

After Neurath: The Quest for an "Inclusive Form of the Icon"

Abstract: Otto Neurath (1882-1945), philosopher of science and political economist, was also a European pioneer of information visualization. His system of representing quantitative information via easily interpretable icons became crucial for modern data graphics. This lecture explores some of the background and some of the implications of his method of creating a visual "language" with easily understood and easily remembered symbols - which can be seen as an anticipation of cultural techniques beyond text, and of a new kind of media literacy.

On the occasion of this symposium's topic "After Neurath", I will try to evaluate Otto Neurath's project of an International Picture Language not from a designer's view but from a specific philosophical standpoint, since the background of my studies are in media philosophy and mediology. Basically, this means that it is not possible to reduce the contribution of a sociologist on the visualisation project - this has to be seen from a wider perspective, one which has to do with

1. The politics and economics of "making things public", and in this case it means enlightenment, not information only, but communication in public space and work within a frame of social politics
2. The general renewal of the knowledge architecture by pioneers before the computer age. There was a new way of addressing issues which came along with the media revolution of 19th century, issues like documentation, standardisation of formats, metadata, database form (Paul Otlet, Wilhelm Ostwald and others).

How can this perspective - *After Neurath* - achieve new ground, if not by rejecting romantic reminiscents of both sorts, the positivistic approach in science for one, and the modernist graphics movement for the other?

I will address the "Iconic", then, more in the sense of "object-oriented", as software programmers do, and not in the semiotic sense of the word. It is all about aggregation of data, the transformation of data types, and the reduction of complexity, so that it allows actants (actors in the sense of Bruno Latour) to model their "reality" beyond a given context. In the end this "programmed realism", as I understand it, deals less with aesthetics but with politics, and less with clear cut graphics but with the question: what is the object of science and technology, given the hybrid forms of our digital media culture?

The Iconic Form

A return of the Iconic in Western culture can be stated in the 19. century with new media technologies, expanding the typographic form and partially replacing it, when it became possible, for example, to mass reproduce photography in print. This caused a proliferation of images, an explosion of illustrations, and an ornament overload. It also caused critique well known from architects (Adolf Loos) and typographers (Jan Tschichold), and further to the modernists it caused some cultural criticism and even pessimism. But all of this would not stop the progression of images in the last century. According to Neurath, the diagnosis was clear:

"Modern man receives a large part of his knowledge and general education by way of pictorial impressions, illustrations, photographs, films. Daily newspapers bring more pictures

from year to year. In addition, the advertising business operates with optical signals as well as representations. Exhibitions and museums are indeed offspring of this visual hustle." - Otto Neurath 1926

There is no doubt that modern culture relies heavily on visualisation, and it is only recently that cultural theory found its new topic, and called it the *Iconic Turn*. But in fact it was in the early 60ies when McLuhan stated that with the new media in our culture "we return to the inclusive form of the icon". The media philosopher drew an implicit reference on Neurath in his famous statement on the new, post-typographic literacy - one which would take us beyond the tower of babel, with media technology allowing immediate simulation of meaning, without any need for the alphabetic code. McLuhan saw this "pictographic writing" as the unused Esperanto in our culture:

"Whereas the written vernaculars have always locked men up within their own cultural monad, the language of technological man, while drawing on all the cultures of the world, will necessarily prefer those media which are least national. The language of visual form is, therefore, one which lies to hand as an unused Esperanto at everybody's command. The language of vision has already been adopted in the pictograms of scientific formula and logistics. These ideograms transcend national barriers as easily as Chaplin or Disney and would seem to have no rivals as the cultural base for cosmic man." - Marshall McLuhan: *Culture Without Literacy*, 1953

This is sound with one of Neurath's basic thoughts, which he put into the famous slogan: *Worte trennen, Bilder verbinden* [= words separate, pictures unite]. Drawing together, the uniting force of the iconic sounds kind of orthodox, and indeed both men were quite orthodox, with a slight difference between them: as McLuhan was a devoted Catholic, and Neurath - not less devoted, a Socialist. In the iconic form, both emphasized a communitarian aspect of sorts.

Short History of Pictorial Statistics

In trying to break through the limitations of alphabetic expression, Neurath was following the numerous attempts historically to find or reconstruct an ideal language. The philosopher John Locke, one of many, claimed at the end of 17th century: "*As the main objective of language in communication is to be understood, words are not suitable for this purpose.*"

The idea was that a more effective medium beyond the arbitrary use of words, will enhance iconicity and, as in the case of Leibniz' "*Characteristica Universalis*", will lead to the development of an ideal language in which the degree of interpretation can be kept as low as possible. The German logician, Gottlob Frege, later introduced an approach which made use of new forms of scientific expression. He called this "conceptual writing" (*Begriffsschrift*, 1879), the main characteristics of which was the optimized use of both dimensions of the writing space (left to right, top to bottom). Frege strongly influenced the "Vienna Circle" with its struggle for clarity in philosophical forms, which resulted in the ground-breaking work of Rudolf Carnap and Ludwig Wittgenstein, who both tried to 'decontaminate' language from metaphysics. In contrast to this, Neurath's approach was not therapeutic, it was clearly educational.

Neurath made frequent reference to the philosopher and educator Johann Amos Comenius, whose "*Orbis sensualium pictus*" printed in 1653 was a source and inspiration for the use of pictures in education. In fact Neurath planned to publish an atlas on the history of civilisation

as the new "Orbis", in cooperation with Paul Otlet and the Mundaneum in Brussels.

Another source for his work were 19th century picture statistics or statistic charts. The economist William Playfair, for example, developed the picture statistics method for showing the balance of trade in his "Statistical Breviary", published in London 1801. Another popular picture statistics was devised by Michael George Mulhall. His acclaimed "Dictionary of Statistics" was published in 1893, but his approach of illustrating quantities by means of smaller or larger images found its critics. Among them was Willard C. Brinton, who published a new "Graphic Methods for Presenting Facts" in 1914 and whose work may have directly influenced Neurath in adopting the idea to represent quantities through a serialization of images of the same size, instead of enlarging the size of the image. This serialisation of iconic information elements became a crucial aspect in the so-called Viennese Method, developed in mid-1920ies in Vienna, as the name has it. After the emigration to Den Haag, the name changed to ISOTYPE (International System of Typographic Picture Education).

In Vienna, Neurath's work was in the tradition of then popular science museums; for which he needed to adopt signs and tables, posters and even objects for hands-on experience in the exhibition. To reach a multitude of common people, the multiplication of display material made possible by the use of data graphics was crucial. Neurath's idea was neither to illustrate a piece of text or a figure, nor to give any illusion of authentic representation which might be the case when using photography or film. He trusted only statistics to give an unbiased view of social and economic reality. Pictorial Statistics in enabling such a view would eventually become a revolutionary instrument for the Social Sciences.

For the specific aesthetics of Neurath's ISOTYPE-pictures, we need to consult some more history: The Belgian mathematician Adolphe Quételet worked out the foundations of statistical methodology in the 19th century. For his anthropometrical research he developed a way of expressing the normal distribution of mean values of measurable variables, which, called the Quetelet-index, is still in use today, although better known as the body-mass-index, the measure of obesity. His publication "Sur l'homme" (Treatise on Man, 1835) presented a "social physics" in which these values were used to describe crime or suicide rates within the frame of statistical laws. Eventually, this led him to the concept of "l'homme moyen", or the average man. This average man is not a character. He has no personality, no individual features. He is simply a statistical phenomenon. His form follows the "curve of possibility", in modern statistics called the "normal curve".

The Power of Pictograms

It was Neurath's graphic designer Gerd Arntz whose expertise was to develop the average visual figures for expressing statistical phenomena in ISOTYPE charts. These basically meaningless visuals were meant to be serialized and to be put in relation with each other. This language aspect is of major importance. Eventually, the pictorial elements would be used according to specific rules and therefore function as "picture language" (Neurath 1936). The expression of such a picture language could be set in lines and in tableaux, showing so-called "Mengenbilder" ("amount-pictures" or "number-fact pictures") which according to Neurath would be of special value for educational purpose.

The "Museum of the Future", Neurath believed should bring the museum to the people, not the other way around. It was meant to address common people, and for its educational purposes he trusted the effect of pictures to be "greater than the effect of words, specially at

the first stage of getting new knowledge" (Neurath 1936: 22). To achieve this, the "Gesellschafts- und Wirtschaftsmuseum" employed graphic designers Erwin Bernath and Gert Arntz as well as the architect Josef Frank for setting up the exhibitions. So it was not only the pictures which would get serialized, but the exhibition as a whole.

The best representation of the pictorial work of the ISOTYPE-team is the publication "Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk", Leipzig 1930. This collection contains a hundreds sheets of colorprint, some of it still amazingly fresh and clear to look at today. But it should be noted that this publication only served as a showcase for the method, with its final goal not being print, but charts on plates for the use in exhibitions and in public space. The way these plates offer information can be seem in contrast to reading - one can read texts, but not pictures, which are simply designed to look at:

"A picture produced after the rules of the Viennese Method shows the most important details of the object at first glance; apparent differences must strike the eye immediately. At second glance, it should be possible to distinguish the more important details, and at third glance, whatever other details are to be seen. If a picture gives further information at a fourth or at fifth glance, it should be rejected as pedagogically unsuitable according to the Viennese School." (Otto Neurath, 1933)

In exactly this sense, the ISOTYPE project went *beyond Gutenberg* - exploring the new cultural technique which we might call browsing, as opposed to reading, allowing a process of decoding which became familiar in today's interface culture where screens replaced the plates.

The power of images in culture has been intensely discussed in recent years, and it has been stated that there is no such thing as an "unmediated representation" (Mitchell 1986, 30). For any kind of "debabelization" (Ogden), there is no simple way back to images antecedent to the written tradition and print. That became more obvious when, as quoted above, discussing eletronic media Marshall McLuhan stated that our culture would "return to the inclusive form of the icon" (McLuhan 1964, 12). However, by designing the ISOTYPE picture language and emphasizing the unifying aspect of pictures, Neurath already envisioned an "inclusive form" of visual communication, such inclusion addressing the working class people who are not able or not willing to accept the cultural offers of literacy. The iconic forms for which he aimed were means to an end with strong political implications. Bypassing certain conditions of what later was called the "alphabet effect" in western culture (Logan 1986), Neurath imagined a new media culture in which every person would have access to knowledge through a pictorial experience.

Education of Public Opinion

Starting his work in Vienna 1924, Neurath pretty soon worked on an international level. "Internationalization" already became a key term for the decades around 1900. Railroads, steamboats and the telegraph had changed traffic and effectuated an international infrastructure. Communication was recognized in its central role for social organisation, although terms like communication, information and media were not used at the time (for an exception see Charles Horton Cooley 1909). Concepts of standardization and unification were presented at large, following the overall policy to enforce on a global scope (from world traffic and world language to the world brain). As author of the international picture language, Neurath was assigned "Director of the International Foundation for Visual

Education".

To develop a proper sign-language was aimed at media literacy of a new kind, one which is not limited to particular knowledge and local meaning. Institutions like Otlet's "Mundaneum Institute" should provide the backup for the new approach, which was presented as the idea of an international encyclopedia in continuation of 18th century Enlightenment. Yet Neurath was quite aware of some limitations of the international picture language. Designed as a helping language, the ISOTYPE project would work in association with socialist politics and economy, and therefore could only provide "the first conditions necessary" for an "education of public opinion".

Neurath seems to have been aware of some of the arbitrary aspects and the history inherent in sign writings: pictographic writings like Chinese "*have been formed by reasoning, and by hundreds of years of use.*" (Neurath 1936: 105) What is important in Neurath's visual education is not the notion of truth in the modes of representation he has adopted, be it in pictures or words, but better pragmatics of the use of signs.

Intermediate result. We have to acknowledge the role of Neurath in the history of visualisation techniques, but if we emphasize only on the progress in these techniques - which first was introduced by the graphic genius of Arntz (e.g. silhouette to linocut for reproduction), and nowadays by computer technology - we miss the point. By using pictures, Neurath tried not to achieve more precision in presenting data, but an offer to make more (and different) sense of the data. This "making sense" did not mean an increase in scientific accuracy, like in representing facts more precisely, but in translating the data and transforming them into new forms which are open to interpretation and to new experience from the data. Therefore, the precision of digital imaging does not fulfill the project begun with ISOTYPE visuals: if one wants precision, then there is numbers, and no need for pictures.

Towards a new visual culture

Modern interface culture uses iconic signs in abundance. Television, Computer screens and the World Wide Web present but an orgy of picture material with the pretense of a helping language. But this proliferation of pictorial communication is not according to an information aesthetics as envisioned by Otto Neurath and his team. Let me try to explain the difference involved here.

For the International Picture Language, the construction of signs and the rules for using them were presented on the same level of importance. Together they offer a kind of information aesthetics, which allows quick navigation based on intercultural commonsense - they constitute a streamlining for easy judgement and a new technique for accessing content.

The characteristic of this aesthetic is not so much a return to the iconic form, instead it is a fast forward toward new visuals, toward a "culture of techno-images" (Flusser 2002: 67), full of pictures which are characterized not by representing objects but texts, ideologies, programs, or even algorithms, on a plain technological level. From letters to numbers to digital code, modernity has seen an increasingly abstract mode of encoding, which puts an emphasis not so much on the mode of interpretation, but on communications technology as the condition for mediations. But our digital computers increase indexicality, not iconicity,

since pictures are replaced by numbers in digital and sedecimal (hexadecimal) codes. So, the more "you see is what you get", the more you will never get what you don't see.

Neurath could not experience the final results of the shift in perspective in relation to the new technologies, the technical transformations of the computer age. 1945, the year of Neurath's death, saw the electronic information revolution on its way. The ENIAC, the first full scale electronic computer was built as a general purpose machine, thus heralding the information age in which computers would not only transform the storage and the distribution of information, but transform communication itself - the ways in which we perceive information and how we interact with the data universe.

Way ahead of this transformation, which was one from script to digits, Neurath was surprisingly attentive to information processes in culture. He seems to have been aware of the contradiction which consists between data structures for one, and the human way of visual orientation for the other.

Alas, visualisation often is taken as some sort of "snake oil" for malfunctions in the scientific process. More and more, computer generated images produce the illusion of something being "real" which - with a little commonsense - reveals itself as pure illusion (like some nanotech-devices, which according to the laws of physics cannot be "seen" but have to be taken as real). To "represent things" then, is not possible without a certain bias towards what nowadays must be called "faitiche" - or factish, a combination of fact and fetish (Latour 1999) - indicating the crucial element of fabrication inherent in the pictures. This is an obvious problem in contemporary media production and with the increased role of the imaging in science, that is, the increasing dependence on illustrations because of the widespread use of computer graphics. The problem is especially evident when images are used to depict mechanisms beyond human perception, like cell mechanisms, the DNA code, prehistoric realities, or the gadgets of nanotechnology. The extended possibilities of digital design can help to visualize the unseen but they can also threaten scientific plausibility (Ottino 2003).

Conclusion. In our media culture, information is textual and verbal (think of the talking heads on TV, or printed news, blogs, RSS feeds) and content in this form is being illustrated. Media theory calls this form the "typographical bias". Commonly unknown, Neurath's visualisations are the most prominent approach to expand the concept of information representation with a form which is more compatible to modern communications, in which the pictorial parts are to be received first, and not subordinate to text. Only with picture language, facts would become contextual data, and the education by the eye "an education in clear thought" (1936, 22)

So isn't Picture Language more about a language than about pictures? Neurath's vision reached way beyond a revision in graphic communication. In fact, he did see cultural communication (and visual education) as a form of data processing following a new cultural algorithm. His role was in translating and transforming data - as in providing a comparative scale for information which is lost whenever we are prompted with percentages, absolute numbers and other decontextualized data.

While the graphic designer wants to catch the eye, Neurath wanted to catch the mind. When, in 1936, Neurath talked about an "education by the eye", his quest was not for better visuals but for getting "the full picture" - through perception to imagination. The result of the

ISOTYPE method is a Language Picture, which is not a perfect Pictogram but a system of "living signs", as Neurath put it - and this "Language Picture" would serve as both
- the *lingua franca* in a globalized culture; i.e. a coordination function in communications: a set of signs to work at the fringes of communication cultures,
- the *iconic interface* to information at large; i.e. a database function, opposite to singularized information chunks: emphasizing on relations between data.

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