, Calea Victoriei/Str. Eugen Carada

1892 architect George Mandrea Fire observatory, Piața Foișorul de Foc, Bucharest

architect Ion Mincu Bufetul de la șosea (restaurant), str. Ion Mincu, Bucharest

1896 architect Ion N. Socolescu Normal school Carol I, str. Mărăști nr. 15, Câmpulung Muscel

1897 architect Ion Mincu House Gheorghe Robescu, Str. Mihai Bravu nr. 28, Galați

1897-1905 architect Ion Mincu Vaults Ghica, Stătescu, Gheorghieff, Lahovary, Cantacuzino, Bucharest

1898 architect Ion D. Berindei House with lions, str. Dianei, Constanța

architect Toma Dobrescu National college „Tudor Vladimirescu", Târgu Jiu

	architect Ștefan Ciocârlan	Palace of the newspaper „Adevărul”, str. Constantin Mille, Bucharest
1900	architect Alexandru Săvulescu	Post palace, Calea Victoriei nr. 12, Bucharest
1903	architect Ion D. Berindei	Cantacuzino Palace, Calea Victoriei nr. 141, Bucharest
1904	architect Ion Mincu	Stavropoleos church, str. Stavropoleos nr. 4, Bucharest
	architect Ion Mincu	Administrative palace, Str. Domnească, Galați
1905	architect Cristofi Cerchey	Nicolae Minovici villa, str. Dr. Nicolae Minovici nr. 1, Bucharest
1908	architect Petre Antonescu	Brătianu houses, str. Biserica Amzei nr. 3-5, Bucharest
	architect Ștefan Burcuș	Bursa palace, str. Ion Ghica nr. 4, Bucharest
	architect Nicolae Mihăescu	House Mița Biciclista, str. Cristian Tell nr. 9, Bucharest
1909	architect Ion D. Berindei	Astronomy observatory Amiral Vasile Urseanu, Bucharest
1910	architect Petre Antonescu	Palace of the Ministry of Public Works, Bucharest
	architect Daniel Renard	Casino, Boulevard Regina Elisabeta, Constanța
1911	architect Grigore Cerchez	Odeon theatre, Calea Victoriei, Bucharest
	architect Dumitru Maimarolu	Palace of the Military Circle, Bucharest
	architect Nicolae Mihăescu	Saints Nicolae and Alexandru cathedral, Sulina
1912	architect Spiridon Ceganeanu	House Gh. Petrașcu, Piața Romană corner with Căderea Bastiliei, Bucharest
	architect Grigore Cerchez	Justice Palace, Str. Domnească, Galați
	architect Arghir Culina	Cișmigiu hotel, Boulevard Regina Elisabeta, Bucharest
	architect Nicolae Nenciulescu	Summer garden Capitol, str. Constantin Mille, Bucharest
1913	architect Petre Antonescu	Casino in Sinaia, parc Dimitrie Ghica
	architect Ion D. Berindei	Cantacuzino palace – Small Trianon, Florești, Prahova

1914 architect Statie Ciortan Palace Vama Poştei, str. Lipscani nr. 1, Bucharest
architect Ernest Dondeaud Pavillion of the bathes in Govora
1915 architect Dumitru Maimarolu Armenească church, Bucharest
architect Paul Smărăndescu Vânători villa, Boulevard Carol nr. 43, Sinaia
1916 architect Dumitru Maimarolu Palace of the Chamber of Deputees, Mitropoliei alley, Bucharest
1921 architect George Sterian House of architect George Sterian, Str. Mihai Eminescu nr. 10, Bacău
1923 architect Petre Antonescu Palace of the Marmorosch Blank bank, str. Doamnei nr. 4, Bucharest
1924 architect Virginia Haret „Tinerimea Română" block, str. Schitu Măgureanu, Bucharest
1926 architect Virginia Haret House of the architect, Spătarului entry nr. 8, Bucharest
1927 architect Grigore Cerchez Faculty of Architecture Ion Mincu, str. Biserica Enei nr. 1, Bucharest
architect Cristofi Cerchez Czech embassy in Romania, str. Ion Ghica nr. 11, Bucharest
architect Florea Stănculescu Agriculture palace, Brăila
1928 architect George Matei Cantacuzino Palace of the Bank Chrissoveloni, Str. Lipscani, Bucharest
architect Duiliu Marcu State Theatre, Timişoara
architect Ion D. Traianescu Madona Dudu church, Craiova
1929 architect Paul Smărăndescu Cerbu hotel, Sinaia
1930 architect George Matei Cantacuzino Tudor Arghezi memorial house, str. Mărțișor, Bucharest
architect Octav Doicescu Restaurant in Băneasa forest, Privighetorilor Alley, Bucharest
architect Jean Pompilian Extension of the Belvedere cigarette factory, Calea Giuleşti nr. 1-3, Bucharest
1931 architect Horia Creangă ARO block, Boulevard Magheru, Bucharest
architect Marcel Iancu villa Jean Juster, str. Silvestru nr. 75, Bucharest
1932 architect Horia Creangă villa Bunescu, Aleea Alexandru nr. 12, Bucharest
architect Nicolae Nenciulescu Royal Palace, Calea Victoriei nr. 49-53, Bucharest

architect Gheorghe Simotta Block on Str. Atena nr. 20, Bucharest
1933 architect Petre Antonescu Accademia di Romania, Rome
architect State Baloșin Block Wilson, Boulevard Magheru nr. 2, Bucharest
architects George Cristinel/Constantin Pomponiu Orthodox cathedral, Piața Avram Iancu, Cluj-Napoca
architect Constantin Iotzu Palace of the Association of Veterniry Doctors, Boulevard Elisabeta nr. 53, Bucharest
architect Duiliu Marcu Block Aleea Modrogan nr. 1, Bucharest
architect Jean Pompilian Al. I. Cuza University, Iași
1934 architect George Matei Cantacuzino Bellona hotel, str. Falezei, Eforie Nord
architect Statie Ciortan Town museum, Câmpulung Muscel
architect Horia Creangă Elisabeta Cantacuzino villa, Aleea Alexandru corner with str. Tirana, Bucharest
architect Dumitru Ionescu-Berechet Town hall, Câmpulung Muscel
architect Marcel Locar Cantacuzino block, str. C.A. Rosetti nr. 43, Bucharest
architect Paul Smărăndescu Sanda villa, Balchik, Bulgaria
architect George Matei Cantacuzino Palace of Industrial Credit, Piața Universității, Bucharest
1935 architect Horia Creangă Ottulescu block, str. Gh. Manu nr. 12, Bucharest
architect Grigore Ionescu Toria sanatory, Covasna
architect Toma T. Socolescu Central halls, Str. Griviței, Ploiești
architect Horia Teodoru Restoration of the Curtea Veche church, str. Franceză, Bucharest
1936 architect Petre Antonescu Palace of the Faculty of Law, Boulevard Kogălniceanu nr. 36-46, Bucharest
architect Henrieta Delavrancea-Gibory House Prager, Boulevard Aviatorilor nr. 32, Bucharest
architect Octav Doicescu Miorița fountain, Șoseaua București-Ploiești
architect Duiliu Marcu Special train station Băneasa, Piața Gara Băneasa, Bucharest
architect Paul Emil Constantin Miclescu Ford factory, Calea Floreasca, Bucharest

	architect Tiberiu Niga	Block on Calea Victoriei 122, Bucharest
	architect Tiberiu Niga	Block Boulevard Schitu Măgureanu nr. 53, Bucharest
1937	architect Dumitru Ionescu-Berechet	Parcul Domeniilor church (Cașin), Boulevard Mărăști nr. 16, Bucharest
	architect Richard Bordenache	Headquarters of the General Association of Engineers in Romania, Boulevard Dacia, Bucharest
	architect George Cristinel	Athenee of the King Ferdinand I University, Str. Emanuel de Mortonne, Cluj
	architect Henrieta Delavrancea-Gibory	Cancicov house, Balchik
	architect Henrietta Delavrancea-Gibory	Vâlcovici house, str. Londra nr. 44, Bucharest
	architect Marcel Iancu	Vasile Moga block, str. Armenească nr. 16, Bucharest
	architect Tiberiu Niga	Housing block, str. General Berthelot, Bucharest
	architect Gheorghe Simotta	Block on str. Blănari 12-14, Bucharest
1938	architect Georghe Matei Cantacuzino	Corp Eforiei Kretzulescu, Calea Victoriei nr. 45, Bucharest
	architect Horia Creangă	ARO block, Calea Victoriei, Bucharest
	architects George Cristinel/Constantin Pomponiu	Mărășești mausoleum, Vrancea county
	architect Henrietta Delavrancea-Gibory	Cinema Capitol, Boulevard Regina Elisabeta nr. 36, Bucharest
	architect Octav Doicescu	Banloc block, Calea Victoriei, Bucharest
	architect Octav Doicescu	Ministry of Propaganda, str. Wilson nr. 8, Bucharest
1939	architect Dimitrie Nicolae Cucu	C.E.C. pension house, Splaiul Unirii nr. 5, Bucharest
	architect Arghir Culina	Ambasador hotel, Boulevard Magheru, Bucharest
	arhitect Florea Stănculescu	Institute of Agronomic Research, Boulevard Mărăști nr. 61, Bucharest
	architect Victor Ștefănescu	North Train Station, Piața Gării, Bucharest
1940	architect Horia Creangă	Malaxa (Faur) factory, Boulevard Basarabia, Bucharest

	architect Radu Dudescu	Romanian National Bank, str. Doamnei, Bucharest
	architect Nicolae Nenciulescu	Royal stables, 303 dormitory, Șoseaua Cotroceni nr. 140, Bucharest
1941	architect Nicolae Ghika Budești	Peasant Museum, Piața Victoriei, Bucharest
	architect Duiliu Marcu	Miliary Academy, Bucharest
1942	architect Constantin Iotzu	Saint Elefterie Nou church, Piața Elefterie nr. 6, Bucharest
1944	architect Duiliu Marcu	Palace of the Ministry Council, Bucharest, Piața Victoriei
1946	architect Radu Dudescu	Zodiac block, Calea Dorobanți, Bucharest
	architect Ion D. Traianescu	Cathedral saint Trei Ierarhi, Timișoara
1948	architect Mircea Alifanti	Airport Aurel Vlaicu Băneasa, Șoseaua București-Ploiești
1949	architects Horia Maicu/Mircea Alifanti/Tiberiu Ricci	Casa Scânteii, Bucharest
	architect Tiberiu Ricci	Palace of Radio, Str. Nuferilor, Bucharest
1950	architect Horia Creangă	Obor halls, Piața Obor, Bucharest
1951	architect Richard Bordenache	Palazzo Calcaneo, Piața Palatului, Bucharest
1953	architect Octav Doicescu	National Opera, Piața Elefterie, Bucharest
	architect Paul Emil Constantin Miclescu	Free space theatre in Bălcescu park, Boulevard Bucureştii Noi nr. 105, Bucharest
1956	architect Ștefan Balș	Restoration of the Brâncoveanu palace in Potlogi
1958	architect Haralamb G. Georgescu	House Pasinetti, Beverly Hills, USA
	architect Constantin Moșinschi	Block of flats/galleries Piața Casei Centrale a Armatei, Bucharest
1959	architect Eugeniu Cosmatu	Block of flats str. Cristian Tell nr. 1-3, Bucharest
	architect Sofia Ungureanu	Block La coloane, Piața Romană, Bucharest
	architects Horia Maicu/Romeo Belea	Sala Palatului, Bucharest
1960	architect Cezar Lăzărescu	Mamaia resort

architects Tiberiu Niga/Garcia Leon Housing complex, Piața Palatului, Bucharest
1961 architect Nicolae Vlădescu Culture house, Mangalia
1962 architect Mircea Săndulescu Mathematics institute Simion Stoilow, Bucharest
architect Theonic Săvulescu Train station, Brașov
1963 architect Dimitrie Nicolae Cucu Heroes monument, Parcul Carol, Bucharest
1964 architect George Matei Cantacuzino Pavillions of Mitropoliei Palace, Iași
architect Ascanio Damian Pavillion of the International Fair, Bucharest
architect Hans Fackelmann Timișoara University
architect Aurelian Trișcu PTTR post office, Eforie Nord
1938-1965 architects Horia Creangă/Ion Rădăcină ARO hotel, Brașov
1967 architect Cezar Lăzărescu Europa hotel, Eforie Nord
1968 architect Nicolae Porumbescu State circus Globus, Bucharest
1969 architect Vasile Mitrea Telephone central, Cluj Napoca
1970 architect Cleopatra Alifanti Extension Academia de Studii Economice, Bucharest
architect Mircea Alifanti Administrative palace, Baia Mare
architect Anton Dâmboianu/Gheza Vida Monument of the Romanian soldier, Carei
architect Hans Fackelmann Roman-catholic religious centre, Orșova
architect Ioana Grigorescu Restoration of the assembly of Sucevița monastery
architect Dinu Mihai Hariton Intercontinental hotel, Bucharest
architect Constantin Joja Restoration Hanul cu Tei, Bucharest
architect Constantin Joja Restoration Hanul lui Manuc, Bucharest
architect Cezar Lăzărescu International airport Henri Coandă, Bucharest-Otopeni
architect Nicolae Porumbescu Administrative palace, Botoșani
architect Tiberiu Ricci Romanian television, Bucharest
architects Elena Voinescu/George Filipeanu Extension Architecture Institute Ion Mincu, Bucharest
1972 architect Octav Doicescu Politechnic institute, Bucharest
architect Dorin Gheorghe House of culture of sindicates, Ploiești
architect Șerban Manolescu Amfiteatru assembly, Olimp resort

1973 architects Horia Maicu/Romeo BeleaNational theatre, Bucharest
architect Constantin Săvescu National theatre, Târgu Mureș
architect Nicolae Vasilescu Landing lamp, Constanța
architect Nicolae Vlădescu House of culture of sindicates, Târgoviște
1974 architect Dorin Gheorghe House of culture of sindicates, Sibiu
architect Alexandru Iotzu National theatre Marin Sorescu, Craiova
1975 architects Constantin Dobre/Victor Ivaneș/Toma Olteanu Hotel Forum, Costinești
architect Constantin Rulea Academy Ștefan Gheorghiu, bucharest
1976 architect Gheorghe Leahu Unirea department store, Bucharest
1977 architect Cezar Lăzărescu Parlament palace, Khartoum, Sudan
1978 architect Radu Tănăsoiu Central assembly and prefect headquarters, Brăila
architect Mihail Albert Caffe Elderly dormitory, Str. Jimbolia, Bucharest
1979-1989 architects Manuela Antip/Gheorghe Beznilă/Adriana Bunu/Dan Constantinescu/Viorica Curea/Lia Dima/Geta Gabrea/Ion Marineci/Clement Moldoveanu/Victoria Nacrescu Radu/Alin Negoescu/Ioan Novițchi/Alexandru Panaitescu/Ileana Paina/Doina Pătra/Ion Podocea/Bogdan Popovici/Cătălin Stanciu Metro stations, Bucharest
1980 architect Emil Barbu Popescu Student park, Student complex Tei, Bucharest
Architect Nicolae Porumbescu Central assembly and town hall, Satu Mare
1982 architect Eugeniu Cosmatu Bucuresti hotel complex, Calea Victoriei, Bucharest
architect Stefan Lungu House of Science and Technique for Zouth, Râmnicu-Vâlcea
1983 architect Constantin Rulea Restoration of Hotel Caraiman, Sinaia
1984 architect Nicolae Vlădescu Restoration Cotroceni Palace, Bucharest
architect Dan Sergiu Hanganu Row houses, Parc Quesnel, Montreal, Quebec, Canada
architect Zoltán Takács Postăvăria Română entreprise, Bucharest
1985 architects Gheorghe Nădrag/Dinu Mihai Hariton National Palace of Children, Bucharest
1986 architects Emil Barbu Popescu/Dorin Ștefan House of Science and Technique for Youth, Slatina



Fig. 14. Example of a panel in the exhibition, architect Duiliu Marcu.



Fig. 15. Example of a panel in the exhibition, Monument of the Romanian soldier, Carei.

4 Geographic spread of early reinforced concrete buildings / Maria Bostenaru, supervision Cristina Gociman[7]

The Modern movement was a global one in architecture, music, arts, physics, philosophy, economy and social theory, and industrialization in the first half of the 20th century. One of the nuclei of the ideology of this movement was the housing programme. This is a traditional programme, still, new technologies brought by industrial development, including reinforced concrete, were employed to investigate innovation. While in moder industrialized European countries the Avant-Garde when in the direction to tackle up the huge load of social housing, in some of the others the new possibilities were seen as an opportunity to give a new image to capital cities, allowing a reorganization of the urban tissue, which denser housing for the middle class in preferred zones. Following the Athens Charter (1933) function became a decisive component in the creation process. Functional requirements start with the social ones till technology. While connecting to the Franch models, a particular condition of the location namely that of seismicity, was neglected. Since then, capital cities where the Modern Movement is represented mainly by housing have been affected by earthquakes, which displayed the vulnerability of those buildings.

Zahariade[8] sees to parallel movements in the Modern Movement:

1. The Western Avant-Garde, focused on the social requirement of the housing problem and the control of urban development of architecture. This includes the many "ism"s.
2. The ones which are also called "other Modernisms": the evolutive tendency, organically, shapes which are gradually simplified towards those of the Avant-Garde. The local character is maintained, it never has the complete flexibility from the west, but it is adjusted to its aesthetical canons regarding geometry and the employment of the right angle.

Although the 4th CIAM Congress proclaimed in 1933 the Charter in the Greek capital, the Athens Charter has never been successful there. The

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[7] This chapter is adapted from the doctorate thesis of Maria Bostenaru Dan, under the supervision of Cristina Olga Gociman

[8] A.-M. Zahariade: ―Locuinţa în creaţia lui Horia Creangă‖, în Uniunea Arhitecţilor din România: Horia Creangă, Catalogul expoziţiei organizate la împlinirea a 100 de ani de la naştere, Bucureşti, 45-122, 1992.

housing needs requested something else. Without a social contribution the Greek interwar architecture was centered on housing and the apartment blocks are the "public face of Greek cities"[9]. The 1930s were a turning point in the history of housing in Greece, when the so-called "appartamentalisation"[10] of Greece begun: the flat in a block became the housing model. Studying housing in Greece in the 20th century means for Constantopoulos[11] to study the phenomenon of the urban block of flats. New words appeared for these flat typologies. In Greece, like in Romania, there is a nostalgy of that time though, as observes Constantopoulos[12] which found its expression in research projects, publications and doctorates on the topic. We consulted for this work a volume edited by Condaratos and Wang[13]. For Romania we looked at monographs of architects suh as Creangă[14], Iancu[15], Marcu[16], Delavrancea-Gibory[17] but also at the comprehensive work of Machedon & Scoffham[18]. In Romania, the first modern house was published 1927 by Marcel Iancu, but the first to receive an echo was the ARO block of flats by Horia Creanga from 1929, after which the Modern Movement became generally accepted. The 1900s architecture maintained its continuity, so Romanian architects touched more styles, from New-Romanian to Neoclassicism, Art Deco and Modernism. In the earthquake affecting Romania, one Modernist building with cinema collapsed in 1940 (Carlton, 1930-32, arch. G.M. Cantacuzino, which originally balanced the ARO building), and others in 1977 (Scala, ca. 1936, arch. Emil Nădejde,

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9 A. Giacumacatos: ―From Conservatism to Populism, Pausing at Modernism (The Architecture of the Inter-War Period)‖, în: S. Condaratos, W. Wang (coord.): 20th Century Architecture – Greece, Prestel, Munich, 26-39, 1999.

10 E. Constantopoulos: ―From City-Dwelling to Multi-Dwelling‖, în: S. Condaratos, W. Wang (coord.): 20th Century Architecture – Greece, Prestel, Munich, 79-88, 1999.

11 Constantopoulos (1999)

12 Constantopoulos (1999)

13 Condaratos, W. Wang (coord.): 20th Century Architecture – Greece, Prestel, Munich, 75-78, 1999.

14 Zahariade (1992)

15 UAR, Centenarul Marcel Iancu 1895–1995/Marcel Janco Centenary, Simetria: Bucharest, 1996.

16 D. Marcu, Arhitectură 1912–1960, Editura tehnică: Bucharest, 1960.

17 M. Sion: Henrieta Delavrancea Gibory - Arhitectura 1930-1940, Simetria, Bucureşti, 2009.

18 L. Machedon, E. Scoffham: Romanian Modernism: The Architecture of Bucharest, 1920-1940, MIT Press, Cambridge MA, USA, 1999.

balancing the cinema by Fränkel and Casata, ca. 1936, arch. Jean Văleanu, a vertical accent). The buildings replacing them do not have the same quality. An exception was the ARO building, where the cinema was recently restored after a fire[19]. The Ambasador and ARO buildings form an impressive complex maintained after earthquakes and they are protected as monuments according to current legislation. The strategical position of the ARO building was decisive in influencing architects which constructed modernist landmarks on the boulevard. Other buildings have been damaged by the earthquake, for example Turist, before imobilul Palladio (1936, arh. Marcel Locar), the corner of which was reconstructed.

Interwar and earlier architecture in Italy between 1890-1940 was investigated by Etlin[20]. The particular movement of Novecento Milanese was the subject of Burg[21]. For the most important architect of the time, Giuseppe Terragni, we looked to monographs, such as that by Zevi[22] and Libeskind[23]. For Portugal, we consulted a volume edited by Tostões and Wang[242526]. We included more references in the study trips part of this work, with the literature used for making the respective tours.

4.1 The emergence and spread of reinforced concrete, from the contribution of industry until the approach to housing

Concrete was known since the antiquity, and it was used at the Pantheon in Rome. The ruins in Ostia Romana tell us this story, of the construction

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19 Prager (1979)

20 Richard Etlin: Modernism in Italian Architecture, 1890-1940, MIT Press, Cambridge, MA, 1991.

21 A. Burg: Stadtarchitektur Mailand 1920 - 1940 : die Bewegung des Novecento Milanese um Giovanni Muzio und Giuseppe de Finetti, Birkhäuser, Basel/Berlin/Boston, 1992.

22 B. Zevi, Giuseppe Terragni, Verl. für Architektur Artemis: Zürich, 1989.

23 D. Libeskind, P. Rosselli, A. Terragni: The Terragni Atlas: Built Architecture, Skira editor: Milan, 2005.

24 R. Henriques da Silva: „Die _Casa Portuguesa‘ und die neuen Programme 1900-1920—, în A. Becker, A. Tostões, W. Wang (coord.): Architektur im 20. Jahrhundert – Portugal, Prestel, München, 15-22, 1997.

25 M. Souza Lôbo: „Stadtkultur und Landschaft—, în A. Becker, A. Tostões, W. Wang (coord.): Architektur im 20. Jahrhundert – Portugal, Prestel, München, 111-116, 1997.

26 J. Vieira Caldas: „Fünf Intervalle über die Zweideutigkeit der Moderne—, în A. Becker, A. Tostões, W. Wang (coord.): Architektur im 20. Jahrhundert – Portugal, Prestel, München, 23-33, 1997.

techniques (opus cartaecicum). According to Prager[27] the first construction which uses the logics of reinforcing concrete in assembling stone blocks was the Pantheon in Paris, arch. Rondelet (1770).

Unfortunately reinforced concrete is not seen as historical construction material by many researchers, unlike historic masonry. Our work is a contribution to see why the study of reinforced concrete buildings from the pre-seismic-code period is important, in the prewar and interwar times, not only from postwar times, for which research exists.

In the approach in the philosophy of materials, treated by Bostenaru[28], the real employment of reinforced concrete deserves a separate approach. At the begin the Hennebique system was used. In the drawing of the patent for the Hennebique system a network of primary and secondary beams out of reinforced concrete is visible. This is a characteristic which was later not kept, when the hierararchy between primary and secondary was mixed. The German language differentiates between this early reinforced concrete (iron-concrete) and the later version (steel-concrete).

In the 19th century more reinforced concrete systems were created after the arrival of Portland cement (1824), based on the invention by Monier (first experiments 1840, patent 1867), but Hennebique got remarked introducing the system of plates sustained by principal and secondary beams which could become a constructive system (patent 1892). The first reinforced concrete building was a deposit (1868 Croissy, France), the first bridge was built 1875 (Chazelet, France)[29]. The first building entirely in reinforced concrete was on Rui Danton 1, Paris (1889-1900).

Reinforced concrete became recognized as construction material at the universal exhibition in Paris in 1900. After the collapse of the imperial hotel in Nice construction codes were published (Germany 1904, France 1906, Switzerland 1910) and university courses started to be taught (the first at École Nationale des Ponts et Chaussées, in 1897) after which patents were given up[30]. This would explain the transition to the skeleton structure.

The Hennebique office was based in Brussels and from there spread to Europe and outside it. So, in Italy representative of the Hennebique system

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27 Prager (1979, p. 43-44)

28 Bostenaru (2012)

29 R. Grima López, A. Aguado de Cea & J. Gómez Serrano: Gaudí and reinforced concrete in construction, International Journal of Architectural Heritage: Conservation, Analysis, and Restoration, DOI:10.1080/15583058.2011.632470, Available online: 19 Oct 2011

30 Grima et al. (2012)

was Porcheddu, with the headquarters in Turin and active in whole Italy, more so in the North[31]. The Lingotto FIAT factory is one of the examples which gained importance, also through today's conversion by Renzo Piano and the integration into the Olympic Games. In Genua, a boulevard was traced at the transition from the 19th to the 20th century, with buildings built in the Hennebique system: Via XX Settembre. In Bucharest there is a similar boulevard with reinforced concrete construction, but in skeleton structure, not Hennebique, done in the interwar time, in Modernist style: the Magheru boulevard.

In Great Brittain it was Mouchel and in Germany Züblin who applied the Hennebique system[32].

Recently, the Technical University in Vienna analysed an example of application of the Hennebique system using also precast elements imported from Belgium outside Europe: the Baron palace in Cairo [33].

Different from Italy, in Romania the Hennebique system did not spread, reinforced concrete came to be applied at large scale suddenly in the interwar time, with the possibilities of the material not researched sufficiently. An early example of reinforced concrete in Hennebique system is Athenée Palace in Bucharest, by the French origin architect Daniel Renard (1910/1912) and the notable Romanian civil engineer George Constantinescu, a student of Anghel Saligny. This was the first building in Bucharest with reinforced concrete structure. Daniel Renard is also the author of another representative Art Nouveau style building on the territory of the old kingdom in Romania: the Casino in Constanţa, on the Romanian seaside (1909). The engineer George Constantinescu conceived also the structure for the first reinforced concrete building in Romania, the moschee in Constanţa and for the Casino. Athenée Palace was altered in the interwar time with an intervention leaning at Italian Novecento, by the architect Duiliu Marcu, in 1937 (Fig. 20).

Reinforced concrete was employed for the first time in Romania in 1888 by the engineer Anghel Saligny for the construction of cereals silos in the harbours Brăila and Galaţi, in Monier system, constructions of particular

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31 R. Nelva, B. Signorelli: Avvento ed evoluzuon del calcestruzzo armato in Italia: Il sistema Hennebique, Associazione Italiana Tecnico Economica del Cemento, Edizioni Di Scienza E Tecnica ~ Milano, 1990.

32 D. McBeth: Francois Hennebique (1842–1921) – Reinforced concrete pioneer, Proceedings of the Institution of Civil Engineers, Londra, 1998.

33 http://www.baronpalace-project.net/

importance for the development of Romanian engineering[34]. The first civil building with multiple floors was the building of the C.F.R. housing in the Sinaia train station[35].

Some of the Romanian architects, such as Virginia Haret, the first woman architect, adhered at the New-Romanian style, despite a stay in Italy, before starting the search for Modernism. Interesting the activity of Virginia Haret is the attribution of the first apartment block in reinforced concrete in Romania, the one on Frumoasa street. This block of flats has a different style of New-Romanian and Modernism, is in eclectic style[36] and so the authorship of the block was contested. Virginia Haret also designed industrial constructions in reinforced concrete at the start of the century, like the water tower in the courtyard of the Faculty of Medicine (1927), demolished later on (Fig. at the form on the architect).

One pioneer woman was also active in Hungary in employing reinforced concrete: Eszter Pécsi.

Reinforced concrete employed first in industrial architecture was also a characteristic of Portugal, the case in which Moreira de Sá & Malevez (MS & M) were Hennebique agents[37].

Despite this, the Riga architecture enumerates these industrial buildings in its Art Nouveau heritage, for example the water tower at Agenskalns, on Alises 4 by Wilhelm Bockslaff, an example of National Romanticism (1910) [38]

Hennebique himself, at the own house, employed shapes of industrial architecture.

In other parts of Romania, such as Transylvania, uses of the Hennebique sysem in Art Nouveau were found: in Oradea, the city of József Vágo, one of the architects who brought the experience from this place to Italy: the

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34 Prager (1979), p. 52-58

35 Prager (1979), p. 59

36 R. Bem: „Imobilul de Locuinţe de pe Strada Frumoasă 50-56 (1925-28)‖, în A. Beldiman şi C. Woinaroski (coord.): Arhitectura Bucureşteană sec. 19 şi 20, , editura Simetria ArCuB, Bucureşti, 2000.

37 A. Tavares: ―The Effects of Concrete on Portuguese Architecture: the Moreira de Sá and the Malevez Case (1906-1914)‖, Proceedings of The Second International Congress on Construction History, vol. 3, Construction History Society, pp. 3041-3059, 2006.

38 Rigas kultūras agentūra: Art Nouveau in Riga, Rigas Jūgendstila Centrs, Riga, 2008

palace Moskivits Miksa, in Secession München style, the so-called Lilienstil[39] (Fig. 21), with close relationships to Hungarian architecture.

Also in Finland Art Nouveau style was practices in this time of history (Fig. 22).

Reinforced concrete, probably in Hennebique form, is documented, also in the archives of the works of Béla Lajta in Budapest[40], underlining the light play of the skeleton at the lower levels and of the heavy façade with holes in the load bearing masonry at the higher levels, as in Loos architecture. This can be precursory of the seismically vulnerable flexible ground floor in the Bucharest interwar language. In the 21st century Italian architecture with Western European Modernist influences inversed this situation of the prototype in L'Aquila of the pillar ground floor in Le Corbusier style, free and with the destination of parking, adapted to a sloped terrain, but presenting seismic isolation at the basis. It is remarkable that mistaken approaches with the jacketing of these columns at the ground floor can lead to ductility differences.

In the Viennaise architecture let us not forget the contribution of Joze Plecnik with the first church in reinforced concrete, with the skeleton placed in the basement, for which the architect found an own language, which brings to expression the difference between a spatial structure and multistory building. Despite this, in the native city of Ljubljana Plecnik built little in reinforced concrete, there masonry was prevalent (Fig. 23).

In Spain Portland cement existed from the second half of the 19th century, first time being constructed with it in 1848 in Bilbao on the Northern coast. In August 1884 the Monier patent was recorded for its employment by Lecanda Macià y Compañía for water towers[41]. The first project in reinforced concrete was such a water tower in Puigverd în Lleida, 1893[42]. One of the first cement factories was Asland in Barcelona of Eusebi Güell in 1901, the mecene of Gaudi. The Hennebique patent was employed for bridge construction until the own method was patented. The first building fully built in concrete was an industrial one, the mill in Badajoz (1899) and used the Hennebique patent. For the housing buildings which did not have such large spans patents were too expensive at the begin. In Catalonia it was

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39 M. Paşca: Arhitecţii József şi László Vágó la Oradea, Arca, Oradea, 2010 (ed. a 2a)

40 T. Csáki: Lajta Béla Virtuális Archívum http://lajtaarchiv.hu/

41 Burgos (2009), apud Grima et al (2012)

42 Cañadas (2006), apud Grima et al (2012)

first employed for hotels and shops (1909-1919) but also for housing 1912-1914 through Juan Miró Trepat/Construcciones y Pavimentos S.A.[43].

Grima[44] identifies from the 183 patents in Spain that the one of Habrich, from German origin, was the one known to Gaudi. This approach is new, as till then the employment of reinforced concrete by Gaudi was negated, with the argument that Gaudi's architecture requested traditional materials close to nater. But with Gaudi's activity being contemporary with the development of reinforced concrete, this could not remain foreign. Reinforced concrete was employed at Bellesguard, the Nativity Façade of Sagrada Familia, but mainly in the Guell park (Fig. 25) as well as the Jardinières viaduct and the Artigas gardens. We underline thus a new employment of reinforced concrete, in landscape architecture. But in facades which would suggest the material tectonics, such as Casa Milà only the envelope was chosen to suggest concrete. In case of the contemporary finishing of Sagrada Familia reinforced concrete is experimented to create the shapes designed by the architect ().

Reinforced concrete enjoyed an inequal spread in Europe. Such, in Germany, although it was experimented with reinforced concrete, a large spread enjoyed also steel, for which there were resources. Reinforced concrete was more adopted where there weren't so reach resources. Many interwar buildings in Germany have a steel structure, such as those of Otto Hässler in Karlsruhe (Fig. 26) and Celle, or thos of Mies van der Rohe in Stuttgart. In "Weisse Vernunft" (White Rationale), an interactive CD ROM of the State School of Design in Karlsruhe the innovative construction techniques in reinforced concrete, steel and glass from the interwar time in Germany are documented. It is to be discussed the relationship between reinforced concrete – steel structure at the retrofit of the Telephone Palace in Bucharest, Romania, and the relationship to metal structure which was typical for Germany in Fränkel's building Adriatica in Bucharest, the local culture of such a structure. Later on we will see the relationship between the frame structure in reinforced concrete (or metal) of the first half of the 20th century compared with the traditional construction with timber skeleton.

With this structure the multistory luxury housing buildings in the centre of some major cities were constructed, such as Bucharest, Milan, Athens, Lisbon. Luxury buildings were not the major current of the Avant-Garde, so also in this field research is needed.

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43 Grima et al (2012)

44 Grima et al (2012)

Before being applied "en masse" in the seismically vulnerable zones of Europe reinforced concrete reached France. A pioneer of the reinforced concrete construction was Auguste Perret, and his contribution is significant because the French typological model of the immeuble de rapport in a built front was also adopted in Romania, with the recesses at higher levels etc. Perret also built the Champs Elysees theatre in Paris, remarkable for the language relationship with one of the authors of the essays about reinforced concrete: István Medgyaszay (Fig. 25). „Immeuble de logements Rue Franklin", designed and built by architect Auguste Perret, 1903-1904 (Fig. 25) is the forerunner of the most exemplary derivates of the so-called interwar style in Romania. Further on, "immeubles" in Paris at the begin of the century display similar characteristics to the interwar Romanian ones regarding the features of integration in the urban structure and the functional features. And not only. Also, while the employment was usually to do computations according to the norms which came from France (as written by Prager, 1979) or from Germany. The German circular from 1925 was the most used one, although considered by design for gravity loads only. Such, constructions with reinforced concrete skeleton resulted. In Germany, the vulnerability of Romanian interwar constructions was researched from a point of view which combines geology and engineering knowledge[45]. Architectural issues and the portability of the present regulation are not included. „Immeubles du beton" from the begin of the century in Paris, or, in time, from interwar Romania, represent the same architectural features. And they are buildings of cultural value. The DOCOMOMO association has as scope the "documentation and conservation of buildings, sites and neighbourhoods of the Modern Movement". Despite this, again, so few have concrete as structural material of the building, or at least are documented as such. Recent research of the author had little success in looking for such buildings in Slovenia, an earthquake prine country, which gave architects of international dimension of an own style, with elements of the Modern Movement. Especially in what regards housing units. Also in Germany innovative buildings in "pure iron-concrete frames" of the Modern Movement are not known to the author.

The buildings of the modern Avant-Garde were raised in a short time, of 20 or maybe just 10 years, in which many styles co-existed (Fig. 28), also with the newest discoveries in philosophy, sociology, physics but also industrial and technological development. The employment of advanced construction technolog of the time was common, but not always the possibili-

45 Sonderforschungsbereich 461 "Starkbeben", University of Karlsruhe

ties of materials and systems were researched enough. The state of research refered principally to the innovation of the façade, since the Modern avant-garde looked for such a new style. The new technologies brought by industrial development were a central part of the world movement in that time. Such, one of the nucleus of the movement was the housing programme, which was particularly suitable to investigate innovation. While in more industrialized countries ways to solve social problems were looked for, in other European countries the new possibilities were seen as an opportunity to give a more prosperous image to cities, raising the density of housing for the middle class. The followed principles were the refusal of a senseless ornamentation, the employment of modern materials and construction ways, the study of new typologies connected to function and particularly a radical innovation in housing construction. The employment of reinforced concrete skeleton made it possible that different plans are designed at superposed floors. Different of the case of the International Style, the individuality of architecture and of the individual apartment was conserved, also in cases like the stappeled villa or the serial plan.

A lesson to be re-evaluated according to the new understanding is how traditional constructions behaved better in earthquakes that modern structures. This was attributed to the so-called local seismic culture. The new understanding took into account the fact that the urban way of life led deliberately to these improvements. During the earthquakes in Turkey in 1999 the traditional timber skeleton buildings called "himiş" behaved better than the modern structures in reinforced concrete[46]. According to Lachner[47] timber constructions can be classified in bloc constructions, column-beam construction and column-bloc construction. At least the latter two have a frame structure. But the buildings with timber construction are not characteristic for with the earthquake prone zones. In earthquake prone zones, as Romania, bloc typologies were adopted, as in the Tatra mountains and thus without fully using the structural characteristics of timber. In coastal zones like Lisbon and Istanbul it can be due to the industrial vicinity of naval industry.

The blossom of multistory reinforced concrete buildings started in France, like the gothic for churches, and was accompanied by innovative solutions for these, like the landmarks of Le Corbusier. Although churches

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46 P. Gülkan, R. Langenbach: ―The Earthquake Resistance of Timber and Masonry Buildings in Turkey‖, în: Proceedings of the 13th World Conference on Earthquake Engineering, Vancouver, 2004, Paper #2297, 2004.

47 C. Lachner: Geschickte der Holzbaukunst in Deutschland, E. A. Seemann, Leipzig, 1887.

have a ship structures, at least at the level of spatial organization, the lateral forces, considered in their design (wind) were not always taken into account at the design of reinforced concrete buildings. On turn, in Vienna, reinforced concrete enjoyed priority with regard to timber and steel, invoking a tradition in stone construction[48], rather than in timber.

At the level of interior space, the ceiling was modeled in structural dependence of the ship in case of gothic churches. In the stone gothic churches the cage structure to be found in the timber frame of "gaiola" (cage) pombalina from the post 1755 earthquake reconstruction in Lisnon can be recognized in the spaces called "ships" of the building. In the reinforced concrete church Holy Spirit of Jože Plečnik, especially in the most innovatie space, the cripta, more levels of reinforced concrete in spatial frames are prefigurated. The stone constructions in gothical style had in common with the timber structure and previously shown building the structure-frame span. Stone constructions in gothic style, also, had in common with the reinforced construction which followed the same structure-opening span. The philosophy behind the employment of reinforced concrete was different in this case of that of timber. So, spatially, tridimensional structures, as were those in ston in the gothic, are typical for reinforced concrete. The "reinforced concrete skeleton" spred later than the Hennebique structure which was an early structure in "reinforced concrete frame", before of what we know today in shape of "seismic codes". Before, the adoption of the frame (in Greece or Italy) seemed to come from the existing urban structures, talking of the regulated frame of parcels.

Two buildings with reinforced concrete structure from the first half of the 20th century in Vienna and Bucharest, the Zacherl house and the Patria bloc of flats have a related stylistic language, but the building in Vienna hast a spatial structure of reinforced concrete frames, different from the building in Bucharest, which has a structure in reinforced concrete skeleton, with secondary beams.

Between the two programmes, sacre and residential, an exchange of architectural and structural language took place. Italy features several churches of the interwar time as the chapel at Sapienzia campus, or that in the north by Piacentini.

The design of spatial structures is similar to a laboratory where the possibilities of the new material are researched and in which lessons for multi-

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48 A. Becker, D. Steiner, W. Wang (coord.): Architektur im 20. Jahrhundert: Österreich, Prestel, Munich, 1995.

story constructions are learned. Such lessons for employing the material have to be learned also for concrete.

Another aspect connected to the traditional modern dialogue is the development of national states in the time of Modernity and of the introduction of reinforced concrete. Such, reinforced concrete was also used for the construction of public institutions. Less in Romania, but more in Italy it was also used in the architecture of expo's, a contemporary occasion to introduce multimedia elements in the perception of memor in intervention, which migrates also towards common buildings.



Fig. 19. Romantic nationalism, one of the Art Nouveau styles in Riga, Latvia. Apartment block, Elzens Laube, Alberta Street 11 (1908). Photo: M. Bostenaru, 2011.

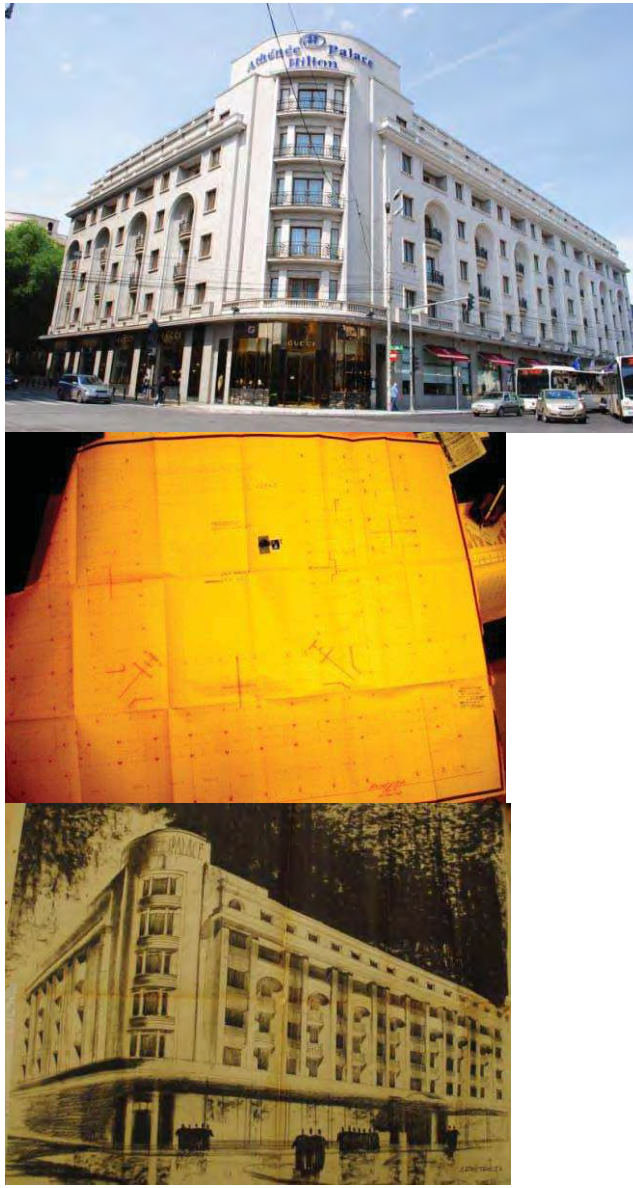


Fig. 20. Athenée Palace, Bucharest. Initial design: Arch. Daniel Renard (1910-12). Converted into interwar architecture by Duiliu Marcu (1925-27). Photo: M. Bostenaru, 2011, archive plan and perspective: Bucharest Town Hall archives



Fig. 28. Czech Cubism. House of the Black Mother of God, Prague. Arch Moskivits Miksa palace, architect Josef Gočár (1911-12) Celetná Str. amd Ovocný trh. Photo: M. Bostenaru, 2008.

4.2 The urban and architectural resonance of the introduction of early reinforced concrete

This book presents a comparative overview of the early 20th century architecture in Europe together with conservation approaches to put in value this architecture in the respective countries. A close view is dedicated to the employment of reinforced concrete.

The multistory construction had urban resonance together with the raise of height, in order to satisfy hygiene requirements, promoted among others by the Avant-Garde, the distance between fronts raised, and this way new boulevards were defined, as for example in Bucharest, or it was built in the periphery, in large green spaces, as in the West of Europe. The tracing of new boulevards, superposed on the organic grid of streets led to parcels with irregular contuure, reflected then in an irregular grid in the disposition of partition and structural elements of the buildings, cause for their seismic vulnerability in Bucharest. In other countries, such as Greece or Portugal, the boulevards were traced at the extension of the city, for example towards facilities of the time such as the train station, and as such the buildings have a regular structure.

The type of building in our research was conceived to raise density in the centry of the cities. More even, Sonne[49] observes when analyzing the typology of block of flats, that these have a sustainable typology, a viable model for urban development today. Sonne[50] follows typologies with an atrium, in order to conserve green spaces and a better adaptability to climate change, taking into account the difference in function, although the difference in climate in the countries considered is not highlighted. In the Sonne[51] research the following typologies in Western Europe and North America are considered:

- Berlin and Germany
- Vienna for Central and Eastern Europe – some examples from Prague, Budapest, Switzerland and Russia,
- Amsterdam and the BeNeLux (namely Rotterdam)
- Copenhagen and Skandinavia,
- Paris and France,
- Milan and Southern Europe, namely Spain,
- London and Great Britain,
- New York and the USA (Chicago).

Our research instead went out from a seminar at the University of Karlsruhe on early 20th century architecture in Eastern Europe. Thus, exactly countries missing in the research by Sonne[52] are covered, Romania, Greece, Slovenia, Portugal, Estonia, Latvia to name just some examples. Italy is a common point, with the "Novecento" and the "ambientismo" architecture. Hungary is only tounched.

The attitude towards the Modern Movement is different in Europe. At the IV Congrès Internatiounaux d'Architecture Moderne in 1933, the Charter of Athens was proclaimed, and later documented by Le Corbusier. This put the basis for rational cities, the key concept being the strict separation in zones for the four "functions": housing, work, loisir and circulation. These concepts were employed on large scale for the reconstruction of European Cities after WWII, in the "functionalist" style. In the interwar time, even before WWI, such housing was developed experimentally, in the difficult taks of economic efficiency. New technologies such as reinforced concrete were employed. The begin of the 20th century disposes the difference between the

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49 W. Sonne: Dwelling in the metropolis: Reformed urban blocks 1890–1940 as a model for the sustainable compact city. Progress in Planning 72 (2), 2009, p. 53-149

50 Sonne (2009)

51 Sonne (2009)

52 Sonne (2009)

non-west of the predominantly Western Modernism. Generally accepted, Modernism is a historical phenomenon manifested in a linear history between two peak moments which define it: the interwar time and the postwar time, even if "other modernisms" continue to exist. Such "other" Modernisms existed also paralelly to the principal modernism flux. It is a question of frontiers, not only theoretically, temporally and aesthetically, but also geographically / cultural barriers. There is a conditioned dependency between the geographic and the chronological limits – this way Eastern Europe had forerunners in the buildings built before WWI in Central and Western Europe. Same happened in the second half of the 20th century, even if the reasons were different, looking for expression. At the same time, Western Europe saw the development of so-called participatory architecture, while during Eastern Europe totalitarism mass housing was built. Practically, in today's architecture, we can see the reaction to the architectural approaches differently seen in the spread of functionalism in postwar time, when the ideals from the begin of the 20th century of the Avant-Garde made place to mass housing. The Western architecture of Italian rationalism has in common with Eastern Europe the European Modernism in Greece and Romania, the contextualism: its buildings were not raised at the periphery, but in the city. Milan is a product of the 1930s as are the main boulevards in Bucharest. The section in central Bucharest is unique in Europe, while the Milan works are spread close to the central railway station similarly to Athens, but the position of the building in context builds a difference in approach to Germany, for example. In France, this approach which served as a model for Romania was spread before WWI.

In Western Europe innovation was done in social housing, at the periphery, in the so-called Siedlungs. An exception are the Viennaise Hofs (Fig. 29), but also these are a typology many times neglected in architecture history. A typology close to the Viennaise hofs we find in Warsaw (Fig. 30). Housing was a major contributor to interwar architecture, a pioneering programme, shaping architects' careers, emancipating society and remodeling the urban tissue, but, for example in Greece, innovation was done also in school buildings.

11.2 Bordenache, Richard (1905-1982)

Richard Bordenache (1905-1982), graduate of the Architecture School in Bucharest (1929) and scholarship holder in Rome 1930-32 made studies about the Santa Trinita di Venosa church, published in Ephemeris Dacoromana VII (1937, p. 1-76). The work contains numerous building survey plans and photographs, completed with the reconstruction of the demolished parts. The church presents architectural influences from the time of the entrance of nomads in Italy. Although Bordenache returned and activated as architect mainly in Romania, but also in frame of the Commission for Historic Monuments, being professor at the "Ion Mincu" Architecture Institue (1944-71), his son, also an important architect, emigrated to Karlsruhe, Germany. The nephew is a digital artist. In the interwar time Bordenache built works like the AGIR block of flats, a functionalist building plated in stone, like the Italian Rationalism works of Terragni. Among numerous interior design works is also the extension of the building of the Romanian Cultural Institute in Alexandru alley. From the villas designed we name the one for important and mobile art historian Tzigara Samurcaș. In the postwar time remarkable is a so-called palazzo on the southern part of the Palace/Revolution square, thus covering the brand wall of the Generala interwar block of flats, a new Italian influence, but of Novecento. Later on, from inner city locations, Bordenache turned towards the lakeside of Bucharest, with interventions in Snagov, Mogoșoaia and Floreasca. Building at water was prize awarded for again a classicistic building, the Loisir house for Communist nomenclature. Bordenache was also active in interwar time post-disaster reconstruction outside Bucharest, with the Corbeni intervention in Argeș county after a flood. Remarcable in interwar time are also the industrial buildings.

Works in Bucharest

1933 Costea house, parcelarea Basarab

1934 House dr. Enescu, Viilor str., house Tzigara Samurcas, M. Kogalniceanu str., house Ing. Pâslaru, Sf. Elefterie str.

1934-36 interior design National Art Museum, Kiseleff avenue

1935 Ursescu house, Roma str., eng. Portocală house, parcelarea Basarab, The school of conductors at the Ministry for Public Works and Constructions

1936 Prof. eng. Nicolau house, Dr. Lister street, Eng. Epure house, parcelarea Basarab

1937 Th. Emandi house, Clucerului str., block of flats AGIR, Eminescu street, painter A. Jiquidi house, Neculce street, interior design of the house Boteanu-Pipidi, Calomfirescu street

1938 IOR factory Sos. Vergului, interior design eng. Slăvescu house, Paris street, interior design, furniture and special installations, former Morţun-eng. Malaxa house, Alexandru alley, dr. Palada villa, Otopeni, k. 18, eng. Dumitrecu house, Colentina
1939 eng. Runcan house, Mogoşoaia, Devechi house, Floreasca lake, Oiaga house, Domeniilor park, restoration and interior design of the Girls school of Ion Mincu, modification prof. eng. Vasilescu-Carpen house, Domeniilor park, design of the exhibition of the Pipe factory, N. Bălcescu boulevard
1941 block of flats behind AGIR
1942 extension of IOR factory
1945-46 interior design of the flat of eng. Holzer, Sf. Apostoli street; interior design of the block of flats in Beldiman street
1947-48 interior design and installation Panduri hospital, dormitory for disciples 23 august factory
1948-49 transformation of the reunion hall and the central body of the RPR Academy

In frame of design institutes:
1951-52 „Generala" brand wall, Calea Victoriei, Loisir house in Snagov (prize awarded work), interior and exterior design Otopeni sanatorium, landscape design and decoration Snagov assembly
1953 restaurant building for the Youth Festival Şoseaua Viilor

Visual material:

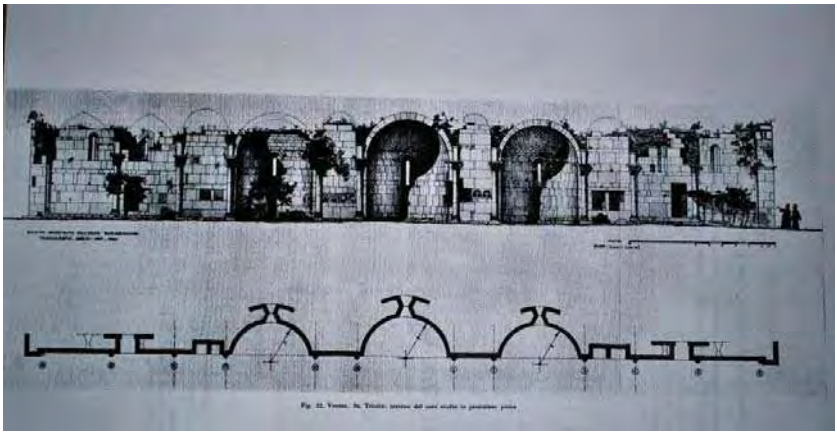


Fig. 69. Richard Bordenache. Building survey Santa Trinita di Venosa (Ephemeris Dacoromana, VII/1937, Fig. 22)

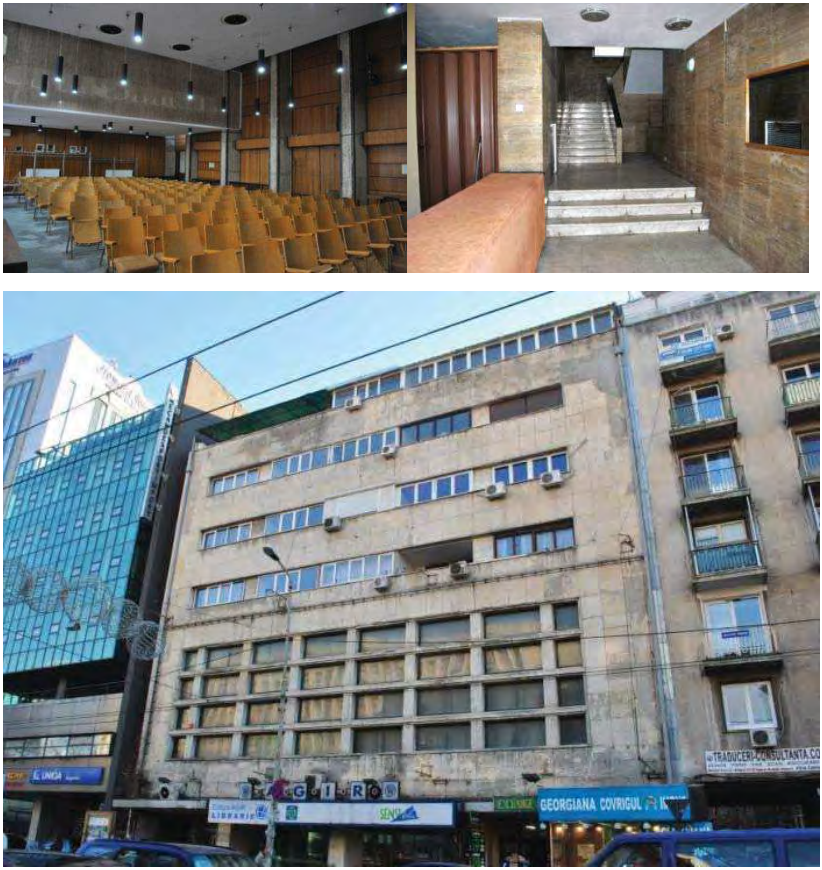


Fig. 70. Richard Bordenache. Functionalist architecture. AGIR/ASIT palace (1935-37). Photos: M. Bostenaru, 2012, 2014.

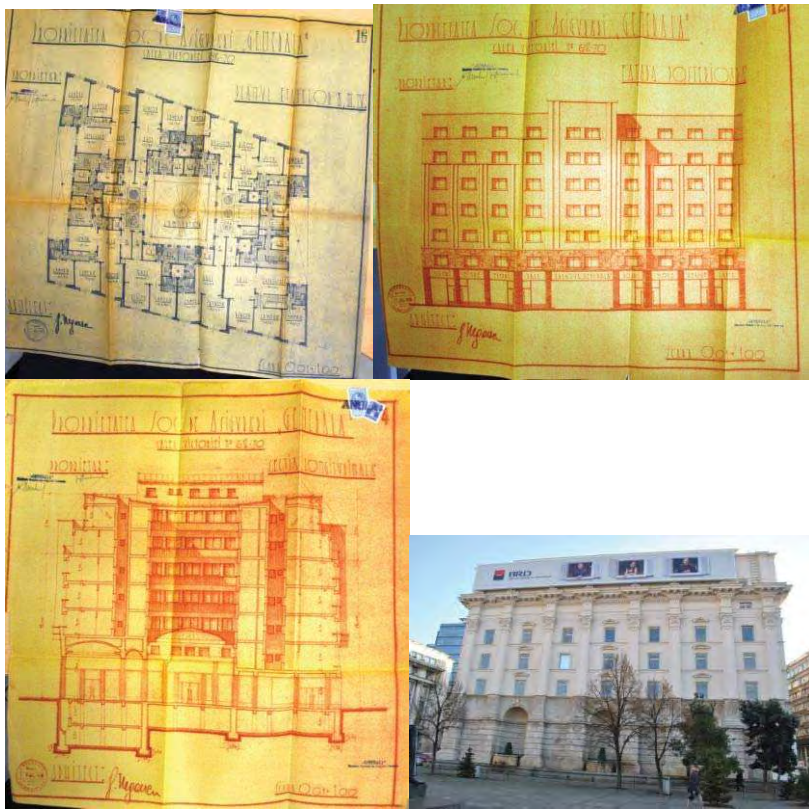


Fig. 71. Richard Bordenache: An Italian type palace, closing the brand wall of General Building (1954). Photo: M. Bostenaru, 2012. The original Generala building. Archive plans from the Town Hall of Bucharest city (PMB fond tehnic)

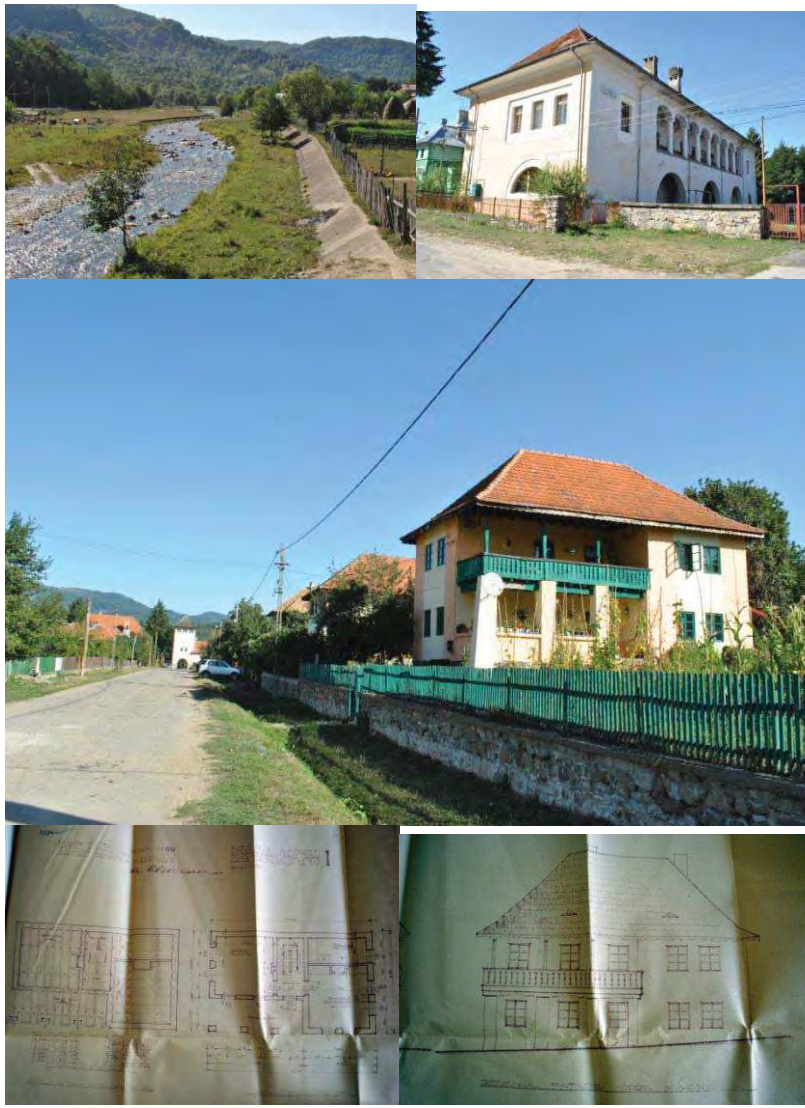


Fig. 72. Richard Bordenache: Flood reconstruction in the village of Corbeni, Argeș county. Landscape, community building and a villa. Photos: M. Bostenaru, 2012. Archive plans and facade, Arges county archives.

11.4 Fränkel, Rudolf (1901-1974)

Photo at http://kg.ikb.kit.edu/arch-exil/320.php (small size)

The German-Jewish architect Rudolf Fränkel was the son of Louis Fränkel, a government architect who studied architecture at the Royal Technical College in Charlottenburg while receiving practical training from his father.

Soon after opening an office in Berlin in 1924 he worked on his first major commission, the Gartenstadt Atlantic, a Siedlung of the type garden city in an inner-city location (for which reason it was prize-awarded) now protected as monument and which underwent recently renovation (2005). One of the landmarks of the development was the Lichtburg cinema (an architecture of light), which no longer exists. Yet the Gartenstadt Atlantic is different from German Modernist architecture exactly through it way of adapting the garden city to the inner city: it has blocks and not the well known German "Zeile" (row), and the interiors are rather classical and do not display the innovation in the communication of spaces. Fränkel built some other residential buildings in the following years, which are not listed in this article. Fränkel was invited to join the Bauhaus, but declined. 1933 with the raise to power of the Nazis, he emigrated to Bucharest, where he built first a property including his studio (Dr. Roth), a metal structure office building (Adriatica), some other family and collective housing as well as industrial buildings, and two spectacle buildings – the Comedy Theatre and the Scala Cinema. It is the corner of CA Rosetti street and Magheru boulevard which displays 3 Fränkel buildings: the Malaxa (together with Horia Creanga), the Scala cinema and another one, which has been recently reshaped by removing the interior and keeping only the facade. The multifamily housing developments in Bucharest prove to suit well Fränkel's style, as they are integrated in the context of innercity blocks. In the interwar time Bucharest displayed housing in the newly populated N-S boulevard in the city centre, instead of periphery like in (Western) Europe. Obviously he had no write to sign his own projects as the archive drawings show. The last buildings in Bucharest were raised 1936, and 1937 Fränkel moved to London, where he continued to design residential and industrial buildings. 1950 Fränkel finally emigrated to the USA to teach at the Miami University in Oxford, Ohio. Here he started the first urban planning programme in America which he led until he was retired, not being tenured (as foreign national), and he was ac-

tive in developing Master Plans. Miami University staff Gerardo Brown-Manrique is the best informed researcher on his work, while some original drawings and period photographs are kept at the Canadian Centre for Architecture in Montreal, Canada. The University of Karlsruhe (TH) used to maintain a directory of German speaking architects in exile, reporting also on Fränkel's buildings and archiving of material. Recently an NGO based in Berlin dedicates time to German Jewish architects in exile. Fränkel through his career was a unique example of moving from Western Europe to Eastern Europe and can serve as role model for the EU today.

List of works

1924–1928 Gartenstadt Atlantic settlement, Gesundbrunnen, Berlin, Germany
1927–1929 Lichtburg cinema at Gartenstadt Atlantic, Gesundbrunnen, Berlin, Germany
1933 Dr. Roth Property (including Fraenkel studio), Bucharest, Romania
1933 Adriatica office building, Bucharest, Romania
1934 House Pop, Bucharest, Romania
1934 Velvet Textile Factory (demolished), Bucharest, Romania
1934 Block of flats Pop, Bucharest, Romania
1935 Comedy Theatre, Bucharest, Romania
1935 Vaida-Comşa House, Bucharest, Romania
1935/6 Scala Cinema, Bucharest, Romania
1935 Building Malaxa (with Horia Creanga), Bucharest, Romania
1936 Villa Flavian, Bucharest, Romania
1936 Property Magheru 1-3 (altered), Romania
1937–1938 Frankel house, Outer London, UK
1946–1947 Suflex Ltd. Factory, UK

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http://kg.ikb.kit.edu/arch-exil/320.php

http://svrdam.cca.qc.ca/search/bs.aspx?langID=1#s=rudolf%20fr%C3%A4nkel&p=1&a=kw&nr=1&nq=1

Visual material:



Fig. 74. Gartenstadt Atlantic, Photo: M. Bostenaru 2012

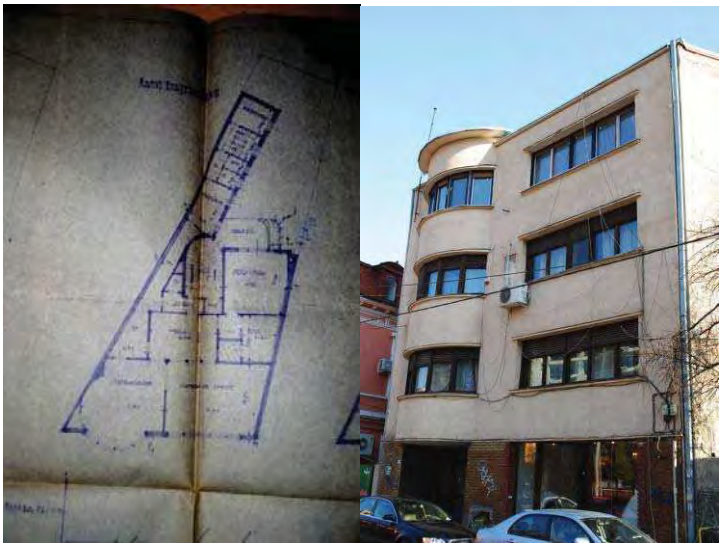


Fig. 75. Dr. Roth block of flats (including the flato f Fränkel) 1933. Archive plan from the Town hall of Bucharest (PMB fond tehnic). Photo: M. Bostenaru 2011

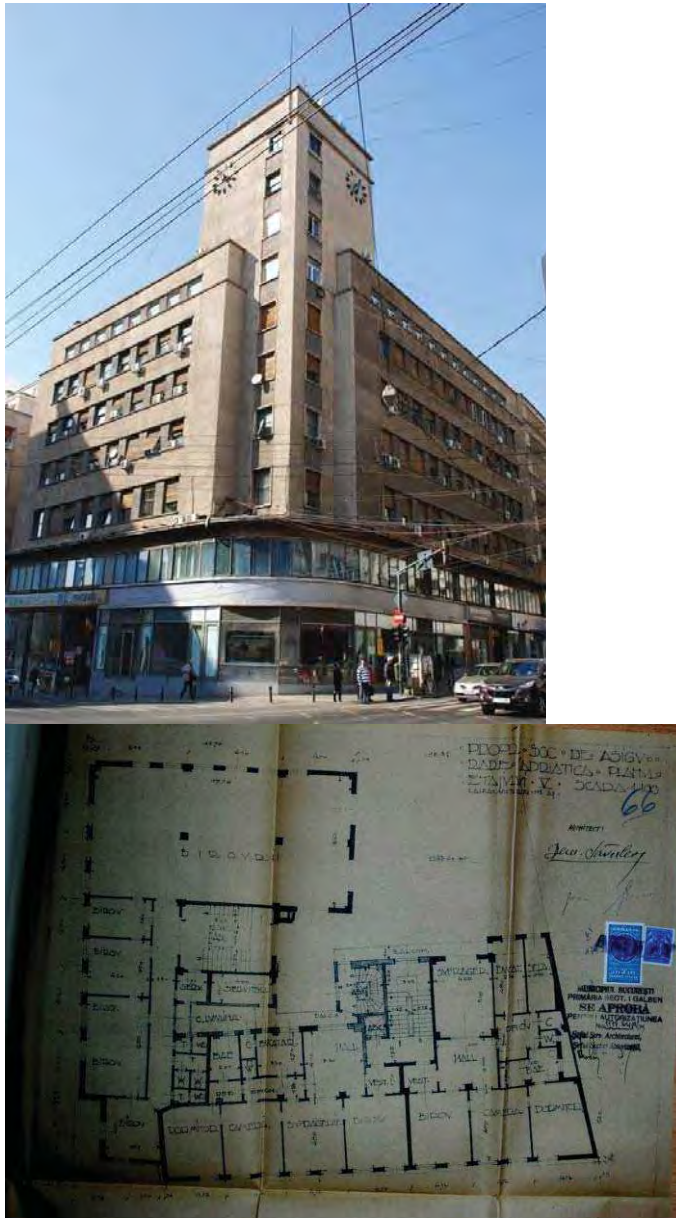


Fig. 76. Adriatica building, Photo: M. Bostenaru, 2011. Plan: Town hall of Bucharest archives (PMB fond tehnic).



Fig. 77. Scala cinema. Photo: M. Bostenaru, 2011 and 2013

11.5 Ponti, Gio (1891-1979)

No free portrait, Wikipedia links to this one http://en.wikipedia.org/wiki/File:Gi%C3%B2_Ponti.png

The Italian architect, designer and publisher Gio Ponti studied architecture at Politecnico di Milano, from where he graduated 1921, after having also served in the First World War. 1923-27 he partnered with Novecento architects Mino Fiocchi and Emilio Lancia and then till 1933 with Emilio Lancia only, a time from which date some emblematic Novecento Milanese buildings. The Novecento Movement was the counterpoint of the Rationalism of Gruppo 7 (around Giuseppe Terragni). It's architecture marked two periods, both started by Giovanni Muzio, one of decorative Novecento and one of geometric Novecento. Both leaned to the typical Milan palazzo, and were a sort of classic revival. However, as early as 1934 he built a Rationalist building in the Città universitaria in Rome (the Mathematics building). After Lancia he partnered with engineers, and, in 1950, won the commission for the Pirelli tower in Milan (1955-58) for which he partnered with no less than Pier Luigi Nervi. The 52 storeys (127m) high tower is the highest one in reinforced concrete in the world. The curtain wall is hold by a central structure. It is then when he truly turned towards Modernism. The tower attracted international attention and commissions from other continents (Venezuela, Hong Kong, USA) came. But he built abroad before, in the interwar time he built Casa Tataru in Cluj-Napoca, Romania, which retains the original furniture. One masterpiece which was built after this was the 1971 Denver Art Museum. The museum was extended twice since, and a new extension is the Hamilton pavilion by Daniel Libeskind. When comparing the original museum with the extension the adequacy for exhibition space lets Ponti's design be the winner (Taisto Mäkelä). He continued to work for Milan as well, with a series of churches.

As industrial designer, Gio Ponti did furniture, glass and ceramicsware, including lamps from the beginnings of 1923 on, when he participated at the Bienalle in Monza. He also did scenographic arrangements. In 1928 he founded the today successful Domus magazine, the show-off magazine in architecture and arts of Italy, which he led as editor with intermittences. He was professor of his Alma Mater, the Polytechnic of Milan (1936-1961).

Gio Ponti's work was praised by a number of awards: "Commander" of the Royal Order of Vasa in Stockholm, Accademia d'Italia Art Prize, gold medal from the Paris Académie d'Architecture and hold o honorary doctorate from London Royal College of Art.

List of works

1925 House in Via Randaccio, Milano, Italy
1927 Monumento ai Caduti (Monument of the Fallen) in Piazza Sant'Ambrogio, Milano, Italy
1928 House in Via Domenichino, Milano, Italy
1931 Typical houses: Domus Julia, Domus Carola and Domus Fausta in Via De Togni, Milano, Italy
1933 House Rasini, Porta Venezia, Milano; Italy
1933 Torre Littoria, Parco Sempione, Milano, Italy
1934 Math School, Città Universitaria, Roma, Italy
1935-1938 First Palazzo Montecatini, Milano; Italy
1938 Villa Tataru, Cluj-Napoca, Romania
1939 Palazzo Ferrania (then Fiat), Milano, Italy
1947–1951 Second Palazzo Montecatini, Milano, Italy
1952–1958 Istituto Italiano di Cultura (Fondazione Lerici), Stockholm, Sweden
1953-1957 Villa Planchart, Caracas, Venezuela.
1956–1961 Pirelli skyscraper, Milano, Italy
1955-1960 Church San Luca, Milano, Italy
1970 Cathedral Gran Madre di Dio, Taranto
1970-1971 Denver Art Museum, Denver, USA.

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Taisto Mäkelä, Denver professor for history of architecture http://z10.cgpublisher.com/proposals/146/index_html
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Visual material:



Fig. 78. Casa Tătaru, Cluj-Napoca (1938). Arch. Gio Ponti. Photo: M. Bostenaru, 2012. Visit by permission of the owner.

11.6 Cantacuzino, George Matei (1899-1960)

Photo at the Faculty of Architecture in Iasi which bears his name http://www.arhitectura.tuiasi.ro/?page_id=703&lang=en

The Romanian architect and writer George Matei (GM) Cantacuzino was born in Vienna with a diplomat father and a mother descending from the Romanian ruling family. After childhood in Vienna and school years in Switzerland (with vacations in Romania), and war years, he is admitted to study in Paris in 1920, when he also starts working on the restoration of Mogoşoaia palace. The decision for France comes on the background of Romanian francophonie, while the decision to study architecture comes on the family background of seing the begin of works at Mogoşoaia palace (under the Venetian architect Domenico Rupolo, who might connect the idea of loggias to those oc Ca d Oro in Venice). Mogoşoaia palace is one in the vicinity of Bucharest, built in Brâncovenesc style, by voivod Constantin Brâncoveanu. Afterwards he founds an office with August Schmiedigen, whom he met on the Mogoşoaia building site, with whom he builds in Palladian style (urban palace of the Chrissoveloni bank). According to Teodorovici this also reflects his childhood memories of Viennaise architecture. Actually he writes a study on the work of Andrea Palladio in 1928. In 1929 he graduates and moves back to Romania. In 1930, with opening of an own office with three collaborators, he turns towards functionalist architecture with the resort buildings at the Black Sea. In the field of functionalist architecture he collaborated with another big name of Romanian functionalist architecture, Octav Doicescu, in the industrial buildings of IAR and at the exhibition pavilion in New York (where the later remained). Another functionalist buildings are the blocks of flats in the centre of Bucharest and another hotel on the seaside designed together with Vasile Arion. A block of flats planned only by him in functionalist manner on Magheru boulevard is the Carlton block of flats, which collapsed in the 1940 earthquake. It is the only building from interwar time to collapse in this earthquake, but a precursor of the numerous collapses of interwar buildings in the 1977 earthquake due to their conformation with accentuated corner buildings. The collapse suscitated an active discussion about its cause, misused by the legionary dictatorship. However, also the interwar years are marked by in parallel designing in Renaissance style and in Brancovenesc style (villas, and a markant building at Piaţa Universităţii, the Industrial Credit Company building). An interesting approach is the corpus near Creţulescu church, and

stay back from the big architecture gesture to put in value the church (which was in line for his history preoccupations for churches). The architecture, although Palladian, has thus the simplity and lack of ornament of functionalism. It is an urban planning approach. The co-existance of these three directions (Renaissance/Palladian, New-Romanian/Brâncovenesc and Functionalist) led to place his architecture between tradition and Modernism. The classical approach, result of his travel studies, was as much part of his attitude as functionalism. In parallel with building activity he also did publication work: architecture history, theory and criticism. Notable are his issues of Simetria. Apart of architecture designing and writing he did architecture drawings with which he opened several exhibitions in interwar but also in postwar time. He does a number of architecture travels, incl. in the Orient. The taste for travel came during study years, when he travelled between Bucharest and Paris to see whole Europe. He works also on the urban plan of Bucharest of 1934 along with other big names of interwar architecture. After the war he built one more major building in the centre, and restored a manor (return to Palladio) before being forced by the communist regime to resign from designing. 1948 he is imprisoned for being a prince, till 1953. He worked 1953-1956 at the Monument Protection Office cataloguing church heritage before being obliged to resign also from there and moved to the places of his childhood in Northern Moldavia, where he restored monuments, a direction his career took also in better years. Notable is the building of pavilions for the Mitropoly, which was done under false name.

List of works (selection):

1920-1930 Restoration of the Mogoşoaia palace; Mogoşoaia, Romania

1923-1928 The Chrissoveloni Bank Palace, Bucharest, Romania (with August Schmiedigen)

1925 Housing for the employees of Chrissoveloni Bank, Bucharest, Romania (with August Schmiedigen)

1925-1928 Restoration and extension of the former Palace of Queen Elisabeth of Greece, Bucharest, Romania (with August Schmiedigen)

1930-1933 Villa complex on the Black Sea coast, Eforie Nord, Romania (incl. Villa Aviana 1933, Villa George Bibescu, 1930-31, Villa Crinul 1933 and many other Egreta, Anemona, Flora, type villas etc.)

1930-1934 Hotel Bellona, Eforie Nord, Romania

1930-1933 Industrial complex of the aircraft factory IAR (later Tractorul) – assembly hall (collaboration with Octav Doicescu), Braşov, Romania
1932 Block Carlton, Bucharest, Romania (collapsed in the 1940 earthquake)
1930-1933 Villa N. Mavrocordat, Bucharest, Romania
1932 Tudor Arghezi residence, Bucharest, Romania
1934 Collaboration at the Master Plan of Bucharest, Romania
1934-1935 Office building of the former Industrial Credit Company, Bucharest, Romania
1934-1935 Block of flats Emanoil Kretzulescu, Bucharest, Romania (with Vasile Arion)
1934-1935 Block of flats D.D. Bragadiru, Bucharest, Romania (with Vasile Arion) (next to Horia Creangă Barbu Dimitrescu building with the office of the architect)
1934-1935 Villa Florica Policrat, Bucharest, Romania
1936 Villa Nae Ionescu, Bucharest, Romania
1936-1940 Hotel Rex, Mamaia, Romania (with Vasile Arion)
1938 Octavian Goga Mausoleum, Ciucea, Cluj county, Romania
1938 Corpus of the Kretzulescu Church Wardenship, Bucharest, Romania
1938-1940 Church Adormirea Maicii Domnului, Flămânda, Argeş county, Romania
1939 Romanian pavilion at the World exhibition in New York, USA (with Octav Doicescu)
1938-1940 Restoration of the Drugănescu Manor, Drugăneşti-Stoeneşti, Giurgiu county, Romania
1945-1948 Gas and Electric Company Building, Bucharest, Romania
1957-1960 Restoration of the Mitropolia, Iaşi, Romania
Restoration of monuments in Northern Moldavia (incl. Biserica Trei Ierarhi, Iaşi), Romania

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Theoretikers George Matei CantacuzinoPhD dissertation, University of Stuttgart, http://elib.uni-stutt-
gart.de/opus/volltexte/2010/5813/pdf/teodorovici_dissertation_2010_16_mb.pdf

Visual material:



Fig. 81. Block of flats D.D. Bragadiru (1934-35), Photo: M. Bostenaru, 2014



Fig. 82. Block of flats Emanoil Kretzulescu (1934-35), Photo: M. Bostenaru, 2014



Fig. 83. Corpus of the Kretzulescu Church Wardenship (1938), Photo: M. Bostenaru, 2014



Fig. 84. Office building of the former Industrial Credit Company (1934-35), Photo: M. Bostenaru, 2014



Fig. 85. Gas and Electric Company Building (1945-48), Photo: M. Bostenaru, 2014

11.7 Delavrancea-Gibory, Henrieta (1894-1987)

Photo (small size) at http://arhitectura-1906.ro/2011/07/henrieta-delavrancea-gibory-1894-1987/

The Romanian pioneer woman architect Henrieta Delavrancea-Gibory was the fourth daughter of the writer Delavrancea, born in a family of artists, her older sister Cella being a renowned musician (piano). She started studying architecture in 1915, and graduated in 1927, after an interruption of eight years of the studies (till 1924) due to service in the infirmary during the war as well as marriage (1919) with an officer from the mission of the French general Berthelot. Soon after graduation she wins the project competition for the district hall (prefectura) in Oravita, in New-Romanian style. At the time of her graduation the New-Romanian style still existed in Romania, but there were also French influences of Modernism, since the Romanian Modernist architecture was mostly marked by this, with the blocks with recesses in the spirit of Auguste Perret and Henry Sauvage. Henrietta Delavrancea started an architecture which combined the spirit of the place with Modernism. Although Bucharest features a number of her buildings, including residential, but also sanitary buildings (with one competition of this kind she won against the team of renowned architect Horia Creanga, but the building, one of her first designs, was finished only 1942), her main field remains resort architecture. She constructed on the Romanian (in Eforie), but mainly on the Bulgarian seaside (from 1934 on, the first one, the villa Vanturile, valurile [Winds and ondes], being demolished in 2009). The 17 villas in Balchik, then Romania, today Bulgaria, are the peak of her architecture, which she achieved at the age of over 40 years. They include a villa in the garden of the Royal Palace of Queen Maria, hence pioneer woman architect and pioneer investor. As an architecture, they combine stone with modern materials painted in white, for which reason her works are cited for combining traditional and modern. Also 2009 was demolished one of her modernist villas in Bucharest, the villa Prager. The villa Prager in Bucharest was the only one there reminding the architecture of the villas in Balchik. After the war, she further designed, remarkable for this time being the hospital buildings (Fundeni), and then in collective work in design institutes. She also worked in history of architecture research, doing studies for the restoration of churches, and promoted her fellow women architect colleagues from the pioneer time. Records of her memories were published in the magazine Arhitectura, and her main monograph on the topic remained

unfinished. In 1972 she received the prize of the Romanian Union of Architects for her whole activity. Starting 1977, over 80 years old, when the earthquake triggered an excuse for demolishing buildings for the Comunist power, she was involved in efforts to save monuments of Bucharest, but without result.

List of works

1925-26 Own house, Eminescu str., Bucharest, Romania
1927 House Iosipovici, Bucharest, Romania
1928 House Blanche Bernay, Bucharest, Romania
1930-33 Medicine Institute "dr. N. Lupu" (now in ruin), Bucharest, Romania
1932-39 Institute of Public Health and Hygiene, Bucharest, Romania
1932-34 Villa "Vanturile, valurile", Balchik, Bulgaria
1934 House Prof. Gavrila, Bucharest, Romania
1934 Villa "Turnul lui Mugur" (Mugur's tower), Balchik, Bulgaria
1934 Casa Balcica, Balchik, Bulgaria
1934-35 Vila "Lupoaicei", Balchik, Bulgaria
1934-35 Villa poet Ion Pillat, Balchik, Bulgaria
1935 Villa Eliza Bratiani, Balchik, Bulgaria
1935 Tea pavilion of Queen Maria, Balchik, Bulgaria
1935 Tobacco debit, Balchik, Bulgaria
1935 Fruit shop, Balchik, Bulgaria
1935 Villa "Cuibul lui Roman", Balchik, Bulgaria
1935 House M. Serbescu, Bucharest, Romania
1936 Town hall, Balchik, Bulgaria
1936 Pavilionul Granicerilor (Frontier keepers pavilion), Castle, Balchik, Bulgaria
1936 Villa Grigore Iunian, Balchik, Bulgaria
1936 Villa Misterioasa, Balchik, Bulgaria
1936 Villa ing. Prager, Bucharest, Romania
1936 Villa "Ghiul Hane", Balchik, Bulgaria
1936 Villa "Ghiul Serai", Balchik, Bulgaria
1936 Villa Mircea Cancicov, Balchik, Bulgaria
1936-37 Villa prof. Vilcovici, Bucharest, Romania
1936 Villa "Casa cu terase in mare" (House with terraces in the sea), Balchik, Bulgaria
1937 Villa Cantuniari, Bucharest, Romania

1937-38 Block of flats general Glatz, Bucharest, Romania
1938 Facade of the cinema Capitol, Bucharest, Romania
1936-37 Snagov palace of Prince Nicolae (modified 1970), Snagov, Romania
1938-39 Block Grig Arapu, Bucharest, Romania
1946-48 Block of flats Brezoianu str., Bucharest, Romania
1949-59 Fundeni hospital, Bucharest, Romania
1950-60 Oncology Institute, Filantropia hospital, Bucharest, Romania
1982-87 Contribution to the restoration of the church of Sf. Gheorghe, Bucharest, Romania

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Retegan, E., Doctorate thesis, “Ion Mincu” University of Architecture and Urbanism (in work)

Visual material:



Fig. 86. Villa Ion Pilat, Balchik (1934-35), Photo: M. Bostenaru, 2010



Fig. 87. Vila Ghiul Serai, Balchik (1936), Photo: M. Bostenaru, 2010

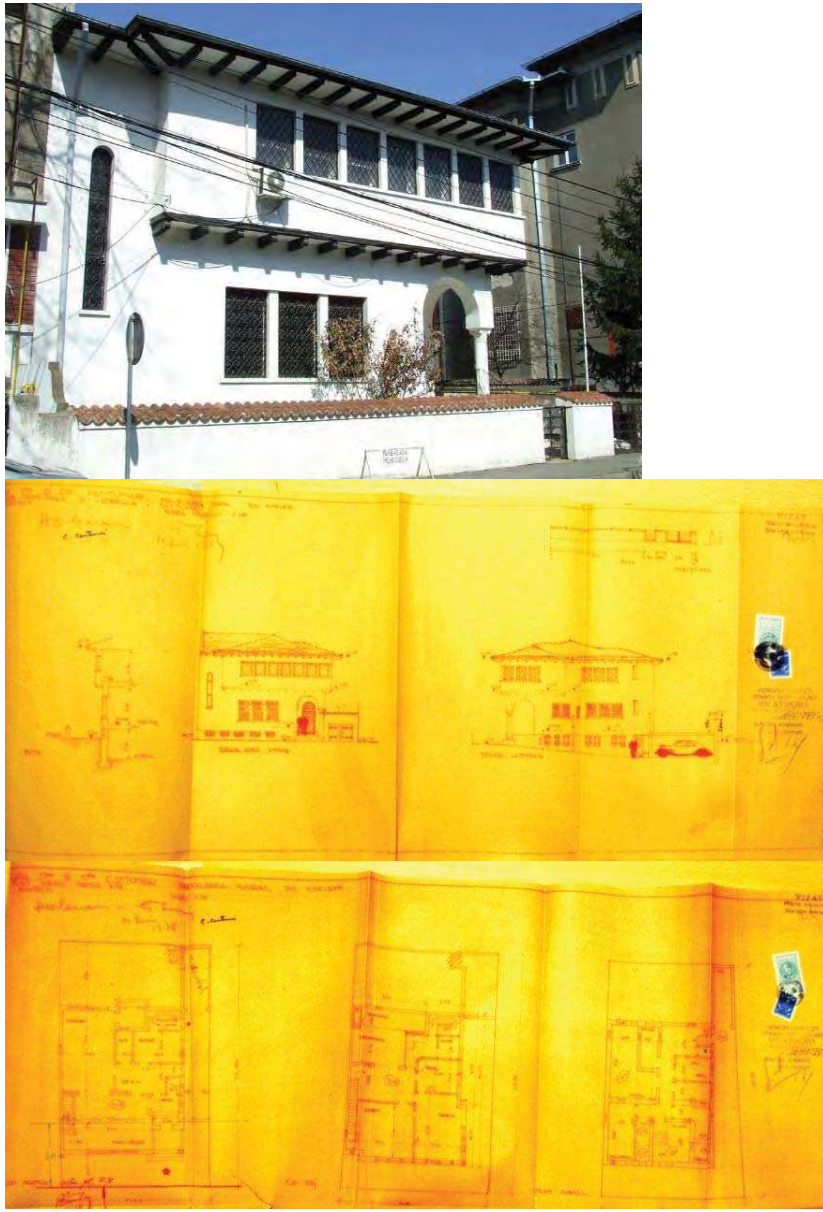


Fig. 88. House Cantuniari, Bucharest, Romania (1937), Photo: M. Bostenaru, 2010. Plans from the Bucharest city archives.



Fig. 89. Pavillion at the Queen castle, Balchik (1936), Photo: M. Bostenaru, 2010.



Fig. 90. Nicolae Lupu medicine institute (1930-33), Photo: M. Bostenaru, 2011.



Fig. 91. Block of flats on Brezoianu street (1946-48), Photo: M. Bostenaru, 2010.



Fig. 92. Villa Prager (1936, demolished 2009), Photo: M. Bostenaru, 2009

11.14 Andreescu Haret, Virginia (1897-1962)

Photo small size at https://www.bnab.ro/2012/expo-arh-rom/17/

The Romanian architect Virginia Andreescu Haret, the first woman architect in Romania and at least one of the first of the world, was born in a family of artists, the brother of her father being the painter Ioan Andreescu. Along with the School of Architecture, she attended the School of Beux Arts, and the Romanian Academy Library holds a collection of her stamps. She graduated 1919 from the School of Architecture after which she went, on her own, as the Romanian School in Rome was funded afterwards, to continue studies in Italy, where she worked under the guidance of archaeologists. Probably from this stay is her taste for research, being then present at conferences abroad, but also doing history of architecture studies (ex. building surveys with Ghika-Budesti). She married in 1928 the son of the scientist Spiru Haret, Spiru Haret-Gold, civil engineer, and they had a son. One of the issues in researching the work of women in architecture is that it was possible for her to profess and design more than 30 built projects because of the good cooperation with her husband. She worked first at the Technical Service of the Ministry of Education, for which reason she did numerous and important projects for schools, in Bucharest (Şincai and Cantemir Lyceum) as well as in the country (Bârlad, Focşani). Side by side with buildings of large dimensions, many of them protected as monuments, she also designed houses for one or two families. Both the small houses and the multi-family houses also included cheap housing. The cheap family housing on Hristo Botev street is monument protected, while in what regards small houses Virginia Haret designed two groups of villas. At the begin these small size houses were built in the New-Romanian style, and many of them in the neighbourhood of Cotroceni. Later on she renounced at this style and moved towards Modernism. Notable for this is that her first house was in New-Romanian style, the house of the family however was Modernist. Movement to Modernism also was marked by the move to new technologies, building in reinforced concrete. From her New-Romanian time dates one of her best projects was Block Tinerimea Română. Outside Bucharest, where most of these buildings are, a notable building is the Cinema-Casino in the resort city of Govora.

The Danish architect and designer Arne Jacobsen first trained as a bricklayer before studying architecture at the Royal Danish Academy of Fine Arts, Copenhagen (1924-27). Under the auspices of the director of furniture

design, Kaare Klint, Jacobsen explored what would become hallmarks of Nordic Modernism – refined texture, integrity of form and advanced workmanship. After graduation, a successful architectural career was launched, yet it is Jacobsen's furniture design, especially his chairs, which have brought the prolific designer international acknowledgement on a larger scale. Researching her work is not only important for gender issues, as it does today the COST action genderSTE, but also for early mobility of architects, from Romania to Italy and back, in the context of the EU.

List of works

1920-25, 24-28 Lyceum Gh. Şincai, Bucharest, Romania
1922 Housing block Calea Victoriei corner Str. Frumoasă, Bucharest, Romania
1923 House Stănescu, Bucharest, Romania
1924-27 Palace Tinerimea Română (Romanian Youth), Bucharest, Romania
1925-26 Lyceum Dimitrie Cantemir
1926 Deposits, administration, staff housing, Banca Viticolă, Bucharest, Romania
1926 House, Intrarea Spătarului, Bucharest, Romania
1927-34 Chuch Holy Trinity, Bucharest, Romania
1928 House Rosetti-Soleşti (extension), Bucharest, Romania
1928 Cinema-theatre, casino, Băile Govora, Romania
"Cheap housing" palace Piaţa Rosetti, Bucharest, Romania
1928 House A. Opran, Bucharest, Romania
1929 Group of 7 villas with each two apartments for the employees of a bank, Bucharest, Romania
1931 House Haret
1933-34 House Radu & Elena Perianu, Bucharest, Romania
1936 House Constantinescu, Bucharest, Romania
1936 House Panait Mazilu, Bucharest, Romania
1936-37 House Dumitru Stoica, Bucharest, Romania
1935 House Nestor, Parc Panduri, Bucharest, Romania

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Visual material:

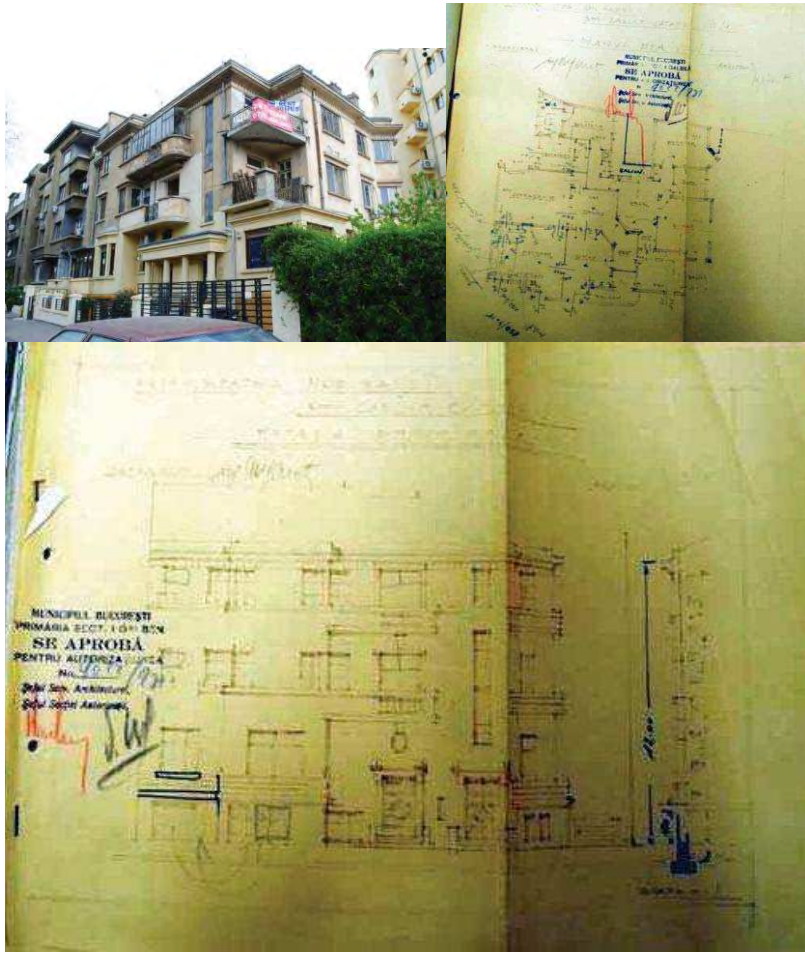


Fig. 128. Family Haret house (1931), Photo: M. Bostenaru, 2011. Archive plan and facade: Town hall of Bucharest city (PMB fond tehnic).

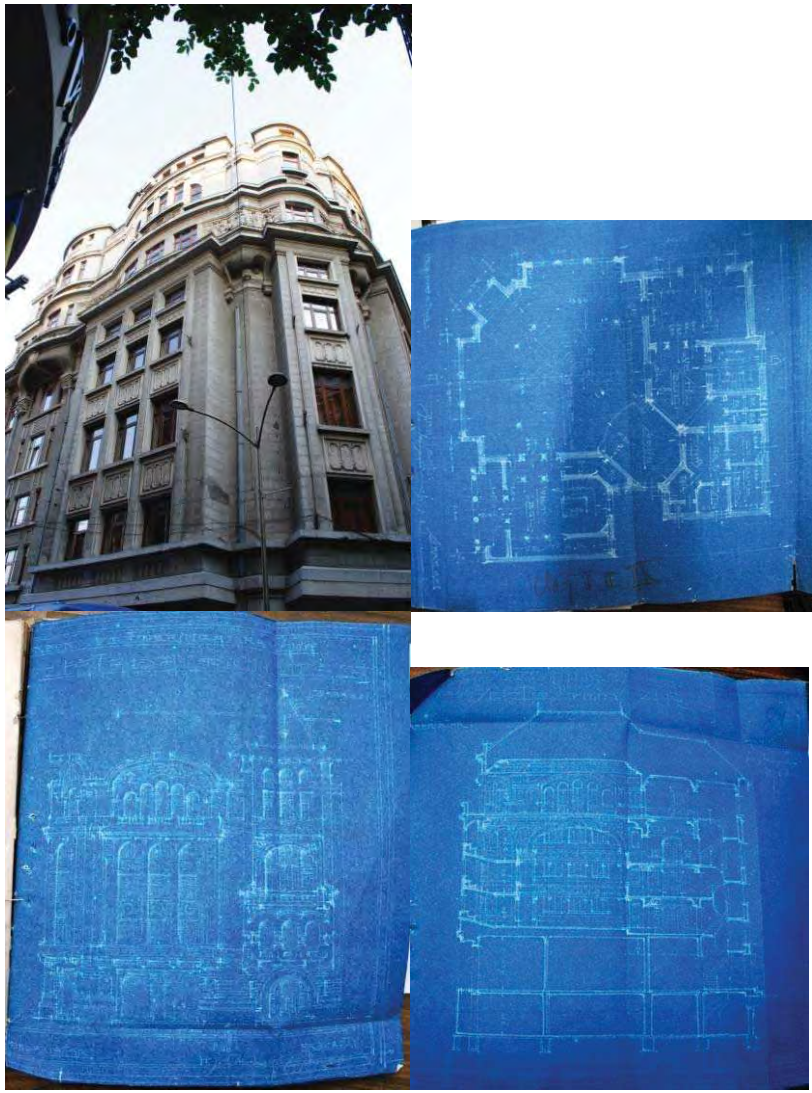


Fig. 129. Tinerimea Romana block (1923-27), Photo: M. Bostenaru, 2012. Archive plan, facade and section: National archives of Romania.

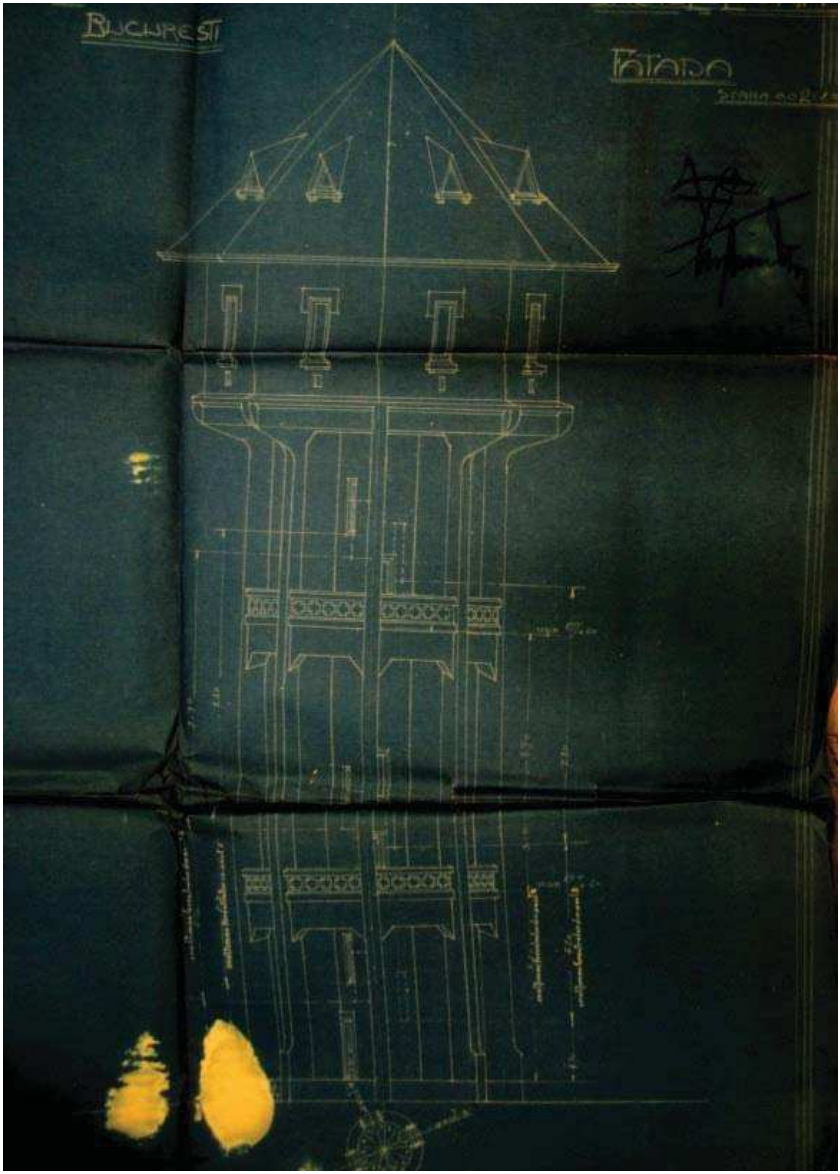


Fig. 130. Industrial building in reinforced concrete. Water tower (1927). Town hall of Bucharest archives.



Fig. 131. Group of villas (1929), Photo: M. Bostenaru, 2011



Fig. 132. Villa eng. Dumitru Stoica (1937), Photo: M. Bostenaru, 2011