

# Written Language and Picture Language *after* Otto Neurath—Popularising or Humanising Knowledge?

Friedrich Stadler, Vienna

The ‘Vienna method of pictorial statistics’, created by Otto Neurath (1882–1945) and his team in the *Social and Economic Museum in Vienna* (1925–1934) and developed, after his forced emigration, into the ‘Isotype’ (International System Of Typographic Picture Education), constitutes to this day a relevant contribution to educational work and the communication of knowledge and science. The reconstruction and renewing of this Enlightenment concept through both pictures and writing, within the context of a ‘scientific world conception’ and the *International Encyclopedia of Unified Science*, offers a fruitful perspective on the current possibilities and limits of visual communication between ‘science and the public’.

The integration, as pushed for by Neurath, of this picture language of ‘figurative constructivism’ (Gerd Arntz) into a comprehensive critical concept in the tradition of Comenius, Leibniz and the French encyclopédistes, running all the way to the Vienna Circle, leads to a remarkable, but unfortunately incomplete treatise on ‘Visual education: humanisation versus popularisation’ (Neurath 1945) as a model for a modern museology. Neurath’s posthumous publication, a comprehensive sketch of a cultural history of *Visual Education* (excerpts of which were printed in 1973, the complete version in 1996), served as an illustration of this topic and can in hindsight be fairly judged a concrete contribution towards highlighting the relation between science, politics and the public. Fortunately, his visual autobiography was published in the meantime and is accompanied by recent research.<sup>1</sup>

The fact that, at present, written and picture languages are mostly conceived of as alternatives only has not been offset by a noticeable trend towards a ‘visual turn’ either:<sup>2</sup> an interdisciplinary ‘visualistics’ as the study of images, or imaging science, seems more like a compensation for the powerful influence of communication, and an appendix to computer sciences, than a well-founded investigation of the two correlative areas of word and image taking place within the context of public demand for the popularisation of knowledge and science.<sup>3</sup> The tension and complex relations between science and public are also impacted upon by the method of imparting knowledge and information, in which—similar to the TV and the Internet—visualisation brings about a strong polarisation between producers and consumers.<sup>4</sup> It seems all the more surprising that a comprehensive practical and theoretical contribution to picture language and museology has only been noticed by a small number of experts—a contribution which is associated with the life and work of Otto Neurath. There may be historical reasons for this, to do with Neurath’s being driven into exile three times and his early death, but also to do with theoretical reservations and deficiencies grounded in ahistorical specialisation and typologising of language and its research. Against this backdrop, a critical reconstruction of Neurath’s ‘visual education’ is not only a contribution to the history of education and science but also constitutes an assessment relevant to today’s discourse on the ‘knowledge society’. It can both help prevent a nostalgic enshrining of ‘Austrian intellectual history’ and break up a perspective rigidly fixed on individual disciplines.<sup>5</sup>

### **Historical Interconnections**

The ‘Vienna method of pictorial statistics’ constituted a significant attempt to generate knowledge about socio-economic correlations for a broad public using picture language and diagrams, and was intended to serve as a communicative medium within the wider framework of the associated ‘Social and Economic Museum’. However these phenomena of ‘Red Vienna’s’ education movement were not intended to be isolated instruments of popularisation following the motto ‘knowledge is power’ but were rather always designed to be a part of a neo-enlightenment ‘scientific world-view’, which must be understood as an essential component of the encyclopædia movement up until the outbreak of the Second World War. We are therefore dealing with a thematic



Fig. 1

#### Precursor of the modern schoolbook:

Jan Amos Comenius's *Orbis Sensualium Pictus*  
(1685)

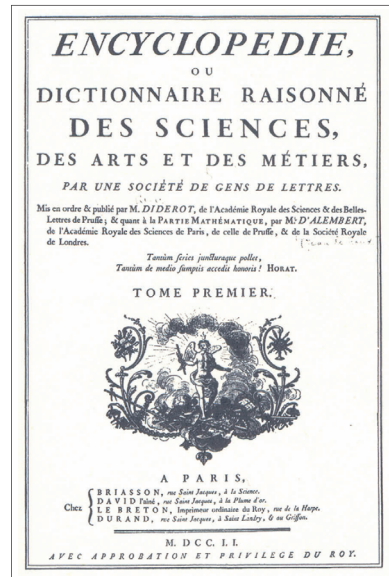


Fig. 2

#### Image plates as aesthetic add-on:

Denis Diderot's *Encyclopédie*  
(1772)

development of Jan Amos Comenius's *Orbis Pictus* such as was intended by its author, and of the French *Encyclopédie*. (Incidentally, the latter's image plates alone guarantee a certain aesthetic pleasure, but they offer no purposeful overview of the corpus of referential knowledge.<sup>6</sup>) Furthermore it seems that the mature versions of picture language, in the form of Isotype, made a fruitful contribution to the debate on popularisation, challenging all 'top-down' models of didactics in terms of epistemology and education policies.

Neurath described the typical 'Vienna atmosphere', which would be partly responsible for the development of logical empiricism.

While the idea of German nationalism was dominant in university circles, there were among other intellectuals many who stood apart from the nationalist way

of thinking and who subscribed mainly to the ideas of Liberalism, but later also to those of socialism, of utilitarianism, pragmatism, and empiricism, in a mixture of varying proportions.<sup>10</sup>

With this, people such as Rudolf Goldscheid, Theodor and Heinrich Gomperz, Friedrich Jodl, Wilhelm Jerusalem or Friedrich Adler represented both the ‘opponents of traditional thinking’, but also intellectuals of (mostly anti-Kantian) modern ‘scientism’ in Austria, which sprang from four roots: anti-metaphysics, empiricist views of a general sort, the inclination towards the systematic inclusion of logic, and the mathematization of the sciences. This self-conception is already reflected in the programme of the Vienna Circle (1929):<sup>11</sup>

Thanks to this spirit of enlightenment, Vienna has been leading in a scientifically oriented people’s education (*Volksbildung*). With the collaboration of Victor Adler and Friedrich Jodl, the society for popular education was founded and carried forth; ‘popular university courses’ and the ‘people’s college’ were set up by the well-known historian Ludo Hartmann whose anti-metaphysical attitude and materialist conception of history expressed itself in all his actions. The same spirit also inspired the movement of the ‘Free School’ which was the forerunner of today’s school reform.<sup>11</sup>

This was not just a declaration of intent; we have documentary evidence of the vital participation of Vienna Circle members (especially Hans Hahn, Viktor Kraft, Otto Neurath, Friedrich Waismann, Edgar Zilsel) in adult education and school reform in Vienna (Edgar Zilsel and Karl Popper) from the turn of the twentieth century.<sup>12</sup> The most effective manifestation of this cooperation was unquestionably the work of the ‘Social and Economic Museum in Vienna’ founded by Neurath, which—together with the Ernst Mach Society—both aided the development of a specific picture language, and served as a platform for discussion circles on the periphery of the Vienna Circle. Here, in theory and in practice, social reform and work on education merged to form a creative field of experimentation within modernity that lasted until the wrecking of democracy starting in 1933–34.

One tried and tested thought experiment, using a *counterfactual* method, is to reflect on what could have been expected of Neurath and his colleagues had they lived longer, especially with regards the catastrophic outcome of





Fig. 3  
**Otto Neurath**  
(c. 1938)

Fascism and National Socialism: as left-wing and enlightened intellectuals of Jewish origin, they would have been forced to reorient themselves and take stock of the situation; in the case of Neurath, in exile in Holland and England, this had already led to concrete answers (for example with his planned book on ‘Persecution and Tolerance’). And in the case of all of these leading figures the project of an ‘enlightenment in Viennese modernity’ is a topic of discussion even now in the postmodern present.<sup>13</sup>

### **On Otto Neurath (1882–1945): Between Encyclopædia and Utopia**

The research on one of the most brilliant all-round intellectuals of modern Vienna meanwhile amounts to a substantial sum total, which can hardly be given in a brief account.<sup>14</sup> Neurath’s life and work between ‘encyclopædia and utopia’ points to the continuities and breaks in social development since the turn of the century (during the struggle between revolution and reform) and the project of creating a scientific picture of the world in the spirit of the Enlightenment and in the context of modern *civil society*. In historicising this exemplary life-story of Austrian intellectual emigration,

there emerge relevant and essential elements of his future work in education and understanding of science, which can be outlined only by a few key words: a non-hierarchical picture of science (for instance the allegory of the ship's captain popularised by Quine) together with a relativistic and non-reductionist epistemology, an empiricism (naturalism) that regarded the difference between everyday and scientific knowledge as one of degree, a single overarching perspective on specialisation and popularisation in words and pictures, and, especially, research and education as the subject and object of a cooperative scientific praxis with a constant demand for societal change. Accordingly, this unfulfilled and fragmentary project of modernity is thematised, in all its facets, in the present day: in the philosophy of science and science research, in the ecological perspective in political economy, in architecture and the social housing movement, in modern commercial art and typography, and finally in the present-day construction of museums as social 'museums of the future'.<sup>15</sup>

It is no accident that the most recent literature on Neurath's life's work is international and inter-disciplinary and, similarly, lies at the interstitial points of tension between modern and postmodern diction.<sup>16</sup> These disparate perspectives, which demonstrate the absurdity of the long-prevailing quarrel about positivism, are gradually providing the building blocks for his conception of his own life and research, understood as a dynamic undertaking in his contemporary environment such that the 'producers' of science were themselves made part of the epistemological process (the 'Republic of Letters'), abandoning an absolute meta-perspective. From this vantage point alone it is easy to imagine how this conception would have interfered in past debates on the 'science wars'. In view of the limitations and fragility of our context-dependent knowledge it would not have been an 'Enlightenment dialectic' but rather a critique of it as a partial answer to the experience of totalitarianism and the Shoah.<sup>17</sup> At the same time, this epistemological approach means renouncing every secure *system* of science and knowledge, connected with thinking in alternative *utopias* of science/society, which certainly corresponds with a conception of possibility according to Robert Musil. This is the background to the vociferous *Anti-Spengler's* postulating a *plan* for the establishment of freedom, happiness, and prosperity.<sup>18</sup> Today—after the economic crisis and in an age of globalisation and corporate planning—this is, again, a highly topical demand, appealing both as an alternative to *laissez-faire* capitalism, and to a challenged New Economy.



Fig. 4  
 One of the first  
 advertisements for the  
 Social and Economic  
 Museum of Vienna  
 (1925)

**‘Words divide—pictures unite’:  
 on the ‘Vienna method of pictorial statistics’  
 up to Isotype (Vienna – Holland – England)**

In 1925 on Otto Neurath’s initiative the ‘Social and Economic Museum of Vienna’ (*Gesellschafts- und Wirtschaftsmuseum in Wien*, or GWM) was founded.<sup>19</sup> The members of this association were the Municipality of Vienna, the Free Trade Unions, the Chamber of Workers and Employees, the Cooperative Societies, the social security institutions, and the Workers’ Bank. This new kind of institution, which was to be an ‘educational museum of the present day’ for the knowledge and understanding of socio-economic correlations, ran regular exhibitions in the Festival Hall of the new city hall, as well as in the first and twelfth districts of Vienna. Up to 1933 thirty-six national and international exhibitions were organised there or supplied with material.

The topics presented there convey an impressive picture of systematic encyclopædism, the work towards popular education that had been carried out in the spirit of social reform: health, women and children, social politics, housing and urban planning, peace education, schooling, the workers' movement, art, social security, architecture, etc. Along with this there were independent touring exhibitions at home and abroad, as well as separate publications and articles in various periodicals and books. In 1927 Josef Frank, brother of Philipp Frank, was acquired for the museum as an architect, and a year later Neurath employed the artist and designer Gerd Arntz, who drew the characteristic symbols and systematised the production techniques. The scientific department under Aloys Fischer, the 'Transformation' department under Marie Reidemeister (later Marie Neurath) and the technical collaborators completed the team. For several years the innovative Social and Economic Museum cultivated a working partnership with Otto Glöckel's social-democrat school-reform movement. This enabled the GWM to contribute to the cultural life of Vienna by making an impact on visual education. Additionally, in Holland in 1931 the 'Mundaneum' was founded with the aim of intensifying international collaboration. Branches were set up in Berlin, Amsterdam, Prague, New York, London, and the Soviet Union.<sup>20</sup> Following this phase of productive work at home and abroad came the end of the GWM after the political events of 12th February 1934. Several functionaries were arrested, and valuable fittings were confiscated. The renamed 'Austrian Institute for Pictorial Statistics' remained under the control of the Austro-fascist corporative state, until the National Socialists seized this institution for their own propaganda purposes. Despite these confiscations Neurath was able to transfer a large amount of valuable holdings to Holland and England.

The fundamental objective of the 'Vienna method of pictorial statistics' was to represent socio-economic facts and correlations, particularly with regard to their historical development, in a simple, easily graspable system of symbolic figures.<sup>21</sup> A range of real things and complex facts was to be represented by means of a fixed range of signs and symbols, in which the same sign would always be used for the same object. This method of visualisation therefore arose from the coinciding of content and size as well as from a mapping of sets, such that a larger set of objects was represented by a larger set of signs without perspective. In this way—said Neurath—the facts about society could be reflected quantitatively.<sup>22</sup> The method, developed and improved following his emigration to Holland, was, with the change in

circumstances, renamed the *International System of Typographic Picture Education*, with the acronym *Isotype* (which was also the Greek for ‘always the same sign’).<sup>23</sup>

In a memorandum (1924) Neurath developed his concrete ideas of an ‘educational museum of the present day’, which would facilitate knowledge and understanding of societal correlations. The (epistemological-)theoretical background of pictorial statistics possibly lies in the visualisation of logical empiricism, as the arrangement of images was meant to portray facts about society quantitatively. Likewise deserving a mention as part of the background knowledge are the ‘empirio-criticism’ of Mach and physicalism, since the non-dialectical form of representation—as expression of abstract sociological categories—was to correspond to the unemotional and neutral description of relations demanded by logical empiricism.<sup>24</sup> At the same time, both pictorial statistics and Isotype must be seen as part of a broader nexus within the context of Neurath’s work: his greatest interest was in making a comprehensive contribution to general, international education. Corresponding to this cosmopolitan and egalitarian claim was the idea of an encyclopædia, which following his emigration Neurath attempted to put into practice through the Unity of Science movement. This aim formed no less a part of his emancipatory concept of social enlightenment through visual education, being a necessary premise for the ‘humanisation’ of life.<sup>25</sup> For that reason pictorial statistics was only a part of the wider work in general education, and school and adult education only one of the contexts in which it was applied.

In Holland further well-attended exhibitions were organised, but—because of the impending Second World War—despite significant publications<sup>26</sup> the mass impact that had been hoped for was no longer achievable. The escape of Neurath and Marie Reidemeister to England in 1940 brought an end to activity on the continent, while Gerd Arntz remained in Holland where he continued to work alone after 1945.<sup>27</sup> After the death of her husband, Marie Neurath continued this productive work in Oxford with the newly founded ‘Isotype Institute’ and moved to London in 1948. Despite the unfavourable circumstances this was not entirely in vain, as today teaching and research in the tradition of the Vienna method of pictorial statistics and Isotype continues at the University of Reading in a department dedicated exclusively to modern typography and visual communication.<sup>28</sup>

In 1928 Otto Neurath engaged the German Gerd Arntz as a designer, which signalled the beginning of an innovative collaboration that was to last

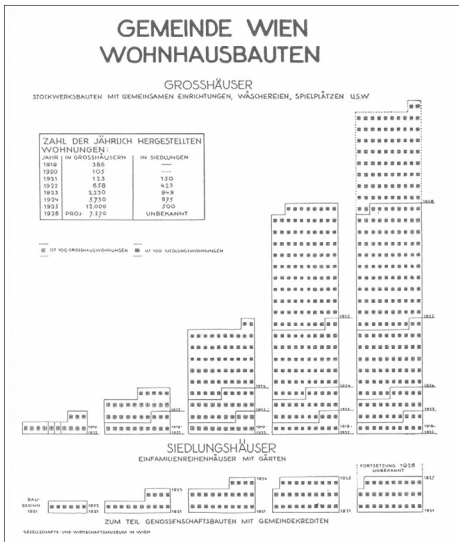


Fig. 5

Diagram designed by Gerd Arntz, originator of a 'figurative-constructivist graphic style'

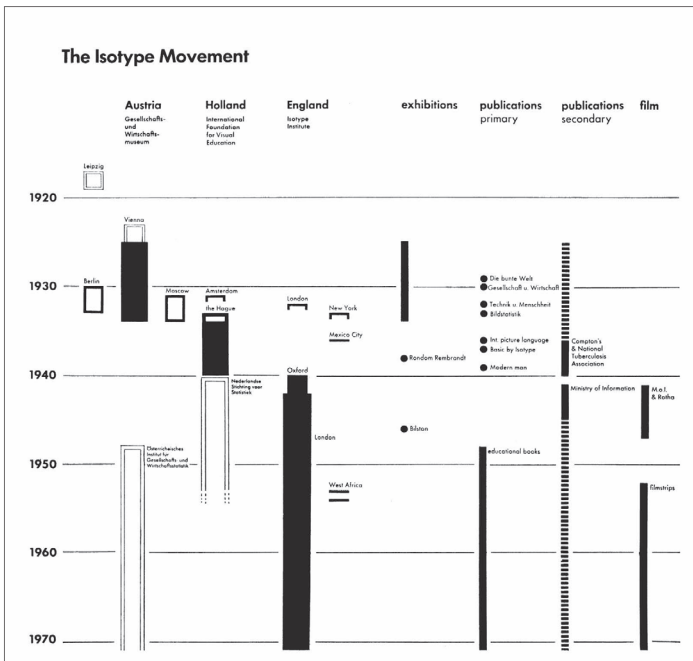
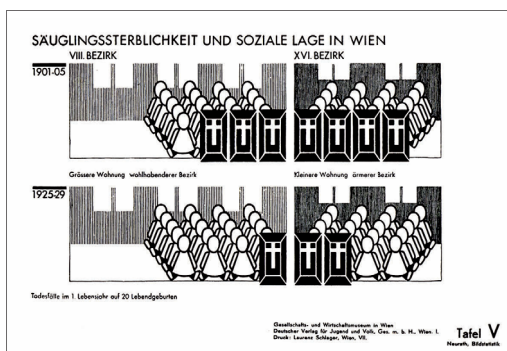
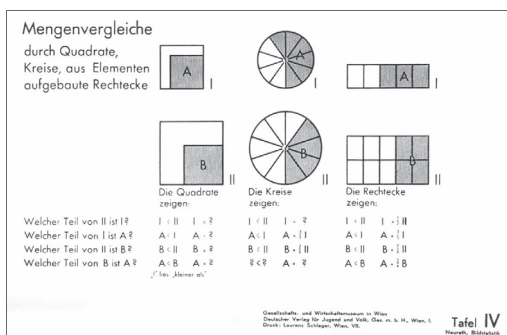


Fig. 6

Survey depicting the international activities of Isotype

many years.<sup>29</sup> Before this period Arntz had already marked himself out in the art world of the Weimar Republic as a member of the ‘Rhine Group of Progressive Artists’ (1918–1933) with an original socio-critical, figurative-constructivist graphic style. After the First World War he benefited from a specialist education amid the post-revolutionary climate of the young republic (especially in Düsseldorf) and came into contact with Cologne’s circles of artists. After that Arntz collaborated again with Peter Alma and August Tschinkel, among others, at the GWM, and from 1919 to 1933 published work in *a-z*, the theoretical mouthpiece of the Constructivists. There followed further international exhibitions and—as a corollary of the GWM’s activities in Moscow at the beginning of the thirties—contacts with the Russian *avant-garde*. Following the events of February 1934, and finding himself in danger, the artist emigrated with Neurath to the Hague and, alongside his demanding work at the Mundaneum Institute there, took part in the anti-fascist opposition movement (as well as in an exhibition in London and the Amsterdam exhibition *De Olympiade Onder Dictatuur* [‘The Olympic Games under the Dictatorship’]). It was in Holland that Arntz, together with Neurath, was able to achieve the apogee of the *Bildstatistik* output with the success of the book *Modern Man in the Making* (1939). During the war Arntz continued to work as lead designer for the ‘Dutch Foundation for Statistics’ (*Nederlandse Stichting voor Statistiek*). Following his conscription by the Germany army he escaped to the Resistance in Paris, and was held as a prisoner of war. After the Second World War Arntz, now in changed circumstances, again resumed his commercial and artistic graphic work. Alongside the usual social commentary of his work there was also pictorial-statistical work for UNESCO, while from the end of the sixties his political graphic work would receive renewed international interest.

If Arntz’s first woodcuts were still located in the expressionist tradition, his work from the twenties was already abstract-constructivist. He integrated elements of the French Cubists (Ferdinand Leger) until he came to achieve a distinctive profile of his own within the ‘Group of Progressives’. The common characteristics of this Cologne group—among them Heinrich Hoerle, Franz W. Seiwert, Hans Schmitz, August Tschinkel, among others—were an aesthetic affinity centred on the use of figurative-constructivist picture-forms, a shared political (liberal-communist) outlook with a programmatic yoking of art and politics, the cultural background of the Rhine region, and finally the members’ conception of themselves as forming a coherent whole.<sup>30</sup>



Figs. 7 &amp; 8

Principles and application of the 'Vienna method of pictorial statistics'

In accordance with the intensive response to the Russian revolution (Lunatscharski, Bogdanov, El Lissitzky, among others) joint exhibitions were organised in the Weimar Republic, which were marked by the post-revolutionary spirit. In their periodical the Constructivists also critiqued the New Objectivity (*Neue Sachlichkeit*), but they cultivated close contacts with Bauhaus artists—as did, incidentally, Neurath, Carnap and other members of the Vienna Circle. Here we must also mention another co-founder of modern typography, Jan Tschichold, whose influence can be detected in the typical figurative-constructivist picture-forms of Gerd Arntz and in the graphic design of the pictorial statistics. The principle held by Arntz, who opposed, for instance, the 'psychologism' of an Otto Dix or George Grosz, went thus: 'make everything impersonal, use templates, be a constructor.' In this we can detect the influence of the Japanese woodcut, the French purists, and the Dutch group 'de Stijl' (Piet Mondrian) between realism and objectivity.



As already mentioned, pictorial statistics were especially suited to pedagogic reform, such that for many years Neurath and his co-workers nurtured a productive collaboration with the Vienna school-reform movement. The school reform from 1918 to 1934, initiated by Otto Glöckel, represented an attempt to reform the traditional school system, with its state and church-dominated drill schools, and to set up secular 'labour schools' elsewhere, in which teaching would be carried out according to egalitarian and socially just methods. Here the educational principles of intellectual autonomy and practical relevance, of clarity and conciseness in education, as well as of an æsthetic education with a scientifically thorough under-pinning played a large role. Pictorial statistics very much complied with these objectives. As early as the 1920s Neurath had stressed grasping the notion of the 'statistical age' as a teaching objective, and, subsequently, in a handful of articles and with systematic treatment in his 1933 book *Bildstatistik nach Wiener Methode in der Schule* (*The Vienna Method of Pictorial Statistics in School*), summarised the methods and principles, as well as the possibilities of applying them in a school setting. Practical cooperation culminated in the decision of the Vienna municipal school council to have pictorial statistics tested in a special experimental school.

This was preceded by the steady work of the GWM:<sup>31</sup> statistics was included as a subject in school syllabuses on a trial basis, and the GWM itself had already made 'intellectual life and schools' a permanent topic area within its 'contexts and culture' department. Various school classes visited this educational museum, and visual-education experiments were carried out as early as the nursery stage. The collaboration also bore fruit in terms of publications, particularly with the periodical *Das Bild im Dienste der Schule*, with a GWM supplement that ran from 1927 to 1930. The use of pictorial statistics was articulated most impressively by the publications *Die bunte Welt* (1929) and *Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk des GWM in Wien* (1930). In the Ernst Mach Society and in various newspaper articles Neurath tried in addition to disseminate these reformist ideas. With the start of the school experiments further activities were set,<sup>32</sup> until February 1934 saw the final failure of the school reform project; the above-mentioned dissolution of the GWM, as it then existed, soon followed.

The contribution of the GWM to didactic methodology and visual education had already been laid out by Neurath in his book *Bildstatistik nach Wiener Methode in der Schule* (1933): social enlightenment through training of

the intellect along with the nurturing of children's drawing and design skills. His pictures of sets were successfully trialled at the Montessori Kindergarten and Montessori school in Vienna. The emphasis on praxis also led to affinity with the Freinet system of pedagogy that was then being developed in France, which put into practice the idea of 'labour schools', particularly by means of their school printing presses. The objective of the didactical experiments begun in the school years 1930/31 and 1931/32 was to optimise 'ways and means' in concrete educational environments across different subjects. They covered four classes of schoolchildren, and the experiences were shared during many conferences, so that numerous parties interested from home and abroad came to visit these classes. The conclusion of this project took the form of an exhibition on the pictures of sets that had been made as well as the teachers' final reports. Here it was established that an introduction and a certain amount of time would be needed. Across all subjects multiple methods were used, from the presentation of prepared pictures of sets to their production by the pupils themselves. The disadvantages reported were, according to subject, the necessity of drastically rounding up the numbers, the amount of work required, as well as its unsuitability for the teaching of German. The advantages mentioned were the scope for working autonomously, the consolidation of the pupils' knowledge of the material at the end of the problem-solving, the connecting of different subjects, the increase in motivation, and, in particular, its usefulness in the subject of history.

The key to the long-overdue reconstruction and updating of both writing and image, in the context of the scientific world-view, is Neurath's publications on visual education.<sup>33</sup> Using them we can systematically pursue both the theoretical development and the development of the picture language of this inter-disciplinary and collaborative educational undertaking, and link current revisiting of this potential to the methods, principles and contents of pictorial statistics. Neurath's writings on visual education similarly represent an excellent field of study for inter-disciplinary and collective work on science and education. In numerous illustrated articles, brochures and books Neurath describes the history of the Social and Economic Museum as an organisation, and also the concomitant story of the internal theoretical and practical development of picture language from pictorial statistics to a visual pedagogy integrating writing and symbols. Here we can see the connections at its origin with the Vienna cultural movement as well as the interlinking of the principles of this popular education project with the logical empiricism of

the Vienna Circle and with the artistic work of the figurative constructivists around Gerd Arntz.

The programmatic titles of Neurath's specific writings alone convey a sense of the intentions and socio-political orientation of this conception, which became an international one from 1930.<sup>34</sup> The pictorial representation of social facts with the help of 'statistical hieroglyphs' would concisely and informatively explain society in all its aspects with a view to improving 'living conditions'. The scope of topics therefore extends from home, the reality of the world of work, housing and urban planning, to economic considerations on social welfare. From a modern-day perspective the monographs *Bildstatistik nach Wiener Methode in der Schule* (1933), *Internationale Bildersprache/International Picture Language* (1936), and finally his most mature work *Modern Man in the Making* (1939)/*Auf dem Weg zum modernen Menschen* (1991) are of special interest. In these numerous pictograms are used to treat the theory and application of picture language along with written language. In addition, with his essay 'Museums of the Future' (1933) Neurath laid out a programme for a modern sociological and economic museum that remains impressive to this day, and which can be interpreted as the antithesis of the postmodern 'hands on' museums, the collections of devotional objects, and the contrived 'total works of art':

From Comenius' *Orbis Pictus* an uninterrupted movement leads to modern visual education. A picture made according to the Vienna method shows at the first glance the most important aspect of the subject; obvious differences must be at once distinguishable. At the second glance, it should be possible to see the more important details; and at the third glance, whatever details there may be. A picture that has still further information to give at the fourth and fifth glance is, from the point of view of the Vienna school, to be rejected as pedagogically unsuitable.

Thus a new clarity and purposefulness is developing in communication that may be regarded as preparation for more incisive social planning. Teachers and other groups of people concerned in social education, directors of museums, and editors of periodicals are confronted with the responsibility of placing their energies at the service of this common international task.<sup>35</sup>

The all too early death of Neurath prevented the completion of his socio-historical monograph on picture language, which was published posthumously



Fig. 9

One of the few articles written by Gerd Arntz explaining the 'Vienna method' (1930)



Fig. 10

Social criticism by means of graphic art: work by Gerd Arntz (1927/28)

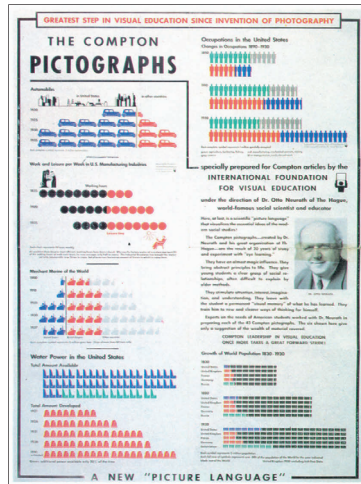


Fig. 11

Advertising leaflet to promote the use of Isotype in the 15-volume *Compton Pictured Encyclopedia*, Chicago 1939 (F. E. Compton & Co.)

OTTO NEURATH	
VISUAL EDUCATION HUMANISATION VERSUS POPULARISATION	
<i>Edited by Juhani Manninen</i>	
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Fig. 12

Contents page of Neurath's unfinished manuscript "Visual Education: Humanisation versus Popularisation" (1946)

only in 2010. With these publications we can reconstruct the aims of this emancipatory visual education and evaluate the road ahead that was implied by 'From hieroglyphics to Isotype'<sup>36</sup> (1946) as well as an unfinished manuscript titled 'Visual Education: Humanisation versus Popularisation'.<sup>37</sup> The latter discusses the possibility of a non-hierarchical international picture language, which through its neutrality imposes tolerance on education and at the same time makes possible a humanisation in opposition to authoritative popularisation:

We must begin our explanations in accordance with the knowledge and vocabulary already familiar to the people. Gradually simple traditional expressions in more complicated combinations and perhaps some more advanced terms may be introduced. But in principle, one should try to build up more comprehensive knowledge by simply looking at the environment, and by using the language of daily life and its derivatives. This procedure from the simplest to the most complicated, I shall call humanisation.

Generally speaking, the average books destined for children and the man in the street start in a different way. They try to simplify the highest level of scientific formulation, presented in scientific books. Sometimes writers think



Fig. 9

Cover of *Society and Economy*, a publication containing 100 coloured plates of pictorial statistics developed for the GWM (1930)

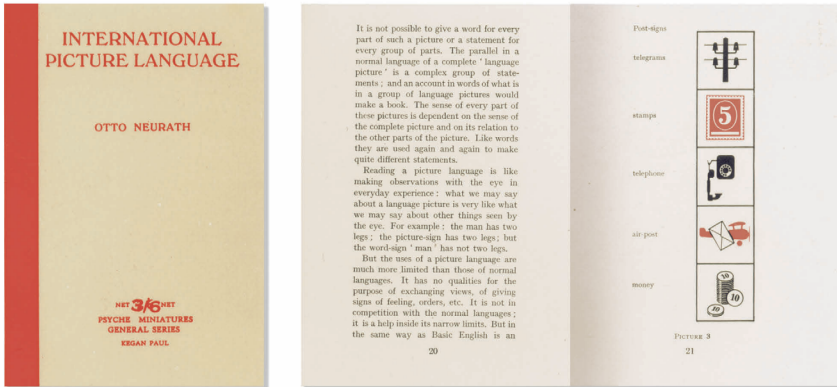


Fig. 10

Cover and double spread (pages 20 to 21) of *International Picture Language* (1936)

that a translation of well selected terms into popular terms is sufficient, whereas it is common knowledge that the insufficiency of these terms was the main reason for the introduction of scientific terms. This kind of translation from the complicated to the simple, from top to bottom, as it were, I shall call popularisation of knowledge.

In the humanisation of knowledge one tries to avoid what may be called an inferiority complex as well as all kinds of frustration which so often appear when people try to grasp a piece of knowledge in vain. Looking at a book often creates a kind of fear. There are not a few people who become uneasy when confronted with a general term like ‘magnetism’ but who would not be irritated by hearing about magnets and iron. Humanisation implies avoiding technical terms before they are really needed. The question is how far we can go without using more complicated expressions. [...]

All statements which speak of seeing, hearing, touching, tasting, etc., appeal to the average man, because every sensual statement is possible in the common neutral and democratic language.<sup>38</sup>

Here, visualisation is presented as an essential means of aiding cross-cultural communication, which takes as its starting point people’s everyday concrete world and, acting as a building block, enables the construction of a social museum of the present that is, as it were, cosmopolitan in character (‘Mundaneum’). Equally apparent was the cooperative and international element of such an educational project, and this—against the spirit of the times—expressed the democratic idea of a ‘plan for freedom’:

Visual education leads to internationalisation much more than word education does. One can use the same visual arguments, connected with different words for explanation in various languages; one can even vary the remarks on the same visual material. Visual education is related to the extension of intellectual democracy within single communities and within mankind, it is an element of international social planning and engineering.

This is a period of planning, planning for getting something done, where without planning defects are manifest, such as destruction of coffee, unemployment, etc. But we can remove all this without regional planning, without city planning; we can imagine a nation with planned production as far as raw materials are concerned, but also building up ‘planning for freedom’, which signifies intentionally not interfering. Much city planning is full of pomposity,



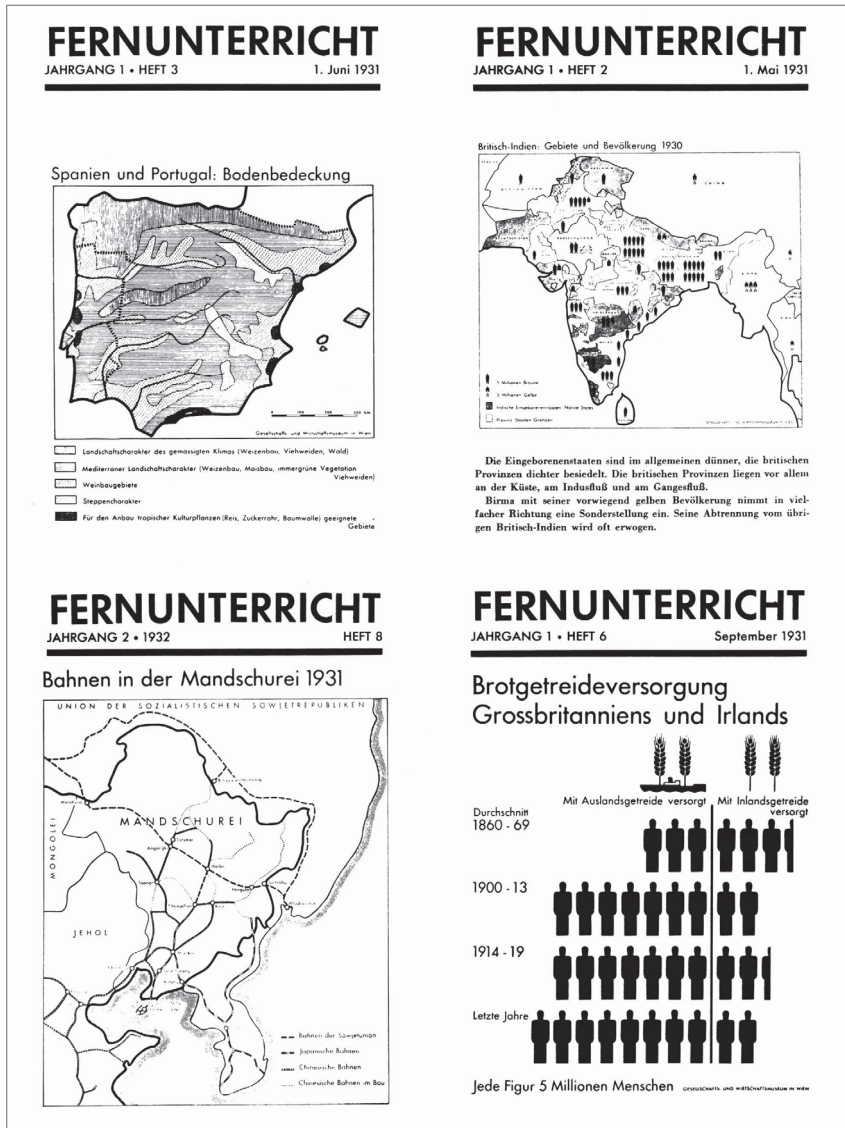


Fig. 11

Covers of *Fernunterricht*, a subscription magazine for distance learning, each dedicated to an individual topic. (1931/32)



with a totalitarian undercurrent, pressing forward some way of life. Perhaps people want to do so; but the dictatorship of planning is a danger in itself and is not connected with planning against want. You may be in security, but free to choose your kind of life within this security. The either-or is important. We may create certain conventions in language without unifying the laws; a world language does not imply a world dictatorship but may help world understanding. For a democratic society it is important to have a common language.<sup>39</sup>

While the Vienna Method of Pictorial Statistics was relatively well known in its theoretical and practical application in school contexts, a parallel initiative in adult education received little attention: from 1931 to 1933 the GWM in Vienna regularly published the *Fernunterricht* (retitled *Bildstatistik* from 1932), a series of distance education booklets issued as subscriptions, with each dedicated to an individual topic.<sup>40</sup> As this series of publications for popular education was not reprinted in the *Gesammelte bildpädagogische Schriften*, due to its purely non-theoretical, applied approach, a brief characterisation is presented below. From today's perspective one can treat these brochures with their changing topics as foundation stones, or defining landmarks, in the field of social history. As it emerges from the preface, there was particular emphasis on user-friendly orientation and the invitation to provide feedback, which helps in creating an interest-oriented mode of communication that puts the participants on an equal footing:

*Der Fernunterricht* is dedicated to anyone endeavouring to acquire new knowledge, and especially to adult educationalists and teachers who impart their knowledge to a narrower circle. Newspapers and periodicals are not able to devote their attention to the systematic training of the readers; the former give us ephemeral information on the day's events, the latter thorough discussion concerning specific questions. Not everyone has the time and energy to form this into a well-ordered overview and to acquire the necessary information to complement his/her knowledge. This is what *der Fernunterricht* intends to do. Lack of time compels learners and teachers to look for concise summaries. For this pictures are a great advantage. They demonstrate, clearly and quickly, even to those with the little preliminary knowledge, what is essential. The 'Vienna Method of Pictorial Statistics', which has already proved its worth internationally, combines objectivity and easy memorability. In view of all this, *der Fernunterricht* offers not prettily written articles, detailed discussions, but very

concise substantial material and images, which will not be easily forgotten. The reader can gradually construct his own compilations of individual issues of *der Fernunterricht* to suit his own particular purposes. *Der Fernunterricht* can be easily cut up, as every section ends with a full page. Society, life, engineering and science are covered, and the reader can find out which path he should take to obtain specific information, and what shortcuts are possible. Students of the *Arbeiterhochschule* (Vienna College for Workers), whose colleagues far from Vienna suffer from a lack of educational resources, turned to the ‘Social and Economic Museum of Vienna’, which has a scientific department, and suggested the creation of a distance learning course which is hereby published, in expanded form, for a wider circle.<sup>41</sup>

Neurath then goes on to give an account of the connectedness between science and popular education, which, according to his thinking, could be brought about through the empirical view of science.<sup>42</sup>

The *Fernunterricht* magazine was especially important in publishing the GWM’s pictures of sets, such as those, for instance, from the elementary work in pictorial statistics *Gesellschaft und Wirtschaft* (*Society and Economy*, 1930); they were accompanied by introductions and explanations, which could be obtained by post as transparencies and off-prints. An inserted page for questions and suggestions from readers facilitated free correspondence concerning particular issues of the magazine, and hence regular feedback from subscribers. Selected questions were answered in writing in the following issues. Going by reactions to it, the undertaking was a success, which was also noted abroad. The political turning points of 1934 and 1938 finally brought about the disappearance of this enlightenment tradition in Austria, and after 1945 it fell into oblivion. It is no coincidence that it was in England, where the bourgeois enlightenment brought about egalitarian concepts of education, that Neurath’s ambitions struck fertile soil. Thus Neurath was able to present the importance of visual education *vis-à-vis* popular education in several articles in the periodicals of adult education organisations.<sup>43</sup> Above all the article ‘Visual aids in adult education’ (1944) ran the gamut from Comenius to modern picture language and its role in the struggle against superficial knowledge, illiteracy and the confinement to simplistic reading material; his argument was supported by a web of various ‘visual arguments’, and ended with a perfectly realistic, but still unrealised vision:

It seems to be within the reach of our generation to support a future commonwealth in a practical manner. Of course the network of arguments conveyed by means of Isotype is much smaller than that conveyed by literature, but it may be of a similar kind. Should all these international day-dreams of an intellectual world of the common man not be realized, the introduction of visual education in schools and adult education classes seems nevertheless to promote an atmosphere of argumentative meditation and of some peacefulness.<sup>44</sup>

Current international research into the field of visual communication and general semiotics confirms to an impressive degree the viability of developing Neurath's approach further.<sup>45</sup> Following the further development made in the Anglo-American world, slowly but surely in German-speaking areas, too, attention is turning to this innovative tradition of the 'Vienna Method', as demonstrated by the new discoveries, and the rediscovery, of Neurath's life and work.<sup>46</sup>

## Outlook

The contemporary relevance of picture language after Otto Neurath in the context of science, politics and the public can only be outlined here. His model of a combined visualisation and museology, against a linear and hierarchical popularisation of knowledge and science, is manifest in at least four overlapping research areas:

1. In perception research, starting from the static diagram (as a 'visual argument') all the way to the TV screen and film application.<sup>47</sup>
2. In reconstruction within a general inter-disciplinary semiotics which had begun to show itself at the time in the cooperation with the Dutch signifiers around Gerrit Mannoury for the journal *Synthese*.<sup>48</sup>
3. In the critical assessment of the correlative relationship between society and science which is apparent, for instance, in the new works on the potential of the encyclopædist project.<sup>49</sup>
4. In its applicability in the area of the social sciences and the alternative political economy, which does not restrict the criteria for progress and wealth to money alone.<sup>50</sup>

Concerted work on this loose programme *after* Neurath would once more show the limits and possibilities of building and rebuilding a ship, a task which would only be possible through cooperation and a continuous division of labour in a joint and endless project. But that, of course, is the fate of every conception of science, which is in principle sceptical vis-à-vis the demands for a single method and a single rationality. The late W. V. O. Quine recognised this fact as far as philosophy is concerned, when he used Neurath's sailor simile—outside its historical and thematic context—as a motto for his book:

*Wie Schiffer sind wir, die ihr Schiff auf offener See umbauen müssen, ohne es jemals in einem Dock zerlegen und aus besten Bestandteilen neu errichten zu können.*

We are like sailors who must rebuild the ship on the open sea, never able to dismantle it in dry-dock and to reconstruct it there out of the best materials.<sup>51</sup>

## Notes

This article is a translated and revised version of my ‘Schriftsprache und Bildsprache nach Otto Neurath—Popularisierung oder Humanisierung des Wissens?’, in: *Wissenschaft, Politik und Öffentlichkeit. Von der Wiener Moderne bis zur Gegenwart*. Edited by Mitchell G. Ash and Christian H. Stifter (Wien: Facultas, 2002), 267–303. I am grateful to Naomi Osorio-Kupferblum (Vienna) and Bryn Harris (Oxford) for their valuable translation work.

- 1 Otto Neurath, *From Hieroglyphics to Isotype. A Visual Autobiography*, edited by Christopher Burke and Matthew Eve (London: Hyphen Press, 2010). Also: Hadwig Kraeutler, *Otto Neurath and Exhibition Work. Spaces (Designed) for Communication*. (Frankfurt/M.-Berlin-Bern-Bruxelles-New York-Oxford: Peter Lang, 2008). The most systematic documentation and research is done at the University of Reading, Department of Typography and Graphic Communication, especially the ‘Isotype revisited’ project: [www.isotyperevisited.org](http://www.isotyperevisited.org)
- 2 As an example of the growing interest in visualisation see the series *Philosophie & Repräsentation/Philosophy & Representation*, edited by Petra Gehring/Jörg Maas (Amsterdam-Atlanta, GA: Rodopi, 1992 ff.). Also: Johanna Hofbauer, Gerald Prabitz, Josef Wallmansberger (eds.), *Bilder–Symbole–Metaphern. Visualisierung und Informierung in der Moderne* (Vienna: Passagen, 1995).
- 3 Symptomatic for a rather naïve euphoria, the description: ‘Die Wissenschaft von der visuellen Wende’ (‘The study of the visual turn’), in: *Die Zeit*, 6 December 1996, 35. A more recent, trans-disciplinary discussion in the context of Science Studies: Caroline A. Jones, Peter Galison (eds.), *Picturing Science—Producing Art* (New York-London: Routledge, 1998).
- 4 As a general discussion of the cultural position of visualisation see: Johannes Domsich, *Visualisierung. Ein kulturelles Defizit? Der Konflikt von Sprache, Schrift und Bild*. Vienna-Cologne-Weimar: Böhlau 1991.
- 5 Still a fruitful gloss: Karl H. Müller, *Symbole, Statistik, Computer, Design. Otto Neuraths Bildpädagogik im Computerzeitalter* (Vienna: Hölder-Pichler-Tempsky, 1991).
- 6 Neurath himself referred to this connection time and again in his writings. For a systematic comparison of the relationship between pictorial statistics and Neurath’s modern encyclopædia, see Karl H. Müller, *Symbole*, 10, and Dahms ‘“International Encyclopedia of Unified Science” als Torso’ in Elisabeth Nemeth/Richard Heinrich (eds.), *Otto Neurath: Rationalität, Planung, Vielfalt* (Berlin: Oldenburg und Akademie Verlag, 1999), 184–227. For a research-oriented history of his life and

- work, see Kurt Blaukopf, 'Kunstforschung als exakte Wissenschaft. Von Diderot zur Enzyklopädie des Wiener Kreises', in: Friedrich Stadler (ed.), *Elemente moderner Wissenschaftstheorie. Zur Interaktion von Philosophie, Geschichte und Theorie der Wissenschaften* (Vienna-New York: Springer, 2000), 177–211.
- 7 For the few biographical details we have cf. the entry on him in *Philosophen-Lexikon. Handwörterbuch der Philosophie nach Personen*, edited by W. Ziegenfuss (Berlin: de Gruyter, 1949), 395: 'Goldscheid, Rudolf, born 12th August in Vienna, died 6th October 1931 in Vienna. Sympathised with Monism. In 1909 he founded the German Sociological Association.'—With regard to the current research on Goldscheid, who was also a founder member of the Vienna Sociological Association in 1907, on social reform and social sciences see: Christian Fleck, *'Rund um Marienthal' Von den Anfängen der Soziologie in Österreich bis zu ihrer Vertreibung* (Vienna: Verlag für Gesellschaftskritik, 1990). And on fiscal sociology see especially: Rudolf Goldscheid and Josef Schumpeter, *Die Finanzkrise des Steuerstaates. Beiträge zur politischen Ökonomie*, edited by Rudolf Hickel (Frankfurt/M.: Suhrkamp, 1976). Ingrid Belke, *Die sozialreformerischen Ideen von Josef Popper-Lynkeus (1838–1921) im Zusammenhang mit allgemeinen Reformbestrebungen des Wiener Bürgertums um die Jahrhundertwende* (Tübingen: Mohr Siebeck, 1978).
  - 8 Triggered by his article 'Die Pflanzstätten der Wissenschaft als Brutstätten der Reaktion', first published in: *Monistische Monatshefte* (Hamburg 1923), later in: *Arbeit und Wirtschaft* (Vienna 1926, vol. 4, issue 4). Also on this cf. *Wiener Internationale Hochschulkurse 1922–1971* (University of Vienna, undated).
  - 9 Friedrich Stadler, 'Spätaufklärung und Sozialdemokratie in Wien 1918–1938' in: *Aufbruch und Untergang. Österreichische Kultur zwischen 1918 und 1938* (Vienna-Munich-Zürich: Europa Verlag, 1981). For a portrait of Goldscheid as part of the Vienna social and culture movement see the still valid Michael Hubenstorf, 'Sozialmedizin, Menschenökonomie, Volksgesundheit' in: *Aufbruch und Untergang*, 247–266.
  - 10 Otto Neurath, 'Die Entwicklung des Wiener Kreises und die Zukunft des Logischen Empirismus', in: Neurath, *Gesammelte philosophische und methodologische Schriften*, vol. 2, edited by Rudolf Haller and Heiner Rutte (Vienna: Verlag Holder-Pichler-Tempsky, 1981), 691 f.
  - 11 'The Scientific Conception of the World: The Vienna Circle', in Otto Neurath, *Empiricism and Sociology* edited by Marie Neurath & Cohen Robert (Dordrecht-Holland: Reidel, 1973), Chapter 9.
  - 12 Friedrich Stadler, *Studien zum Wiener Kreis. Ursprung, Entwicklung und Wirkung des Logischen Empirismus im Kontext* (Frankfurt/M.: Suhrkamp, 1997), (English edition:

- Vienna-New York: Springer 2001). Especially ch. 12 and the list of the Vienna Circle members who participated in the adult education in Vienna. On the early Vienna Circle before the First World War regarding popular education and social reform cf. particularly: Thomas Uebel, *Vernunftkritik und Wissenschaft: Otto Neurath und der erste Wiener Kreis* (Vienna-New York: Springer, 2000).
- 13 For a full account of the research on this see: *Wissenschaft, Politik und Öffentlichkeit im Kontext der „Wiener Moderne“, 1890–1930. Literatur und Forschungsbibliographie*, edited by Österreichisches Volkshochschularchiv (Vienna, 2000). On this see also the periodical of the ÖVA: *Spurensuche. Zeitschrift für Erwachsenenbildung und Wissenschaftspopularisierung*, Vienna. See also: *Heureka! Das Wissenschaftsmagazin im Falter*. Vienna: Falter Verlag, and the series of publications (Vienna: Passagen Verlag) and the Newsletter *Moderne. Zeitschrift des Spezialforschungsbereichs Moderne—Wien und Zentraleuropa um 1900*. University of Graz. Especially: Günther Sandner, *Engagierte Wissenschaft. Austromarxistische Kulturstudien und die Anfänge der britischen Cultural Studies* (Wien-Berlin: Lit Verlag, 2006).
- 14 On his life and work see: *Arbeiterbildung in der Zwischenkriegszeit. Otto Neurath – Gerd Arntz*, edited by Friedrich Stadler (Vienna-Munich: Löcker, 1982). Otto Neurath, *Empiricism and Sociology*, edited by Marie Neurath and Robert S. Cohen (Dordrecht-Boston: Reidel 1973); Paul Neurath/Elisabeth Nemeth (eds.), *Otto Neurath oder Die Einheit von Wissenschaft und Gesellschaft* (Vienna-Cologne-Weimar: Böhlau 1994); Elisabeth Nemeth and Friedrich Stadler (eds.), *Encyclopedia and Utopia. The Life and Work of Otto Neurath (1882–1945)* (Dordrecht-Boston-London: Kluwer 1996); Nancy Cartwright, Jordi Cat, Lola Fleck and Thomas E. Uebel, *Otto Neurath: Philosophy between Science and Politics* (Cambridge University Press 1996); Elisabeth Nemeth and Richard Heinrich (eds.), *Otto Neurath: Rationalität, Planung, Vielfalt* (Berlin-Vienna: Oldenbourg und Akademie Verlag 1999); Elisabeth Nemeth, Stefan W. Schmitz and Thomas Uebel (eds.), *Otto Neurath's Economics in Context* (Dordrecht: Springer 2007). Most recently on Isotype: Otto Neurath, *From Hieroglyphics to Isotype. A Visual Autobiography* edited by Christopher Burke and Matthew Eve (London: Hyphen Press 2010).
- 15 Cf. Otto Neurath, 'Museums of the Future', in: *Survey Graphic*, 22/9 (1933). Published in Rudolf Haller/Robin Kinross (eds.), *Gesammelte bildpädagogische Schriften* (henceforth: *GbS*) (Vienna: Hölder-Pichler-Tempsky, 1991), 244–257.
- 16 On current research see: Thomas Uebel, *Vernunftkritik und Wissenschaft: Otto Neurath und der erste Wiener Kreis* (Vienna-New York: Springer, 2000).
- 17 Cf. Friedrich Stadler, 'Elemente einer zukünftigen Wissenschaftstheorie: Zur Interaktion von Philosophie, Geschichte und Theorie der Wissenschaften', in: Stadler,

*Elemente moderner Wissenschaftstheorie*, vii–xxvi.

- 18 ‘Otto Neurath, Empiricism and Sociology’, Chapter 11, as well as the corresponding work on the theory of science from the perspective of the ‘scientific world-view’ up until the Encyclopædia in: Otto Neurath, *Gesammelte philosophische und methodologische Schriften*, (henceforth: *GpmS*) 2 vols. edited by Rudolf Haller and Heiner Rutte (Vienna: Hölder-Pichler-Tempsky, 1981); Otto Neurath, *Philosophical Papers 1913–1946*, edited by Robert S. Cohen and Marie Neurath (Dordrecht-Boston-Lancaster: Reidel, 1983).
- 19 This section essentially restates my *Studien zum Wiener Kreis*, ch. 12.3. On the growth and influence of pictorial statistics see: Gerd Arntz, *Kritische Grafik und Bildstatistik* (The Hague: 1976); Gerd Arntz, Monographie-Reihe Remscheider Künstler 2 (Remscheid, 1982); Robin Kinross, *Otto Neurath’s Contribution to Visual Communication 1925–45* (Mphil. Thesis. Reading, 1979); Stadler (ed.), *Arbeiterbildung in der Zwischenkriegszeit*, 1982. For Otto Neurath’s primary literature see: M. Neurath/R. S. Cohen (eds.), *Empiricism and Sociology*; Rudolf Haller/Robin Kinross (eds.), *Gesammelte bildpädagogische Schriften (GbS)* (Vienna: Hölder-Pichler-Tempsky, 1991). For an overview on this see: *Otto Neurath. Wissenschaftliche Weltauffassung, Sozialismus und Logischer Empirismus* edited with an introduction by Rainer Hegselmann (Frankfurt/M.: Suhrkamp, 1979).
- 20 Otto Neurath, *International Picture Language/ Internationale Bildsprache*. Facsimile reprint of the English edition of 1936 (Department of Typography & Graphic Communication: University of Reading, 1980). *Graphic Communication through ISOTYPE*. (Department of Typography & Graphic Communication: University of Reading, 1975).
- 21 On the biography specifically, and particularly on the ‘Vienna Method’, cf.: Paul Neurath, ‘Otto Neurath (1882–1945). Leben und Werk’, in: Neurath/E. Nemeth (eds.), *Otto Neurath oder die Einheit*, 13–96.
- 22 Otto Neurath, *Bildstatistik nach Wiener Methode in der Schule* (Vienna-Leipzig: Deutscher Verlag für Jugend und Volk, 1933). Published in *GbS*, 265–336.
- 23 Otto Neurath, *International Picture Language*; Neurath, ‘Visual Education’ (1937). Both in *GbS*.
- 24 Cf. E. Gillen’s article in: *Politische Konstruktivisten. Die „Gruppe Progressiver Künstler“*. (Cologne-Berlin: Neue Gesellschaft für bildende Kunst, 1975).
- 25 O. Neurath, *Empiricism and Sociology*, 227–248.
- 26 Particularly Neurath, *Modern Man in the Making*.
- 27 Gerd Arntz, *Zeit unterm Messer. Holz- und Linolschnitte* (Cologne: Leske Verlag, 1988).



- 28 Michael Twyman, 'Isotype und die Universität Reading', in: *Arbeiterbildung in der Zwischenkriegszeit*, 185–189.
- 29 Gerd Arntz, *Kritische Grafik und Bildstatistik* (The Hague-Cologne, 1976).
- 30 *Politische Konstruktivisten*, H. U. Bohnen, *Das Gesetz der Welt ist die Änderung der Welt. Die rheinische Gruppe progressiver Künstler (1918–1933)* (Berlin: Karin Kramer Verlag, 1976).
- 31 Arntz, *Kritische Grafik*, 47.
- 32 Especially with the periodical *Fernunterricht* and with articles in: *Die Volksschule* and *Die Quelle*.
- 33 Neurath, *GbS* 1991 (all subsequent references are taken from this).
- 34 Neurath, *GbS* (particularly the relevant publications of 1925–1946).
- 35 Neurath, 'Museums of the Future' (1933), in: Neurath, *Empiricism and Sociology* edited by Marie Neurath and Robert S. Cohen (Dordrecht: D. Reidel, 1973), 218 ff.
- 36 Neurath, 'From Hieroglyphs to Isotypes' (1946), in: Neurath, *Empiricism and Sociology* edited by Marie Neurath and Robert S. Cohen (Dordrecht: D. Reidel, 1973), 4–6. Now published as separate publication as Neurath (2010), see note 14.
- 37 Otto Neurath, 'Visual Education. Humanisation versus Popularisation', edited by Juha Manninen, in: Nemeth/Stadler, *Encyclopedia and Utopia*, 245–336. Following on from this is an overview by Reinhard Fabian on Otto Neurath's *Nachlass* in Haarlem (NL), 337–355.
- 38 Quoted from Neurath, *Empiricism and Sociology* edited by Marie Neurath and Robert S. Cohen (Dordrecht: D. Reidel, 1973), 231 f.
- 39 *Empiricism and Sociology*, 231 f.
- 40 Gesellschafts- und Wirtschaftsmuseum in Wien (Leipzig-Vienna): *Fernunterricht* (1931/32), continued under the name *Bildstatistik* (1932/33).
- 41 *Fernunterricht*, 1 February 1931.
- 42 *Ibid.*, 11.
- 43 For instance in: *Bulletin of the World Association for Adult Education* (London, 1942). *Highway* (London, 1944): *The New Era* (London, 1944). *Health Education Journal* (London, 1944). *The Lancet* (London, 1945).
- 44 Otto Neurath, 'Visual Aids and Arguing' *The New Era in Home and School*, April 1944, vol. 25, no. 3, 51–61.
- 45 Cf. the corresponding articles in Section III. 'Pictorial Statistics – Isotype – Museology' in: Nemeth/Stadler, *Encyclopedia and Utopia*.
- 46 David Skopec, 'The Changing Media of Visual Statistics', and Angela Jansen, 'Isotype and Infographics', in: *ibid.*, 143–166; Nader Vossoughian, *Otto Neurath. The Language of the Global Polis* (Rotterdam: NAI Publishers, 2008).

- 47 Along with his Isotype Institute in England Neurath had already produced Isotype filmstrips and films and Isotype animations in collaboration with Common Ground and Paul Rotha Productions. For current media research cf.: Kurt Blaukopf, 'The Shortcomings of the TV-Screen in Cultural Communication', in: Daniel Greenberger/Wolfgang Reiter/Anton Zeilinger (eds.), *Epistemological and Experimental Perspectives on Quantum Physics* (Dordrecht-Boston-London: Kluwer, 1999), 317–336.
- 48 Jeff Bernard/Gloria Withalm (eds.), *Neurath. Zeichen* (Vienna: ÖGS/ISSS, 1996). Jeff Bernard/Gloria Withalm/Karl H. Müller (eds.), *Bildsprache – Visualisierung – Diagrammatik* (Vienna: ÖGS, 1995 = *Semiotische Berichte* vol. 19, 1–4/1995). Jeff Bernard/Friedrich Stadler (eds.), *Neurath: Semiotische Projekte und Diskurse* (Wien: ÖGS, 1997 = *Semiotische Berichte*, vol. 21, 1/1997).
- 49 Cf. particularly the publications already mentioned above in note 13.
- 50 Robert Leonard, "'Seeing Is Believing": Otto Neurath, Graphic Art, and the Social Order', in: *Economic Engagements with Art*, edited by Neil De Marchi and Craufurd D.W. Goodwin (Durham and London: Duke University Press, 1999), 452–478. The 7th European Conference on the History of Economics 2001 in Montréal was likewise dedicated to the topic 'Economic Science and Visual Representation'. John O'Neill, *The Market. Ethics, Knowledge and Politics* (London-New York: Routledge, 1998). In May 2000 at the Vienna University of Economics and Business, during a symposium on 'European Society of Ecological Economics' there was a separate session on 'Concepts of Knowledge and Economic Thought by Otto Neurath and Josef Popper-Lynkeus'.
- 51 Motto to his book dedicated to 'Rudolf Carnap, teacher and friend': Willard Van Orman Quine, *Word and Object* (Cambridge, Mass.: MIT Press, 1960).