'Words Divide, Pictures Unite.' Otto Neurath's Pictorial Statistics in Historical Context[1]

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In keeping with his principle that 'metaphysical terms divide, scientific terms unite' Otto Neurath (1882–1945) wrote in 1931 in the German teacher's journal *Die Volksschule*:

> Finally it should be noted that the picture education, especially the pictorial statistics, are of international importance. Words carry more emotional elements than set pictures, which can be observed by people of different countries, different parties without any protest; Words divide, pictures unite.[2]

For the primary aim to communicate empirical based observations Neurath believed his method of pictorial statistics to be a useful tool to transmit rational information across barriers of class, culture and education most effectively.

In figure 1 overleaf one sees Otto Neurath, two years before his untimely death in 1945, in front of a statistical chart on the occasion of an exhibition at the London cinema screening of the documentary *The World of Plenty*. The film was produced by British director Paul Rotha in cooperation with Neurath.[3] In this film animated statistical charts were extensively used to explain the complex cycle of food production and subsequent distribution by the nutritionist Boyd Orr. In addition to that Neurath's method was used as a voice-over in the film to help ordinary people to understand the figures behind the statistics. Like in other image-guided displays the pictures here were indeed capable of uniting the spectators, but not of speaking for themselves. Neurath's method, however, had a discursive element. His statistical

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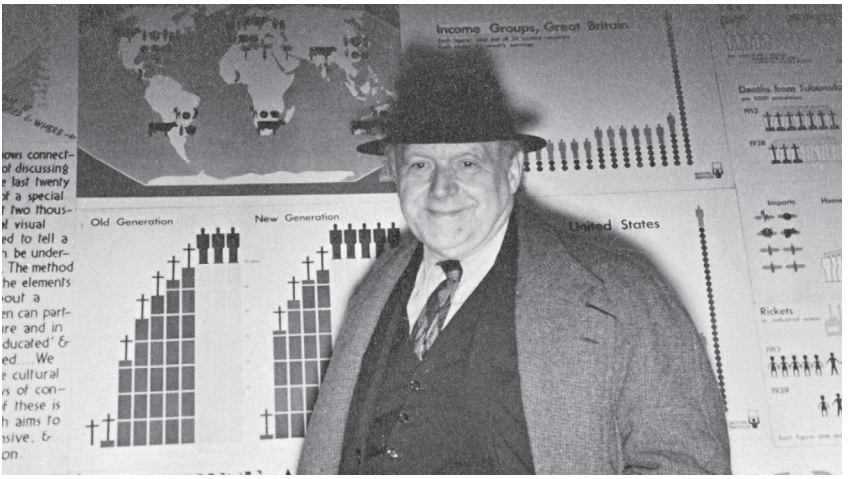

Fig. 1

Otto Neurath in November 1943,
The Otto and Marie Neurath Isotype Collection (reprinted by permission of the Department of Typography & Graphic Communication, University of Reading)

charts were meant to encourage a discussion on the information displayed.

Following Neurath's famous slogan 'words divide, pictures unite' I will start with a brief comment on the labelling of his pictorial statistics as language. Yet the main part of my paper will focus on two overlapping historical aspects of his pictorial work in Red Vienna, rooting in his philosophical and educational intentions. To sum up my argument I will use the example of the peoples of the world in his chart collection *Society and Economy* published in 1930 to show in greater detail how Neurath's philosophical and pictorial work went hand in hand.

Labelling his system as an International Picture Language as he did in his booklet from 1936[4], when he changed the name of his technique from Vienna Method of Pictorial Statistics into **I**nternational **S**ystem of **TY**pographic **P**icture **E**ducation (short **Isotype**), did not mean that Neurath claimed a general superiority of his system over natural languages.[5] Moreover, he did not want his image-guided displays to communicate through visual tools alone. Isotype was developed as an educational aid and instrument for

teachers to train the spectators to comprehend complex information. It was by no means intented that the spectators would design their own charts. Neurath was aware of the fact, that images are polysemous and need to be complemented by other media to become comprehensible. The design of the charts was a very complex task, because it required a particular expertise.

Isotype was developed closely along the writing system. The pictorial charts include words and numbers as in headings and legends to give precise information about the displayed subject. The symbols themselves were arranged in lines and columns like in writing and charts. Neurath's pictorial statistics required a structured observation. Isotype was supposed to facilitate a strong empiricist view on the social order. It was primarily intended to appear in various educational contexts, like reading newspapers, school lessons, lecture halls or films as well in exhibitions. At least the first contact with this kind of visual material was monitored by trained teachers, who assisted the audience in absorbing complex information. In books and newspapers the pictorial statistics were explained by the corresponding text. In other situations a voice guided the acquisition of facts.

Seen from the production side one must say that charts were intended to make social reality comprehensible by generating social facts, which were mostly—but not exclusively—based on quantitative information. Neurath's aim was to give access to expert information and to base public discourses on visual arguments. Isotype was an auxiliary device to observe the social order in a pertinent way. Neurath intended the pictures to unite the audience because the encoding of their visual arguments was supposed to work—generally speaking—regardless of the viewer's background.

Flying over the Earth with Bird-like Empiricist Eyes

As a social engineer Neurath transcended the confusing variety and complexity of the social world. He did not let himself become confused by the chaos of individual impressions, but rather developed a way of observing patterns of social order and behaviour that could signify relevant global changes in time and space. His perspective was bird-like, with the exception that he flew from the North and West to the South and East. Likewise he developed the following thought experiment in explaining how one should view the expansion of worldwide capitalism in 1928:

> If one could only fly over the Earth and show everybody, Chinese gardeners live side by side in old fashion. Next to them a capitalist germ cell which puts its feelers out into the country! See the factory chimney smoking! Ships come and go. And in the North, nomads and tribes of hunters who don't know anything of a capitalist order even though they sell furs to entrepreneurs. A sharpened eye would be able to grasp this. All of this can be grasped and represented in pictures![6]

The charts show what his sharp empiricist eyes have seen, especially how different elements constitute a social phenomena or how persons, objects and things are linked together, which he claimed to be the only legitimate objects of research in the social sciences published in the Vienna Circle manifesto in 1929 as well in his *Empirische Soziologie* in 1931 and in his writings in picture education.[7]

Neuraths occupation with pictorial statistics is closely connected to his philosophical work. Thomas Uebel commented that his method contributed to building the foundations of the Scientific World-Conception, but not merely in a one-way direction.[8] Simon Shaffer underlined his argument that during the 20th century the public had a tremendous impact on what was regarded science by referring to the Viennese Museum of Society and Economy as institution that served as an instrument for the Vienna Circle in general and for Neurath in particular to transmit the right image of science to the public, thus fighting metaphysical tendencies as well as irrational and religious belief.[9] Neurath's method was intended to fix information in the mode of protocol statements, that is, to register all variations of a phenomenon in time and space. It became the public trademark of a non-disguised application of the scientific attitude to reality. Elisabeth Nemeth has convincingly shown how Neurath in his early foundation of social science was looking for a way to compare heterogeneous entities in a precise way without reducing the subject to one single denotation and how to use the example to compare two pictures to explain his method.[10]

Neurath's philosophical work and political activities went hand in hand with his occupation with the pictorial statistics (in figure 2, statistical publications among his books and editions are set in bold italics). Neurath designed the Viennese method in line with his Scientific Conception of the World, which he was advocating as a left-winger of the Vienna Circle and the Unity of Science Movement.[11] I agree with Peter Galison and Robert

Otto Neurath in Red Vienna

1920	Secretary General of the Research Institute for Gemeinwirtschaft
1922	Secretary General of the Austrian Union of Settlements and Allotment Gardens
1922	*Gildensozialismus, Klassenkampf und Vollsozialisierung*
1924	Foundation of the Museum for Settlement and Town Planning in Vienna
1925	Foundation of the Museum of Society and Economy in Vienna
1928	Foundation of the Vienna Circle
1928	*Lebensgestaltung und Klassenkampf*, ***Die Gewerkschaften***
1929	*Wissenschaftliche Weltauffassung* (with Hahn and Carnap), ***Die Bunte Welt***
from 1929	*Schriften zur Wissenschaftlichen Weltauffassung* 1–11 (1929–1937)
1930	***Gesellschaft und Wirtschaft***
from 1930	*Erkenntnis* 1–8 (1930–1938)
1931	*Empirische Soziologie*
from 1931	Foundation of Museums in Moscow, London, Amsterdam, New York
1932	***Technik und Menschheit***
1933	***Bildstatistik nach Wiener Methode in der Schule***
1933	*Einheitswissenschaft und Psychologie*

Fig. 2

Historical chart of Neurath's publications and activities.

Leonard, who consider Neurath's preoccupation with pictorial statistics as the visual pendant of his philosophical program to renew philosophy on an empirical and rational basis.[12] The defined rules of his method, like the simplicity, uniformity and meaningful distinctions of his symbols as well as his syntax, only allow him to display visual arguments that meet the limited standards of protocol sentences. Neurath's pictorial statistics display a social order in which phenomena were strictly specified through temporal and local functions. As Neurath said, one would not be able to design pictorial statistics according to the Viennese method for meaningless, all-up or religious statements and beliefs.[13]

A Museum of the Future

The institution that allowed Neurath to develop his method was the Viennese Museum of Society and Economy (fig. 3). This institution and Neurath's Viennese Method of Pictorial Statistics were specific outcomes of Red Vienna's housing and settlement movement of the early 1920s (see also figure 2). As general secretary of the Austrian Union of Settlements and Allotment Gardens, Neurath organized an extensive education program, including lectures and courses for settlers as well as very popular public exhibitions on housing, town planning and building techniques.[14] From 1923 on he arranged for the teaching activities of the Union to take place under the roof of the Settlement and Town Planning Museum. It held exhibitions but also functioned as a centre of practical advice for settlers. In 1924 Neurath approached the municipality of Vienna with the idea of expanding this institution and renaming it Museum of Society and Economy in order to be able to organize even larger exhibitions on much broader social and economic issues.

It opened officially in January 1925. Besides a section on Settlement and Town Planning, which was inherited from the earlier institution, it had two new departments: 'Arbeit und Organisation' [Labour and Organiza-

Fig. 3

Advertisement of the Museum of Society and Economy, The Otto and Marie Neurath Isotype Collection (reprinted by permission of the Department of Typography & Graphic Communication, University of Reading)

tion] and 'Lebenslage und Kultur' [Life Circumstances and Culture].[15] In contrast to the traditional museums of his time, which exhibited numerous unique artefacts and curiosities, Neurath's museum concept was different and more challenging. It was neither a place where objects were collected for their peculiarity nor a building with exhibition rooms. It was a workshop for the production of didactic material. This material was displayed in a spot, where people had to pass it by on their way to the administrative offices. Since each current permanent exhibition located in the foyer of the New City Hall, people had to pass it by on their way to the administrative offices, thus allowing them to become acquainted with the displayed material in way that was not as intimidating as a museum might have been. Satellite exhibitions were displayed on the outskirts of Vienna.

He conceptualised his institution as a 'museum of the future'. It should be organized, he claimed in his article in *Survey Graphic* in 1933, around the presumed interests of the citizen seeking explanations for social and other important issues of the day.[16]

In his workshop he strived to manufacture charts for exhibitions as one might manufacture cars or books in series of identical copies:

> To speak of the museum of the future is like speaking of the automobile of the future. Automobiles are manufactured in series and not produced one by one in a smithy. The idea that every museum ought to contain unique exhibits has come to us from the past. […] It was the same at one time with books: some famous manuscript entered into a collection, a unique treasure; but today, there are ten thousand reproductions of the same manuscript. In the future, museums will be manufactured, exactly as books are today.[17]

For Neurath museums of the future were to be able to manufacture their exhibitions anywhere and publish copies of their artefacts for any media, instead of displaying unique objects. His model of production for the Viennese method was the modular assembly system.

Representing the World Population via Pictorial Statistics

Looking at one particular example, allows one to better understand how Neurath's principles were incorporated into his pictorial statistics in collabo-

ration with his colleagues at the Viennese Museum of Society and Economy. Figure 4 is part of the global collection 'Society and Economy' including 100 coloured charts showing the distribution of populations, natural resources, economic products as well as social, political and cultural aspects of life in time and space.[18]

The result of Neurath's bird-like flight over the Earth results for instance in a snapshot of the peoples of the world in 1930: showing three main groups, represented in white, yellow and dark colours. One basic figure of a man of the same size, body shape and gender is used because Neurath believed that all humans belong to the same kind. The signs were understood as signatures of objects and phenomena that should be represented. Following his basic principle that nothing seems to be more dangerous than a symbol that tells the observer more than the designer wants to express[19], he disapproved of too much detailed realism in the expression, polysemous display or meaningless graphical information. He thus clearly disassociated his visual method from art, where the focus was on individualistic expression. In Neurath's pictorial statistics all its graphical characteristics were supposed to be exclusively of informational value.[20]

In order to take into account the human diversity, he clustered groups of people together by colouring their skin and focusing on hats. The upper row shows the Europeans and their emigrated descendents in white. The second depicts the American Indians in red, Africans in black, and Oriental and Indian people in brown. The lower row, finally, represents the Chinese, Mongols, Japanese and Asians in yellow. In his choice of colours he followed the general tradition in representing human diversity, but avoided the supposedly clear race classifications of his time. He used the more neutral term of 'population groups', largely defined in social anthropology.

The figures were structured in series, designating a certain number of people being part of one group on a scale of 100 million people. Neurath's chart not only portrayed statistics in the picture, but also gave the observer a visual argument regarding the equilibrium between the political and economic leading world of the West and the North (upper row), the colonial world of the South (mean row) and the rising powers of the East (lower row). The pictures were part of Neurath's colonial political education on the occasion of the International Socialist Workers' Congress 1928 in Brussels. In the corresponding article Neurath referred to the globalization of capital and the resulting problems for the international working class.[21] In showing

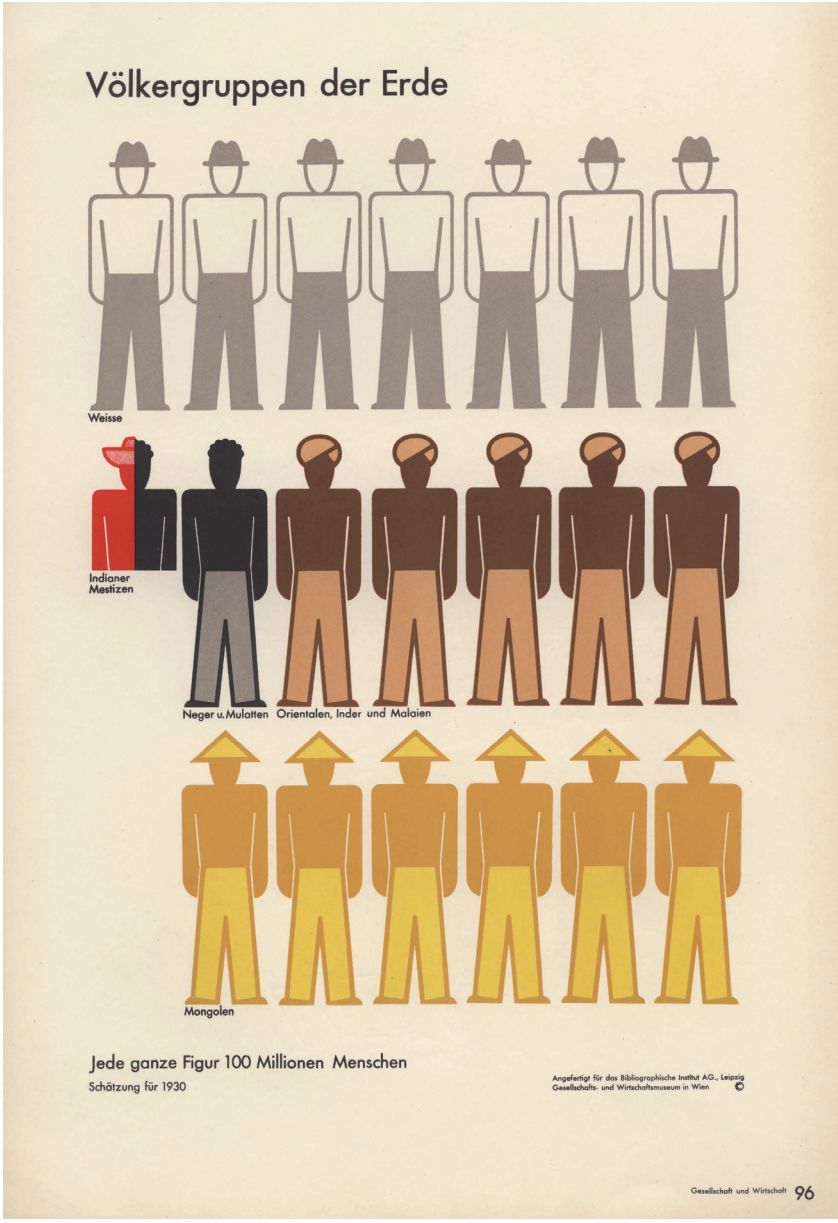

Fig. 4 **Peoples of the World** from *Gesellschaft und Wirtschaft* (1930), Plate 96

that the world population splits in three groups of almost same size, among them the Chinese who were fewer than expected, he intended to rationalize political discourse by restricting himself to pure observational facts. The big task—as he said in his article—was to persuade the workers from the West (especially in Germany and Austria, who had no first-hand experience with colonialism) that the cattle breeders from the East were neither a danger nor strangers, but came from the same social class, and that workers around the globe should make a united front against the exploitation of worldwide capitalism.

As early as 1926 Neurath had recognized how crucial his visual vocabulary was for the depiction of the international working class by graphical means:

> It is difficult to describe workers from different countries in different ways. It is a striking feature of our age that clothing becomes more similar, so that, by a mere glance, it is difficult to distinguish a German from a French or an English worker. The same is the case with the entire population. It is not wise to reach back to the old ideas of past eras and to describe, for example, the Americans as wearing a grey cylinder, a goatee or other strange things, or the Germans as wearing a pointed cap. Modern people are not aware of these differences![22]

Neurath was aware of the fact that for semiotic reasons stereotyping and standardization of his pictures were necessary to make communication across borders possible. The search for cultural independent symbols was obviously not trivial and perpetuating stereotypes. In fact, the representation of the peoples of the world for a pictogram representing human mankind in 1930 was the result of a much longer process and not his final solution at all.[23]

'We could not photograph social objects even if we tried.'

The example also demonstrates how Neurath mediated between a more naturalistic representation, such as used in physical anthropology to represent humans by using photographs, and a more abstract pure schematic depiction through words, numbers or graphs that only experts could decipher. With his pictorial statistics Neurath wanted to achieve the same effect that was already

common practice in, for instance, biology and physics, namely the production of pictures with a camera to which objectivity, authenticity and realism were attributed. In his paper on the museum of the future he justified his method in the following way:

> To come to the point, an abstract formula is educationally as useless as is a naturalistic reproduction. What we need is a schematic representation that can be immediately understood. We could not photograph social objects even if we tried. They can be demonstrated only through symbols. It is because this is not an easy task that it has so long remained unfulfilled.[24]

For epistemological as well as educational reasons, Neurath viewed the existing graphical methods for visualizing statistics as unsuitable. He repeatedly argued that in most of the cases curves and diagrams would misrepresent exactness with regard to social facts that had not been empirically proven.[25] Neither were mere abstract representations the solution due to their incomprehensibility for the layman. Especially in Neurath's own field of expertise, the social sciences, in which the principles of the Vienna Circle were even less accepted, he introduced his pictorial method as prescription to produce facts that were based on observational statements and to make clear-cut statements on heterogeneous entities like populations.[26]

Neurath's plan to democratize the global order through the use of Isotype in the communication of anything anywhere failed in its pretentious totality. Like contemporary pictorial systems, they work where people of different cultures need orientation in space, for instance, at the airport or in a refugee camp. Other useful applications are the labelling of consumer goods and instruction manuals. These examples demonstrate how for well-defined purposes image-guided displays can bridge cultural differences and complement the Babylonian confusion caused by everyone speaking his/her own natural language. If we study Neurath's case in its historical context we see how innovations in pictorial systems were deeply connected with ideas to modernize science and society.

Notes

1 I want to thank Elisabeth Nemeth for inviting me to the Workshop at the Wittgenstein Symposium 2010 in Kirchberg. Preliminary results of this paper were presented at the departmental seminar in the Max Planck Institute for History of Science in Berlin (Dept. III) in November 2009 and at the Panel on 'Creating a World Population: The Global Transfer of Population-Control Technologies in the Twentieth Century' of the *Historikertag* in Berlin in October 2010. I thank the participants of both meetings for helpful comments. For access, help in evaluating and permission to reproduce archival material from the Otto and Marie Neurath collection of the Isotype Institute at the Department of Typography & Graphic Communication, the University of Reading I am indebted to Chris Burke and Eric Kindel. For their help with the translation I thank Birgit Kolboske and Marc Weingart.

2 Otto Neurath, 'Bildstatistik nach Wiener Methode', *Die Volksschule* 27 (1931): 569 (reprinted in *Otto Neurath. Gesammelte bildpädagogische Schriften*, edited by Rudolf Haller and Robin Kinross (Wien: Hölder-Pichler-Tempsky, 1991: 180), my translation.

3 Eric Knight and Paul Rotha, *World of Plenty. The Book of the Film* (London: Nicholson & Watson, 1945), Tim Boon, 'Agreement and Disagreement in the Making of World of Plenty', in *Nutrition in Britain. Science, Scientists and Politics in the Twentieth Century*, edited by David F. Smith (London/New York: Routledge, 1997), 166–189.

4 Otto Neurath, *International Picture Language* (London: Keagan Paul, 1936), translated by Marie Neurath and reprinted in Neurath 1991, *Bildpädagogische Schriften*: 355–398).

5 Otto Neurath, *International Picture Language* (as in note 4), 373.

6 Otto Neurath, 'Kolonialpolitische Aufklärung durch Bildstatistik', *Arbeit und Wirtschaft*, 1928, 15: 677 (reprinted in Neurath 1991, *Bildpädagogische Schriften*: 130), my translation.

7 [Hans Hahn, Otto Neurath and Rudolf Carnap], *Wissenschaftliche Weltauffassung. Der Wiener Kreis* (Wien: Arthur Wolf, 1929), reprinted in: *Otto Neurath. Wissenschaftliche Weltauffassung. Sozialismus und Logischer Empirismus*, edited by Rainer Hegselmann (Frankfurt am Main: Suhrkamp, 1979: 81-101, English translation in Otto Neurath. *Empiricism and Sociology*, edited by Marie Neurath and Robert S. Cohen (Dordrecht/Boston: D. Reidel Publishing Company, 1973: 301–318), Otto Neurath, *Empirische Soziologie. Der wissenschaftliche Gehalt der Geschichte und Nationalökonomie* (1931, reprinted in: *Otto Neurath. Gesammelte philosophische und methodol-*

ogische Schriften, edited by Rudolf Haller and Heiner Rutte (Wien: Hölder-Pichler-Tempsky, 1980, Vol. 1: 423–527, English translation in Neurath 1973, *Empiricism and Sociology*: 319–421), Otto Neurath, *Bildstatistik nach Wiener Methode in der Schule* (Wien/Leipzig: Verlag für Jugend und Volk, 1933), reprinted in Neurath 1991, *Bildpädagogische Schriften*: 265–336.

8 Thomas Uebel, 'Arbeit am "Unterbau" der Wissenschaftlichen Weltauffassung', *Grazer Philosophische Studien* 41 (1991): 235-243.

9 Simon Schaffer, 'What is Science', in: *Science in the Twentieth Century*, edited by John Krige and Dominique Pestre (Amsterdam, 1997: 33).

10 Elisabeth Nemeth, 'Gesellschaftliche Tatbestände sichtbar machen. Otto Neurath über den Gegenstand der Wirtschaftswissenschaften und seine Visualisierung', in: *Philosophie an der Schwelle zum 21. Jahrhundert*, ed. by Ewa Czerwinska-Schupp (Frankfurt am Main: Peter Lang 2003: 181–208), Elisabeth Nemeth, 'Visualising Relations in Society and Economics. Otto Neuraths Isotype-method Against the Background of his Economic Thought', in: *Pointure du symbole*, edited by Jean-Yves Beziau (Paris: editions Petra, 2011: forthcoming).

11 For a more detailed account see Sybilla Nikolow, 'Aufklärung durch und mit Beobachtungstatsachen. Otto Neuraths Bildstatistik als Vehikel zur Verbreitung der wissenschaftlichen Weltauffassung des Wiener Kreises', in: *Wissenschaft und Öffentlichkeit als Ressourcen füreinander. Studien zur Wissenschaftsgeschichte im 20. Jahrhundert*, edited by Sybilla Nikolow and Arne Schirrmacher (Frankfurt am Main: Campus, 2007: 245–272).

12 Peter Galison, 'Aufbau/Bauhaus. Logical Positivism and Architectural Modernism', *Critical Inquiry* 16 (1990): 709–752. Robert J. Leonard, '"Seeing is Believing". Otto Neurath, Graphic Art, and Social Order', *History of Political Economy* 31 (2000) (Special Issue: Economists and Art. Historically Considered): 452–478.

13 Neurath 1936, *International Picture Language* (Neurath 1991, *Bildpädagogische Schriften*: 373).

14 Nader Vossoughian, *The Language of the Global Polis* (Rotterdam: NAi Publishers, 2008): 54–58.

15 Otto Neurath, 'Gesellschafts- und Wirtschaftsmuseum in Wien', *Österreichische Gemeinde-Zeitung* 2 (1925), 2: 1–12, (Neurath 1991, *Bildpädagogische Schriften:* 1–17, English translation of this article in: Neurath 1973, *Empiricism and Sociology*: 214–218).

16 See for Neurath's concept from a contemporary museological view: Hadwig Kraeutler, *Otto Neurath. Museum and Exhibition Work* (Frankfurt am Main: Peter Lang, 2008).

17 Otto Neurath, 'Museums of the Future', *Survey Graphic* 22 (1933), 9: 458

(reprinted in Neurath 1973, *Empiricism and Sociology*: 218–223).

18 *Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk. Das Gesellschafts- und Wirtschaftsmuseum in Wien zeigt in 100 farbigen Bildtafeln Produktionsformen, Gesellschaftsordnungen, Kulturstufen, Lebenshaltungen*. (Leipzig: Bibliographisches Institut, 1930). For a more detailed description of this collection see Sybilla Nikolow, '*Gesellschaft und Wirtschaft*. An Encyclopedia in Otto Neurath's Pictorial Statistics from 1930' in: *European Modernism and the Information Society. Informing the Present, Understanding the Past*, edited by W. Boyd Rayward (London: Ashgate Publishing, 2008): 257–278.

19 Otto Neurath, 'Schwarzweißgraphik', (1926, reprinted in: Neurath 1991, *Bildpädagogische Schriften*: 55). Presumably based on Ludwig Wittgenstein's bonmot 'Wovon man nicht sprechen kann, darüber muss man schweigen.'

20 Neurath 1933, *Bildstatistik*, see Neurath 1991, *Bildpädagogische Schriften*: 279–284).

21 Neurath 1928, *Aufklärung* (Neurath 1991, *Bildpädagogische Schriften*: 126–132.

22 Otto Neurath, "Statistische Hieroglyphen", (1926, reprinted in Neurath 1991, *Bildpädagogische Schriften*: 43), my translation.

23 For a detailed discussion of the graphical representation of the population groups see Sybilla Nikolow, 'Gestaltete Bilder und visuelle Argumente. Die "Völker der Erde" in Otto Neuraths Bildstatistik und "*Isotype*"', in: *Bild und Gestalt. Wie formen Medienpraktiken das Wissen in Medizin und Humanwissenschaften?*, edited by Frank Stahnisch and Heijko Bauer (Hamburg: LIT Verlag, 2007): 229–243.

24 Neurath 1933, *Museums of the Future*: 462.

25 Neurath 1926, *Hieroglyphen* (Neurath 1991, *Bildpädagogische Schriften*: 44), Marie Reidemeister, "Die Kunst der statistischen Darstellung" *Kulturwille. Monatsblätter für Kultur- und Arbeiterschaft*, 4 (1927), 9: 194–5.

26 It was Paul Rotha who understood Neurath's visual arguments displayed in his charts as clear-cut statements that he used in his documentaries. Paul Rotha, 'Films and Other Visual Techniques in Education, 1946', in: *Rotha on the Film. A Selection of Writings about the Cinema* (London: Faber and Faber, 1953): 89.—For Rotha's documentaries see also Tim Boon, *Films of Fact. A History of Science in Documentary Films and Television* (London: Wallflower Press, 2008).