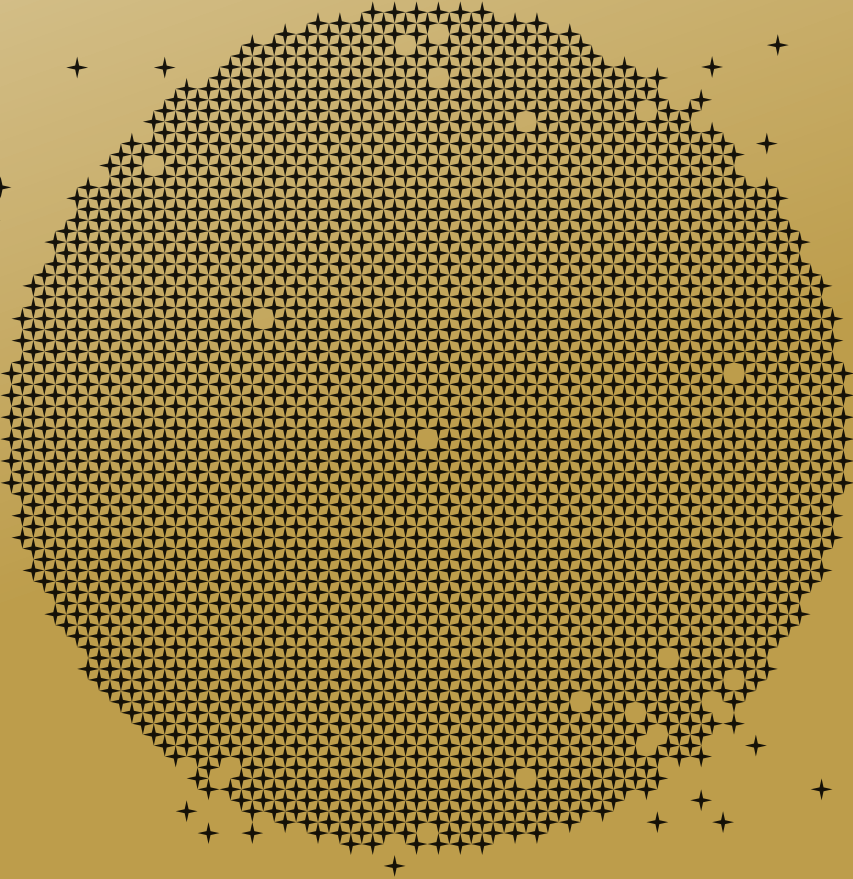
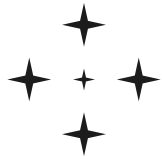


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VII/01

journal of design culture
_Designing Digital Humanities





Disegno

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Contact: Moholy-Nagy University of Art and Design
H-1121 Budapest, Zugligeti út 9–25.
disegno@mome.hu

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DESIGNING THE INTERNATIONAL NETWORK OF TÉR ÉS FORMA, 1928–1939.

A HUNGARIAN ARCHITECTURAL JOURNAL'S DATA-DRIVEN ANALYSIS

Ágnes Anna Sebestyén

ABSTRACT

Architectural periodicals were the major means of transferring textual and visual information about the current production, discourses, and problems of architecture during the interwar era. Illustrated magazines were widely available, and the immaterial sites of architectural publications became equally important as the construction site itself.

In interwar Hungary, the architectural journal Tér és Forma (Space and Form) was the major organ of modern architecture under the editorship of the architect Virgil Bierbauer between 1928 and 1942. The periodical included the latest examples of modern architecture in Hungary and the current international scene covering most of Europe with an outlook on the USA, South America, and Japan. Bierbauer relied on his extensive international network of professional connections for transferring information and creating content for his journal.

My paper focuses on the digital processing and analysis of Tér és Forma using the Croatian Artists Networks Information System (CAN_IS) as a digital network analysis tool. It allows the representation of the international relations of the journal based on its content, and the changes in editorial directions and its social network. My paper considers the methodology of organising the information extracted from the system and how this knowledge can be visualised. My paper also addresses the problems of legibility and distortion in data visualisations.

#modern architecture, #networks, #journals, #interwar Hungary, #Croatian Artists Networks Information System (CAN_IS)

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INTRODUCTION

Architectural periodicals were at the forefront in transferring textual and visual information about architecture during the interwar era. In the printed page, the production, the discourses, and the problems of architecture were widely discussed and presented. Illustrated professional journals became broadly available and were also circulated in the international architectural scene, crossing linguistic and geographic borders. The immaterial sites of architectural publications became equally important as the construction site itself (Colomina [1994] 1996, 14–15). The editors of these magazines relied on their extensive network of professional connections to collect up-to-date information for creating content and extending the scale of coverage.

In interwar Hungary, the architectural journal *Tér és Forma* (*Space and Form*) was the major organ of modern architecture (fig. 1). The magazine was first published as an illustrated appendix to the journal *Vállalkozók Lapja* (*Contractors' Journal*) in 1926, and in 1928, it was launched as a monthly periodical. It was edited by the architect Virgil Bierbauer between 1928 and 1942, and it ceased to be published not much later, in 1948. *Tér és Forma* focused on the latest examples of modern architecture in Hungary and it also followed the recent architectural production of the international scene covering most of Europe with an outlook on the USA, South America, and Japan. Bierbauer reached out to his international professional network, sought inspiration from his experiences during his travels and followed the latest architectural publications to collect information for his magazine.

My research in Virgil Bierbauer's editorial activities goes back many years, and this is also the subject of my ongoing research as a PhD candidate at Moholy-Nagy University of Art and Design (Sebestyén 2016, 2017, Ritoók and Sebestyén 2018, Sebestyén 2018, 2020, 2021). One of the major focuses of my research was Bierbauer's international network of professional connections. The primary source of reconstructing his network is his correspondence of approximately 900 letters held in the Virgil Bierbauer Archive of the Hungarian Museum of Architecture and Monument Protection Documentation Center in Budapest.¹ Other crucial archival materials include the memoir of Bierbauer's wife, Adrienne Graul, entitled *Bottle post*, which is also held in the



FIGURE 1. The cover of *Tér és Forma* 6/2 (1933), with the photograph of the Beistegui Apartment (Paris, 1929–1931), designed by Le Corbusier and Pierre Jeanneret, photograph by Marius Grivot

¹ Virgil Bierbauer's correspondence was catalogued by Ágnes Anna Sebestyén in the framework of her research project funded by the National Cultural Fund of Hungary (ref. n. 101102/00444).

² Adrienne Bierbauer (née Graul): Palackposta (Bottle post). Unpublished manuscript. Budapest 1958–1972. Holding of the Virgil Bierbauer Archive in the Hungarian Museum of Architecture and Monument Protection Documentation Center, Budapest.

Bierbauer Archive;² as well as the journal itself with its international content that can be linked many times to specific letters in the correspondence, which, in this way, give an insight into the mechanisms of how the journal was created.

CHANNELLING INTO DIGITAL ART HISTORY— CHALLENGING “TRADITIONAL” ART HISTORY

During my research, I have mostly relied on the traditional methods of art history, and the tools and the methods of Digital Art History came relatively late into my research. Although, according to some experts, the distinction between traditional and digital art history will be irrelevant at some point in the future, and only the umbrella term art history will remain (Bentkowska-Kafel 2015), this point has not yet been reached. Art historians nowadays, of course, work within the realm of digitised art history, which means that we browse online databases, use online image collections and work with digitised artefacts—but digital art history involves a much more complex methodology. Digital art history is, in Claire Bishop’s words, “the use of computational methodologies and analytical techniques enabled by new technology: visualisation, network analysis, topic modeling, simulation, pattern recognition, aggregation of materials from disparate geographical locations, etc.” (Bishop 2018, 123) In this seminal paper titled “Against Digital Art History,” she acknowledges the potential of computational metrics in aggregating data and indicating patterns, but at the same time, highlights the weakness of these tools for explaining causality, which should always be a subject of interpretation. (Bishop 2018, 127) Some consider this as an unlikely problem, since

[n]o one is advocating digital technologies as an objective, unmediated methodology in the humanities. They are intended as an addition, not a substitute. Human validation and analysis remains necessary after all the digital aids have provided their output. In fact, with help from digital tools the expert can devote less time to the search of documentation and more effort to the tasks where we humans work at our best: judgment, interpretation, evaluation. New hypotheses, new questions can be proposed to researchers, but answering them still requires a qualitative input that no machine can provide. (Lozano 2017, 6)

Thus it is essential to the humanities in this digital environment “to tolerate ambiguity, uncertainty, to see the historical situatedness and constructed character of knowledge.” (Kienle 2017b, 123) This means that it is vital for maintaining the relevance of the methods and critical attitude of the humanities, which is a challenge in the computation ecosystem that resists the ambiguities, irregularities and unpredictability inherent in the humanities (Kienle 2017a, 6).

In my research, this might be the reason why I have not (yet) found it a disadvantage that I entered the realm of Digital Art History at a relatively late stage of my research. I relied on archival sources such as Bierbauer's above-mentioned correspondence, the memoir, and other archival materials such as personal documents and photographs as well as printed matters. After the thorough processing of Bierbauer's letters, I used case studies and pinpointed small histories to reconstruct Bierbauer's decision making processes as editor and the mechanisms of information transfer. Understanding small histories can contribute to outlining the bigger picture and apprehending the overall mechanisms on a wider scale. This approach might also help to locate false outcomes in data visualisations.

In the realm of Digital Art History, another problem is the lacunae in historical archives or—in certain cases—the total lack of archival materials, let alone historical objects. It is always a challenge to work with fragmentary archives and hiatuses, as this scenario creates missing and ambiguous data that can hardly be translated into valid data visualisations. As Stephanie Porras put it: "Data is the product of history as much as a record of it." (Porras 2017, 44) Using well-preserved and well-documented archives and existing datasets based on the data of well-funded institutions and regions carries the danger of reinforcing and reinscribing historic and current power differentials that exist between different regions, countries, communities. (Porras 2017, 44) Speaking about only our region in the heart of Europe, there is an imbalance of available data if we compare Western and Central-Eastern European institutions. This means, for example, that we have to keep in mind that while processing primary sources it is advisable to start creating new data and datasets that can be the basis for a research that aims to use digital tools for analysis.

Data, however, is also not found and given, but always produced and constructed. As Johanna Drucker has argued: "*Data are capta*, taken not given, constructed as an interpretation of the phenomenal world, not inherent in it." (Drucker 2014, 128) In other words, data is not a neutral matter, as it is up to us researchers to select, process and interpret data, which is also a responsibility and a question of authorship. As Georg Schelbert explained: "We should not just see data as primary sources, we should also accept the various stages of data creation as a genuine part of research." (Schelbert 2017, 6) It means that data creation and sequencing data are authored, and thus might be also biased.

Social networks are also constructed and authored. There is no true social network out there that needs to be discovered and analysed by researchers. (Borgatti and Halgin 2011, 1170) It is always the researcher who defines the network by choosing the set of nodes and the types of the edges (Borgatti and Halgin 2011, 1169). The researchers' choices

should be dictated by the research question, which also means that each question creates its own set of nodes and edges and thus networks are generated with a structure specific to each question.

In my research, I have focused on case studies and small histories so far—as I mentioned above—to outline the mechanisms behind Bierbauer’s editorial activities, and I tried to detect patterns and draw conclusions with reference to the bigger picture. In other words, I have concentrated on the microscopic view. The social network of the journal *Tér és Forma*, however, has never been drawn up. Entering the realm of Digital Art History, I decided to seek validations from a macroscopic perspective and to place the small histories into the bigger picture. As a first step—and only this part will be addressed in this paper—I decided to concentrate on the content of *Tér és Forma*, i.e. on the featured architects and designers as well as their related country to see the preferences and orientation of the journal and its editors. I also aim at tracing the changes of the direction of the journal if it can be detected via visualisations, therefore, I selected four specific time periods, which—according to my previous research—reflects slight shifts in connection with the editors’ decisions as well as the historical and economic background. I also consider focal points in the visualisations whether these can be linked to specific findings from my previous research. These focal points might also designate never-before-analysed cases that need to be examined during further research.

BUILDING THE DATASET OF *TÉR ÉS FORMA*

The social network of *Tér és Forma* and its underlying dataset was created in the framework of the bilateral project entitled “Architectural Encounters of Croatia and Hungary: Modalities of Professional Knowledge Exchange, 1900–1945,” which ran between the partner institutions the Hungarian Museum of Architecture and Monument Protection Documentation Center (Budapest) and the Institute of Art History (Zagreb). The two-year project (2021–2023) was funded by the National Research, Development and Innovation Office of Hungary (2019-2.1.11-TÉT-2020-00258) as well as by the Ministry of Science and Education of the Republic of Croatia (MBP-IPU-2021-410).

The Institute of Art History in Zagreb developed the Croatian Artists Networks Information System (CAN_IS) during another recent project titled “ARTNET— Modern and Contemporary Artist Networks, Art Groups and Art Associations. Organisation and Communication Models of Artist Collaborative Practices in the 20th and 21st Century.” The intention of the ARTNET project was to reveal the unforeseen and never-before-visualised transnational histories of artistic exchange in the twentieth and twenty-first centuries (Kolešnik 2018, 11). As a Croatian-based project, it also aimed to shed light on the under-

represented actors and networks of the Central and Eastern European region. As, due to the above-mentioned computational inequality, it is important to highlight here as well that Western European and North American institutions are far ahead of Central and Eastern European institutions in building and sharing datasets based on archives and collections of museums, etc. Due to the research conducted prior to the ARTNET project, it was known that at least four different types of networks can be distinguished within modern and avant-garde networks, i.e. the networks formed by 1) magazines and publications, 2) artistic concepts and ideas, 3) exhibitions and public events, and 4) social networks. (Kolešnik 2018, 11) These four types of networks provided the basis for the separate data entry sections in CAN_IS—in other words, users of the system can insert data according to these four categories, which can be linked with different sets of relations. The ambition of ARTNET is to be open to the international research community, so the project “Architectural Encounters of Croatia and Hungary” fits ideally into ARTNET’s objectives. With regards to my research, the focus on a Hungarian magazine with an international scope provided a fitting case to be studied with the help of CAN_IS.

In the case of *Tér és Forma*, no dataset existed, so it became part of my research process to create the data and the dataset. The preliminary archival research based on primary sources and my existing research findings were essential in building the dataset especially when deciding what to include and what to omit. To remain objective and consistent while enriching, reviewing, and cutting the data was a challenge, as several important aspects had to be considered.

CAN_IS was used for data entry: the basic data for all *Tér és Forma* issues were recorded such as bibliographical details for all magazine articles, as well as biographical details of all editors, authors, contributors, and featured persons. The main challenge in building the dataset was to select the relevant “mentioned persons” from *Tér és Forma*, as recording all the persons who were mentioned in each article would have resulted in a confusing outcome that is not representative of the content of the magazine. To put it simply, the major subject of an article would have ended up on the same level as just a single not-so-important mention. This was one of the phases where the preliminary research proved to be essential to locate the real subject of an article and to distinguish him/her from a less relevant mentioned person. This is also a decision-making process where the researcher’s choice constructs the data and thus the dataset. Despite all my efforts to be consistent, the outcome might be biased due to the preceding knowledge of my research topic and the primary sources that were previously used. As my intention is to show the international coverage in *Tér és Forma* and the national distribution

during different phases of the journal, the related countries also had to be linked to each person. In many cases it was obvious, but due to the turbulent political and historical climate, a significant number of architects migrated between different countries. Thus, choosing the only relevant country for each person for each timeframe was a decision in itself (it is important to note here that the system can only manage one attribute per record—i.e. one country per person per time period).

This paper concentrates on the international content and national distribution of *Tér és Forma*, therefore, data was exported from CAN_IS with only the mentions and co-mentions from the journal selected, which defined the sets of the edges. In this way, the exported nodes represent the mentioned and co-mentioned persons (most of the time architects) and those who mentioned them, and the edges are defined by the relations mentions and co-mentions. For the export, CSV files were chosen, and separate files were exported for each chosen time period of *Tér és Forma*. The exported CSV files were then imported to the data visualisation software Gephi, where the visualisations were created for each of the four time periods. The selection for the criteria of the data export shaped the four graphs, i.e. the networks that represent the content of the magazine in different years. I used different colour schemes for each represented country, which appear as the colour of the nodes and the edges. It was difficult to distinguish the represented persons according to countries and maintain a sufficient level of readability. (The chosen colours for each country are indicated in the image captions.) The size of the nodes represents the extent of the appearance of the linked person in *Tér és Forma*. The position of the nodes reflects the centrality of each person in the network. Finally, the thickness of the edges indicates the frequency of mentions between two nodes, in other words, a thicker edge represents more mentions.

THE MACROSCOPIC VIEW OVER TÉR ÉS FORMA

The main objective of this paper is to visualise how the content of *Tér és Forma* changed over the course of the period between 1928 and 1939. 1928 marks the launch of *Tér és Forma* as a monthly periodical under the editorship of the architects Virgil Bierbauer and János Komor. Although Bierbauer edited the magazine until 1942, I chose 1939 as the endpoint of my analysis because this paper does not extend to analysis to the time of World War II, with its significant political, economic, and geographic shifts—though I acknowledge that these changes did not happen overnight, and many historical events preceded and anticipated the outbreak of the war during the 1930s. These political and social circumstances of course had a major effect on the building industry

as well as on the circulation of ideas and the migration of artists and architects. I chose the four periods according to different levels of changes, i.e. along with changes in personnel and editorial direction as well as historical changes. 1931 marks the first shift, as János Komor acted as co-editor until the end of this year, and the architect Lajos Kozma served as a contributor between December 1929 and June 1931 as it was indicated in the imprint. Komor's influence on the magazine truly ended in 1931, while Kozma's presence was still noticeable later on—which is also decipherable in the visualisations. I decided to break the period between 1931 and 1935 into two phases because of the Nazis rise to power in 1933, which had a significant effect on architectural culture in Germany as well as the direction of modern architecture and the migration of modern architects. The German orientation of Hungarian modernist architects prevailed in the late-1920s and early 1930s, and of course it was prevalent in the pages of *Tér és Forma*, so it proved essential to mark and visualise the shift in 1933. 1935 was chosen for the next break, as in this year, Bierbauer published a pivotal editorial, which signalled some changes in the magazine's direction. Along the lines of these negotiations above, I selected the four periods of 1928–1931, 1932–1933, 1934–1935 and 1936–1939 as the subject of the present analysis (figs. 2, 3, 4, 5).

To see the bigger picture, it is important to evaluate whether the visualisations confirm my presuppositions based on my previous research and whether solely the mention–co-mention networks reflect these changes. Regarding the creators of the magazine, it was obvious that Virgil Bierbauer would end up as the node of the highest degree of centrality in each network—not just as an actor but as a featured architect in the magazine. Until 1931, the graph reflects the two other major creators of the journal: János Komor as the co-editor, and then Lajos Kozma as a collaborator. As an emerging important figure in the magazine, Farkas Molnár also needs to be mentioned here: he was an author of a few articles and he was also included in the magazine as a progressive architect several times—acknowledging his past Bauhaus-training, as it is visible in the graph via his ties to his peer Marcel Breuer and his mentor Walter Gropius.

Although 1933 did not immediately change architectural culture or compel Jewish architects to emigrate, the rising of Nazism can be measured indirectly in the number of mentions, i.e. how many names appear with regards to Germany and in what context. The most German names (or to be more accurate, the most names of architects based in Germany) with German-based works appear in the period 1928–1931—in fact, these are the second most-covered group of architects after, of course, the Hungarians. Although Bierbauer's primary aim was to promote and disseminate modern architecture and to implement its best ideas into Hungarian architectural



https://disegno.mome.hu/articles/Sebestyen_Fig2.pdf

FIGURE 2.



https://disegno.mome.hu/articles/Sebestyen_Fig3.pdf

FIGURE 3.



https://disegno.mome.hu/articles/Sebestyen_Fig4.pdf

FIGURE 4.



https://disegno.mome.hu/articles/Sebestyen_Fig5.pdf

FIGURE 5.

practice, he did not only focus on the most progressive branch of German modernism. It means that besides the Bauhaus—hallmarked by Walter Gropius’ and Marcel Breuer’s names—and Ernst May’s Neue Frankfurt, Bierbauer covered examples from a much more diverse scale including the works of Fritz Höger, Alexander Klein, Otto Bartning, Emil Fahrenkamp and Albert Bosslet, among others. With regards to the number of mentions, German-based architects are ranked as the fifth between 1932–1933, only the tenth between 1934–1935 and fifth again between 1936–1939. However, it is important to look beyond the numbers, as after 1933, these German mentions were usually taken in retrospect, and they generally also represented modern architecture (except Albert Bosslet’s churches).

In the sixth issue of 1935, Bierbauer published an article entitled “Revision’s revision,” where Bierbauer explained that due to economic difficulties it is not possible to cover international architecture on the same level as before, since the limited spread of the magazine had to be mostly dedicated to the production of Hungarian architecture. (Bierbauer 1935, 158) The impact of these economic difficulties can indeed be noticed by the diminishing length of the issues as well as the decrease in international coverage. Foreign examples of the current architectural production, however, did not disappear completely, but their length, frequency and way of presentation changed. These changes are noticeable in the visualisations. Compared to earlier phases of *Tér és Forma*, the clusters including people from mostly from the same country became smaller and more diverse. The article “Revision’s revision” is immediately apparent in the visualisation as a big colourful cluster with architects representing Czechoslovakia, France, the Netherlands, Italy, Turkey, Great Britain, Norway, the USA and Japan. These mentions are just glimpses from a certain period in modern architecture. They give a panoramic view but not a full idea of what is happening in a certain country or region. Such mixed big clusters appear also in the visualisation of the period between 1936 and 1939: the biggest cluster shows an article written by Lajos Kozma in 1938 about the free floor plans describing selected pieces of residential architecture mostly in retrospect (Kozma 1938); while the smaller mixed cluster represents an article about the “Art et technique” exhibition of the Paris International Exhibition of 1937. (Weltzl 1937) Other international features and mentions are only decipherable as small, less-connected nodes in the visualisation.

It is evident that *Tér és Forma* always placed Hungarian architecture in its main focus (see the big clusters in all visualisations in medium green), but Bierbauer aimed at covering the best practices from the international scene to varying degrees over the course of his fifteen years of editorship. The visualisation of 1928–1931 shows a solid international coverage with distinctive national clusters: the biggest is the

Italian (in light green), but also distinct are the German (in black), Polish (in pale blue), British (in red), and Austrian (in orange). These clusters clearly visualise that the foreign content of *Tér és Forma* at the time was more comprehensive and frequent in comparison with the international coverage in the second half of the 1930s. There are several articles in *Tér és Forma*, which present one or just a few specific buildings—either from the Hungarian or the international scene. In the visualisations, these contents often appear as two or a few interconnected nodes depending on the number of architects who participated in the design of the featured building. In many cases, these persons are just single mentions and thus do not constitute noticeable clusters, as is quite apparent in the visualisation of the late 1930s.

The major significance of the Italian content of *Tér és Forma* and the prominence of the Italians in Bierbauer's network of professional connections had been already known from previous research, especially from the study of his correspondence. Italians are the third most mentioned in the period between 1928–1931, and the second most mentioned after 1932 (after of course the Hungarians), which means a solid Italian coverage in the journal. Regarding the political implications, Bierbauer's attitude towards Nazism and Italian fascism was completely different, as it is known from Bierbauer's writings in *Tér és Forma* as well as from the memoir *Bottle* post by Bierbauer's wife. While Bierbauer published explicit critiques of the architecture of the Third Reich, he praised the architectural culture of fascist Italy in particular due to Mussolini's preference for modernist architecture and the great number of state-funded projects such as new public buildings as well as the new cities like Sabaudia and Littoria. Italy was also Bierbauer's major travel destination—for both work and leisure—and he also befriended many Italian architects whose projects he continuously covered in the magazine.

To read the visualisations accurately, it is essential to know the magazine contentwise, because there are some distorting parts in the visualisations. For example, it is crucial to understand that those features that speak about a greater number of persons are shown as bigger clusters in the visualisations and thus seem to be of greater importance than the others. For instance, in the visualisation of 1932–1933, there is a big Austrian cluster (in orange) that seems to be of outstanding importance, though it is just the visualisation of one article: the piece written by Virgil Bierbauer about the *Werkbundsiedlung* in Vienna in 1932 (Bierbauer 1932). But because of the number of co-mentions, the software outlines these kinds of contents as bigger clusters, although they represent just one article among the many others. This is the reason of the visual inequality between articles mentioning only a few and articles covering a greater number of people, which distorts the overall picture, shifts the emphasis, and makes legibility

³ Tamara Bjažić Klarin and Nikola Bojić conducted thorough research into the CIAM networks in the framework of the ARTNET project, see: Bjažić Klarin and Bojić 2018.

difficult. Furthermore, the article of the Vienna Werkbundsiedlung represents only one project—albeit a building ensemble with many individual buildings—which is content-wise equal to a project of a single building with one or two designers. We can also compare the cluster of the Vienna Werkbundsiedlung to the Polish cluster in the visualisation of 1928–1931, which represents Heinrich Lauterbach's article about contemporary architecture in Poland (Lauterbach 1930). In the case of the Lauterbach piece, this comprehensive essay features a greater number of projects and all the related architects. Thus, it is impossible to tell the structural differences in the magazine only from a cluster in the visualisation.

The other factor associated with distortion is due to a technical issue. It is not possible to export those mentions from CAN_IS, where the related author is unknown or unidentified. This means that some important architects are missing from the visualisations because two nodes are needed to create edges (in this case the person who mentions someone and the person who is mentioned), and in this way, the system cannot translate it to relations. This problem does not affect the statements of this article, however, it needs to be solved in the near future in order to create valid data visualisations that truly reflect the content of *Tër és Forma*. As, in this case, there are hiatuses, which are not caused by the lack of source materials but technological problems. Unfortunately, this is an unsolved problem in this stage of my work, which clearly signals that this present paper is more of a research report than the milestone of a finished work.

THE MICROSCOPIC VIEW OVER TÈR ÈS FORMA

The visualisations also give an insight into the microhistories of the magazine, as it is possible to locate the positions of artists' groups and individuals over the different time periods, and to trace the nodes that provide the context of certain coverages.

The Congrès Internationaux d'Architecture Moderne (CIAM, the International Congresses of Modern Architecture) was one of the most important professional organisations in twentieth-century architecture.³ It was founded in 1928 (the same year as the launch of *Tër és Forma*) and aimed at disseminating modern architecture, providing solutions for housing and town planning problems and giving internationally adaptable answers. National working groups provided the basis of CIAM, the Hungarian branch was established in 1929 with young and progressive modern architects. Farkas Molnár served as the first delegate, József Fischer as the second, and other members included Fred Forbát, József Molnár, Gábor Preisich and Zoltán Révész. Bierbauer joined CIAM only in 1937. The exact date is proven by a recent research finding in the Fred Forbát Archive of ArkDes, the Swedish Centre for

Architecture and Design, where there are exchanges of letters between Farkas Molnár and Fred Forbát from December 1936 about Bierbauer's possible admission to the Hungarian CIAM group, and in related correspondences from 1937, Bierbauer is already listed as a member of the group.⁴ Despite Bierbauer's absence from CIAM before 1937, he generally sympathised with the works of the group's members, so he broadly featured these in *Tér és Forma* from the beginning. From 1932, the Hungarian CIAM group was given the opportunity to present their work in separate magazine issues—ideally in one issue per year. Finally, it was in 1932 and between 1934 and 1937, when at least one issue per year was dedicated to the works of the Hungarian CIAM group in the journal.⁵ The publication material was put together by the group, led by Farkas Molnár as editor of these issues. 1937 was marked by the formation of CIAM-Ost, the Eastern European branch of CIAM, which intended to handle problems specific to the East-Central and Eastern European region. In the visualisation of 1928–1931, when there were no individual CIAM issues published, a separate CIAM cluster is not detectable, but its members are still relatively close to each other in the mention–co-mention spectrum. From 1932, when the first CIAM issue was launched, the CIAM cluster became increasingly visible in the graphs; while the visualisation of the late-1930s shows the formation and connectedness of CIAM-Ost based on the published reports on the CIAM-Ost meetings with participants such as Walter Loos from Vienna, Szymon and Helena Syrkus from Warsaw, František Kalivoda from Brno, Vlado Antolič from Zagreb and CIAM secretary Sigfried Giedion (fig. 6). In the same graph, between Bierbauer and Farkas Molnár, the position of Fred Forbát with his link to the Dutch architect Jacobus Johannes Pieter Oud represents a tension within the Hungarian CIAM group. It is a microhistory behind the visualisation that is about a debate between Molnár and Forbát in which Oud took Forbát's side concluding the greater importance of function over form, when Molnár did not consider one of Forbát's houses in Pécs modern enough to be published in a CIAM issue.⁶

Tér és Forma played a big part in shaping the canon of Hungarian modern architecture, and at the same time also internalised the canonisation processes of modern architecture on an international level. Le Corbusier was a constant reference point for Bierbauer both with positive and negative connotations—i.e. Bierbauer appraised his theoretical works but at times criticised his built works such as his two houses in the Weißenhofsiedlung in Stuttgart. As I explained earlier, I did not record every mention in the journal, only the actual coverage of buildings and publications, as otherwise it would have distorted the result in the visualisation. This is especially the case with regards to Le Corbusier, who is a highly cited person in *Tér és Forma*, but including his mention every time would not be reasonable if we want

⁴ The letters are organised in the folder *Korrespondens M (1/2) AM1970-18-193 (without unique inventory numbers)* in the Fred Forbát Archive in ArkDes, the Swedish Centre for Architecture and Design, Stockholm.

⁵ The special CIAM issues of *Tér és Forma* are: 5/12 (1932), 7/1 (1934), 8/1 (1935), 9/1 (1936), 10/1 and 12 (1937).

⁶ The related correspondence between Virgil Bierbauer and Fred Forbát is without a unique inventory number in the Fred Forbát Archive in ArkDes, the Swedish Centre for Architecture and Design, Stockholm.



https://disegno.mome.hu/articles/Sebestyen_Fig6.pdf

FIGURE 6.

⁷ Ágnes Anna Sebestyén's research on Virgil Bierbauer's travels was funded by the National Cultural Fund of Hungary (ref. no. 101102/00578).

a relevant picture of him in the graphs. However, Le Corbusier as an already canonised figure at the time, is still a much recognisable node with a definitive tie with Bierbauer in all four visualisations. It is also clearly visible at first glance from the visualisations—and of course it is already known from *Tér és Forma*—that although Bierbauer promoted modern architecture, he did not exclusively include the progressive architectural productions of the era, but incorporated new buildings that matched his criteria of good practice in architecture in line with the functional requirements, the inhabitants' everyday needs and the environmental context (climate, locally available building materials, etc.). It is especially true to the Hungarian scene, where there was a steady presence of a great number of contemporary architects beyond the CIAM branch such as Bertalan Árkay, Dénes Györgyi, Alfréd Hajós, István Hamburger, Iván Kotsis, Endre Kotsis, Gyula Rimanóczy, Károly Weichinger, and others.

The selection of the international material was at many times biased because of Bierbauer's personal preferences, his favoured architects, many of whom he befriended, as well as the direction of his travels. Bierbauer's friends can be located in the visualisations. He was on very good terms with many Italian architects, but it was Giuseppe Capponi who was really considered a close friend according to their correspondence and the memoir of Bierbauer's wife. (Sebestyén 2020, 206–7) In the graphs representing the periods between 1928 and 1933, Giuseppe Capponi stands quite close to Bierbauer with marked edges (it means more mentions, fig. 7). This was the time of their closest friendship: they started corresponding in 1928, they personally met first in 1929 in Rome, then Bierbauer and his wife joined the Capponis in their summer home in Capri, where they spent their holidays later as well in 1932 and 1933.⁷ (Sebestyén 2018, 393–94) The lessons learned from Capri had a significant impact on Bierbauer's ideas about the connection between modern and vernacular architecture, which is quite similar to Giedion's engagement with Greece and Heinrich Lauterbach's interest in Santorini. (Sebestyén 2018, 394–95) The Breslau-based German architect Heinrich Lauterbach was a friend almost as close as Capponi, and he also acted as a mediator many times for Bierbauer contributing to the expansion of Bierbauer's professional network. (Sebestyén 2020, 205–7) In 1930, Lauterbach wrote an article about the new architecture in Poland featuring the works of e.g. Szymon Syrkus, Bohdan Lachert, Józef Szanajca, Bohdan Pniewski, Stanisław Brukalski, Barbara Brukalska, Jan Stefanowicz, Edgar Aleksander Norwerth, Maksymilian Goldberg, and Hipolit Rutkowski—who all constitute a Polish cluster in the visualisation with Lauterbach in the position of a mediator (i.e. bridge in terms of social network analysis) between Bierbauer and the Polish as well as between the Polish and the German architects (Lauterbach 1930) (fig. 8). We find



https://disegno.mome.hu/articles/Sebestyen_Fig7.pdf

FIGURE 7.



https://disegno.mome.hu/articles/Sebestyen_Fig8.pdf

FIGURE 8.

the Hungarian architect Ernő Heim in the same mediator position towards Sweden and Norway, as he took a study trip to Sweden in 1929, worked in Ivar Tengbom's and Erik Gunnar Asplund's office and took the opportunity to build a Scandinavian network. This group of architects included his mentors Tengbom and Asplund, as well as Wolter Gahn, Nils Einar Eriksson, Ture Wennerholm, and Eskil Sundahl from Sweden, and also Eyvind Moestue and Ole Lind Schistad from Norway. Hungarian émigré architects also acted as agents such as Marcel Breuer, who between 1928 and 1939 relocated several times to Berlin, Zürich, Budapest, London, and finally to the USA, while maintaining his Hungarian connections, expanding his own international network and acting as a tie to the international from a Hungarian perspective. In the visualisations of *Tér és Forma*, he is usually linked to the Hungarians, especially to the Hungarian CIAM group as his works (regardless of their whereabouts) were often published together with the works of the Hungarian CIAM members, which beside signalling their connectedness, underlines Breuer's position as a tie to the international from the perspective of his CIAM peers in Hungary (fig. 9.)



https://disegno.mome.hu/articles/Sebestyen_Fig9.pdf

FIGURE 9.

CONCLUSION

This paper represents only a phase of the ongoing research about Virgil Bierbauer's professional network and the social network around the journal *Tér és Forma*. Firstly, as I explained earlier, the mentions—co-mentions networks need to be completed with the data that could not be visualised here due to the characteristics of data export from CAN_IS. Taking this issue in consideration, it is still can be stated that the delineation of the four time periods—which represents a decision based upon my previous research—proved to be representative with regards to the overall changes in the magazine's direction and content. The selected microhistories also appeared to be highlighted in the visualisations. Secondly, my future plan is to import the data of Bierbauer's correspondence into CAN_IS to visualise Bierbauer's own social network. Here hiatuses have to be considered, as despite the fact that Adrienne Graul took great care of her husband's legacy and archive, Bierbauer's correspondence did not remain intact: some letters were lost during or after Bierbauer's lifetime, others were simply thrown out or reused. Thus, the visualisations of his network will be shaped by the lacunae in the archive and by research questions based on previous research findings. Finally, it is also necessary to investigate previously undetected focal points that only became visible via the visualisations and to assess whether these can be considered important and relevant regarding the magazine's history and the editorial decisions.

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