Alfred Neumann's Design for a Chair in the Villa of Dr. Slezák in Brno

Evidence of the Origins of His Structural Thinking

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This article explores the lesser-known furniture designs of Alfred Neumann, a visionary modernist architect whose innovative thinking shaped postwar architecture in Israel and beyond. Focusing on a modular chair designed by Neumann for the Slezák villa in Brno in the 1930s, the study investigates its structural and proportional relationship to his later architectural works. Through qualitative research, including on-site documentation and interviews, the article situates the chair within Neumann's broader spatial theories, particularly his EM-PHI proportional system developed in his publication *The Humanization of Space* (1956). It argues that Neumann's architectural language, based on modularity, prefabrication, and human-centered dimensions, was already present in his early furniture; hence the chair exemplifies his consistent design philosophy and forms a link to his iconic buildings such as the Mitzpe Ramon synagogue. By examining this overlooked area of his oeuvre, the article contributes new insights into Neumann's holistic approach to architecture and design, enriching the historiography of modern architecture.

Photo of the existing chair
Photo: Jiří Gerö

Introduction

Possibly, the architect Alfred Neumann (1900–1968) would have become the most famous creator and theorist of modern architecture from Czech territory – if not for the harsh historical shifts of the era in which he lived and created. His theories, visions and professional achievements fell into oblivion and only now is his genius gradually coming to light, along with a full understanding of his significance and place in the history of modern art.[1]

Alfred Neumann was born in Vienna in 1900 and raised in Brno. His father established a cabinetry and furniture workshop in the city, where the young Neumann spent a lot of time working and developing various skills, such as drafting and furniture design, that would help him later on in his architectural career.[2] He attended a German secondary vocational school of building in this Moravian city. In 1918 he was conscripted into the Austro-Hungarian army but, at the end of World War I, started his studies at the German Technical University in Brno in the same year, graduating in 1922. He then continued his education in the master's school of Prof. Peter Behrens at the Vienna Academy of Fine Arts. After finishing his studies, he left Vienna for Paris, then in 1934 for Cape Town in South Africa. In 1936 he returned to Brno, where he remained until the beginning of World War II. Due to his Jewish origin, he was deported to the Theresienstadt ghetto, though he managed to survive his internment. Emigrating from Czechoslovakia in 1949, after the Communist coup of the previous year, he built up a striking international career and made friends with the most prominent figures of his era, among them Le Corbusier or Walter Gropius. In fact, the latter architect even wrote the foreword to Neumann's book *L'Humanisation de l'Espace* [The Humanization of Space], published in 1956.

Neumann designed his most important buildings in Israel, where he first settled after his emigration. From 1950 to 1953, he worked at the Institute for Urban Planning, where he designed a spatial plan for the city of Beit Shemesh for 80,000 residents, located 24 km from Jerusalem. In 1953 he was appointed Dean of the School of Architecture and Urban Planning at the Technion Israel Institute of Technology in Haifa, where he also spent 16 years as a professor.

In 1959, together with Eldar Sharon (1933–1994) and Zvi Hecker (1931–2023), he founded an architectural studio in Israel. It established its reputation with the winning competition entry for the town hall in Bat Jam; completed in 1963, this building is based on a modular concrete grid with a hexagonal structural spatial complex, with an impressive use of indirect basilica lighting and natural ventilation. The oblique angle determines not only the floor plan of the building, but also its volumetric and spatial composition, which consists of three types of semi-regular polyhedrals.[3]

In 1964, with Zvi Hecker, he designed a remarkable synagogue on the grounds of the Central Officers' School in the Negev desert near the town of Mitzpe Ramon, which was completed in 1969. Around this synagogue, other buildings such as gymnasiums, dormitories and canteens are arranged in four wings; being a military facility, this complex is not open to the public. In 1965, he left Israel for Canada, where he died in Quebec in 1968.

While many books have been published about this world-renowned architect, they all focus on his architecture over his furniture designs. In the most recent and comprehensive treatment, *Space Packed: The Architecture of Alfred Neumann, by Rafi Segal*[4], his furniture work is briefly mentioned but never once depicted. Similarly, in the catalogue edited by Rafi Segal, Tadeáš Goryczka and Jaroslav Němec[5] for the traveling exhibition "Space Packing Architecture", held in the Czech Republic in 2015 and 2016, there is no description whatsoever of his furniture work. Hence it is the aim of the present article to provide new and previously unpublished information about his Brno furniture designs at the beginning of his career.

The main research questions were how Neumann thought about furniture, how he designed it, and how one specific artefact – the Brno chair – related to his later buildings, addressing the proportional relationships between his furniture and buildings as Neumann defined them. Further, a group of undated designs for white functionalist villas for either France or Brno, successfully combining the architect's Viennese and Parisian experience, may date from this period, a hypothesis strongly supported by one Brno realization – the reconstruction and enlargement of the villa of Dr. Josef Slezák at Viniční Street 179 from 1934[7].

My hypothesis in the present work is that the chair under study has a modular and metric connection with Neumann's most significant buildings. From the beginning of his career, it is evident that he was thinking in a completely original way, as also reflected in this chair. photographs and detailed drawings are used to support the presented ideas, along with qualitative data collection: i.e., thoroughly measuring all dimensions of the chair, photographing it and determining the materials of its construction. I also studied available literature, searched for data in the library, on portals with scientific articles, but also in various databases where I found no mention of the furniture that he designed for Dr. Slezák's villa. Personal assistance was provided by the renowned Brno architect Ivan Wahla, supervisor of the restoration of the villa's interiors in 2017, who supplied valuable information, in turn, personal home visits and interviews with the owner of the house at Viniční Street brought me beneficial insights. From synthesizing these analyzed facts, it became possible to arrive at a new evaluation of Neumann's furniture thinking as a vital counterpart to his built oeuvre.

Comparison between Furniture and Buildings

The most striking element of Alfred Neumann's buildings, like his chairs and armchairs, is their composition out of individual prefabricated units, which at first glance seem to allow them to be disassembled and reassembled like a building kit. The scale of these spatial units is remarkable, whether as furniture or realized buildings, because he adapted them to the dimensions of the human body using

Photo of the existing chair
Photo: Jiří Gerö

Dr. Josef Slezák's house at Viniční St. 179 in Brno
Photo: Jiří Gerö, October 2023

Photo of the existing chair in the current interior
Photo: Jiří Gerö, October 2023

Children's armchair from Dr. Josef Slezák's
house at Viniční St. 179 in Brno,
photo of the current state at Špilberk Castle in Brno
Photo: Jiří Gerö

his original proportional system, termed EM-PHI. More about this proportional system in detail can be found in his 1956 book *L'Humanisation de l'Espace*,[8] which had a considerable response among architects. Not only does the EM-PHI System represent an important contribution to the whole field of design, planning, architecture and industrial production: to my knowledge, it is the first attempt to create a modular system that comprehends the full range of the possibilities of proportions.[9]

Obvious connections can be made between the proportions of the chair and the basic spatial module of his buildings, as well as his constructive approach to devising structures, whether furniture or buildings. If Neumann's true source of fame lay in his hexagonal spatial structures and unconventional thinking, these features are visible already in his furniture. Today, we understand that Neumann's designs not only expand the repertoire of modern architecture but combined with his writings offer a theoretical basis in contemporary discussions about form-generating methods. All the same, Alfred Neumann may well be still more significant as an inspiring architect, exemplary in his belief that the artistic integrity of the architectural work is the sole means by which architecture can truly become a cultural contribution.[10]

The chair by Alfred Neumann in Dr. Josef Slezák's house: The object in detail

Neumann's design for the renovation and extension of Dr. Joseph Slezák's house was influenced by Adolf Loos's "Raumplan" concept, hence planned to contain built-in and freestanding items of furniture[11]. Over the decades, several of the freestanding items have managed to survive in the house up until today, one of which – here analyzed in detail – is a chair now in the living room, originally one of a group of three. Based on the findings from my research, this piece of furniture has never been described in detail and thus offers a detailed possibility of documentation. In the chair it is possible to trace the incipient genius of this architect and his original thinking: even through this example of a small piece of furniture, we can see the deeply structurally thought of this exceptional architect.

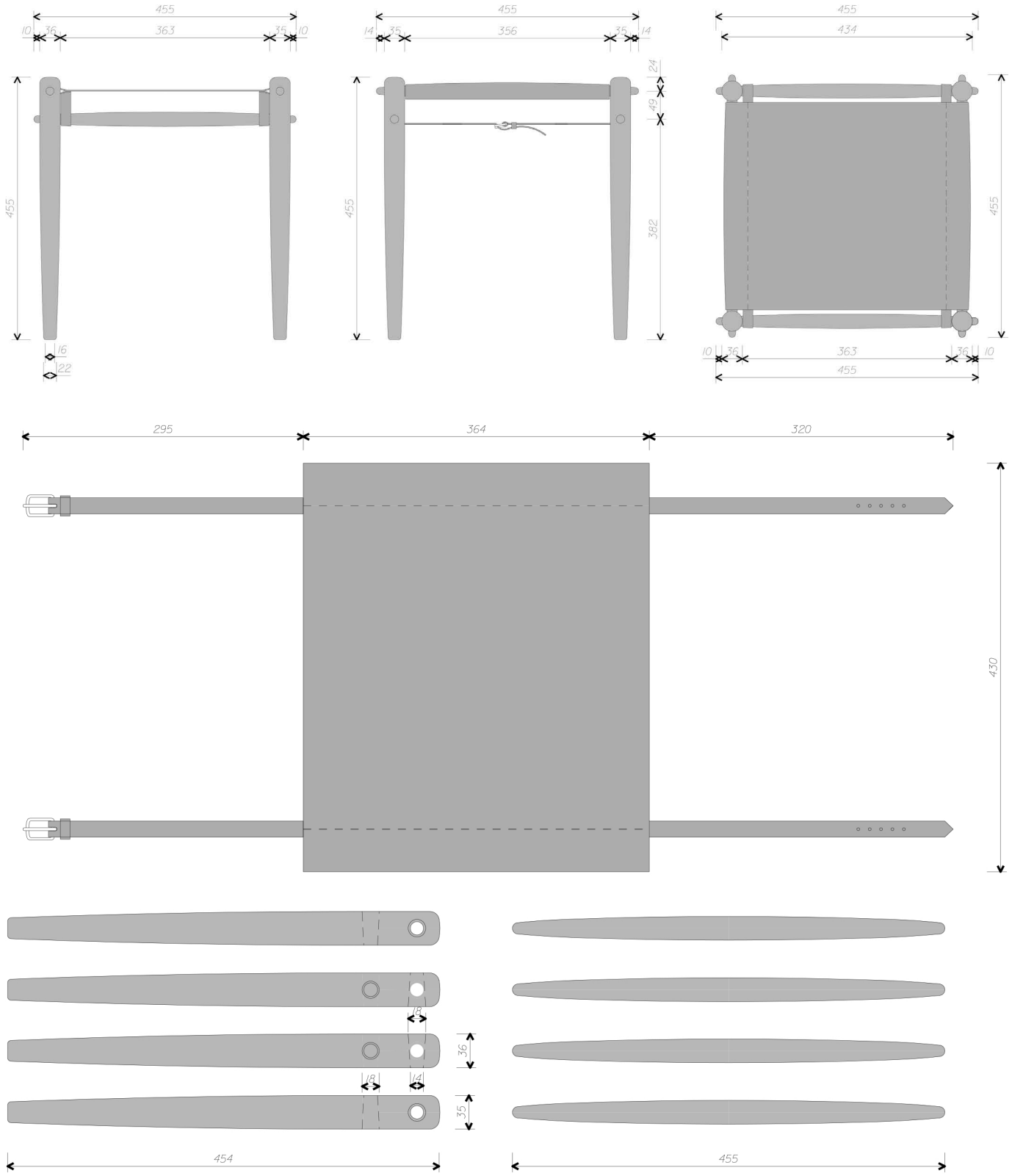
Considering his family background, there is no question that Alfred Neumann had a relationship with furniture from an early age. Starting in the 1920s, he was involved in furniture designs in connection with the family business. It is likely that his family company produced the very low leather armchair with a steel tubular structure enclosing feather-stuffed cushions with layers of African grass, and along with a second armchair in the children's room of Dr. Slezák's villa. During my personal visits in the villa, the daughter of Dr. Slezák, Ms. Naděžda Slezáková, told me that Alfred Neumann also had designed the original custom-made kitchen, itself was most likely produced by his father's company.

I visited this house for the first time in October 2023 and spoke with Dr. Slezák's descendants. Focusing on the furniture inside the villa, I first noticed the chair which is the main topic of this article, situated in the living room and displaying a highly sophisticated design. His still-living daughter, Ms. Slezáková, and his granddaughter, Ms. Poláčková, confirmed to me that the chair was designed by Alfred Neumann. This ascription can also be supported by the previously cited children's armchair from 1936, also in the same villa and preserved from the original children's room. However, this item was donated by the Slezák family to the collection of the department of architectural history of Brno's interwar architecture, and is now displayed in the permanent exhibition dedicated to Brno functionalism "About New Brno" in the Špilberk Castle Museum.

This children's armchair can be seen to have the same design and material principles as the chair under review. We see the same details, the structural connection of the rod to the drilled hole in the seat to the chair leg, the same leather, the same color, the same wood and the same formal design. The leather of the chair's seat and back is itself fastened with a leather strap, which stiffens the chair and gives it spatial rigidity. Even the snap hook is the same. Indeed, even the children's chair is comfortable to sit in; only the dimensions are smaller. In short, this armchair sprang from the same architectonic brain.

Originally, there were three identical chairs in the villa; now, only one remains in the living room. The second chair, which is the subject of the paper, was preserved in a disassembled state with missing elements and perished leather. In 2017, the two chairs were restored and reassembled by Ivan Wahla. The whereabout of the third chair, though, remain unknown.

The framework is connected to the seating section only by means of pegs inserted into holes in the legs. These pegs are conical in shape, as are the holes in the legs into which they slide. What holds the chair firmly together is the leather straps with buckles attached to the leather seat, which can be tightened or loosened. The color of the leather is dark brown, and the wooden pieces are light brown and are polished and painted with colorless varnish. What makes the chair unique is its construction without the use of solid connections: as with Neumann's prefabricated houses, it is assembled from demountable parts. Four horizontal elements run through the four legs each with two hole clutches, and the entire structure is held down using leather straps attached to the leather seat. The seat is made of leather, with the two longer sides ending in lengthwise pockets for the two cigar-shaped extended wooden pieces to pass, these being inserted at either end into the conical holes in the legs. All wooden elements are of the same length, giving a surface area of dimensions 455 mm x 455 mm, with the height also at 455 mm. As a result, with the area precisely equal to the height, the chair is transformed into an imaginary cube. In turn, the cube is a basic building unit, which when multiplied and spatially arranged can be used to form regular polyhedra, the method that Neumann later applied to his most famous buildings. In a sense,



Drawing based on the real chair from the Slezák living room,
elevations, plan in view, unfolded pieces of the chair
Drawing: Jiří Gerö

the metric regularity of his chair formed an early rendering of the conceptual basis for his buildings. Yet another feature of the chair is the possibility of its dismantling, transporting, and reassembling in another place.

Viewing this chair, we note that the details and individual elements are in harmony and thus create a coherent whole, like all Neumann's constructions. In addition, all proportional ratios match and display perfect adaptation to human ergonomics. For a later comparison, we can cite the supporting structure of the family bungalows for the Achziv recreational settlement in the Western Galilee region of northern Israel, made of wooden elements consisting of three basic modules in combination with a thatched roof. Here, it is worth mentioning that he visualized the conceptual sketches for his Israeli designs using a children's Lego set, based on the same principles of assembly like this chair. In short, there is an evident connection between his chair and his masterpieces of architecture.

The dimensions and the proportions provoke a strong emotional reaction. With the human need to feel oneself surrounded by life, any creation of an artificial world, whether through art or through technology, the structural properties of life and humanity become imprinted onto inanimate matter, conferring more firmly the appearance of potential energy[12].

The Synagogue at the Military Officers' Academy in Mitzpe Ramon

Critically challenging the conventions of 20th-century modernist architecture, Alfred Neumann developed a completely new spatial language of polyhedral patterns to organize architectural space. His buildings are composed of individual units accreted together – or, to use his own term, "space packed" – to form larger, three-dimensional spatial patterns. In turn, these spatial units were scaled to match the dimensions of the human body according to a proportion system that Neumann developed in the 1950s, called the EM-PHI system[13].

The small mystical synagogue for 120 worshipers in Mitzpe Ramon, evoking the deepest roots of Judaism, appears as a revelation in the arid landscape. Equally, this building reflects Neumann's thinking in its purest form. Assembled from prefabricated modules, as in many of the prefabricated, demountable structures he completed with Zvi Hecker, it is strikingly similar to his Brno chair. Additionally, Neumann's true specialty are buildings based on hollow demountable polyhedra, a subject he mastered technically, tectonically and spatially like no one else in the world. The result was a modular construction system that represents the whole range of conceivable proportions, from the unit to its assembly, paving the way toward future industrial building production: exactly the same principles he used when designing furniture in Brno.

In its state disassembled into individual parts, the chair reveals the modularity of the structure, paralleling the modularity of the structure of the Mitzpe Ramon synagogue. Functional truth is obtained by exposing the geometry not only outside but equally inside his buildings; material truth is gained by exposing the concrete, as the architect's main material, and its sculptability. Neumann sought to express the structure's truth as its functional and materialistic essence. It is evident that his structural truth traces its roots to Brno. Understanding these historical consequences is essential for understanding Neumann's uniqueness in his buildings, forming a fascinating link between his Brno furniture and his architecture around the world.

> "Neumann has built his own means of conveyance, a vehicle of great precision and incredible velocity. Powered by his imagination, he could travel effortlessly through planes of distant civilizations, centuries apart, embracing archaic wisdom and Renaissance sophistication. Our own course became for Neumann an extension of bygone times, never too distant to provide example and confirmation. Firmly anchored in the present, he never stayed for too long in the past. For us, Neumann's path is untraceable, and it would be fruitless to follow him. However, we can learn from Neumann how to construct our own means of mobility, adapting it to intractable topography and vast highways. Such a vehicle will of necessity be different from Neumann's, for it has to be driven by our thoughts and imagination. Constructed simply, but improved on continuously, it will take us through the landscape of our life-long experience"[14].

The Humanization of Space

The first architect to understand immediately the significance of Neumann's research was none other than Walter Gropius. In his review of the work, three years before its publication, he wrote: "Alfred Neumann's *Humanization of Space* represents a significant contribution to the entire field of design, planning, architecture and industrial production. It is the first attempt I know of to create a modular system containing the full range of possibilities. For many years I have followed many systems based on the golden ratio and the decimal system that have been proposed before and the Neufert system more recently. All of these systems suffer from being too limited. The only system, related to Alfred Neumann's new research, which also contains a comprehensive approach to this problem is Le Corbusier's Modulor, discovered instinctively. Alfred Neumann surpasses this system and gives it a comprehensive mechanic basis[15].

All Neumann's constructions, whether buildings or furniture, are designed in a proportional module based on precisely the same original scientific approach described in *Humanization of Space*. Explaining relationship between art and technology as a synthesis of these two disciplines, Neumann describes the use of prefabricated elements, which gradually increased in popularity in Israeli architecture in the 1950s and the 1960s. He introduced a regular grid system in his constructions to obtain regular rhythm and repetition. By using standardized elements, he created coherent works. Only a rational proportional system based on the golden section, in his

Details of the existing chair
Photo: Jiří Gerö

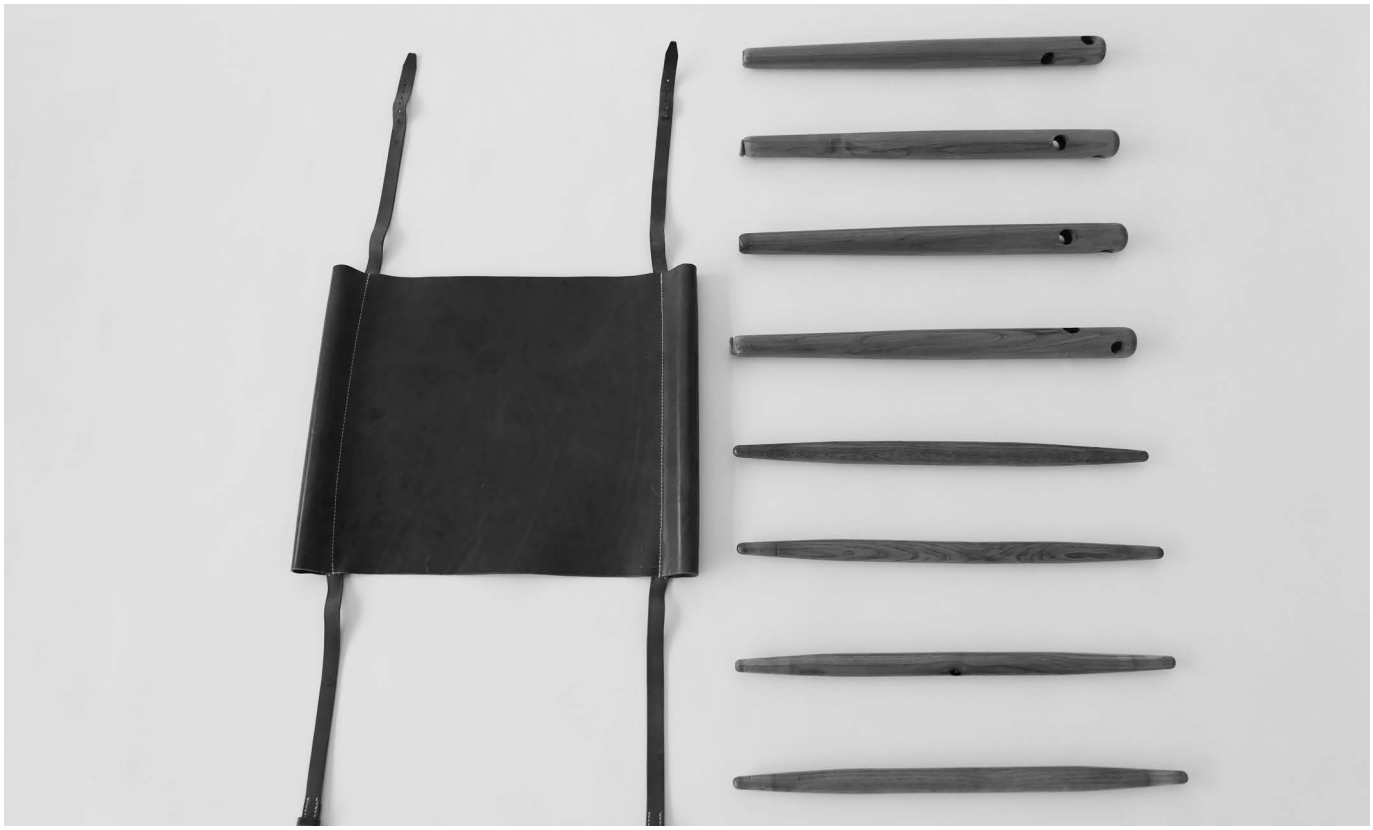


Photo of the existing chair, disassembled
Photo: Jiří Gerö

view, could prevent improvisation and create spaces that are harmonious and pleasant for people. He believed that right proportions evoke a strong emotional response, hence placing such strong emphasis on them. Since an architect creates an artificial world like a building, he must take into consideration that it has to be human and harmonious, as Neumann held.

This graphic representation shows the relationship between the numbers in the multiplicative grid. The black square represents any number in the table. As in Neumann's Brno chair, which is square both in surface area and all views, the geometric shape of the square is a basic form. In essence, the chair thus becomes a cube, i.e. a square in space. The legs and the size of the chair seat have the same dimensions so it can be either halved or doubled easily in multiples that are always in the same dimensional module, in ground plan or space of any building. Thus, all dimensional requirements will be met without any loss of the underlying proportion, whether through multiplication or division. As such, the basic assumption of modularity is visibly evident as early as the construction of the Brno chair.

Neumann ranked among the world's most important architects primarily for his designs of exceptional, innovative buildings. He found new forms in the areas of plasticity and modularity, and based on mathematically defined principles, he created geometric forms of extraordinary artistic quality[16].

Conclusions

This article aims to contribute to the hitherto obscured knowledge of the furniture creation of Alfred Neumann, an extraordinary architect whose furniture designs display a structural, metric, modular and proportional connection with his buildings. The obliqueness, not only of the plan but also of its three-dimensional volume, emerged as Neumann's key stylistic specialty, and its influence is particularly evident in his most outstanding buildings[17].

All the mentioned reasons inevitably lead us to realize that Neumann spent much effort toward a synthesis of the multiple metric system and all proportions, leading him to use metric grids to obtain the dimensional units visible in his masterpieces of architecture. He encouraged new approaches and new searches for the structural truth, both contextual and human.

> "Alfred Neumann's wide education provided him with sediments of knowledge he used extensively while keeping away from prevailing and exciting norms of modern architecture. The path he chose to travel and the destination he sought to reach had not been attempted before. They were not to be found on the map, and there was no public transportation in service"[18].

He was part of that progressive and groundbreaking mood of Israeli architecture after 1949 until his death in 1968. In his obituary in *L'architecture d'aujourd'hui* published in 1969, his former student Zvi Hecker and his later colleague wrote:

> "Like all great artists that leave behind their misunderstood ideas and unachieved work, Alfred Neumann died prematurely. It is not only that in a relative late period of his life, he began to develop totally new ideas in architecture, his death prevented his creativity from reaching its highest peak"[19].

He influenced many young architects, mostly Technion graduates from Haifa who shaped the new architectural character of Israel's public buildings specifically. Through Neumann's teachings, his students bestowed on their works a peerless architectural character, developing into unique "sculptable" buildings against a backdrop of their teacher's influence. Moreover, he handled quite skillfully a series of commissions ranging from interior furniture to urban planning.

Although Neumann's vision was bold and unwavering, his temperament was reserved and humble. "He balanced a rational methodological approach with his own intuitive artistic expression. A unique voice of reason, originality and creative power, Neumann embodies the ideal of the artist as an independent thinker and leader in society. His work reflects this attitude, and is compelling in our day as it was when it was first conceived "[20].

The legacy and work of this remarkable architect continues, among other things, in the buildings of his famous successor Rafi Segal. Alfred Neumann is mainly an inspiring architect in his integrity of an artist that significantly contributed to world architecture and has an unquestionable cultural contribution for us all.

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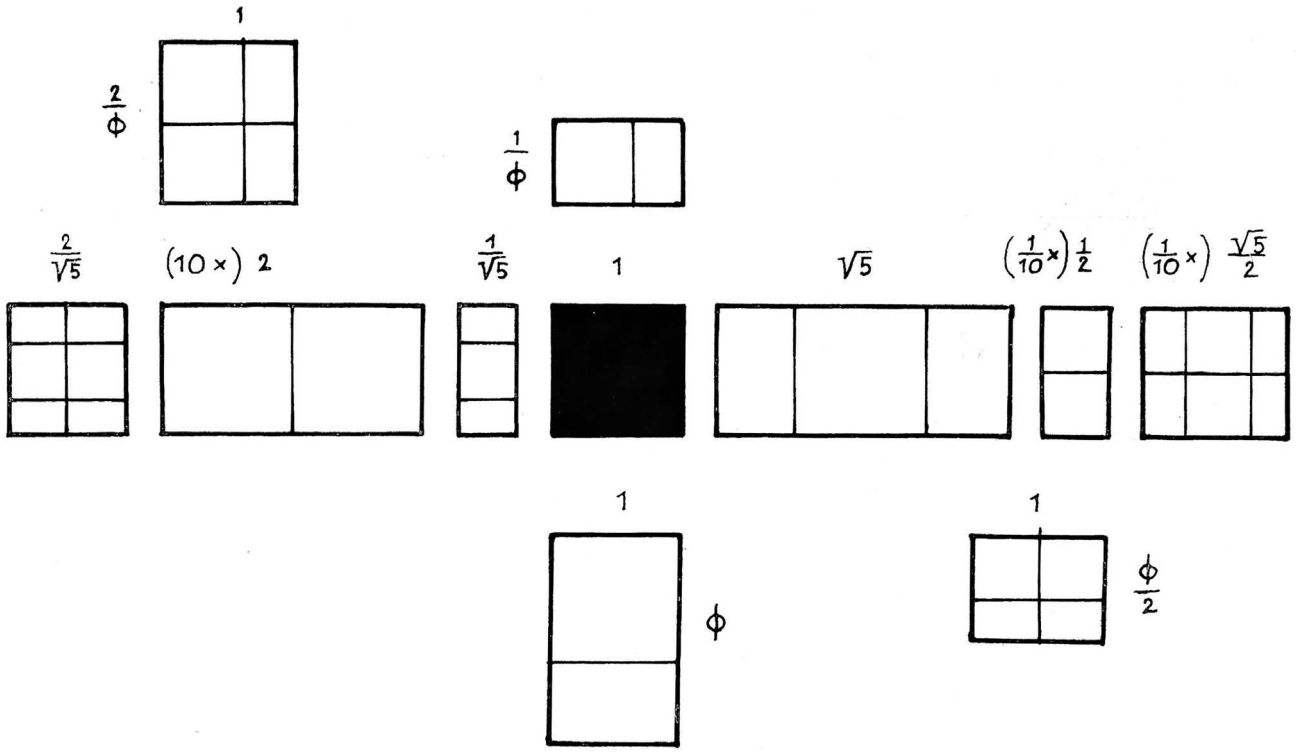
Alfred Neumann's graphic representation illustrates the relationship between the numbers in the multiplicative grid; the black square is representative of any number in the given table
Source: NEUMANN, Alfred. 1956. *L'Humanization de l'Espace*. Paris: Editions A. A., p. 28



1 GORYCZKA, Tadeáš. 2015. *Space Packing Architecture: The Life and Work of Alfred Neumann* [exhibition catalogue]. In: Segal, R. and Šlapeta, V. (eds). Ostrava: Kabinet architektury, p. 7.

2 SEGAL, Rafi. 2017. *Space Packed: The Architecture of Alfred Neumann*. Zürich: Park Books, p. 9.

3 HAAS, Felix. 1980. *20th Century Architecture*. Prague: State Pedagogical Publishing House, p. 484.

4 Segal, R., 2017, p. 375.

5 Goryczka, T., 2015, p. 202.

6 Segal, R., 2017, p. 28.

7 ŠLAPETA, Vladimír, PELČÁK Petr and WAHLA Ivan. 2000. *Brno's Jewish Architects 1919–1939*. Brno: Spolek Obecní dům Brno, p. 22.

8 GROPIUS, Walter. 1956. Foreword. In: Neumann, A. *L'humanization de l'Espace*. Paris: Editions A. A., p. 49.

9 Segal, R., 2017, p. 35.

10 Gropius, W., 1956, p. 49.

11 Segal, R., 2017, p. 122.

12 Neumann, A., 1956, p. 6.

13 Segal, R., 2017, p. 328.

14 Goryczka, T., 2015, p. 5.

15 Šlapeta, V., Pelčák, P. and Wahla, I., 2000, p. 22.

16 HARLAP, Amiram. 1971. *Synagogues in Israel, From the Ancient to the Modern*. Jerusalem: Dvir Publishing House, p. 134.

17 Haas, F., 1980, p. 487.

18 Goryczka, T., 2015, p. 5.

19 Segal, R., 2017, p. 11.

20 Segal, R., 2017, p. 324.