Pluralisms: Otto Neurath and the Emergence of Modern Mapping

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Introduction

The sun was shining on this last day of the congress as the ship from Athens sailed smoothly into the harbor of Marseilles. But the weather and the leisurely environment did not help the sentiment on board, when disagreements on the matter of the congress' resolutions culminated. The English delegation was advocating for a more scientific approach in evaluating the collection of maps, while some of the most prominent members of the congress were pushing for immediate design solutions.

"The resolutions will not find resonance, if they are not based on exact materials,"[1] the head of the English delegation weighed in. "Rather than coming to conclusions, we should advance for the coming year a program as concise as possible on the … same topic. Only in this way can we expect effectiveness and potential support from the governments."[2] "The congress has neither meant to conduct scientifically exact works nor fancied to provide final works," countered the chairman. "The intuitive working method calls for the volatility of our meetings. We have to embrace the thereby caused chaos, because we are not…" and at this moment the powerful congress' president jumped in to give the chairman backup and yelled "because we are not in a military camp."[3]

"The essence are our resolutions," the chairman concluded. "The congress should rather risk a wrong conclusion, than to loose itself in endless analyses."[4] And then, another architect with seniority silenced all resistance for the time being; "we must not endlessly work on ways of posing problems. Scientific urbanism does not exist. The city is an organism much too complex."[5]

Thus the line at CIAM was finally drawn. On one side stood a camp, headed by the Englishman Wells Coates, that wanted to map cities in a scientific manner which involved drawing up tables and statistics. On the other side, stood a group

that advocated for mapping cities in an architectural manner, which allowed quick design solutions; most notably this group was represented in the power triad of Lazlo Moholy-Nagy, Sigfried Gidion, and Charles Éduard Jeanneret, better known as Le Corbusier. But there was yet a third position that had not been heard: one that advocated for the use of a simple graphic language that would be precise and at the same time open to interpretation, that would allow that all people, from specialist and non-specialist audiences, to participate in an architectural discourse on the city. Since its architect supporters had prematurely withdrawn from the congress, a sole proponent remained: an economist, an economist who had presented CIAM with the first concise socio-political map for Modern urbanism.

Otto Neurath and the Austrian Settlement and Allotment Garden Association: Urban Convictions

The economist and philosopher, Otto Neurath, returned to Vienna after spending several months in prison in 1919. He had been jailed for his political activism during the uprising of the Bavarian Soviet Republic after its violent abatement. Neurath, who had lectured on economics in Vienna and served as the director of the German Museum for War economy until the end of WW I, had friends powerful enough to ensure his safe arrival in Austria's capital, with the provision that he would stay away from all political activity in Germany. Upon his return to Austria he became the secretary of the Austrian Settelement and Allotment Garden Association (*Österreichischer Verein für Siedlungs- und Kleingartenwesen*), which gave him the platform and the reason to make full use of his knowledge of the wartime economy, his skills as a political orator, his thoughts on Museum education and ultimately his vision of on an urbanism based on community.

To Neurath the modern city was an economic organism. But unlike many of the modern figures in architecture that either rationalized city building by economic means, or subordinated the production of city planning to the economy of the industrialized world, Neurath perceived economic strategies as a means to substantiate lively urbanism. Thus, when Neurath collected images of dockyards, grain silos and factories in 1925 for instance, he did not necessarily admire them for their machine aesthetics, as modern architects did.[6] For Neurath, ports,

Image 1. The 1937 Map. Its original color version was titled "City Planning"

warehouses and elevated railway tracks represented the global industry, in which he believed foundations for a socially improved modern city could lie.[7] In 1923 he wrote:

> What will the city of the future look like? Above all, it will be shaped by the modern, large scale industries of global trade. The city of the future will be characterized by harbors, railway stations, silos, warehouses, factories, sweeping platforms of elevated trains, and ironworks. Skyscrapers will rise up proudly to … coalesce into a harmonious "Gesamtbild." But how will the residential dwellings be distributed?[8]

Hence, to Neurath the city was an agglomeration of economic relationships and such institutions, but housing maintained a special position amongst them. Furthermore, Neurath was concerned with their connection via transportation routes, which he also perceived as interwoven networks within the social fabric of the city. Cities were spaces where cultural exchange took place, where people met in plazas and in coffee houses, where they demonstrated and went to school, where they were hospitalized, enjoyed a walk in a park, or swam in a public pools.[9] Neurath saw cities as a union of architecture and organization,[10] and he based his city planning ideas on this unitary vision when he became the secretary of the "Austrian Settlement and Allotment Garden Association." During the years of WWI "wild settlements" had emerged, when people in search of food and shelter started to cultivate small gardens and build provisional barracks on the outskirts of Vienna. The Austrian Settlement and Allotment Garden Association finally came into existence in the early 1920s to unite 230 dispersed settlement clubs. Neurath's great achievement was to meld it into an efficient operation while maintaining the settler's principles of self-help and autonomy.

In comparison to the housing typologies later pursued by "Red Vienna," the settlements resembled not necessarily a strictly urban form of living; while Red Vienna's *Höfe* would be dense and usually at least five stories high, the settlements followed row-house typologies, never higher than two stories since chief architect of the Association's *Siedlungsamt*, Adolf Loos, had proclaimed that they had to maintain a close connection to their gardens, where they tilled vegetables.[11] They often even featured small stables and barns. Neurath also favored such settlements over multi-storey dwellings, because he argued that a stronger sense of *Gemeinschaft* (community) emerged from them. This notion of community had already emerged in the settlements due to the practice of self-help during the early years of their existence, but the mixture of bottom-up and top-down organizational strategies that Neurath put in place further fostered community. As secretary of the Austrian settlement movement, Neurath created a complex system of entities – cooperative building companies, supermarkets, and gardening supply stores – which were instrumental in building and maintaining the settlements, strengthened the notion of community within the settlement, and helped maintain autonomy from the city.

Image 2. CIAM Delegates on Board of the Patris, 1933

Although designs after 1919 were provided by architects and overseen by city officials, the settlers were autonomous in managing building processes and cooperatively owned the settlements once they were finished. They distributed skilled workers to their various wood and metal shops, and founded entities that laid down construction roads, dug foundations and burned bricks. Through the collective work process the settlers built an inclusive sense of group identity, since woman and men worked on the construction of the communities equally. In this fashion a variety of clubs also soon came into being. When late in 1921 for example the settlement Rosenhügel was opened there existed small clubs tied together by their shared interests: hiking clubs, for example, military organizations, musical bands, and children's clubs. These primarily recreational clubs gave way to more varied notions of community. The architects implemented spaces for such communal activities in the form of clubhouses, small parks and plazas, cooperative shops, and secondary infrastructure where chatter could take place.

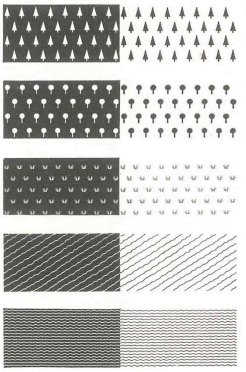
Through the building processes of the settlements, whose economic strategies Neurath and others managed, it also became paramount that such a collective endeavour demanded the informed participation of all members. This led to the organization of classes in cooking, canning, farming and the construction of buildings, as well as architecture classes that equipped the former urbanites with the skills of the "real settler", taught by famous architects like Margarete Schütte-Lihotzky and Josef Frank. But it also meant publishing magazines and journals and organizing exhibitions, for which an austere graphic language was developed. This language first emerged through pictorial statistics that documented the achievements of the settlers.

Although Neurath preferred the settlement over the *Höfe* typology he grew increasingly open minded about other architectural conceptions over the years. He started to recognize that settlements could not be employed everywhere and that the city's communal projects created higher densities. He therefore underlined that Gemeinschaft, although formally differently articulated than in the settlements, was also generated in the municipal dwellings. "In the public dwellings of Vienna's municipality emerges a new common life," he wrote. "The common courtyard serves the play of children, on summer evenings young and old possibly even dance to the sound of the loudspeaker."[12]




Image 3. Settlers in Make-Shift Settlement, ca. 1922
Image 4. Women and Men digging foundations
Image 5. Houses and Small Gardens under Construction
Image 6. Mandoline Orchestra

This notion of pluralism in urban planning corresponded to his philosophical position on coherentism and logical empiricism at large. Those ideas suggested that reality was a compound of entire systems, but could also be ascribed to its individual propositions. However, scientific opinions differed on the question of whether coherentism allowed many possible systems of truth or only a single one. Neurath believed that whatever decision one made "lay in the 'path of life' chosen by the decision maker."[13] Therefore, to him, a city had to encourage various models to solve problems, so a collective decision could be made by many people on the basis of what they found appropriate for their ways of life and their needs. This attitude foreshadowed Neurath's notion of the purposes of picture statistics. By showing various statistics (aspects of reality) chart by chart, they encouraged their viewer to draw his or her own conclusion. In picture statistics he found this was possible.



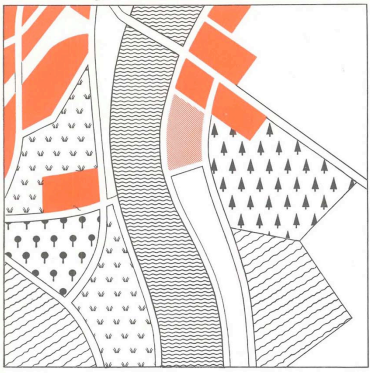


Image 7. "Various ISOTYPE Symbols"
Image 8. "Various ISOTYPE Patterns"
Image 9. "Second Version of a Section of the same (1937) Map," ca. 1937

The Search for Simplicity: Otto Neurath's Graphic Convictions

Since Neurath perceived of the Modern city as an economic organism, he had to find a way to illustrate the "invisible forces" that governed it. To facilitate this comprehension, which could potentially transgress borders and social status, he strove for a universal language: the language of picture statistics.[14]

Over the years a visual chart collection had become the heart of the exhibitions that captured the settlers' achievements. In 1925 a permanent Museum was established from this collection, called "Museum of Society and Economy" (Gesellschafts- und Wirtschaftsmuseum). This Museum became the home of picture statistics, where the graphic depiction of data was tested and refined. It was here that the graphic history of the 1937 map, "City Planning," which Neurath was to create in the aftermath of CIAM more than a decade later, began. The map would consist of three main elements: pictograms, hatches – patterns made of symbols, and spatial constraints.

In the early years of its existence the Museum of Society and Economy experimented a lot with quantitative picture statistics. Most crucial to such charts was the role of the transformer – the statistical and graphic personnel that

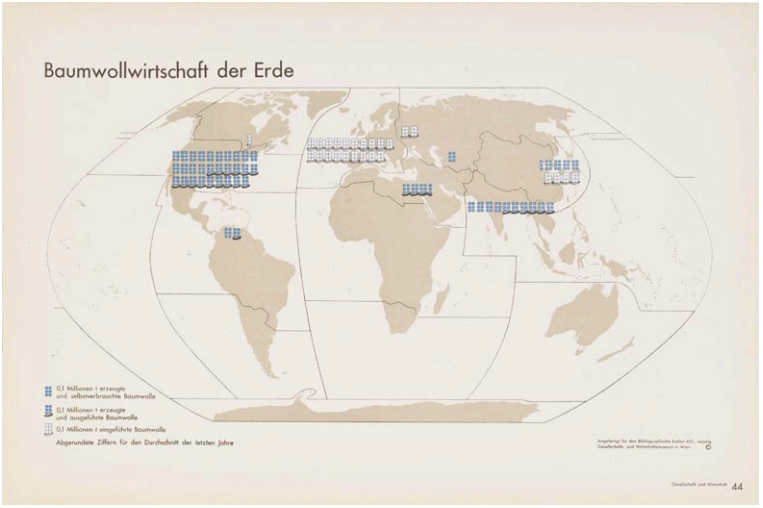


Image 10. "Baumwollwirtschaft Chart 44," ca. 1929 - 1930

translated data into the quantitative map. Charts at the Museum were not only created according to aesthetic judgment and graphic knowledge, but were also mathematically precise (although they were rounded off).

In the 1920s quantitative charts were mainly characterized by arrays of symbols, which actually represented quantities. A main shift occurred in the early 1930s when symbols started to be paired. Until then "factory" and "shoe" for example, were represented as two separate symbols and had two separate meanings. They also usually just indicated a quantity when multiplied. By the early 1930s however, symbols started to appear in pairs, and the merge of shoe and factory indicated, "shoe factory." This shift defined the nature of I.S.O.TY.P.E. – Neurath's International System of Typographic Picture Education.

While the history of pictograms is well documented in Neurath's writing, the graphic history of the hatches, the second entity employed in the 1937 map was always less clear. From an architectural stand-point, hatches represented a breakthrough because they bridged the symbol to the plan. Hatches allowed the

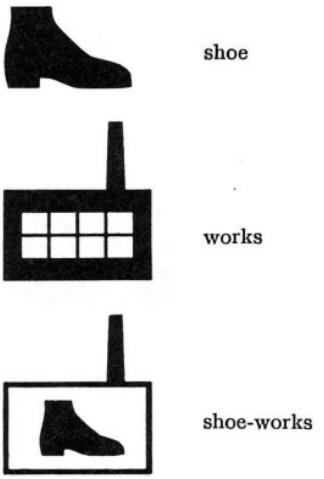


Image 11. Paired Symbols, "Picture 17"

symbol not only to signify quantities within space, but to actually become the signifier for space when multiplied. They efficiently represented the fabric of rural and urban texture to the "uneducated eye."[15] Conventional hatches, like solids or those composed of horizontal, vertical and inclined lines, were employed in other architectural maps at the time, but they were never nearly as comprehensive as Neurath's "wallpapers," as he liked to call them.

Neurath wanted his quantitative maps to depict information in an unbiased way: his aim was for them to contain a catalogue of universal signs as neutrally as geographical maps. However, he seldom worked with the actual spatialities of a city. For one, the implications of actual spatialities of the city and their illustration required a degree of technical or architectural craftsmanship that was too complex for the "ordinary man" to decipher. Therefore Neurath decided to dismiss actual geographical charts and decided to work with cartograms. He argued "cartographic depiction […] was adjusted to match picture statistics."[16] They were intentionally "not geographical maps, but only cartograms."[17]

Image 12. "Bodem," Gound

Furthermore, Neurath's town plans rarely contained more than one geographical layer, and all information depicted in those layers was highly abstracted. If, for once a map reached a more detailed level, Neurath insisted that quantitative information was to be kept completely separate from a second geographical or spatial layer. According to Neurath, town plans should only "explain the character of a district, but not its exact location or disposition."[18]

Neurath thus did not think in depth about how socio-political factors could be mapped onto space until the 1937 map. Pairing layers stood at the end of a long process. Although the divorce of space from statistical information might have fostered better understanding of the chart, it also testifies to Neurath's underestimation of space's dispositions and its resulting complexities. Since the cartograms consciously followed the laws of the pictogram, they never inherited the properties of an architectural diagram.

Besides Neurath's notion of pluralism the concept of the social silhouette is crucial for investigating Neurath's resistance to spatial particularities leading to design strategies.[19] The concept of the social silhouette counsels that certain

aspects of life ought to be depicted only in single charts, so that they do not lead the reader to false conclusions. In *The International Encyclopedia of Unified Science* (1944) Neurath stated:

> Various nations have different mortality rates; one cannot say that where the mortality rate is higher, we may also expect a lower standard of public health. It may be that in one nation the percentage of old people is extraordinarily high and, therefore, the national mortality rate may also be very high, even if in all age groups the mortality rates were lower than in other nations. The silhouette of mortality rates would tell us what the situation is.[20]

This is precisely why Neurath wanted to illustrate every single category by itself. Only in their collectivity would the charts create a social silhouette that would show a more holistic picture of social interconnectivities. In contrast to architects, Neurath, the philosopher, could perceive the city as the cognitive construct of manifold social relations that it was. He was freed from the burden of having to coerce it with the specificity that design tasks often demand. But while Neurath's maps made good representational tools, but were rarely heuristic instruments- and for the same reason.

With the 1937 map Neurath did not aim to arrive at design conclusions, but he did start to chart multiple aspects in one city plan. By doing this, he achieved what no architect had accomplished before him: to illustrate socio-economic forces within the city with the same objectivity as the geographical map, legible to all.

From Picture Statistics to Picture Education:

Otto Neurath's Pedagogical Convictions

Neurath's ultimate goal was to enable everyone to "participate in a common culture" and he fought to eliminate "the canyon between educated and uneducated people."[21] In this search of "humanizing" knowledge, graphic education had to be scientifically and pedagogically probed in relation to the intended audience and the vehicle for this refinement became the Museum.[22] It was where new tools were invented and tested and from where they travelled, as exhibitions, catalogs and matrices, to other exhibitions and into classrooms.[23]

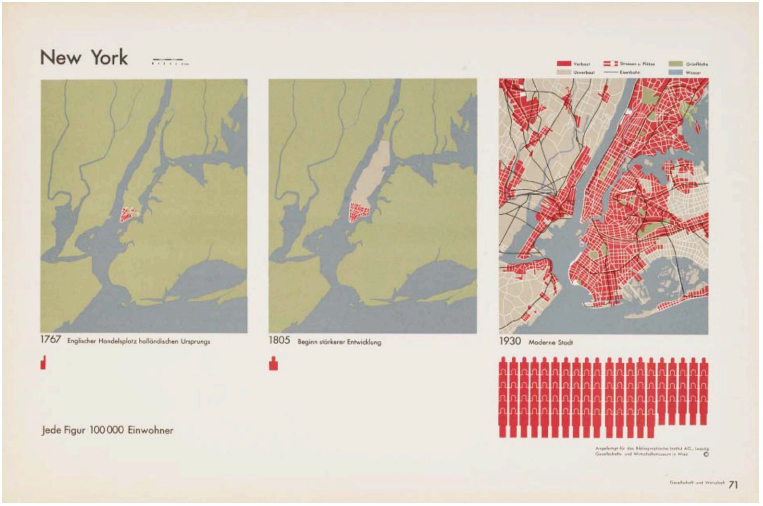


Image 13. "New York, Chart 71," ca. 1929 - 1930

While the invention of new media for ISOTYPE did not change the language of picture statistics as such, they were additional instruments through which this language could be articulated. Concretely, this meant a shift from exhibiting solely quantitative maps on paper, towards providing a set of items that could be used to inform the broad public, ranging from magnetic or mountable boards to short films.[24] The alteration from using solely charts towards a wide variety of media was also reflected in a change of name: the word Bildstatistik (picture statistics) was replaced by Bildpädagogik (picture pedagogy) better known as Picture Education. Picture Education was also as P. E. to form i.s.o.ty.P.E. abbreviation.[25]

Between 1925 and 1932 the "Museum of Society and Economy" started an extensive collection of commissioned photographs in-house as a result of the Museum's collaboration with Vienna's "Professional Support Bureau and the Viennese Chamber of Labor" through which the life of the workers and their labor environments were studied meticulously.[26] But staff of the Museum did not only go out to capture work environments, prospective wage earners were

also invited into the Museum to gain an overview of various job possibilities.[27] Progressive sequences – lantern slide shows – of work scenes created narratives on the duties of the hairdresser, the locksmith, the optician, the tailor, the carpenter, the blacksmith and the factory worker.[28] These small narratives were headed by a title and a credit slide as well as a "lead image." The most interesting results however were possibly achieved during the Museum's work with students.

By the end of the 1920s, picture education became a part of the Viennese school reform. Initiated by the social-democratic government of Red Vienna, the school reform tried to weed out antiquated teaching methods that were considered debris of the monarchy. In the framework the Vienna method was probed in various school types, mostly in Hauptschulen (middle schools: 10 – 15 year olds), elementary schools (6 – 10 year olds) and kindergartens (3 – 6 year olds). Different teaching materials were used to engage various age groups and drafting of picture statistics was taught at all levels. Surprisingly, this led to the understanding that picture statistics were often more easily appropriated and correctly employed by younger students.

When confronted with drawing the statistical chart, "How many children stayed at home on the weekend and how many went outside?" Neurath remarked that teenagers were inclined to solve these problems in an all too detailed and naturalistic way, if the instructor did not specifically request symbolic depiction.[29] He said of the drawings:

> In an all girls' class, for instance, one will find series: of (drawn) girl-(figures), whose little dresses feature all kinds of details. Braids and such animate the composition. The girls, who stay at home, look outside the window, whose drapes are affectionately drawn out. The lead images give reason for picturesque activity. All too easily they lose the character of statistic free symbolism.[30]

The technique of drawing picture statistics thus proved apt for children in elementary schools. Research in child psychology had shown that during the years of elementary school and earlier, children were very capable of inventing symbols and designing them in an abstract way, Neurath stressed in *Bildstatistik und Schule*:[31]

> In one… case a child indicated the "Sunday in the open-air" with the tree symbol adjacent to a mushroom symbol, omitting [the symbol] of children walking outside. Asked why he chose the tree and the mushroom, he answered absolutely in terms of best picture education: the tree alone could indicate a park in Vienna; with the mushroom it becomes clear that it is a forest.[32]

In general, children quickly grasped the method of drawing quantitative rather than geographical maps. But ISOTYPE was still not for everybody and Neurath knew and fostered this; it was not taught in gymnasiums, secondary schools or at universities, it was kept from institutions that drew on the upper class. First and foremost, ISOTYPE was provided to those who needed it most, a non-specialist audience. In this way, the apparent simplicity of the Vienna Method was unique, because it empowered the weak, it gave the ones who could not read the chance to participate, and it considered the adult just like the child and those with any kind of disadvantage or disability.[33]

When the school material started to travel, so did the Museum's exhibitions. And it was for this reason that some famous architects took notice of Neurath and invited him to be the first non-architect member to advise them in creating a didactical map of the city. Nobody knew what they were getting themselves into, until after they boarded a steam ship that carried them toward Athens and the most defining congress of architecture and urbanism of the 20th century: CIAM 1933.

Neurath and "The Functional City": CIAM as Catalyst for the 1937 Map

CIAM IV, titled "The Functional City," took place on the cruise ship SS Partis II en route from Marseilles to Athens between July 29 and August 12, 1933. With the goal of mapping 32 cities in terms of housing, working and leisure zones as well as routes of transportation, the CIAM architects were drawn to Neurath's expertise on cartograms and they hoped he would help them to enhance their visual language for illustrating the city. Neurath on the other hand was attracted to CIAM as a platform, because it presented an opportunity to launch an interdisciplinary professional language on a large scale. In addition, Neurath was in close contact with the architects Josef Frank and Magarete Schütte-Lihotzky, who

both belonged to CIAM's left wing. Since the original CIAM declaration had been drafted by some of CIAM's left wing members, it deeply resonated with Neurath's understanding of urbanism.

Neurath's concerns were even mirrored in the first declaration, which stated:

> The idea of modern architecture includes the link between the phenomenon of architecture and that of the general economic system. Town planning is the organization of the functions of collective life; the redistribution of land, the indispensable preliminary basis for any town planning, must include the just division between the owners and the community of the unearned increment resulting from works of joint interest.[34]

During the preparations for CIAM IV however, the left wing grew less influential, resulting in the absence of most of its members for the actual congress. The election of the Dutch architect and city planner Cornelis Van Eestern as CIAM's chairman in 1930 was crucial to CIAM politics, because he symbolized the neutral compromise between the opposing (Swiss)-German and (Swiss)-French camps. While the (Swiss)-French camp headed by Le Corbusier thought of architecture more along the lines of Fordist production and aesthetics, the (Swiss)-German camp, including Hannes Mayer and Hans Schmidt, perceived the architectural tasks at hand in purely functionalist terms. In Schmidt's and Mayer's absence some of their concerns were voiced by the English delegation. Between those opposing camps, Van Eesteren's mild nature and his will to mediate between different actors contributed to his ability as chairman.

A further quality that prepared Van Eesteren for CIAM IV was his double role as architect and urban planner. Having served for four years in the Urban Development Section of Amsterdam's Public Works Department he had started to work on an extension plan for the city. For this purpose he had drawn out maps generating a comprehensive design strategy. Since Van Eesteren had completed three model maps for the city of Amsterdam, it was sensible to use their logic and organization as the basis for maps of "The Functional City."[35]

The first map in 1:10.000 scale sought to show existing conditions in a city, recording industrial and housing zones, as well recreational areas. The second

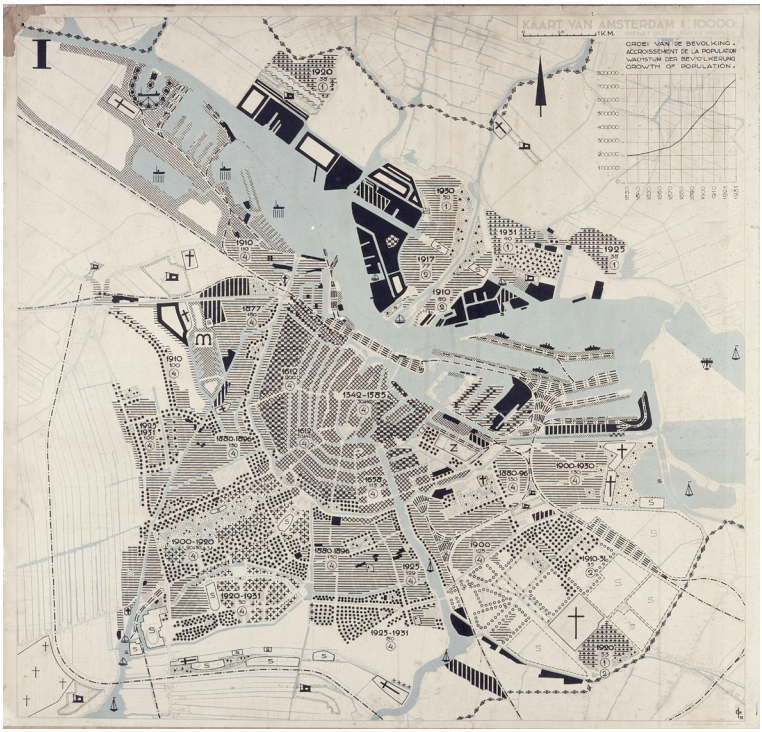
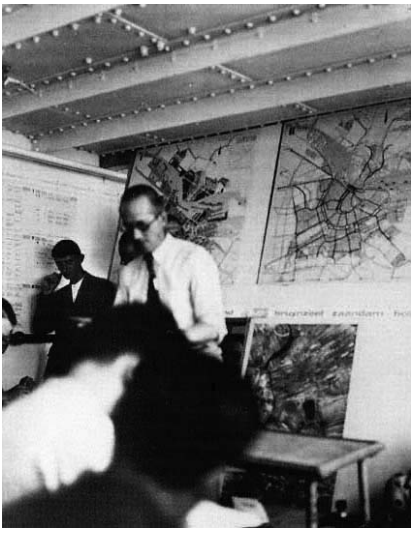


Image 14. "CIAM Model Map I," Cornelis Van Eesteren, CIAM, 1931

map, drawn at the same scale, analyzed transportation networks, and the third, at 1:50.000, captured "the city in its regional setting, including areas of public and private open space, and additional information on all four [Corbusian] functions of dwelling, work, recreation and transportation."[36]

Van Eesteren prepared the model maps and 72 symbols that would help clarify the provided information. At a preparatory meeting in Berlin, during the Building Exposition, a contribution of the "Museum of Society and Economy" received special attention from the CIAM members due to its comprehensive designs. It was then that Sigfried Giedion suggested collaborating with non-architect



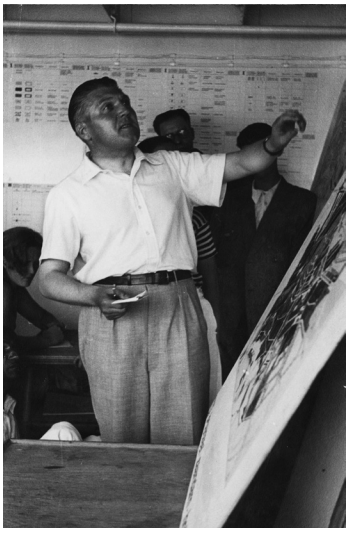


Image 15. Le Corbusier on Board of the Patris, Background, Three CIAM Model Maps, 1933
Image 16. Cornelis Van Eesteren, Background Van Eesteren's Symbols, 1933

specialists for CIAM IV, namely Otto Neurath.[37] Although preliminary meetings between Neurath and Van Eesteren had taken place before 1933, Giedion notified Neurath to join the congress on the Patris at last minute.

Van Eesteren had done his best to develop a comprehensive graphic system in preparation of the congress. He was, however, unable to unite his 72 symbols in a coherent way and mixed conventional architectural drawing methods with symbols. This gave reason to hope that Neurath's speech would clarify certain graphic hurdles and since publication of CIAM's maps was anticipated, this was especially important.

The first three days aboard the Patris were dedicated to discussions and analyses of the delegations' maps. Le Corbusier held an introductory speech, addressing the question of how the maps could achieve concrete design conclusions and advocated for quick procedures. The English delegation subjected to such hasty decision making and insisted that questionnaires would be given out that tested the

Image 17. Sigfried Giedion and Otto Neurath, 1933

accuracy of the mapmaking methods.

The next day, Cornelis Van Eesteren addressed urban analyses' effective illustrations and their translation into design proposals in his speech "Methoden des funktionellen Städtebaus (Methods of Functional City Planning)."[38] He explained how data had been extracted and to which urban proposals these analyses led. He accompanied his lecture with the extension plan for the city of Amsterdam as an example. On the collection of data, he said:

> In the extension plan, one only has to take into consideration the entities that require an advantageous position in relation to the entire body of the city. These are the objects that appear insular in every city: hospitals, mental institutions, cemeteries, crematories, etc.[39]

But he also stated:

> On the basis of technical details, like railways and shore connections, solutions were found and extensive reports were drafted. For the expected

> population a prognosis was made and a minimum as well as a maximum were determined, for both cases the plan should propose housing possibilities.[40]

His speech was followed by Neurath's "L'urbanisme et le lotissement du sol en representation optique d´après la méthod viennoise" (Town Planning and Lot Division in terms of Optical Representation Following the Viennese Method).[41] Neurath's answer to mapping densities in a city was still what he had always pledged: they should not be mapped into the drawing, but instead be shown in a separate supporting chart. Presenting the image "Men Living on a Unit of Space in Town," he reiterated:

> If one wants to show the density of inhabitants in the large cities of the world using our method, they would be characterized by monuments, for example, Paris by the Eiffel Tower and Notre Dame, London by the bridge over the Thames, etc. The population density will be represented by black or colored figures. At first glance, one will notice that while in Anglo-Saxon cities, for example, there are fewer inhabitants per 100 square meters than in the cities of Central Europe. I do not enter into considerations of whether dwelling in one- or two- floor buildings determines this situation.[42]

This solution was of course disappointing to the architects, because it did not allow for densities to have a spatial implication. Neurath also insisted that actual maps did not even have to be drawn up at all and that cartograms served the cause of mapping the city better than maps with spatial precision.

> It is not always necessary to show these graphics on geographical maps; it often suffices to use geographical diagrams. The diagram facilitates observation. I think that we could better represent many facts studied at this congress through similar diagrams [to the ones I've shown] rather than through plans or geographical maps.[43]

To some, this statement must have felt disconcerting, since they had spent days and weeks in preparing of their precise city maps.

At last Neurath showed plans on the city development in Damascus, produced for the Atlas *Gesellschaft und Wirtschaft* in 1930, to illustrate the topic of the Congress

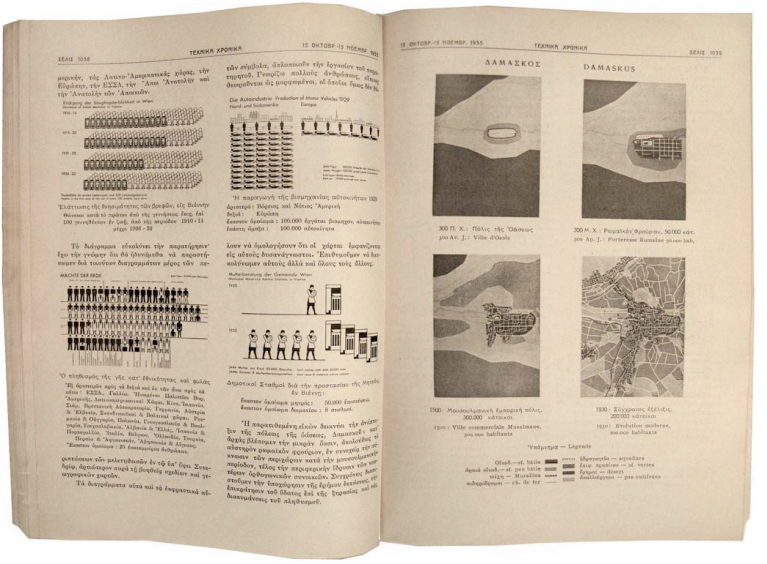


Image 18. Left side, Charts of Damascus, ca. 1929 - 1930

more closely. These maps were however lacking any kind of paired information like combinations of spatial implications and symbols, or implied socio-political and demographic data. But despite its lack of new insight, Neurath's speech was accurate in its criticism of the CIAM maps. It identified their shortcomings, such as their lack of a uniform system of symbols. Furthermore, it pointed out that they were not appropriate for the public at large. To remedy this, Neurath suggested the usage of wallpaper cut outs and symbols on paper, which schools had been able to order through the Museum.

Although Neurath's speech was disappointing, he was nonetheless elected to serve on various committees, amongst others the publication commission. A collaboration between CIAM and the Mundaeum in Vienna was planned before returning to Marseille. On August 12, upon arrival in Marseille, a first meeting of the publication commission, consisting of Van Eesteren, Sigfried Giedion, Lazlo Moholy-Nagy and Otto Neurath took place. The fight over the "scientific

legitimacy" of CIAM's resolutions, which had rekindled just hours before, affected this first meeting.

For Neurath, the question of scientific urbanism was not central. He did however perceive illustrating CIAM's resolutions as a great opportunity to spread his international language of signs, to make urbanism accessible to a non-expert audience. He therefore sided with the English delegations' wish to rework some of the congress' material that only targeted a professional audience. Giedion on the contrary strongly advocated that material produced by the architects for the purpose of the congress should be used exclusively, so that the publication could proceed faster. Neurath, in turn, insited that the resolution should be shown in simple statements with newly produced fragments of plans illustrating the resolution's singular focal points,[44] until Moholy-Nagy cut the discussion short and ruled that the CIAM's maps were "impressive" and best displayed the resolution's origin as well as its process. In conclusion, the commission decided that a small publication should contain the resolution with "images and explanations" and that the larger publication required "in depth reassessment with perfect optical representations."[45]

Despite losing the dispute over the publication, Neurath was still eager to get to work in the immediate aftermath of the congress. Van Eesteren, however, wrote a letter to Moholy-Nagy confessing his happiness that Moholy had "so actively participated in the congress," in particular in a conversation with Neurath, because otherwise they "would have certainly fallen victim to [Neurath's] rather limited system."[46] In the following months the correspondence between Van Eesteren and Neurath dwindled, because Neurath sensed that some of the architects did not appreciate his input. Also, Van Eesteren was severely sick and Neurath, due to the rise of National Socialism, was forced to flee Austria for The Hague in the Netherlands.

Nontheless, Van Eesteren gave Neurath an honest second try in 1934. In a letter to Giedion he wrote that he still believed that "something must grow" from the collaboration between the congress and Neurath.[47] Concretely, Van Eesteren thought of an exhibition titled "The Functional City" that he planned to show in Amsterdam where the next CIRPAC meeting would take place. Van Eesteren still hoped that Neurath could advance his symbols for city planning. In preparation

for "The Functional City" in Amsterdam, Neurath's interest and Van Eesteren's enthusiasm for the collaboration reignited: they met frequently between October 1934 and February 1935. Neurath tried to work on the symbols and maps, identifying some of the major spatial problems. "One should possibly combine density of population, number of apartments, floor heights etc. [by means of symbols]" Neurath wrote.[48]

The final death knell of the collaboration came with a presentation Neurath gave for the architecture collective "de 8" which included Van Eesteren. The meeting did not draw much attention, but many architects left displeased with Neurath's speech.[49] Neurath on his part was highly disappointed that Van Eesteren did not show up. He wrote a last letter stating that he was very sorry about his absence, because Van Eesteren "was always so mediating."[50]

He concluded: "Everything can be solved given some consideration, but neither is it only a graphic task nor is it solely that of an architect; it requires an intermediary …TRANSFORMATION… But this is an old song I have already whistled and jingled to you in different variations."[51] "The Functional City" exhibition in Amsterdam opened in July of 1935. Neurath was never credited anywhere, although some charts were modeled after his suggestions.

Now, why did this collaboration between Neurath and CIAM fail so catastrophically? For one, the Neurath scholar Enrico Chapel has very precisely assessed the problem of Neurath targeting a different audience than CIAM. He stressed that from the beginning, Neurath and the CIAM architects aimed at disparate target groups and they "expected totally different reactions."[52]

> Neurath invented his system within the framework of a global visual communication programme, with a view to "humanize" knowledge for the greater benefit of the general public; the architects sought to internationalize an established body of knowledge; their principal targets were the decision-makers in the field of urban production.[53]

Le Corbusier on the other hand conceived of the purposes of CIAM IV transnationally. This "meant working closely with large interests with the capital to implement his overarching vision of social and architectural transformation" as Mumford has argued in his CIAM *Discourse on Urbanism*.[54] But in general the

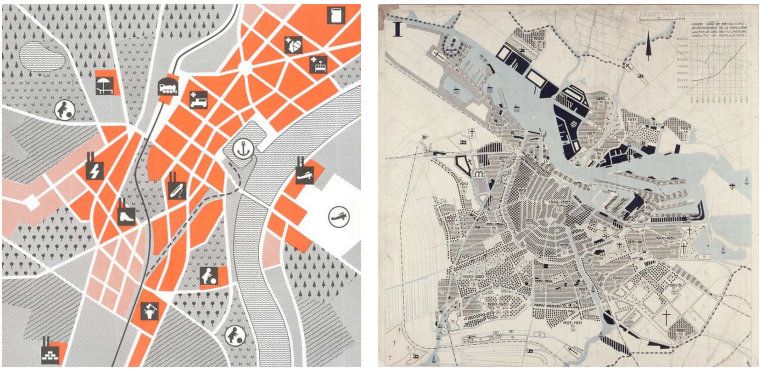


Image 19. Images 1 and 14 : Comparison

architects took pride in their technical expertise and the fact that they had found the means of representation that were specific to their discipline. Again, Enrico Chapel has put it precisely in saying:

> In the first place, one should not underestimate the difficulty of applying a pictorial method that was not designed with town planning in mind… This system, which visualized social phenomena and economic data, failed to account for a whole range of dimensional and more generally spatial parameters, which are nonetheless indispensable to any study carried out prior to the intervention of urban space.[55]

Kees Somer, who has written a biography on Van Eesteren, supports Chapel's assessment in stating that the CIAM architects saw their maps "as practical instruments" and "their attention remained focused, on the reality of urban planning, which they had investigated with an immediately operational purpose: the improvement of the planning and design of the environment in which people live."[56]

These observations are crucial because they precisely describe the difference between the map as an architectural heuristic device and the map as representational medium: one meant making new, and in this case, Corbusian, designs of cities, the other embodied a participatory discourse on architecture that gave agency to a

non-specialist audience. Such a divide could not be overcome by Neurath and the architects in the framework of CIAM IV.

From City Planning to Architectural Record:
The 1937 Map – City Planning

In 1937, two years after the end of his failed collaboration with CIAM, Neurath published his first socio-political map of a town, originally titled "City Planning." The title was more charged than one might assume, as it suggested a concern with actual "planning" rather than just a sober analysis, which would have been the typical mode of operation for Neurath.

The great breakthrough of the 1937 map was the overlap of spatial parameters with hatches and pictograms. This overlap was certainly missing in the map of Damascus that Neurath had presented on the Patris, and it was also missing in all his quantitative charts of the world. While the ISOTYPE symbols presented altered concise syntax, the 1937 map also effectively clarified how to successfully employ "wallpapers" and how to abstract spatial implications. In fact, the 1937 map was one of the first to map space with precision, which eventually enabled it to show traits of the map as an architectural tool without abandoning the central idea of making maps for a non-professional audience.

Among CIAM's three model maps, model map I of Amsterdam lends itself best to a comparative study, because it depicts existing conditions in a city and accounts for housing, work and leisure zones in a manner closest to the content of Neurath's map. Admittedly, when comparing Neurath's map to Van Eesteren's model map I of Amsterdam, Neurath's approach in mapping the city still looks relatively abstract. But given a closer reading it becomes apparent that Neurath actually managed to supersede Van Eesteren's approach in creating an insightful tool.

In a first and most obvious instance Neurath's hatches are more developed than Van Eesteren's. ISOTYPE hatches could be inverted due to their simplicity and indicate two different, but clearly indicated meanings in one map. Van Eesteren's hatches on the other hand employed a multitude of different manners of hatching, so that his charts became impossible to read without an index.

Neither map successfully addressed the indication of density. Van Eesteren used numbers to indicate additional social factors in the plan, but they did not provide a general understanding of the relationship between statistics and space. Neurath, on the other hand, did not even try to address this issue, since he stayed true to his principle that quantitative information should be kept separate from the map. "Architects who are always closely connected with making floor plans and maps mostly intend to show social facts on maps, but in a great many cases we have to give preference to other methods of representation," he criticized in *Architectural Record*.[57] In his text for *Architectural Record*, Neurath reiterated this principle, which he had already demonstrated on the Patris with the example of Damascus, by showing the density charts of different cities.

On a second level, Neurath greatly improved the comprehensiveness of his symbols by using simple means to differentiate various types of buildings. Houses, factories, and big halls like railway stations could be distinguished by the basic shape of their symbols. Whether a space was located outdoors or indoors was indicated by black and white backgrounds.[58] In addition, Neurath gave his symbols a background so they could be read as a symbol only. He also showed them in elevation, which made them clearly more abstract and identifiable as a symbol. Van Eesteren's symbols on the other hand, are "driving" or "floating" in all kinds of directions, which makes the plan very literal. In addition this makes it difficult to understand what the symbols imply: is this a real ship or is this an area for ships?

Thirdly and lastly, there was the issue of spatial abstraction, which had always been Neurath's weak point. When analyzing Neurath's map the discrepancy in scale is unsettling. The map seems to depict an urban environment and it indicates urban institutions (hospital, factory) yet the size of the city seems too small, too trimmed, to be an actual city.

Unfortunately Neurath did not often discuss maps individually; there is no hint in the literature that the 1937 map derived from a real city. The general assumption has always been that the 1937 map was a generic representation, since Neurath argued for years that rules in city planning were best illustrated by means of showing small generic parts or cut-outs. Yet, how does one illustrate a generic city or invent a city from scratch? This would seem to be a fairly complicated task for

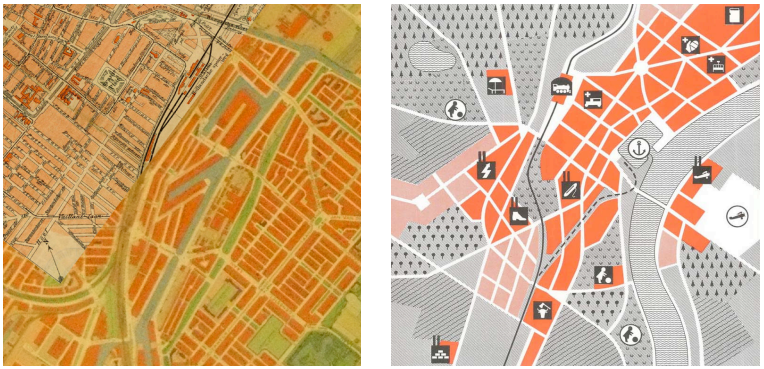


Image 20. and 1: The Hague 1930 and 1937 Map Comparison

someone who had no such specific training.

What counters the generic theory is that Neurath usually drew from actual social and economic facts. So why would he make an exception with the city? Why would he not treat the city as a spatial social fact? In addition, the 1937 map clearly seemed to be "Neurath's attempt at [contrasting] the language of 'The Functional City'" and that would suggest working with an actual city.[59] After all, CIAM specifically set out to map more than thirty actual cities in the world. But as for being the illustration of a real city, the 1937 map was too out of proportion, and as generic it was too specific.

It seems that to some extent both theories are applicable: The 1937 map is indeed generic, but there is reason to believe that the generic cut-out was drawn on the basis of a significant city. It was a city meaningful to Neurath, a city that made sense in contrast to Van Eesteren's Amsterdam: The Hague, the city where Neurath continued his legacy.

It seems that in the end Neurath realized that spatial givens were important to take into consideration, even when depicting the city. However, he kept this realization a secret, because for him it was paramount to emphasize that such infrastructure could exist with slight differences in every city in the world.

In order for the map to be a valid response to CIAM it needed to be a place that

possibly incorporated all aspects of "The Functional City;" housing, workplaces, recreational areas and various transportation networks. Obviously, such a place was hard to find in only a small cut-out of a city. Therefore modifications had to be made: spatial transformations.

The charts above, first depicting an actual plan of The Hague and lastly depicting the 1937 map, suggest that the trained statistical transformers were able to transform the particularities of space. They seem to suggest that from the actual city, a good transformer would move on to draw out a larger city block and scale it down. Then the transformer might morph a river into a sidewalk and some housing blocks into a river. The transformer might also copy an airfield from the far south of the city and insert it straight up north into the fictional city, where it fit best alongside a major transportation route. Then, he might also do the same with a lake from the outskirts of the city. Finally, the transformer could start drawing out actual greenery in the city. He might also invent some greenery and reshape some housing blocks and move them to where they fit best. And if he were a gifted transformer, he would eventually arrive at a generic city.

The combination of spatial implications and socio-political factors alone was one big step, but to actually work on the basis of a real city while at the same time making such spatial transformations signifies one step towards the operative. Van Eesteren was never able to improve his symbol dictionary despite his dedication. Neurath alone did make a step forward: he started to develop his first and last map of a city and moved toward "city planning."

But to be clear, Neurath never did one thing: he never combined quantitative and spatial maps. That would have been too suggestive a move, inviting seductive design conclusions and singular decisions. So to the question posed in the beginning whether Neurath perceived of the city as an agglomeration of social facts, the answer is yes, he did. He believed that these social institutions in a city could and had to be mapped in the city, that in fact they needed to be drawn out so that people could come to an understanding of their built environment. Still, he never thought of the maps as means of making precise design decisions.

Nonetheless he illustrated in the generic map of The Hague for the audience he had always wanted to communicated with, and he portrayed a city as he had always envisioned it: as a small town by the water, fifty percent greenery, fifty percent

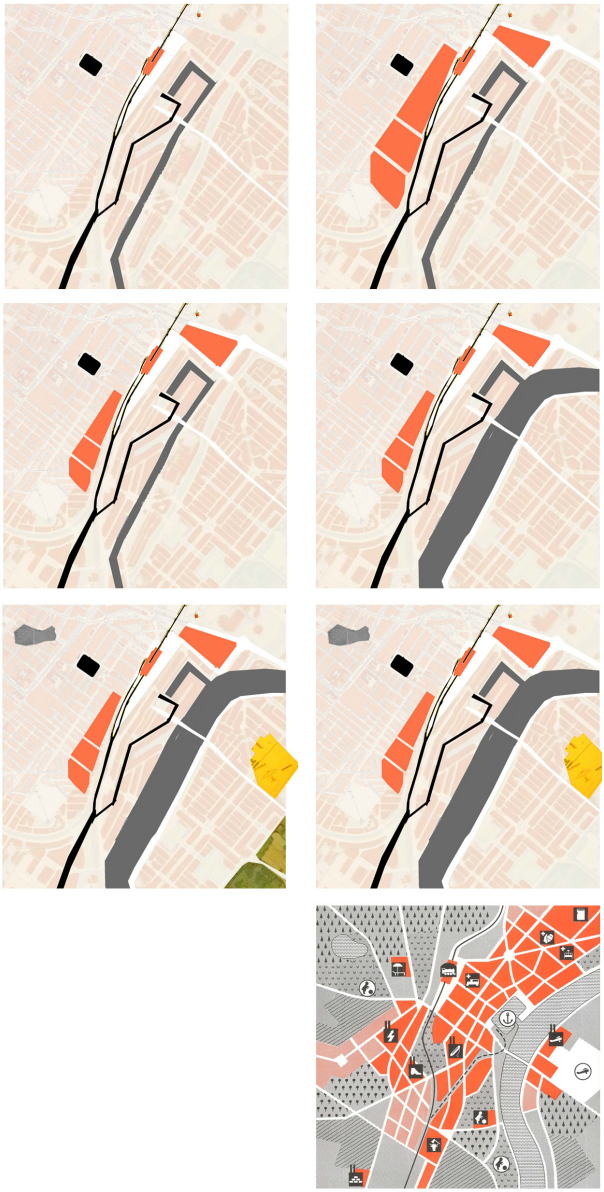


Image 21. Transformation

urban fabric, possibly reminiscent of the Viennese settlement movement. But Neurath also stressed the city's important institutions: working areas and leisure zones, hospitals, kindergartens and playgrounds as well as factories. And these were integrated in housing zones, in great contrast to how the CIAM architects had envisioned the city during CIAM IV. More than only creating an altered illustration of the city, Neurath also represented a piece of the city in a unity of architecture and organization structured around community. "City planning and home planning are concerned with life planning in general," Neurath wrote in 1937 in an accompaniment to his map, "and architects must often cooperate with technicians such as builders, carpenters and plumbers on the one hand and, on the other, with specialists in social sciences, with social workers, physicians interested in public and individual health, geologists, meteorologists and other people who deal with the environment of our social life and private life." He followed:

> The reason for this is that architects are people whose profession it is to make the entire lives of human beings as happy a possible and that their theoretical view is not only founded on principles which determine certain technical functions but also on ideas of happiness of human beings as a function of architectural activity. […]If we wish to explain the general importance of a new architectural project or idea to specialists in various branches as well as to laymen, we must show how people live and act within buildings such a houses, schools, factories, hospitals, museums, libraries; …That is to say, it is not enough to represent location and motion of men, vehicles and other things – one must also give a picture of the factors which condition human happiness. […]
>
> Therefore we have, if possible, to build up a method of representation which gives enlightenment both to poorly educated people and to people educated in certain fields, that means in the end to all people, since no single individual is informed in all fields of knowledge. A suitable basis for such a common education and information is visualization of all important problems. We need for this purpose visual aids which are self explanatory, if possible. The ideal types of expositions and picture books would be adapted to humanizing the problems but not in contradiction to a serious and scientific attitude.

Neurath referenced the CIRPAC in this text only once, in a footnote. He stated that ISOTYPE standardization could be compared "with various attempts at

Image 22. Image courtesy OMA

architectural representation, e.g. with the stimulating proposals of the CIRPAC made by Van Eesteren."[60] It is unclear if that mention was really meant as a tribute to the "stimulating proposals," or if it was meant to parallel his own work to that of CIAM, mention of which he might have felt, was long overdue. I would argue, it resembled a new notion towards urbanism, that conceived it in its socio-political context and that was a clear alternative between the functionalist approach, which adhered to "scientific urbanism," and the approach which rooted architecture in art and advocated for quick design solutions.

Postscript

Today, Rem Koolhaas's AMO is the most prominent architectural think tank promoting the use of the map as tool as well as representational device in a contemporary context. Through their heavy publication activities and their particular architectural wit, AMO has fostered an interest in mapping that is now found in architecture schools all around the world. In an interview conducted

for this research on Neurath, Rem Koolhaas confirmed that he was familiar with the work of Arntz and Neurath and that he had been influenced by it. However, he also stressed that more complex rules were generated by AMO, for a more complex world and for the more diverse cultures that exist today.

"Although one would initially think that a diagram speaks a universal language, I do not think so," Koolhaas said. "I think that a diagram… means totally different things in the Islamic world or in China or in America." I asked him if this was because of the symbolism that accompanied the diagram. "Yes, but also because the way of looking at figurative things does not have the same history in every country," he added.

"And doesn't a liquid, completely globalized world, also require more liquid maps? Ones that apply a fundamentally different logic, than the ones from the 1920s and 30s." "How would you imagine that?" he asked me and then more rhetorically suggested "are they in real time, are they alive?" "Yes," I said. Koolhaas responded,

> The promises of the digital are short-lived. In many cases before the promise can establish itself, the decadence of it already prevails, or the commercial prevails, or the trivial prevails. It has been an incredibly difficult domain in which to retain precision and to retain integrity. In certain cases exactly against this fluidity and against this immediate abuse of every idea, that the Internet […] seems to suggest, [we create maps that are] at least momentary freeze frames of particular conditions.[61]

AMO's maps therefore do have something in common with Neurath's. But Koolhaas finally accomplishes what Neurath and the CIAM intended to do: using operative maps with an elaborate grammar and syntax as a means of designing, and utilizing others to communicate precise statements about the world. This duality of the map as a statement and the map as tool exists in his practice. "Sometimes," Koolhaas said, "the diagram is an attempt to document and interpret an existing situation and at other times the diagram is a tool to trigger a project. I think we use them in both directions."

I think we [make maps] … as interpreters at a moment of great political and ideological confusion" Koolhaas continued. "To some extent we adopt a language, not so much ironically, as a statement that there once was clarity, but the clarity

is currently gone. [But] most of the diagrams we make try to clarify our own confusion. So they are fundamentally engines to create clarity for ourselves."

So Neurath persists. Not only in mass culture, in signs and symbols all around the world and in the way architects design and illustrate the contemporary city but also in the generation of critical thinkers, being educated at this very moment, equipped with the generative tools to discover political clarity anew. Sometimes I wonder what Neurath and Van Eesteren would say, if they saw that "their maps" have finally been altered for making precise statements, while at the same time being effective design tools. I think they would be satisfied. But since the search for "humanizing knowledge" is still ongoing, Otto Neurath might ask Rem Koolhaas, what his ulterior motive was.

References

1. Unknown Authors, "CIAM Minutes, Meeting, August 12, 1933," *Technika Chronika*, (1933): 1180. *Die Resolutionen werden keine Resonanz finden, wenn sie nicht auf ganz exaktem Material basieren.*
2. A., Unknown, *Technika Chronika*: 1180. *Statt Resolutionen zu fassen, soll man für das folgende Jahr ein so genau wie mögliches Programm über dasselbe Thema des gegenwärtigen Kongresses aufstellen. Nur so können wir Wirksamkeit und eventuelle Unterstützung von seiten der Regierungen erwarten.*
3. A., Unknown, *Technika Chronika*: 1180. *C. Van Eesteren: Der Kongress hat sich nie vorgenommen und sich nie eingebildet, wissenschaftlich exakte und endgültige Arbeit zu liefern. Sinn und Geist unserer Kongresse ist es, alles anzuschneiden, was bisher noch nie oder noch nie auf solche Art angeschnitten worden ist. Diese intuitive Arbeitsmethode bedingt die Sprunghaftigkeit unserer Sitzungen. Wir sollen das daurch entstehende Chaos empfinden, aber wir sind nicht... Corbusier: Nicht in der Kaserne!*
4. A., Unknown, *Technika Chronika:* 1180. *C. Van Eesetern: Hauptsache sind unsere Zusammenfassungen. Lieber soll der Kongress eine falsche Resolution riskieren, als sich in endloser Analyse verlieren.*
5. A., Unknown, *Technika Chronika:* 1180. *Alvar Aalto: ...Wir dürfen nicht endlos an einer Problemstellung arbeiten. Wissenschaftlichen Städtebau gibt es nicht. Die Stadt ist ein viel zu komplizierter Organismus.*
6. These are all photographs of other photographs or publications that Otto Neurath collected in the N_Files. These are N_421, N_425, N_430. ISOTYPE Archive, Department of Typography, University of Reading, Reading, UK.
7. Otto Neurath, "Städtebau und Proletariat," *Der Kampf*, (1923): 240.
8. O. Neurath, "Städtebau," 240. *Wie wird die kommende Stadt aussehen? Vor allem arbeitet an ihr die moderne, großorganisierte Industrie, der weltumspannende Handel. Hafenanlagen, Bahnhöfe, Silos, Lagerhäuser, Fabriken, kühn geschwungene Hochbahnen, Eisenkonstruktionen kennzeichnen die kommende Stadt, Wolkenkratzer recken sich stolz empor, an bestimmten Stellen durch bestimmte Zwecke bedingt, einem Gesamtbild unter Umständen durchaus harmonisch eingefügt. Wie aber werden die Wohnungen verteilt sein?*
9. O. Neurath, "Städtebau," 240. *Es geht darum, nicht nur die Industrie- und Wohnbauten richtig zu verteilen, Wohnungen mit den Verkehrswegen richtig zu verknüpfen, es geht auch darum, das so Geschaffene architektonisch harmonisch zusammenzuführen, die Stadt als eine einzige architektonische Einheit anzusehen!*
10. O. Neurath, "Städtebau," 240. *Was für Architekturideen leben nun in den Architekten und Organisatoren, was für Architekturideen werden von den breiten Massen aufgesogen?*
11. Adolf Loos, "Wohnen Lernen, 1921," Trotzdem, 1900-1930. (Wien: G. Prachner, 1982) 165.
12. Otto Neurath, "Kommunaler Wohnbau in Wien?," *Die Form* (1931), 52. *In den Volkswohnungsbauten der Gemeinde Wien beginnt ein neues Gemeinschaftsleben. Der gemeinsame Hof dient dem Spiel der Kinder, an Sommerabenden tanzt Groß und Klein wohl gar nach den Klängen eines Lautsprechers.*

13. Andreas Faludi. "Otto Neurath and Planning Theory," in *Encyclopedia and Utopia, The Life and Work of Otto Neurath* (1882 – 1945), ed. Elisabeth Nemeth and Friedrich Stadler (Dortrecht, Boston and London: Kluwer Academic Publishers, 1996), 208.
14. Otto Neurath, "Die pädagogische Weltbedeutung der Bildstatistik nach Wiener Methode," *Die Quelle*, (1933): 209. *Die internationale Bedeutung dieser Methode beruht unter anderem darauf, dass wie die Erfahrung zeigt, die gleichen Bildertafeln in verschiedenen Ländern verwendet werden können. Die Bilder sind geeigneter als Worte, eine Menschheitskultur vorbereiten zu helfen. Worte trennen – Bilder verbinden.*
15. This is a phrase that Neurath used a lot.
16. O. Neurath, "'Grundsätzliches zur Kartographie': Gesellschaft und Wirtschaft, Bildstatistisches Elementarwerk," (Leipzig: Bibliographisches Institut A.G., 1930): 102.
17. Otto Neurath, "Grundsätzliches," 102. *In diesem Bildstatistischen Elementarwerk gibt es keine geographischen Karten, sondern ausschließlich Kartogramme, um Eintragungen vorzunehmen oder bestimmte Tatsachen zu veranschaulichen.*
18. O. Neurath, "Grundsätzliches," 102. *Auch die Stadtpläne sollen nur den Charakter der Stadtteile, die Verschiebungen der Lage kennzeichnen, nicht aber genaue Lokalisierungen ermöglichen. Die kartographische Darstellung des Atlas wurde ausschließlich der Bildstatistik angepasst.*
19. Otto Neurath, Rudolf Carnap, Charles Morris, ed., *International Encyclopedia of Unified Science, Foundations of the Unity of Science, Volumes I-II of the Encyclopedia* (Chicago: University of Chicago Press, 1944)
20. O. Neurath, R. Carnap, C. Morris, *International Encyclopedia*, 33.
21. Otto Neurath, "Visual Education," 25.
22. Whenever I have capitalized the word "Museum" it means that I am referring to the "Museum of Society and Economy."
23. Otto Neurath, "Gesellschafts- und Wirtschaft im Lehrbild," *Österreichische Gemeindezeitung*, May 1, 1927, 44. *Man muss nun darangehen, festzustellen, welche Lösungsweisen uns zur Verfügung stehen, es muss der Bereich der Darstellungsarten abgegrenzt werden. Leuchttafeln, Magnetkarten, Zeichenfilme, die alle bedürfen methodischer Pflege. Man muss allmählich feststellen, was man so darstellen kann, was nicht; welche Vorteile das ruhende statistische Bild vor all dem hat. Die Wirkung von statistischen Bildern, die abwechselnd aufleuchten, ist noch allzuwenig untersucht.*
24. Nader Vossoughian has described this notion in detail. Nader Vossoughian, *Otto Neurath: The Language of the Global Polis*, (Rotterdam: NAi Publishers, 2008), 79.
25. Otto Neurath, "Bildhafte Pädagogik im Gesellschafts- und Wirtschaftsmuseum in Wien," *Museumskunde, Neue Folge III* (1931): 125–9. Neurath used the term *Bildstatistik* all throughout the 1920s and well into the 1930s. Although pedagogy had always been an element of Neurath's aspirations, it became the most important goal in the early 1930s when *Picture Education* replaced *Picture Statistics* for the first time an article's headline in "Bildhafte Pädagogik." For the change in article headlines see: Robin Kinross, index to *Band 3 Gesammelte bildpädagogische Schriften*, by Otto Neurath, edited by Rudolf Haller and Robin Kinross (Vienna: Hölder-Pichler-Tempsky, 1991) v-vi.
26. O. Neurath, "Bildhafte Pädagogik," 128. *Das Gesellschafts- und Wirtschaftsmuseum beschränkt sich nicht auf Bildstatistik, es hat in seinen Werkstätten mit seinen Mitarbeitern noch eine Reihe musealer Hilfsmittel geschaffen, wie neuartige Karten in ungewöhnlichen, pädagogisch wirksamen Ausschnitten (Projektionen), technische Bildtafeln, insbesondere zur Rationalisierung großzügige Holzmodelle für seine Abteilung Wohnung und Städtebau, auf durchsichtigem Material Grundrisse übereinanderliegender Stockwerke, Magnettafeln zur Eintragung wechselnder Mengen; auch die Photographie wird zur Charakterisierung viel herangezogen.*
27. See Note to Illustration 2.24 and 2.25 in N. Vossoughian, *Global Polis*, 77.
28. Images are at the Otto and Marie Neurath Isotype Collection, University of Reading, Department of Typography.
29. Otto Neurath, *Bildstatistik nach Wiener Methode in der Schule*, (Vienna and Leipzig: Deutscher Verlag für Jugend und Volk, 1933), 39. *Bilder der 10 – 14jährigen zeigen deutlich, wie die Aufgabe immer naturalistischer gelöst wird, wenn man nicht ausdrücklich die symbolische Darstellung verlangt.*

30. O. Neurath, *Bildstatistik in der Schule*, 39–40. *In einer Mädchenklasse z.B. sieht man Reihen von Mädchen, deren Kleidchen allerlei Details aufweisen. Zöpfe und anderes belebt die Situation. Die Mädchen, welche daheim bleiben, blicken etwa zum Fenster hinaus, dessen Gardinen liebevoll ausgemalt werden. Die Führungsbilder geben Anlass zu malerischer Betätigung. Allzuleicht verlieren sie den Charakter statistikfreier Symbolik.*
31. O. Neurath, *Bildstatistik in der Schule*, 36. *Während auf den unteren Stufen die Kinder, wie dies den Erfahrungen der Kinderpsychologie entspricht, sehr geeignet sind, Symbole zu erfinden und vereinfacht zu entwerfen, drängt sich auf höherer Stufe, insbesondere knapp vor der Pubertät, der Naturalismus vor, welcher die mannigfaltige, reiche Darstellung bevorzugt.*
32. O. Neurath, *Bildstatistik in der Schule*, 39–40. *Mit 6- und 7jährigen wird Bildstatistik anfangs am besten in der Weise betrieben, dass man Beispiele wählt, in denen ein Zeichen einen Gegenstand darstellt… Es wird z.B. die Frage aufgeworfen: Wie viele Kinder waren am letzten Sonntag daheim, wie viele im Freien. … Die Erfindung von Zeichen ist auf dieser Stufe sehr aufschlussreich;… In einem anderen Fall hat ein Kind den „Sonntag im Freien" mit einem Baumsymbol, verbunden mit einem Pilzsymbol gekennzeichnet, unter Weglassung der Kinder, welche ins Freie wandern. Gefragt, weshalb es den Baum und den Pilz gewählt habe, antwortete es durchaus im Sinne bester Bildpädagogik: Der Baum alleine könnte einen Park in Wien bedeuten, durch den Pilz wird klar, dass es ein Wald sein soll.*
33. O. Neurath, "Visual education," 28. *This visual method has special uses in teaching public health lessons, child care, safety, and so on, adults and to children, and in teaching retarded or handicapped children. The International Foundation for Visual Education is working along these lines in many countries.*
34. Kenneth Framton, "Introduction," in Eric Mumford, *The CIAM discourse on Urbanism*, 1928 – 1960 (Cambridge and Massachusetts: MIT Press, 2000), xi.
35. For a detailed description of how the three CIAM model maps came into being see K. Somer, *Cornelis van Eesteren*, and E. Mumford, *CIAM*.
36. E. Mumford, *CIAM*, 62– 63.
37. Sigfried Giedion, "Letter to Cornelis Van Eesteren, 21.12. 1931," CIAM Archiv, 42-K-1931, Eidgenössische Technische Hochschule, Zürich, Switzerland. *Vielleicht ist die erste Karte mit den Verkehrszeichen, die sich oft ähnlich sehen, nicht ganz leicht lesbar. Die zweite Karte jedoch ist beim ersten Anblick klar. Vielleicht sollten wir in Zukunft mit Spezialisten von Zahlenzeichen und Statistiken zusammenarbeiten. Wir wollen den Direktor des Wiener Gesellschaftsmuseum, Dr. Neurath, nach Zürich kommen lassen, da er meines Wissens über die grösste Erfahrung auf diesem Gebiete verfügt (erinnerst du dich an die Wandtafeln der österreichischen Abteilung der Berliner Bauausstellung?)*
38. Cornelis Van Eesteren, "Methoden des Funktionellen Städtebaus," Technika Chronika, (1933): 1150. *Über die Methoden städtebauliche Erscheinungen zu fassen, über die Erscheinung an sich und über Wege welche zum städtebaulichen Entwurf der Stadt der Zukunft führen, werde ich jetzt sprechen.*
39. C. Van Eesteren, „Funktioneller Städtebau," 1152. *Im Generalplan hat man nun die Lage der grossen Einheiten anzudenken welche eine gute Situation im Bezug auf den ganzen Stadtkörper verlangen. Es sind dies Objekte, die in jeder Stadt vereinzelt vorkommen wie: Krankenhäuser, Irrenhäuser, Friedhöfe, Krematorien u.s.w.*
40. C. Van Eesteren, „Funktioneller Städtebau," 1152. *Ausführliche demographische Studien wurden gemacht. Über Technische Einzelfragen, wie Eisenbahn, Uferverbindung, kam man zur Lösung und wurden ausführliche Berichte aufgestellt. Für die zu erwartende Bevölkerungszahl wurde eine Prognose aufgestellt und ein minimum und ein maximum festgestellt, für welche beiden Annahmen der Plan Wohnmöglichkeit bieten soll.*
41. Neurath's speech was printed in Technika Chronika which is available at the gta archive at the ETH, Zurich.
42. O. Neurath, "L'Urbanisme", 1153. *Si l'on veut montrer la densité d'habitation dans les grandes villes mondiales d'apres notre méthode, celles-ci seront caracterisées par des médaillons, p.e. Paris par la our Eiffel et Notre Dame, Londres par le pont sur la Tamise, etc. La densité d'habitation sera représentée par des figurines noires ou colorées. A première vue on constatera alors que dans les villes anglo-saxonnes p.e. il y a par 100 m2, moins d'habitants que dans les villes d'Europe Centrale. Je n'entrerai pas dans des considérations pour savoir si le fait de l'habitation sur un seul ou sur deux étages détermine cette circonstance.*
43. O. Neurath, "L'Urbanisme", 1153–4. *Il n'est pas toujours nécessaire de presenter ces graphiques sur des cartes géographiques; il suffit souvent d'employer des schémas géographiques… Le schéme facilite l'observation. Je pense que nous pourrions mieux représenter une quantité de faits étudiés à ce Congrès par des schémas semblables, plutôt que par des plans et des cartes géographiques.*

44. Marie Reidemeister, "Protocoll of the Publication comissions' meeting 12.8.33., Attachment Otto Neurath Letter to Sigfried Giedion, 19.8.1933," 1—2, CIAM Archiv, 42-K-1933, Eidgenössische Technische Hochschule, Zürich, Switzerland. *aussprache ueber die veraenderung der bisherigen karten. M sehr dafür, weil eindrucksam und werdeprozess steigend. N sehr dagegen, weil vollkommenstes gezeigt werden soll einfache relationen der resolution an vereinfachten ausschnitten besser demonstrierbar. Zusammenarbeit zuerich, amsterdam, wien mit M., G., vE vermitteln, man einigt sich darauf, dass entwicklung der arbeit gezeigt wird mit beispielen aus karten, und zwar faelle groesster mannigfaltigkeit und faelle, die zu besonderer kritik anlass geben, um eventuell die notwendigkeit der mundaneumsarbeit zu entwickeln. M und vE betonen, dass das chaotische der stadt gezeigt werden soll.*
45. M. Reidemeister, "Protocoll," 2. *Die grosse publikation nach gruendlicher durcharbeitung mit vollkommener optischer darstellung.*
46. Cornelis Van Eesteren "Letter to Lazlo Moholy-Nagy, 4.9.1933," Vienna Circle Archive, 232, Noord – Hollands Archief, Haarlem, The Netherlands. *Ich bin wirklich sehr froh darueber dass du den congress mitgemacht hast, nicht nur weil du einen schoenen congres-film gemacht hast und den schoenen fotos die wir noch zu sehen bekommen werden, aber vor allem weil du an der congres-arbeit so activ teil genommen hast. Von neuem hat es sich bewiesen, dass an unserem congres auch uns nahestehende nicht-architekten teilnehmen muessen. Besonders ist mir in erinnerung geblieben wie activ du an der besprechung mit Neurath teilgenommen hast – worin du immer das menschliche und psychologisch richtig wirkende in der diskussion nach vornen gebracht hast, sonst waeren wir sicher zu viel dem etwas begrenzten system Neurath's zum opfer gefallen. Du wirst bemerkt haben, dass ich waehrend den ganzen verhandlungen versuchte deine und Neurath's ideen fruchtbar aufeinander einwirken zu lassen, da ich davon fuer die publikation dieser congres-arbeit viel erwarte. Ich hoffe auf deine weitere schoepferische mitarbeit an der congressarbeit. Es wird noch viel noetig sein um mittel und wege zu finden um die wuensche zu verwirklichen.*
47. Cornelis Van Eesteren, "Letter to Sigfried Giedion 10.5.1934," Vienna Circle Archive, inv.nr. 232, Noord – Hollands Archief, Haarlem, The Netherlands. *Neurath. … Ausgangspunkt ist immer noch, dass aus des zusammenarbeit zwischen kongres – und neurath etwas wachsen muss, sei es dass ... neurath so vollständig ist, dass wir damit erreichen (wovon ich noch nicht ueberzeugt bin) was wir vorhaben – oder dass wir daraus etwas neues wächst. Neurath hat die absicht nach london zu gehen und ich würde es begrüssen, wenn in diesem sinne mit ihm umgesprungen würde. Ich halte es für wichtig zu versuchen, dass wir mit ihm zu etwas kommen, du weißt aus barcelona wie kritisch ich seinen damaligen vorschlägen gegenüber stand, aber perönlich mit ihm zu etwas zu kommen, halte ich für möglich.*
48. Otto Neurath, "Letter to Vornelis Van Eesteren 21.11.1934," Vienna Circle Archive, 232, Noord – Hollands Archief, Haarlem, The Netherlands. *Wir haben die Zeichensache nun wieder um einiges gefördert. Die Schwierigkeit beruht darauf für eine bestimmte Art der Darstellung die Zeichen festzulegen, als damit Zeichen zu bekommen, die auch für andere Plandarstellungen verwendbar sind. Man soll womöglich Bevölkerungsdichte, Wohnungsanzahl, Stockwerkshöhe usw kombinieren können und sowohl für jede Kombination zu Zweien, als auch zu mehr ein brauchbares Bild bekommen, das optisch orientiert.*
49. Kees Somer, *The Functional City: The CIAM and Cornelis van Eesteren, 1928 – 1960* (Rotterdam: Nai Publishers, 2007), 179.
50. Otto Neurath, "Letter to Cornelis Van Eesteren 20.2.1935," Vienna Circle Archive, 232, Noord – Hollands Archief, Haarlem, The Netherlands. *Es war mir sehr leid, dass sie nicht kamen. Sie sind immer so sänftigend. So vertrat ich mit freundlicher Unerbitterlichkeit das Prinzip, man müsse alles, was der Darstellung für eine etwas breitere Oeffentlichkeit dient, so gut pädagogisch bearbeiten, als es möglich ist. Die zögernde Zustimmung und geringe Bereitschaft BILDPÄDAGOGIK als eine Spezialität anzuerkennen ist mir vertraut.*
51. Otto Neurath, "Letter to Cornelis Van Eesteren 20.2.1935," Vienna Circle Archive, 232, Noord – Hollands Archief, Haarlem, The Netherlands. *Es lässt sich bei einiger Überlegung alles wirksam lösen aber das ist nicht nur eine graphische Aufgabe, so wenig es nur eine Architektenaufgabe ist, es bedarf der Dazwischenschaltung der TRANSFORMATION, das ist der bildpädagogischgen Analyse und Richtunggebung. Die Bemerkung, dass der Architekt nicht so viel Zeit für solche Sachen haben könne, beantworte ich mit dem Hinweis darauf: er solle auch die Zeit nicht auf so was verwenden, sondern das eben hiefür ausgebildeten Spezialisten überlassen. Das ist aber das alte Lied, das ich Ihnen in verschiedenen Variationen schon vorgepfiffen habe und vorgeklimpert habe.*

52. Enrico Chapel. "Otto Neurath and the CIAM – The International Pictorial Language as a Notational System for Town Planning," in *Encyclopedia and Utopia, The Life and Work of Otto Neurath* (1882 – 1945), ed. Elisabeth Nemeth and Friedrich Stadler (Dortrecht, Boston and London: Kluwer Academic Publishers, 1996), "Town Planning," 175.
53. E. Chapel, "Town Planning," 175.
54. E. Mumford, *CIAM*, 20. *But avoiding revolution, of course meant working closely with large interests with the capital to implement his overarching vision of social and architectural transformation. Such interests transcended national borders, and he was prepared to welcome capitalist internationalism in the service of social rationalization and reform along Taylorist lines.*
55. E. Chapel, "Town Planning," 173.
56. K. Somer, *Cornelis van Eesteren*, 179.
57. O. Neurath, "Architectural Problems," 58. *Architects who are always closely connected with making floor plans and maps mostly intend to show social facts on maps; but in a great many cases we have to give preference to other methods of representation. We must avoid accumulating maps showing social data; it is more instructive to combine maps and pictographs. This leads us to a use of a symbol dictionary which contains symbols applicable to both maps and pictographs. This is the basis of visualization more widely applied.*
58. O. Neurath, "Architectural Problems," 59. *The symbol*, representing stations, factories, kindergartens, and other buildings are in black with a white design in the middle.
59. Nader Vossoughian indicated that the 1937 map was Neurath's way of illustrating the functional city in his subtitle to 4.4., N. Vossoughian, *Global Polis*, I however, think Neurath really wanted his solutions to stand in contrast the Functional City.
60. Footnote to O. Neurath, "Architectural Problems," 57. *See examples in Otto Neurath, Basic by Isotype, Kegan Paul, London, 1937, We can couple ISOTYPE standardization with various attempts at architectural representation, e.g. with the stimulating proposals of the CIRPAC made by Van Eesteren.*
61. Interview with Rem Koolhaas, April 13, 2010, see Appendix B, Sophie Hochhäusl, "Otto Neurath – The Other Modern: Proposing a Socio-Political Map for Urbanism," (MA Thesis, Cornell University, 2010).

Image Credits

1. The 1937 Map, 1937. Its original color version was titled "City Planning," source: Architectural Record, July, 1937, 56.
2. CIAM Delegates on Board of the Patris, 1933, source: gta archive, CIAM Archive, ETH Zurich.
3. Settlers in Make-Shift Settlement, ca. 1922, source: Siedlung Rosenhügel, History Online Archive.
4. Women and Men diging foundations, source: Siedlung Rosenhügel, History Online Archive.
5. Houses and Small Gardens under Construction, source: Siedlung Rosenhügel, History Online Archive.
6. Mandoline Orchestra, source: Siedlung Rosenhügel, History Online Archive.
7. "Various ISOTYPE Symbols," source: Visual Representation of Architectural Problems, Otto Neurath, Architectural Record, 1937, 57 - 58.
8. "Various ISOTYPE Patterns," source: Visual Representation of Architectural Problems, Otto Neurath, Architectural Record, 1937, 57 - 58.
9. "Second Version of a Section of the same (1937) Map," ca. 1937 source: Visual Representation of Architectural Problems, Otto Neurath, Architectural Record, 1937, 57 - 58.
10. "Baumwollwirtschaft Chart 44," ca. 1929 - 1930, source: Gesellschaft und Wirtschaft.
11. Paired Symbols, "Picture 17" source: International Picture Language, Otto Neurath, Kegan Paul, Trench, Trubner & Co, London, 1936, 51.
12. "Bodem," Gound, source: Gerd Arntz Archive, Gemeentemuseum The Hague, The Netherlands, Folder 8.

13. "New York, Chart 71," ca. 1929 - 1930, source: Gesellschaft und Wirtschaft.
14. "CIAM Model Map I," Cornelis Van Eesteren, CIAM, 1931, source: gta Archive, CIAM Archive, ETH Zurich.
15. Le Corbusier on Board of the Patris, Background, Three CIAM Model Maps, 1933 source: gta archive, CIAM Archive, ETH Zurich.
16. Cornelis Van Eesteren, Background Van Eesteren's Symbols, 1933
17. Sigfried Giedion and Otto Neurath, 1933, source: gta archive, CIAM Archive, ETH Zurich.
18. Left Hand, Charts of Damascus, ca. 1929 - 1930, source: Technika Chronika, gta archive, CIAM
19. Image 1 and 14 : Comparison
20. Image 19 and : The Hague 1930 and 1937 Map Comparison
21. Transformation, All figures drawn on the basis of the 1930 Plan of The Hague, 2010, Sophie Hochhäusl.
22. Image courtesy OMA