Marie Neurath and Isotype Picturebooks

Marie Neurath and Isotype Picturebooks

Transforming Knowledge for Children

Edited by
Susanne Blumesberger, Bettina Kümmerling-Meibauer
and Jörg Meibauer

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It is our hope that this book will call attention to the Isotype picturebooks by Marie Neurath and help stimulate further research on this outstanding picturebook corpus.

Susanne Blumesberger, Bettina Kümmerling-Meibauer, and Jörg Meibauer
Vienna, Tübingen, Mainz, May 2025

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Bettina Kümmerling-Meibauer & Jörg Meibauer

Introduction: Transmitting Knowledge by Isotype Picturebooks. The Legacy of Marie Neurath

1 Introduction

Marie Neurath (1898–1986), née Reidemeister, was an illustrator and graphic designer who created innovative nonfiction picturebooks for children from the mid-1940s until the end of the 1960s.[1] Together with her husband, the politician and philosopher Otto Neurath (1882–1945), and the artist and designer Gerd Arntz (1900–1988), she developed a method of visual representation that became known as Isotype, an abbreviation for **I**nternational **S**ystem **o**f **Ty**pographic **P**icture **E**ducation (Jansen 2009). Influenced by the progressive ideas of the Vienna Circle, Isotype was intended to contribute to the democratization of knowledge, that is, to its dissemination even to those parts of society which have limited access to knowledge (Stadler 2001). To this end, the Neuraths and their team created a special form of pictorial statistics that was intended to make complex scientific relationships understandable to the layperson (Burke 2010; Groß 2015; Hartmann and Bauer 2006; Körber 2016, 2019, 2023). While Otto Neurath was responsible for obtaining the scientific information and Gerd Arntz developed the corresponding pictograms, Marie Neurath took on the role of "transformer", that is, she transformed the information and data into a simple and comprehensible form (Neurath and Kinross 2009). She used various didactic pictorial strategies, such as enlargement, cross-section, and sequencing, which she referred to as "visual education" (Reidemeister 1932). She thus acted as an intermediary between experts on the one hand and graphic designers on the other. Initially, the project focused on social and economic development, but Otto and Marie Neurath soon turned their attention to other areas, such as history, modern technology, and the natural sciences in order to cover a broader spectrum of domains.

The Isotype Institute was located in the Gesellschafts- und Wirtschaftsmuseum (Social and Economic Museum) in Vienna, co-founded by the Neuraths, and

1 In contrast to corresponding studies on Otto Neurath (cf. Nemeth and Stadler 1996), no biography of Marie Neurath has been written yet. Information on her life can be found in Blumesberger (2014), Burke and Sandner (2022), Kinross (2002) and Lyon (2021), as well as in the contribution by Blumesberger in this volume. Breuer and Meer (2012) and McQuiston (1988) deal with Marie Neurath's contribution to modern graphic design in the postwar period.

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it had, due to its commitment to the democratization of knowledge, close contacts with left-wing circles that were engaged in workers' education (Sandner 2019). There were also numerous connections to avant-garde movements of the 1920s and 1930s that sought to develop a new typography and visual language, such as the Bauhaus in Weimar and Dessau or the concept of elementary typography advocated by Jan Tschichold (Lupton 1989). Moreover, Isotype infographics left their mark on documentary animated film, contemporary nonfiction, logo design, cartography, and numerous exhibitions in Vienna and later in other cities in Europe and America (Kräutler 2008; Pedersen 2023). Isotype thus provided a powerful basis for the abstract or non-figurative representation of facts that is so common in modern visual communication.

The Isotype Institute was closed in 1934 at the instigation of the Dollfuss government. Marie and Otto Neurath emigrated first to the Netherlands and then to England in 1940. They founded the Isotype Institute in Oxford in 1942.[2] During this time, they began to work on a new concept for nonfiction books for children based on the Isotype method (M. Neurath 1971). A key goal consisted in transforming knowledge about science, technology, and history in such a way that it was easily accessible and understandable for children (M. Neurath 1972a, 1972b). After Otto Neurath's death in 1945, Marie Neurath continued this project on her own (Eve 2009). Together with a team of authors and illustrators, she created more than seventy nonfiction picturebooks and designed corresponding book series.[3] These books cover a wide range of topics: modern technology, natural phenomena, space travel, ancient cultures, the history of mankind, animal life in different regions of the world, scalar relationships, and much more. Instead of proceeding in an encyclopedic manner, the novel approach consisted in directing the child's

2 The Isotype Institute was dissolved in 1971. Marie Neurath was unable to find a suitable successor. In her memoirs she mentioned that she hoped for a while that a son of her brother Lolo, who was very interested in graphic design, would follow in her footsteps ("An was ich mich erinnere", p. 95). The search for a suitable institution that would take over and preserve the existing materials and books also turned out to be difficult. Neither the Institute of Education, London University, nor the Royal College of Arts, London, seemed appropriate for Marie Neurath ("An was ich mich erinnere", p. 100). It was only by chance that the estate finally found a new home at the Department of Typography, University of Reading, whose director Michael Twyman was deeply interested in the connection between design and education.

3 The most extensive list of Isotype picturebooks can be found in Seeber (1998, 148–149). Here, 72 books are enumerated, but this list does not seem to be complete, as for instance, the book *Man-Made Moons* (1960) is missing. A search in the catalog of the British Library reveals that 66 Isotype books are archived, while the Library of Congress (Washington) hosts 57 Isotype picturebooks.

attention towards the comprehension of selected phenomena and processes, thereby encouraging independent and exploratory thinking.

The Isotype picturebooks were extremely successful in the postwar years and after. They achieved high print runs and were marketed internationally, with translations into several languages, including Dutch, French, German, Italian, Japanese, and Swedish. Today, the surviving Isotype picturebooks are difficult to access as they are archived in libraries and museums or belong to private collections. Although the graphic design and visual language of the Isotype picturebooks can be regarded as exemplary for many developments in the field of modern nonfiction books for children, these achievements have been forgotten over time. There is therefore an urgent need for research on this subject.

While there have been numerous academic studies on Otto Neurath and his work, there are virtually no current academic studies on Marie Neurath and the Isotype picturebooks she developed. In particular, her outstanding role in the creation of modern nonfiction books for children has been overlooked by international children's literature scholars. Exceptions to this rule are the studies by Sue Walker, who has conducted scholarly examinations of the estate of Otto and Marie Neurath held at the University of Reading since 1971 (Burke, Kindel, and Walker 2013; Walker 2012, 2014, 2017, 2022, 2024).[4] The AHRC project "Picturing Science", which she oversees, serves to make the estate accessible as well as to provide illustrative material for designers and for school lessons. The focus in this project is therefore on teacher training and practical teaching, while cultural-historical studies or individual analyses of Isotype picturebooks are still lacking. In the following sections, we address some research questions that arise from the perspective of children's literature research.

2 Lines of tradition and context of use

Even though there is a consensus to classify the nonfiction books designed by Marie Neurath and her team as picturebooks because of the high proportion of pictures and the interaction between text and pictures, a closer look reveals some gaps regarding the lines of tradition and the context of use.

Far too little is known about the possible influences that may have inspired Marie Neurath. There is a long tradition of nonfiction books for children that goes back to Johann Amos Comenius' *Orbis sensualium pictus* (1658). The picture-

4 Marie Neurath's engagement with the Isotype picturebooks is referred to rather casually in Benner (2014), Philipps (2001), and Seeber (1998) in the context of exile studies.

book *Die bunte Welt* (The Colorful World, 1929), published still in Vienna, which was conceived by Otto Neurath and Gerd Arntz in collaboration with Marie Neurath and represents the first attempt to provide pictorial statistics by using the Isotype method in a book for children (O. Neurath 1929), has been associated with the *Orbis pictus* tradition in contemporary reviews (Reidemeister 1930).

At the same time, the 1920s and 1930s were a period in which avant-garde movements exerted a major influence on contemporary literature and art, with demonstrable effects on children's literature and picturebook design (Druker and Kümmerling-Meibauer 2015). The Neuraths were in close contact with artists who belonged to the avant-garde, such as the couple El Lissitzky and Sophie Küppers-Lissitzky. There were further connections to the Bauhaus and the designers around Jan Tschichold, who are associated with New Typography. The impact of the New Objectivity, which also had representatives in Vienna, was also significant. The extent to which these aspects impacted on the conception of the Isotype picturebooks has not yet been investigated in detail (see Kümmerling-Meibauer's chapter in this volume).

Next to nothing is known about whether Marie Neurath had access to nonfiction picturebooks for children or actively sought to gain an overview of the history of this type of picturebook. Neither in the Gesellschafts- und Wirtschaftsmuseum in Vienna nor at the University of Reading are there any records of Marie Neurath or any children's book collections initiated by her. It would certainly be a worthwhile task to compare the Isotype picturebooks with corresponding nonfiction picturebooks produced at the same time (regarding the Puffin Picture Book published in England since 1935, see the chapter by Laura Little in this volume). One could also examine the extent to which the nonfiction series for children that emerged in the 1920s and 1930s, such as the "Here and Now" storybooks by Lucy Sprague Mitchell in the USA or the "Albums du Père Castor" in France, were inspired by similar ideas, namely to convey contemporary knowledge to children using modernist illustrations.

A unique feature of the Isotype picturebooks is the attempt to systematically cover knowledge domains in order to address a wide range of topics (McLaughlin 2019). The focus was on the natural sciences (animal and plant life, weather conditions, the function of machines, the structure of the atom, etc.), the communication of knowledge about technical achievements (telegraph, airplanes, rockets), and general historical overviews, by additionally considering sociological and political aspects. It was not until the 1960s that historical topics with a focus on the reconstruction of living conditions in ancient cultures in Europe and outside of Europe took center stage. However, there are no Isotype picturebooks about fine

art and architecture,[5] nor any volumes that deal with significant historical events such as conquests, wars, and forms of government. Nevertheless, Marie Neurath did write in her autobiographical text "An was ich mich erinnere" ("What I Remember") that she considered addressing the subject of war as part of her preparations for the twenty-volume series "They Lived Like This". She describes her studies in the reading room of the British Museum in London:

> I would have liked to make a book about the origins of war, but I could not find any literature on the subject; I had to painstakingly collect individual items. It came to nothing; we did make a movie strip that we called "Evolution of Empire". And certain aspects came up in the individual books: the wars between the Mesopotamian temple cities were actually fought between the gods in heaven. ("An was ich mich erinnere", p. 99, our translation)

In order to emphasize the systematic nature of knowledge transfer, but also for the purpose of better marketing, individual series were conceived such as "Visual History", "Visual Science", "The Wonder World", and "They Lived Like This". How exactly these series had been conceptualized and to what extent the individual volumes within a series are connected and complement each other has not yet been researched in detail and should provide new insights into the serialization of nonfiction picturebooks – also in comparison to corresponding series at Puffin Picture Books or Ladybird Books.

The Isotype picturebooks were not exclusively intended for private use – little is yet known about how exactly the high sales figures and success of these picturebooks in the postwar period can be explained. Some series, such as "Visual History of Mankind" or the six volumes of the "Visual Science" series, were primarily intended for school lessons (Forest and García Ureta 2022). This is indicated by the accompanying paratexts, which explain how the charts can be used in the classroom. In addition, they point out that a prime principle of the "Visual Science" books consisted in introducing students to an understanding of science: "Science is not simply a 'subject' which you learn in the classroom, in the laboratory or by reading books. It is a way of observing, or understanding, of doing things" (*Science in the Home* (1950, 5); cf. M. Neurath 1974). Even though some Isotype picturebooks do not include paratexts that explicitly refer to their employ-

5 Interestingly, the books published in the "They Lived Like This" series deal with art products of ancient cultures such as Egyptian wall paintings, Greek vases, cylinder seals from Mesopotamia or Chinese forms and calligraphy, but as Marie Neurath noted in "Lehrling und Geselle von Otto Neurath in Wiener Methode und Isotype": "the word *art* did not appear at all" (Kinross 2017, 93, our translation). The corresponding works of art are classified here as "communication", that is, they document the lives of the peoples represented.

ment in the classroom, one can suspect that the other series, for instance, "The Wonder World" and "They Lived Like This", were also purchased by schools.[6]

Against this background, it is reasonable to examine the Isotype picturebooks from the perspective of picturebook research as well as textbook studies. A prime question is how the Isotype picturebooks differ from contemporary schoolbooks and textbooks for children and to what extent the Isotype picturebooks fill a didactic gap in the transmission of contemporary knowledge to students. Major differences certainly refer to the specific text–image relationship, the implementation of individual questions aimed at encouraging independent discovery, and the maximally simplified representation of complex structures. A historical-systematic comparison of these issues could be based on the system of infographics developed by Martin and Unsworth (2024) for the domain of science textbooks. There are apparently neither sources nor records that inform about the impact of the Isotype books on students' knowledge acquisition or any studies that explain how the volumes were used in school lessons. Empirical studies on what children can learn from these picturebooks and what skills they need in order to fully understand the complex issues outlined in Isotype picturebooks are virtually non-existent (Kümmerling-Meibauer et al. 2015).

Furthermore, the question arises as to whether the Isotype picturebooks can be categorized as crossover picturebooks. According to Sandra Beckett (2014), crossover picturebooks are aimed at all age groups, from children to adults. The Isotype book series developed for the school context are designed in such a way that they foster collaboration between the teaching staff and students. Apart from that, one may also presume that many Isotype picturebooks are attractive for older children and adults due to the complex issues they present. A possible employment of these books in adult education cannot be ruled out either.

In contrast to (illustrated) encyclopedias for children, the Isotype picturebooks obviously did not intend to impart encyclopedic knowledge, but rather to arouse the curiosity of child readers by a carefully considered selection of topics, thus stimulating them to read on. Two strategies can be distinguished: first, the text–picture sequences reveal a logical structure, such as in *Railways under London* (1948) and *A Message Round the World* (1953), in which the functions of technical achievements are explained from the first page to the last, thus conveying the impression of a comprehensive presentation. Second, a new aspect is presented on each double page that matches the overarching theme of the picturebook, as in *Too Small to See* (1948) or *I'll Show You How It Happens* (1948). Individ-

6 This would also explain why many copies that occasionally are on sale in antiquarian bookshops bear the stamps of school libraries or local municipal libraries.

ual analyses of these books would help to crystallize the arrangement of the subjects more precisely in order to provide an insight into the conception of the individual picturebooks. Three chapters in this volume have carried out such studies (see the chapters by Ersan, Hoem Iversen, and Meibauer) and could serve as role models for future analyses of other picturebooks by Marie Neurath.

3 Explanative picturebooks

In Anglo-American literary studies, it is common to distinguish between fiction and nonfiction. Isotype picturebooks belong to the nonfiction category. Their main task consists in describing and informing about facts. It is not their aim to tell an exciting story. Since fictional texts also contain information, the term "informational picturebook" – though widespread (Merveldt 2018) – is possibly misleading. The notion "descriptive picturebook" appears to be more appropriate, since it points out that such a book is primarily describing facts.

We put forward the thesis that Marie Neurath especially intended to provide scientifically substantiated explanations. This implies that many Isotype picturebooks represent a special book type which can be classified as "explanatory picturebook". Such an assumption is based on the taxonomy of Herman (2008), who distinguishes between description, narration, and explanation as three basic cognitive modalities. Description relates to text segments that describe the look of things, people, and nature, the living conditions of humans and animals, and the activities involved when employing machines and tools. Narration refers to text segments that tell a story about the characters, objects, and settings involved. Finally, explanation aims at instigating answers to why- and how-questions in relation to the described objects and natural phenomena, thus providing scientific knowledge (Herman 2008, 454; see also Kümmerling-Meibauer and Meibauer 2021, 194–196).

The following assumption, which is widespread in the philosophy of science, applies to the concept of explanation: a fact *x* is considered to be explained if it can be subsumed under a general law *y*. An example taken from *Many Foods* (1963) may explain this general assumption. This picturebook informs about the foods that animals have to eat in order to survive. In relation to the koala bear it notes, "Take this little koala bear, for instance. He can eat only the leaves of certain eucalyptus trees. Other leaves may poison him" (p. 6). Accordingly, if one finds a poisoned koala bear, one can explain this occurrence by the fact that he has most likely eaten the wrong leaves. Moreover, one can even predict that a koala bear will be poisoned if he eats the wrong leaves.

Against this backdrop, the following methods of "transformation" of knowledge serve the goal of explanation:[7]

Component parts: what appears to be complete and of one piece can be broken down into smaller units. Examples are "How the Alarm Rings at the Right Time" in *Machines Which Seem to Think* (1954) and "Light and Heat from an Electric Current" in *What is Electricity?* (1964).

Repeated Base Image: a phenomenon can be explained by representing the change in a state over time by using a basic image. Each additional image manifests a greater or lesser change in the initial state. Examples are "Fountains of Boiling Water Gush Out of the Ground" in *The Wonder World of Land and Water* (1957) and "When the Cockatoo Watchmen Sound the Alarm" in *The Wonder World of Birds* (1953).

Magnification: human perception is subject to certain limitations. Magnification, for example by means of an optical device such as a magnifying glass, makes things accessible that cannot be perceived by the human eye. Examples are "Walking Upside Down on the Ceiling" in *Too Small to See* (1956) and "Many Million Times Smaller Still" in *Inside the Atom* (1956).

Cross-section: what is hidden within can be made visible through a cut, whether the object be a fruit, a house, or a hill. Examples are "A Strange Way to Look at a House" in *If You Could See Inside* (1948) and "A Million People Use this Station Every Week" in *Railways under London* (1948); see the chapter by von Merveldt in this volume.

Comparison: a comparison always requires a dimension that underlies the comparison. For example, squirrels and beavers can be compared from the point of view of how they live, what supplies they store, to what age they live, etc. Examples are "Beaks Which Are Slender, or Strong, or Sharp" in *The Wonder World of Birds* (1953) and "The Four Seasons" in *Visual Science* (Book 1, 1950).

Contrast: opposites are emphasized by a comparison. A case in point is *Many Homes* (1963), which shows the contrasting construction methods of houses, by comparing "bottom up" (foundation > walls > roof) and "top down" (roof > walls > foundation) methods.

7 The following examples have mostly been taken from the exhibition "Marie Neurath: Picturing Science" showcased at the University of Reading in 2009. See https://www.marieneurath.org/.

Serialization: a state, an event, or an action is divided into several segments in order to visualize the different aspects, levels, or processes. An example is "The Layers of the Jungle" in *The Wonder World of the Jungle* (1963).

Vector graphics: vectors illustrate the connection between individual elements. They indicate the direction of movement and thus control the direction of the reader's gaze. An example is "Giant 'Pillar' Trees Need 'Pedestals'" in *The Wonder World of the Jungle* (1963).

It should be noted that these processes are not genuine Isotype inventions, since they have shaped the history of technical and scientific illustration for a long time (Bredekamp, Dünkel, and Schneider 2018). The special feature of the Isotype design – in addition to the eschewing of photos – is the employment of a certain graphic style in order to render these methods in a clear and understandable manner. This includes, among others, sparse representations without decoration, color reduction, emphasis on lines and surfaces, and rasterization. Such an approach provides the impression of modernity compared to earlier graphic designs that used similar methods. A promising research question is to analyze in which contexts these procedures are employed and whether they are optimally suited to conveying a comprehensible explanation to children. Such an analysis additionally requires investigating how precisely these procedures are applied (see the procedures explained in Martin and Unsworth 2024). Another dimension comes to the fore when considering the potential combinations of these methods and how they affect the understanding of complicated processes.

Just as some graphic representations are easier to understand than others, the same applies to the explanatory texts, which to our knowledge have not yet been systematically examined. The texts vary in complexity, in terms of their length, the syntax, or the (technical) vocabulary they employ. A number of texts presuppose encyclopedic knowledge, that is, they rely on the elementary education of children. In *Too Small to See* (1948), for instance, a double-spread is assigned to the food procurement of bees (pp. 10–11): in this book the notion "pollen" is used four times without explaining its meaning, thus anticipating that the child reader already knows this technical term. Another example is a page in *I'll Show You How It Happens* (1948), in which a flying dandelion seed is compared with a parachute, which implies that the reader is able to understand the metaphor (p. 9). An attempt was made to map reception levels to the series concept, as can be seen from the inside flap of *Many Foods* (1963):

> The Junior Colour Books have been welcomed by parents and teachers everywhere as a companion series for younger children (5–8-year-olds) to the already well-known Max Parrish Colour books [. . .].

Therefore, there are often approaches to encourage the child reader to deliberate on prompts and questions, such as in *Many Foods*: "The giant pandas eat only bamboo shoots. What will happen to them if their food supply disappears?" or "Look at the long tube-like snout which he [the giant ant-eater] uses for poking into ant-hills". (pp. 6–7)

In addition, the blurbs provide indications of how the books should be employed:

> In each title the child and his environment is taken as the starting point, and then compared with other situations in nature. In this book, for instance, we see the many curious ways in which living things – plants as well as animals and human beings – find nourishment. In this way, a child is led simply to reflect on the unity and wonder of the world about him. The vocabulary is particularly carefully watched and the illustrations are in the usual clear and direct Isotype Institute style. (*Many Foods*, inside flap)

The presumption that the Isotype picturebooks are basically explanatory picturebooks is not contradicted by the fact that, in addition to the books that explain a single phenomenon (e.g. the atom, London Underground, human birth, etc.), there are also books that bundle several phenomena by subsuming them under a specific concept (outside – inside; food in general, houses in general, etc.). What these books have in common is their aim to propagate a "discovering" perspective, that is to educate children to appreciate overarching questions or cross-connections between phenomena. Such methods were already being fostered in the context of the development of "mechanical literacy", as Massa Hoiem (2024) traces for the period 1762–1860 on the basis of British nonfiction literature for children.

It is precisely this latter type of book that distinguishes Isotype books from typical textbooks used in a school context. It should be noted, however, that the series "They Lived Like This" approximates the textbook again, both in terms of the more restrained, traditional illustrations and the rather detailed explanations.

4 Ideological underpinnings

Following John Stephens (1992) and many other researchers, children's literature is shaped by ideological attitudes. This observation goes hand in hand with the fact that children's literature is used to educate generations of children, that is, to influence children to conform to certain norms and values prescribed by the respective adult society. One may argue that the domain of science, in which it is only important to convey objectively and intersubjectively valid facts, is neutral towards any ideology. Or put the other way around: any ideology must first of all

respect the world of facts. But in this respect, one may reason that even the selection of facts can be ideologically motivated, which is particularly reinforced by the omission of information. For example, if one wants to represent world religions, the question arises as to which of the many religions are selected and how exactly they are differentiated from one another.

Otto Neurath wanted to provide secure social knowledge in a simple way to people who suffer from "epistemic injustice" (Fricker 2007), since they have no access to academically validated knowledge owing to a lack of interpretative sources and restricted admission to reliable information. On the other hand, it is obvious that Isotype statistics can be applied very well for propaganda purposes, for instance when the increase in productivity in the USSR is attributed to Stalinist policy, although the projected data for the outcome of the five-year plan has not yet been achieved (Burke and Jansen 2022, 9; Minns 2013, 259, Burke and Sandner 2024, 47–56, see also Köstenberger 2013).[8] Since no reliable sources are usually given, the readership is apparently expected to have a fundamental trust in Isotype's research and representation methods. So far, little is known about the associated problems or disputes.

Overall, it is certainly not wrong to assume that Marie Neurath was optimistic about science and progress. Scientific optimism is based on the idea that science is constantly creating new knowledge and thereby improving our knowledge of the world. Regarding this, new technical developments are in principle desirable. Consequently, children should be involved in this transmission of knowledge at an early age so that they are able to participate in the new technical world.

The optimism concerning progress holds to the conviction that humanity is making progress thanks to scientific knowledge. However, potentially disastrous consequences of modern scientific knowledge are ignored. In *Machines Which Seem to Think* (1954), the possibility of manipulation by "self-thinking" machines is not considered. Although nature is regarded as a "wonder", nature needs also to be exploited for technical and economic reasons. Negative consequences of human intervention in nature are ignored; on the contrary, nature is seen as a self-regulating system (see *The Wonder World of Earth and Sky* from 1958 and *The Wonder World of Trees and Flowers* from 1961). Ultimately, *Inside the Atom* (1956)

8 Statistics that provide information on the deterioration of living conditions, for instance, could not be expected. In this respect, it should be noted that Otto Neurath was concerned about the political situation in Soviet Russia. In a letter to Rudolf Carnap of 1 October 1932, he states that he is a technical specialist and aims to "abstain from all arguments which only seem to lead to differences [. . .] But I accept the consequences of this ideological abstinence and concentrate on the technical" (quoted in Minns 2013, 259–260). For someone who regarded himself as politically interested and even engaged, however, this professed abstinence is hardly credible.

mentions the atom bomb (p. 33) but does not refer to the horrible casualties this weapon might cause.

Although Marie Neurath was very interested in historical descriptions and explanations, the historical development is hardly reflected upon, and children are not encouraged to ask critical questions (Sanders 2018). She obviously hoped that negative developments could be prevented through education and information. This is supported, among other things, by her sociopolitical commitment in Africa, which should be seen in the context of "soft propaganda", that is, spreading reliable information by promoting democratic values and other positively regarded norms (see Burke and Jansen 2022).

The insistence on objectively valid visualizations manifests itself in an extensive renunciation of decor and ornamentation. The graphic design of Isotype picturebooks has often been described and perceived as clinical or cool and was not equally accepted in all countries. This is indicated by adapted, newly illustrated versions of the books, as it happened, for instance, in Italy (see the chapter by Campagnaro in this volume) or in Austria (see the chapter by Schreiner in this volume). Another potential focal point is the investigation of how Isotype design directly or indirectly shaped nonfiction picturebooks in European countries and beyond (see the chapter by Veryeri Alaca in this volume). It is also not known whether the typical graphic design of the Isotype books was attractive to children. On the other hand, other methods of "beautiful" (salient, attractive) design in these books can certainly be identified, which come close to the means of modern (concrete) art.

5 Many designs and new formats

Contrary to what is sometimes assumed, there is no standardized Isotype design. On the contrary, the graphic design in the Isotype picturebooks varies to a greater or lesser extent. Classic statistical illustrations as in *Die bunte Welt* (1929) are virtually non-existent after 1945. Exceptions are the three volumes *Living in Early Times* (1948), *Living in Villages and Towns* (1948), and *Living in the World* (1949), which together form the "Visual History of Mankind" series. Isotype charts are integrated in these volumes but also in the "Visual Science" series (6 vols., 1950–1951) which was designed for school lessons. These charts are often maps that provide statistical information on population figures (in the world, in a comparison of urban and rural areas, or in different countries), the distribution of age cohorts and political systems ("Right to Vote"). Other maps give an overview of different tools, foods, or means of transportation used over certain periods of

time. By contrast, the picturebooks *If You Could See Inside* (1948) and *I'll Show You How It Happens* (1948), which were produced at the same time for younger readers, do not feature any pictorial statistics or comparable illustrations.

The inventory of pictorial symbols applied in the illustrations can be sparse, reduced only to line and surface, but it can also be quite rich in more complex pictures as is obvious in *A Message Round the World* (1954). Furthermore, in some books the pictures are very colorful and build on strong color contrasts or contrasts of lines and surfaces, but in other books they seem to appear monotonous and thus rather "boring". While the Max Parrish Colour Books are distinguished by bright colors, the Parrish Junior Colour Books show a rather reduced color palette. In the "They Lived Like This" series, two to three colors are generally discernible in each volume: in *They Lived Like This in Ancient Egypt* (1964) and *They Lived Like This in Old Japan* (1966), assorted parts of the illustrations on each double-spread are alternatively tinted in blue or in light brown. In addition to the idea of facilitating the acquisition of knowledge by using selected colors that are assigned to certain subjects, economic reasons obviously also played a role.[9]

Against this background, the series "They Lived Like This" stands out, since Isotype principles are no longer to be found. Nevertheless, Marie Neurath attempted to build a connection to Isotype by presenting the hieroglyphic script of the Egyptians as proto-Isotype in the pioneering *They Lived Like This in Ancient Egypt* from 1964 (Walker 213, 407; see also O. Neurath 2010 on the connection between hieroglyphs and Isotype). This series might represent the insight that Isotype graphics could no longer compete on the children's book market and that customers increasingly preferred pictorial representations. It is seemingly this tendency that led to the disappearance of the Isotype design in nonfiction picturebooks and its elevation into the realm of infographics. Even the integration of photographs, as in the German ÜBER books like *Über das Atom* (About the Atom, 1971), could not stop this trend.

Regardless of the changing designs and formats, it is noticeable that the Isotype brand is present in all picturebooks. Both the back cover and the imprint indicate that the books are "designed by Isotype" (back cover) and "designed by Isotype Institute" (title page). This observation goes in line with the aim of marketing the Isotype brand, which Marie Neurath used to obtain paid commissions for the Isotype Institute. Through her involvement in publishing, Marie Neurath built up a network that included publishers, book packagers, and filmmakers as well as employees in ministries and educational institutions. One of the market-

9 In the same vein, the function of typography should not be underestimated, since it might support the comprehensibility of the texts (see the chapter by Segalini in this volume).

ing strategies was obviously that in almost all Isotype picturebooks, only Marie Neurath is mentioned as the author, although she apparently cooperated with a team of designers, authors, and illustrators.[10] Who exactly these partners were remains obscure. However, the names of team members are increasingly mentioned in books published in the 1960s. In *Many Foods* (1963), for instance, the imprint indicates Katherine Cook as the person responsible for research and text and John Ellis and Evelyn Worboys as the artists responsible for the design. However, Marie Neurath is still listed as the sole author on the cover and the title page. This strategy changed with the series "They Lived Like This", in which the name of the illustrator is always mentioned on the cover alongside Marie Neurath. Next to nothing is known about these collaborators, which results in a further gap in our knowledge.

6 Outlook and overview of the volume

This collection aims to fill some of the research gaps described above by examining Marie Neurath's contribution to the development of Isotype and its significance for the picturebooks she created in tandem with a team of authors and illustrators. In addition, the various facets of the Isotype picturebooks are analyzed with an emphasis on the characteristic text–image relationship and the transmission of knowledge to children. Therefore, this volume strives to promote theoretical and historical research on nonfiction books for children, which is key in current children's literature research (Goga, Hoem Iversen, and Teigland 2021; Grilli 2024). Since the significance of Marie Neurath's role in the conceptualization and design of the Isotype picturebooks can only be fully captured if the historical, social, political, and cultural context is taken into consideration, the collection follows an interdisciplinary approach. For this reason, this volume gathers contributions from scholars covering various disciplines and focal points, such as literary studies, visual studies, history, pedagogy as well as picturebook research, and avant-garde studies.

The collection consists of three parts. The first part explores the social and cultural contexts of the Isotype picturebooks, since less is known about the potential influence of contemporary art movements and the changing book market on

10 Only the three volumes in the "Visual History of Mankind" series mention Otto and Marie Neurath and J. A. Lauwerys, a professor of Comparative Education at London University, as authors and designers alongside a honorary editor, Lancelot Hogben.

the conceptualization of this picturebook corpus, not to mention the underlying motivations of Marie Neurath herself.

The first chapter by Susanne Blumesberger elaborates on two autobiographical texts written by Marie Neurath in the 1980s. While the first text, "An was ich mich erinnere" (What I Remember, 1980) has not yet been published, the second one, "Lehrling und Geselle von Otto Neurath in Wiener Methode und Isotype" (Apprentice and Partnership with Otto Neurath in the Vienna Method and Isotype, 1986), has been translated into English, after some revisions made by Marie Neurath, and was published in 2009. A comparative analysis of both texts reveals the commonalities and differences between both documents that shed new light on Marie Neurath's childhood, her academic education, her collaboration with Otto Neurath and his team, and the continuation of the Isotype project in the postwar years. Particular attention is paid to those sections that provide information on the Isotype picturebooks, albeit these are often kept brief.

Which interwar avant-garde movements and ideas of Reform Pedagogy shaped Marie Neurath's Isotype picturebooks is discussed in Bettina Kümmerling-Meibauer's chapter. In this respect, two prime issues are center stage: the idea of the active and engaged child and the development of an abstract design language that can be understood well even without prior knowledge. The chapter demonstrates that such visions characterized several picturebooks in the interwar period. Considering these ideas and by a thorough analysis of *Pro dva kvadrata* (About Two Squares, 1921) by El Lissitzky and *Die bunte Welt* (The Colorful World, 1929) by Otto Neurath and Gerd Arntz, Kümmerling-Meibauer extrapolates the close connections of the early Isotype picturebooks to aspirations of avant-garde art of the 1920s. Moreover, the deviation in the later Isotype picturebooks from Isotype graphics reveals an orientation towards a modernist postwar design.

The third chapter by Laura Little investigates how the developments in children's publishing and education in the 1940s led to a vibrant children's nonfiction market in the United Kingdom. While visually very different, Marie Neurath's picturebooks from the 1940s to the 1970s share a similar ethos for supporting social change through information in the form of high-quality editorial and illustrative content. A comparison of nonfiction picturebooks published by Puffin Picture Books and Isotype picturebooks shows that the former brought an English modernist approach to children's books in their experimentation with new technologies, while the latter are shaped by a European avant-garde approach with the employment of flat primary colors and simplified graphics.

The cooperation of Marie Neurath with the book-packaging company Adprint, founded by Wolfgang Foges in 1937 in London, is at the center of Silke Körber's chapter. Striving to mediate objective and well-designed information, Isotype and Adprint established creative practices in cooperation with British publishers.

Through her work as author, principal transformer, and later director of the Isotype Institute, Marie Neurath contributed to the further development of close image–text structures, by broadening the range of topics and by an increasingly free visual design. Körber argues that with the increasing internationalization of publishing, these types of books proved successful and set standards in the design and processing of knowledge to meet the general educational demands and concerns of postwar Western societies.

The second part of the volume sets a different accent by focusing on the specific design of Isotype picturebooks. The chapters in this part either elaborate on the unique features that distinguish these picturebooks or offer in-depth studies of individual Isotype picturebooks.

How sectional drawings are applied in Marie Neurath's nonfiction picturebooks is a key question in Nikola von Merveldt's contribution. After a brief historical overview, the chapter presents a typology of sectional views. Since Marie Neurath was convinced that children's attention could be captured by presenting the familiar in strange new ways, the chapter demonstrates how cross-sections are used to reveal the hidden insides of buildings, machines, or animals in *If You Could See Inside* (1948). Situated at the intersection of technical drawing, scientific illustration, and graphic information design, the sectional drawings align with the visual strategies deployed in Isotype picturebooks.

The following chapter by Alessandro Segalini investigates the typography employed in Marie Neurath's nonfiction picturebooks. Segalini argues that Neurath's approach to typography matches the educational goals of the Isotype picturebooks, ensuring that the text is easily readable and complements the visual elements in conveying information. By a detailed description of a number of covers of Isotype picturebooks and by considering this body of work within the larger context of the book as an interface, the chapter emphasizes that typography needs to be considered as an important part of the book design. Although the typesetting is generally not very sophisticated, the consistency of typography – particularly within book series – is regarded as a significant measure in order to achieve visual clarity.

In Jörg Meibauer's chapter, the tension between truth – the correct representation of an event or fact – and transformation – understood as a process of coarsening events and facts by careful simplification – is examined with respect to *Railways under London* (1948). It turns out that this book, while broadly achieving its aim to inform about the London Underground in a convincing and aesthetically appealing manner, leaves out historical facts that could have been relevant for the child reader. In addition, the complex technical vocabulary and the inconsistent usage of the color scheme might hamper the process of knowledge acquisition. The chapter also points to the book's ideological aim of showing the

speed, efficiency, and safety of the London Underground, thus reflecting the optimism of the postwar years and the hope in a new era of wealth propelled by technological innovations.

How the ambitious task of explaining fundamental science to children has shaped *A Message Round the World* (1953) and *Inside the Atom* (1956) is at the core of Gökhan Ersan's chapter. In these two books, Neurath translated scientifically available knowledge on electromagnetism and the atom into a modular and coherent graphical language. A close reading of Marie Neurath's original technical drawings and typewritten notes reveals elements of her streamlining process that resulted in the mini expository sequences that are displayed on double-page spreads. The chapter concludes with a discussion of how Marie Neurath's naturalistic visual iconography, double-page spreads, and expository arc strategies work to contextualize and humanize the subject matter of these two books and what the significance of this approach for science and engineering communication is today.

The representation of gender played a prominent role in the Isotype picturebooks, as Sarah Hoem Iversen's chapter aptly demonstrates. Generally, the male body served as the norm with respect to the goal to present "universal" visual signs. By contrast, when the aim was to depict sexual reproduction, the female-gendered body took on particular significance. The chapter considers the issue of gender and Isotype in general, before moving on to an investigation of the visual and verbal strategies employed to convey information about gender and the gendered body in the nonfiction books *A New Life Begins* (1961) and *How the Baby Came* (1963).

The third part of the volume centers on the international reception of Isotype picturebooks with an emphasis on Austria, Italy, and Türkiye, complemented by a study on the reception of the Isotype method in a contemporary school setting.

Sonja Schreiner examines the special position of Marie Neurath's books in Austria and Germany since the second half of the 1950s by noting and explaining the similarities and differences between original and translation. Additionally, the chapter investigates why the Austrian publisher Schönbrunn Verlag chose precisely three titles from Neurath's much broader oeuvre. Finally, the analysis focuses on the editions published by Verlag Buch und Welt in 1971, which use a different graphic design by adding photographs, thus toning down the Isotype style.

The chapter by Marnie Campagnaro analyzes the reception of the translations of Marie Neurath's picturebooks in Italy by comparing her Isotype method with other illustrative styles and methods prevalent in Italian nonfiction picturebooks at that time. The publisher Fratelli Fabbri Editori, founded in 1947, played a crucial role in this respect, as this publishing house has been a benchmark for

entire generations of Italian children. At the end of the 1950s, Fratelli Fabbri Editori published more than twenty Isotype picturebooks, though the illustrations and cover designs have been changed considerably. Campagnaro points to the alterations made in the color scheme, the graphic design, and the arrangement of text and pictures, thus elucidating how the Italian adaptations deviate significantly from the original editions to the extent of ignoring Marie Neurath's educational program.

In almost the same vein, Ilgım Veryeri Alaca pursues the question of whether Marie Neurath's picturebooks exerted an influence on Turkish nonfiction books for children published from the 1930s up until the late 1960s, the topics of which show parallels to Neurath's preferred set of themes. Owing to the educational exchanges between Austria and Türkiye since the early twentieth century, it is to be expected that Neurath's subject selection and graphic language inspired the nonfiction picturebook design with respect to color use, employment of abstract patterns, and simplifications to attain clarity. By doing this, Veryeri Alaca works out how these books selected and transmitted information differently to young audiences, in addition to an analysis of text–picture relationships that demonstrate where Neurath's style has potentially influenced Turkish picturebook design.

The final chapter in this volume, by Gernot Waldner, returns to the origins of the Isotype method at the Gesellschafts- und Wirtschaftsmuseum in Vienna in the 1920s. With reference to the participatory involvement of children and young people as a prime principle of the exhibitions organized by the Neuraths and their team, a new sociological project, "Isotype Reloaded", was launched as a collaborative effort between a team from the museum and the University of Vienna. The overarching topic consists in discussing the impact that family, gender, migration background, and other factors have on the education of young people with 13- to 17-year-old students. By using different kinds of information transfer (Isotype charts, roleplay), this project intends to revive the tradition of visual education co-developed by Marie Neurath.

In retrospect, the three parts of this volume give an insight into how Marie Neurath's picturebooks shaped the development of nonfiction picturebooks for children in the postwar period and beyond. Moreover, the chapters demonstrate the reciprocal influence of historical, social, technical, and cultural changes on the design and conceptualization of these picturebooks. Ultimately, some contributions provide a glimpse into the complicated reception processes that determined the international perception and evaluation of Isotype picturebooks.

In the wake of the increasing interest in nonfiction books for children on the international book market as well as in children's literature research, Marie Neurath's picturebooks deserve much more attention than they have received so far. The Isotype picturebooks paved the way for the implementation of infographics,

modern visual design, and contemporary scientific issues in picturebooks for children. This achievement cannot be overestimated and will hopefully spur further academic studies.

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Part I: **The Social and Cultural Context of the Isotype Picturebooks**

Susanne Blumesberger

"What I Remember": Autobiographical Reflections by Marie Neurath

1 Introduction

A biographical reconstruction of Marie Neurath's life and work can be based on the following texts: an interview which was carried out in 1977 and two autobiographical texts, written in 1980 and 1986 respectively. The interview, which lasts around 57 minutes was conducted by Josef Docekal, then-director of the Gesellschafts- und Wirtschaftsmuseum (Social and Economic Museum) in Vienna, on the occasion of a visit by Marie Neurath, and is available on YouTube.[1] The first autobiographical text, "An was ich mich erinnere. Erzählt und aufgeschrieben für Henk Mulder" (What I Remember: Told and Written Down for Henk Mulder),[2] contains 119 pages and has not yet been published. It is now part of the estate of Otto Neurath in the Austrian National Library.[3] A revised version of this document, dated 1982, is part of the Moritz Schlick Collection at the Wiener Kreis Archief, Haarlem, the Netherlands.[4] Robin Kinross translated this text into English, as Christopher Burke and Günther Sandner explain:

> The first draft of "An was ich mich erinnere" is dated December 1980, and it was revised in 1982. In 1984 an English translation, "What I Remember", was made by Robin Kinross and approved by Marie Neurath. The original typescript is in: University of Reading, Otto and Marie Neurath Isotype Collection (IC), "What I Remember", unpublished typescript, 1984. (2022, 127 fn. 14)

The second autobiographical text, "Lehrling und Geselle von Otto Neurath in Wiener Methode und Isotype" (Apprentice and Partnership with Otto Neurath in the Vienna Method and Isotype) had been written by Marie Neurath at the request of Robin Kinross and was to be published in a book. The original version is a 25-page

1 https://youtu.be/fsV16AwRHTc?si=KoflTxzc1ZUcW58r (2 June 2024).

2 Dr. Henk Mulder is Lecturer and Program Director of the Master Science Education and Communication at the University of Groningen, the Netherlands.

3 Cod. Ser. n. 31883-31886 HAN MAG.

4 This document consists of 102 pages and includes multiple changes made by Marie Neurath. These changes have either been inserted in the form of handwritten remarks or written on additional typewritten pages. A meticulous comparison of the two typescripts has obviously never been carried out and would be a research project of its own. A digital version can be found at: https://valep.vc.univie.ac.at/virtualarchive/public/Marie_L_Neurath_An_was_ich_mich_erinnere_1982_M/d:990997

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text written on A4 sheets and typed in June 1986. Robin Kinross translated this text into English in August 1986 and added some changes by Marie Neurath (Neurath and Kinross 2017, 16 fn. 1). This English version was published in the book *The Transformer: Principles of Making Isotype Charts* (2009) by Marie Neurath and Robin Kinross, of which a German translation appeared in 2017.

The interview mainly covers the early years in Vienna, the foundation of the museum, the development of the first exhibitions, and the escape of Marie and Otto Neurath to The Hague and later to England, while nothing is said about the postwar years and the Isotype picturebooks. The first autobiographical text encompasses Marie Neurath's childhood memories, her academic education, the collaboration with Otto Neurath, and the continuation of the Isotype project after Otto Neurath's death. The second document focuses on Marie Neurath's position as a transformer, thus presenting information about the collaboration with Otto Neurath and his team as well as the attempt to go ahead with the Isotype project in the postwar years. Both texts deal with the Isotype picturebooks, albeit very briefly and rather superficially.

Considering these texts, the question arises as to what extent the information given in these texts is trustworthy.[5] Studies on autobiographical memory have shown that memories are subject to continual processing (Anderson 2001; Markowitsch and Welzer 1995). Since autobiographical memory is fragmentary per se, the question of the coherence of the recalled events arises. While many authors choose a holistic strategy by filling in the gaps between individual fragments of memory with second- or third-hand information to create the impression of a self-contained and homogeneous text, other authors point to the fragmentary nature of their memories (Fivush 2011).

Although Robin Kinross attributes to Marie Neurath a general "concern for accurate and honest statement" in his obituary for her (Neurath and Kinross 2009, 120; see also Kinross 2002), this does not exclude the possibility that Marie Neurath portrayed certain successes or failures in a false light or that she omitted relevant information consciously or unconsciously. This attitude may particularly concern those situations where she felt potentially committed to protect her own or other people's privacy. Moreover, as Burke and Sandner noted on the trustworthiness of "What I Remember": "As a memoir written by somebody aged 83 – unedited and not intended for publication – it must be approached with caution, yet it displays remarkable recall and precision" (2022, 108).

5 A brief biographical survey of Marie Neurath can be found in Blumesberger (2014). See also Burke (2024).

A case in point is the interview of 1977 in which Marie Neurath endeavors to provide precise information, but at the same time she emphasizes that she is occasionally unsure whether she was recalling something correctly. The story of the escape from Scheveningen to England, with which the interview ends, stands out as Marie Neurath presented it in a particularly lively fashion. This may be due to Marie Neurath’s vivid memory, but perhaps also to the fact that she had told this story several times on different occasions.

So far, only two studies on Marie Neurath’s autobiographical texts have been published. Burke and Sandner (2022) reconstruct the relationship between Otto and Marie Neurath based on the autobiographical texts (without the interview), with an emphasis on “What I Remember”, and aim to carve out Marie Neurath’s independent achievements. Moreover, they address Marie Neurath’s attempt to shape and protect the public image of Otto Neurath. By contrast, Stina Lyon (2021) explores the entire intellectual environment in which Otto and Marie Neurath collaborated by focusing on Marie Neurath’s increasingly independent role as a transformer.

Less is known about Marie Neurath’s development after Otto Neurath’s death, although her productivity in the period after World War II is quite unique. Therefore, in addition to the description of her significant literary work for children (Walker 2013), the autobiographical texts must be scrutinized to determine whether there are any self-declarations to be found or, if there are none, to consider the potential reasons for their omission.

Against this backdrop, a thorough historical reconstruction to verify the information provided in the autobiographical documents is a task for the future. This chapter will provide summaries of the different autobiographical documents by paying attention to those sections in which relevant information is given about the books Marie Neurath wrote for children and how she has conceptualized them. A comparative analysis will then extrapolate the differences and commonalities between these texts.

2 “An was ich mich erinnere” (What I Remember)

The typescript written in German has a title page on which the individual chapters are listed. The text starts with Marie Neurath’s early childhood memories, and it then continues with details about her academic career and her collaboration with Otto Neurath. In recounting all this, she addresses the political circumstances as well as their numerous acquaintances in artistic and scientific circles. The text concludes with a report on her efforts to continue the Isotype project

after Otto Neurath's death. In the following, an overview is provided of the autobiographical recollections of Marie Neurath about her childhood and youth, her collaboration with Otto Neurath, and the period after Otto Neurath's death.

2.1 Childhood and academic education

The record begins with a memory of her brother's christening, when Marie Neurath was two years old. She recounts that she began to draw and play music at an early age and that her mathematical talent also seems to have been recognized early on. In this respect, she mentions that she learned arithmetic from her brother Kurt, who was five years older, even before she started school. The report also touches on her emotional state of mind: she notes that she never felt very close to her mother, while she considered her father to be a rather unsuitable caregiver: "I came alive when I got out of that oppressive and spoiled atmosphere" (An was ich mich erinnere, 11). By contrast, she has positive memories of her school lessons: "Mathematics was a fascinating game to me" ("An was ich mich erinnere", 14). In 1917, she began studying at the Technical University in Braunschweig. At the same time, she was fascinated by the lectures on drawing and calligraphy offered there. In the ensuing sections, she describes in detail her studies at the universities of Munich, Berlin, and Göttingen, with an emphasis on Max Planck's lectures on theoretical physics given at the Humboldt University of Berlin. Nothing is said about the reasons for why she changed her place of residence several times.

In 1924 she moved to Vienna, since she was deeply interested in the Viennese school reform. Her brother Kurt Reidemeister, who was a professor of mathematics at the University of Vienna, introduced her to the so-called "Neurath Circle", where she met Otto Neurath and Hans Hahn,[6] among others. During this time, she completed her studies in physics and passed the state examination at the University of Göttingen. Marie and Otto Neurath began an extensive correspondence and continued their personal conversations ("An was ich mich erinnere", 33). They met secretly in Austria before she started working at the Gesellschafts- und Wirtschaftsmuseum on 1 March 1925.

6 Born 27 September 1879 in Vienna, died 24 July 1934 in Vienna, was an Austrian mathematician and philosopher. Kurt Reidemeister met him at a mathematics congress and arranged for him an appointment as assistant professor at the University of Vienna.

2.2 The collaboration with Otto Neurath

The texts focus on the professional collaboration with Otto Neurath in Vienna, their escape to the Netherlands and England, and the restart of the Isotype project in Oxford; in general, Marie Neurath is rather reserved about her personal relationship with Otto Neurath.

Yet, she describes her first encounter with Otto Neurath in quite a dramatic manner:

> For Friday, 26 September 1924, in the afternoon at 5 o'clock, I was registered for my first visit to the Neuraths. [. . .] A red-bearded giant in a brown-striped shirt opened the door, looked at me in a friendly manner and said "So this is Mieze". ("An was ich mich erinnere", 29) [. . .] I was quite unprepared for the fact that I would be completely won over and overwhelmed by the first impression. I can hardly recall anything of the conversation, I only remember that I listened to everything that Otto said with the greatest interest and growing approval. [. . .] For the first time I felt a harmony between thinking, feeling, and action. ("An was ich mich erinnere", 30)

Marie Neurath then continues to recall their conversation as exactly as possible and concludes:

> Otto saw how impressed I was, and asked me if I could perhaps design things of this kind; but what should I say – I had never seen anything quite like it before. "But", he asked, "If I start a museum where such charts are designed, would you be willing to join in?" To which I replied without qualifications "yes" and I meant it. ("An was ich mich erinnere", 32)

In the ensuing sections, Marie Neurath elaborates on the working conditions at the museum in Vienna, where her main task initially consisted in analyzing data and translating it into graphic design. She recalls that her first job was to run the cash register, type letters, and draw up an inventory. She also spent many hours in the showroom, where she was acquainted with the method of creating wall charts.

In 1929, Otto Neurath and his team started a close collaboration with Gerd Arntz,[7] who had moved to Vienna. This close cooperation gradually developed into the so-called Vienna Method of Pictorial Statistics, which shaped an exhibition opened in the Volkshalle on 7 December. It is interesting that Marie Neurath admits that one of the charts that she had made in Otto Neurath's absence provoked his displeasure, because it was too colorful and the colors did not correspond to the precisely defined purpose, that is, each color needs to have a specific

7 Born 11 December 1900 in Remscheid, died 4 December 1988 in The Hague, was a socio-critical artist and graphic designer.

meaning ("An was ich mich erinnere", 42). Nevertheless, Otto Neurath tolerated this chart.

Marie Neurath dedicates many sections to the contacts the Neuraths had with artists, writers, scientists, and politicians, for instance, Martha Tausk and Lise Meitner, both aunts of Robert Frisch, but also Elsa Brandström and H. G. Wells. Occasionally, Marie Neurath describes these contacts in detail, while others are only mentioned in passing. Some of these encounters turned into long-lasting friendships, including with El Lissitzky,[8] who designed charts about letters and numbers based on his artistic exchange with Otto and Marie Neurath. Another important person was Rudolf Brunngraber,[9] an expert in social statistics, whose first novel *Karl und das zwanzigste Jahrhundert* (Karl and the Twentieth Century, 1932) drew heavily on Otto Neurath's research regarding the economy and statistics.

Marie Neurath also recalls the search for a new name for the "Vienna Method". She suggested the name "Isotip" (International System of Teaching in Pictures), which in turn then became Isotype. According to her, Otto Neurath was very positively surprised by the name and Arntz was commissioned to design a signature symbol for it ("An was ich mich erinnere", 64).

2.3 Knowledge transfer

Time and again, Marie Neurath stresses that sharing knowledge was key to her and Otto Neurath, which resulted, for instance, in the cooperation with the newly-founded institute Izostat (an abbreviation for "All-Union Institute of Pictorial Statistics of Soviet Construction and Economy") in Moscow. However, the fact that they may have served as part of Stalinist propaganda is not mentioned in the memoirs. Occasionally, Marie Neurath included political comments, for example when she writes that the Social Democrats in Moscow were called "social fascists" and that a coworker joined the Communists, as did Grete Schütte-Lihotzky ("An was ich mich erinnere", 55). Marie Neurath does not explicitly address her own political views; in this respect she also seemed to have been greatly influenced by

8 Born 22 November 1890 in Potschinok, Russia, died 30 December 1941 in Moscow, was an important Russian avant-garde artist and graphic designer.

9 Born 20 September 1901 in Vienna, died 5 April 1960, was an Austrian writer, journalist, and painter. In 1933 Brunngraber was elected chairman of the newly founded Austrian Association of Socialist Writers. Brunngraber was unable to publish in Austria during the Austrofascist period. However, he continued to be very successful in Germany and was temporarily appropriated by Nazi cultural policy.

Otto Neurath, who was a member of the Sozialdemokratische Partei Österreichs (SPÖ; Social Democratic Party of Austria) according to the interview of 1977.

Marie Neurath repeatedly tells of new connections that helped to spread the knowledge of Isotype. As a result, Otto Neurath was invited to the World Social Economic Congress, organized by the International Industrial Relations Institute (IRI) in Amsterdam, and it becomes clear that these connections made it easier for the Neuraths to stay far away from Nazi Germany. Otto Neurath set up a foundation in The Hague, and he began to learn English with Marie Neurath's support. In this context, Marie Neurath mentions a precautious measure: in the event that the political situation should worsen and make a return to Vienna too dangerous, they agreed that he should receive a telegram saying "Carnap is expecting you" (because Rudolf Carnap was staying in Prague at that time). After Otto Neurath's office was searched, Marie Neurath sent the telegram and prepared everything for their departure. In the meantime, Otto Neurath had founded the Mundaneum, a kind of comprehensive museum, in The Hague.

Despite the grim situation, they aimed at fulfilling commissions they had received while still in Vienna, for instance, a series of photographs for the Norwegian Workers' Educational Center and two books for the publisher C. K Ogden. Marie Neurath also reports on the worsening political and financial conditions they had to face. In 1934, Otto Neurath's doctorate was questioned, but he was able to show his diploma and thus this accusation was dropped. At almost the same time, the Russian contracting parties informed the Neuraths that the contract between them contradicted Russian laws and that payment could no longer be guaranteed. As Marie Neurath comments, "Years of absolute hardship were coming" ("An was ich mich erinnere", 65). Her family supported her with remittances, but she and Otto Neurath were so afraid of being deported that they did not officially declare how little they earned, and therefore they paid far too much in taxes. As she explains, "It was only later, when we could stand on our own two feet, that we dared to admit it and we were recompensated" ("An was ich mich erinnere", 65).

In 1936, a collaboration arose with Dr. Kleinschmidt from New York, who worked for the National Tuberculosis Association and was responsible for health education. This resulted in a fruitful collaboration that lasted for years. An exhibition was conceived that traveled across the USA. Marie and Otto Neurath were also invited to Mexico for consulting activities, which were arranged by Alice Rühle, who knew Otto Neurath from Dresden where she had worked as a translator. Otto and Marie Neurath felt so at home with Alice and Otto Rühle that they even thought of emigrating to Mexico.

Until the outbreak of the war, Otto and Marie Neurath worked on illustrating a children's encyclopedia (neither the title nor the content is made clear in the

memoirs). Moreover, Otto Neurath received a commission from the publisher Alfred A. Knopf to write a book, which resulted in *Modern Man in the Making* (1939). This book represented an innovative picture–text style where the picture had to be read alongside the text in order to follow the logic: "The whole thing is of one piece, the most beautiful book we have made" ("An was ich mich erinnere", 74). Knopf asked for another book proposal, so Marie and Otto Neurath prepared a book about the history of persecution and tolerance all over the world. The honorarium of 400 dollars per month enabled them to research intensively before they were forced to make their escape.

After having settled in Oxford, they continued to work on their book project in addition to the lectures that Otto Neurath gave. At the same time, the first Isotype film was made, *A Few Ounces a Day* (1941), a call to produce less waste. In the months that followed, more and more Isotype films were commissioned. To fulfill all these requirements, Otto and Marie Neurath worked with photographers such as Peter Bradford and several scientists.

Since foreigners were not allowed to work independently at that time, Marie and Otto Neurath had to find employment, and therefore they founded the Isotype Institute Limited. Their home office enabled Marie and Otto Neurath to work as joint secretaries and directors of studies. Shortly before his death, Otto Neurath was involved in a housing project where he advocated building barrier-free flats for older people.

Marie Neurath also mentions two unfinished manuscripts that were left behind after Otto Neurath's death. These were "Visual Education – Humanisation versus Popularisation", for the Karl Mannheim series, and "From Hieroglyphics to Isotype – a visual autobiography", commissioned by Adprint. The head of Adprint, Max Parrish, discarded Otto Neurath's original design, which greatly annoyed Marie Neurath.

Otto Neurath's death meant a major turning point in Marie Neurath's private and professional life. While she did not elaborate extensively on her emotional distress, she described the changed situation at the institute, since she no longer had anyone with whom she could discuss the Isotype work, but on the other hand she knew that Otto Neurath would expect her to continue their joint work as best as she could. Since all contracts were transferred to Marie Neurath, there was no problem with the continued running of the Institute. She also mentioned in passing that in 1951 she was asked by Franz Rauscher, the director of the Austrian Social and Economic Museum, to return to Vienna. He offered her the management of the production department, but she declined, as she no longer felt any attachment to Vienna.

Almost at the end of this autobiographical document, Marie Neurath informs quite matter-of-factly about the development of the Isotype picturebooks for chil-

dren. Together with Max Parrish, with whom there were apparently disagreements about illustrations suitable for children's books, she released the "Visual History of Mankind" series and the "Visual Science" series and experimented with designs for children's books (Burke, Kindel, and Walker 2013). The first children's book *If You Could See Inside* (1948) was written, followed by *Railways under London* (1948). Afterwards, the company Cable & Wireless asked her to create comprehensible materials, and, to achieve this goal, she sought advice from experts, such as Otto Robert Frisch and Hermann Bondi. Apart from that, the publisher Walter Foges, who produced an illustrated magazine for western Nigeria, asked Marie Neurath to produce suitable illustrations to convince the government that pictures could be very helpful in the literacy campaign. Marie Neurath received a monthly allowance and her travel expenses were covered. Her first commission consisted in designing a booklet on education to promote compulsory education. Subsequently, further booklets sixteenth pages in length were produced in which contemporary problems, tasks, and solutions related to Nigeria were shown step by step.

Very briefly, Marie Neurath mentions the twenty-volume series "They Lived Like This . . ." aimed at children. At the same time, she writes that it became more difficult to work with the publishers, as there were always new staff people who did not know much about Isotype. Moreover, she was worried about the future of the Isotype Institute, because she could neither find experienced employees nor suitable successors.

At the end of this text, Marie Neurath tells of how she handed over her estate and working materials to the University of Reading. She also explains the reasons for writing her memoirs, which were to be published in the series "Vienna Circle" (Wiener Kreis):

> I don't know what the secret is that I get into storytelling in Henk's presence. [. . .] Now I have sat down and written, for him; but slowly I am getting used to the idea, also for other friends of Otto Neurath's world of thought. It gives me pleasure to bring up the old memories. ("An was ich mich erinnere", 119)

Two female students, who were studying design in what was then the Unit of Typography at the University of Reading, got the ball rolling as they wanted to hear the history of the Institute. Ultimately, Marie Neurath met Henk Mulder, with whom she edited an anthology for the "Vienna Circle" series and for whom she eventually wrote the autobiographical report, as indicated in the subtitle.

3 “Lehrling und Geselle von Otto Neurath in Wiener Methode und Isotype”

At the beginning of this text, Marie Neurath apologized for not being able to provide an introduction to pictorial statistics, because she had already forgotten most of it. However, she stresses that it was important for her to describe chronologically those moments that had remained in her memory. Under the heading “The first encounter” she describes how she got to know Otto Neurath’s work when she came with a small group of fellow students from the University of Göttingen to Vienna: “Neurath took me round the Siedlungsmuseum [Museum of Estate Housing]. Some of his charts were on display there” (Neurath 2009, 11). Marie Neurath writes that she was deeply impressed by his graphics, especially those about the depiction of cities:

> [. . .] it was not so much the manner of presentation that impressed me, but the formulation of the question: the idea of showing the five largest cities, and the anticipation of this outcome, that enabled so much of the history and character of these countries to be indicated. It was in front of this chart that I agreed to join Neurath in the making of such visual presentations. (Neurath 2009, 11)

Immediately after completing her studies, Marie Neurath moved to Vienna. She describes her everyday work in the first office in Vienna’s third district, where she was responsible to produce the design drawings. She had fond memories of working on the large exhibition “GeSoLei” (an abbreviation for “Gesundheitspflege, soziale Fürsorge und Leibesübungen”), which took place in Düsseldorf in 1926 and focused on healthcare, social welfare, and physical exercise. Above all, she remembers the satisfaction of having depicted well the age structure of Vienna’s population before and after World War I. With each draft, she went into the next room to consult Otto Neurath, but as she concedes, “Most of the charts that we were commissioned to make have gone from my memory” (Neurath 2009, 17).

In contrast, she remembered the exhibition “Vienna and the Viennese” (1927) quite well. Her job at that time was to supervise the work and pay out wages. Meanwhile, she cooperated with the draftsman Friedrich Jahnel, who created, among other productions, the map “Gliederung eines industriellen Unternehmens” (Structure of an industrial enterprise). In this regard, she emphasized that in order to set precisely every line connecting the different departments, one had to understand these structures beforehand. In 1927, the first booklets *Die Gewerkschaften* (The Trade Unions) and *Die Entwicklung von Landwirtschaft und Gewerbe in Deutschland* (The Development of Agriculture and Trade in Germany) were published. In the chapter “Transformation”, Marie Neurath describes how this project involved her own design work. She maintains that her knowledge of

social contexts and her good rapport with Otto Neurath led to quick and very satisfying results and stresses how important Otto Neurath's ideas were in this undertaking. An example she mentions is the correct placement of the symbols in order to perfectly display the development of the number of employees from 1882 and 1925:

> I remember that the last stimulus to a further improvement came from Neurath: align the middle-sized business under each other; then we have an axis, which makes clear the shift from small- to large-sized business. How much more satisfying is his solution to that in which one should show that the number of those employed in small businesses has stayed the same, that the number in middle-sized businesses has doubled and those in large concerns have multiplied by five. (Neurath 2009, 19)

Otto Neurath also made sure that the employees were well equipped:

> I was provided with good tools for my transformation work: coloured pencils and carbon-copy notebooks of roughly quarto size, in which the top sheet was squared; this was useful for my sketches, and I retained a copy of each in the book. At that time, we also searched stationery shops for materials with which to make the charts. (Neurath 2009, 21)

According to Marie Neurath's report, a milestone in her work seems to have been the exhibition in the Volkshalle, which opened on 7 December 1927. A decision was made in favor of a modern design; the consulting architect Josef Frank suggested, for example, that the wooden design of the display walls be retained. Lighting was used selectively: only the charts were illuminated, while the rest of the room remained dark. Another new feature was the use of a magnetic board, which was later used again, for instance in school lessons. In her report, Marie Neurath dedicates a lot of space to the description of this exhibition and points out the pleasure she took in guiding school classes through the exhibition, asking the children questions that they could answer by looking at the charts. In this way, she could easily determine if a chart was still too complicated, and this experience seems to have been a significant preparatory work for her later children's books. In this regard, Marie Neurath also pointed out that the maps and charts should please children of all ages, as those who did not yet understand the meaning enjoyed at least the symbols and colors.

This exhibition contributed to the fact that Otto and Marie Neurath's work became better known. As a result, the Viennese publisher Arthur Wolf asked them to create *Die bunte Welt* (The Colorful World), conceived as a schoolbook, by using the Vienna Method of Pictorial Statistics. Marie Neurath remembers that this book demonstrates how quickly the development of their collaborative work progressed, because many different styles had been mixed. Once this book had been completed, they were contacted by the publisher Bibliographisches Institut

in Leipzig, resulting in books on society and the economy. In view of this, Otto Neurath could afford to pay specialists, such as the statistician Alois Fischer or the historian Robert Bleichsteiner, as well as the art historian Schwieger. As Marie Neurath remembered:

> For my own part, I learned especially from Professor Peucker, the cartographer. When I showed him my simplifications of maps in *Die bunte Welt*, the equal area projection certainly seemed right to him; "but", he said, "we have to give the thing a bit more life". (Neurath 2009, 29)

This made it clear to Marie Neurath that purely mechanical simplification was not enough; rather, it was also important to adopt different perspectives and to be very careful with comparisons.

During the last years that Marie and Otto Neurath spent in Vienna, particularly Otto Neurath received numerous commissions for lectures to be given in Berlin, Amsterdam, and Moscow, among others. In Vienna they had the opportunity to work closely with schools. This allowed them to determine how their work affected students, apart from numerous discussions with teachers. The results of these experiences shaped the book *Bildstatistik nach Wiener Methode in der Schule* (Image Statistics According to the Vienna Method at School, 1933). Due to the charged political situation, however, Otto and Marie Neurath were forced to flee. Marie Neurath described the consequences of this as follows: "We could survive only as citizens of the world. Never again did we have a home like Vienna" (Neurath 2009, 46).

In the next chapter, Marie Neurath describes the naming of Isotype, which was also first made public in 1935. Before, they never dispensed with words in their charts, but it was their aim now to create a language of sign. It is interesting that Marie Neurath does not mention the forced change of location at all in this chapter, although it is entitled "The Hague". It was much more important for her to show how their work went on. In this regard, she elaborates on the collaboration with Dr. Kleinschmidt from New York that resulted in charts depicting the development and the appropriate handling of infections such as tuberculosis; these charts were part of a traveling exhibition throughout the USA. While the Neuraths were working on a booklet to present the respective material, they received an invitation to Mexico City, where a museum for science and industry had been founded. They stayed there for six weeks and shared their expertise. Quite soon after that, the publisher Compton asked them to draft a children's encyclopedia, the prime goal of which should consist in representing contemporary scientific knowledge by means of accessible texts and visuals. As Marie Neurath summed up, "We became more confident in the belief that every kind of scientific statement is open to a visual treatment" (Neurath 2009, 55). This work reinforced

Otto Neurath's wish to create a visual thesaurus as part of the *International Encyclopedia of Unified Science*.

When a department-store chain inquired about an exhibition to displayed in three cities – The Hague, Rotterdam, and Amsterdam – Marie Neurath suggested the Dutch painter Rembrandt as the theme, to which Otto Neurath readily agreed. The result was the exhibition "Rondom Rembrandt" (Around Rembrandt) that showed a lot of historical background information, but also photographs of Rembrandt's self-portraits. In addition, interactive methods were included such that knowledge transfer could be tested.

The records evidently demonstrate that Marie Neurath could increasingly assert her ideas, and during the production of *Modern Man in the Making* (1939), she acted not only as a transformer but also arranged the text. After the completion of this book, war broke out in Europe. Otto and Marie Neurath fled to England and were initially interned as "enemy aliens". In February 1941, they learned that they could stay in Oxford, where they collaborated with Paul Rotha, a pioneer of documentary film. He needed diagrams to show the different blood groups, which resulted in the documentary *Blood Transfusion* (1941). This was the beginning of a long-term collaboration. Another film was *A Few Ounces a Day* (1941), encouraging people to collect certain kinds of waste for recycling. Though Otto Neurath died, when *Visual History of Mankind* was two-thirds finished, Marie continued the work with all partners.

Through the mediation of the publisher Wolfgang Foges, she met the Prime Minister of Nigeria in 1950. The Prime Minister presented her a booklet and asked her to transform the most important ideas therein into visuals that align with the Isotype method in order to promote compulsory school attendance. While staying in Ibadan, she drafted a 16-page booklet in which she explained the arguments step by step, complemented by other topics such as agriculture, health, and finance. To foster the learning effects, Marie Neurath visited school classes and instructed teachers to link the pictures and the written information. Moreover, she indicates that her simple explanation of how elections work led to a significant increase in voter turnout. However, she admits that she failed in training Nigerians in her method.

Another setback was the sudden death of a publisher for whom Marie Neurath was working on a filmstrip about the history of medicine; she was no longer able to work with his successors, and the same happened with the books that were in preparation:

> I had to deal with people whose values had nothing in common with ours. I was now over 70 years old and I decided to bring the work to a close. So, it had a real end, just as it had a very clear beginning. (Neurath 2009, 75)

In view of this situation, Marie Neurath was eager to find a convenient place for all her material so that it could be of use to younger generations. She reports on the felicitous coincidence that two students from the University of Reading had contacted her for an interview. As she detected a genuine interest in her work, a contract was signed with the University of Reading, Numerous boxes of working materials[10] were then transferred to Reading. Moreover, an exhibition on Isotype was showcased in 1975. Marie Neurath concludes her account with the following statement: "And elsewhere in the world there are people for whom our work means something. I have written this sketch for them" (Neurath 2009, 76).

Considering the fact that Marie Neurath and her team created more than 70 Isotype picturebooks for children, it is interesting to see how Marie Neurath described the creation of the children's books. Otto Neurath originally wanted to develop a book on boxes that looked the same but contained completely different components inside, and thus have different functions. This was the starting point for Marie Neurath to make cross-sections of different objects to visualize how they look inside, whether a lighthouse or a wasps' nest. These ideas shaped the children's book *If You Could See Inside* (1948), which attracted the interest of Max Parrish. In the ensuing years, Parrish published several of Marie Neurath's children's books in which complicated mechanisms are explained as simply as possible. These books were very successful and prompted the Cable & Wireless Company to commission a book that could describe technical problems in a simple way and be used in schools (Kinross 2009, 89).

The different book projects, portrayed in detail in Walker (2013), are just mentioned in passing and Marie Neurath presents herself primarily as the solver of technical problems rather than elaborating on the narrative and visual aspects of the Isotype picturebooks: "I learned to master the technical problems by breaking them down into the smallest elements and showing them side by side at the same time" (Neurath 2009, 90). Although Marie Neurath emphasizes that mastering the scientific aspects was easier for her than the historical ones (90), this is somewhat at odds with her very positive memories of designing the twenty-volume series "They Lived Like This . . .". One can speculate that the renunciation of typical Isotype requirements in this series also had a liberating effect, as Marie Neurath admits openly: "I was given complete freedom and I enjoyed the work" (Neurath 2009, 93). Basically, a certain step is taken here into a more descriptive and narrative mode of presentation, while the purely analytical-explanatory approach of the earlier Isotype books is abandoned.

10 https://www.reading.ac.uk/typography/collections-and-archives (3 June 2024).

4 Conclusion

The two autobiographical texts and the interview show different emphases and cover different time periods. The most detailed text is "What I Remember", which begins with childhood memories and tells of the important stages of Marie Neurath's life until her retirement as director of the Isotype Institute. The second text, "Apprentice and Assistant to Otto Neurath in Vienna Method and Isotype", omits the phases of childhood and adolescence while focusing on the collaboration between Marie and Otto Neurath and the continuation of the Isotype project in the postwar years, until the closure of the Isotype Institute in 1981. The interview, however, concentrates on the early years in Vienna, the foundation of the museum, and Marie and Otto Neurath's escape to the Netherlands and later to England, while nothing is told about Marie Neurath's achievements after her husband's death. Moreover, it is noticeable that only the first text provides some information about Marie Neurath's family relationships, while this is totally absent from the second text.

Even though both texts refer to the most significant stages of Marie Neurath's life, so that a superficial reading gives the impression that the same facts are repeated, on closer consideration they prove to be quite distinct from one another. One reason for this could be that the first text was not intended for publication, while the second one appeared in a book. Another observation is that the first autobiographical text is very associative, shows gaps in the narrator's memory, and does not always follow a stringent chronological order. This report resembles an oral narrative rather than a self-contained autobiography. Almost without transition and very erratically, Marie Neurath merges sequences from different periods of her life. The development of her academic and graphic work often remains in the dark, not to mention the lack of detailed information about the production of the Isotype picturebooks. Even the second text is characterized by a fragmentary character and a subjective approach. Nevertheless, potentially due to the revision process on the occasion of the English translation, this text is much easier to understand. Moreover, it has a clearer focus, because Marie Neurath intended to represent her own development as a transformer. But here, too, the children's books are only mentioned in passing, as if she did not give them any significant credit with respect to the development of informational picturebooks for children in the postwar period. Under these circumstances, one can only speculate about the reasons for this obvious negligence of the picturebooks in the two autobiographical documents. Did she attach less importance to the picturebooks in comparison to books for adult readers? Did she rather want to honor the achievements of Otto Neurath, although she points out that she played a major role in the development of Iso-

type? Overall, it seems that her own life remains in the shadow of Otto Neurath. What is striking, however, is Marie Neurath's aspiration to document the numerous encounters with prominent artists, writers, scientists, and politicians, thus emphasizing that she and Otto Neurath were part of international artistic and scientific networks since the 1920s. How these networks functioned exactly, and what impact they exerted on Marie and Otto Neurath's work, has not yet been investigated in all its facets. Seen in this light, the autobiographical texts of Marie Neurath are valuable historical documents that provide insight into the author's self-assessment as a graphic designer, transformer of knowledge, and mediator of the Isotype system, as well as embedding these issues into the contemporary social, political, and artistic context.

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Bettina Kümmerling-Meibauer

The Idea of a New Abstract Design Language: Interwar Avant-garde Movements and Their Impact on the Isotype Picturebooks by Marie Neurath

1 Introduction

The Isotype picturebooks that Marie Neurath created in tandem with artists and scientists hold an important position in the realm of nonfiction picturebooks for children. They introduced new concepts of depicting science by fostering accuracy, clarity, and attention to detail in order to impart knowledge in a way that children can easily understand (Walker 2013, 395). Although these ideas are not new and the visual strategies and formats used, such as maps, charts, and intersectional pictures, can be found also in previous informational children's books, Marie Neurath and her team developed a concise design language, the roots of which go back to concepts generated by Otto Neurath and his associates in Vienna in the mid-1920s. While there have been ample studies on the evolving Isotype system per se, and its predecessors and impact on graphic design and infographics, also in view of the possible influence of progressive and avant-garde art movements of the 1920s and 1930s, these potential connections have not yet been considered in relation to the Isotype picturebooks themselves. Since it has been proven that Marie and Otto Neurath were in close contact with avant-garde artists and art schools, such as the Werkbund and the Bauhaus (Burke 2013b, 76–78), it is likely that Marie Neurath's conception and design of the Isotype picturebooks were also influenced by contemporary efforts to employ modernist art forms that were considered suitable for children. In this respect, two picturebooks played a significant role: *Pro dva kvadrata* (About Two Squares, 1922) by El Lissitzky and *Die bunte Welt* (The Colorful World, 1929) by Otto Neurath and Gerd Arntz. While the first book is regarded as the first picturebook for children that exclusively used abstract forms to tell a story, the latter is the first picturebook based on the Isotype method. Marie Neurath most likely knew Lissitzky's book, since she had been in close contact with the artist since the 1920s. Both shared an interest in developing an abstract design language accessible to children. As for *Die bunte Welt*, Marie Neurath had been involved in this project, since she acted

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as a transformer[1] by supervising the potential comprehensibility of the graphic design for a broader audience.

Against this backdrop, this chapter aims to examine to what extent the Isotype picturebooks were inspired by the avant-garde tendencies of the interwar period. What do we know about Marie Neurath's relationships to avant-garde artists and art schools of that time? Can *Die bunte Welt* be regarded as a precursor of the Isotype picturebooks or rather not? Are there perhaps completely different sources of inspiration that influenced Marie Neurath's conceptualization?

First, the notions "avant-garde" and related concepts such as "modernism" and "radical children's literature" will be explained, since these terms share some commonalities and are sometimes conflated. Second, this chapter will elaborate on the impact of avant-garde movements on children's books of the 1920s and 1930s, with a close examination of *Pro dva kvadrata* and *Die bunte Welt*. Finally, this chapter examines how these ideas potentially shaped Marie Neurath's Isotype picturebooks and what other spheres of influence can be located.

2 Avant-garde and related concepts

The notion "avant-garde" looks back on a longer conceptual history, which suggests that there is no unique definition. What exactly can be understood by "avant-garde" depends on the theoretical frameworks employed, the historical and cultural background, and the artistic conceptualizations in different countries. Used as an umbrella term for different art movements of the twentieth century such as Constructivism, Dadaism, Expressionism, Surrealism, and the New Objectivity that turned against bourgeois culture and scrutinized then-traditional concepts of art, the avant-garde reveals itself to be a heterogeneous phenomenon (Krauss 1999; Murphy 2003). It should be noted, however, that those art movements rarely used the term "avant-garde" to characterize themselves. Such attributions mostly happened later, in the further course of the twentieth century (Van den Berg 2006). Generally, the concept of the avant-garde is related to the idea of being ahead of one's time, advanced, and progressive. By and large, the avant-garde aims to push the boundaries of what is accepted as the aesthetic standard. Consequently, it aspires to "achieve an eradicative renewal of artistic forms

1 This scholarly term will be comprehensively explained in the Introduction. In short, it refers to the process of transforming the knowledge of experts in such a way as to adjust it to the knowledge and understanding abilities of non-experts.

as well as to establish a completely new conception of art and its position within the society" (Druker and Kümmerling-Meibauer 2015, 1).

In addition, the avant-garde is often conflated with modernism, a broad pan-European movement that began in the final decades of the nineteenth century and saw its heyday in the 1910s and 1920s, with offshoots far into the postwar period (Eysteinsson 1990). Although some critics construe a dichotomy of avant-garde and modernism by associating the latter with a conservative aesthetics and stylistic rigor, others highlight the similarities between both aesthetic concepts rather than the differences (Fokkema 1984; Zima 2001). Apart from these sophisticated discussions, the term "modernism" is also used when categorizing avant-garde art and literature in some countries, such as the Nordic countries or the United Kingdom (Fähnders 2007). To avoid any semantic confusion, the notion of avant-garde is used throughout this chapter when referring to avant-garde tendencies of the interwar period.

Ultimately, one should ascertain that some artists applied aesthetic features of the avant-garde while advocating a rather bourgeois or even traditionalist perspective. In contrast, some leftist or radical artists and authors could be aesthetically traditional or conservative by favoring mainstream popular tastes (Webber 2004). Therefore, it is advisable to also consider the artists' political attitudes alongside their artistic achievements in order to fine-tune the multiple aspects that might have shaped the individual artist's alignment to specific avant-garde postulates, which were often expressed in manifestos and other programmatic texts. This complicated matter – the distinction between the political and aesthetic aspirations of avant-garde artists – points to another concept which has been vividly discussed in children's literature research since the appearance of Kimberley Reynolds' book *Radical Children's Literature* (2007). This study elaborates on the influence of political, educational, and aesthetic measures on radical changes in contemporary children's literature. Subsequent studies took up this issue by emphasizing the promotion of social justice, environmental awareness, and acceptance of any kind of differences (Mickenberg and Nel 2011, 445). While these ideas are often connected to left-wing authors and publishers, they can be attributed to any children's book that pursues a progressive agenda. More specific studies followed suit in order to identify the historical basis of radical thinking in children's literature as well as to explain how such books differ from mainstream books (Mickenberg 2017). In another study on the impact of radical publishing on British children's literature from the beginning of the twentieth century up to the postwar years, Reynolds (2016) distinguishes "social/political radicalism" and "aesthetic radicalism" as two distinctive features of radical children's literature. At the same time, her study exemplarily shows that this concept can be successfully applied to the historical investigation of children's books. While some studies

have already adopted this approach, there are hardly any in-depth investigations that address the relationship between avant-garde children's literature and radical children's literature (Heywood 2018; Kümmerling-Meibauer and Meibauer 2019). This issue should be kept in mind in relation to the Isotype picturebooks, too.

In any event, these aporias of avant-garde research can be avoided by understanding the avant-garde as a phenomenon of social cohesion and group formation in the cultural field. Against this backdrop, the avant-garde thus appears as a spatial-temporal network that is heterogeneous on the synchronic level and changing on the diachronic level, but ultimately unified, encompassing all areas of art. At the same time, avant-garde movements were not restricted to certain countries or regions, although many researchers have located the origin of early avant-garde aspirations in Europe. Due to the cross-border movements of avant-garde artists all over Europe and even beyond, they were able to exert a great influence on long-established art schools as well as private art circles, thus contributing to a transnational conceptualization of avant-garde art.

Although the avant-garde reached a climax in the 1920s and at the beginning of the 1930s, it continued in the postwar years and still lives on in contemporary art. Seen in this light, the avant-garde itself has become historical, something which has led to a distinction between the historical avant-garde and neo-avant-garde or post-avant-garde. This distinction points to the fact that artists and authors have striven to renew the avant-garde ideas of the first half of the twentieth century, thus fueling a debate on the influence of the avant-garde in the postwar years and after, right up to the present day (Beekman 2007).

3 Avant-garde movements of the interwar period and their impact on children's literature

Although prominent avant-garde artists, such as Lyonel Feininger, Hannah Höch, Wassily Kandinsky, Bruno Munari, and Ladislav Sutnar, created artworks for children – whether children's books, theater plays, films, or toys – avant-garde research still tends to disregard these artifacts. By contrast, several studies in the domain of children's literature have diligently explored the influence of avant-garde art on children's culture, for instance, the rise of the Russian avant-garde picturebook in the 1920s and 1930s, the impact of the Bauhaus on contemporary design objects for children, or the influence of modernist trends on children's literature in the Nordic countries and the United Kingdom (Druker 2008; Lemmens

and Stommels 2009; Druker and Kümmerling-Meibauer 2015; Reynolds 2016; Weld 2018; Kümmerling-Meibauer 2020).

Following these investigations, it is uncontested that avant-garde works for children paved the way for the modernization of children's literature and culture since the beginning of the twentieth century. They introduced new aesthetic, narrative, and pedagogical concepts and may thus be regarded as cornerstones in the history of European (and even non-European) children's literature and culture. The interwar period particularly experienced a surge of picturebooks and illustrated children's books that were instigated by ideas taken from Reform Pedagogy and avant-garde tendencies of the 1920s and 1930s. In this regard, three prime issues played an eminent role: the idea of the active and engaged child, the agenda to provide knowledge about topical political, technical, and scientific issues, and the development of an easily accessible design language. These ideas were key in several avant-garde movements, such as Constructivism, the New Objectivity, and the Bauhaus, and resonated in contemporary children's literature in different European countries.

The first aspect points to the vision of the child as a future citizen of a society in which all members have equal access to education and culture, thus realizing an idea raised by progressive educators such as Friedrich Fröbel, Ellen Key, and Maria Montessori. Moreover, a prime idea of Reform Pedagogy consisted in fostering children's creative skills by encouraging them to create their own artworks, whether on their own or in close cooperation with playmates. Artists at art schools like the Wiener Werkstätte (Vienna Workshop) or the Bauhaus in Weimar (later in Dessau) even collaborated with children in order to find out what topics and artistic forms they find particularly attractive (Kümmerling-Meibauer 2013). Moreover, renowned artists such as Paul Klee, Henri Matisse, and Bruno Munari found inspiration in children's art for their own artworks (Maffei 2002; Olson 2012). Likewise, these ideas flowed into the books and toys they designed for children.

This tendency – to perceive children as creative agents rather than passive consumers – is almost inseparably connected to the second and third aspect, because educationalists, artists, authors, and publishers strove to impart knowledge about the present to children rather than shielding them from contemporary issues such as urban life, technical progress, industrial development, even political changes associated with historical events and the struggle of different political systems. These demands instigated lively debates about the socialization of children by means of nonfiction books, particularly the acceptability of books dealing with machines, factories, construction sites, and related issues. At the same time, prominent and influential psychologists, pedagogues, and cultural anthropologists advocated the idea that children should get in contact with modern life from early on, since children's minds are malleable and flexible. If properly educated and made

accustomed to the technical progress that was radically changing people's everyday life, children could represent a better or new generation, as they would be better adjusted to the changing working life and would develop an awareness of the related political and economic contexts. This approach led to the emergence of children's books that inform readers about the production of things, that is, how things are made and how machines run. This kind of nonfiction book for children, for which the label "production stories" has been coined, saw the light of day across many countries at almost the same time (Massa Hoiem 2021).

One of the first and most prominent voices in this respect was Lucy Sprague Mitchell, who founded the Bureau of Educational Experiments in New York in 1916. She propagated a "here and now" methodology, which implied that children should learn about the world by studying the phenomena of their environment and by playing with real objects rather than artificial toys. Mitchell's "Here and Now" books about skyscrapers, steam engines, and other subjects were highly successful in the USA in the 1920s (Op de Beeck 2010). Translated into other languages, the books held a high reputation in Soviet Russia where they served as models for similar production stories. These Soviet books were illustrated by then-popular avant-garde artists such as Boris Kustodiev, Vladimir Lebedev, and Alisa Poret (Balina and Oushakine 2022). At the same time, Mitchell's "here and now" books have been illustrated by artists who were either emigres from Soviet Russia or inspired by European avant-garde movements, thus coming full circle (Steiner 2015).

Since the topics addressed in production stories and other related books for children are rather complex and presuppose a certain knowledge of the world, artists and authors aimed at drafting a new design language, one based on simple geometrical forms, serial arrangement, and a limited color palette. Relying on the pedagogical programs of progressive educators, they particularly referred to the ideas of Friedrich Fröbel and Maria Montessori who developed pedagogical toys for preschool children. These specific toys consisted of simple geometrical forms, such as squares, rectangles, circles, and triangles, made of wood and other solid materials, mostly tinted in primary colors, with the addition of the secondary color green. These objects were to stimulate young children to create their own buildings, bridges, figures, and other constructions in a playful manner (Bordes 2007, 65). By doing so, children would gradually acquire an awareness of shapes and colors as a precondition for a better understanding of more complex forms and color palettes (Deppner 2011).

Another artistic strategy consisted in the serial arrangement of the same figures and objects in pictures, thus emphasizing the sheer number of things or people involved in the production of consumer goods and in carrying out work in factories and in agriculture. This kind of schematism was regularly employed in

informational books of the 1920s and 1930s and was quite prominent in Soviet picturebooks of that time (Rothenstein and Budashevskaya 2013). The schematic or serial design thus served two purposes: it should facilitate children's understanding of numbers – an idea that also emerged in the Isotype picturebooks – as well as introduce prototypical items that represent specific subjects. By reducing the complexity of the world to repetitive schemes, children may comprehend the basic tenets more easily and be able to recognize commonalities to related issues rather than being frustrated by complicated illustrations that might be overwhelming.

By and large, the art employed in production books and related genres was supposed to be fully integrated with life, thus conveying practical guidance into the world of knowledge. This program is in line with the tendency to employ abstraction, thus coalescing the principles of abstract geometric forms, limited color palette, and schematism or serialization. The stylistic and ideological context of the respective Soviet and Western children's books was frequently coupled with left-wing political inclinations which propagated equal access to education, particularly for children from proletarian and precarious backgrounds (Steiner 1999). This trend diminished in the second half of the 1930s, ushered by the economic and political crises of the period and the ascent of Fascism and Stalinism. However, mainstream publishers assimilated these concepts so that they continued to be used nevertheless, albeit in a weakened form.

Against this backdrop, the question arises as to how these three issues shaped the narrative structure and visual design of picturebooks and illustrated children's books. In the following sections, I will present two outstanding picturebooks from the 1920s whose innovative graphic design, pedagogical orientation, and ideological conceptualization pursued the purpose of conveying contemporary knowledge and/or encouraging children's active involvement by spurring their political and social awareness. On closer consideration, these two books are more closely connected than one would initially expect, since for the most part the picturebook artists knew each other personally. This was not unusual, because members of avant-garde circles frequently met in the artistic metropolises of Amsterdam, Berlin, Dresden, Hanover, London, Paris, Vienna, and Zurich or maintained an intense correspondence.

4 El Lissitzky: *Pro dva kvadrata* (1922)

El Lissitzky (1890–1941), a famous Russian avant-garde graphic artist and professional printmaker, is one of the most prominent representatives of the conception of the book as an expression of "creative sign-formation". He insisted that words

on the page are to be learned by sight, not by hearing. Therefore, the page design should embody a new visual language which privileges "optics instead of phonetics". During his collaboration with the Suprematist artist Kazimir Malevich in Vitebsk in the first decade of the twentieth century, Lissitzky designed the picturebook *Pro dva kvadrata* (About Two Squares), which heavily relies on this artistic movement. Because Suprematism was rejected by the state authorities shortly thereafter, Lissitzky no longer saw any prospects for his art in Russia and, as an unofficial ambassador of the International Bureau of Russian Artists, he emigrated to Berlin in 1920 with the picturebook manuscript in his luggage. This work was published in 1922 by the exile publisher Skythen in Berlin. The reception was somewhat hampered for linguistic reasons – the original edition is in Russian, while a German translation had not been considered for whatever reason[2] – and due to the changed political situation in Europe. However, *Pro dva kvadrata* found a great echo in artistic circles, particularly in Germany and later in the USA and Soviet Russia, due to the unusual page layout and the abstract illustrations (Weld 2018; Oushakine and Balina 2021, 36–39).

The book itself consists of an assemblage of text, lines, and colored geometric objects. The story itself is about two squares, a red one and a black one, representative of Proun[3] art and Suprematism. The squares fly towards the earth and smash the old architecture. Afterwards, they establish a new world order and then move on. Through reducing the images to simple and compound geometric forms and using a reduced color palette – red, black, and white – Lissitzky wanted to create a universal visual language that could be understood even without knowledge of visual symbols.

The fact that Suprematism was the basis for the development of this pictorial language is clear from the subtitle printed on the title page: *Suprematicheskii skaz pro dva kvadrata v shesti postroeniiakh* (A Suprematist Tale about Two Squares in Six Constructions). In addition, Lissitzky aimed at conveying a political and social message, the essence of which is that the existing world order was antiquated and must be replaced by the new art movement of Suprematism. Through the dedication "To all, to all children" that precedes the actual story, the picturebook reveals itself to be an early representative of crossover literature, as it addresses both children and adults (Beckett 2014, 25). The open ending, indicated by the text line "This is the end / onward" and the two squares flying away from the

2 Through the mediation of the avant-garde artist Theo van Doesburg, *Pro dva kvadrata* had been published in Dutch translation in 1923 as a double issue of the art magazine *De Stijl* (Lemmens and Stommels 2009, 365).

3 Proun is an abbreviation for "Pro Unovis", whereby "Unovis" is in turn an abbreviation of the Russian term "*Utverditeli Novogo Iskusstva*" (Advocates of New Art).

earth into space, as well as the invitation in the peritext to construct a story oneself out of paper, geometric shapes, and colors, emphasize the active role of the reader, thus encouraging children to develop their own version of the story (Weld 2018, 56).[4]

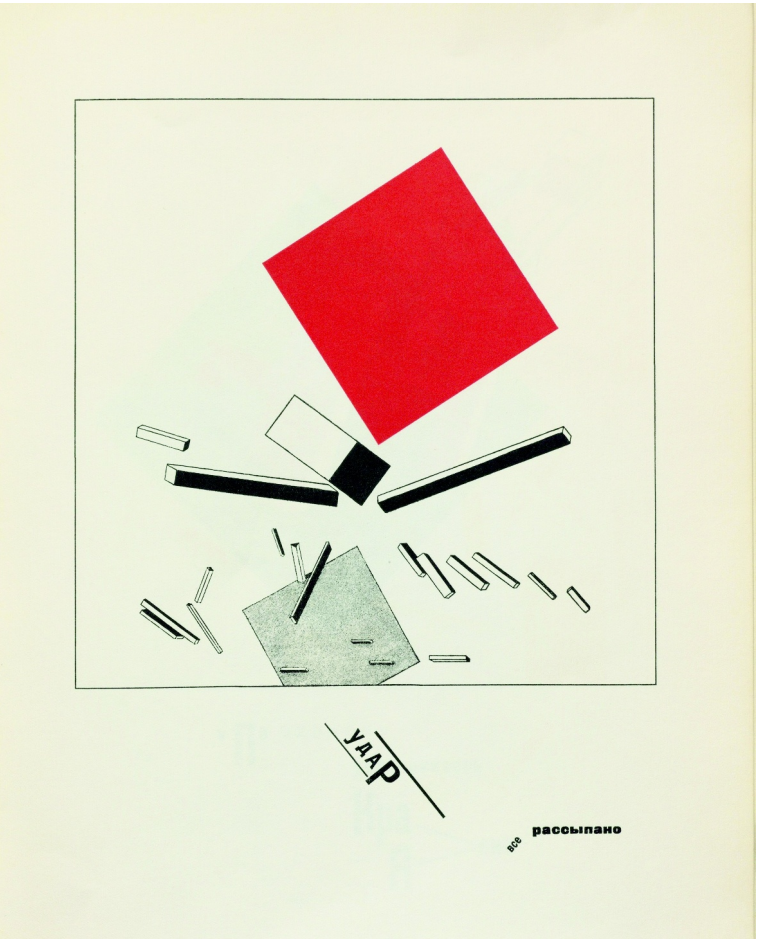


Figure 1: *Pro dva kvadrata. Suprematicheskii skaz pro dva kvadrata v shesti postroeniiakh* (1922) by El Lissitzky. The red square destroys the "old" architecture on earth. Private collection.

4 Next to nothing is known about the actual impact of this request on the reception and handling of El Lissitzky's book by real children, since there do not exist any empirical studies on this subject.

Critics have interpreted this sophisticated story about chaos, a mighty blow, and subsequent stabilization as an allegory for the commotion of the Bolshevik Revolution as well as Russia's eventual program for reconstruction. Seen in this light, the picturebook most likely delivers the following political message: two squares from outer space arrive on earth and destroy the buildings and artifacts created by mankind (Figure 1). After the heap of broken fragments has been restored to create a new world order, the two squares finally leave earth to seek out new adventures. Lissitzky's own political activism obviously points in this direction.

Whatever meaning this story may have, it should not be ignored that Lissitzky based the book on a certain principle, namely to "formulate an elementary idea using elementary means". This idea is in line with the request to reject traditional art forms in favor of Suprematism, which is represented by the two squares and the six geometrical constructions on the penultimate page. The geometrical forms and their arrangement on the pages were meant to activate the readers' creative thinking. Constructed as a sequence of binary codes, such as black vs. red and chaos vs. order, the book emphasizes the changes evoked by violent encounters. By employing an unusual combination of abstract shapes, typography, and page layout, Lissitzky encourages the reader to take a close look at the whole page in order to understand the possible meaning of the picturebook story. Against this backdrop, Lissitzky conceived reading as an activity that serves as a model for playful engagement with the world. The solicitation at the beginning of the book – to take "paper (fold), columns (color), and building blocks (build)" before one starts reading – can therefore be regarded as an invitation to construct one's own version of the story or to draft a completely different story altogether.

Lissitzky wanted to create a visual language which could be understood without any knowledge of visual symbols. For this specific reason, he prioritized simple geometric forms by relying on ideas developed in Suprematism. Apart from that, the close connection to Reform Pedagogy is obvious. This particularly comes to the fore in the request to take an active part by selecting appropriate material and related actions at the beginning, the use of basic geometric forms and a reduced color palette, and by encouraging the readership to think about possible extensions of the storyline when closing the book, or perhaps even destroying it by folding it into something new.

In any event, academic studies emphasize that Lissitzky's *Pro dva kvadrata* paved the way for the emergence of abstract picturebooks for children (Perez 1999; Kümmerling-Meibauer 2017; Weld 2018). Although Lissitzky's picturebook obviously tells a narrative story, it intends, on both the textual and the visual level, to draw the reader's attention to current political issues in the interwar period, namely about the conflicted situation in Soviet Russia. The reasons for

the decision to employ abstract shapes are manifold: they could be related to concerns by parents and educators, even the censorship measures which hovered like a sword of Damocles over many artists at that time. Another cause probably lies in the artist's efforts to create stories that are not limited to single political events but rather address universal ideas about the impact and development of political systems. This conceptualization goes hand in hand with the use of abstract elements in the illustrations, thus inviting the reader to "oscillate constantly between the image and the word, between an abstract idea and a concrete form, between a picture and a real object" (Oushakine and Balina 2021, 37).

Similar thoughts emerged in the sector of nonfiction books for children by the end of the 1920s, when authors, illustrators, and publishers were in search of new book concepts that would meet the criteria of a verifiable transmission of current knowledge, adaptation to children's cognitive abilities and interests, and an aesthetically attractive design. These ideas shaped inter alia the production stories published in the USA and the Soviet Union (Pichon-Bonin 2017). However, these informational books, although striving to impart contemporary knowledge in an easily accessible way, do not employ pictograms or use visual statistics, which is a standalone feature of the picturebook *Die bunte Welt* that had been developed by Otto Neurath and his team.

5 Otto Neurath and Gerd Arntz: *Die bunte Welt* (1929)

In tandem with Gerd Arntz (1900–1988) who worked as a graphic leader at the Gesellschafts- und Wirtschaftsmuseum in Vienna from 1929 to 1934, Otto Neurath (1882–1945) created the picturebook *Die bunte Welt* (The Colorful World), which was published in 1929. It should be noted, however, that neither of their names appear in the imprint or on the book cover. The imprint merely states "Publications of the Social and Economic Museum" without indicating any editor or author. Praised by Friedrich Heller as an "icon of modern visual language" (2008, 73) in the realm of picturebooks for children, this work was the first attempt to use the Wiener Methode der Bildstatistik (Vienna Method of Pictorial Statistics), developed in the mid-1920s, in a children's book. Arntz contributed new pictograms for the figures to be shown in the book (Arntz 1982). In this respect, he was inspired by Heinrich Hoerle, a member of the "Gruppe progressiver Künstler" (Group of Progressive Artists) based in Cologne. In line with "figurative construc-

tivism" – an art movement that borrowed from both Constructivism and the New Objectivity – Hoerle devised human figures whose outlines and shapes resemble simple constructivist forms. These "standard figures" (Benus 2013, 220) had been models for Arntz's later pictograms.

Although Marie Neurath (then known as Marie Reidemeister) is not mentioned as an author or contributor, it seems that she contributed to this project, since she was in charge of spreading the popularity of the new graphic design, thus assuming the role of a transformer (Kinross 2007, 158). Shortly after the publication of the book, she wrote an article in the journal *Arbeit und Wirtschaft* (Work and Economy, 1930), in which she elaborates on the unique feature of *Die bunte Welt*, namely that this book provides information in a unified and consistent manner rather than conveying it piecemeal through texts distributed in various media (Reidemeister 1930, 145).

The subtitle "Mengenbilder für die Jugend" (Quantity Pictures for Youth) already points to the overarching idea of providing knowledge about quantities in different areas, encompassing political, social, economic, religious, and geographical issues. As a whole, *Die bunte Welt* does not tell a continuous story. This picturebook rather consists of a sequence of pictures, with occasional short texts that provide general information about the images, for instance, the role of trade unions, the population distribution on earth, the amount of automobiles on earth, infant-mortality rates, or the changes of political systems after World War I. The range of the charts varies: while some of them focus on statistical data relating to the city of Vienna (for instance, the ratio between men and women who work in the dressmaking industry) or individual countries (mostly Germany), others visualize data relating to Europe and even the whole world. Of the 34 charts, fifteen focus on the world, six on Europe, seven on Germany, three on Vienna, and three on America, Africa, and/or Asia. With such themes and focuses, the book contrasts with the bourgeois conservative representations of the world still manifest in German textbooks and children's books in the late 1920s, thus paving the way for the modernization of informational children's literature in Austria. The images, printed alternatively in black-and-white and in full color (with a restriction to six colors), are governed by the principle of conveying accurate and clearly understandable visual messages.

Although it is generally agreed that Arntz exclusively designed the illustrations, the individual charts demonstrate a surprising variation in the depiction of figures. This is discernible in a double-spread which contrasts peoples of the world and different religions on earth (Figure 2). While both charts show standardized figures, the ones on the right-hand illustration are far more complex and show more details.

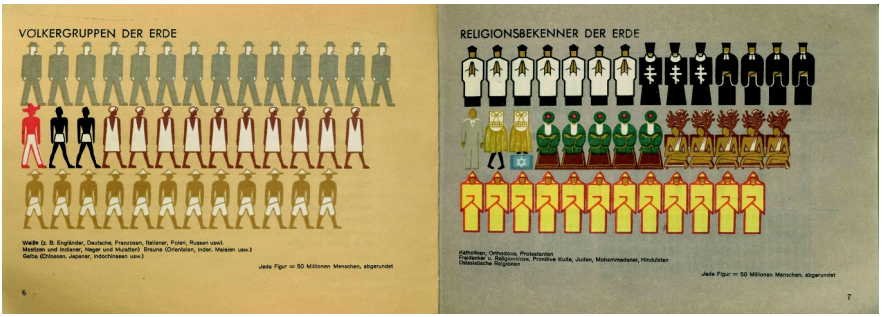


Figure 2: *Die bunte Welt* (1929) by Otto Neurath. Ill. Gerd Arntz. pp. 6–7. Charts about peoples of the world (left-hand picture) and religions on earth (right-hand picture). Private collection.

The difference in the representation of figures becomes even more obvious when one considers another double-spread on the soldiers who fought during World War I in Europe (left-hand picture) and the fates they suffered (right-hand picture) (Figure 3). The figures on the left-hand picture are much more abstract, to the extent of reducing them to their contours. While only this image resembles the charts and illustrations Arntz created for other books, leaflets, and exhibitions, the figures in the other charts are less abstract and strikingly figurative. For this reason, it has been speculated that the corresponding drawings were created by Erwin Bernath and Erich Meixner, who were responsible for the statistics design before Arntz took over the position as graphic leader at the museum (Burke 2013b, 103).



Figure 3: *Die bunte Welt* (1929) by Otto Neurath. Ill. Gerd Arntz, pp. 26–27. Charts about soldiers fighting during World War I in Europe (left-hand picture) and the fate they suffered (right-hand picture). Private collection.

Within the frame of fostering "visuelle Erziehung" (visual education),[5] particularly in the realms of economics and politics, Otto Neurath and Arntz envisioned a specific pedagogical concept, because the book was written as part of a school experiment commissioned by the Vienna City School Board. School principals expected the new visual pedagogy to improve female and male students' access to complex political, social, and economic processes. Although the picturebook was employed in several schools in Vienna, no empirical studies or reports exist that tell of its effects and reception within the school context. For this reason, it is not possible to make any firm statements about the extent to which the idea of the actively involved child was actually implemented. Categorized as a "new *Orbis pictus*" in a publisher's announcement (Heller 2008, 93), *Die bunte Welt* was placed within a centuries-old tradition.[6] Quite in the spirit of Johann Amos Comenius' *Orbis sensualium pictus* (The Visible World, 1658), *Die bunte Welt* intended to convey contemporary knowledge about the world to children. While the *Orbis pictus* additionally served as a language-learning book – with the aim to teach at least two different languages, namely Latin and a vernacular language such as German, French, or English – this purpose is absent from *Die bunte Welt*. Instead, as an advertisement by the publisher claims, the book would satisfy the demands of contemporary children: "Wie viel? fragen neugierige Kinder die Eltern, denn der heutigen Jugend ist Statistik so selbstverständlich wie der früheren die Technik" ("How much?" curious children ask their parents, because today's youth take statistics as much for granted as technology in the past) (quoted in Heller 2008, 324).

The political situation in Austria after 1933, the emigration of Marie and Otto Neurath and Arntz to the Netherlands and later to the United Kingdom, as well as their struggle to continue their projects under these difficult circumstances, prevented an immediate continuation of the project to create more informational picturebooks. Nevertheless, the question arises as to whether *Die bunte Welt* exerted a significant influence on the Isotype picturebooks or whether Marie Neurath developed a different concept.

5 On Otto Neurath's concept of *Bildpädagogik* (Visual Education), see Groß (2015) and Hartmann and Bauer (2002).

6 Burke (2013a, 10) points out that the *Orbis pictus* had been a "visual touchstone" for Otto Neurath's conceptualization of this book.

6 Marie Neurath and Isotype picturebooks

In her function as a transformer, Marie Neurath was involved in the conception of *Die bunte Welt* from the beginning, but she also knew El Lissitzky's artwork and had met the artist on several occasions, for the first time at the International Press Exhibition "Pressa" in Cologne in 1928. From that time on, Marie and Otto Neurath became close friends of El Lissitzky and his wife, the artist Sophie Lissitzky-Küppers. They met again in Moscow in 1931 to collaborate on the further development of the Vienna Method of Pictorial Statistics, which led to the foundation of the institute Izostat (an abbreviation for "All-Union Institute of Pictorial Statistics of Soviet Construction and Economy") in Moscow, which was used to illustrate the (over)fulfillment of the five-year plans and planned-economy quota (Minns 2013, 261). Although Marie and Otto Neurath ended their cooperation with Izostat in 1934 due to the institute's shift from education towards propaganda, they stayed in touch with El Lissitzky, and Marie Neurath particularly continued a personal correspondence with Sophie Lissitzky-Küppers. Regarding these transnational flows, it is less surprising that the concepts that governed the picturebooks *Pro dva kvadrata*, *Die bunte Welt*, and the Isotype picturebooks by Marie Neurath and her team are quite similar.[7]

Principles such as simplicity, comprehensibility, and the active involvement of the child reader, as well as the idea of developing a consistent design language,[8] were on the agenda of the picturebook makers, albeit with different premises. Guided by the same spirit, the artists were concerned with quenching children's thirst for knowledge and at the same time allowing them to participate in contemporary knowledge issues. To foster children's active engagement, the picturebooks employ different strategies, such as asking questions or assigning tasks in order to stimulate readers to take on the role of researchers. These essentials match the criteria set by Reynolds (2016) with respect to "political/social radicalism," that is, "treat children as socially important and rational", "future-oriented", and encourage them towards independent thought (217). Therefore, the authors and illustrators dovetailed the criteria of simplicity and easy comprehensibility by simultaneously inviting the active participation of readers to

7 The Isotype Collection at the University of Reading does not hold any nonfiction books for children, apart from those designed by Marie Neurath. Information provided by Sue Walker and curator Emma Minns. Therefore, it is difficult to ascertain which possible models could have inspired the Isotype picturebooks.

8 In this respect, it should be noted that Lissitzky's idea of a universal design language was not taken up by Marie Neurath. Although she wanted to create an easily comprehensible design, her approach is more international than universal (see also Burke 2013a, 10).

achieve these goals. At the same time, the books discussed here are aesthetically innovative, since they "experiment with form, design, and medium", and "promote new ways of seeing and thinking about the world" (Reynolds 2016, 217), thus aligning with criteria related to "aesthetic radicalism".

Marie Neurath refined the artistic demands of these evolving avant-garde trends to facilitate knowledge transfer to children. Like Lissitzky and in accordance with the concept of *Die bunte Welt*, she applied a limited color palette and certain kinds of abstraction to facilitate the comprehension of rather complex subjects. In addition, she was likewise interested in children's active engagement and the idea to provide knowledge about actual "here and now" topics. The fact that this objective has not only a pedagogical dimension but also a political one, establishes a line of connection to Lissitzky, who placed an emphasis on the promotion of political awareness to the extent that he even used propagandistic measures.[9]

While the two picturebooks I have previously discussed have close links to avant-garde movements of the interwar period (Suprematism, the New Objectivity), one may ask whether Marie Neurath's Isotype picturebooks show any avant-garde features at the very least.

The early Isotype picturebooks tie in with the interwar avant-garde; most noticeable is the influence of the New Objectivity and (figurative) Constructivism (see Figure 4). Yet the obvious changes in the graphic design of the Isotype picturebooks point at Marie Neurath and her team gradually becoming oriented towards an illustrative style influenced by postwar modernist graphic design.[10] Characteristics of this style are lesser details by focusing on simple shapes set against a monochrome background, a reduced color palette with a preference for light colors, and very few lines to indicate a setting or the position of objects and figures, thus enhancing their recognizability. Another feature is the tendency to evoke a certain dynamic by lines of movement and comparable visual strategies. Despite some similarities with interwar abstract design, the modernist graphic style of the 1950s and 1960s increasingly includes pictorial elements, thus softening the oftentimes static impression of images that merely use abstract elements.

9 The same can be said about *Die bunte Welt*, which combines information and political propaganda as a critical stance against the capitalist economy and a Eurocentric worldview by demonstrating the impact of political and economic processes in countries and regions all over the world (Sandner 2019, 236).

10 In this regard, it would be appealing to compare the Isotype picturebooks with the informational picturebooks published by Puffin and other British publishers of that time. See the chapter by Laura Little in this volume.

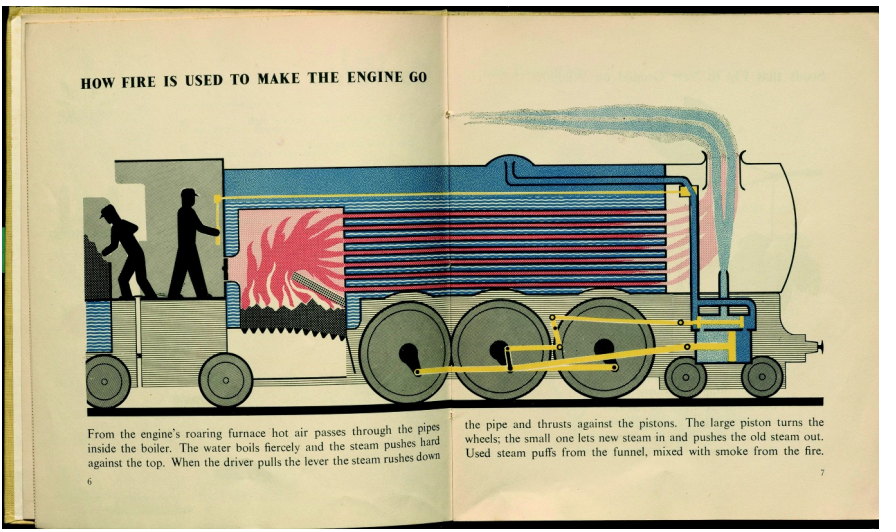


Figure 4: *I'll Show You How It Happens* (1948) by Marie Neurath. The illustration demonstrates the use of fire to make a steam engine go. Private collection.

One can only speculate about the reasons for these alterations discernible in the Isotype picturebooks, but the following causes might have triggered them: first, the adaptation to current changes in aesthetic tastes and programs of contemporary artists and publishers; second, the realization that children may have a greater interest in pictorial rather than abstract images; and third, the endeavor to cover a certain range of variations within the Isotype picturebooks. Another reason could be the idea to raise the comprehensibility of the topics presented in the books, although this goal does not always seem to have been fulfilled satisfactorily (see the chapter by Jörg Meibauer in this volume).

Apart from the turn towards contemporary modernist graphic design, the Isotype picturebooks cannot be regarded as successors of *Die bunte Welt* in various respects. First and foremost, in contrast to *Die bunte Welt*, the Isotype picturebooks include descriptive and explanatory texts about the scientific and technical issues on display. These narratives are either short stories which are usually of 1–2 pages or longer stories which run from the first pages to the last. Second, although the notion of Isotype recurs on the book titles as a sort of brand name, the method of visual statistics is only used in a few early Isotype picturebooks, such as the three volumes of the "Visual History of Mankind" (1948–1949). Instead, the picturebooks employ different visual strategies, such as repetition of basic images, magnification, and cross-section, to support children's understanding of complex technical and scientific phenomena. These features align with the main

Isotype principles, that is, omission of unnecessary detail, simplicity of shapes, and the use of pictograms when appropriate (Walker 2013, 401). A closer look at the depiction of figures in different Isotype picturebooks reveals changes over the course of time. While the Isotype picturebooks of the late 1940s and 1950s represent human figures as silhouettes, with no faces and rendered in rather static actions, those from the 1960s and later tend to individualize the figures by adding facial features, dressing them in typical clothes, and allowing them more movement (Figure 5).

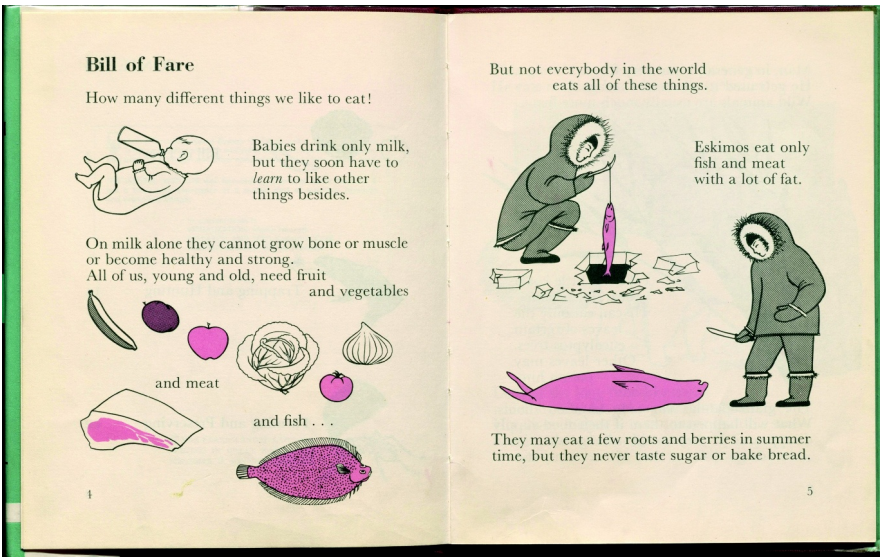


Figure 5: *Many Foods* (1963) by Marie Neurath. The human figures and the things they eat (fruits, vegetables, meat, fish, and milk) show individual features and thus deviate from the Isotype pictograms developed in the 1920s and later. Private collection.

This turn to characterization indicates that the criteria of schematization and standardization are mitigated in favor of drafting well-recognizable figures and objects that are not purely abstract, thus enabling child readers to more easily establish a relationship between the things depicted and their models in real life. Owing to these stipulations, one can conjecture that the key principles for the design of the Isotype picturebooks were education and knowledge transfer at the expense of compliance with formal requirements. This shift towards education once again points to the *Orbis pictus* tradition which also shaped the conceptualization of *Die bunte Welt*. Moreover, the limited printing possibilities of the seventeenth century had led to rather crude and simple depictions of figures and objects, which poten-

tially eases the understanding of the topics presented. Comparable ideas can be found abundantly in the history of infographics (Rendgen 2019). When analyzing the use of simplified classes of people and categories of things in the Isotype picturebooks, these different strands should be considered in order to obtain a comprehensive picture of the particularities of these exceptional picturebooks.

7 Conclusion

The gist of this contribution was, among other things, to demonstrate that the special features of the Isotype picturebooks cannot be fully understood without taking into account similar concurrent efforts to develop an abstract design language. The changes in the concept and style of the Isotype picturebooks have hardly been studied in depth so far. They may provide insights into the alterations that the aesthetic program of these picturebooks underwent over the course of almost thirty years. However, it has resulted from the analysis that the Isotype picturebooks refer to avant-garde tendencies of the interwar period. On the other hand, Marie Neurath did not seem to pay much attention to emerging avant-garde movements of the postwar years and beyond, such as Abstract Expressionism, Arte Povera, and Pop Art. Compared to the changes evoked by these movements – even on the creation of picturebooks for children (see Kümmerling-Meibauer and Meibauer 2011) – some Isotype picturebooks, particularly the early ones, use a visual concept which refers to past avant-garde features rather than including ideas taken from the post-avant-garde. Although Marie Neurath's picturebooks paved the way for the further development of nonfiction picturebooks by focusing on contemporary issues and considering the comprehension facilities and interests of children, the Isotype picturebooks themselves cannot be exclusively regarded as avant-gardist. A more precise description is that they employed features which were prominent in interwar avant-garde picturebooks, but these had been adjusted, even softened, to match actual ideas expressed by publishers and educationalists. Moreover, it is obvious that other sources of inspiration, such as the *Orbis pictus* tradition and the history of infographics, need to be considered. Nevertheless, Marie Neurath's picturebooks conform to an essential aim of radical children's literature, as they focus "on helping their readers mature into rational, fulfilled, capable adults by arming them with the skills and information they would need to interrogate their surroundings and decide what they wanted to think and believe" (Reynolds 2016, 2).[11] In retro-

11 Considering these similarities, it is more than surprising that Marie Neurath's Isotype picturebooks were not included, or even mentioned, in Reynolds' study.

spect, it is also apparent that the three issues closely connected with nonfiction picturebooks inspired by avant-garde ideas, namely the concept of the engaged child, the focus on contemporary political, technical, and scientific issues, and the creation of an art language which can be grasped reasonably quickly by children, shaped the Isotype picturebooks to varying degrees.

Against this background, the similarities and differences between the Isotype picturebooks and comparable (nonfiction) picturebooks of the interwar period as well as the postwar years can be much better identified, thus opening new vistas for a more detailed and precise analysis of this outstanding picturebook corpus.

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Laura Little

Nonfiction Picturebook Design in the UK in the 1940s

1 Introduction

This chapter looks at the context of children's publishing in the late 1930s and 1940s in the UK, leading to the publication of Marie Neurath's early Isotype books. This is a period of special interest in children's publishing, in which advances in print, production and design combined to create an environment in which high-quality, innovative children's books thrived. It is not the intention here to provide a comprehensive study of children's publishers of that period, but to explore how a few different publishers and illustrators responded to British and European modern aesthetics and modern ideology and how they influenced one another, a cross fertilization that led to the publication of pioneering illustrated nonfiction books for children. The examples provided here will also include unpublished work as these very early examples offer insights into the thought processes, considerations, and explorations that publishers, illustrators, and printers adopted in a new and fast-changing environment. John B. Thompson suggests that "the publishing field is an intensely competitive domain characterized by a high degree of inter-organisational rivalry. [. . .] The staff of every publishing house are constantly looking over their shoulders to see what their competitors are doing" (2012, 10), a sentiment valid for twentieth and twenty-first century alike. Considering publishers alongside one another helps to provide a context for the work they produced. Marie Neurath's Isotype approach of using bold flat colors and repeated pictograms, for example, diverges markedly from the nonfiction titles of her contemporaries in the UK but her work nevertheless has aspects in common with them. While numerous children's publishers were in the market during this period (see Joe Pearson (2010) for further details), the focus of this chapter will be the influence of Noel Carrington's publishing strategy at Country Life and Puffin Picture Books, and Marie Neurath's early work published by Max Parrish and packaged by Adprint.

Penguin Random House is one of the "Big Five" publishers in the UK today, and the founding of one of their imprints, Puffin Picture Books, is a seminal moment in children's nonfiction publishing. While early Ladybird Books, published

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by Wills & Hepworth, can be challenging to date accurately (as can books from other publishers, e.g. some Puffin editions), the 1940s saw the publication of titles on fairy tales, nursery rhymes, and adventure stories, while nonfiction titles on nature, history, and mechanical topics formed their list in the 1950s (Zeegen 2015; Day 2023). In recognition that "tools, typologies and theoretical frameworks that exist for fiction and narrative picturebooks cannot necessarily be directly applied to nonfiction picturebooks" (Goga, Iversen and Teigland 2021, 3), Ladybird Books will not be considered here, rather Joe Sutliff Sanders' characterization of nonfiction as "[inviting] critical engagement" will be followed (2018, 224). Sutliff Sanders focuses primarily on books published during a later time period, but his definition can also be applied to earlier titles; when discussing early Puffin Picture Books, for example, Kimberley Reynolds describes them as having a "view of instilling the habit of independent thought" (2016, 103).

2 Children's publishing in the 1940s: Design, illustration, printing, and publishing

Significant changes came to the UK in the fields of illustration, printing, and publishing during the interwar years. The 1930s and 1940s saw the introduction of new courses at the Royal College of Art (RCA) with an emphasis on professional instruction. These courses included fashion, product design, and graphic design. Under the umbrella of graphic design came an emphasis on illustration and commercial art, and an ethos for supporting practitioner-lecturers lent an industry focus to these courses. Sir William Rothenstein, Principal of the RCA, hoped to inspire the next generation of artists and designers to create "a new Modernism rooted in traditional practices" (Hawkins 2017). Alan Powers commented on work created by design students at the RCA in which they could be seen to be "combining progressive and conservative qualities in their work" (2018, 8). Rothenstein's approach was described by Robert Hawkins as "conservative radicalism", as it was conservative in taste, yet radical in methods. Similar principles can be seen in children's publishing of this period, in which "past and future were powerfully connected in the sphere of radical publishing" (Reynolds 2016, 201).

While influences from the European avant-garde are apparent during this period, British modernist art has distinctive characteristics of its own, reflected, for example, in Paul Nash's essay "Going Modern and Being British" (1932). In 1924, Nash described the "outbreak of talent" he witnessed while teaching at the School of Design at the Royal College of Art, where he advocated that his students should have "a new freedom to practice a form of Modernism through commercial art",

while maintaining artistic freedom and integrity (Powers 2018, 10). Of this group of students, Edward Bawden, Enid Marx, Helen Binyon, and Eric Ravilious went on to illustrate children's books. Of these, Marx was perhaps the most overt in embracing in her children's book illustrations bold, geometric patterns, that were derived from textile designs, such as her stylized images of the sea in *The Pigeon Ace* (1943), which are made up of a geometric v-shaped pattern in blues and greens. Kimberley Reynolds discusses how visual experimentation across typography and design that results in striking, graphic images is perhaps more easily recognized as avant-garde; for example, the illustrations in Lewitt-Him's *The Football's Revolt* (1939) are influenced by avant-garde movements such as Cubism. In contrast, early Picture Puffin books, aimed at children aged 7–14, have been described by Paul Stiff (2007, 23, 34) as experiments in "gentle modernity", where modernity is viewed as a social project, as distinct from the striking graphic, visual experimentation that Reynolds outlines as more recognizably avant-garde. This view is echoed by Harriet Cory-Wright, who suggests that, "The Puffin Picture Books offer an alternative instance in which modernity can exist more as a social construct than something that can be distinguished from the look and feel of modernism" (2014, 262). According to Reynolds, "one of their recurring themes, benefits of progress, was very much in keeping with the message of radical children's literature" (2016, 98), which "urged young readers to be excited by the prospect of social change and to engage with rather than retreat from modernity" (9).

The changing role of the commercial artist was further facilitated by developments in printing and publishing. In 1935, Allen Lane founded Penguin Books with the aim of producing high-quality, affordable paperbacks that could be "bought as easily and casually as a packet of cigarettes" (Our Story, no date; Stevenson 2010). Influenced by Soviet picturebooks and Père Castor books (Baines 2010; Pearson 2010), Puffin Picture Books were carefully designed to combine high-quality illustrated content with affordable production. World War II brought paper rations and ink shortages; here, Penguin's business model was advantageous as their high print runs meant that they were allocated a proportionate amount of paper for their 1940 print run, based on their previous year's paper use.[1] This gave them sufficient paper stock to create their new Puffin imprint (Stiff 2007; Baines 2010; Stevenson 2010). The principle of affordability remained strong (Stiff 2007). Each Picture Puffin was carefully designed to keep costs down, both as titles in their own right, but also as part of the wider Penguin business. For example, each Puffin Picture Book was exactly twice the size of a Penguin paperback to allow for efficient warehouse storage. The publisher worked closely

1 See Iain Stevenson (2010) for more detail on book publishing in World War II.

and collaboratively with their authors, illustrators, and printers across the different aspects of the publishing process.

When Noel Carrington, the editor of Puffin Picture Books (Baines 2010), approached Lane about launching a nonfiction list, he advocated for an illustrated children's list, comprising "books on 'nature, mechanics and farming'" (Jackson 1993, 37). As a publisher, Noel Carrington (1895–1989) was an advocate for high quality design. He worked for Country Life from 1923 to 1928 and again from 1935 to 1940. In the 1930s, he joined the Design and Industries Association (DIA), which was instrumental in shaping his understanding of design and printing processes. In the late 1930s, despite Country Life's reputation for celebrating predominantly English gardens, architecture, furniture, and country houses, Carrington drew on his interests in both design and print and began to expand their children's list, incorporating highly illustrated content. The authors and illustrators he collaborated with included the young talent identified by Nash: Carrington commissioned work by Bawden and Ravilious, among others. Titles included Kathleen Hale's *Orlando the Marmalade Cat* (1938) and Eric Ravilious' *High Street* (1938), with a text by J. M. Richards, which it could be argued were precursors of the Puffin Picture Books,[2] as they offered Carrington an opportunity to explore lithography as a means of producing colorful illustrations in high print runs (Pearson 2010, 34–40). In this aim, Carrington was facilitated by the new generation of commercial artists, whose experimentation across multiple artistic mediums gave rise to high quality craftsmanship and an understanding of production techniques in areas such as printing. For example, Eric Ravilious (1903–1942) worked across numerous formats as an artist and designer. His paintings are held in private and public collections. He produced wood engravings and lithographs for book illustration and created designs for Wedgwood ceramics. His book *High Street,* first published in 1938 by Country Life Ltd., was published as a facsimile edition by Thames and Hudson and the Victoria and Albert Museum in 2012 and 2022, demonstrating a continued interest in this work. Originally proposed as a children's book comprising an ABC of shops on the high street, the final version contains 24 color lithographs of shops, including the butcher, knife sharpener, and submarine equipment shop (Figure 1). The content focuses on an explanation of what the different shops offer, and implies a delight in the less usual, such as a submarine shop, a taxidermist and a sign and letter works. Originally published in an edition of 2,000, the book largely met with positive reviews and was praised for its "wit and elegance" (Powers 2013, 58). There was some discussion regarding the audience of this book; however, Carrington, who was building a new children's list,

2 Hale and Ravilious were both later commissioned to create titles for the Puffin Picture Books.

steered the project in this direction and considered it a book for children (Powers 2013, 56). A mild nostalgia can be seen in content such as the style of the diving suit, and the architecture of the shop fronts. The contrast between the repeated, graphic pattern in the submarine shop's display and the Victorian style of the ironwork above the shop sign highlights Ravilious' gentle exploration of tradition and modernity. Ravilious uses a muted color palette gently offset by highlights in yellow and crisp linework that lends a characterful impression to the diver's suit. From a technical perspective, this book was Ravilious' first attempt at working with lithography, a printing technique based on the principle that water and oil repel one another. Artwork made by means of a copper or wood engraving would typically be transferred to the printing plate by the printer, but in lithography, the artwork is drawn directly onto the printing plate (usually a lithography stone) by the illustrator with an oil-based, black, greasy crayon.[3] This allowed for an immediacy in the printing process, as it was the illustrator's unprocessed image that was printed. Creating prints in color using lithography is complex: the illustrator needs to understand the printing process to separate and draw their image onto several printing plates which are inked using different colors. A CMYK four-color print for example, requires separate plates for cyan, magenta, yellow, and black ink, which are printed on top of one another to create a colored print. So, if the image contains green, a plate for both cyan and yellow needs to be made and the images on the two plates lined up correctly so that the printed image appears green to the viewer's eye. To prepare a lithography plate, the surface of the stone is regrained using carborundum grit of different weights, leaving a smooth surface. However, the texture of the stone's surface is unlike paper, creating a different amount of resistance and drag when the artist moves a crayon across it, so that drawing on it feels quite dissimilar. During the war, a shortage of lithography stones resulted in zinc composite plates being substituted, and Ravilious used these for the *High Street*. These plates were typically dark grey, which made it harder to see the black marks of the greasy crayon. However, although it involves a high level of skill from both the illustrator and the printer, lithography as a process provides scope for the reproduction of a rich illustrated image, and this offered Carrington the confidence to print a new, highly illustrated children's series in the form of Puffin Picture Books. It demonstrates Carrington's early explorations of combining high quality content with developments in print technology to produce affordable books with color illustrations in high print runs. The *High Street* also marked the start of Ravilious' professional relationship with Carring-

3 The crayons can be diluted with ionized water to create an 'ink', which can be used with a dip pen or a paintbrush on the lithography stone, offering versatility of mark-making.

ton, who went on to become a champion for his career, for example by highlighting Ravilious' work in his essay on the "The Modern British Artist in British Industry" (1945), and Ravilious was one of the first illustrators Carrington commissioned to create a Puffin Picture Book.



Figure 1: *High Street* (1938) by J.M. Richards, ill. Eric Ravilious. A window display of a submarine shop which shows a diver's suit. Photo credit: The Stapleton Collection / Bridgeman Images.

With the outbreak of war, Carrington and Lane were keen to publish books on nature and the English countryside for children evacuated from cities, including titles such as *On the Farm* (1940) (Wright 2009). In late 1939, Ravilious produced a series of pencil and watercolor images of chalk figures in the English landscape, including the "The Westbury Horse" and "The Wilmington Giant" (Friend 2018,

266). These images were intended to provide some of the illustrations for a Puffin Picture Book on "White Horses".[4] Powers (2013) comments on the combination in these images of aspects of the countryside and contemporary visual representations, for example, the goods train in the background of "The Westbury Horse", or the barbed wire fence cutting through the forefront of the image of the "Wilmington Giant" (Figure 2). Ravilious' contemporary at the RCA, Helen Binyon, describes how the angle from which he painted the chalk figures, such as from train windows, or from a vantage point higher up on the hill, created an unusual focal point (Binyon 1983, 109). These images of a historic landscape connect with Paul Nash's idea of "the spirit of place", linking together nature and evidence of human intervention, such as chalk figures, hedges and field boundaries. At 68 meters high, the "Wilmington Giant" is a well-known example of one of England's chalk figures. It was later covered over to hide a distinctive landmark from planes during World War II.

In his exploration of new printing techniques and in his engagement in the 1930s and early 1940s with content matter ranging from nature to machinery,[5] Ravilious exemplifies "conservative radicalism" in both his urban and rural images.

In contrast, Marie Neurath in *If You Could See Inside* (1948) also depicts an image of natural features in a hillside (Figure 3), but as a generic landscape, with insufficient details to connect it to a particular geographic region. Neurath's image portrays a vegetation-covered hillside, with natural and human-made features such as caves and buildings but the visual style is very different from Ravilious', whose "Wilmington Giant" captures the texture of the landscape by providing a three-dimensional impression of the contours of the hillside with line and shading. Neurath's image is stylistically simplified: the contours of the hill are smoothed into a two-dimensional, symmetrical dome. The hill is covered with grass represented by a repeated, graphic pattern, with groups of green pictogram trees, and buildings in contrasting red.

The success of the Puffin Picture Books created a precedent for experimental children's publishing in the UK during the 1940s. It was supported by advances in

4 Originally titled "Downland Man", Ravilious sent a dummy of the book and sample illustrations to Carrington, who intended to publish it as a Puffin Picture Book in 1941. By then, Ravilious was working as a war artist and the book was not completed before his death in 1942, and therefore was not published as part of the early Puffin series. The dummy was discovered in 2010 and the "lost Puffin" was completed, based on letters and sketches between Carrington and Ravilious, and published by Design for Today in co-operation with The Penguin Collectors Society in 2019 (Pearson 2019).

5 As a war artist, he documented planes, submarines, and ships. For more information, see: "Ravilious: Submarine" by James Russell.



Figure 2: The Wilmington Giant, a chalk figure on the South Downs, ill. Eric Ravilious, 1939. Photo credit: Bridgeman Images.

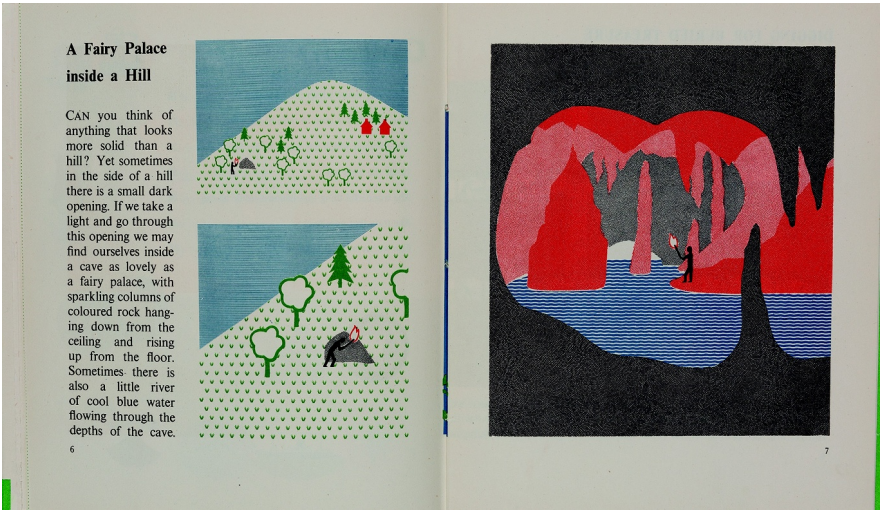


Figure 3: A hillside in *If You Could See Inside* (1948) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

print and production technology, and by developments in art and design education in the interwar years. This success during the early years created a trend for high-quality, dynamic, and innovative children's picturebook publishing. To reiterate Thompson, staff at other publishers would have been looking over their shoulder to see what their competitors were doing and considering ways of building on that in their own lists, as they looked for ways of developing new work. It seems likely that the success of the early Puffin Picture Books created a space for children's nonfiction lists to grow and develop new ways of communicating information. The influence of French and Soviet children's books on the Puffin Picture Books has been documented (for example, see Baines (2010); Pearson (2010)), however, Puffin Picture Books also influenced other publishers, such as Max Parrish and his book packager,[6] Adprint, who built on Puffin's work in the nonfiction domain and brought a European modern aesthetic to children's publishing in the UK, as is evident from their publication of Marie Neurath's children's books. According to Paul Stiff, "its trial and error development of a mixture of prefabricated modular elements and language-like attributes: clearly-articulated rules for the combination of these elements, segmentation and reduced iconicity" made the Isotype "modern" (2007, 35). Marie Neurath's children's books were a development of her work in Vienna with her husband, Otto Neurath; however, given the environment created by other publishers in the UK at that time they found a ready market there.

3 Isotype characteristics and children's books

Marie Neurath created over 80 children's books between 1948 and her retirement in 1971. These give an indication of the extent of Neurath's engagement with the universal symbols of the Isotype to explain complex ideas to a young audience. The different techniques and approaches used by the Isotype Institute have been outlined by Sue Walker (2014), and include the use of cross-sections, magnification, and color coding. For example, in *Railways under London*, first published in 1948 (Walker 2013b), all vehicles, including trains, buses, underground trains, taxis, and cars are consistently colored red throughout the book. Aimed at children aged 9–12, the book provided information on how the London Underground worked, including facts about brakes, elevators, automatic doors on trains, and

6 The role of the book packager was created during the war to facilitate book production before titles were passed on to the publisher for sale and distribution (Stevenson 2010).

ticket machines. It attracted critical acclaim and in 1949 was chosen as one of the 50 best British books of the year by the National Book League.

A guiding principle of Marie Neurath's method was to focus on well-researched and highly accurate content. She was meticulous in her use of a variety of sources to confirm technical accuracy. In a retrospective reflection on the Isotype approach from the 1920s onwards, Marie Neurath describes how the Isotype charts developed and were tested in several settings (Neurath and Kinross 2008): for example, school groups at the museum used the charts to answer questions, which gave the team of transformers feedback on how to arrange data for ease of use (Neurath 1974).

Influenced in part by Carrington's Puffin Picture Books (Walker 2012), the Isotype children's books were created in collaboration with Adprint and published under the imprint Max Parrish. Adprint, a book packager, was founded in 1937 by Wolfgang Foges and Walter Neurath (no relation of Otto Neurath, Walter Neurath went on to found Thames and Hudson). Book packagers work with several different publishing companies; the King Penguin series, for example, was launched by Allen Lane in association with Adprint in 1939 (Stevenson 2010, 134). Walter Neurath, as production manager, understood the importance of the integration of text and images on a double-page spread (Walker 2012). The process of creating these books and Marie Neurath's role as a "transformer" has been documented by Neurath and Kinross (2008) and Walker (2014, 2017).

Neurath's books from the 1940s reflect her utilization of the Isotype method of image creation in order to communicate complex information in an accessible manner. Drawing on approaches derived from the visual presentation of statistics and data charts, these early forms of infographics pioneered methods of simplifying complex information by visual means. This problem-solving process in relation to image-making continues to hold interest for graphic designers today, who use a series of tools or techniques primarily developed to convert graphic design intended to communicate statistical information into another subject area or medium.

Devised with the intention of creating a universal visual language, Isotype was developed during the 1920s and 1930s at the Museum for Social and Economic Affairs in Vienna, Austria, under the leadership of Otto Neurath and his collaborator Marie Neurath to depict information such as unemployment statistics in a pictorial way that allowed the reader to interpret the data quickly and easily. Otto Neurath did not have a design background, and Isotype was content-first in their approach: as Twyman points out, "the Isotype Movement provides the best example I know of graphic design innovations stemming from the need for social reconstruction" (1975, 7–8). Schematic shape and flat color are used to produce simplified representations of a data set in the form of a pictogram.

From a graphic design perspective, these simplified images were effective in a nonfiction context: as Lupton asserts, "flatness suggests a factual honesty, as opposed to the illusion of a perspective drawing" and they offer "a natural cast rather than a cultural interpretation" (1986, 54), and their legacy can still be seen today in road signs and information signs such as the conventional use of a stylized, simplified image of a suitcase at an airport to represent a luggage collection point. As well as applying their concepts in Vienna, the Neuraths looked for international opportunities for their work. In 1938, Otto Neurath travelled to the USA, where he launched a series of information charts that showed how to help prevent the spread of tuberculosis. The team also collaborated with partners in the Soviet Union to create statistical graphics, covering topics such as the Five-Year Plan and developments in coal and steel. In the 1930s, the Neuraths moved, first to The Hague, and then on to the UK. They began to explore new applications for the Isotype method that they had devised and to experiment with different ways of presenting information.

The subject matter of the Neuraths at this stage centered on aspects of social change, for example, through communicating information on the spread of infectious diseases, or on how a household can salvage scrap materials. One of their new approaches can be seen in an Isotype animated film commissioned by the UK Ministry of Information. *A Few Ounces a Day* drew attention to the importance of limiting the stream of goods coming from the USA by ship in 1940–1941, since many of these convoys were destroyed in transit by German vessels (Jansen 2009, 233). Produced by Paul Rotha, the film highlights the need for households to save scrap such as bones, lightbulbs, and packaging in order to replace some of the material that was lost at sea in transit to the UK. The use of a pictogram to represent an item such as a ship, a crate, or a burlap sack, at times repeated as in, for example, a group of identical ships at sea, exploits techniques that they had developed at the Museum for Social and Economic Affairs in Vienna to provide a visually effective way of describing multiple ships of cargo crossing the Atlantic Ocean. However, as the production was outsourced, the Neuraths were not always fully satisfied with the results (Burke 2013, 377). A chart is often designed as a stand-alone object, whereas a book or animation consists of sequences which require a different approach, both in terms of design and in terms of curating a coherent whole. Each double-page spread of a book is viewed in isolation, but also in the context of the preceding and subsequent spreads. It could be argued that the repetition of universal pictograms gives a strong sense of cohesiveness throughout a book.

4 *Just Boxes* and *If You Could See Inside*

In 1944, the Neuraths created the prototype for *Just Boxes*. The premise behind this book was that "[. . .] modern implements present themselves usually in boxes, therefore one has to look into the box to see how they work" (Otto Neurath 1944). Although unpublished, this prototype is a significant example as it shows the developmental work and consideration apparent in the Neuraths' exploration of a new medium in the form of a children's book. Similarly to early Puffin Picture Books, the Neurath's early prototype is of note as it offers insights into their early considerations. The prototype covers numerous "boxes", including a refrigerator (a cold box), a cooker (a hot box) and a house (a living box). This collaborative prototype formed the basis of Marie Neurath's first children's book. After Otto Neurath's death in 1945, Marie Neurath moved from Oxford to London and continued their work with Isotype, and in October 1948, *If You Could See Inside*[7] was published. Printed in four-color offset lithography,[8] this book comprises 27 full color pages, a board cover, cloth spine and a jacket. The content includes items such as a volcano (a fiery mountain), a castle under siege, a mole's tunnel, a hen's embryo growing inside an egg and a house. Color is employed to convey meaning and extraneous details are omitted. As in the Neuraths' previous Isotype publications, repeated images of the same pictogram are utilized in the spreads, for example, of the mole burrowing underground in its tunnel. A development on the idea of *Just Boxes*, the concept behind Marie Neurath's first book, *If You Could See Inside*, is based on "cutting through"; if you cut through something such as a volcano, an egg, a house, or a mole's tunnel with a magic knife, this is what you would see. The topics selected for this title include both human-made objects such as a house, and aspects of natural science such as the inside of a wasp's nest. The visual design follows what Ellen Lupton refers to as "Machine esthetics [. . .] clean, logical, transparent, free of redundancy" that requires the "elimination of [. . .] perspective and internal features" (1986, 54–55), while added elements reflect a more fluid approach. For example, a pictogram of a cross section of a house is made up of straight lines depicting the walls, stairs, plumbing and foundations that provide a clear explanation of how a house is constructed (Figure 4). However, the image also contains silhouettes of furniture, people, and a cat.

7 A digitized version of the book can be seen here: https://www.marieneurath.org/ (27 July 2024).
8 In offset lithography the image is transferred or 'offset' from the plate to a rubber blanket or roller before it is printed on paper, so the final is effectively a print of a print. This allow for the image to be created as it would appear on the paper (the print is in reverse if printed directly from the plate). Offset printing can help protect the plate, as the print is taken from an intermediary surface rather than directly from the plate.

While this information could be argued to be superfluous, perhaps suggesting limitations of the "machine aesthetics", it helps the viewer to identify the house as a dwelling rather than a generic building and the child to relate to it as a home. Otto Neurath's idea of "engaging" a child with a repeated image such as a black cat is also pertinent; in a comment about series and the use of common images across different titles, he writes: "one may use again and again the same house, and a certain animal, e.g. a black cat may appear again and again, partly not as a leading actor" (Neurath 1944). Echoes of this idea can be seen in later children's books, such as the recurring yellow duck hiding on each page in Stephen Cartwright's illustrations for Usborne Books.

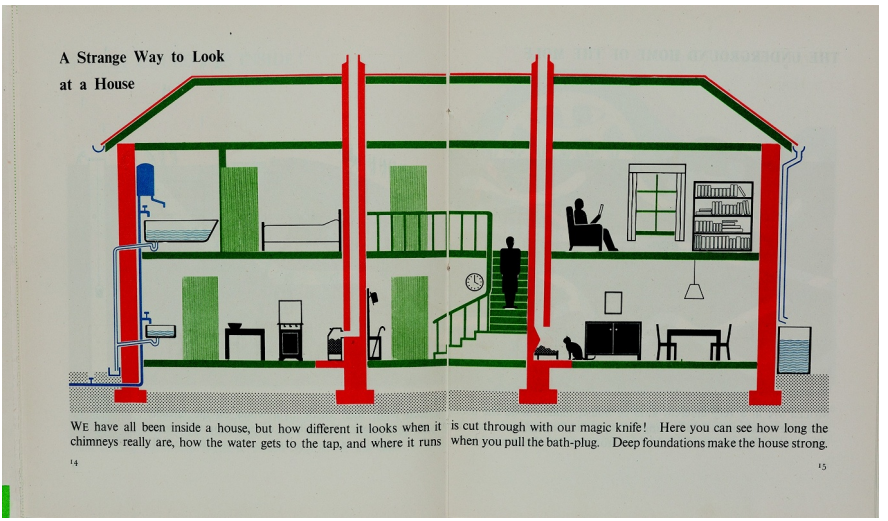


Figure 4: *If You Could See Inside* (1948) by Marie Neurath. The image shows a cross-section of a house showing stylized foundations, plumbing, and chimneys. Otto and Marie Neurath Isotype Collection, University of Reading.

A challenge for the design of Isotype pictograms arises from the transformation of complex content into stylized schematic simplicity, a job undertaken by the role of the 'transformer' in the collaborative process at the Isotype Institute. The content of Marie Neurath's early books, that include mechanics and the natural world, is broadly similar to that of the early Puffin Picture Books, but her use of bold graphic shapes and strong primary colors diverge visually from them. Phil Baines contrasts Neurath's diagram of a house with Puffin's *Building a House* (1949), which also features a cross section of a house showing foundations, plumbing, and internal structure in a more complex three-dimensional image and

points out that the difference lies in the Isotype Institute's simplification of technical information from three-dimensional to two-dimensional image and omission of details such as the external façade, detailed information on the positioning of the plumbing pipes and methodical descriptions of the parts of the chimney. In the Puffin Picture Book, the content is more technical, and Baines speculates that the audience could be professional engineers, rather than children (2010, 44). Richard Leacroft, the author and illustrator for *Building a House*, was an architect by trade. He wrote several books throughout his life for both adults and children, which contain detailed, accurate, isometric "cut-away" illustrations of both the inside and the outside of the structure. His book *The Development of the English Playhouse* (1973), which is recognized as one of the most informative and authoritative books in its field, is particularly noted for its detailed and accurate illustrations (V&A Archives Collection, no date).

Perhaps this is where the "Isotype exemplifies a project common to much modern art and design – the attempt to eclipse interpretation with perception, to replace reading with seeing" (Lupton 1986, 50). The "world language" of the Isotype makes cultural references universal, rather than specific, and the sense of "the spirit of place", discussed above in relation to Ravilious' work, disappears.

5 Conclusion

While there are similarities in both content and arguably the approach to creating content between some titles of the Puffin Picture Books and Neurath's children's picturebooks published in the UK in the 1940s, their graphic styles are very different. It could be argued that while the Isotype approach offers a distinctive visual language that has its roots in the desire for 'social reconstruction', an aspiration for readers to engage with social progress can also be seen in the Puffin Picture Books published during this era. The Puffin Picture Books brought an English modernist approach to children's book creation in their experimentation with new technologies and "a specifically British response to avant-garde arts [. . .] in which overthrowing convention and reinvigorating the arts was achieved through re-engaging with tradition and reconnecting with place" (Reynolds 2016, 103). In contrast, Neurath brought a use of flat, primary colors, and simplified graphics. Her work reflects an approach that makes information more accessible, with social progress encouraged through understanding rather than radicalization. Her visual icons of people, forexample, are simplified yet relatable, rather like a peg doll or the wooden figurines of a child's board game, and they engage in familiar activities like walking upstairs or sitting in front of a fire. The similari-

ties in presentation between the publishers Puffin Picture Books and Max Parrish offer accessibility to nonfiction content, while allowing the reader/viewer scope to explore it in visually different ways. As Thompson argues, the way publishers are influenced by each other helps drive forward new approaches and innovation. The publication of facsimile editions, and in some cases the publication of 'lost' early work, such as *White Horses,* suggests that the problem-solving process involving image-making that illustrators used in their books in the 1940s to communicate complex information in an accessible manner still holds interest today. Similarly, techniques that Neurath pioneered such as the use of striking, graphically bold shapes combined with a flat color palette can still be seen in both the wider field of graphic design and in UK nonfiction children's publishing today.

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Silke Körber

Marie Neurath and Adprint

1 Isotype and Adprint in exile

The development of the pictorial method of knowledge transfer by Otto and Marie Neurath and their partners during their years in exile only becomes intelligible against the background of contemporary currents and tendencies in culture and science. In the first half of the twentieth century, access to increasingly specialized knowledge had become the condition for participation and advancement in cities from London to Vienna. Intellectuals, journalists, writers, publishers, and scientists were at the time concerned with aspects of mass communication such as reading habits, the public's understanding of science, or the idea of a universal language: from the German Bauhaus movement to Paul Otlet's Mundaneum in Brussels and C. K. Ogden's Basic English (a condensed version of English with a reduced vocabulary of 850 words). In the course of his life, Otto Neurath collaborated with all of them in the form of lectures, educational projects, and publications. He believed that modern science should help to gain a clearer and more coherent view of the world for all people, regardless of social status or age. Especially in the face of emerging dictatorships, the spread of political propaganda, and manipulation by the political establishment or the sensationalist press, critical opinion-forming needed to be supported. This was also the view of a group of left-wing and Jewish emigrants in Great Britain (and the USA) around Wolfgang Foges, Paul Steiner, and his staff at the book-packaging company Adprint, a partner with whom Otto and Marie Neurath closely collaborated. The communication of scientific facts, new findings, and developments in Adprint's illustrated nonfiction books required not only expert knowledge on the part of the authors, but also the ability to convey this didactically. They saw it as their duty to combine a contemporary, modern way of imparting knowledge to a mass audience with emancipative-enlightenment goals and forward-looking design.

Another contemporary example, besides Isotype, are the infographics of the German bestselling author and physician Fritz Kahn. He became known for his multi-volume work *Das Leben des Menschen* (Human Life, 1922–1931). This included illustrations such as "Der Mensch als Industriepalast" (Man as Industrial Palace), which depicts bodily functions in analogy to modern, rationalized, and mechanized work processes or the human body as a machine. In an innovative and often humorous way, Kahn succeeded from the 1920s onward in making complex biological facts and processes comprehensible to the masses in words and images in close semantic connection, especially drawings. Kahn was closely asso-

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ciated with Paul Steiner and published several of his books with him in the USA.[1] In comparison with Kahn, Otto Neurath's approach was more systematic and universal: the development of Isotype (International System of Typographic Picture Education) in exile – as described most notably by Christopher Burke, Eric Kindel and Sue Walker in their standard work on Isotype (2013)[2] – can be seen in analogy to the development of a scientific language – as a symbolic language based on conventions with a high iconic quality, e.g. showing social, technological, biological, or historical connections in pictorial form. Back in Vienna at the Museum of Society and Economy, Otto Neurath, with a team including Marie Reidemeister and graphic designer Gerd Arntz, had invented between 1925 and 1934 the so-called Vienna Method of Pictorial Statistics, on which Isotype is based. They established rules for the systematic transformation of data, first in the context of "Red Vienna" for the workers' movement, laypeople, and for schools, basically for the German-speaking market. In exile, the team developed this further to provide education and information for an international audience. Marie Neurath, who held the role of "principal transformer" at the time, described the work processes in Vienna at the museum and the later development in her book *The Transformer – principles of making Isotype charts,*[3] posthumously published in 2009:

> From the data given in words and figures a way has to be found to extract the essential facts and put them into picture form. It is the responsibility of the 'transformer' to understand the data, to get all necessary information from the expert, to decide what is worth transmitting to the public, how to link it with general knowledge or with information already given in other charts. In this sense, the transformer is the trustee of the public. He has to remember the rules and to keep them, adding new variations where advisable, at the same time avoiding unnecessary deviations which would only confuse. He has to produce a rough of the chart in which many details have been decided: title; arrangement, type, number and colour of symbols; caption, etc. It is a blueprint from which the artist works. (Neurath and Kinross 2009, 78)

For Otto and Marie Neurath and their team, the processes of social transformation were essentially mediated by comprehensive linguistic and visual communication that was intended to address the cognitive and emotional development of people as social beings. This could be accomplished by creating the structures necessary for this transfer of information, by establishing formalized procedures and standards, and by applying multimodal epistemic techniques for describing facts in the world. After Otto Neurath's sudden death on 22 December 1945, Marie

1 For more information on Fritz Kahn and Paul Steiner see: Körber (2016, 57–76) and Körber (2018).

2 See Burke, Kindel, and Walker (2013).

3 See Neurath and Kinross (2009).

Neurath took over the management of the Isotype Institute, which she moved to London in 1948 to be closer to the most important partners with whom she collaborated. From that point on, the schemes of illustration were varied and new trends in the visualization strategy could be observed, for example in the brochures produced by Isotype for West Africa and in the children's books that were published from the 1950s onward. Even before Otto Neurath's death, there had been an exchange of ideas with Wolfgang Foges about the production of books for young readers, but it was not until 1948 that these plans were implemented under the imprint Max Parrish and later partly as Rathbone Books/Aldus.[4] At this point, a brief introduction should be given to Adprint, a likewise innovative but little-known producer of books.

In 1937, the Austrian Wolfgang Foges founded the company Adprint (the name was formed from the words "advertising" and "printing") in London and assembled a group of creative collaborators consisting of diverse talented, well-informed emigres from Germany and Austria and a growing number of local employees as well. Among them were freelance writers (mostly British), designers, photographers, and picture editors (like Ruth Rosenberg),[5] the latter being an emerging profession at the time. Adprint and the newly founded Isotype Institute in Oxford began their close and fruitful collaboration in 1942, which Marie Neurath continued even long after 1945. Adprint founder Foges initially produced magazines with the support of Lord Glenconner (Tennant & Son); this was an occupation he had already pursued in Vienna. Only a little later did he concentrate solely on nonfiction books, which from about 1939 he published with other German-speaking emigrants such as Eva Feuchtwang (later Neurath) and Walter Neurath (no relation to Otto Neurath). The two were to found the publishing house Thames & Hudson in London in 1949. The US branch of the company, called Chanticleer Press, was represented by Foges' childhood friend Paul Steiner from

4 In 1948, Foges left Adprint as the company was losing money and the financiers no longer had confidence in him. Max Parrish, who had previously worked at the Ministry of Information (MOI) and as an editor at Adprint, took over the company in 1948, but Foges returned to Adprint in 1952, after Lord Glenconner sold his shares to Wilfried Harvey of the Purnell and Sons printing company. According to David Lambert, at that time Adprint only produced children's books that were mostly based on television programs or were adaptations of books from the United States. See Lambert (2009, 116) and Holman (2008, 109, fn 155).

5 Ruth Rosenberg from Berlin was an art historian and archaeologist who had previously worked at the German Ullstein Verlag for the precursor of Bilderdienst, then for Adprint and Max Parrish in the field of image research and design, and later became an influential book designer at Thames & Hudson. See Nyburg (2009, 51) and R. Rosenberg, National Life Stories. Book Trade Lives Interviews, interviewed by C. Courtney, 29 February 1992 – 4 April 1992.

Vienna. The novel production model for illustrated nonfiction developed by these emigres is presented in more detail in Section 3.

After the war, the German publisher Willy Droemer in Munich together with the German book agent Felix Guggenheim, who had emigrated to Los Angeles, became one of the closest partners of the book producers and publishers[6] mentioned here. The development of the technically demanding and complex publications that emerged from these collaborations was possible not least on the basis of the enormous advances in the field of printing, the (photographic) reproduction of images and color printing, which made it possible to distribute print products to a mass audience at affordable prices. The knowledge and ability to apply and control the techniques involved had already been acquired by Wolfgang Foges, Paul Steiner, and Walter Neurath[7] in their home country. It was based on the long and rich tradition of German-language publishing and bookselling with which these actors were familiar and with which Otto and Marie Neurath strongly engaged as well.

At the same time, Otto and Marie Neurath remained committed to the core concerns of a "scientific worldview" in line with the philosophy of the Vienna Circle set out in the manifesto *Wissenschaftliche Weltauffassung* (Scientific Worldview, 1928), which had also determined their work in Vienna. The interdisciplinary collective of the Vienna Circle emerged from a discussion group around Otto Neurath, the mathematician Hans Hahn, and the physicist Philipp Frank before World War I. Around 1922, with the call of Moritz Schlick to the chair of natural philosophy, the circle continued its work with an enlarged group of participants and conducted weekly meetings. There was agreement on a materialist program on an interdisciplinary basis in the service of science and society: its foundation was to be modern mathematical logic on the one hand, and empirical data on the other. This publication states, among other things, that the members felt committed to the ideals of the Enlightenment, humanism, and social progress. Following these principles, Neurath advocated working in an interdisciplinary collective,

6 The term refers to book packagers (or producers) who take on the creative and design part of the genesis of books, i.e. they design them on behalf of publishers or as their own development for them and produce them up to the pre-press stage or also commission the printing, see Ridler (1976, 9); Westphal (1991, 198–199), and Fischer (2011, 78).

7 As Paul Steiner described it, Foges had gained some experience in the Moderne Welt publishing house in Vienna as a magazine publisher and benefited from this knowledge about illustration material and reproduction techniques, knowledge that at least at that time most book editors lacked. See Steiner (1913–1941, 422). An exception is Eva Feuchtwang (née Neurath), later cofounder of Thames & Hudson, who worked in an antiquarian bookstore and in art stores in Berlin but only came into contact with the production of books in exile, see Neurath and Feuchtwang (2017).

combined with the claim to intersubjective communication of experiences and the orientation towards empirically founded knowledge. This was linked to the intention of objectifying the transfer of information for a broader audience. The visual presentation of facts and data should therefore focus on a systematic methodology to remove ambiguities in the service of better communication. The targeted selection and preparation of information – from the simple to the complex ("humanization," not simplification)[8] – and the claim to connect theoretical knowledge with the real world, was in the Viennese period still strongly indebted to the popular-education and workers' movement.

The situation during the war, however, and the conditions of exile in The Hague, then in England, affected the scope and focus of Otto and Marie Neurath's work. In addition to adapting to the new cultural-linguistic context parallel to the scientific goals of the Unity of Science movement of the Vienna Circle, the scale and direction of the activities also changed. On the one hand, the orientation shifted towards an Anglo-American culture and even an international market, something which was also reflected thematically. On the other hand, the books reached a much wider circle of readers, which ultimately required a higher degree of standardization, serialization, and expertise. The founding of the Isotype Institute in Oxford in 1942, which was to coordinate the comprehensive activities for the visualization of knowledge for a mass audience, should also be analyzed in this context. Hence, one could speak of two phases or strands of development in exile. On the one hand, there was the emergence of Isotype from 1934 onward, which still took place in The Hague together with the graphic designer Gerd Arntz on the basis of the Viennese method. This international *Hilfssprache* (auxiliary language), as Otto Neurath also called it, was intended to be a universally understandable instrument, at least in terms of its intention of conveying knowledge in the service of a future egalitarian community of nations. Isotype, compared to the previous approach of the Viennese period, aimed to potentially address a wider readership with a greater variety of topics. The convention-based symbols had a high iconic quality and were applied to different media in the context of the established method of transformation. The Isotype symbols, while not intended to completely replace the text, were used where pictorial signs could clarify and enhance a context. The second strand in the development of the visualization of information was the development of a "picture-text style" as implemented in a novel type of book called *Modern Man in the Making*.

8 See Neurath's posthumously published text "Visual Education – Humanisation versus Popularisation" (1945), in Dahms et al. (1996, 245–335).

2 *Modern Man in the Making* and the picture-text style

The decisive step in this direction came with the book *Modern Man in the Making* (1939), published in the USA by prestigious publisher Alfred A. Knopf. As Marie Neurath had suggested, the use of Isotype was to be combined with a coherent "neutral" everyday language. In retrospect, she described it as follows:

> Otto got a contract with Alfred A. Knopf for *Modern Man in the Making*. The new work gave us new joy, and recognition and opportunities came to us from the Netherlands also. [. . .] I remember when Otto and I were walking together one evening along the street to post several letters and we were talking about *Modern Man*. Otto remarked that we had only to put together some of the many things we had done in the past; and for once it was my turn to suggest: why not use this chance to make something different? It was all in our hands. And so the picture-text style idea was born that night. It certainly came more from his brain than from mine, but I did present one real gift to him at that time, the word 'Isotype'. He heard it and liked it, and he asked Arntz the next day to design an Isotype trademark. (Neurath and Cohen 1973, 63–64)

Apparently, the development of the semantically closer picture-text style and the more international scope of Isotype was very much the result of a cooperative decision and process of debate. Even if only Otto Neurath's name appeared on the cover of the book, the contribution of the whole team, especially Marie Reidemeister and Gerd Arntz, is mentioned in the foreword as well as in the acknowledgments of *Modern Man in the Making*. Moreover, the picture-text style was very consciously perceived as a new stage in displaying information on a specific topic. It did not just convey facts and data but also promoted critical-logical thinking on a broad level, for example through comparative analysis: the reader was to be put into a discursive state of mind which, and this is crucial for the development of the picture-text style, also requires the written language – moving back and forth between pictures, maps or diagrams and textual information, comparing facts, data, and visualizations and gradually revealing what is at stake in a specific context. This means that different pieces of information could be linked and provide a practical demonstration of how to think and argue in a clear, more scientific way, as explained in the foreword:

> This comprehensive survey starts with facts. The same facts can be looked at from different points of view. Thus it may be an element in the world situation, [. . .] or an element of daily life. It is important to build bridges from one field of investigation to another and to show cross-connexions. [. . .] Certain arguments appear again and again, but are scattered so that it is not easy to arrive at a comprehensive view. How can facts be presented without

> causing confusion by their overwhelming diversity? The visualization of selected primary material connected with simple statements is one solution. (Neurath 1939, 7)

In Otto Neurath's view it was important not only to present data but to contextualize and connect it, and even more, to show how to do this in an appropriate scientific way. Many contemporary sources of information like newspapers and magazines remained superficial or were written in a lurid style. Or, like scientific and educational publications, they were often clouded by technical terms and jargon and already presupposed a more comprehensive background knowledge on the part of the readers. Hence, Neurath intended to show an alternative: "Therefore this book presents, where possible, material which everybody will find useful in interpreting statistics published in newspapers or reference books" (Neurath 1939, 7).

The overall intention of the book was to analyze "fundamental trends" in the social, political, and economic life of humanity without "presenting any social or economic theory" (7). The topics covered include diverse social issues of the time such as mortality, health, employment, trade, education, mobility, migration, and demographics. All in all, it was intended to support common people in adopting a modern attitude, i.e. a "scientific attitude," in dealing with the increasingly urgent global social problems of mass societies – as the Vienna Circle had also called for since its early days from 1907 on. Especially against the background of the following acute political crises, extreme polarization, and economic and social grievances, such training of cognitive and analytical skills seemed necessary to the strengthening of "common sense".

In formal terms, the book was a close semantic and physical combination of Isotype and a simple, comprehensible text, similar to C. K. Ogden's Basic English,[9] whereby grasping the content was only possible through the cognitive processing of both elements – as it is formulated at the beginning:

> The principle of visualization applied in this book is based on the ISOTYPE method, developed by me together with my collaborators during the last fifteen years. It shows connexions between facts instead of discussing them. Impressive visual aids do not merely act as illustrations or as eye-bait in this book; they are parts of the explanations themselves. The reader may not understand the contents by reading the text only; he must 'read' the pic-

9 The linguist Charles Kay Ogden was the inventor of the international auxiliary language Basic English, which was conceived (and published in 1930) with a vocabulary of 850 words and was intended to promote language reform. By 1935 it had spread to over 30 countries. Ogden was committed to the international peace movement and, in this context, to a closer link between linguistics and philosophy to improve global understanding through the creation of a universally usable language.

> tures as carefully as the text. An international picture language is combined with a world language. (Neurath 1939, 8)

In the book the use of pictures like the typical "Mengen-" or "Führungsbilder," maps, and the special color guide system can be understood as tools to activate a "scientific attitude" on the part of the reader through a comparative analysis of different panels or pictorial statistics in interaction with the text. Thus, following on from Elisabeth Nemeth's approach, it is not a matter of using illustrations to comprehensively present a particular issue (Nemeth 2011, 71). The structure developed by Neurath and his colleagues is too complex and requires an in-depth study of the facts and figures presented. Rather, it is the combination and alternation between different illustrations and parts of the text or levels of communication that should enable reflective access to the content – in the sense of a "visually guided comparative judgement," as Nemeth claims (71).

The overarching goal, however, was already to develop a model for further publications and a modular system in which the arrangement of information could be varied according to the requirements of the topic. In a time of greater media diversity and the technically feasible mass reproduction of images, the close connection of image and text was the key to addressing a wider audience: the serial production of knowledge content according to the principles of the greatest possible consistency, clarity, and objectivity. Avoiding technical terms and a descriptive, clear, and easily accessible language mode play a role here, but also the building up of information from the simple to the complex in order to introduce the recipients to a topic. Marie Neurath described it this way in her report in the publication *Arbeiterbildung in der Zwischenkriegszeit* (Worker Education in the Interwar Period):

> Text and pictures follow each other in a continuous train of thought: we called it picture-text style. I later did a children's book series in this style: "They lived like this." For *Modern Man in the Making*, the work of transformation involved not only the panels themselves but also fitting them into the text; the collaboration of all involved in the production of this book was particularly close and, I believe, successful. (Neurath 1982, 29, translated from German by the author)

The picture-text style formed the basis for the Isotype Institute's further cooperation with Adprint. Here again, processes of the modern mass society, which are based on the division of labor, standardized and also commercialized, played a role because they made knowledge about the world available for many people at affordable prices. In principle, the visualization of information about nature and culture, technology or art for different purposes and target groups has a long history – from ancient wall paintings to manuscripts and illuminated codices, maps, diagrams, and illustrations in atlases and encyclopedias to the mass-distributed

periodicals of the nineteenth and twentieth centuries with color photography. However, the systematic use for argumentative purposes over longer sections in a book was a novelty. The term used for this at Adprint was "integrated layouts" or "integrated books", in which the semantically and physically close connection of text and image on a book page became the principle.[10]

As Marie Neurath has already indicated, the practical and technical implementation of the picture-text style was particularly elaborate and required a certain know-how and infrastructure for a broader implementation. These prerequisites were only fulfilled in exile together with the aforementioned Jewish and leftist publishers and their collaborators. The cooperation between Adprint and the Isotype Institute included the development of various nonfiction series and individual titles for adults, as well as ideas for children's books. These projects were realized after Otto Neurath's death by Marie Neurath and Adprint, mostly for the imprints initiated or managed by Wolfgang Foges. In order to understand this creative and innovative cooperation, it is necessary to describe the new book production model invented by Adprint.[11]

3 Book packaging: Creative design and production

Even before his emigration in 1937, the publisher Wolfgang Foges had been familiar with Otto Neurath's ideas and apparently met him personally for the first time in 1930 or 1932 as a student of national economics in Vienna. Both came from the same intellectual and cultural background in Vienna, such as the circle around sociologist Paul Lazarsfeld and social psychologist Marie Jahoda. Neurath and Foges met again in London in 1941 and a very creative and successful period of collaboration of nonfiction books and magazines for a general audience began, e.g. on science and technology, culture, society and history or biology and medicine. Even if it was at times not without conflict, the collaboration with Isotype was to be of lasting significance and undoubtedly shaped the development of Adprint's publications. This can be observed in the structuring of content, the clear and rather neutral language, and the colorful picture-text style in integrated lay-

10 As Eva Feuchtwang (later Neurath) recalled, "The type of book Adprint produced was unusual at the time: Richly illustrated books with text and pictures integrated, and with illustrations playing a documentary role, were yet largely unknown in England or America" (qtd. in Steiner 1997, 40). See also Facetti (1964, esp. 57), Ridler (1976, esp. 22), and Meredith (1990).

11 For more details see Körber (2016, 2018).

outs. In an interview with Ian Hamilton from *The Guardian*, Foges described Otto Neurath as "the most important influence on his thinking" (Hamilton 1964).

At the time Adprint worked for and on behalf of British publishers and also on behalf of the Ministry of Information as a so-called book packager. As Foges' childhood friend Steiner explained in his unpublished memoir, this involved a novel production model specifically for illustrated nonfiction, based on Foges'

> brilliant idea of setting up a book-publishing house according to the principle of the creation of books, i.e. a publishing house whose sole task was to conceive books and book series, to have the texts written, but not to take care of the distribution. (Steiner 1913–1941, 421–422, translation from German typoscript by the author)

The conception and design of these nonfiction books was not developed within a publishing house, as usually happened, but was taken over by the book-packaging company's in-house editorial team. This team was not only responsible for the text of individual volumes and book series, but also for the illustrations and the integration of text and images. Foges proposed to English publishers such as Collins that they leave the entire time-consuming and cost-intensive production of new books and series to Adprint and that they in turn take on marketing and distribution themselves as usual. The reprints and other distribution rights, for example for international co-productions, would be organized and safeguarded by the book packager, so that both parties had an interest in the lasting success of the works produced.

Gradually, a professional workflow and production processes were established that could meet the high demands for quantity and quality in serial publications. The result of this collaboration with Adprint, the American branch Chanticleer Press, and their clients and partners was not least the development of genre-specific conventions, which corresponded to the stronger contemporary systematization of scientific content. Foges advanced to become the "first major British maker of illustrated educational books for an international market" (Lambert 2009, 113), as David Lambert, former editor at Wolfgang Foges' Rathbone Books, summed up.

After Adprint, Foges founded other book-production companies such as Aldus Books, and imprints including Max Parrish, Rathbone Books, and Buffalo Books. At its peak, Aldus Books employed some seventy people and produced long-lasting and profitable major projects that were distributed internationally and translated into various languages. In this way, he influenced the publishing industry primarily in Europe and the USA, which led to the formation of the above-mentioned business model, and the establishment of book types such as subject-specific picture encyclopedias.

The innovative books developed with their modernist design, initially close to the Bauhaus style, and the sequential double-page structure consciously incorpo-

rated new communication strategies. This included the use of photography instead of drawing, the depiction of everyday life and ordinary people, and the use of a more documentary, observational style. Models for this could also be found in advertising, photography, and film at the time. This included the use of different types of images in the book series, which were not only chosen or produced for their aesthetic value, but rather for their epistemic quality. Different types of text, typographically marked or highlighted, provided the necessary deepening or supplementation. Thus, text–image schemes were developed that visually signaled the cohesion of the individual titles in a series at the very first glance, e.g. a specific color coding for cover and back cover or the use of photo montages for the cover image. The underlying method of systematically making information accessible through a coherent interplay of text and image was vividly described by the book designer Germano Facetti. He described Adprint's integrated books as follows:

> [. . .] the flow of images, captions and diagrams was planned like a documentary film; but unlike a film, the book could be opened at any page to provide leads onward and backward in the text. [. . .] In these books the images and the graphics follow a track where the essence of the text is underlined [. . .] in 'close-ups' enhancing the art works and in 'sequences' integrated in the text. (Facetti 1964, 53, 57)

Nevertheless, from today's perspective, the question of the value of art and art practice in the transfer of knowledge and in science also arises – as an extension of scientific goals and ideas of objectivity or intersubjectivity that is not readily accessible and usable.[12] For this is also about the limits of understanding art, which are not least conditioned by the specific materiality and technical realization. Thus, pictorial symbols, whether Isotypes, diagrams, or photographs, often function in differentiation from and supplementation of textual statements in that they leave empty spaces, deliberately focus on individual statements, or generalize. Not least, however, this creates space for imagination and creative reinterpretation, which makes this form of information transfer particularly connectable as a multifaceted statement. In particular, Elisabeth Nemeth has pointed out that the Isotype symbols were not intended to comprehensively represent a certain fact (2011, 71). The visualizations were far too complex and required a certain

12 Otto Neurath in particular rejected the idea of objectivity as a whole as pseudo-rationalistic, in favor of an intersubjective acceptance of conventions within the framework of a collective understanding of science. For him, knowledge was historically and socially conditioned and subject to constant change, as formulated several times in the famous simile of the ship, e.g. Neurath (1932/33, 206).

amount of practice and willingness to delve into the depicted contexts in order to unfold a productive benefit:

> By contrast the visualisation method which Neurath advocated is based on an approach in which the added precision is achieved in quite a different way, namely by comparing back and forth between two constellations of elements. The contrasted constellations trigger certain activities in the observer: 'considerations' in which she constructs the comparison herself. (Nemeth 2011, 71)

It seems, then, that in the publications that Adprint developed together with the Isotype Institute, it was rather the combination and alternation between different illustrations and levels of (also textual) information that was intended to enable reflective access to the content. It was a process of constant comparison and understanding, as Germano Facetti described it, by turning the pages back and forth in the book.

4 Marie Neurath: Prototypical authorship

Adprint's illustrated nonfiction books required the ability to convey specialized knowledge didactically, and furthermore to develop it closely with the image level. In general, external freelance authors, often well-known British experts and scientists like biologists Julian Huxley or John Boyd Orr, were chosen to produce the book series and individual titles in order to make it easier to launch and sell the books on the English-speaking market. But most of these authors lacked an understanding of the requirements of book design and the importance of visualization in the structuring and creation especially of book series. Instead, the book packager's workflow focused on the creative part of the concept and design – in close coordination with Isotype, who took on a special role as a partner due to their close collaboration over many years. As a consequence, it was not uncommon for the editorial team to heavily rewrite the texts, or to write them themselves from the start, because many scientists or experts could not do so appropriately for the "common reader" or for a younger target group. Even though a final fine-tuning took place with the respective external authors and often with the publisher or board of editors, the important decisions were made in the preceding process of coordinating text and image. This took also place with regard to the general design principles of, for example, a book series. In this respect, it becomes obvious that Marie Neurath was an exception: in addition to her creative tasks as a transformer, she also took on the function of the idea-generating author, which corresponded to Otto Neurath's practice established in Vienna.

Under Marie Neurath's aegis, children's books became an important and successful field of activity for the Isotype Institute, including the "Visual History of Mankind" (1948), a series still developed together with Otto Neurath, or the "Visual Science" series (1950–1952) in six volumes. But, as Burke and Sandner point out, "[. . .] she came into her own with books on scientific subjects, drawing on her previous education. For series such as "Wonders of the Modern World" and "Visual Science", she conceived titles and consulted with leading experts on the content" (2022, 115).

Notwithstanding the difficulties that subsequently arose, especially with Max Parrish who had little understanding of the Isotype Institute's method (Walker 2013, 396), Marie Neurath was able to gain greater freedom for herself as an author and designer of books for children and young people than other authors. This lay precisely in her ability to think and develop a theme in argumentative text–image chains and to maintain the balance between image and text throughout the book – as the prototypical author and designer. For this purpose, she evaluated current informational material in advance that helped to analyze a topic from different perspectives and prepared drafts of the integrated layout with image sketches as well as text sections in order to structure the subject through text and image from the very beginning. In other words, the picture section is not conceived after a text has been created as a decorative element or to break up the content.

A good example from Marie Neurath's production is the children's book *Inside the Atom* (1956) for the Max Parrish imprint. In the USA, the book was published in 1957 at the publishing house Lothrop, Lee & Shepard under the title *Exploring the Atom* with a slightly different cover (Chanticleer Press Edition). Text and image were closely linked and required detailed specialist knowledge of how the content needed to be structured and a possible visualization. As described comprehensively and in detail by Sue Walker (Walker 2013, esp. 420–421), material was gathered for this purpose from various sources, including the archive of the Isotype Institute, but also from periodicals, which helped to analyze it from diverse perspectives. In addition, Marie Neurath sought advice from the emigre Austrian physicist Otto R. Frisch (1904–1979), nephew of famous physicist Lise Meitner, who had been involved in the Manhattan Project (in the main phase 1942–1946) to build the atomic bomb in Los Alamos, USA, before teaching in England at Cambridge University. After such a closely linked process of design and conception, a dummy was usually produced and presented to interested publishers and at trade fairs.

Nevertheless, it is important to note that the potential of this method lies particularly in its flexibility and expandability, on the one hand with regard to the target groups and the variety of topics, and on the other hand in the manner and

style of visualization – and here too Marie Neurath forged her own path. This was particularly evident in the projects she carried out for Wolfgang Foges and his subsidiary Buffalo Books on behalf of the British Colonial Office in West Africa. Here she collaborated with the regional administration and did on-site research in order to be able to better understand and adapt the content and design to the cultural and social conditions, especially since the topics were political, economic, or medical and needed to reach as many adults as possible. As Eric Kindel has pointed out, Marie Neurath, unlike Otto Neurath, was able to test and advance the idea of internationalization through symbols which were supposed to characterize Isotype (2013, 449). In practice, the development and application of Isotype remained limited to the "modernized West" and was oriented towards Western concepts of language and knowledge. Stylistically, the visualizations as a whole remained committed to the visual language of Isotype and used tables, picture symbols, and diagrams, even though the color palette appeared larger and some new features and characteristics were introduced, "balancing general and local depictions":

> General depictions consisted of graphic arrangements showing processes, relationships, and comparisons typical of Isotype. Local depictions include the flora, fauna, equipment, buildings (materials and structures), village and town scenes, and work roles typical for the Western Region, which Marie Neurath observed herself or had brought to her attention by government officials and specialists. With few exceptions, depictions of humans were also localized in their naturalistic features and in their cultural and social identities, conveyed mainly through attire. (Kindel 2013, 460)

Another example that shows the extension of visual language and stylistic adaptability is the series "They Lived Like This" (1964–1971), already mentioned in connection with *Modern Man in the Making*, by Marie Neurath, which was also produced for Max Parrish and for which she collaborated with various illustrators. Here, on the visual level, they broke away from the strict schematization and simplification of the Isotype style and instead chose a finer, narrative style that also resembled the visual language of the culture depicted. It seems that in the children's books, despite the desire to do full justice to the original character of Isotype and the clear, reduced, and static form, Marie Neurath nevertheless successively added new layers. It is a progression that might not have been possible before, since consistency of visualization was a high priority – although changes may have made the books more accessible for children. Thus, Sue Walker quotes an article by the *Times Literary Supplement* from 1964 according to which the books "have softened over the years" and the illustrations "have a more human quality [. . .] less coldly diagrammatic" (2013, 406). Different types of images were used, such as photographs of landscapes, and the combination of text and image was,

according to Marie Neurath, less dense or closely intertwined (2013, 406–407 fn 26). However, with a wider range of image types from different sources, it is more difficult to achieve a coherent visual style and argumentative image–text coordination. Here, the approach of visually guided comparative judgment as was constitutive of the earlier Isotype books might give way to a mixed form in which the aesthetic quality of the images also varies, and the text is complemented rather than allowing independent understanding or access to the information.

5 Conclusion

As Burke and Sandner have pointed out, Marie Neurath was a "key figure" in the "work of visual education from the beginning" (2022, 103). It was her merit as author and designer to have decisively influenced the further development of these (children's) books. All the more so as these books on current scientific topics were time-consuming in their research and preparation and were also technically complex in the integration of images and text. The nonfiction publications for various target groups that emerged this way eventually found their way into other book markets: through international co-productions Foges, Steiner and also Thames & Hudson were able to realize high-quality produced books with an increasing proportion of color prints for a large readership, even if adjustments had to be made over time to changing standards and reading habits. An example for a rather fluid transition of target groups of such publications is Wolfgang Foges' successful *Wonderful World* series (16 vols., 1954–1961), from 65 to 96 pages with about 250 color illustrations in the format 32.5 x 24.5 cm for 21 shillings per volume. The text had a more sober and factual style that reflected the change in the type of illustration and at the same time sought scientific legitimacy so as not to be perceived as a mere picturebook. Isotype diagrams, photos, drawings, and comic-like sequences were used as well as relief maps from Foges' subsidiary Geographical Projects. The series, attracting authors such as Lancelot Hogben, Benjamin Britten, Julian Huxley, James Fisher, Richie Calder, Lord Boyd Orr, and J. B. Priestley, whose qualifications and reputation were highlighted in the blurb and short biographies, covered topics ranging from mathematics to archaeology, medicine, nutrition, energy, evolution, theatre, and music in a colorful design. The books appealed to young people as its core target group, but were also received by adults. Bertrand Russell, for example, said of the most successful volume *Man Must Measure* (1955) by the British scientist Lancelot Hogben that it was a "masterpiece of

simplification without falsification" (Lambert 2009, 118, 120).[13] David Lambert, author and former editor at Wolfgang Foges' Adprint, Rathbone Books, and Aldus described it in the following way:

> The books' big, colourful jackets; distinctive pictures [. . .] headings in a modern sanserif typeface – all these stood out from a dull sea of academic publishers' small-format textbooks sparsely illustrated with foggy grey photographs. Schools bought the series for their libraries [. . .]. (2009, 120)

However, it turned out that reading habits and the more flexible allocation of the target group could also prove to be challenging. The German publisher Droemer Knaur, which acquired the license for the German-speaking market, had problems selling these volumes on the rather conservative German book market, precisely because the books dared to break new ground in terms of language, content, and visuals. Willy Droemer, who had realized various projects with the book packagers and publishers, nevertheless was one of those who welcomed and supported this development in equal measure. He outlined this in the publishing program for the autumn of 1961, naming as references Brehm's *Thierleben* or also Comenius' *Orbis pictus*, to which Otto Neurath had also referred more than once:

> An era of the visual had dawned. And this newness demanded a new type of book. The "illustrated" book of the past was no longer sufficient; a new, closer connection between colorful picture and word had to be created, a new type of "picture book" that was at the same time a "nonfiction" book. Publications of this kind, however, could only be created through international cooperation. [. . .] And the framework of cooperation with the publishing elite of the Western world was constantly expanding. (Droemer 1961, 4, translated by the author)

Here, the Munich publisher describes the successive internationalization of the publishing market after 1945, as a result of which the aforementioned concepts and publications found their way all over the world but also back to Germany, where licenses were once again traded at the Frankfurt Book Fair from 1949 onward. In this context, the book concept and design evolved towards the greatest possible international compatibility of texts and illustrations. Overall, the idea of the "integrated book" or the picture-text style in the service of "humanizing" and visualizing information proved to be a successful concept. Such books facilitated access to complex topics and offered orientation in an increasingly demanding world of work and life. The encyclopedic idea, which was also the basis of Otto Neurath's scientific work, can be seen here on the one hand in the serial processing of interconnected complexes of topics within book series. Marie Neurath developed these for children and Wolfgang Foges later in single-volume picture en-

13 B. Russell, without source reference (qtd. in Lambert 2009, 124, column 1).

cyclopedias on thematic complexes. The combination of a standardized visual language and a factual, everyday language was able to fill a gap in the transfer of knowledge for the common reader in the form of affordable publications for different target groups – a task that Marie Neurath considered her central concern as a "principal transformer" and whose methodology she decisively shaped after 1945.

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Part II: **The Specific Design of Isotype Picturebooks**

Nikola von Merveldt

The Magic Knife: Marie Neurath's Use of Sectional Drawings in Isotype Informational Picturebooks for Children

1 Introduction

"We have all been inside a house," reads the text below the sectional drawing of this family home, underscoring the familiar (Figure 1). However, as, the heading suggests, this Isotype informational picturebook invites children to adopt "a strange way to look at a house" (Neurath 1948a, 14). And indeed, the sober architectural line drawing departs from more conventional depictions of houses in children's literature. This transformation of the familiar gaze into the "strange way" of looking is achieved through the magic powers of the graphic designer, who possesses special tools: "but how different [the house] looks", Marie Neurath explains, "when it is cut through with our magic knife!" (ibid.)[1]

Marie Neurath's use of the metaphorical "magic knife" in explaining sectional drawings serves as a mental bridge for young readers. In this metaphor, the familiar concept of a knife, usually associated with cutting or slicing, is employed to make the abstract idea of sectional drawings more accessible. Just as a knife can reveal the inside of an object when it cuts through it, the "magic knife" metaphor suggests that sectional drawings, like the cuts, unveil the inner details of a subject. This metaphor acts as a cognitive tool, connecting the tangible and known idea of a knife to the more abstract concept of graphic design techniques. It helps children grasp the idea that, just like a knife reveals what's inside, sectional drawings expose the inner workings and structures of things in a visually engaging way. In this way, the metaphor enhances the understanding of graphic design for young minds by providing a relatable analogy.

The magic knife opens up "[a] strange way to look" at the world, presenting it in sectional views. A graphic technique familiar from scientific and technical drawing, sectional drawings transform the way we look at things, establishing meaningful relationships between outside and inside, above and below, the visible and the hidden, cause and effect. This magic-knife technique of sectional re-

1 In the following, Marie Neurath is considered as the main transformer and author. However, as she clearly stated in her essay on transformation, the books were the result of the collective team effort of the various members of the Isotype Institute, including researchers, designers, experts, and printers, which she referred to as "a little factory" (cf. Walker 2013a, 399).

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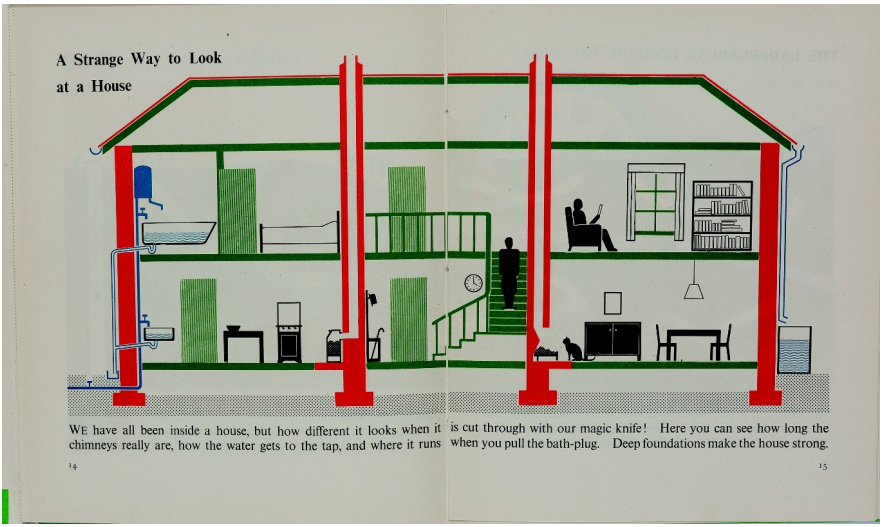


Figure 1: *If You Could See Inside* (1948) by Marie Neurath, pp. 14–15. Architectural cross-section of a family home. Otto and Marie Neurath Isotype Collection, University of Reading.

presentation is a powerful visual tool that plays an important part in Isotype informational books.[2] More broadly, however, sectional views are a key graphic technique in many fiction and non-fiction children's books that present information about what is usually hidden from view. It is all the more surprising that there seem to be no systematic descriptions or studies of sections in children's book. Therefore, while this chapter focuses on Marie Neurath's specific approach to and use of sectional drawings, it also aims to make a broader contribution to research on informational picturebooks by proposing a general typology and terminology for adequately describing and analyzing sectional views (cf. von Merveldt 2018, 242).

While I will cite a few examples from later books, I focus my analysis on the first Isotype book that systematically explores this "strange way of seeing", *If You Could See Inside* (1948). It lays the technical and ideological groundwork for the many Isotype books to follow. Before taking a closer look inside this book, however, it is revealing to go back to Otto Neurath's autobiographical memories, in which he reflects on how sectional views shaped his own personal visual educa-

2 In her exhibition booklet "Marie Neurath. Picturing Science", Sue Walker names and illustrates five major "picturing techniques" used in the Isotype Institute's informational books for children: magnification, cross-section, comparison, component parts, and narrative sequences with repeated base images (Walker 2019).

tion as a child in Vienna and how these impressions informed the Isotype approach to children's books in the London exile. It is within this larger general context of sectional drawings and the specific context of the Isotype Institute that the true contribution of Marie Neurath will become most clearly apparent.

2 Topics and typology of sectional drawings

The topics covered in *If You Could See Inside* range from architecture (house, lighthouse, pyramid, fortress) to biology/anatomy (homes of moles and wasps, chick embryo in an egg), and from geology (cave, volcano, mine) to science and technology (windmill, diving bell, ferry train). Not incidentally, these four domains are the disciplines that rely most heavily on the visual strategy of cross-sections for documenting, visualizing, and transmitting their knowledge (Yee 2020). Architecture and engineering work with blueprints of buildings and plan drawings to help plan construction and communicate with clients; geology uses cross-sections to show the different underground layers of rock, soil, other geological formations and structural features such as faults and folds, visualizing geological time in space; technology (inventions and transportation) focuses on the inner workings and thus the functioning of machines and mechanic inventions; and anatomy, the science of the structure of bodies, carries the idea of cross-sections in its very name: the Greek verb *anatomein* means "to cut open, to dissect". Medicine, biology, and anatomy are the only disciplines using real knives (or rather specialized surgical instruments) to perform real cuts that can be realistically represented (Wall/Mazierski 2018). While geological cross-sections are based on data collection from various sources, including field observations, borehole data, and seismic surveys, architects and engineers draw on plans and construction documents. They strategically choose their section planes, the vertical or horizontal line, which represents the cut through the building, structure, or formation to reveal what they choose to focus on, depending on the specific function of the cross-section. Whether real or imaginary, the section cuts offer new and revealing perspectives on familiar sights.

The most basic function of section drawings is to "reveal [. . .] through pictures things otherwise inaccessible and hidden from view" (Richards 2017, 86). They can serve various functions ranging from documenting, investigating, planning, constructing, communicating, and promoting (cf. Ross 2017). While magnification, the other graphic technique of showing the hidden, is a visual strategy solely enabled and assisted by technology (Wall and Mazierski 2018, 144–145, 152), cross-section views mainly rely on the powers of conceptualization and imagina-

tion. Sections do not copy an image produced by a technical device such as a microscope or telescope, but visually deconstruct, disassemble, uncover, and reveal what cannot be seen otherwise. Sections are – for the most part – acts of the imagination, extrapolations of sample views, conceptualizations of intellectually reconstructed contexts.[3] The hypothetical title of the first Isotype book beginning with "What if . . ." refers to this imaginary and conceptual quality of section views. The intellectual act of cutting through visual obstacles to reveal and understand the hidden often seems to take on magical powers – hence Marie Neurath's metaphor of the magic knife. Overall, as contemporary digital designer Allen Keith Yee summarizes his observations on the visual art of dissecting, "the cross section can be a revelatory way to depict and imagine the world around us" (Yee 2020, 15).

Historically, the visual technology of sectional drawings is intertwined with the development of technical illustration. It dates back to the Middle Ages, is further developed in the Renaissance by artists such as Leonardo da Vinci, and then again celebrated in the Enlightenment, notably in the picture plates of Diderot's and d'Alembert's *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers* (1751–1772).[4] The Industrial Revolution fueled the demand for clear and accurate technical documentation. Sectional drawings became crucial in engineering disciplines, depicting everything from steam engines to intricate machinery. In the twentieth century, advances in printing technology and the growth of engineering fields further popularized sectional drawings. The emergence of computer-aided design (CAD) technologies in the 1960s transformed the way technical drawings were created. Today, sectional drawings continue to play a crucial role in fields such as engineering, architecture, medicine, and various sciences. Digital tools have revolutionized the creation and presentation of sectional views, allowing for dynamic and interactive representations. Throughout history, sectional drawings have evolved from practical depictions of architectural and mechanical structures to sophisticated tools for conveying complex in-

3 A striking example of this imaginary and hypothetical nature of cross-sections is Leonardo da Vinci's visualization of a foetus in the womb, which art historian Martin Kemp reveals to be a highly innovative and imaginative combination of a pregnant cow's womb, which he had dissected and visually documented, with a human foetus. Rather than being an analytic anatomical investigation, it is a philosophical reflection on the mysterious relationship between mother and child, macrocosm and microcosm (Kemp 2000, 20–21).

4 Cf. Pannabecker 1998. For examples, see the online exhibition "Technology and Enlightenment: The Mechanical Arts in Diderot's Encyclopedia" at https://libraries.mit.edu/exhibits/diderots-encyclopedia-exhibit-preview/ (20 December 2023).

formation across a wide range of disciplines. The ongoing integration of technology continues to shape the landscape of sectional drawings in the modern era.

It seems no coincidence that sections as infographic strategies peak in times that celebrate the quest of knowledge and the desire to communicate new insights across linguistic boundaries. The universalist vision of the Isotype Institute certainly has its roots in the Renaissance and Enlightenment.

Following this very brief historical overview, it is time to present a simple typology of sectional views. For our purposes, I would like to follow the practice of technical drawing (cf. Richards 2017, 87–91), which proposes a classification into four major types of sectional views: 1) the cross-section, 2) the cutaway view, 3) the exploded view, and 4) the x-ray view.

A **cross-section**, like the one of the house (Figure 1), shows an object or organism as if cut through with a knife, or, in more technical terms, "[a] section, or cross section drawing, represents a particular object that has a vertical plane cut through it." (Yee 2020, 13). In most cases, "the vertical plane is perpendicular to the ground plane" (Yee 2020, 20), granting two-dimensional axial views of objects or organisms. Imagine a cake with icing sliced in half, revealing the number and color of layers. This right-angle cut across a visual plane is termed an orthogonal section, and it has become standard in the repertoire of anatomical and architectural drawings. In anatomical cross-sections, the image corresponds to a frontal view of a dissection performed on the body of an animal (including human) or plant. The knife, in these biological cases, is real and based on scientific practices for research and teaching.

For most other cross-section views, the cut remains metaphorical – the cross-section is a visualization rather than an illustration of an actual dissection: cutting cathedrals, ships, or motors in two remains a conceptual exercise undertaken for planning, construction, or communication purposes. No matter whether based on scientific or conceptual practices, cross-sections are less realistic depictions of structures cut through with real or imaginary knives than stylized visual reductions to the main structural features that need to be communicated. There is a diagrammatic paring down to the relevant information: depending on the function of the image and the graphic conventions of the time, cross-sections select the data they visually organize very differently. Cross-sections, like diagrams, thus are visual tools that are "good to think with" (Reviel Netz, cit. in Bender and Marrinan 2010, 7). Neurath uses this conceptual tool throughout her informational books for children to explain organic structures of plants, for example, to map the layout of the London Underground Piccadilly Circus station (*Railways under London*, 1948), or to explain why freezing water causes a pipe to burst (*Visual Science*, First Book, 1950, 23).

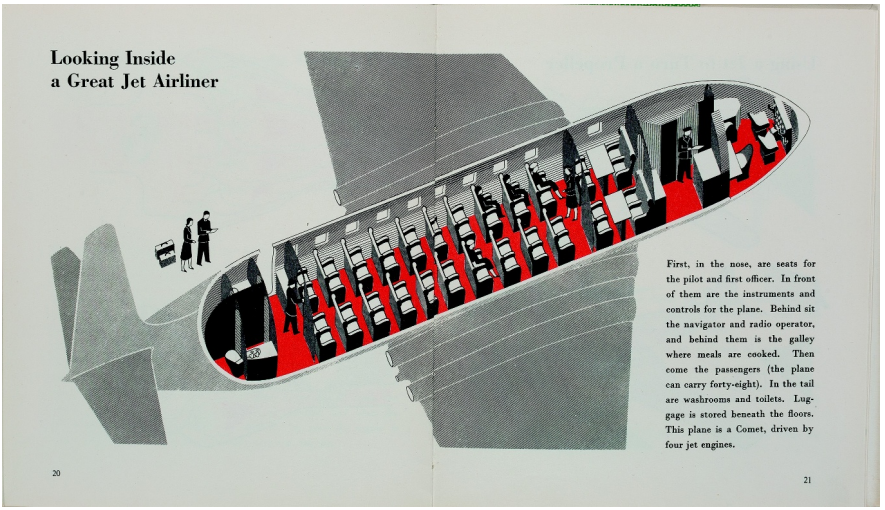


Figure 2: *Rocket and Jets* (1951) by Marie Neurath, pp. 20–21. Example of a cutaway view. Otto and Marie Neurath Isotype Collection, University of Reading.

While cross-sections remain two-dimensional and do not show depth, **cutaway views** add depth to the visual field. They combine the sectional cut with elements in perspective (Figure 2). As the name suggests, cutaways cut or peel away part of selected outer layers to reveal the internal features in their spatial arrangement. In contrast to the orthogonal view, cutaways show the relationship of the outside to the inside, thus being particularly suited to giving a good understanding of spatial ordering. They create the illusion of transparency: one can look through the skull into the brain cavity, for example, or, as in this illustration, through the casing of the jet airliner. In the context of children's books, this visual technique of cutaway views is particularly appealing, as it retains the vividness and familiar realism of perspectival pictures while providing detailed visual information in its context, thus offering great narrative potential (Ross 2017).

The **exploded view** (Figure 3) takes the parts of an object and visually explodes them across the page.[5] Rather than cutting through something, it takes apart or disassembles, clearly showing the individual parts in relation to each other and to the whole. It is most commonly used in technical illustrations, as it shows the workings, the way and the sequence in which pieces fit together; this way,

5 Sue Walker refers to this technique as "component parts" (Walker 2019). Strictly speaking, this is not a section, but since it shows in detail parts otherwise not visible, it is often grouped together with section techniques in manuals of technical drawing.

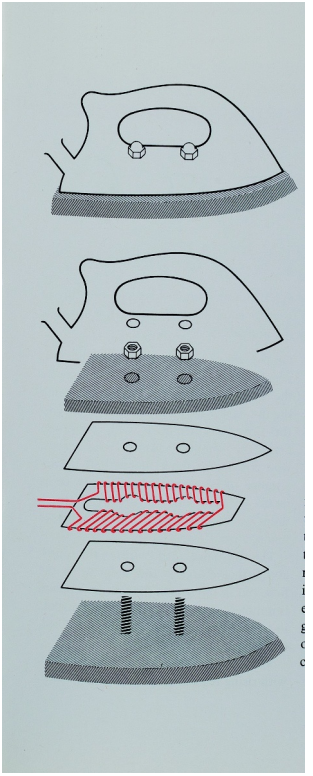


Figure 3: *What Is Electricity?* (1964) by Marie Neurath. Exploded view showing the component parts. Otto and Marie Neurath Isotype Collection, University of Reading.

they can be used as assembly instructions (think: IKEA) or as a way of visualizing how mechanisms work. Marie Neurath uses them rarely and more in the later series for older readers. This image of the electric flat-iron depicts the whole appliance at the top and explodes it into its component parts below, clearly showing the sequence of assembly in which the different layers fit together. As Walker points out, Marie Neurath uses this technique "to illustrate complex processes, or the applications of sources of power, such as electricity." (Walker 2019). The inclusion of everyday objects, advocated by educationalists since the eighteenth century, was also part of Neurath's educational strategy to encourage children to look at their familiar surroundings with new eyes and apply this inquisitive perspective to the world around them.

The **x-ray view or technique of ghosting**, finally, sees through the outer layer as if it was transparent to reveal what is hidden inside. There are two main variants of this magic way of seeing what is inside: while the x-ray view completely dissolves the outside to reveal what is obscured inside, most often focusing on one main feature, such as bones, the technique of ghosting does not

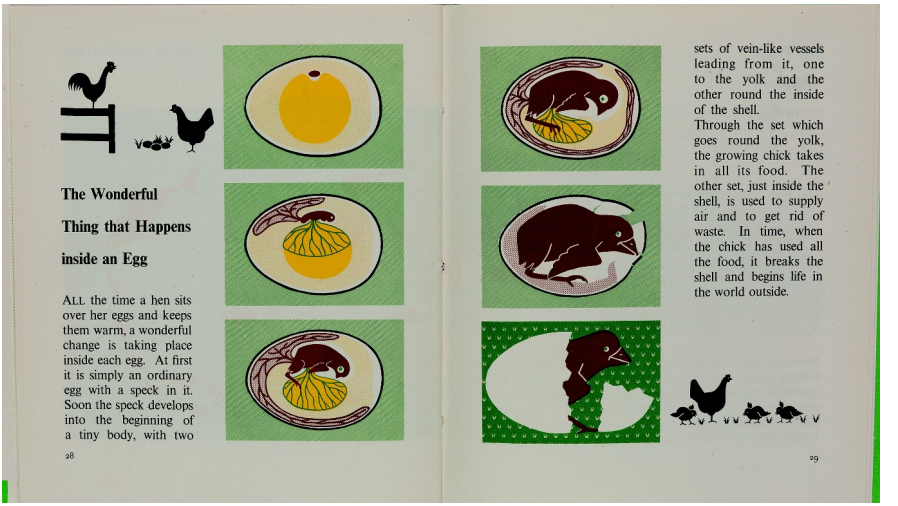


Figure 4: *If You Could See Inside* (1948) by Marie Neurath, pp. 28 – ghosting technique to reveal growing chick. Otto and Marie Neurath Isotype Collection, University of Reading.

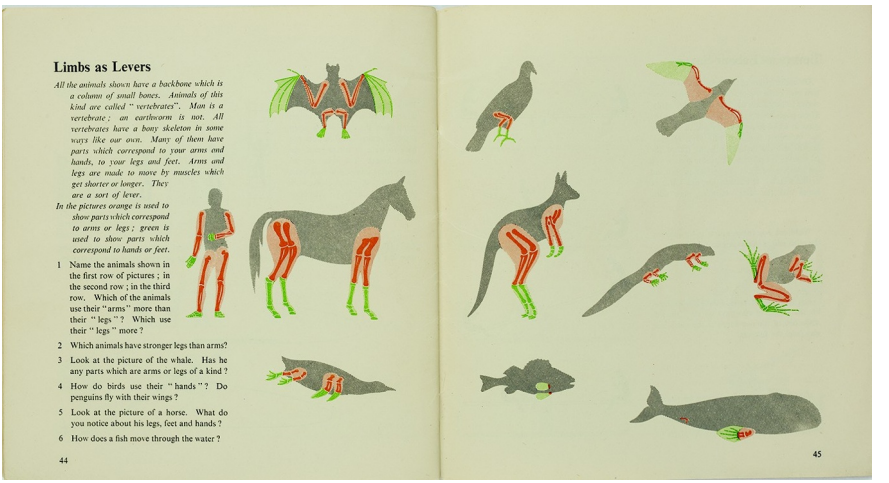


Figure 5: *Visual Science: Book Two* (1950) by Marie Neurath, pp. 44 – x-ray view of lever bones. Otto and Marie Neurath Isotype Collection, University of Reading.

eliminate opaque barriers but renders them transparent. Often used in technical drawings and for promotional effects, ghosting achieves – if well executed – the illusion of an intact outer layer and truly magical powers of the observer to see right through it. It is the visual version of having a cake and eating it. The devel-

opment of the chick, from fertilized egg to the hatching of the little creature, is shown using this technique of ghosting (Figure 4): the opaque egg shell is magically dissolved to grant view inside the egg. In Book 2 of *Visual Science*, Neurath opts for the more abstract x-ray view to illustrate the bones of animals that act as levers (Figure 5). Rather than showing the entire skeletal structure, only the bones acting as levers are visible. While the animals remain grey silhouettes, the lever limbs are highlighted in pale red. The bones corresponding to the arms and legs are color orange; the bones of the hands and feet are color green. This x-ray view is far from realistic – it is a highly selective, highly stylized, color-coded image with the specific intention of illustrating the workings of particular limbs. It is readily apparent to the eye how the relationships between the very different overall structures of each animal's body and the respective lever bones cause the animals to move in the ways typical for their species. Rather than seeking the artistic mastery of ghosting, Neurath prefers the sober x-ray presentation of information without distractions. The aim of this image is to lead the reader to look, compare, and understand. The reduced form of the x-ray view perfectly serves this educational purpose.

This differentiation into four types of internal views, the orthogonal cross-section, the cutaway, the exploded and the x-ray view, is one way of classifying the visual technique used to reveal the hidden. In practice, however, many illustrations are combinations of the different types of cross-sections. Cut-aways may be combined with exploded views (a technique Stephen Biesty is fond of using in his cross-section series published by Dorling Kindersley),[6] cross-sections with ghosting. Marie Neurath does this rarely, and never purely for visual interest or entertainment. The default internal view in Isotype books remains the classic, two-dimensional orthogonal cross-section, a simple line drawing without shadowing and using four or fewer coded colors. Perspective seems to be considered a distraction, diverting attention from the relevant information. Only when strictly needed to understand the functioning of an essential part of the drawing does Neurath add another dimension. One such example is the windmill in *If You Could See Inside* (Neurath 1948, 23), which shows how the mill-blades turn the slotted axle, which in turn translates the force of the wind to the lower slotted axle turning the big water wheel. While the architectural structure of the building is depicted in a black cross-cut line drawing, the moving mechanical parts – the mill-blades and the perpendicular axle shaft – are shown in red and in perspective, illustrating the geared mechanism, which transports the rotary motion of the wind blades along three distinct axes to lift the water above sea level. The use

6 https://www.penguinrandomhouse.com/series/FD7/dk-stephen-biesty-cross-sections/.

of perspective clearly serves the understanding of the working of the mill mechanism.

True to their function of revealing and identifying the hidden, sectional drawings generally combine image and denotative text. They typically include labeled features or annotations to provide the relevant terminology and possibly additional information about the depicted object or region. Visual connectors come in the form of callout or leader lines, linking labels, captions, or annotations to specific areas or objects within an image (abundantly used in David Macaulay's *The Way Things Work*, 1988). Arrows and pointers serve the same identifying purpose, visually connecting signifier and signified. Assigning numbers or letters to parts of the illustration is a visually cleaner way of naming, by listing the labels or annotations in a separate legend, clearly separated from the image (as practiced by Comenius in his 1658 *Orbis sensualium pictus*). These labels help viewers name and understand the various components or layers being shown and facilitate communication and comprehension. Interestingly, cross-sections in Isotype informational books come entirely without these features. The only accompanying text consists in headings for the different sections (in the case of *If You Could See Inside* one for each double spread), and a brief descriptive and/or explanatory text, often directly addressing the reader.

To conclude this brief typology of sections, it becomes quite clear that Isotype informational children's books rely on a long and rich tradition of scientific and technical drawings revealing what is usually hidden inside. As we will see in the analysis of her first Isotype children's book, Marie Neurath combines Isotype figures with section view conventions from architecture, anatomy, geology, or engineering to create a coherent and convincing picturebook language inviting young readers to look inside. The transformative process of Isotype image production relies on intensive research in libraries and hence the established repertoire of scientific and technical drawings dating back to the Renaissance, as documented in scientific, professional, and popular publications. The fascination for the cognitive and explanatory potential of sectional views of Marie and Otto Neurath is anchored in this rich tradition.

3 Otto Neurath's visual memories

The idea of presenting the familiar in unexpected ways goes back to Otto Neuraths' earliest discussions about creating books for children. In *From Hieroglyphics to Isotype. A Visual Autobiography* (2010 [1945]), Otto Neurath looks back on visual memories of his childhood and adolescence. This memoir of his visual com-

ing-of-age provides a genealogy to the basic tenets of the Isotype language. Otto Neurath's recollections of printed imagery that inspired or frustrated him in his quest to know and understand his environment serve both as a "collection of comparative visual research" (Neurath 2010, 6) and as an empirical foundation for the Isotype Institute's vision of visual education of children. Cross-sections as one strange way of looking at the familiar played a particularly important part in Otto Neurath's personal visual education. While Marie Neurath had her own, more heavily scientific visual education, her graphic approach was very much inspired and informed by her exchanges with her companion and husband of twenty years. As such, it is hardly surprising that sectional views informed the information language of the picturebook production of the Isotype Institute's London years.

Otto Neurath recollects one childhood incident, which makes the connection between a real knife and a "magic one": As a young boy growing up in an upper-class home of educated Jewish parents in Vienna, Otto remembers slicing a pomegranate in two with a knife and admiring the intricate inner structure of the fruit: the seeds embedded between fine membranes. This look inside the fruit, covered by the shiny red skin, fascinated him. He later compared his autopsy with a cross-section illustration in a botanical atlas he took from his father's library, struck by the fact the illustrators had come up with the same stratagem to show the hidden: cutting through an object and showing the section-view. It was "a centuries-old tradition in botanical books", as Neurath asserts in his *Visual Autobiography*: "Our botanical atlas attracted me partly because it did not only show the plants from the outside but also from the inside [. . .]" (Neurath 2010, 32). This way of visualizing the otherwise invisible allowed him to "subconsciously [learn] a good deal about plants and their parts" (ibid.), thus preparing him to grasp more complex botanical knowledge later on in life. Apart from laying the foundations for further learning, cross-sections also enabled cross-overs to his favorite fiction: "When I thumbed through the plant atlas", he reminisces, "how nice the section of the coconut looked with its hairy skin and the milk, which my Robinson Crusoe swallowed with such great pleasure after he reached his island." (ibid). This synesthetic experience combining sight, touch, and taste shows how the visual strategy strikes young Otto Neurath's imagination and allows him to establish meaningful relationships between inside and outside, fact and fiction, real-world objects and striking visual representations. The simple act of using a kitchen knife to cut a pomegranate in two and revealing the inside thus becomes the archetypal image of looking inside for Isotype imagery.

Other vivid cross-section childhood memories include the sections of animals and geological events. Otto Neurath names the engraved cross-section of a lion from Peter Mark Roget's *Animal and Vegetable Physiology* (1867) as an example. It

shows the mighty outlines of a male lion's in a pale, hatched gray, supported by a comparatively slight skeletal frame: "I always felt very much impressed to see how astonishingly slight the skeleton is beneath a lion's mass of muscle and hairy pelt" (Neurath 2010, 32). It is the visual contrast on the printed page between the imposing outside and the vulnerable inside, which elicits strong feelings in the young boy studying the image. Rather than just revealing the bones, this way of presenting the otherwise invisible skeletal structure within the visible exterior invites the child to contemplate the paradox of apparent strength and underlying frailty, sparking philosophical musings. Otto Neurath appreciated the "crude and even rough" drawings (38) of geological evolution in Descartes' *Opera philosophica* because the cross-sections, reduced to simple lines, delivered the information "directly and forcefully" (39), without any distraction. He concludes: "Thus my own childhood experience [. . .] compel me to regard a certain simplicity, combined with impressiveness, as something of importance wherever pictures for children are concerned" (41).

No wonder then that Otto Neurath's concept for Isotype's first informational picturebook was based on the concept and visual technology of cross-sections. *Just Boxes* was supposed to explain "modern implements",[7] such as the radio, cooker (hot box), or refrigerator (cold box) to young children. Since these inventions "present themselves usually in boxes", Otto Neurath concluded that "one has to look into the box to see how they work" (cit. in Walker 2013a, 400). His dummy, joining his love of basic geometric shapes and the principle of combination, shows a series of cross-sections granting insight into the technological innovations of the mid-twentieth century.[8]

Marie Neurath was to rework Otto Neurath's initial book project, adapting it to a younger audience. She decided that the geometrical concept of boxes was too abstract for this age group and focused on the fundamental idea of looking inside as her guiding principle. While pomegranates can be cut with kitchen knives, dissections performed on animals with surgical instruments to expose their muscular and skeletal structure, and geological formations uncovered through elaborate diggings with picks and chisels, there are things that call for *magic* knives to reveal their inner workings. Marie deployed her experience and imagination to magically transform information about the world modern children live in into simple and impressive visualizations. *If You Could Look Inside* (1948) became

7 https://www.marieneurath.org/#early-ideas – "Isotype Books for children".

8 The dummy can be seen as part of the online exhibition, https://www.marieneurath.org/#early-ideas (6 October 2024).

Marie Neurath's first own informational picturebook for children – her successful attempt at using sections to think outside the box.

4 Looking inside the book: *If You Could See Inside* (1948)

Published in 1948 as a Parrish Colour Book for Young Children, *If You Could See Inside* is part of the "Wonders of the Modern World" series, which was intended to "fire the awakening imagination with the wonder of the real world".[9] This first picturebook exploring the possibilities of Isotype in the children's book format is addressed to readers between six and eight, "who have reached the age at which they constantly ask questions" (ibid). In 32 pages, it covers topics from the family home to the deep sea, from chicks growing in eggs to windmills using the force of the wind to lift water. The answers to the children's insatiable curiosity are provided "in pictures which explain at sight" (ibid). The text is minimal with two to five sentences per double-spread, encouraging the children to take a closer look at the images for explanations.

The guiding concept of "looking inside" structures the entire book – not just thematically but also physically. The "little factory" of Isotype designers in collaboration with Max Parrish made clever use of the material make-up of the book to translate the core message into the reading experience: varying compositions of the images on the single or double-spread, thoughtful typographic layout, including choice of size and color, all work together to pace the turning of the pages.[10] This is all the more remarkable given that the Isotype language had been developed for exhibitions, working with large-format panels and charts displayed in exhibition spaces. Clearly, Marie Neurath does not simply transpose exhibition charts into book format but considers the book as a medium with its own logic and ways of interacting between the reader and the pages.

The cover of the original English edition shows a brown hen curiously looking at a yellow egg framed by ears of wheat (Figure 6). The title is set in red sans serif letters and divided into three parts, the typographic layout guiding the readers' at-

9 https://www.marieneurath.org/#header Letter of acceptance. 14 May 1948.

10 Even though Walker (2013a, 401) notes that this early book still lacks the consistency of later Isotype picturebooks, especially in regard to layout and typography, every double-spread within itself exhibits a compelling overall graphic logic. The complete book is accessible online at https://www.marieneurath.org/#early-ideas as part of the online exhibition about Marie Neurath. It is possible to leaf through the pages, reproducing the reading experience quite vividly.

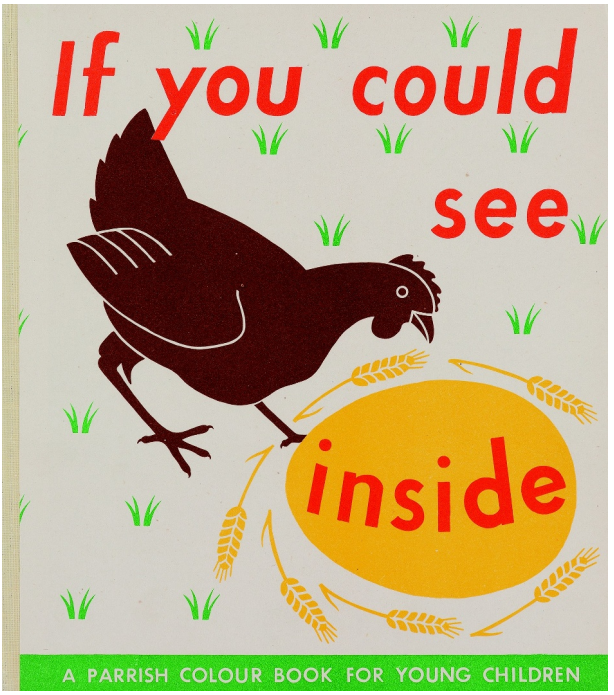


Figure 6: Cover of *If You Could See Inside* (1948) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

tention: "If you could" at the top announces the imaginative "what-if"-dimension of the book integral to sectional drawings; the verb "see" is placed in the middle, just above the eye of the hen – granting visual emphasis to the central act of seeing; the word "inside", finally, is placed inside the egg, slightly curved to adopt the form of the shell, the red of the letters creating a stark color contrast with the vibrant yellow of the yoke. The effect is playful and enticing, inviting readers to open the book to look inside to discover things usually hidden. Even the spacing of the three lines seems suggestive; while the interspace between the first two lines is standard, there is ample visual room between "see" and "inside", resembling the rhetoric effect of pausing to create suspense. Looking "inside" the book thus opens up the imaginary world of "what if" possibilities. While the cover of the German edition uses the fortress as title image, the wording of the title cleverly transposes the visual concept of looking inside into a verbal one: *Außen, innen, was ist drinnen?* (*Outside, Inside, What is in There?*, 1956). By tying the main title to the subtitle by way of rhyme, the "innen" (inside) is encapsulated both graphically and acousti-

cally in the word “drinnen” (within), programmatically announcing the relationship of inside to outside as the guiding principle.

The rest of the front matter in both editions continues this inside pull: the half title highlights the “inside” by using a green font to contrast with the brown font of the rest; and the internal title page creates a forward momentum by decentering the double-spread: the bibliographic information (author name, ISOTYPE logo, imprint etc.) is shifted to the left while the illustrated title on the right spills over the gutter, setting the conditional “If” in green letters on the left half and placing the “inside” in bright red font on the far right, above the blades of the windmill. This calculated visual imbalance catapults readers onto the next page, which presents the table of contents. Before having looked at a single cross-section, readers will have made the real-life experience of opening the book and looking inside, guided by the well-chosen paratexts and the clever overall design of the book.

The rather heterogeneous table of contents combines fourteen enticing subject headings with schematic vignettes in “gay colours”[11] indicating the contents of the chapters. Six of them feature the preposition “inside”, promising to show what usually remains hidden: “A fairy palace *inside* a hill”, invites readers into a cave, “*Inside* a fiery mountain”, shows them the bowels of a volcano, and “*Inside* the deep sea”, lures them deep into the ocean with a diving chamber, for example (italics mine). Some headings seem more mysterious than others. Despite the romantic title, “Digging for buried treasure” leads to a coal-mine, and “The lonely house that stands in the sea” shows the workings of a lighthouse. Some ask questions (“Can we see inside a balloon?”), while others provide answers (“How the wind is used to raise water”, about windmills). It is a rather eclectic collection of topics, visually connected by the graphic information technique of sectional drawings.

Three of the headings use verbs of visual perception: “A strange way to *look* at a house” (Figure 1), “If they [sic] could *see* inside” (Figure 7) “Can we *see* inside a balloon?” (Figure 9) [italics mine]. They explore the ways and limits of looking: Are there normal and strange ways to look at things? Do things look different from another perspective? What is visible to us? Taken together, these three headings surreptitiously provide a miniature philosophy of visual perception, suggesting that seeing is cultural (there are normed ways of seeing), positional (depending on your position, what you see is not the same), and physical (depending on the physical properties and states, elements can be more or less visible to the human eye). *If You Could See Inside* thus reveals much more than just the in-

11 https://www.marieneurath.org/#header Letter of acceptance. 14 May 1948.

side of sites, structures, organisms, and things; it teaches children that looking is an epistemological, cultural, and possibly even ethical practice. The conditional "if" of the title opens up new possibilities of understanding and engaging with the world. The title *If You Could See Inside* is a shorthand for the mission and vision of the Isotype Institute: producing intelligent educational images that grant understanding and new insight. If visual education were taken seriously, it seems to suggest, books would help build a better world.

5 A strange way to look: Three sections

Let us finally take a closer look at the use Marie Neurath makes of the visual possibilities of sectional views in her first informational book for young readers, *If You Could See Inside*. She incorporates principles of the Isotype Institute with standard techniques of scientific and technical drawing in a unique way to produce sober but engaging lessons of age-appropriate visual education. Apart from the learned scientific literature – such as the botanical, zoological, and geological atlases mentioned by Otto Neurath in his *Visual Autobiography* – contemporary popular magazines provided ample visual inspiration for showing hidden insides and sectional views (cf. Ross 2017). I have chosen three double-spreads, which illustrate different ways in which Neurath makes innovative use of the graphic technique of sectional drawings: First, the cross-section of a family home, which introduces the Isotype way of seeing as "a strange way to look" at familiar surroundings (Neurath 1948, 14–15); second the magic cut through a hill revealing a secret tunnel under a besieged castle (12–13) as an example of how the cross-sections foster an active, engaged way of looking; and, finally, the internal view of the cave (6–7), to show the way in which text and cross-section image collaborate to guide children in the process of scientific thinking.

The double-spread of the house presented in the introduction of this chapter perfectly illustrates how Isotype informational books depart from both children's books and technical drawings to create their own distinct visual language and pedagogical approach. Under the heading "A Strange Way to Look at a House" (Figure 1), the image shows a single-family home in the standard architectural orthogonal view, a simple two-dimensional line drawing. The exterior front walls are magically cut away to grant insight into the living spaces of the home: kitchen on the lower left, dining room on the lower right, bathroom and bedroom on the upper left and library or reading room on the upper right. The middle section, to the left and right of the gutter, shows the staircase, connecting the rooms. While

the rooms are sparsely furnished, the attic and basement crawl space remain entirely empty.

"We have all been inside a house", the text below the house reads, "but how different it looks when it is cut through with our magic knife!" Small details such as the possessive pronoun "our" for the magic knife and the exclamation mark at the end of the sentence reveal how urgently Marie Neurath invites children to change their habitual viewpoint and to make the strange Isotype way of looking at things their own. "These pictures", she will later write in the preface to the *Visual Science* teachers' notes, "are not meant to show you exactly how things look but give you information about them, like a map or an engineer's blue-print" (Neurath 1951). It is this shift away from the way "how things look" to "information about them" that is at the core of the Isotype transformative process.

This departure from mimetic representation *of* things to presentation of information *about* them is most apparent in the use of colors. Rather than aiming for realistic colors, the double-spread showing the house uses consistent color-coding to identify the different building materials or different categories of things: red for masonry or cement, green for wooden structures, such as flooring, doors, or staircase. Black is reserved for furniture and a few accessories, such as a hat, a cane, a bowl, and books, as well as for the stereotypical Isotype people and cat inhabiting the house. Blue shows where the water runs in the house: "how the water gets to the tap, and where it runs when you pull the bath-plug" (14–15). Finally, the ground on which the house is built, is represented by screen-print dots in black. None of the color-coding is explained in the text or legend, no key is provided. But there is no need, since the coding is so clear and self-explanatory, provided readers take the time to look closely at the pictures. This semantic use of color clearly signals that Isotype books offer a "different" way of looking at things, one encouraging children to think in categories (immovable building materials and moving or movable accessories and inhabitants), to develop analytic capacities (by recognizing and differentiating between brick and wood, for example), and to adopt a descriptive-explanatory rather than a narrative stance. Details such as the color-coded brick flooring under the fireplaces inform attentive viewers about fire safety. Again, the focus is not on "how things look" but on learning what they do and how they work. The result is a highly schematic, stylized cross-section in form and color, which challenges customary ways of looking at everyday surroundings.

This "strange" cross-section of a house radically departs from the dollhouse view familiar from children's books, which usually use perspective and fill the

rooms to the top with amusing or endearing details.[12] There are no children or toys in this view, no gnomes or mice; merely a cat sitting in front of the fireplace, which may capture a child's imagination. Rather than promoting an identificatory and imaginative reading of the images, however, the text guides the child in the new, "strange" way of seeing: Instead of focusing on the cat or people, the reader is encouraged to develop an eye for architectural detail: "Here you can see how long the chimneys really are [. . .]". And thanks to the clear red lines, even very young children will be able to see that the chimneys do not start at the rooftop but reach all the way down to the heater in the kitchen and the fireplace in the living room. Building on facts they are already familiar with, child readers will discover new things in Neurath's cross-section of a family house: foundations, pipes, and drains. More importantly: They will understand by way of looking how the things relate to each other and what their functions are: stability, aeration, and circulation of water, for example. The Isotype cross-sections thus do not primarily reveal things hidden from view but makes things visible that usually go unnoticed. They are tools serving the visual education of children and henceforth their overall emancipation. Simply reproducing the world and showing "how things look" is not what these cross-sections are designed to do. Their job is to introduce even the youngest readers to strange ways of looking. "Because they have an unusual job to do", Neurath insists in the same preface of the teacher's notes, "they [the images] are made in an unusual way" (Neurath 1951a).

This active, thinking, and very engaged way of looking is even more evident in the double-spread showing a besieged castle on the hillside (Neurath 1948,12–13) (Figure 7). The privileged knowledge of what is hidden inside the hill signifies the difference between a battle lost and won. This is made clear by the heading "If they could see inside". It is an illustration of a situation that looks very different depending on what kind of information one is privy to. Contrary to the house section, which refuses narrative engagement with the image, this one unfolds its visual power through visual narrative. From the outside, the party besieging the castle, equipped with cavalry, many foot soldiers carrying bows and arrows and pulling a catapult, seems to pose a serious threat to those defending the castle. Two important pieces of information invisible to the attackers reverse the situation, however. The cross-section, performed with the magic knife, reveals on the far right that the castle possesses a very deep well, providing the defendants with plenty of water and assuring their hygiene and well-being. A bit further to the

12 View the blog post "Welcome to the Dollhouse: The Best Cross-Sections in Picture Books" at www.mrslittle.com for numerous examples from nonfiction and fiction ranging from the 1970s to the present.

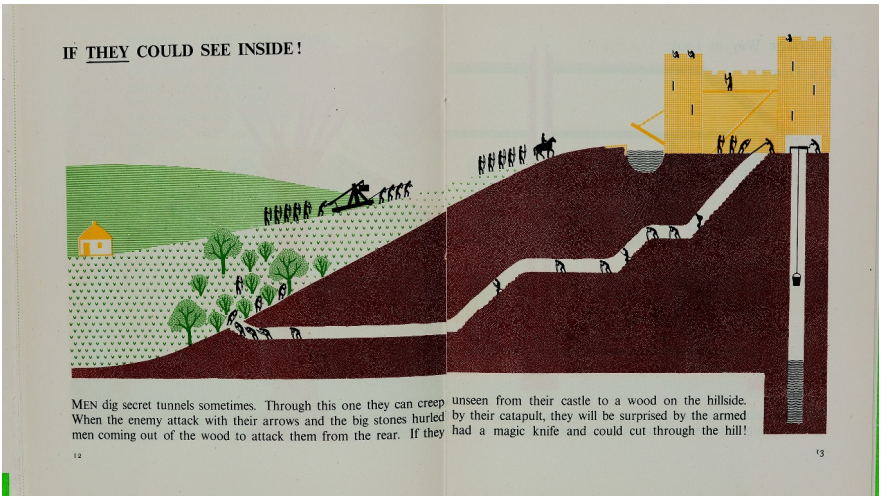


Figure 7: *If You Could See Inside* (1948) by Marie Neurath, pp. 12. Sectional view of hillside revealing secret tunnel. Otto and Marie Neurath Isotype Collection, University of Reading.

left, a castle inhabitant lifts a trap door, revealing a secret tunnel cutting across the hill and surfacing in a little wood, right behind the attacker's army. Three groups of defendants, all carrying bow and arrows, are using this secret weapon: one group waiting to enter the tunnel, another one working its way down, and the last one already spilling out at the other end of the tunnel and into the woods, ready to surprise the advancing enemy. Unaware of what is happening inside the hill, the enemy army focuses their attention on the frontal attack and leaves its vulnerable back exposed. "If they had a magic knife and could cut through the hill!" (Neurath 1948, 12–13), the text reads, making it very clear that knowledge of what is hidden signifies power. Learning about the secret things and hidden workings of their everyday world was to empower the children looking at these images. The cross-section of the castle on the hillside encourages them to take different positions – that of the confident but blind attackers, and that of the cunning defenders whose intimate knowledge of their surroundings gives them the advantage to win the battle thanks to strategy rather than force. There are valuable lessons to be learned here. Looking at Isotype children's books not only promotes visual literacy but also empowers children to become critical thinkers. It encourages them to look beyond the surface and examine the world around them more deeply, helping them to become conscious and responsible individuals and citizens.

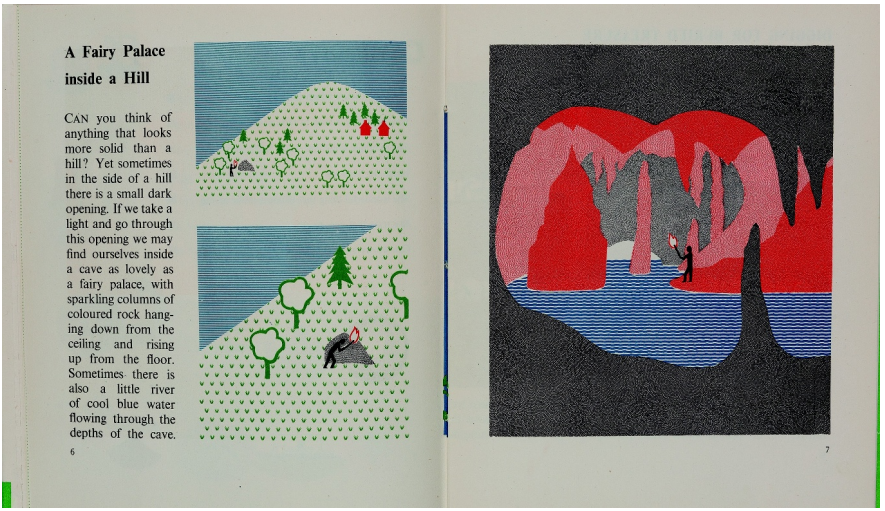


Figure 8: *If You Could See Inside* (1948) by Marie Neurath, pp. 6. Sectional view of a cave (right). Otto and Marie Neurath Isotype Collection, University of Reading.

The third and final cross-section double-spread presented here, the "Fairy palace inside a hill" (Figure 8), shows how the text guides the reader's sense of observation (outer eye) and fosters the power imagination (inner eye) to encourage a habitus of scientific inquiry, filled with awe. Rather than using captions, callout lines and annotations, the Isotype informational books for younger children provide a text, which embeds the cross-section in miniature dramatic scenarios, at times of cinematic quality. The verbal information does not simply identify facts, explain specific details, and provide answers but addresses and engages readers and invites them to ask further open-ended questions, thus emulating the process of scientific thinking. The double-page granting insight into the cave takes viewers/readers gradually closer and deeper into the magical inside by proposing a three-panel sequence: beginning with a panoramic view of a mountain ("Can you imagine anything more solid than a mountain?"), the next image zooms in on a "small dark opening" on the side of the hill. A silhouette Isotype person holding a torch is about to enter. "If we take a light and go through this opening", the text continues, and the facing page offers a full-spread cross-section view of the cave. The "magic" of Marie Neurath's visualization resides in the gradual approach to the hidden inside, while the use of the personal pronouns "you" and "we" creates intimacy and complicity. Readers feel taken serious and readily embark on the scientific mission. The hill, which seems to embody the impenetrable, – is shown to have a small opening. What was concealed and dark, becomes apparent and

illuminated: Marie Neurath holds the light of the graphic designer to the darkness of the cave. The sectional cut through the cave walls appears as flat gray frames and two shades of red show the depth of the cave, reminiscent of nineteenth-century accordion peep shows. While in the first two frames, the viewers were following closely behind the genderless Isotype person, identifying with them, the final image shows the person in the distance. The magic effect is amplified by the reference to a fairy palace. The inside of the hill is described as "lovely", with its "sparkling columns of coloured rock". Rather than whisking children away to fairy worlds, however, Neurath guides them to discover geological phenomena. The verbal comparison to the fairy landscape merely serves as a way to express the wonder and awe at the heart of scientific inquiry. True magic, is the message, is knowledge revealed.

It may seem paradox that Neurath uses the metaphor of the magic knife to describe her rather rigorous approach to the picturing technique of cross-sections. Her sober, effective style rather seems to practice a kind of utilitarian *Entzauberung*, a de-enchantment of the supposedly magical childhood by focusing on mechanical inventions, engineering exploits, and natural phenomena, presenting them in two-dimensional line drawings and using a reduced palette of colors. And yet, the magic of Isotype informational books is closely linked to the awe and wonder of science and scientific thinking. In fact, the process of "transforming", the Isotype way of translating complex information into simple pictograms and images, could be considered to be magic. The magic knife metaphorically invoked by Neurath to produce simple yet powerful sectional views revealing the hidden is the graphic information designer's tool to select and to focus, to make visible and highlight, to bring into relation and compare, to engage and to empower. It truly is a "strange way to look" at things and raises the all-important question at the root of scientific thinking, "what if . . .".

6 Conclusion: Popping the metaphor

The sectional drawings of Isotype informational books are at the intersection of technical drawing, scientific illustration, graphic information design, and children's book illustration. At their most basic, sections enable a better understanding of the internal structure and composition of objects, areas, or organisms. More importantly, however, they serve as a powerful educational tool that foster curiosity, facilitate understanding, and spark a sense of wonder about the world. They encourage exploration, critical thinking, and engagement, making learning enjoyable and memorable for young readers. The last page of *If You Could See*

Inside is at once a poignant illustration of the magic of the graphic design technique of sections and of its limitations (Figure 9).

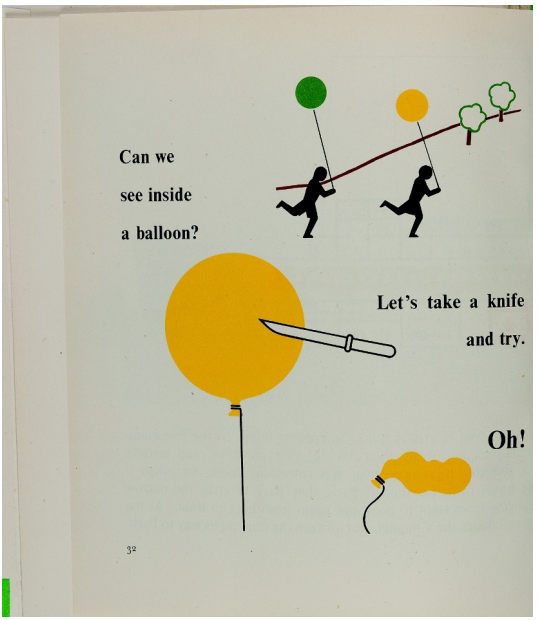


Figure 9: *If You Could See Inside* (1948) by Marie Neurath, p. 32. Popping the metaphor. Otto and Marie Neurath Isotype Collection, University of Reading.

"Can we see inside a balloon?", the text asks, and playfully proposes an empirical approach to the scientific query with a simple experimental setup: "Let's take a knife and try" (Neurath 1948, 24 – 25). Following the rather cheerful image showing stylized silhouettes of a boy and a girl with balloons skipping across the page, the close-up picture of the yellow balloon will cause kids to hold their breath: a sharp knife is pointing right at the toy, about to perform the painfully delightful experiment. The final image of the brief visual sequence presents the sad result, a busted balloon, accompanied by an at once laconic and emphatic "Oh!"

What a finale to an entire book dedicated to looking inside! It injects a rare dose of humor, an element of surprise, and seems to suggest that there are things we cannot see.

Marie Neurath's use of a literal knife to puncture the balloon at the end of the book appears to be a clever and symbolic choice. The unexpected outcome, with the balloon deflating instead of revealing its inner contents, could be interpreted as a metaphorical statement about the limitations of graphic design. By

physically popping the balloon, Neurath might be illustrating that while graphic design, represented by the "magic knife" metaphor, can provide insights and understanding, it also has its boundaries. Some concepts or aspects may remain elusive or resistant to visual representation. The simple exclamation "Oh!" in the text emphasizes surprise, perhaps encouraging readers to consider the unpredictable nature of both graphic design and the exploration of knowledge. This thoughtful and cleverly choreographed conclusion adds punch to the book, inviting readers to reflect on the nuanced relationship between representation, visualization, and the inherent complexities of the subjects graphic design seeks to illuminate.

The metaphor of the "magic knife" in the context of Marie Neurath's Isotype children's books can thus be viewed as a meta commentary on strategies of visualization and graphic design within the realm of informational children's literature. The "magic knife" metaphor becomes a symbol not only for the act of visual dissection but also for the tools and strategies used in graphic design to simplify and communicate complex information. In the world of Isotype, where clarity and accessibility are paramount, the magic knife embodies the creative and transformative power of visualization techniques. Moreover, the deflation of the balloon at the end introduces a layer of self-awareness, suggesting that while graphic design can reveal and simplify, it also acknowledges its own limitations. This meta commentary encourages readers, including children, to appreciate the thoughtful choices made in visual representation, fostering a critical awareness of the strategies employed in conveying information through graphic design in the context of children's literature.

Finally, the deflation of the balloon on the last page of Marie Neurath's first informational Isotype book can also be seen as a subtle foreshadowing for the later exploration of more complex and invisible phenomena. By starting with the elusive concept of air in the balloon, Marie Neurath lays the foundation for a progression into more abstract and invisible subjects like electricity, sonic waves, telegraph signals, and beyond in subsequent books. Some phenomena are inherently challenging to represent visually, yet the pursuit of understanding and visualizing the "invisible" remains a central theme in the development of graphic techniques across Marie Neurath's body of work.

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Alessandro Segalini

The Typography of Marie Neurath's Isotype Picturebooks

1 Introduction

Marie Neurath is known for her innovative approach to picturebook design, particularly in her work with the Isotype (International System of Typographic Picture Education) method developed with Otto Neurath. Her picturebooks are characterized by several distinctive features and a consistent visual language, where typography was specified to support visual clarity and accessibility, the type pragmatically set as a visual element to convey meaning and often at once to be illustrative, reinforcing the connection between text and image. Neurath researched, calculated, and co-designed nearly every Isotype ever created, from the early days in Vienna in 1925 all the way to when she retired in 1971.

Reading about Otto Neurath's life, one could speculate that he would never have embarked on the Gesellschafts- und Wirtschaftsmuseum in Wien project (Social and Economic Museum of Vienna) without Marie. The trio of Otto and Marie Neurath and Gerd Arntz became the nucleus of all Isotype work from 1928–1941. Then "when the Isotype Institute was set up in England in 1942, Otto and Marie were directors on equal terms. After Otto Neurath's death in 1945, Neurath continued Isotype's work for nearly thirty years, concentrating on the production of educational books for young readers. The achievement of these books, seen in the context of their time, has yet to be properly assessed" (Kinross 2022, 51–55).

In his book *Unjustified Texts* (2022), Robin Kinross goes on explaining that the character of Isotype – "character" also indeed as a quintessential type design word – was concerned with the visual representation of things that needed to be said, particularly or exclusively information worth presenting, from which one could intelligibly learn historical and social relationships, as well as facts.

Kinross met Marie Neurath in 1975, when they made an exhibition on Isotype at the University of Reading. The two met regularly since then, and Kinross stated that in her practice she had "a beautiful economy of effort" (Kinross 2010). Marie Neurath referred to herself as "the Transformer" (Kinross 2022) and it is this role in her team that I will elaborate on.

Marie Neurath explained the work of the transformer as a chart in which many design details have been decided, as a "blueprint from which the artist works" (Neurath and Kinross 2009). That is also intellectually and practically a

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good description of the proto-typographer's function – an expert, a supervisor of the printers and publishers. "Today we would consider the work of the Transformer somewhere between a data scientist and an information designer" (Forrest 2020):

> From the data given in words and figures, a way has to be found to extract the essential facts and put them into picture form. It is the responsibility of the transformer to understand the data, to get all necessary information from the expert, to decide what is worth transmitting to the public, how to make it understandable, how to link it with general knowledge or with information already given in other charts. In this sense, the transformer is the trustee of the public. (Neurath and Kinross 2009, 78)

Their "transformer" was indeed an editor. Surprisingly, it appears Otto and Marie Neurath never used the term "designer".[1] This word has only in recent years resumed its special sense of someone who plans and gives material form to content. And, as Robin Kinross wrote in his article "Designer as publisher", "there is the fact that content is always embodied in its form, and so to make form is also to shape content" (Kinross 2010).

The process of visually configuring material lies at the intersection of science, design, and communication, and typography is essential in conveying educational content effectively. Neurath's approach to typography aligns with the educational goals of her picturebooks, ensuring that the text is easily readable and complements the visual elements in conveying information. Moreover, Neurath's bright colors and elaborate cross-section diagrams add a layer of creativity that captivates any viewer regardless of their age.

The main concern analyzing Marie Neurath's Isotype picturebooks typographically is that the typography in her books is quite basic and not very sophisticated. The internal layouts, although particularly engaging thank to the illustrations, are always either a two- or three-column grid of unrefined justified text in a wide format; at times the line length or frame width is arbitrary to fit the illustration. Perhaps the correct approach or angle to describe this body of work is to see it in the larger context of the book as an interface. Besides the sketches and specification prepared in galleys for the printer by Marie Neurath's team, see for example the specs for *The Wonder World of Land and Water* (1957) in Figure 1, it appears that there was very little consistent practice for typography, yet there seems to have been some consistency across series.

1 The German equivalent to design is "Gestaltung" which was widely used in the 1920s in modernist and vanguard circles, for instance in the Bauhaus journal *Zeitschrift für Bau und Gestaltung* (1926–1931). Marie and Otto Neurath employed this term in their pedagogical texts, paying attention to this important concept.

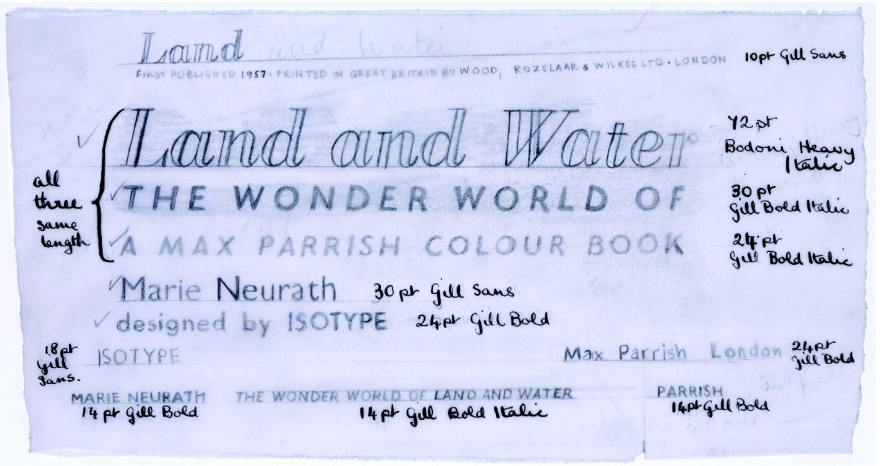


Figure 1: Galleys of *The Wonder World of Land and Water* (1957) by Marie Neurath. The galleys were then cut up and pasted on to boards that were sent to the printer. Otto and Marie Neurath Isotype Collection, University of Reading.

Similarly, it is difficult to find a rationale for typeface selection, other than the obvious and expected Futura/Bodoni dynamic. Typestyles that are close in design, but not from the same family create a visual discordance. Our sensibilities seem to require either strong typographic contrast, or none at all. Unlike color combinations that can benefit from subtle contrast, typeface changes need to be obvious. The "Futura/Bodoni" pair, a beautifully working font pair thank to their opposing stroke contrast but similar letterform aspect ratio, first appeared in a formal typestyle compatibility matrix guide in "FY(T)I, For Your Typographic Information" in the magazine *U&lc* (September 1992, 28). We can reason that the font Gill Sans, a humanistic sans by Eric Gill (published by the Monotype foundry in 1928) substituted for the geometric sans-serif Futura by Paul Renner (published by the Bauer foundry in 1927), when typesetting was done by UK printers, yet the lack of consistency in the typography reflects conventional typesetting practices of the time (1940s and 1950s), with the final composition left entirely to the printer's office.

The 1940s and 1950s were a time of technological transformation in the printing industry. Letterpress printing, which had been the dominant method for centuries, was still widely used, but newer technologies were beginning to gain prominence, like offset printing and phototypesetting. Monotype and Linotype machines were still in operation, primarily for setting large amounts of text for newspapers and books.

The 1950s were a time when design movements like the International Typographic Style, also known as the Swiss Style, began to shape the field of typography. Swiss Design was a movement that took hold in the 1950s in two Swiss art schools, the Kunstgewerbeschule in Zurich led by Josef Müller-Brockmann, and the Allgemeine Gewerbeschule in Basel led by Armin Hofmann (Meggs 2006). This design approach emphasized clarity, readability, and objectivity, promoting the use of sans-serif typefaces like Helvetica (namely "the Swiss typeface"), grid-based layouts, and a focus on the relationship between type and imagery. The Swiss Style had a profound influence on design, not only in Switzerland but also in England and the rest of the world, it led to a significant shift in the way typography and typesetting was approached, favoring a more minimalist and structured aesthetic. These developments laid the foundation for the modern typographic and printing landscape we see today. During the late 1940s and 1950s, several typefaces were widely used in England. These typefaces reflected the design preferences of the time and the influence of various design movements:

Times New Roman: Created in 1931 by Stanley Morison and Victor Lardent, Times New Roman became one of the most popular seriffed typefaces during this period. Its clarity and legibility made it an excellent choice for newspapers and books.

Garamond: The Garamond typeface, based on the designs of Claude Garamont from the sixteenth century, continued to be a popular choice. Its timeless elegance and chirographic origins made it a favorite for a wide range of book printing and body text applications.

Baskerville: The Baskerville typeface, designed by John Baskerville in the eighteenth century, experienced a resurgence in popularity during the mid-20th century. The sharp contrast between thick and thin strokes in the letterforms gave it a distinct and modern look that inspired both Firmin Didot and Giambattista Bodoni.

Bodoni: Bodoni, a high-contrast typeface with sharp square-bracketed serifs, gained popularity in the early twentieth century for its Roman modern and elegant design, fitting well with Art Deco and modernist aesthetics in advertising, publications, and fine press editions, in England as well (Morison 1997, 36).

Futura: This geometric sans-serif typeface, designed by Paul Renner in the 1920s, gained popularity for its optically-adjusted geometry, minimalist appearance, and readability in text setting environments as well. It was widely used in advertising and graphic design.

Gill Sans: Created by Eric Gill in the mid-1920s, Gill Sans is a humanist (chirography informed) sans-serif typeface known for its simplicity and legibility. In the early to mid-twentieth century, it was widely used in signage, branding, and print, including the British Railways and Penguin Books, reflecting its versatility and modern design.

Examples of Marie Neurath's book typography are now visible online thank to "Transforming Science for Young People: Marie Neurath and Isotype Books for Children" (2019), the project designed and curated by Sue Walker, Eric Kindel, et al., from the Otto and Marie Neurath Isotype Collection at the University of Reading.

While the content and interiors of Neurath's picturebooks are particularly engaging, the cover design also plays a significant role. The cover always serves as a visual summary of the book's content, using Isotype symbols and clear and simple typography to provide a glimpse of what readers can expect inside.

2 A cover spreads analysis

If You Could See Inside

If You Could See Inside was printed in 1948 by Jarrold & Sons in Norwich, England.[2] The body text was typeset in Times New Roman and the display text on the cover was set in Futura. The word "see" was set on its own line to emphasize the action/topic of the book, and the word "inside" was set on a curved baseline to function as an index with the illustration. The title can be seen as being right aligned, balancing the composition in a simple way, while emphasizing the verb "see" set on its own line. The relation between font, color, and page layout appears to follow basic design and color symbolism principles. The placement of "inside" functions semiotically at the index level (all spatial signs work indexically, i.e., they achieve part of their meaning through their location).

I'll Show You How It Happens

I'll Show You How It Happens was printed in 1948 by Jarrold & Sons in Norwich, England. The body text was typeset in Times New Roman, and the display text on the cover was set in Futura (Figure 2). The title can be seen as being right aligned, yet the word "you" is indented to touch both the globe and the insect part of the illustration, as if humans act as a connection of sort. The relation between font,

2 All cover images not reproduced here can be viewed at: https://marieneurath.org.

color, and page layout appears to follow basic design and color symbolism principles. The overlaps of type and illustration are simple and thought out.

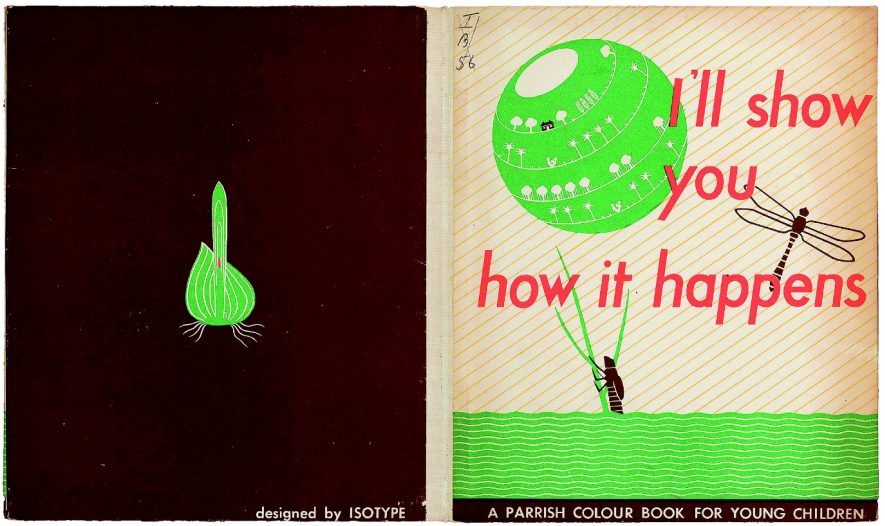


Figure 2: Cover of *I'll Show You How It Happens* (1948) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

Railways under London

Railways under London was printed in 1948 by Jarrold & Sons in Norwich, England. The body text was typeset in Berthold Bodoni, and the display text on the cover was set in Futura. The whole title can be seen as justified to the width of the front cover text frame in three "tracks" or lines. The word "London" is color coded in green, the same color used for the people icons, connoting the users make the city. The relation between font and color appears to respond to a diagrammatic kind of layout, where the white lines also define the ⅛ vertical module used for the linespace of the title text. The color green is "coded" for the city name and the users/people, while the color red is for transportation.

"Visual History of Mankind"; a series of three books

Living in Early Times, the first book in the series, was printed in 1948 by Jarrold & Sons in Norwich, England (Figure 3). The second book, *Living in Villages and Towns*, was printed in 1948, and *Living in the World* was printed one year later. For all three books, the body text as well as the synopsis on the back cover was typeset in Times New Roman, and the titles inside the book were set in Gill Sans

Bold. The first book front cover differs from the other two because the title was set in a shaded glyphic serif typeface, when the other two also show a weight of Times New Roman. The relation between font, color, center alignments, and page layout creates a consistent visual storytelling across the volumes.

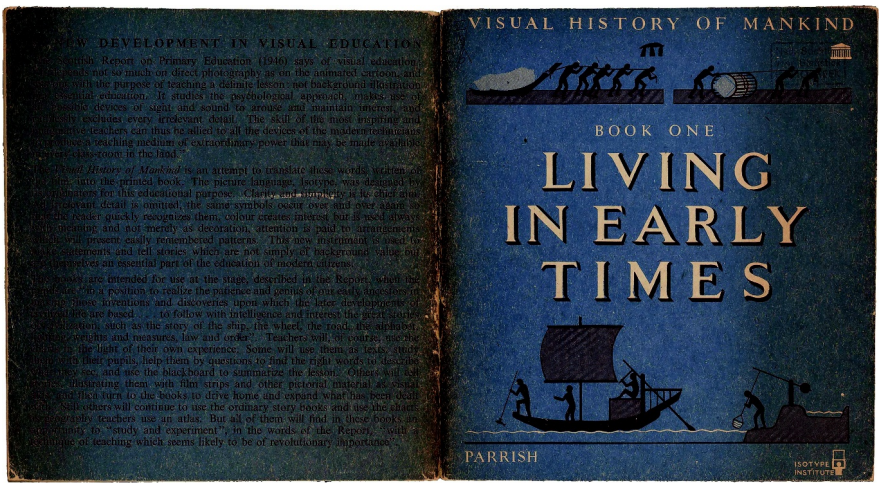


Figure 3: Cover of *Visual History of Mankind 1: Living in Early Times* (1948) by Otto and Marie Neurath and J.A. Lauwerys. Otto and Marie Neurath Isotype Collection, University of Reading.

Fire!

Fire! was printed in 1950 in Holland by De Ijsel Press. Berthold Bodoni was used to typeset both text and titles, and the display letterforms on the front cover appears to be handlettered, based off Futura, and outlined in white for better contrast (Figure 4). The back cover does not carry any text other that "designed by ISOTYPE", set in Futura. The relation between font, color, and page layout appears to follow basic design and color symbolism principles. The placement of the 'r' (in "Fire!") can be seen as a sort of onomatopoeia, and it locks the composition vertically by being set right above the centered firetruck ladder.

How the First Men Lived

How the First Men Lived was printed in 1951 by Waldheim-Eberle, a six-color offset lithography based in Vienna, Austria. Times New Roman was used to typeset both text and titles, yet strangely the title page was set in Gill Sans Bold Italic (Figure 5). The display lettering on the front cover appears to be handlettered, based off Futura, like in *Fire!*; the title is arranged in three lines, like in *Railways under London*.

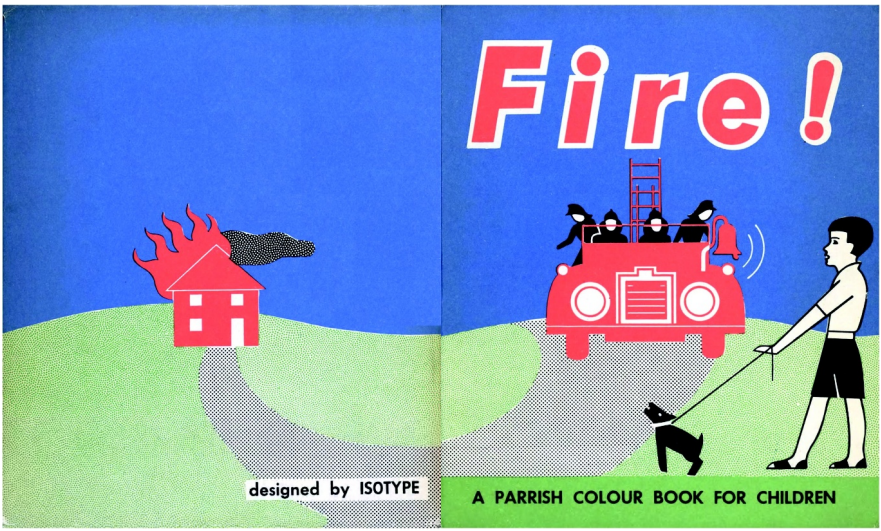


Figure 4: Cover of *Fire!* (1950) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

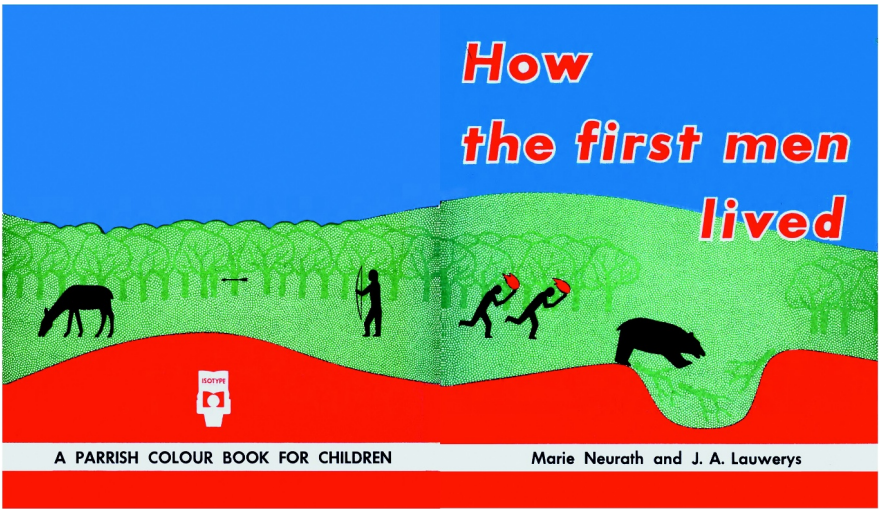


Figure 5: Cover of *How the First Men Lived* (1951) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

The back cover does not carry any text, but makes good use of the horizontal dimension to narrate human/animal activities. The semantic relation between font,

color, and page layout is fully functional to support the iconic storytelling developing across the spread.

Rockets and Jets

Rockets and Jets was typeset in England and printed in 1951 in Austria by Waldheim-Eberle. The body text was typeset in Berthold Bodoni, and the display text on the cover was set in Futura. The display lettering used for the title on the front cover was set in a condensed slab serif, a newspaper/magazine face similar to Linotype Beton Bold Compressed. The back cover does not carry any text, but uses the diagonal to visually stress the dynamism of the subject. The relation between font, color, and page layout is reinforced by a subtle pattern to which the title lettering contributes with the specific letterform's aspect-ratio.

Science in the Home

Science in the Home was typeset in England and printed in 1951 in Austria by Waldheim-Eberle. Times New Roman was used to typeset both text and titles (Figure 6). The display lettering on the front cover was set in Futura. The back cover shows an exploded-view or schematic drawing with a synopsis on the "Visual Science" series also typeset in Times New Roman. The relation between font, color, and layout stands on a four-column grid symmetric to the spread page, where the schematic drawings functions as syntax.

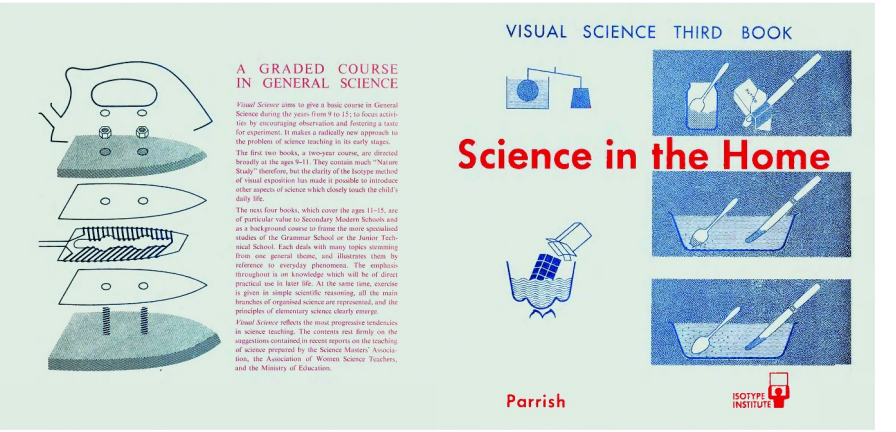


Figure 6: Cover of *Science in the Home* (1951) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

The First Great Inventions

The First Great Inventions was typeset in England and printed in 1951 in Austria by Waldheim-Eberle. Times New Roman was used to typeset both text and titles. Like in *How the First Men Lived* and *Fire!*, the display lettering on the front cover was handlettered, based off Futura (Figure 7). The back cover does not carry any text. The relation between font, color, and layout appears to follow basic design and color symbolism principles, with a stress on the diagonal of the front and back pages.

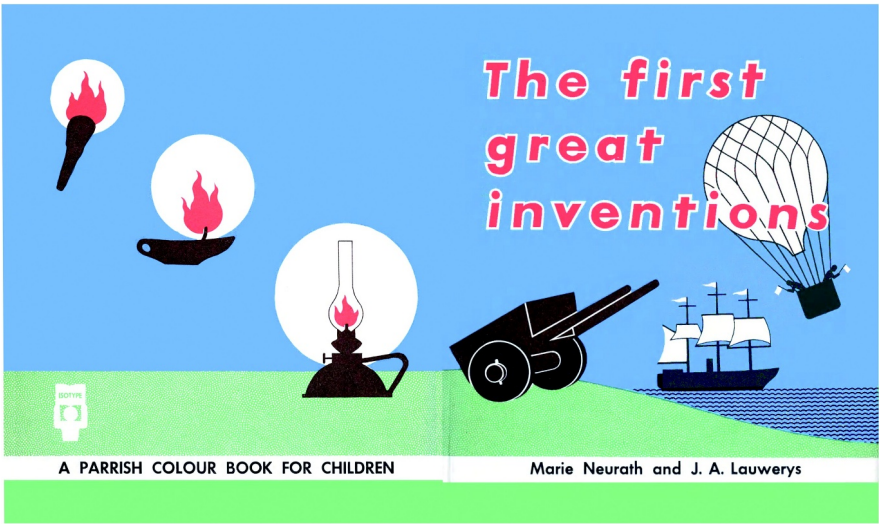


Figure 7: Cover of *The First Great Inventions* (1951) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

"The Wonder World of . . ."; a series of six books

The Wonder World of Birds, *The Wonder World of Long Ago*, *The Wonder World of the Deep Sea*, *The Wonder World of the Seashore*, and *The Wonder World of Strange Plants* (Figure 8) are the first five books in this series, and they were printed in England by Graphic Reproduction London between 1953 and 1956. The body text was typeset in Baskerville, and the titles in Berthold Bodoni. The display text on the covers, as well as on the title pages, were set in Gill Sans. *The Wonder World of Land and Water* is the last of the series, and it was printed in 1957 by Wood Rozelaar & Wilkes in London. The only difference for this book is that the display typography on the cover uses a mix of Gill Sans and Berthold Bodoni Italic. The relation between font, color, and page layout appears to be built off a 3-column 3 rows underlying structure, using basic alignments and similar tex-

tures. The titles are consistently three times larger in type size than "The Wonder World of" overarching series text.



Figure 8: Cover of *The Wonder World of Strange Plants* (1956) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

Machines Which Seem to Think

Machines Which Seem to Think was printed in England by Graphic Reproduction London in 1954. Berthold Bodoni was used to typeset both text and titles. The display lettering on the front cover was set in Futura. The back cover does not carry any text but a symbolic illustration that suggest the sort of professional agreement within the discipline. The relation between font, color, and page layout is tuned on minimalism, perhaps to leave plenty of room to personal interpretations of *the thinking machines*.

Speeding Into Space

Speeding Into Space was printed in England by Graphic Reproduction London in 1954. Berthold Bodoni was used to typeset both text and titles. The display lettering on the front cover was set in Berthold Bodoni Italic. The back cover does not carry any text. The relation between font, color, and page layout is contained by consistent stroke thickness – that of the illustration and the thin strokes in the letterforms of Bodoni.

Too Small to See

Too Small to See was printed in England in 1956 by Wood Rozelaar & Wilkes in London. The body text was typeset in Baskerville, and the titles in Berthold Bodoni. The display typography on the cover was set in Gill Sans Italic. The back cover does not carry any text. The relation between font, color, and page layout fosters persuasiveness through the use of scale and intentional positioning: the placement of the eye of the fly marks both the center of the front cover and the apex of an upside-down triangle that has the word "see" at the top-right corner point. The eye of the fly also echoes the elliptical counters and arches (shapes) in 'o/m/a' in Gill Sans.

Man-Made Moons

Man-Made Moons was printed in England in 1960 by Fletcher & Sons in Norwich. Berthold Bodoni was used to typeset both text and titles. The display letterforms on the front cover appears to be handlettered, with Blackletter-inspired strokes. The back cover does not carry any text but makes wonderful use of scale through the illustration (Figure 9). The relation between font, color, and page layout is arranged and built around the aspect ratio of the letterforms and the circular shapes.

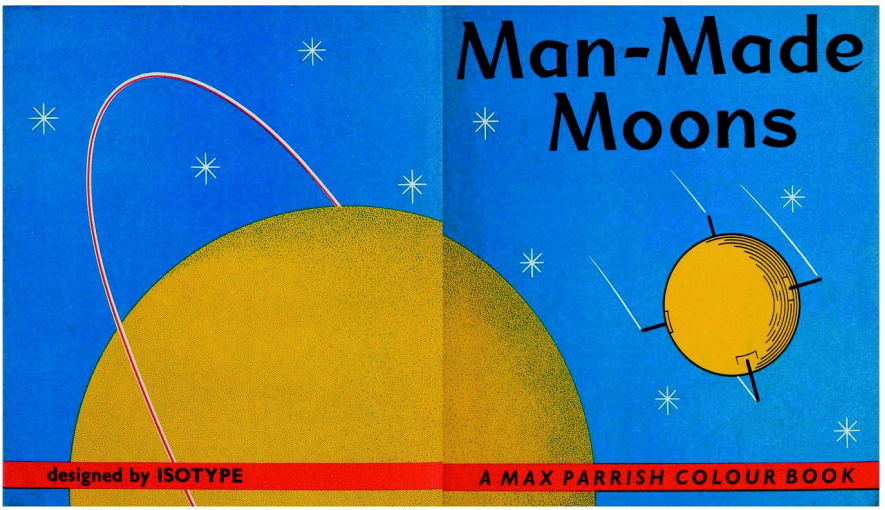


Figure 9: Cover of *Man-Made Moons* (1960) by Marie Neurath. Otto and Marie Neurath Isotype Collection, University of Reading.

A New Life Begins

A New Life Begins was printed in England in 1961 by Fletcher & Sons in Norwich. Berthold Bodoni was used to typeset both text and titles. The display letterforms on the front cover appears to be handlettered in a signpainter or 'marker' fashion. The text on the cover flaps reads a synopsis of the book and a list of the eleven books in the "The Wonder World of Nature" series, set in Baskerville, and Berthold Bodoni. On the front, the relation between the alphabet, color, and page layout appears to create an organic use of the square format.

They Lived Like This in Ancient Crete

They Lived Like This in Ancient Crete was published by Max Parrish & Co and the Canadian edition was printed in 1965 in Vancouver, B.C. by Evergreen Press Limited. Baskerville was used to typeset both text and titles. The display typography on the front cover is set in Monotype Perpetua, one of the most beautiful classic Roman type designs. The relation between font, color, and page layout appears to be built off a 3-column 3 rows underlying structure, using the traditional epigraphic centered alignment.

3 Conclusion

In summary, most of the typesetting in Marie Neurath's picturebook was done in Times New Roman, Berthold Bodoni, and Baskerville. Layout consistency is achieved through the use of basic design and color symbolism principles. The quality of the typesetting is far from optimal, yet a little more exploration was left to display typography; although typography is indeed important in the design of Marie Neurath's picturebooks, it is just one element of her broader approach to creating educational and visually engaging books or "scientific interfaces" for young learners. The visual communication in Marie Neurath's picturebooks reminds us that we seem as a species to be driven by a desire to make meanings: above all, we are surely *Homo significans* – meaning-makers. Distinctively, we make meanings through our creation, interpretation, and transformation of signs and type. Marie Neurath's use of the Isotype method, and her commitment to visual clarity, made her picturebooks distinctive and extremely valuable tools for both education and storytelling.

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Jörg Meibauer

Truth and Transformation in Isotype Picturebooks: Analyzing *Railways under London* (1948) by Marie Neurath

1 Introduction

We do not know much about truth in picturebooks. This holds for descriptive and narrative picturebooks alike. With respect to descriptive (or non-fiction/informational) picturebooks, we can posit that they should represent the world in a truthful manner. Moreover, the information given in text–picture combinations should be accurate, objective, and comprehensible for the addressed audience. It goes without saying that these norms are often violated, for instance in those descriptive picturebooks that convey propagandistic messages. Therefore, we have to examine to what extent a descriptive picturebook represents the world according to the norms of truth, accuracy, objectivity, and comprehensibility.

With respect to the Isotype picturebooks created by Marie Neurath and her collaborators, one can safely assume that the intention was to convey knowledge according to the aforementioned norms. The transformation of knowledge as possessed by experts (for instance biologists or anthropologists) to knowledge potentially possessed by children, was at the heart of Isotype procedures. In order to find out what the relevant knowledge was, a complex process of fact-checking was carried out. Isotype rules for transforming knowledge into pictures were used in order to achieve graphics that not only show something but also help in explaining the respective phenomenon. The additional support by the Isotype picturebook texts is also very functional for this purpose (although this has, to my knowledge, not been widely researched).

This chapter deals with aspects of truth and transformation with respect to the Isotype picturebook *Railways under London* (1948) that appeared from Max Parrish in London. In contrast to *If You Could See Inside* (1948) and *I'll Show You How It Happens* (1948) from the same year, both aimed at young children, *Railways under London* addressed children aged 9–12. (This means that a prototypical child reader was born between 1936 and 1939 and had experienced the war.) *Railways under London* is a complex descriptive picturebook relating to the conceptual frame mentioned in the title (for a typology, see Meibauer 2015 and Campagnaro 2021).

The overall topic of the book, railways under London, that is the London Underground, is attractive for a number of reasons. The London Underground

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opened its first line on 10 January 1863. It is probably the most famous underground railway system in the world. Two seminal visual designs contributed to this popularity.

First, the logo of the London Underground, the so-called roundel, which is a red circle with a horizontal blue bar laid over it. The bar shows either the name of the respective station or the word *UNDERGROUND*. This famous logo was designed by Edward Johnston in 1916.[1] It is widely used for informational purposes and can be seen in every station, on trains, timetables, and maps.[2] Second, the map of the London transport system designed by Harry Beck in 1933:[3] this is a landmark of graphic design and is based on the idea that, for solely informational purposes, the topographical relations of stations are relevant, not their exact location on a map being true to scale. Basically, the plan consisted of lines in vertical and horizontal positions, and 45-degree angles connecting the symbols for the stations. Arguably, there is some overlap in the Isotype principles and the design of the London Underground map (see Kinross 2017, 143–144).

In 1948, memories of the heavy bombings on London were still present in the cultural memory as well as in the minds of individual people. Although most children were evacuated, they were aware of the fact that stations were used as shelters, but as these were attacked by German air raids, they were not always a safe place (Cooper 2014). These wartime experiences are not mentioned in Neurath's book, however. Instead, the book focuses merely on technical and architectural contents, trying to show "the mechanical wonders" (a quotation from the inside front flap) of this underground world.

The outline of this chapter is as follows: In Section 2, matters of truth in picturebooks are discussed, with a close view of the Isotype picturebooks. I will argue that it is not the picture itself that can be true or false, but only the description of the picture. However, pictures can be used in deceptive ways. In Section 3, I will describe the picturebook *Railways under London* in more detail. The exact description always takes place with regard to the fine adjustment between (perceived) reality and its graphic or textual representation. It becomes clear that transformation is a complex process that requires precise consideration of what is comprehensible to a child reader. In Section 4, I will discuss to what extent transformation preserves truth or risks deception. The point is that the (uninten-

1 Edward Johnston (1872–1944) was a British teacher of calligraphy who had a major influence on the development of calligraphy and typography in the twentieth century. See Taylor (2016).

2 Cf. the modified version of the roundel with the publisher's name *Kindler* on the cover of Miroslav Šašek's book *London* (1960 [1959]).

3 Henry Charles "Harry" Beck (1902–1974) was a British technical draftsman and graphic designer. See Garland (1994).

tional) omission of relevant information can have a misleading effect. Section 5 concludes the chapter.

2 On truth in descriptive picturebooks

In picturebook theory, there has not been much systematic reflection about truth in picturebooks. This holds for the textual as well as for the pictorial level. Obviously, this has to do with the widespread concentration on narrative picturebooks where matters of representation of reality are usually discussed under the label of mimesis. When it comes to descriptive picturebooks, the situation is somewhat different, because here, it seems to make more sense to ask whether the pictorial and textual information being given to the child is true.[4] Yet, with the notable exception of Løvland (2016), we are faced with a lack of systematic reflection and analysis.[5]

It is widely acknowledged that informational picturebooks are somehow related to "facts", and that these facts are supposed to be "true". But then, again, it is stressed that informational picturebooks transgress the boundaries of factuality. According to Nikola von Merveldt (2018: 232), informational picturebooks "do not merely represent or illustrate transparent data and facts", and "thus go far beyond facts, readily available elsewhere, to awaken curiosity, inspire awe, and nurture community". This is certainly correct. However, we are left with the question of where exactly truth in picturebooks is anchored and how this information may be used for the purposes Merveldt mentions.

As for the type of pictures, one may rely on the distinction between informing, artistic, and entertaining pictures, as proposed by Bernd Weidenmann (1994). Informing pictures are prominent in instructional situations that serve the acquisi-

4 A note on terminology: I consider the term descriptive picturebook more appropriate than the more widely used term informational picturebook, since narrative picturebooks also always contain information (Meibauer 2015). For the purposes of my argument, nothing depends on the appropriate terminology.

5 Løvland (2016) draws a distinction between four types of truth as related to multimodal nonfiction books: Something is (i) "true because it exists" (as in science textbooks); (ii) "true because its has happened" (as in history textbooks); (iii) "true because it works" (practice related books, for instance hobby books); (iv) "true because the parts are meaningful as a whole" (social science textbooks displaying an (inter)subjective, constructionist approach to social reality). *Railways under London* is best suited to the first category, which the author associates with correspondence theories of truth common in the natural sciences. Sanders (2018) expresses skepticism towards nonfiction literature that aims to convey true facts according to natural science and insists that nonfiction literature should encourage children's critical engagement.

tion of knowledge and skills. It is important that any ambiguity in the pictorial representation be avoided, so that readers can grasp the encoded information in a precise and comprehensive manner. Artistic pictures, in contrast, emphasize aesthetic aspects and allow some vagueness triggering a subjective interpretation. Finally, entertaining pictures aim at captivating viewers' attention and evoking emotions. It may happen that a delimitation of these types cannot be easily drawn, since individual pictures may mix elements of these types in a hybrid manner. Although these three types can be found in descriptive picturebooks, it is obvious that informing pictures are particularly typical for this picturebook genre.

In the parlance of Weidenmann (1994, 12), informing pictures are visual arguments, that is they constitute answers to questions. For instance, a picture showing a gas turbine gives an answer to the question of what a gas turbine looks like. Visual arguments are connected to the criterion of adequacy, since they should encompass all relevant aspects and have to be fine-tuned to the needs of the recipients and the particular instructional setting. Within the realm of informing pictures, we further differentiate between representative (realistic) pictures and logical pictures. Since different types of maps exist, I would like to add maps as a subtype of informing pictures (see Kümmerling-Meibauer and Meibauer 2015) (see Figure 1).

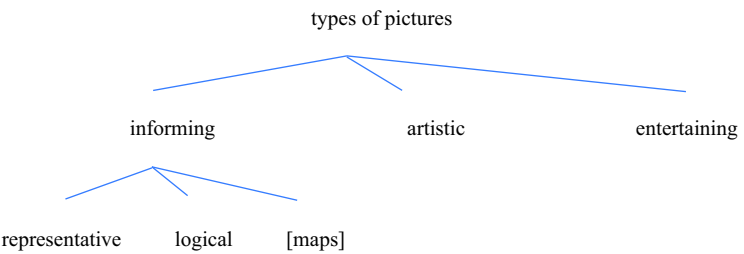


Figure 1: Types of pictures according to Weidenmann (1994). The bracketed category is our addition.

The label of representative picture refers to all pictures that depict something, such as a person, a thing, or an event (Peeck 1994). For instance, a picture of a person shows a relation of similarity to the real person who is depicted. Logical pictures comprise all types of diagrams (for instance Venn diagrams or Isotype diagrams, see Walker 2013) that stand in an iconic relation to aspects of reality (Schnotz 1994). In particular, they may visualize connections between qualitative and quantitative aspects, as in the case of demonstrating how religions are distributed across the population of a large city. Finally, maps represent a part of the world while having also logical properties.

With respect to the pictures in *Railways under London*, the category of "representative picture" appears to be correct. It seems that entertaining and artistic elements do not occur. Logical elements occur only marginally, as we will later see. There is one map that I will also discuss in more detail later on. The electrical-circuit diagrams that we can find, are seen as a subtype of representative pictures (like the London Underground map).

Whether pictures can be true or false, has been extensively discussed in recent research in the philosophy of pictures. Typically, it is asked whether pictures have propositions, that is bearers of truth. In declarative sentences such as "This is a snowflake", the proposition would be *p* = 'that X is a snowflake'. The proposition *p* is true if there is a situation in the world that is correctly described by *p*. I would argue that pictures do not contain propositions in themselves, because they are not sentences (though see Grzankowski 2015). However, pictures can be described by natural-language sentences. Thus, we can point to the picture of a snowflake in *Too Small to See* (1958, 25) and say, "This is a snowflake". Then, the sentence is true if the picture shows a snowflake, and false if this is not the case. We are able to judge this, because the picture has a content (it shows *something*) that resembles more or less something we know about our world.[6]

In the same vein, I would refute the idea that pictures are speech acts (cf. Eaton 1980, Korsmeyer 1985). Speech acts, for instance assertions, are natural-language utterances. Pictures are not utterances in this sense but two-dimensional representations. The picture of the snowflake does not assert that this is a snowflake. However, the picture can be used within an act of communication. That means, for instance, that one can use a picture to warn or inform about something. Thus, one can use a picture in a communication like one can use gestures or mimicry.

By the same token, pictures cannot lie. Only when pictures are accompanied by a description, and this description is deliberately false, can one say that someone lied by using the picture for a deceptive purpose (Viebahn 2019). For instance, if one presents a picture showing a snowflake accompanied by the caption "This is an apple", then this is a lie.

Furthermore, beyond the described pictorial content, there may be contextual aspects that contribute to an enriched (implied) meaning of the picture description (Abell 2005). For instance, with respect to the depiction of the snowflake,

6 This does not mean, of course, that some sort of correspondence theory of truth is the only applicable one. But I would argue that the example applies well to one prominent aspect of joint attention to picturebooks, namely the truthful description of what a picture shows.

one can infer that this is not the original size of a snowflake and that snowflakes normally do not occur with a black background.

This said, we can name a number of aspects that are relevant with regard to a truthful description of a picture in the case of *Railways under London*:

(i) In representative pictures, there should be a resemblance relation between the depicted object and the real object. Thus, the picture of an escalator should be similar to the real escalator, at least in some relevant aspects. This is important, since otherwise pictures cannot fulfill the task of informing about the properties of a depicted thing.

(ii) Isotype pictures typically show abstraction, that is a lack of naturalistic detail that is principally regarded with suspicion. The idea is that abstraction facilitates learning of the relevant properties, while too much detail distracts from learning or even prevents it. However, even if abstraction can very well go together with accuracy, it is not clear how much extra illustrative meaning will be helpful for understanding. As we will see, showing that posters decorate the wall behind the escalator is not necessary for understanding how the escalator works.

(iii) Isotype pictures show a certain isomorphy between aspects of reality and its depiction. For instance, in a picture of a train station, certain elements in the picture correspond structurally to certain elements in reality. One norm for scientific pictures is that there should be some structural preservation of properties of reality in the scientific pictures (cf. Kulvicki 2014, 133–153). Arguably, this is the case in those pictures that show electric circuits. Moreover, this can be assumed for maps insofar as they are not completely fictional.

(iv) What is very important, if one analyzes children's books, is to ask whether these books are comprehensible for the intended audience. It seems that some pictures in *Railways under London* and the accompanying texts are quite hard to understand. Other pictures are burdened with technical details and seem to presuppose physical knowledge. Is this mixture helpful (because it offers a variety of approaches), or does it contribute to the impression that we are faced with a miscellaneous and chaotic mixture of informational pieces? In order to check whether these aspects are fulfilled in the result of transformation to be analyzed, I now consider *Railway under London* in detail.

3 Analyzing *Railways under London*

On the inside front flap of *Railways under London*, Marie Neurath explains the advantages of the Isotype approach in the following way. After asking the three *how*-questions "How does the ticket machine give the right change?", "How do the train-doors open when nobody touches them?", and "How do the trains work the signals themselves?" – admittedly, quite demanding questions – she gives the following answer:

> Try to answer these questions by words alone: the mystery remains. Try to explain by showing photographs: it is a little bit easier. But show the young people the drawings in this book and understanding is possible at once.

This means that Neurath defends the idea that drawings can be superior to photographs because the former are able to leave out detail.[7] By the same token, this may be misleading if the actual mechanical processes are oversimplified.

The title double-spread shows the author's name (Marie Neurath), publisher's name (Adprint Limited London), and the distributor's name (Max Parrish & Co Ltd London) on the left side, and the title "Railways under LONDON" on the right side. The name *London* is colored red and set in sans-serif block capitals, like the station names in the roundel. In the lower half of the double-spread, a cross-sectional picture shows a train leaving or entering a train station. The shape of the train station is reminiscent of the bar of the roundel, but this becomes clear only when the big red circle behind the bar is associated with the circle of the roundel. Attractive as this graphic design is, it may be hard to comprehend.

The next double-spread shows the contents: 14 informational units comprise 32 pages. We read the train that is shown in the lower half as the same train that has just left the station, moving from the left to the right, that is in the same direction as the pages have to be turned.[8]

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7 Marie Neurath sees that Isotype graphics, which are indeed in the tradition of technical illustration, have received competition from modern (color) photography. But technical illustration allows procedures such as the cutout diagram, maps, etc., which do not exist in the form of photography, while photographs can also exhibit qualities of subjectivity/objectivity or concreteness/abstractness (Walden 2005, Costello 2018). On truth and objectivity in relation to photography, see Meibauer (2023). That drawings could be more easily understood is probably wishful thinking. In later adaptations of classic Isotype books, for example in Neurath (1971), one finds both Isotype drawings and photographs.

8 By the term 'informational unit', I understand a complete and self-contained picture–text combination. In *Railways under London*, these informational units have titles so that one can easily refer to them.

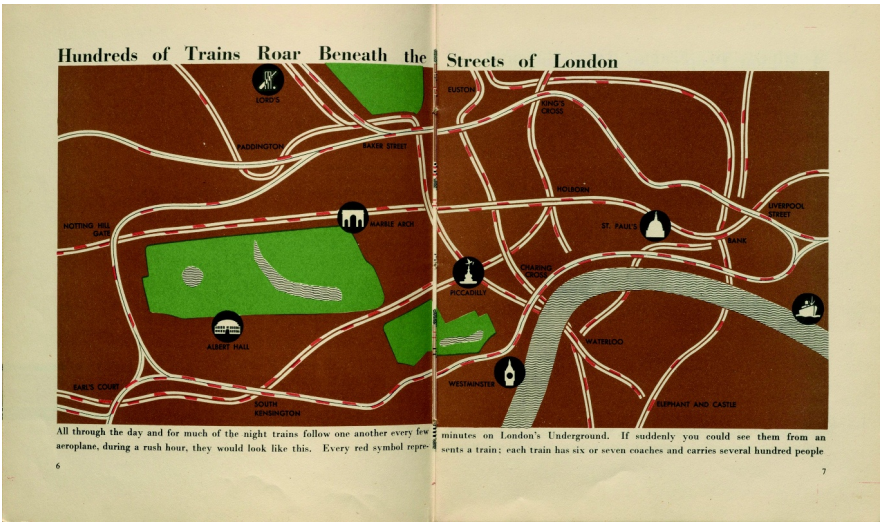


Figure 2: *Railways under London* (1948) by Marie Neurath. Double-spread "Hundreds of Trains Roar Beneath the Streets of London" (pp. 6–7). Private collection.

The first informational unit, "Hundreds of Trains Roar Beneath the Streets of London" (pp. 6–7), shows a map of London (Figure 2). The map represents the river Thames, different underground lines, important parks, and black dots with white symbols inside them: Lord's, Marble Arch, St. Paul's, Albert Hall, Piccadilly, a ship symbol without a name, and Westminster. On the white lines, we see red symbols that represent trains. Using the terminology of Meunier (2017, 25), one can say that this is a figurative map. The gist of this map is to show that the trains are always present in the railway system: "If suddenly you could see them from an aeroplane, during a rush hour, they would look like this." Since, by definition, the tubes are not visible from the perspective of an aeroplane, the book appeals to the reader's imagination, which would make such a view possible. One wonders why Marie Neurath did not use a map resembling the famous London Underground map. The obvious answer is that she wanted to focus on the continuous movements of the trains in the railway network.

The second informational unit, "A Million People Use This Station Every Week" (pp. 8–9), shows the station Piccadilly Circus which is famous for the crossing of two tube railways (Figure 3). What Neurath had in mind was to show the

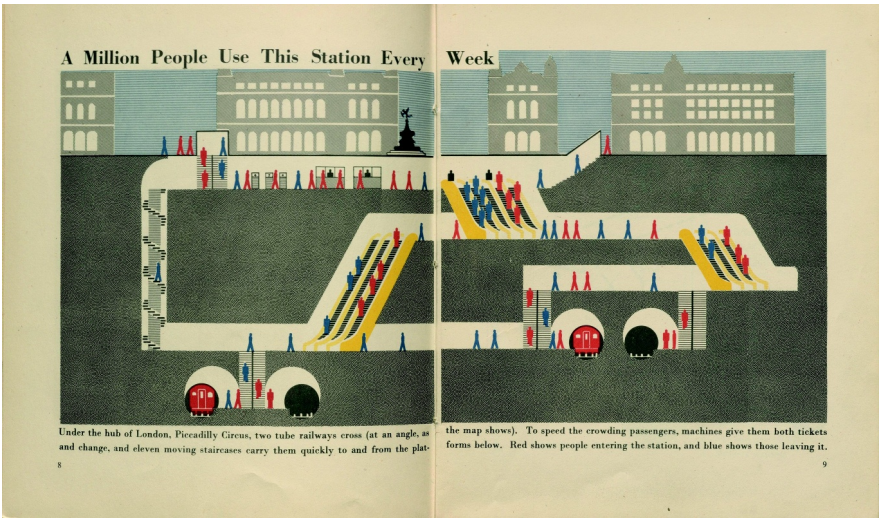


Figure 3: *Railways under London* (1948) by Marie Neurath. "A Million People Use This Station Every Week" (pp. 8–9). Private collection.

movements of the passengers, mirroring the movements of the trains. As Neurath (2017, 87) explains:[9]

> I had a big fight with Parrish over the depiction of the Piccadilly Circus station; he wanted something in perspective, where you could see the angle at which the two lines crossed. I explained that in doing so I was losing all possibility of explaining interchange and alighting. This was about the substance of the method, and this time I couldn't give in. [My translation]

Indeed, that there is a crossing of lines is not pictorially represented in this picture. This is only partly amended by the following passage in the text (pp. 8–9): "Under the hub of London, Piccadilly Circus, two tube railways cross (at an angle, as the map shows)." In the accompanying text, the function of colors is explained for the first time: "Red shows people entering the station, and blue shows those leaving it." This presupposes left-hand traffic for pedestrians.

Parrish may have been thinking of the famous drawing of Piccadilly Circus station by Douglas MacPherson from 1928, which depicted the architectural con-

9 "Ich hatte einen großen Kampf mit Parrish um die Darstellung der Piccadilly Circus-Station; er wollte etwas perspektivisches, wobei man den Winkel erkenne, unter dem sich die beiden Linien kreuzen. Ich erklärte, dass ich dabei alle Möglichkeiten verliere, Umsteigen und Aussteigen zu erklären. Hier ging es um die Substanz der Methode und diesmal konnte ich nicht nachgeben" (Neurath 2017, 87).

struction with its intersecting lines and resulting complex pedestrian circulation in an almost three-dimensional spatial appearance.[10] In this drawing, interchange and alighting of passengers can be represented excellently, although the drawing by no means reaches the level of abstraction of an Isotype graphic. However, it seems to be exaggerated that "the substance of the method" is threatened by the insertion of a well-comprehensible perspectivity. Here, comprehensibility and the insistence on uniform graphic principles come into a certain tension.

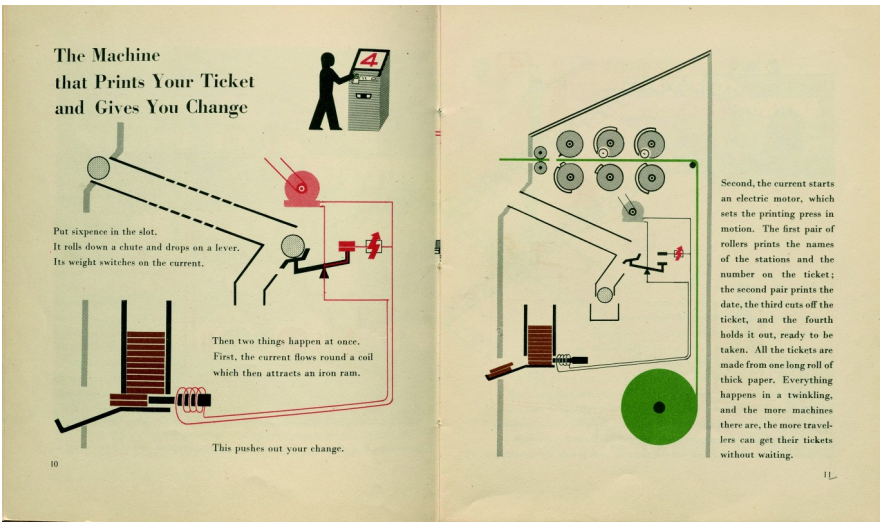


Figure 4: *Railways under London* (1948) by Marie Neurath. "The Machine that Prints Your Ticket and Gives You Change" (pp. 10–11). Private collection.

The third informational unit highlights "The Machine that Prints Your Ticket and Gives You Change" (pp. 10–11) (Figure 4). It is explained that a ticket machine acts out two parallel processes, namely to give change when a coin is inserted in the machine and printing out the ticket. Thus, the process is fast and automatic. It is stressed that "the more machines there are, the more travelers can get their tickets without waiting". Since millions of people use the London Underground, reducing waiting time is important for accelerating traveling times.

10 Douglas MacPherson (1871–1951) was a British artist who worked on the London Underground's building and branding project. MacPherson studied art at the Westminster School of Art. He was an illustrator for William Luson Thomas's weekly *Graphic* – renamed the *Daily Graphic* in 1898 – from 1890 to 1913.

In the upper-right corner of the left page, we see an Isotype figure operating the ticket machine, which has the number "4" on it. Interestingly, this is an anaphoric reference to the previous picture "A Million People Use This Station Every Week", in which three vending machines are depicted that have the very tiny numbers 4, 5, and 6. This is an extra bit of information that seems to be superfluous from the point of view of a rigid application of Isotype principles.

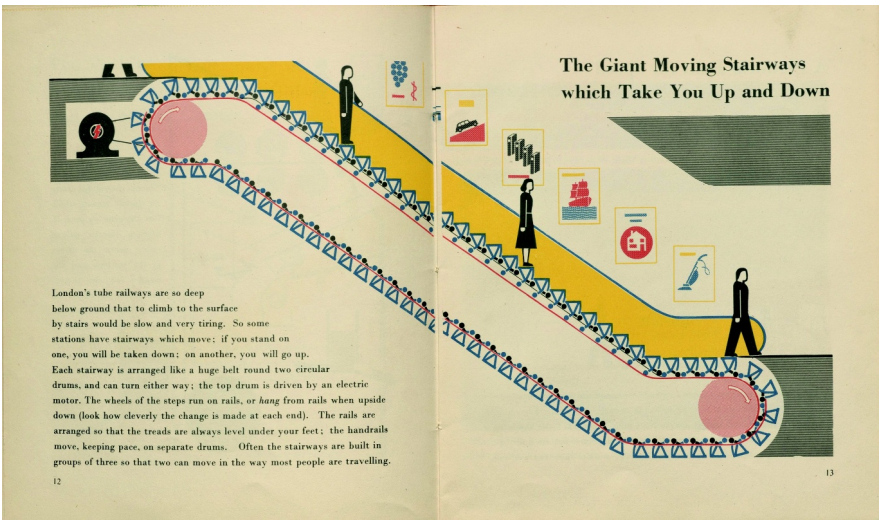


Figure 5: *Railways under London* (1948) by Marie Neurath. "The Giant Moving Stairways which Take You Up and Down" (pp. 12–13). Private collection.

The fourth informational unit, "The Giant Moving Stairways which Take You Up and Down" (pp. 12–13), shows a cross-sectional drawing of an escalator (Figure 5). This picture explains in an appealing manner questions children might already have posed for themselves: Why does a moving stair vanish into the earth? How come a moving stair suddenly appears beneath one's feet? As in the third informational unit, electricity is symbolized by a red arrow. Note that there are six billboards in the background that advertise food, cars, books, ship journeys, houses, and vacuum cleaners. The escalator moves people in such a way that they are quasi-automatically forced to look at the posters. Seen in the austere postwar area, the widespread wish for greater luxury is also alluded to in the picture. It is clear that it is not at all necessary to show the billboards to explain the function of the escalator. However, the posters flanking the escalators serve to anchor them as particular escalators in the visual world of the London Underground.

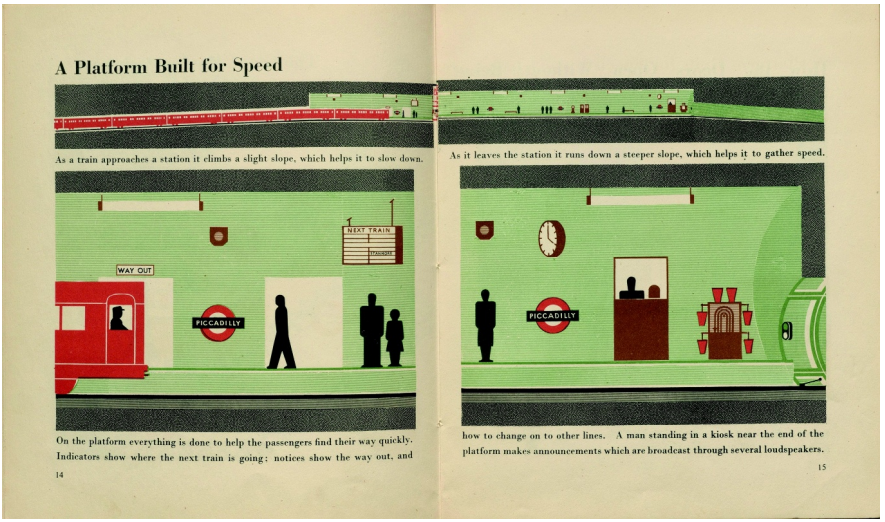


Figure 6: *Railways under London* (1948) by Marie Neurath. "A Platform Built for Speed" (pp. 14–15). Private collection.

The fifth informational unit, "A Platform Built for Speed" (pp. 14–15), comprises two pictures, each picture flowing across the double-spread (Figure 6). The upper picture shows that stations are not built in an exact horizontal dimension: "As a train approaches a station it climbs a slight slope, which helps it to slow down. As it leaves the station it runs down a steeper slope, which helps it to gather speed". In the lower picture, using a magnification technique, we see a part of the Piccadilly station which becomes clear from the two roundels. There is no indication of the slope. Instead, the typical furnishings of a station with a kiosk, an indicator, a clock, and signs showing the way out is highlighted.

The following four informational units relate to several technical aspects. The sixth informational unit, "How the Doors Open Without Being Touched" (pp. 16–17), explains how the doors are locked by using compressed air, and how they can be opened by diminishing the compression. "Without being touched", however, has to be taken with a grain of salt, since the text makes clear that a guard touches a switch in order to start the mechanism of door-opening. Compressed air is marked by blue color, as has already been explained in the inside front flap. For the first time, technical expressions like *piston* and *valve* are printed in the pictures, in order to give the correct names to the relevant graphic depictions.

It is tempting to compare this informational unit to a poster that the Bauhaus artist László Moholy-Nagy designed for London Transport in 1937.[11] This poster, "Quickly Away Thanks to Pneumatic Doors", explains that automatic, pneumatic doors speed up the process of opening and closing the doors. Evidently, if doors open and close on a mechanical basis, this would lead to wasted time. Furthermore, it is stressed that the train cannot move until all doors are closed. Again, with doors being closed mechanically, it may happen that the train moves while the doors are still open. Therefore, pneumatic doors contribute to speed as well as to safety. This is also a subtext in Neurath's book.

As for the graphic design of this poster, we see that the roundel symbol is made use of. The doors are in the middle of the circle while the train partly occupies the horizontal bar. The pneumatic system is not explained in a detailed way. In the middle of the doors, the rubber is highlighted with black lines. Rubber also contributes to the passengers' safety, since it reduces the risk of injury.[12]

The seventh informational unit, "The Power which Drives and Lights the Trains" (pp. 18–19) extends the topic of electricity and explains how electricity is used with the doors, the lights, the heaters, the brakes, and the motors. It is shown how the electricity system extends down the whole train, and a cross-section picture of the train visualizes how these systems work in their respective locations (p. 19).

The eighth informational unit, "How Air Puts on the Brakes" (pp. 20–21) further pursues this topic of electricity and safety. It is shown that the brakes operate via compressed air. When the brakes are off, there is no compressed air in the brake cylinders. When the brakes are on, "the compressed air in the tank has forced up the valve, rushed into the cylinders and pushed on the brakes" (p. 21).

The ninth informational unit, "Signals Worked by the Trains Themselves" (pp. 22–23), demonstrates how the trains automatically trigger green and red lights in order to avoid collusion.

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11 László Moholy-Nagy (1895–1946) was a Hungarian-US painter, photographer, typographer, and stage designer. From 1923 to 1928 he was a teacher at the Bauhaus; in 1935 he went to London. See Koetzle (2019).

12 This poster, though it shows a text–picture combination, is definitely not a picturebook, and it is definitely not addressed to children. Yet, it shows similarities with a modernist page design, in that it combines a simple descriptive text with three drawings, depicting three stages of the door's movement, namely closed, half opened, and fully opened. There are two further differences with respect to a children's book page design: First, the poster has an appellative function; viewers are urged to use the tube. Second, the very salient caption "Quickly away, thanks to (pneumatic) doors", written in big letters, with "pneumatic" written over the word "doors". Obviously, this design is intended to catch the attention of pedestrians since they would like to find out what the topic of this poster is.

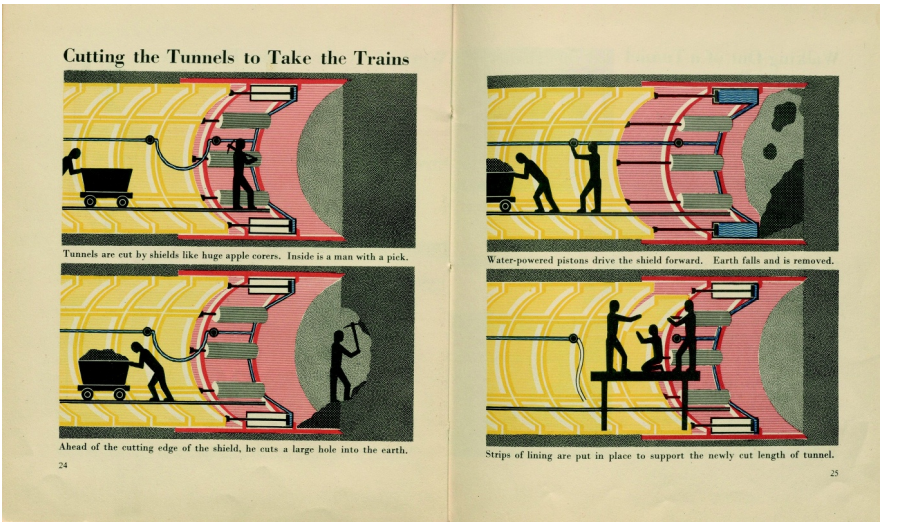


Figure 7: *Railways under London* (1948) by Marie Neurath. "Cutting the Tunnels to Take the Trains" (pp. 24–25). Private collection.

The tenth informational unit, "Cutting the Tunnels to Take the Trains" (pp. 24–25) shows how a tube is constructed (Figure 7). Four pictures are used, each with a short description: (a) "Tunnels are cut by shields like huge apple corers. Inside is a man with a pick"; (b) "Ahead of the cutting edge of the shield, he cuts a large hole into the earth"; (c) "Water-powered pistons drive the shield forward. Earth falls and is removed"; and (d) "Strips of lining are put in place to support the newly cut length of tunnel". Although through this sequence of images the dynamics of the shield drive is reproduced, this seems to be an oversimplified description of a very complex building process.

The following two informational units focus on the topic of safety. In the eleventh informational unit, "Walking out of a Tunnel in Safety" (pp. 26–27), the topic of safety is taken up again. This time the electrical system that will work when the train is forced to stop in a tunnel is shown. Passengers leaving the train and walking to the next train station must be protected from the electrical current and the tunnel must be lit.

The twelfth informational unit, "Cars which Lock Themselves Together" (pp. 28–29), continues with the topic of safety and explains how cars are safely joined together and how they are unjoined. Again, the already known elements of electricity and compressed air are invoked in the course of the explanation.

Escalators have been already depicted in the fourth informational unit. In the thirteenth informational unit, "Going Up in a Giant Lift" (pp. 30–31), the

reader is shown how passengers enter a lift that brings them to the station exit. What is not mentioned explicitly are staircases that are very important in cases of emergency, when the electricity has broken down.[13]

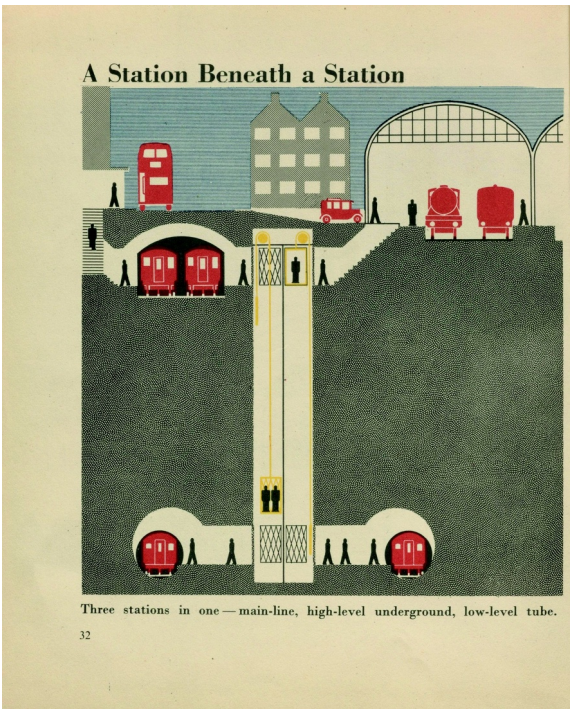


Figure 8: *Railways under London* (1948) by Marie Neurath. "A Station Beneath a Station" (p. 32). Private collection.

Finally, the informational unit "A Station Beneath a Station" (p. 32) shows, by means of a cross-section, the combination of three sorts of stations, namely "main-line, high-level underground, low level tube" (Figure 8). Here, information is left out, since the distinction between a high-level underground and low-level tube has not been explained yet, and the decisive information that the combination of the three stations facilitates the fast transport of people since they can switch to other modes of transport (a taxi and a bus are also to be seen), is left out and obviously represents information to be derived by an alert readership.

13 Arguably, the invention of lifts has made tubes (as well as skyscrapers) possible.

By and large, the book shows the following script.[14] Thus, it seems to take on the perspective of an ordinary tube user who enters a station, uses the railway, and then leaves (or changes) the station. However, this order is not expressed explicitly, but results implicitly from the arrangement of the informational units and must therefore be inferred by the reader.

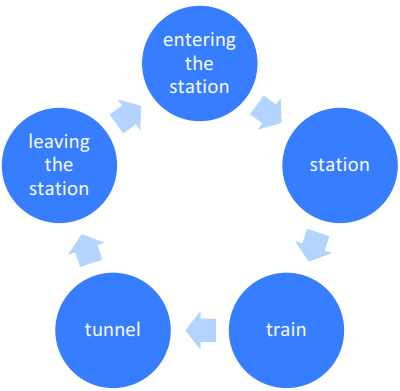


Figure 9: Rough script of *Railways under London.*

When we look at the individual informational units, we find a more complex sequence: map, station, ticket machine, escalator, platform, doors, electric power, brakes, signals, construction of tunnels, escape in the tunnel, locking cars together, lift, combination of stations (changing trains). It is clear that the sequences "doors, electric power, brakes, signals" and "escape in the tunnel, locking cars together" are related to the general concept of safety. This shows that the safety-related aspects are less integrated into the overall structure of the book and constitute subscripts. Safety is certainly an important topic in the construction of underground railways, but of course not the only one. Matters of aesthetics, for instance the architectural design of the London Underground stations, are completely disregarded: they are not the subject of a separate informational unit.

Beyond the script mentioned above, the following background knowledge plays a role by linking the individual information units. Most passengers are likely to want to get to their destination as quickly as possible. Shortening travel times directly contributes to gaining leisure time. But the speed of the railroads

14 A script is a cognitive structure concerning sequences of events that occur regularly in everyday experience and are therefore stored as a retrievable pattern. One can assume that residents of London have stored a script "riding the tube".

should not be at the expense of safety. An optimal transportation system is both fast and safe. Increasing speed was not only possible by introducing more powerful railcars. The closeness of the connections, the architecture of the stations, and the length of the walking paths in the case of intersecting stations also matter. In the course of automating processes, both the requirement for speed and safety were taken into account, because human decisions appeared to be more susceptible to failure than automated operations. The speed of the individual passengers' movement through the transport system is also helped by their ability to quickly orientate themselves in the entrances to the stations, within the stations themselves and in the tube carriages. The design of the London Underground (for instance logos, typeface, map, display systems, loudspeaker announcements) was a huge step forward here. Since some stations were enormously congested by public traffic, passengers had to be guided in such a way as to avoid congestion or even panic. All these aspects come to the fore in Marie Neurath's book, but they remain to some extent inexplicit. The book therefore counts on independent, rational readers who can deduce the general connection between speed and safety for themselves from their own practice and the technical information given in the book.

The page design of the book uses different patterns for guiding the reader's view. On several double-spreads, the train is situated at the top (pp. 14/15, pp. 18/19, pp. 20/21, pp. 28/29), while a more specific information is given in the picture–text combinations below. Some page designs require that picture–text combinations be read from the left page to the right page (for instance pp. 16/17). The graphic design makes sublime uses of areas that symbolize soil. On the book covers, a brown surface has white parallel lines. In other pages, soil is depicted by means of tiny dots (p. 19). The inventory of Isotype persons is restricted: We find symbols for man, woman, and child, but also for guard, driver, and several workers in the tunnel (pp. 24/25).

Mostly, the texts refer to the pictures so that the reader can search the pictures for certain details. Conversely, a complex picture is explained by the text, as in the following example (pp. 28/29):

Here we look down from the top on two cars which are being pushed together. The hooked tongues press against wedges (shown in yellow) which force them into slots, where the wedges (pushed by the compressed air) fix them firmly.	Once the cars are joined, the current flows through the spring contacts. One current opens the taps in the pipes of compressed air. To separate these cars, we must push the wedges again. Can you think how this could be done?

The deictic expression *here* refers to the picture. The functions of the yellow color are explained. Yet there are parts of the picture that are not explained. That the

lock is black, for instance, has to be inferred by the readers. At the end of this text, readers are directly addressed with a question. On p. 20, the technical terms *valve* and *cylinder* and the *off/on* positions of the switch appear as part of the pictures, but this is an exception. Normally, looking at the pictures and reading words/text is strictly separated.

Interestingly, several units engage the reader by showing movements: doors are closed, cars are locked, lifts go up and down, and the escalator moves. The specific kind of movement also has to be inferred by the reader in the event that the process is distributed across two pages (pp. 28–29). This shows that the Isotype representation is not simple, but rather it builds on the logical abilities of the viewer.

What we have found, then, is that the method of adding several informational units, which are organized by an underlying script, allows a reading that can also focus on individual items and omit others. Therefore, the selected informational units are also to be understood as exemplary. A coherent and comprehensive presentation covering all relevant aspects of the London Underground is not intended.

4 Transformation, truth, and deception

According to the Isotype principles of Otto Neurath, as outlined by Groß (2015, 234–242), there are two transformational principles, namely systematization and reduction. Transformation is simply the translation of a specific content from one system of signs to another system of signs.[15] Systematization means that, for instance, colors or symbols for persons are assigned a unique meaning. This happens on the level of the so-called lexicon (the set of basic signs) as well as on the level of the syntax (the level of the picture where signs are combined). Reduction means that irrelevant details are left out. With respect to the level of signs, the elementary is intended. With respect to pictures, schematization is called for. Groß (2015, 254) summarizes these dimensions in the following table (my translation):

15 "Abstrakter formuliert ist Transformation die Übersetzung eines Gehaltes von einem Zeichensystem in ein alternatives Zeichensystem, von einer Methode in die andere" (Groß 2015, 235). In my own translation: "More abstractly, transformation is the translation of a content from one sign system to an alternative sign system, from one method to another".

Table 1: Transformation principles of Isotype (Groß 2015, 254).

Transformational principles	**Principle of systematization**	**Principle of reduction**
Simple level of signs	Lexicon	Elementarization
Complex level of pictures	Syntax	Schematization

According to Otto Neurath, an Isotype picture is well-formed ("richtig") if it is coarsened by careful simplification ("durch vorsichtige Vereinfachung vergröbert") and thus leads to clear statements (Groß 2015, 240). It is obvious that the graphic design of the Isotype pictures, on the one hand, still preserves transformational principles (such as a renunciation of perspectival correctness or the use of schematized symbols for persons), but on the other hand it strives for a richer inventory of graphic devices.

Walker (2013, 402) comments that "some of the drawings/charts, however, were deceptively straightforward and clear, and particularly engaging because of this". This assessment raises the question of whether the degree of transformational simplification is appropriate or whether necessary information has been omitted to enhance the educational or aesthetic effect. We can safely assume that Marie Neurath and her team have done their best to calibrate information in order to avoid misleading the readership. In this sense, the depictions and accompanying texts can be regarded as truthful, although sometimes the impression arises that the descriptions and explanations are either too simple or too difficult for the intended readership.

Beyond that, there are of course other ways to encourage reader engagement. It seems that at least some of the pictures leave out pictorial potential that would be helpful if one is eager to trigger interest in the London transport system. A brief comparison with *London* (1960; the English original edition appeared in 1959 under the title "*This is London*") by Miroslav Šašek and *Underground* (1976) by David Macaulay can illuminate this point. In *Railways under London*, the reader can never look into the tunnel. The only picture that shows a cross-sectional representation of the tunnel, with a wagon, blocks every perspective (p. 19).[16] This picture focuses on the electric devices in the train. It shows schematized persons (two women and a man), but only because they use electronic devices (electric heating and an emergency brake). Macaulay, in contrast, shows a perspectival picture with a deep look into a tube, which is void of a railway and of persons.

16 Compare also the similar picture of a wagon in the tunnel, where one sees the back of the wagon (dust wrapper, backside).

This is an austere, architectural picture, highlighting the construction of a tunnel. Šašek, in contrast, provides a perspectival view, by showing his typical caricatured persons and painting a joyful and colorful picture of the urbanity of the Piccadilly stations. This picture contrasts with Neurath's picture "A Platform built for Speed" (lower picture), in which we see six Isotype-like persons without any individual traits besides their social roles as passengers, driver, and guard. Neurath and Macaulay definitely do not build on emotional engagement of the child viewer, while Šašek does.

Table 2: Tunnel pictures in comparison.

Tunnel	Neurath (1948)	Šašek (1959)	Macaulay (1976)
Perspective	–	+	+
Person	+	+	–
Humor	–	+	–
Color	+	+	–

In sum, then, while the transformations in *Railways under London* may be more or less convincing (and, to a certain degree, a matter of taste), they certainly succeed in providing technical knowledge about the railways, with an implicit focus on safety. One could critically argue that the fine-tuning between reality and its graphic representation is not always optimal because relevant information is simply omitted. This does not make the information incorrect, but in terms of comprehensibility it requires the child reader to actively fill in information gaps. This was certainly the intention of Marie Neurath as a "transformer" (Kinross 2017). In principle, children were seen as inquisitive beings who were capable of learning, that is the acquisition of knowledge.

5 Conclusions

Railways under London holds a unique position in the world of descriptive picturebooks. Although individual cut-out diagrams of subway stations have been used in picturebooks before (for instance, in *Drei Jungen erforschen eine Stadt. Eine kleine Stadtkunde mit vielen Fotos und farbigen Bildmontagen* (1933) by Friedrich Böer, Werner Bürger (ill.) and Erich Kranz (ill.); *A Book of Trains* (1941) by W. J. Bassett-Lowke and F. E. Courtney (ill.)), an entire thematic book on this subject, focusing on structural aspects (architecture and technology), stands out from

the rest.[17] In comparison with *If You Could See Inside* (1948) and *I'll Show You How It Happens* (1948), the selection of subtopics is more successful, as they relate to the overarching script of entering and leaving a subway station.

That said, we may ask whether the information given is truthful, accurate, and objective. Although it is not always possible to judge this well – especially from a historical point of view – we trust the information given, especially since it can be assumed that it was prepared in consultation with London Transport and is therefore very reliable.

Turning to the matter of comprehensibility (or accessibility), we find that some technical drawings, such as the pictures of electrical circuit systems, are not easy to understand. Either the child reader already has prior knowledge here, or he or she actually manages to develop the respective facts by looking at or reading an informational unit several times. Also, understanding cutaway drawings and maps demands some prior understanding, although they also invite viewers to acquire the respective literacy.

The colors are not used in a consistent manner, since red and blue can mean different things across the whole book. As for the texts, there are more simple and more complex texts, containing more technical vocabulary. It is not clear whether these differences are intended or simply resulted from the problem of transforming aspects of reality into a textual representation.

There are definitely different degrees of abstraction in the pictures, so that some picture contents show a clear similarity to reality (and thus a higher recognizability) than others. Likewise, some texts are denser and more presuppositional, while other texts are very simple and elementary. In this way a quite differentiated means for learning has been prepared, but we do not know exactly under which circumstances it could be perceived by children who are willing to learn. In any case, it is assumed that children make a pact of trust when reading, that is, they trust that the information given to them is reliable and true (Harris 2012).

Although *Railways under London* successfully "transforms" the perceived reality, making use of established forms of representation, so that the output certainly meets the criteria of truthfulness, accuracy, and objectivity, it can be observed on a deeper level that contemporary ideological attitudes play a certain role (Stephens 2018). By and large, this ideology implies that the speed, efficiency, and safety of the London Underground are facilitated by technical devices. This

17 A precise classification of corresponding representations in the history and theory of technical illustrations by using image comparison methods, is a task for the future (Dünkel 2015, Meibauer 2025).

reflects the optimism of the postwar years and the hope in a new era of wealth propelled by technical inventions. The modernity of this approach lies in the fact that these aspects are still relevant for constructing systems of transportation in the world's big cities.

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Gökhan Ersan

Marie Neurath's Graphical Language for the Atom and Electromagnetism: *A Message Round the World* (1953) and *Inside the Atom* (1956)

1 From pictorial statistics towards science communication

Marie Neurath's science storytelling through a series of picturebooks has recently caught the attention of design scholars (Walker 2013). These picturebooks were overseen by Marie Neurath after Otto Neurath's death in 1945, growing into Isotype Institute's primary product in the UK, where the Neuraths relocated during World War II. The success of the first few picturebooks ushered in a series that continued until Marie Neurath's retirement in 1971. The series titled the Max Parrish Colour Books constituted Isotype's primary publishing platform (M. Neurath and Kinross 2009).

These books can be viewed as an extension of Marie and Otto Neurath's prewar ambitions to explain science. As early as 1936, Otto Neurath was formulating an encyclopedia to unify all human knowledge using "one language" for all sciences, both verbal and visual, free of domain-specific jargon (O. Neurath 1936). In Otto Neurath's words:

> The encyclopedia [. . .] will have as little as possible to do with any words or signs which are not clear, it will make use of one picture language. The purpose of this new encyclopedia . . . is to give all men a common starting-point of knowledge, to make one united science, forming a connection between the special sciences and putting together the work of different nations, to give simple and clear accounts of everything as a solid base for our thoughts and our acts, and to make us fully conscious of conditions in which we are living. (1936, 111)

Marie and Otto Neurath's work, up until then, had concentrated on pictorial statistics that brought into view social correlations and underscored social inequalities. Their work had also suggested solutions in the form visual materials that sought to inform public projects that were meant to resolve inequalities (Vossoughian 2008, 126–127). By the late 1930s, as the paragraph above demonstrates, Otto Neurath had turned his focus into unifying human knowledge in "everyday

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language" to make knowledge broadly accessible to produce informed citizens (M. Neurath 1950, 22–27). Between 1936 and 1938 Otto Neurath gathered ideas for an *Encyclopedia of Unified Science*, attracting contributions from notable scholars across social and natural sciences (O. Neurath 1938). Otto had envisioned a twenty-six-volume encyclopedia supplemented by a ten-volume *Visual Thesaurus* (Morris 1938, 518). While these intellectual explorations continued, Isotype made a high-profile excursion into natural sciences with a public health exhibition and booklet, titled *Fighting Tuberculosis* (1938), that used infographics to explain the spread of this disease (M. Neurath and Kinross 2009, 50–51). As Marie Neurath recounted in the 1950 Isotype annual report, "as time went on, and more fields of knowledge were dealt with, the symbolism and the ways of representation developed, and with it the confidence grew that visualization is possible in any field of human knowledge" (1950, 23). Then, the Isotype team found an opportunity to test Otto Neurath's *Visual Thesaurus* concept at a wider scale in the 1939 edition of *Compton's Pictured Encyclopedia*, targeted to young readers. Isotype Institute designed 43 charts for *Compton's*, a fair number of them explaining fundamental concepts in physics, chemistry, biology, earth sciences, and technology. *The Compton's* experience had helped the Neuraths extend the "field of isotype-ization" in Otto Neurath's words (O. Neurath 1944). As World War II came to an end, Otto Neurath's *Unity of Science* initiative had stalled due to the disruption of war years and financial troubles that the editors faced, leaving *Compton's* as the only viable venue to pursue this concept (Morris 1938, 519). However, Otto Neurath's proposals to apply Isotype on a much larger scale to post-war editions of *Compton's* did not yield a positive result (Gillfillan 1946; O. Neurath 1944). When the *Compton*'s deal fell apart and Otto Neurath died in late 1945, Marie Neurath was left to pursue science communication ideas with Adprint, a book production company, to which Otto Neurath had pitched children's books (Walker 2013, 394; N. Russel 1979, 397).

However, rather than directly following Otto Neurath's vision of Isotype children's books, Marie Neurath crafted these books to become infographics that tackled scientific concepts for young readers – more in the vein of the *Visual Thesaurus* that was planned to accompany the *Encyclopedia of Unified Science*. These books employed neither straightforward technical drawings, nor illustrations common to children's books. Instead, they fused pictograms and diagrams, creating semi-abstract sequential narratives on the stage of book spreads. This approach was much like the way the Compton's company had described Isotype to its readers in 1939: "a picture language to fill the gap between written language and the lifelike illustrations provided by the artist and the photographer," grown out of a need to explain the explanations (*Compton's Pictured Encyclopedia* 1939).

These picturebooks followed Isotype's principle of jargon-free and consistent visual language, treating illustrations as "language pictures" (O. Neurath 1973, 243). The books also shared a common strategy: they streamlined disparate concepts related to a knowledge domain within a single expository thread, creating "chains of visual arguments," that Otto Neurath had envisioned for Isotype children's books (Walker 2013, 394).

The first few books, such as *If You Could See Inside* (1948) and *I'll Show You How It Happens* (1948) adopted a strategy to reveal layers of technology and science hidden within everyday settings. They accomplished this by using visually impactful techniques like cross-sections and cutaway diagrams presented in the form of semantically engaging panel by panel narration. The third book, *Railways under London* (1948), which had a stronger thematic focus, became a commercial and critical success that ushered in Isotype's long-lasting publishing relationship with Adprint through the publisher's Max Parrish imprint. Marie Neurath followed up on the success of *Railways* with the ambitious "Visual Science" series in 1951, which took a systemic approach in covering scientific fields much in the way Otto Neurath had outlined for *Compton's* in the 1940s. These books were designed to become textbooks for readers aged 9–15. Although the books failed to be adopted as textbooks, they gave her the opportunity to build visual vocabularies for topics across natural sciences and engineering (M. Neurath 1951; Kallen 1951). Marie Neurath, then, turned her attention once again to thematic books on technology and nature. Especially after the dual emergence of the nuclear arms race and the space race, she took on these two subjects in a series of books. These books offered a chance to deepen Isotype's application to science and technology as well as an opportunity to raise a voice for the peaceful use of technology during the onset of the Cold War (M. Neurath 1955a). *Rockets and Jets* (1952) discusses rocket and jet engine technologies by focusing on their potential applications in the field of scientific exploration, while it underplays their military applications. For example, one page illustrates a spy rocket without mentioning it, but suggests that this procedure has the potential to take snapshots of lands on oceans.

Rockets and Jets is significant for driving its technological narrative by a central concept. The idea of thrust unifies the multiplicity of entries in the book. The author introduces the mechanism of thrust by drawing analogies from older, simpler technologies. The first few pages visualize how thrust comes from powders inside fireworks and cannons. On the opening page, a family is portrayed watching fireworks that are sent into the sky. What could be more down to earth and familiar? On the next spread, a cannon is fired next to a rocket. That is also quite digestible. The visuals encode a combustion chamber, explosive chemical, and thrust produced inside a cannon. This simple mechanism of a low-tech device is

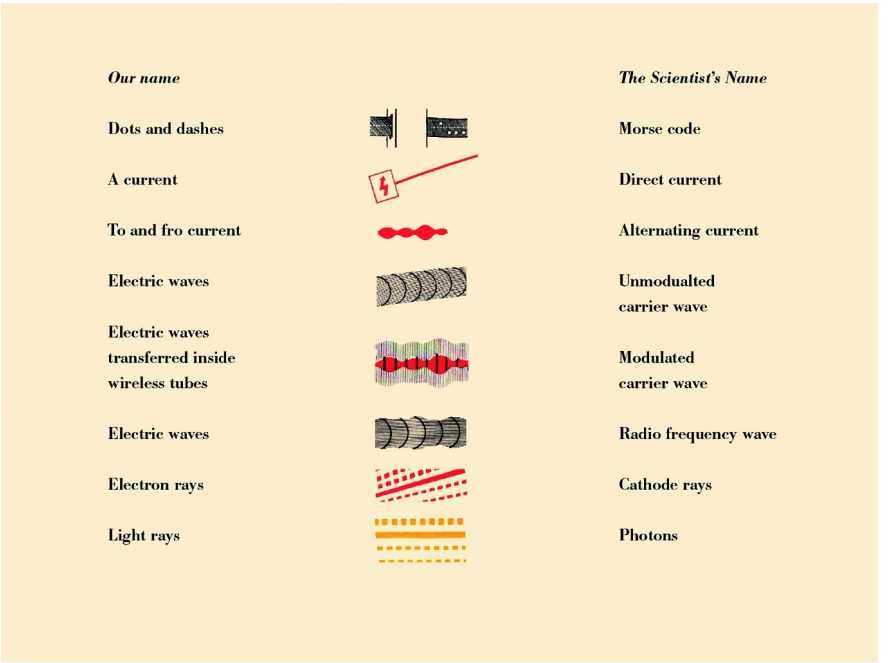
mirrored on the opposite page, inside a rocket, a high-tech product. This revelation assures the reader that they will be able to follow the discussion and invites them to stay along for the ride. The book, then, delivers on its promise and reconfigures these visual building blocks to build larger and more complex cases of combustion and propulsion technologies applied to jet engines and rockets. In the subsequent entries into the series, Marie Neurath continues to use similar conceptual strategies to engage the readers with discussions of complex scientific and technological subjects.

2 Graphical language for electromagnetism through a technological tale: *A Message Round the World* (1953)

After the success of *Rockets and Jets*, Marie Neurath focused on telegraphy, a peacetime technology (M. Neurath 1953a). However, in the process of preparing the book, as topics expanded beyond telegraphy, the author seems to have realized that the underlying scientific theme was to be the spine of the book. This theme was the transformation of one form of energy into another that took place during various acts of telecommunication. Thus, this book gradually turned into one that simultaneously explained the science of electromagnetic phenomena.

Throughout the design process Marie Neurath is bringing in visual concepts and experience from earlier work in order to illustrate intangible physical phenomena. She had illustrated science in earlier Isotype publications, with relative confidence, that can be attributed to her training in mathematics and science (Inglis 2019). On the pages of *A Message Round the World*, Marie Neurath works to make these intangibles concrete by employing a bold visual language that echoes the works of avant-garde modernists like Herbert Bayer and Ladislav Sutnar. She uses the building blocks of form – like point, line, texture, and color – in order to embolden standard engineering notation. She is seen translating visual notation used by electrical and electronic engineering, replacing lifeless circuitry diagrams with never-before-seen representations of energy forms travelling on wires and across the air. This effort to substantiate and naturalize energy culminates into an iconography that conveys the primary actors of the electromagnetic phenomena and that is meant to be understood by non-experts (see Table 1).

Table 1: A Message Round the World (1953) by Marie Neurath. Iconography of electromagnetic phenomena. Private collection.



2.1 A visual vocabulary and narrative stage for electromagnetism

Although *A Message Round the World* is anchoring its narrative in tangible technological objects like the telephone, the radio, the tv tube, the telegraph machine, cables, and transmission towers – the central protagonist is quickly revealed to be the intangible elements of electromagnetism. As the correspondence in the book's project folder suggests, it seems to have begun as a book on telegraphy, as a collaboration between Marie Neurath and a British telecommunications company called the Cable and Wireless Ltd (Cable and Wireless LTD 1953a). After multiple exchanges between the author and engineers, the scope was expanded to encompass the entirety of telecommunications, wired and wireless (M. Neurath 1953b). And even after that, one typewritten page distills the entire concept into a process of conversions:

> Telegraphy [is the conversion of] mechanical - electrical - mechanical. Telephony [is the conversion of] sound - electrical - sound. (M. Neurath 1953c)

Thus, the author's real challenge becomes portraying the visible devices simultaneously with the invisible energies that pass through them, that is, to picture electromagnetism in action. Throughout the design process, the author is at work building a modular graphical vocabulary, which once introduced, can be reconfigured to talk about different topics within the telecommunications domain. Her strategy is to introduce elementary units that can build up to convey complex technological processes. In order to accomplish this goal, the author invites the reader to navigate from a description of waves to the transmission of simple pulses and voice; then to the transmission of still and moving pictures – which all involve conversions of one form of energy into another (see Table 2).

Table 2: A list of energy conversions that are explained throughout the pages of A Message Round the World (1953).

Page spreads	energy conversion
18–19 telegraph	mechanical-electrical-radiant
20–21 waves	
24–25 wireless telephone call (radio-telephone)	mechanical-electrical-radiant
26–27 radio reception, by tuning radio receiver	radiant-electrical-mechanical
28–29 wire-photon	photo – electric
34–35 television	photo-electric-chemical-photo

On a sketchbook page, Marie Neurath conceptualizes wave phenomena by presenting tangible things together with their intangible energies, and by laying them out as parallel visual sentences, stacked vertically (see Figure 1A). Although unaccompanied by captions, this page reads like a sentence: how waves are made [whether they constitute] water, sound, [or] electric [by an impact causing movement].

Neurath's illustrations suggest that water waves are made when an object impacts onto the body of water; sound waves are made when the clapper hits the bell; and electric waves are made when some kind of trigger changes the direction of the current and causes waves to move from one end to another.

On the finished production page these concepts are further streamlined (see Figure 1B). However, due to the limitations of vertical space the two horizontal bands that describe water waves are compressed into one row. This compromise weakens the original concept, which was able display the visual parallels between water and sound wave patterns more directly. Sound and electric waves, however, are visually streamlined. They now share the same primary repeating unit,

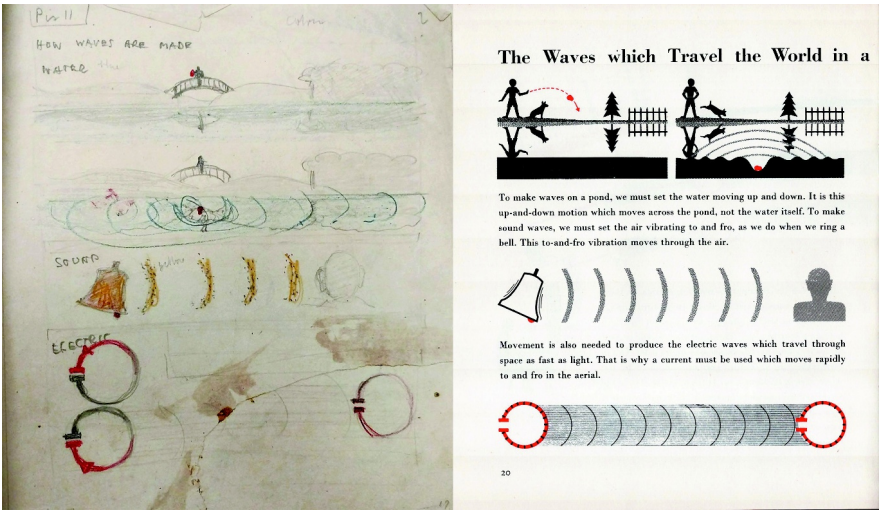


Figure 1A (left): Preliminary sketches describing wave phenomena in the book *A Message Round the World* by Marie Neurath. Isotype 3.2/117. Otto and Marie Neurath Isotype Collection, University of Reading. **Figure 1B (right):** *A Message Round the World* (1953) by Marie Neurath, p. 20. Finished page design describing waves. Private collection.

an arc that moves from left to right. Sound waves are distinguished by being distinct arcs, while electric waves seem more continuous, since they are portrayed as connected by a gray cloud. This system of multiple panoramic rows underscores parallels between related phenomena, and it will serve as a template to explain the telecommunications process throughout the book.

Before going deeper into the discussion of waves, the author establishes how a simple signal is transmitted by a simpler technology, that is, telegraphy. The visible landscape of telegraph transmission and reception is portrayed, across two pages, in parallel with two rows of invisible energetic phenomena that underlie the process (see Figure 2).

Marie Neurath's explanatory solution is to begin with an empty signal as the source, so that when an intelligent signal is introduced into this system, the reader can easily recognize how this second signal alters the energy patterns. On the first row, what seems to be an electrical power source, is seen sending energy into a transmitter tube that converts it into another form of energy. This converted energy goes through an antenna that propagates the source as, yet another form of energy. On the receiving end, this conversion is reversed to restore the original signal. It is important to note that this is not telegraphy. It is the transmission and conversion of an electrical signal with no information attached to it.

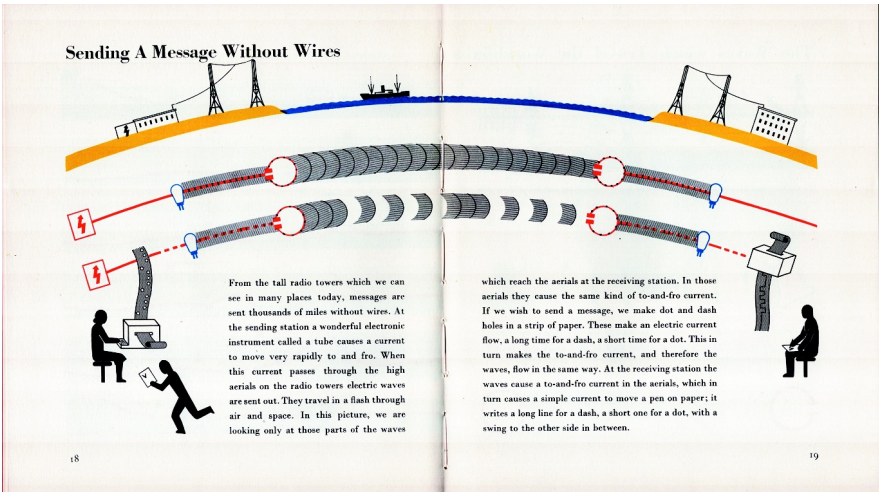


Figure 2: *A Message Round the World* (1953) by Marie Neurath. Page spread explaining the process of telegraphy, as a process of pulse modulation, that results from mechanical-electrical-radiant energy conversions. Private collection.

This comparative strategy was germinating in the original typewritten notes, which describe a linear "carrier current" that is produced by no information at its source, followed by a "modulated" carrier current that is modulated by patterns of the morse code (M. Neurath 1953c). The next row illustrates true telegraphy: An intelligent signal is conveyed by the morse code that is produced at the source. Morse code requires the transmitter tube to modulate the carrier current in intelligible patterns, dots, and dashes, so that intelligent messages can be sent across the air and decoded on the receiving end of the process. This visual explanation is first fleshed out as a double-page spread by a colored pencil sketch, tweaked during the production art stage, then reproduced in the book.

The explanation of basic telecommunication elements like waves and simple signals prepares the reader for a discussion of the wireless telephone call, a nested technology, which requires the transmission of a complex signal, most notably the voice (see Figure 3). This page also serves as an opportunity for Marie Neurath to explain, in detail, what goes on inside the transmitter tube, that is, how this device modulates an input signal to become radio waves. One can derive much of the book's iconography of electromagnetic phenomena by studying this page.

The page that describes the wireless telephone call, or telephony by radio, elaborates on Marie Neurath's typewritten notes on radio transmission. Her notes give us an understanding of the Isotype transformer's actions – from research to

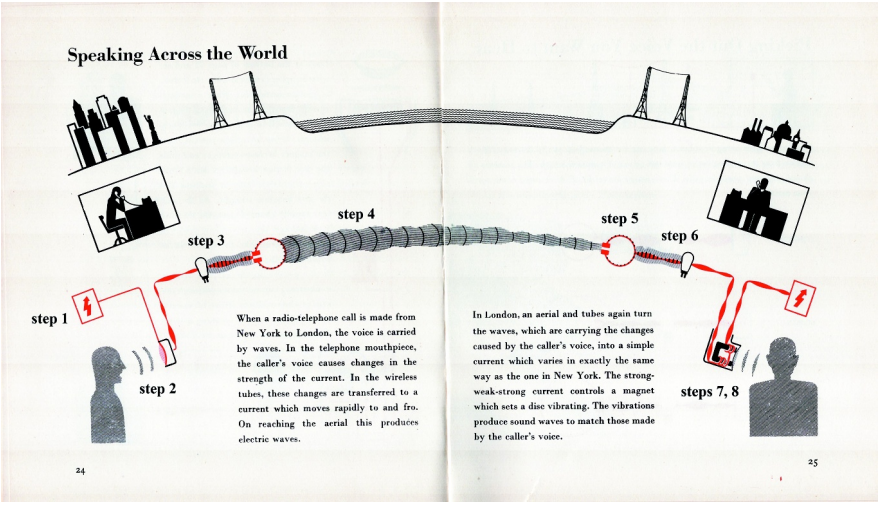


Figure 3: *A Message Round the World* (1953) by Marie Neurath. Page spread explaining the process of a wireless telephone call (radio-telephone) as a result of mechanical-electrical-radiant energy conversions. Step 1. the power supply; step 2. the information signal; step 3. the transmitter; step 4. AM Radio waves; step 5. receiver antenna; step 6. de-modulator; steps 7, 8. conversion into sound waves. Private collection.

synthesis and representation. The notes begin with a sentence that summarizes radio transmission as a simple energy conversion process: "Sound waves – electrical oscillations – soundwaves" (M. Neurath 1953e).

This sentence is followed by a typewritten script that outlines, with confidence, the steps involved in radio transmission. However, the notes suggest that the author had reached this synthesis after lengthy internal deliberations. A penciled side note, "J. H. Reyner: Modern Radio Communication", points towards Marie Neurath's source for the wireless telephone call page. Indeed, one can identify pages from Reyner's book that must have served as the primary source material and reconstruct how she was forming her own ideas from this source (Reyner 1945). One can, then, assess the decisions Marie Neurath has made here in portraying radio process in a naturalistic way.

The first four steps of the wireless telephone call diorama are crucial in explaining transmission:

Step 1. Power supply is presented in the form of a direct current (DC)

Step 2. Information signal, that is, speech is converted into alternating current (AC)

Step 3. The transmitter is represented by the vacuum tube icon, the most prominent element within the transmitter circuit. It takes in the information

signal while producing a high-power, high-frequency carrier wave, in the form of AC voltage. The transmitter, then, impresses the low-power information signal onto the high-power carrier wave enabling the information to be sent over long distances. This is called 'modulation.'
Step 4. Modulated waves are further converted into radio waves that propagate from an antenna into the air, in the form of photon energy.

A closer look at these 4 steps reveals the motivation behind Marie Neurath's design choices in conveying various forms of energy that will develop into an iconography of electromagnetism.

Step 1. The power supply
Direct electric current (DC) is the uni-directional flow of electrons. Marie Neurath represents direct current as a direct and continuous energy phenomenon. The particles, which make up the electric current, the electrons, are suppressed, and are represented as a thin red line.

Step 2. The information signal
Next, we see speech being converted into alternating current (AC). Marie Neurath chooses to represent the sound waves of speech naturalistically, as pulses coming from the mouth of the speaker that go into the mouthpiece of a phone. This is not a flat wave function graph that an engineering textbook would have presented, but a voluminous image that anchors the story within three-dimensions, the human world, as a cartoon would do. AC current, too, is represented naturalistically. Instead of looking like a two-dimensional wave function of peaks and valleys, this AC current occupies space that implies its electrical substance. It is given a rotationally symmetrical body, which looks like a fiery mass moving in space, while being imbued with variations that mimic the variations of the incoming speech patterns. The reader can imagine that this "string of uneven beads," as Marie Neurath describes the AC current, is composed of electrons bundled together, streaming as strong and weak pulses (M. Neurath 1956, 23). This representation combines the amplitude of the wave, the mass, and directionality of the electrical particles.

Step 3. The transmitter
Reyner's *Radio Communication* book from 1945, which seems to have served as the primary source for Marie Neurath's visualization of radio telephony, discusses the transmission process in a somewhat fragmented fashion. The transmitter circuitry is described on Chapters 5 and 7, while transmission and modulation

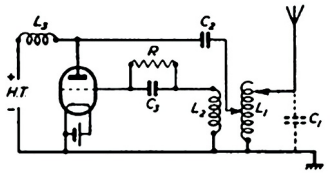
are presented in Chapter 3. Marie Neurath, as the Isotype transformer, correlates the text, graphs, and circuit diagrams from Reyner's various chapters, and from several other sources (Cable and Wireless LTD 1953b). Marie Neurath's notes decompress and linearize the technical language of her source, describing transmission in the following manner:

> Continuous carrier wave radiated from transmission station of constant amplitude (But) When speech takes place, the microphone currents are arranged to modulate the amplitude in exact accord with speech waves. (M. Neurath 1953e)

This textual description that the author had noted for herself, takes on concrete form on the page. The modulated carrier signal is represented as the impression of the information signal onto an imagined blank power-loaded carrier wave (see Figure 3). This act of impression enriches the blank carrier with the peaks and valleys of the speech signal (see Figure 4B). The rest is easy. An aerial antenna will produce AM Radio frequency waves (step 4); propagating them across the air, and into a receiver antenna (step 5) that will de-modulate (step 6) and turn these waves back into their original form, that is sound (steps 7, 8).

Notice that the radio waves (step 4) look like a combination of cartoon-like speech patterns and the pulsating AC current. However, a real antenna propagates radio waves as 3D spherical waves, which get dispersed into the air. That kind of representation would have broken the sequential and semantic continuity of the page. Marie Neurath linearizes radio waves to maintain continuity. She combines the visual qualities of the sound of voice with the pulsating form of the AC voltage, so that radio waves can be understood as a product of these two energy sources. The author has made a potentially risky compromise. This deceptively naturalistic representation could potentially mislead the reader into assuming that it is the true morphology of radio waves. Conversely, this graphic maintains the legibility of the sequence, and adds semantic depth to transmission.

The electrical circuit diagram of the transmitter featured in Reyner's *Radio Communication* book indicates only the 'pathways' of traveling energy (see Figure 4A). Marie Neurath's diagram on *A Message Round the World* adds the substance of energy onto the pathways, their transformational morphologies, and directionality (see Figure 4B). As her numerous handwritten notes indicate, the author had used the brevity and modularity of standard electrical engineering notation to prepare herself for the task of transformation. She abandons technical



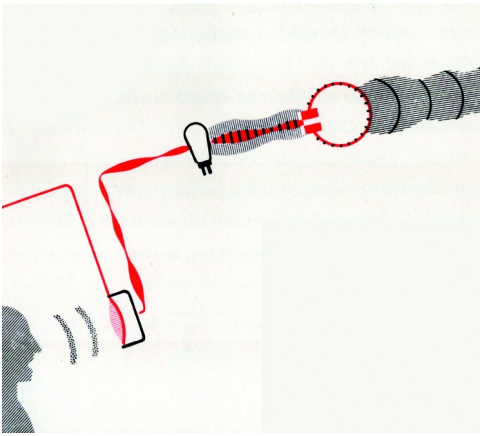


Figure 4A (top): Simple transmitter circuit diagram (Reyner 1945, 319). **Figure 4B (bottom):** *A Message Round the World* (1953) by Marie Neurath. Section that illustrates the transmitter system. The vacuum tube symbolizes the transmitter. The tube takes in the red-pulsating, information-bearing AC current, simultaneously with a gray power current (that is not shown in the picture). The tube impresses the gray power current with the AC current's peaks and valleys, preparing it for propagation by a circular antenna. Private collection.

notation when designing the finished pages and carries on her transformation effort to reach out to the broadest possible audience.[1]

After discussing the transmission of a single message, the author moves on to explaining what happens when multiple messages are sent simultaneously. The radio reception page explains how multiple sources of radio waves are fil-

1 See Hogben and M. Neurath. Marie Neurath was not antagonistic towards standard notation. On the contrary, she had praised standard notations for their simplicity in the book *From Cave Painting to Comic Strip*. Indeed, Marie seems at ease with reading and writing with standard notation, using it as an intermediary device to construct her own naturalistic notation.

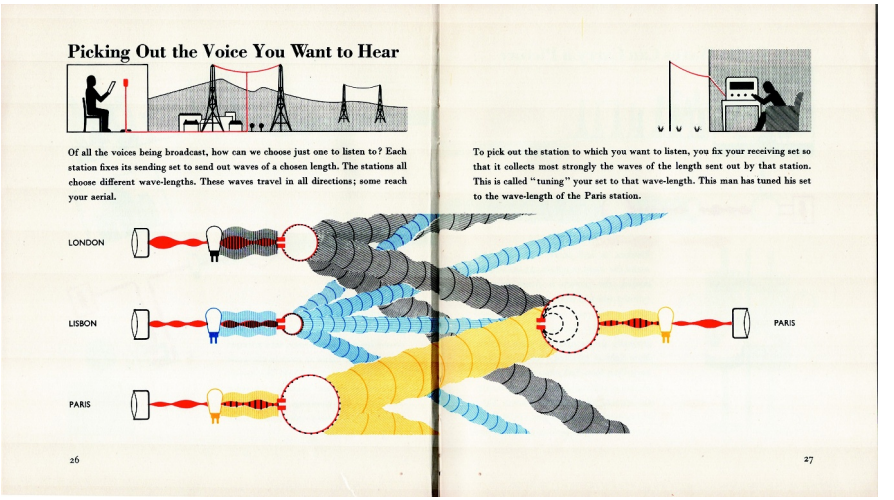


Figure 5: *A Message Round the World* (1953) by Marie Neurath. Page spread explaining how a radio tuner filters incoming radio signals as result of radiant-electrical-mechanical energy conversions. Private collection.

tered by a listener by tuning in (see Figure 5). The page does this by introducing additional layers of information to the previously introduced panorama of wireless communication. The phone caller and receiver are replaced by a radio broadcaster and a radio listener. Three different messages are sent from three different sources instead of one.

Marie Neurath's preparatory notes on this page are both technical and graphical in nature. She is at work training herself on the reception story from technical sources, while drawing numerous diagrams of receiver circuitry. She is also seeking a graphical device that would tell the tuning in story visually (M. Neurath 1953f). Her solution is, once again, something of a compromise. Instead of portraying the different radio sources with frequencies (or wavelengths) that would produce horizontal variation, she chooses to vary the amplitude, that is, the vertical peaks of the source frequencies. This allows her to utilize her circular antenna icon as an aperture device that produces as well as detects the variation of a message's thickness.

On the transmitting side, the larger the circular antenna aperture, the thicker the radio wave that goes out. On the receiving end, a variable diameter antenna is portrayed. The larger the opening, the thicker the radio wave that comes in. The smaller the opening, the thinner the radio wave that comes in. The text is written in a way to help the reader to draw the connection between this varying aperture and the radio's tuning knob.

The invisible energetic phenomena that flow through all of these mechanisms would have been much more complex in nature, as 2D and 3D wave functions. The author orchestrates graphical elements like line, color, and texture in order to convey the variations of energetic substance during transmission. Once the Isotype icons are understood as conceptual representations with a naturalistic look, they take on the power to speak meaningful sentences.

After the primary sequence of electromagnetic transformation is established, more difficult subject matter can be handled with confidence. The author moves onto the transmission of still and moving pictures. Hence, the case of the photo-electric energy conversion.

Before diving into television, which involves the transmission of moving pictures, the book introduces the transmission of a still picture. This is a discussion of wirephoto, which was then the technology used by remotely located journalists to send photographs to their headquarters. The author simply changes the information source from sound into a picture, wound around a cylindrical drum. “Pictures as well as voices can be sent round the world in a flash”, the first sentence reads, emphasizing the semantic continuity of this exotic topic with the earlier more mundane ones (M. Neurath 1953a, 28). The wirephoto explanation serves as a warm-up exercise that proves to readers that it is not magic that converts pictures into current. It is a sensible process of blocking and unblocking light, which scientists call photo-electric conversion, which produces transmittable patterns.

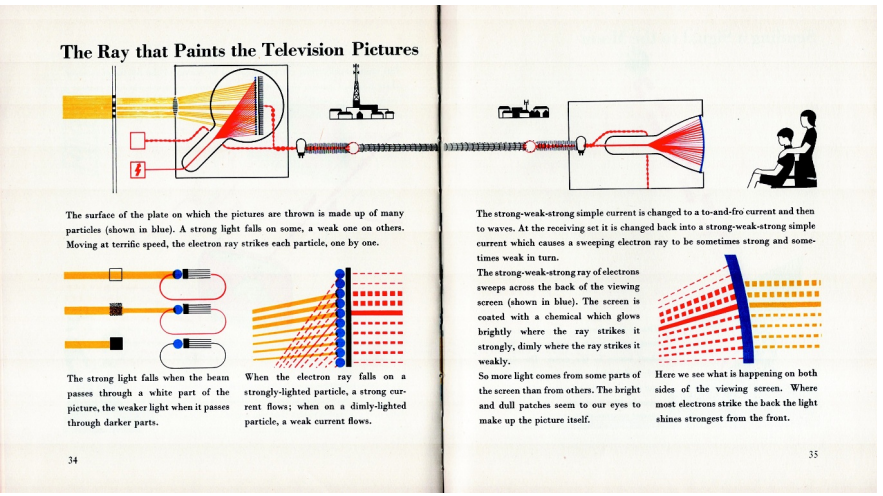


Figure 6: *A Message Round the World* (1953) by Marie Neurath. Page spread explaining how a TV broadcast system transmits images as result of photo-electrical-chemical energy conversions.

On the page that describes the television broadcast, the author now changes the information source from still to moving pictures (see Figure 6). By portraying film frames, instead of a live subject, the author can use information from the previous page to lead into this one, saving readers extra effort (M. Neurath 1953g). The reader is presented with over twenty steps that describe a TV broadcast, although the text does not go through all of them. The information signal is light (yellow lines), filtered through black-and-white film. The signal enters the camera through a lens. Within the camera, strong and weak light fall onto an electrically charged camera plate, which reconstitutes the source image. This image is transformed into transmission waves, which travel to a TV receiver, whose circuitry restores the source image on the TV screen.

On this page, the author introduces new iconography that illustrates photo-electrical-chemical energy conversions. Light rays are yellow lines, thick and thin. Electron rays are red dashed-lines, both strong and weak. Chemical particles are blue dots, which represent the silver globules that coat the TV camera tube. What is particularly inventive is the portrayal of the TV camera not as a box that houses technical components, but as a semi-abstract system, a complex circuit, made up of matter and energy enclosed within a rectangle. The TV camera system is anchored in three tangible objects: a film frame, a lens, and a cathode tube. This hybrid representation blends the intangible science with the tangible technology and reveals how energy and matter interconnect.

These series of telecommunication pages, which range from how waves ripple and travel in water to how moving images are transmitted across a distance, point to four primary transformations that Marie Neurath performs on the source material before a self-contained sequence is put on page. First, she translates domain-specific terminology into everyday spoken language. Instead of saying "tuning a radio receiver", she says "picking out the voice you want to hear". This generalized language serves to naturalize the sequence. Secondly, she streamlines the various representational modalities of information through a bold visual language. Thirdly, she summons semantically fragmented sources from their silos, sequences and synthesizes them on page spreads. Finally, she layers tangible with intangible content, showing the substance of energy that flows through the various devices.

2.2 An expository arc to lure the reader into electromagnetism

The book's jargon-free verbal language, its bold and expressive visual language, and self-contained sequential units, captivates the reader's attention and clearly explains what goes on behind the visible façade of particular telecommunication

technologies. However, Marie Neurath aims to engage the reader on a macro level, by designing an expository arc which intertwines these entries even more. This arc treats the technical entries of the book as if they were loosely connected events in a narrative plot.

The project that had begun with the title "Book on Telegraphy" has grown to encompass the entire telecommunications domain, thanks to Marie Neurath's intellectual ambition to bring knowledge into holistic view. *A Message Round the World* began as a straightforward treatise to describe a single technology, telegraphy, as an earlier typewritten outline suggests (Cable and Wireless LTD 1953a). Gradually, the topics grew, and the whole endeavor became an intellectual adventure for the author. First, Marie Neurath realized that she can talk about related technologies. Then she recognized that these technologies, that is, telecommunication, share the fundamental science. It is the conversion of one form of energy into another that transmits various types of information. The deceptively simple title is a culmination of Marie Neurath's content focusing effort: *A Message Round the World*, efficiently summarizes the plot of a message travelling around the world.

The book opens with a full title page, which illustrates this expository arc, showing, literally, how messages travel around the world with wires and wireless technology. Then the author zooms in. The reader is drawn into the exposition on the first page, which depicts a catastrophic event that serves as the newsworthy message. This message is communicated by sending a telegraph. Next, the author zooms out: the telegraph message travels far, on land and water with wires. She zooms in a bit more. The telegraph machine is now visible, processing information and sending it. Next, the author lifts the lid off the telegraph box to allow the reader to peak inside. The next two pages reveal how underwater cables are laid. Then the point of view switches to the air, showing, in panoramic view, how the telegraph message is sent wirelessly. The information source is simple pulses, converted and sent by radio waves.

To enter the more complex idea of sending audio and visual messages, the author changes strategy. She begins with a close-up of the telephone receiver, which demonstrates, in detail, how sound energy is converted into electrical energy. She then zooms out to reveal how sound information is sent wirelessly through radio waves. This is followed by how multiple sound sources can be picked up by a radio listener. Next, she changes the information source into a picture, and furthermore into moving pictures, to demonstrate TV transmission and reception. The final page serves as a bookend. The book begins with an image of planet earth, and it ends with an image of communication between earth and the moon.

The expository arc of *A Message Round the World* situates a multitude of telecommunication technologies within a global perspective. On the way to achieving this final coalescence, Marie Neurath has found interconnections between the topics and sequenced them in a compelling way. Instead of standing isolated as discrete entries of technical procedures, the book's chapters on telecommunications present themselves as episodes that hinge on the global context that the author had introduced on the full title page. This approach makes the book a literal page turner, the expository arc enticing the reader to find out 'what happens next' in the global telecommunications domain.

Marie Neurath uses several visual storytelling strategies that are cinematic. The author is zooming in and out of a scene; changing the point of view and angle; and using typography to urge the reader to pan their eyes across panoramic layouts. Throughout these pages, infographic devices like cross-sections and cutaway diagrams serve to add informational layers, enriching the overall reading experience. *A Message Round the World* provides an alternative to the engineering book as reference material. The transformer's hard work makes the domain of telecommunication technology an inviting one. The reader can navigate semantically related, visually streamlined expositions of waves, electrons, transmitters, antennae, and receivers without losing thread of their interrelatedness, with relative confidence.

3 A pedagogical prototype for STEM education: *Inside the Atom* (1956)

Originally conceived as another technological wonder book, *A Message Round the World* had transformed into a small treatise on electromagnetism. It served to test the ability of the Isotype approach in communicating fundamental science to a broad audience. The building blocks of electromagnetism were represented by the building blocks of graphic design, visually telling stories of electromagnetic phenomena. Moving from energy into matter might appear to be a logical conceptual transition, but it had risen from a thematic interest in a timely subject matter. In late 1954, during the height of the nuclear arms race, Marie Neurath decided to tackle the atom and, by that account, the atomic bomb. With a storyline and rough sketches for the book, she reached out to notable atomic scientist Otto Frisch, a former Manhattan Project physicist, who now worked at the Cavendish Lab in Cambridge, UK (M. Neurath 1954c). Marie Neurath expressed to Frisch her desire to reach deeper into the subject matter while preserving scientific accuracy in her depictions in these words:

> It is rather risky anyhow to make such hard and fast [drawings], and I want to be as careful as possible. Also, I find it difficult to get certain information which is needed for pictures and can be left vague in words. (M. Neurath 1954c)

Otto Frisch agreed to Marie Neurath's call for support (Frisch 1955). *Inside the Atom* (titled *Exploring the Atom* in the USA) was published in 1956 after seven months long exchanges between the two collaborators (M. Neurath 1956). What started as a children's book turned out to become a concise, graphical-language-driven challenger of a standard, hefty, science textbook.

3.1 An expository arc to streamline physical chemistry

Linus Pauling had covered the primary points of physical chemistry in 33 chapters and nearly 600 pages in *General Chemistry* (Pauling 1947), considered a milestone textbook. This generously illustrated book nevertheless used paragraph text as its primary expository mode as was customary for textbooks in the natural sciences. Marie Neurath touched on these foundational tenets of the field within the 36 pages of *Inside the Atom*, while unpacking many visual aspects of the topics that had been buried within the paragraphs of Pauling's textbook. As a result, *Inside the Atom*, despite its small page run, leaves the reader with an expansive mental picture of the atomic realm. Unlike *A Message Around the World*, which foregrounded the human landscape as the primary stage, *Inside the Atom* is set mostly on the molecular/atomic microcosm. Marie Neurath's primary expository strategy is to start from the visible human scale, "the familiar", in her own words, and to zoom into the invisible realm of matter (M. Neurath 1950, 24). A speck of matter is followed through its molecular pattern and atomic mass, all the way down to its nucleic core. In the beginning, the author invites the reader to imagine a chip of diamond getting shredded into a fine speck of dust, then reveals how diamond's atoms (carbon) are packed in space. The author, then, strips the atom to reveal its interior. It is not simply empty concentric circles that the reader is usually presented with, but filled layers, each representing probability spaces in which the atom's negative particles reside. Next, the exposition moves to a larger atom, chlorine (M. Neurath 1956, 9). Graphics show how green "negative" particles of the atom's outer layer are attracted to red "positive" particles that sit at the atom's core, the nucleus (M. Neurath 1956, 10–11). Then, a picture demonstrates how several elements bond, showing atoms touching and sharing their green particles to indicate covalent bonding, without pronouncing the term (pp 14–15). Then, these covalently bonded atoms are stacked to show how they constitute the larger diamond crystal, the speck of dust, with which the book began.

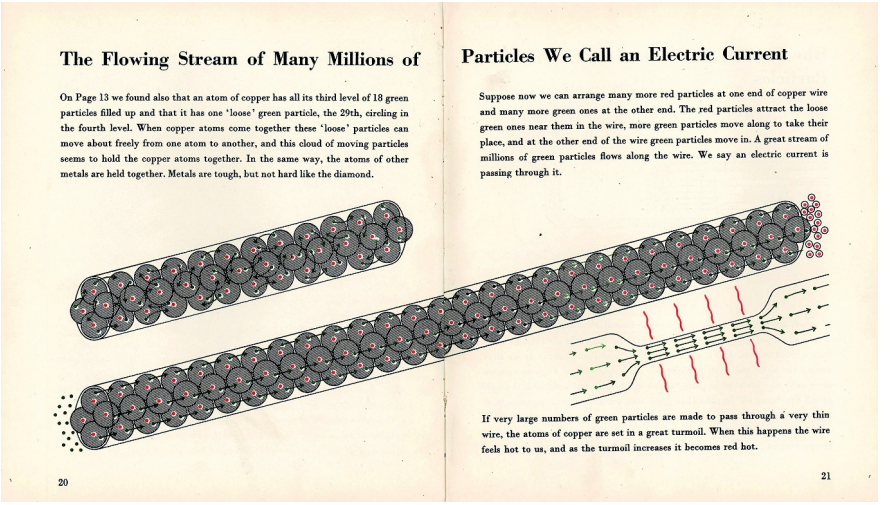


Figure 7: *Inside the Atom* (1956) by Marie Neurath. Page spread explaining how electricity travels through copper wire as a manifestation of electrical conduction. Private collection.

The exposition switches to the salt compound to demonstrate "ionic bonding" when atoms donate electrons rather than share them to hold together (pp. 18–19). Later, when more complex concepts of conduction and electricity are to be explained, the author switches to the element copper, depicting electric current as fast-moving green particles (see Figure 7). This is a double-page spread showcasing a drama of the atomic world in spectacular fashion (pp. 20–21). At first, the page shows unruly green particles (electrons) tumbling along a copper wire. Green particles align themselves once a negative (anode) and positive end (cathode) is attached to the wire, causing "a great stream of millions of green particles [to flow] along" the wire. We call this "an electric current", the author declares. The next page spread illustrates how electric current powers a radio tube (pp. 22–23). The following two spreads illustrate photoemission, showing how sodium lamps, and x-rays do their job by this process (pp. 24–25). Then, the focus shifts into the heart of the atom as the book prepares to explain the most impressive spectacle of the atom: splitting of the uranium nucleus through chain reaction and fission. After an explanation of nuclear decay (pp. 28–29), the stage is set for fission. Marie Neurath does not resort to metaphors or anthropomorphisms; she sticks to pure visual encodings to explain this drama (see Figure 8). Her page spread brings to life physicist George Gamow's model, which envisioned the nucleus as a drop of incompressible fluid of very high density held together by nu-

clear force.[2] The page begins with a picture of the Uranium nucleus displayed as a bundle of particles. If a white particle (neutron) collides with it, the nucleus, now portrayed as Gamow's liquid drop, "splits into parts and throws out all kinds of particles and waves" (p. 32). The facing page zooms out to show, in three steps, how more and more nuclei sitting on the crystal lattice split, causing a chain reaction that results in "the great explosion which we know as an atom bomb". The author notes, in the next page spread, that a similar process of nuclear reaction (fusion) occurs within the Sun. While this results in the benevolent act of the Sun sending us light and heat, the author warns, "it is what happens on earth when men explode a hydrogen bomb". Until the very last page the author carefully avoids using scientific terminology or jargon, keeping the language within the domain of everyday human experience. In the place of a conventional colophon, finally, a key reveals the scientific terms that the book's visuals had been encoding all along.

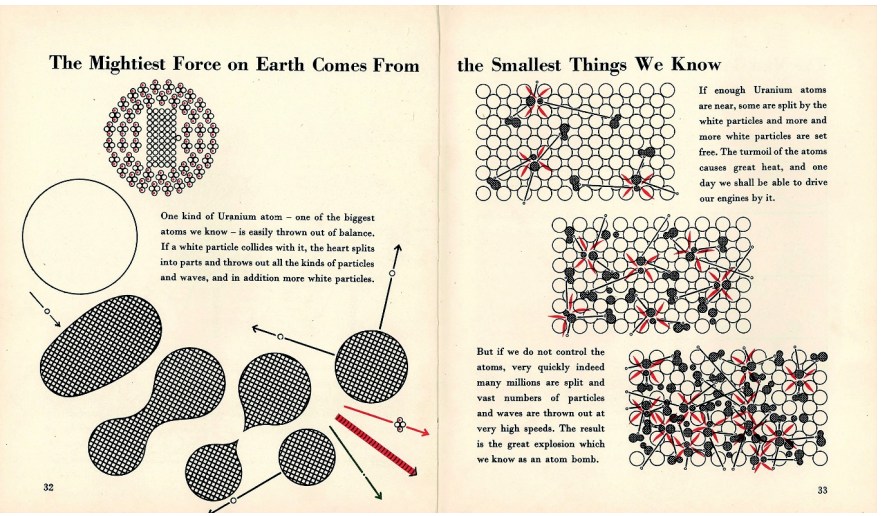


Figure 8: *Inside the Atom* (1956) by Marie Neurath. Page spread explaining nuclear fission. Private collection.

Marie Neurath used *Inside the Atom* to establish visual building blocks, a visual language for the atom capable of telling atomic stories free of calculus, and as the

2 Water drop analogy was expressed in words in a 1930 paper by Gamow (Gamow and Rutherford 1930), then, illustrated in a 1939 paper by Bohr and Wheeler (Bohr and Wheeler 1939). It wasn't until 1958, two years after *Inside the Atom*, that a cartoon version that closely resembled Marie Neurath's drawings appeared in Gamow's popular book *Matter, earth, and sky*.

tone of the last page spread indicates – to make a subtle call for atomic peace. This visual language was re-useable, and applicable to other atomic stories down the road (M. Neurath 1960; 1961; 1964a; 1964b). Otto Frisch was impressed enough by the results that he suggested Marie produce a version of *Inside the Atom* for the general public by collaborating with Joseph Rotblat, another former Manhattan Project physicist (M. Neurath 1955b). However, for reasons that are unclear, Otto Frisch refused to put his name on the book at the last minute (M. Neurath 1955c). One can only speculate whether this was caused by a stigma attached to children's books, or if Frisch wanted to remain behind the scenes at a time when some of his colleagues in the UK were increasingly being regarded with suspicion due to their associations with the Russell–Einstein Manifesto against nuclear armament (Russell and Einstein 1955).

3.2 Graphical language to humanize physics

Nevertheless, as Marie Neurath replied to Fritsch, the publisher felt confident that the book could stand on its own thanks to the recognition the company had been building since the ambitious *Rockets and Jets* (M. Neurath 1955c). Her wish that "certain information [was not] left vague in words" was fulfilled as the Isotype visuals made those esoteric concepts concrete on the pages of *Inside the Atom* (1956). It was a book whose research, writing and design exemplified Isotype's pedagogical purpose to reach broad audiences without watering down content. This little physics book depicted the microcosmic drama taking place inside a single atom with the informative depth of a scientific paper. Author and designer Marie Neurath avoided metaphors and allegories, instead seeking direct, intuitive, and analogical visual expressions for the story's agents and their dynamic action. Throughout the book, graphics walk the reader through many scales of the atomic microcosm by providing transitions from one visual unit into the next in a seamless visual-verbal continuity.

Marie Neurath utilized Isotype's transformation strategy to substitute domain-specific jargon with universal visual encodings. Beyond the finished book itself, the preparatory work, too, sheds light on the rigorous work performed by the author in designing the pages. Marie Neurath sorts through a wealth of fragmented source material composed of technical drawings, diagrams, mathematical formulae, and text paragraphs. Then, she fuses these elements into visual sentences – all in the service of clarifying crucial concepts instead of leaving them vague in words. Marie Neurath's conviction was not "what you can say in words, we can also say in pictures" (M. Neurath 1950, 27). Instead, she meant "don't say in words what you can say in pictures" (M. Neurath 1950, 27). Over twenty years

of experimenting with visualizing information, and deriving design principles from these explorations had prepared her to envision never-before-seen pictures of an atom's enigmatic physico-chemical realm. In the end, Marie Neurath successfully compacted the primary points of a standard 600-page chemistry book, Linus Pauling's *General Chemistry* (1947), into 36 visual Isotype pages.

4 The significance of streamlined expositions for science communication

Marie Neurath's holistic approach to visual education offers strategies to enrich and transform science, technology, engineering and mathematics (STEM) pedagogy. The topics she discussed holistically within dozens of pages of two picturebooks are scattered over hundreds of pages of textbooks that treat the same topics inductively, by presenting knowledge within isolated information bytes that gradually increase in procedural complexity. The standard textbook assumes the learner to be an immensely patient individual who takes in abstract and decontextualized information bytes and build them into larger sensible stories after many years of study. However, there are quantifiable indications that this method is failing to make the study of science a desirable effort (Kennedy 2018; Owen 2009; Palmer 2017; Pew Research Center 2015). A look at the contemporary textbook as a pedagogical tool reveals documentation strategies instead of teaching efforts. The conceptualization part is done with a formality paragraph, coupled with imagery recycled from earlier textbook versions. Then, the learners are told to move on to the exercises. They are to memorize the procedures to solve math equations, without necessarily understanding the natural phenomena that these equations are describing. Then, the lecturer in the classroom, knowing that the textbook had not explained the natural phenomena sufficiently, is seen struggling to piece together a PowerPoint presentation to introduce the concept. For example, a physics teacher has composed a 71-page PowerPoint slideshow to explain the physics of light to students of "Materials Matter", an NEH-funded interdisciplinary science and humanities course (Rutkowski c2018). Over a dozen different graphical styles are employed to encode the story's cast of characters (see Figure 9A). The physicist, consequently, collaborated with a graphic designer to produce an Isotype-inspired graphic that streamlines the majority of that information on a panoramic stage (see Figure 9B). Yet, the challenge to communicate science continues with the researcher's struggle in preparing table of content graphics and research posters so that what he or she has understood can be understood by others.



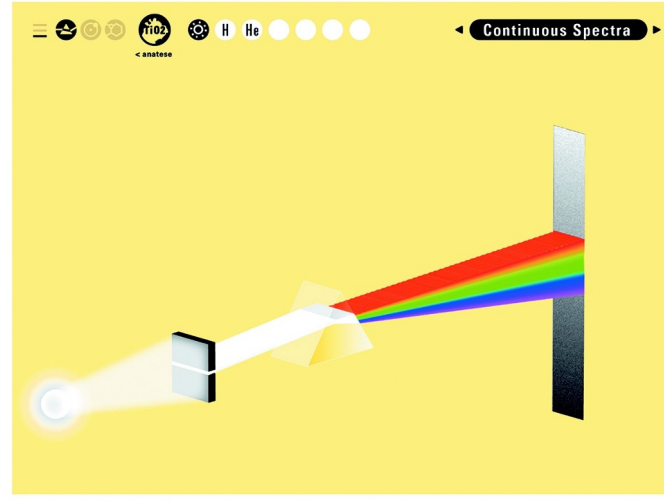


Figure 9A (left): “Science of Light and Color” slideshow (Rutkowski c2018).
Figure 9B (right): Materials Matter App page describing the science of light and color. Light and matter interactions are streamlined within a stage that utilizes the light prism as an expository device (Ersan 2018).

Marie Neurath has provided solutions to these communication challenges, as exemplified in the two books discussed in this chapter, and further down the road with other titles of the Max Parrish picturebook series. Her approach was to battle the multiplicity of languages and the fragmentation of compelling stories. Unlike conventional textbooks and scholarly publications, the Isotype method applied to the topics of electrical and electronic engineering and physical chemistry, brings into view compelling expositions on self-contained page spreads. These books use modular semantic units that are reconfigured to tell various interrelated mini stories. They are designed with a common principle to naturalize intangible phenomena that underlie tangible technological apparatuses.

The visual vocabulary of these stories are not fully comprehensive representations of the phenomena that they are describing. However, once understood as conceptual representations, these visual encodings bear the potential to communicate in an expressive, naturalistic, and non-fragmented manner. Marie Neurath's page spreads live in a holistic domain of scientific and technological knowledge. From each page, the reader can choose to venture deeper into more conventionally detailed sources. Once the reader comes out of a detailed technical rabbit hole, they can land back on an Isotype page of semantic safety and reorient themselves within the larger knowledge domain.

Otto Neurath had remarked that "the ordinary citizen ought to be able to get information freely about all subjects in which he is interested [. . .] there is no field where humanization of knowledge through the eye would not be possible" (Smith 1946, 100). He made a distinction between popularization and humanization of knowledge. Popularization meant translating from the complicated to the simple, a top to bottom process. Humanization of knowledge, on the other hand, implied avoiding technical terms and seeking how far "one could go without using more complicated expressions" (O. Neurath 1973, 231–32). Otto Neurath's wish was that, the humanization method would one day make it possible to teach Einstein's relativity theory "to everybody as simple as Kepler's theory" was taught at the time.

Otto Neurath had worked in the age of mechanical reproduction, where ideas were communicated by written language, lifelike illustrations, and photographic imagery. He had discovered the need to bridge these modalities and realized that the simplicity of hieroglyphics and directness of diagrams offered the possibility to devise a modern visual language (O. Neurath 1973, 240; Compton's Pictured Encyclopedia 1939). Through these and subsequent STEM books, Marie Neurath was in a way fulfilling Otto Neurath's unfinished project to humanize and unify the language of science for everyone to participate in. Her tireless efforts of visualizing concepts, which would otherwise have been left vague in words, her relentless pursuit of clarity of communication with informational depth have produced

a remarkable body of science communication waiting to be re-discovered. Marie Neurath's subsequent work in the STEM domain, which utilizes Isotype iconography instead of standard notation, holistic stories instead of topical entries, demonstrates the potential benefits of Isotype's STEM pedagogy. Today, in the age of digital production and dissemination, this specialized approach to systemic use of visual language promises to connect otherwise separate domains of knowledge, as Otto Neurath had put it in 1936, "to make us fully conscious of the conditions in which we are living" (O. Neurath 1936, 111).

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Sarah Hoem Iversen

Isotype and the Gendered Body in Children's Books about Reproduction

1 Introduction: Isotype and the gendered body

"Words divide, pictures unite" was the slogan of the Isotype Institute. As Kostelnick (2019, 153) observes, after World War I, unifying culture and universalizing the human form through design marked a break from the nationalism that had divided Europe. However, pictures too can divide, for example as regards gendered representations of people. When the Isotype Institute wanted to present "universal" visual signs for "Peoples of the World", the male body served as the prototypical human being (Nikolow 2011, 92). Iconographic representations of people are often either male or read as male. Androcentrism situates males as the "neutral" standard, which means even gender-neutral visual depictions are likely to be interpreted as male (Bailey et al. 2019). In the context of children's literature, this androcentrism also applies to animals. Parents typically use masculine labels for gender-neutral animal characters when reading for their children and children usually assign male gender to ungendered animal characters in pictures (Arthur and White 1996).

When creating prototypical representations of people, it is difficult to avoid stereotyping, as pictograms require simplification, yet cannot be divorced from their temporal and cultural context. Commenting on pictogram design at the Vienna Museum in the 1920s and 1930s, Burke (2013, 505) noted that the pictogram for "woman" might "seem dated to twenty-first-century eyes". Isotype signs such as the female "white-collar workers" in belted midi-dresses and berets, do evoke the fashion of their era. However, as Burke points out, these pictograms were criticized even at the time. Gerd Arntz, the German artist who designed pictograms for the reference file known as the Isotype "picture dictionary" recalled that around 1930 in Vienna there was "criticism from the women's movement that we made the skirts too short or too long" (qtd. in Burke 2013, 505). Isotype representations of people were not just gendered by their clothing, but also by their body shape. The Vienna Museum's guidelines for pictogram design included "a recommendation to stress 'the rectangular forms of the male and the rounded forms of the female' in imitations of the 'manifestations of nature'" (qtd. in Burke 2013, 506). Arntz's artwork, such as his 1933 depiction of "unemployed man and woman" illustrates this. The man's face has a more rectangular jawline and the woman's face is rounder, and her back more sloping. (see Burke 2013, 498). Rather

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than “manifestations of nature”, such depictions represent idealized and stylized embodiments of gender.

2 The gendered body in children’s books about reproduction

In contrast to generic pictograms, where male figures were the norm, the female-gendered body took on particular significance when the aim was to depict sexual reproduction. The Isotype process of extracting “the essential facts” from the experts and converting them into picture form (Neurath 1974, 136) may have been particularly demanding when producing children’s books on complex and challenging topics, such as pregnancy and birth. The present chapter investigates the gendered body in two children’s picturebooks on reproduction, illustrated by principal Isotype transformer Marie Neurath, *A New Life Begins* (1961) and *How the Baby Came* (1963). In these texts, the female (maternal) body is foregrounded, while the male (paternal) body fades into the background. This corresponds to a trend in twentieth and twenty-first-century children’s picturebooks: while female characters are overall underrepresented, mothers are still represented more often than fathers (Adams et al. 2011). As far as representations of gendered bodies are concerned, the Isotype Institute’s desire to present “essential facts” did not result in imitations of the “nature”, free from ideological implications.

When these two Isotype books were published, sex education was a fraught issue in Britain, as the “Sexual Revolution” clashed with social conservativism (Hall 2002). While some condemned sex education as corruptive, others argued that the lack of systematic sex education was dangerous to sexual morals and public health. In 1962, the British Medical Association proposed teaching the basics of sex education in primary school, and in 1963 a motion in favor of compulsory sex education in secondary school was passed by the National Union of Students (Hall 2002, 103). In this context, sex education literature conveyed ideologies about childhood and sexuality, negotiating the boundaries for what was considered appropriate and necessary knowledge for young people.

Examining 13 British picturebooks published 1984–2000, Hunt (2002) found that many texts made no attempt to describe the process of labor verbally or visually. She commented that this is “perhaps understandable” because of the assumption that “the woman will labour in hospital and will not be seen by other children” (17). In other words, the biological process of birth may not have been regarded as important knowledge for children. Comparing the feeding of babies in late twentieth-century and twenty-first century Swedish and English picture-

books, Epstein (2017) found that English-language picturebooks more often depicted babies being bottle-fed rather than breastfed, while Swedish picturebooks were more likely to include depictions of breastfeeding. In contrast to these more recent Anglophone children's books, *A New Life Begins* and *How the Baby Came* do not shrink from depicting the process of labor visually and verbally, including pictorial representations of vaginal birth. Both books also include visual and verbal representations of breastfeeding. However, references to puberty and sexual intercourse are omitted. The focus is on the process of gestation and birth, not what comes before. The processes of birth and breastfeeding were considered important knowledge for young children in the two Isotype books, then, while puberty and sexual intercourse were not.

Different and sometimes conflicting discourses on gender and reproduction may co-exist in children's books on reproduction, with certain ideologies being particularly pervasive. For example, early twentieth century sex education books centered on reinforcing moral and religious ideologies related to the ideal family (Sauerteig 2009). These books aimed to inculcate appropriate gender roles, preparing children for their future roles as husbands and fathers, or wives and mothers. While many books in the first half of the twentieth century emphasized the pain and danger of childbirth to deter girls from premature sexual experiences, mid-century authors avoided too many details, which might discourage girls from wanting children. Instead, girls were told that becoming a mother was the greatest joy imaginable. Boys, meanwhile, were encouraged to respect their mothers and help pregnant women with chores (Sauerteig 2009, 140). The inculcation of gender roles is not reserved for older sex education books. Venzo (2021, 30) has found that today's children's picturebooks generally construct gender, sex, and reproduction in "standardized, binary and heteronormative ways". Similarly, Yameng Liang and Bowcher (2019) argue that present-day sex education picturebooks in China implicitly impart the heterosexual moralities of Chinese mainstream society.

In a study of German sex education texts for children and youth published 1900–1980, Sauerteig (2009) noted that the knowledge about reproduction constructed in these texts was "central to the formation of gender identities" (130). In particular, "the scripts for motherhood" in these books were "fundamental to the construction of femaleness" (130) over time. Early twentieth century books, for example, constructed an image of "the heroic and divine mother" (130–131). In contrast, fathers were largely excluded from these narratives until the 1960s, except in the role as protector and provider. An engraving in the chapter on reproduction in Meyer's *Vor heiligen Toren* (In Front of the Holy Gates, 1913) evokes religious imagery in its portrayal of ideal family life: the mother sits in the foreground breastfeeding one of four children, while the father kneels protectively

behind her (Sauerteig 2009, 131). Studies suggest mothers have a particularly important role as teachers in children's sex education books. Yameng Liang and Bowcher (2019) found that fathers were visually absent in images where mothers talked to children about procreation in Chinese picturebooks (337). Sauerteig (2009, 140) discusses German sex education books from the 1960s, which told readers that fathers, although strong and capable, "knew nothing about bringing up small children" (140). Other books were more concerned with constructing medical knowledge for children, while omitting references to gender roles and the social and emotional aspects of childbearing. For instance, socialist writer Max Hodann's *Woher die Kinder kommen* (Where Children Come From, 1926) was groundbreaking in being the first to include a cross-section illustration of a woman's pelvis during labor (Sauerteig 2009, 135). The book did not focus on the mother's role but did stress the physical hardship of pregnancy and childbirth, recommending that mothers spend a week in bed after delivery. In the 1960s and 1970s, the official introduction of sex education in schools in West Germany had encouraged a raft of new children's books primarily focused on constructing biological and medical knowledge for young readers (Sauerteig 2009, 141). The *Sex Education Atlas* (Sexualkunde-Atlas) (1969), for example, included photos of the foetus, while the pregnant woman's body "was only depicted in cross-section drawings as an object for anatomical study" (Sauerteig 2009, 143). None of the images portrayed the mother during labor or postpartum; no portraits of the intact mother's body allowed display of individuality and emotions, leaving her "strangely detached from the birth process" (145). The visual and verbal narrative was therefore "silent about what the mother felt during pregnancy or how she experienced her body" (143). In terms of ideologies of gender and the maternal body, such clinical and distancing depictions of pregnancy and childbirth reduce the mother to a passive vessel of reproduction.

When reproductive processes were mentioned in sex education books, these were often gendered even on a cellular level. Martin (1991) refers to the "scientific fairy tale" of the reproductive systems in medical texts. Science textbooks construct a "romance based on stereotypical male-female roles", in which a woman's egg cells take on "feminine" characteristics and are seen as passive, while the sperm cells are described as "streamlined", "strong", and "invariably active" (489). Martin (1991, 2001) focuses on textbooks for medical students, but a similar gendered active-passive divide is also evident in descriptions of reproductive processes in children's books (Sauerteig 2009; Yameng Liang et al. 2016; Maagerø and Øines 2019).

In a study on verbal, pictorial, and multimodal metaphors in contemporary Chinese sex education picturebooks for pre-school children, Yameng Liang et al. (2016) found that metaphors not only supported children's comprehension of sci-

entific concepts, but also imparted sociocultural values. For instance, "personification metaphors" were used to endow the reproductive systems with human capacities and emotions in distinctly gendered ways. Sperm were not only described as active and forceful but depicted as anthropomorphic "boy" characters who could talk and run. The uterus was depicted as silent and passive, and even visually portrayed with a shy, feminine face. Such personified depictions become overt representations of Martin's (1991) scientific "romance", working in tandem with the overarching narrative of heterosexual, married love conveyed in these picturebooks. What Yameng Liang et al. 2016 refer to as "domestication metaphors" familiarized abstract concepts with reference to the everyday experiences of child readers. This included architecture metaphors such as "place" or "room" to describe the uterus (186). Adjectives such as "cosy" and "little" used in conjunction with the metaphorical construction of the uterus as a "room" imbue the biological process with sentiments such as being safe at home and being in a mother's warm and loving embrace (187). In addition to making the process of gestation less abstract for child readers, such depictions also reinforce ideological constructions of motherhood.

3 Theoretical considerations

In her work on women's bodies in American culture, Martin (2001) shows how the medical language used about women's bodies and reproduction construct ideological assumptions about women and motherhood. For instance, medical metaphors describe women's bodies as mechanical factories for reproduction. Drawing on Martin and studies on children's sex education picturebooks (e.g. Yameng Liang et al. 2016) the present study considers the metaphorical language used to describe the pregnant and birthing body, and the processes of gestation and childbirth in the Isotype picturebooks. Following Sauerteig's (2009) discussion of mothers as "disconnected" from the birthing process, the birthing woman's agency and role are also considered.

The visual analysis of the picturebooks also considers the Isotype Institute's principles regarding use of colors. The investigation draws on elements of visual design presented by Kress and van Leeuwen (2002, 2021), such as visual modality and color as a semiotic mode. Within Kress and van Leeuwen's Hallidayan systemic-functional approach to visual analysis, colors fulfil all three communicative metafunctions. In their ideational function, colors can be used to represent the appearance of things in the world; green can represent grass, for example. In their *interpersonal* function, colors can be used to evoke emotional reactions, to

impress, warn, even calm, and subdue. As far as picturebooks are concerned, vivid colors might evoke different reactions from readers than muted tones or black and white. Finally, in their textual function, colors can create coherence in texts. For example, contrastive colors can be used to highlight specific elements in an image and repetitions of a color throughout a text can create narrative cohesion (Kress and van Leuuwen 2002). Kress and van Leeuwen (2002) stress that color often fulfils the three metafunctions simultaneously rather than separately and that color-associations are culture- and context-bound.

It should be noted that Isotype illustrations represent a distinct artistic style, in which colors were carefully employed for the purposes of knowledge construction. Marie Neurath acknowledged the importance of the interpersonal metafunction of colors, in that colors create ambiance and encourage reader engagement through evoking emotional reactions and cognitive associations. However, the Isotype Institute stressed that the central function of colors was to create meaning and aid comprehension (Walker 2013, 408). As the introduction to the Isotype book *Living in the World* (1949) informed child readers: "We hope that you will like the bright colours we use, just as we like them, but their main purpose is to help make the meaning of our charts clearer and not just make them more attractive" (qtd. in Walker 2013, 408). Marie Neurath's reflection on the careful design of Isotype illustrations included the use of colors. She asked: "[. . .] what are the essential things we want to show, how can we use comparison, direct the attention, through the arrangement and use of colours, to bring out the most important things at the first glance, and additional features on closer scrutiny" (qtd. in Walker 2013, 395). The arrangement of color and the use of color for comparison and to direct the reader's attention could be linked to the interpersonal and textual functions of colors (Kress and van Leeuwen 2002). According to Walker (2013, 408), early editions of the "Visual History of Mankind" series included eight solid colors and followed many of the color-coding principles in the *International Picture Language* (1936) with green being associated with grass and youth, for instance, and red being associated with machines and warmth. However, this range of colors conflicted with publisher Max Parrish's desire to print affordable books, and later publications used more limited color palettes (Walker 2013, 397).

A New Life Begins was both written and illustrated by Marie Neurath, while *How the Baby Came* was designed by Marie Neurath and written by Dorotheen Allan. In terms of the iconotext, it is not clear how much the writer and illustrator worked together, as the Marie Neurath archives at Reading University do not include notes pertaining to the cooperation between Allan and Neurath. *A New Life Begins* is an Isotype information book about pregnancy and birth in different animals, including humans, while *How the Baby Came* presents information about human pregnancy, birth, and a new baby in the form of a narrative. Elements

such as the child characters in *How the Baby Came* and the second person pronoun *you* used to address the reader in *A New Life Begins* suggest that the implied reader is a child. *A New Life Begins* in particular, is a book one could imagine children reading on their own. Indeed, reader feedback on Isotype picturebooks reported that children enjoyed reading them independently. A mother recounted her eight-year-old son's comments on the "Visual Science" series: "They are wizard books – I can read them by myself – I don't need help from anyone" (qtd. in Walker 2013, 417).

A New Life Begins seeks to answer curious children's questions about reproduction in general, while *How the Baby Came* is the kind of book a child might be given in preparation for becoming an older sibling, and which parents may have read with them. As such, these books represent two typical categories children's books about reproduction have tended to fall into. The knowledge about reproduction is either presented in an informational textbook style, or as a story about a family, in which the child reader is invited to identify with the child characters. As Venzo (2021) observes, the habitual use of storytelling in nonfiction picturebooks about reproduction is "perhaps unsurprising, given that the progression from puberty to sexual maturity, sexual intercourse, conception, pregnancy and birth lends itself to a rather familiar beginning, middle and end narrative structure" (38).

The lines between fiction and nonfiction are blurry, not least in children's texts. As Sanders (2018) points out, children's nonfiction "can and does borrow from the toolbox of fiction writers" (88). What is referred to as nonfiction, descriptive books, or informational books, cannot always be easily compared to narrative fiction. Von Merveldt (2018) observes that nonfiction picturebooks published in recent years are characterized by a "hybridisation of forms", playfully blending "the factual and fictional on the one hand" and the "descriptive and narrative on the other" (243). Similarly, Narančić Kovač (2021) identifies two pairs of categories for describing picturebooks: fiction vs. nonfiction and narrative vs. nonnarrative. She observes that "both nonfiction and fiction picturebooks may be narrative or nonnarrative and that border cases are always possible" (37).

Following Narančić Kovač's (2021) typology, *A New Life Begins* could be categorized as a nonnarrative nonfiction picturebook, while *How the Baby Came* is a narrative nonfiction picturebook. However, the former does include narrative elements and the latter contains descriptions and explanations. One can draw on what Kümmerling-Meibauer and Meibauer (2021, 194) refer to as the "trifurcation of text types" (narration, description, and explanation) in descriptive picturebooks to present these books in a more nuanced way. Both Isotype picturebooks combine description, explanation, and narration to construct knowledge about reproduction for young readers. *A New Life Begins* to a great extent draws on de-

scription and explanation, but also contains several miniature narratives of the start and development of a life, from polyps to people. Conversely, *How the Baby Came* is a story about a family, but the pedagogical aim of the text is to present information about pregnancy, birth, and babies. Description and explanation are therefore built into pedagogical dialogues between parents and children. The child characters are the one asking questions and initiating the pedagogical dialogues. Sauerteig (2009) notes that the questions asked and answered in sex education books direct "children's attention to the relevance of a specific knowledge of reproduction" (129). The silences, omissions, or questions not asked, are therefore equally important to the discourses of gender and sexuality within these texts.

4 Analysis of *A New Life Begins* (1961)

A New Life Begins is part of the "Wonder World of Nature" series from British publisher Max Parrish, aimed at children aged 7–10. The book shows how different animals develop from gametes and come into the world and covers everything from the asexual reproduction of polyps, oviparous animals, such as birds, and reproduction in animals who give birth to live young, such as kangaroos and humans. Hall (2002, 95) discusses the traditional approach to teaching reproduction through a gradual progression up the evolutionary ladder, from amoeba, plants, and invertebrates to mammals and finally humans, which spared adults the embarrassment of explaining human reproduction to children. However, it is not fair to reduce *A New Life Begins* to what Hall calls a literal "birds and bees" approach to sex education, especially as only six out of thirty-six pages are devoted to human reproduction (95).

Each double spread in the book has a different heading designed to catch the young reader's attention. The evocative language in these headings recall newspaper and magazine headlines, e.g. "The Kangaroo No Bigger than Your Finger" and "A Savage, Scaly Youngster Breaks Through a Hard Shell". The verbal text uses the second person *you* to address the implied child reader. For example, in the double spread devoted to human pregnancy, the verbal text explains that "After two months, it [the foetus] is still only the size of *your* little finger" (Neurath 1961, 30 [emphasis mine]). The comparison between a foetus and a child's finger, as well as the second-person address, reduces the distance between narrator and narratee and creates a more child-centered scientific narrative.

A New Life Begins relies on a limited color palette of grey, blue, green, and red, with grey and red being most predominant. Blue is used for water, green for

eggs, and red for babies. Female animals are depicted in grey, while male animals are not colored in and therefore fade into the background. They are depicted as hovering behind the females; ghostly supporting figures (Figures 1 and 2.) As such, males and male bodies are given less prominence than females and female bodies.

The offspring are consistently depicted in eye-catching red; the "new life" of the title becomes the visual focal point of each spread. In terms of ideational function, the color red is often used to represent blood. Moreover, red could symbolize love, life, and warmth, but also anger. In Isotype picturebooks, red often represents warmth and energy, for example in depictions of power and electricity. From the point of view of both ideational and interpersonal function it is an apt choice to represent new life. Of course, red also contrasts with the muted monochromes of grey and white. As Walker (2013) notes, the red color used for babies of different species throughout this book allows for ease of comparison between animals. It is therefore a powerful device for textual cohesion. As such, the red color in this book fulfils all three communicative metafunctions simultaneously (Kress and van Leuuwen 2002). Given the restricted color palette used, technical reasons such as visibility likely played a chief role in color selection. For example, the illustration of the kangaroo shows the mother kangaroo carrying a tiny baby, birthing it, and nourishing it in her pouch. The cross-section depicting the kangaroo baby making its way from the birth canal to the pouch is shown in full, while a close-up shows the more developed joey emerging from the pouch. The embryonic baby is so small it would hardly have been visible without the red color (Figure 1).

The verbal text in the section on rabbits is the one in the book that comes closest to describing sexual procreation:

> In mammals like ourselves, or cats or dogs or rabbits, the egg is not laid, but is kept inside a special tube. A male mammal puts his sperm into this tube. When an egg has been joined by a sperm, it begins to grow. (Neurath 1961, 27)

Here, the phrase "In mammals like ourselves" explicitly links the processes described not only to reproduction in rabbits, but also in humans. This suggests to the reader there are more similarities than differences between reproduction in rabbits and humans; both are animals, and both are mammals. Linking reproduction in animals to human reproduction also makes the process less abstract for young children, who are invited to transfer their knowledge about reproduction in animals such as rabbits to human reproduction, a strategy Yameng Liang et al. (2016) also identified in twenty-first century Chinese children's picturebooks.

The reproductive act is rendered in the active voice in the sentence "A male mammal *puts* his sperm into this tube". In the following sentence, the long pas-

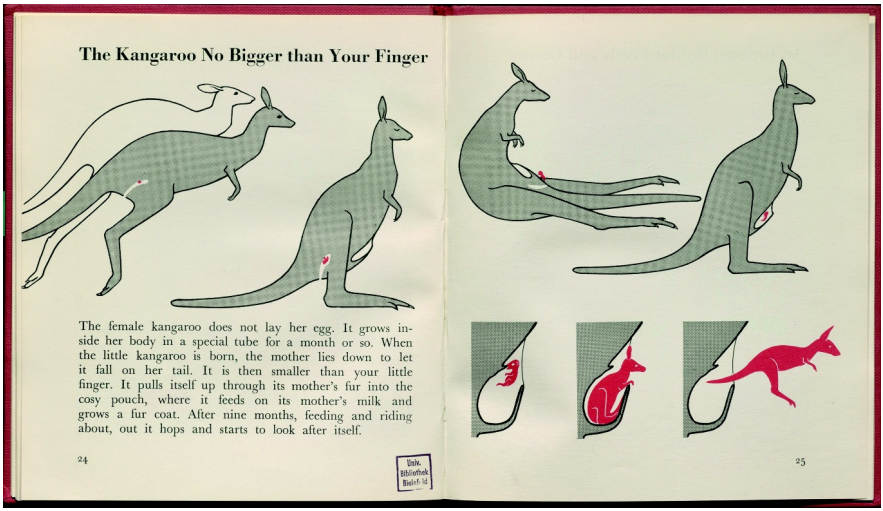


Figure 1: *A New Life Begins* (1961) by Marie Neurath, pp. 24–25. The illustrations show cross-sections of the development and birth of the kangaroo, from embryo to joey emerging from the pouch of the female kangaroo. Private collection.

sive is used: "When an egg *has been joined by* a sperm, it begins to grow" [emphasis mine]. The text refers to the "egg" and "sperm", but otherwise, few medical terms are used. Referring to the vagina as "a special tube", is an example of polite, child-centered language. Conceptualizing the vagina as a "tube" is moreover an example of a domestication metaphor (Yameng Liang et al. 2016). Instead of relying on medical terminology, the verbal text metaphorically refers to terms used to describe oviparous reproduction earlier in the book, helping child readers consolidate new and familiar information. For instance, "The egg needs no shell as it cannot dry up, and it needs no yolk, as all the food comes from the mother" (Neurath 1961, 27).

On the verso side the buck (a white outline) seems to be chasing the doe (rendered in grey). However, the cross-section of the female's body shows that she is already impregnated. The following spread depicts the development of the young and the birth, and again the doe's body is shown in full when she births her young.

When the book turns to human reproduction, the verbal text again makes an explicit comparison between the other animals and human beings: "Just like a rabbit, a human being starts life as an egg which has been joined by a sperm". However, while in the previous section, "the male mammal" actively puts his sperm into the female's tube, here the passive verb form is used. Rather politely,

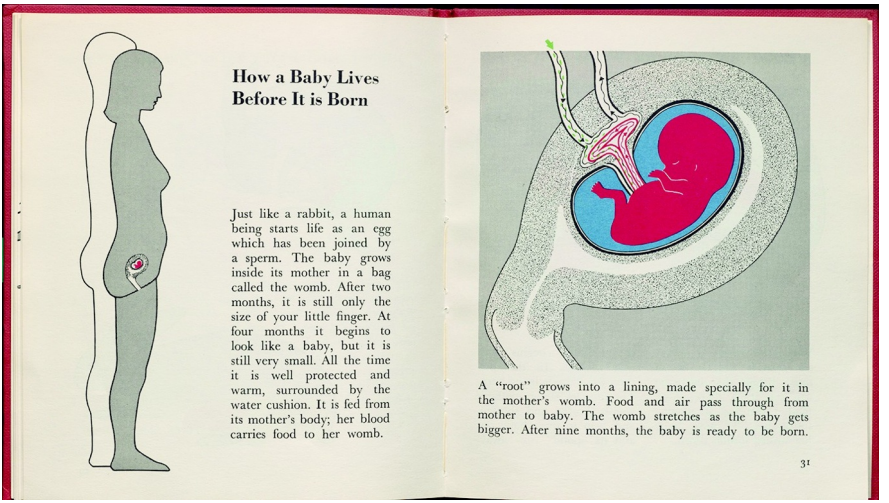


Figure 2: *A New Life Begins* (1961) by Marie Neurath, pp. 30–31. The verso page shows full-body male and female silhouettes, with an embryo inside of the woman's womb. The recto page is a close-up cross-section of the embryo inside of the womb. Private collection.

"the egg has been joined by a sperm" (Neurath 1961, 30). This double spread is dominated by the cross-section of the foetus, with the baby rendered in red and the amniotic fluid in blue (Figure 2). The umbilical cord and placenta are depicted in red, while green arrows illustrate the nutrition passing from mother to baby. The parents are represented as naked silhouettes, with the father's blank, ghostly silhouette close behind the mother. Visually, this echoes the positioning of other animal male/female pairs in the book, such as the kangaroos and the rabbits. Although the verbal text avoids explaining how the sperm joined the egg, the visual positioning of the male close behind the female might suggest intimacy. More interestingly, perhaps, it might indicate that the male initiates the process of reproduction, before disengaging and fading into the background, overshadowed by the female.

Overall, the focus of both the visual and verbal text is on the baby rather than the parents. The aim is to construct medical knowledge, rather than address the social and emotional aspects of childbirth. The mother is mostly mentioned as the one whose body nourishes the child, "it is fed from its mother's body" (Neurath 1961, 30), and keeps it safe and warm inside the womb: "All the time it is well protected and warm, surrounded by the water cushion" (Neurath 1961, 30). The "cushion" is mentioned to show that the baby is protected, but also evokes cosiness, an example of the domestication metaphors identified by Yameng Liang et al. (2016). Unlike baby Stephen in *How the Baby Came*, the baby in *A New Life*

Begins is gender neutral and depersonalized: "*it* is well protected". There is one reference to the mother being able to feel the baby moving inside her and to the womb stretching to accommodate the growing foetus, but otherwise there are no descriptions of how a woman might feel during pregnancy. Plant metaphors are used to describe the placenta and umbilical cord: "A "root" grows into a lining, made specially for it in the mother's womb" (Neurath 1961, 31).

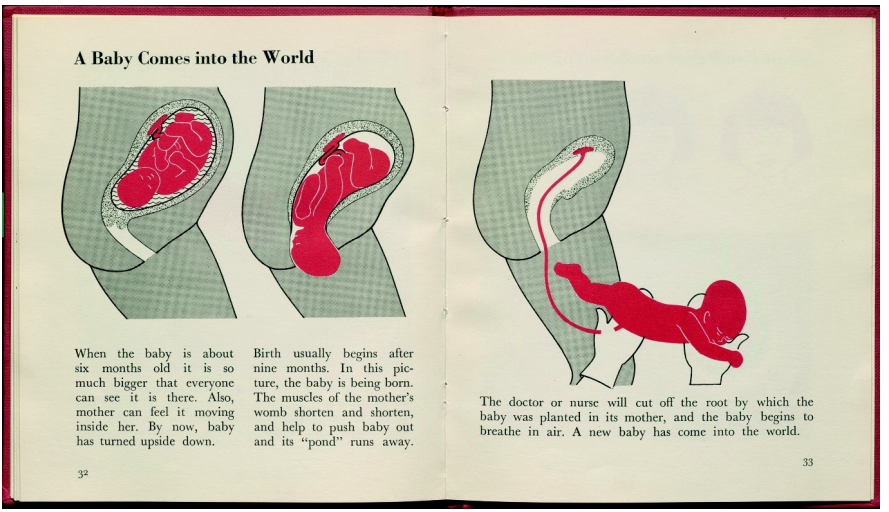


Figure 3: *A New Life Begins* (1961) by Marie Neurath, pp. 32–33. The illustration shows a cross-section view of the baby coming through the birth canal and being delivered into a pair of gloved hands. Private collection.

A New Life Begins does not shy away from showing the baby coming out of the birth canal (Figure 3). However, unlike the depictions of the birthing kangaroo and rabbit, which showed the whole animal, the visual representation of the human woman giving birth is a close-up cross-section of the lower part of her body. This is a visual device reminiscent of anatomy textbooks, which allows for greater detail and understanding of the baby's size relative to the birth canal. However, it also has a distancing effect, which could be seen as a politeness strategy. The perspective separates the birthing woman from the process of birth (Sauerteig 2009). The woman's face is not shown, and the experience is rendered impersonal and scientific. Further, the verbal text does not allow agency to the mother during the birth. The passive voice is used to state that "In this picture, the baby is being born". Moreover, it is "The muscles or the mother's womb that shorten and shorten and help to push the baby out", rather than the mother push-

ing actively (Neurath 1961, 32). Drawing on the analogy between birth and production, Martin (2001) suggests that when labor in childbirth is conceptualized as mechanical work carried out by the uterus, birth is regarded as "the (re)production of goods" (145). Within this narrative, there is no space for maternal agency.

As in previous descriptions of viviparous births, the verbal text uses metaphors from the domain of plants. In addition to being a pedagogical strategy, this also makes the process of birth seem less dramatic. For example, the baby's "pond" runs away and "The doctor or nurse will cut off the root by which the baby was planted in its mother" (Neurath 1961, 32). However, the use of red, a consistent feature for babies throughout the book, in the context of a human birth inevitably evokes blood.

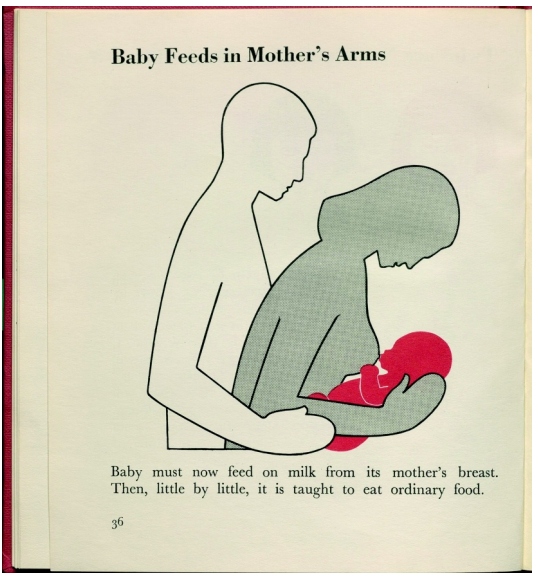


Figure 4: *A New Life Begins* (1961) by Marie Neurath, p. 36. A silhouette of a man embraces a silhouette of a woman who is breastfeeding an infant. Private collection.

"Baby Feeds in Mother's Arms" is the final spread in the book, representing the culmination of the topic "A New Life Begins" (Figure 4). The verbal text simply states, "Baby must now feed on milk from its mother's breast. Then, little by little, it is taught to eat ordinary food" (Neurath 1961, 36). The image shows the mother, a grey, naked silhouette holding the brightly red infant to her breast, while the father, a blank silhouette, embraces her from behind. Like all images of animals in *A New Life Begins*, this is what Kress and van Leeuwen (2021) refer to as a less

naturalistic and highly schematic image, with saturated colors and people represented as generic silhouettes. The lack of an environment behind the people further lowers the visual modality. Nonetheless, subtle features also make this image quite powerful. Although one cannot discern facial features, the woman's silhouette shows a hint of a smile, while the man remains solemn. The mother leaning over the infant and the father embracing her from behind makes a surprisingly tender tableau, although the figures depicted are generic enough to have been pictograms on a traffic sign. Perhaps the schematic presentation of the parents allows for an intimacy that would have been less appropriate in a more realistic style. The image also evokes the religious imagery of the holy family Sauerteig (2009) identified in early twentieth-century sex education books.

5 Analysis of *How the Baby Came* (1963)

The opening page of *How the Baby Came* explains that "This story is about a family. There were two children, Mary, who was seven, and John, who was five, and their mother and father". Unlike the informational picturebook *A New Life Begins*, this book focuses only on this family and not on reproduction in other animals. The family is not as generic as the Isotype people in *A New Life Begins* or Arntz's pictogram people, nor are they a "universal" Isotype family in the sense of being divorced from temporal and cultural markers. Rather, this is an idealized White, British, middle-class family. The father works in an office, the mother is a housewife, and they live in a house with a garden.

In line with Isotype style, characters are depicted with neutral facial expressions, using a limited colour scheme. For instance, all the female characters have grey hair. The clothes are rendered in some detail; the father is immaculately dressed in a suit and tie, while the mother alternates between a white housedress and a pink nightgown. The older children are coded for gender in that they wear red and blue clothing and have pink and blue bedding and bath towels. The new baby boy is similarly swaddled in blue. Mary is depicted as anticipating her future role as a mother; she helps count cloth nappies and her mother teaches her how to fold and pin them on her doll.

While *How the Baby Came* is a narrative picturebook, it has many of the features of Isotype information books for children, such as cross-sections: opening up objects, animals, and people to see what is inside. In the double spread on pages 2–3,[1] the reader first sees the family's house from the outside and then

1 The book is unpaginated.

what goes on inside the house. This recalls Marie Neurath's earlier picturebook *If You Could See Inside* (1948). However, while the former focused on the interior workings of the house as a structure; the length of the chimneys and the plumbing and wiring, the cross-section in *How the Baby Came* illustrates scenes from the family's everyday life: "Then later, when it was dark, Daddy came home from work, and they all had supper together" (Allan and Neurath 1963, 3). This same principle of opening up is applied to the mother's body, with the foetus being shown inside of the womb while the verbal text narrates how the mother announces her pregnancy the children (Figure 5). Neurath did not write the verbal text in *How the Baby Came* and this book does not draw on plant metaphors to explain the processes of reproduction. However, in the double spread in Figure 5, the reference to the baby being due "Just about the time the bloom is on our cherry tree", makes a poetic comparison between the creation of a new life and the blossoms of spring.

A few notable differences and similarities can be observed between the images of pregnant women in *How the Baby Came* and *A New Life Begins*. Both are schematic Isotype illustrations. However, while the woman in *A New Life Begins* is a naked, anonymous silhouette (representing "all" pregnant women), the mother in *How the Baby Came* is a character in a story ("Mummy"), fully clothed, but with an observation hole showing the foetus inside of the womb. Moreover, while the pregnant woman in *A New Life Begins* is depicted with the father of the baby close behind (Figure 4), the father is visually and verbally absent from the double spread in *How the Baby Came* (Figure 5).

In *How the Baby Came* the experienced third-time mother constructs knowledge for the child readers by telling her curious children about what is happening in her womb and what will happen during birth. Like in *A New Life Begins*, readers are reassured that the baby is safe in the womb. However, in *How the Baby Came*, this information is presented by "Mummy" as an addendum to her son's child-centered question about the baby's activities "in there":

> "What does it do in there?" asked John. "Does it play?" "It sleeps," answered his mother. "It's floating in some water, and it can't get hurt." (Allan and Neurath 1963)

The bulk of information presented takes the form of such conversations between parents and children, where the children take the initiative to ask and the parent answers honestly, but in child-centered terms, avoiding medical terminology and overt references to the genitals. For instance, the vagina is "a special opening" between the legs:

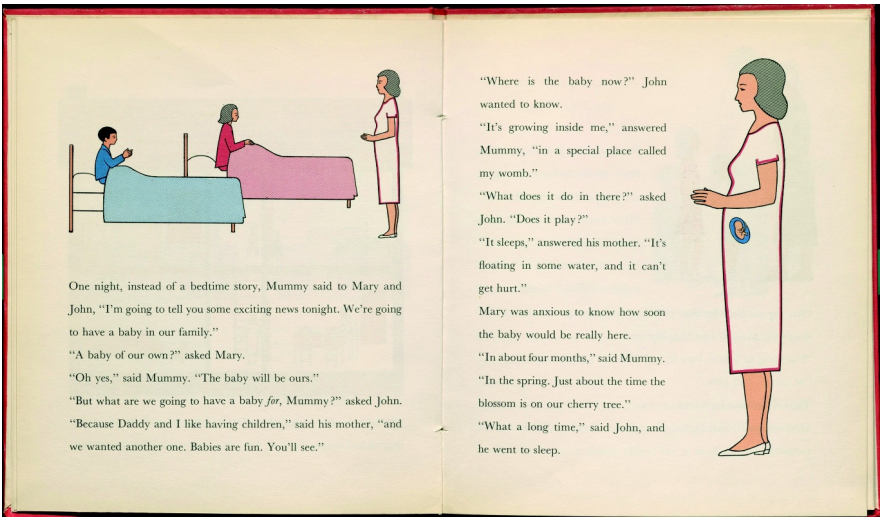


Figure 5: *How the Baby Came* (1963) by Dorotheen Allan, ill. Marie Neurath. The verso page shows a boy and a girl sitting up in their beds with the mother standing in front of them. The recto page shows a close-up of the mother with a peep-hole view into the embryo in the womb. Private collection.

> But John wanted to know something else. "Mummy," he asked, "how is the baby going to come out?" "It will come through a special opening that I have," said his mother. "I shall be lying in bed, and the baby will come out between my legs." (Allan and Neurath 1963)

The pain of childbirth is downplayed and the conversations about the birth are distinctly child-centered, with the focus on the mother's love for her children, as when Mary contemplates the baby's head coming out first during labor:

> Mary was thinking about it. "How can there be room?" she said.
> "The opening stretches a lot," answered Mummy, "and I shall have to push hard."
> "But will it hurt you, Mummy?" asked Mary.
> "A bit," answered Mummy, "but not for long. I remember, when you two were born, I was so pleased to see you that I didn't think about anything else." (Allan and Neurath 1963)

This conversation follows the historical tradition of most children's texts on reproduction; the mother's pain is quickly forgotten by her happiness to see the child (Sauerteig 2009). However, *How the Baby Came* does construct pregnancy as an arduous undertaking. The father asks the children to help whenever the mother needs it, since "Growing a baby is like hard work" (Allan and Neurath 1963, 7). This corresponds to depictions of pregnant women needing help in German books from the same time (Sauerteig 2009). Finally, after delivery, the

mother stays in bed for six days while being looked after by the family, nurse, and next-door neighbor.

Although the mother is the chief conveyor of knowledge about pregnancy and birth in the book, the father also has pedagogical conversations with his children. He tells them they will not know the gender of the new baby until it is born but, like a progressive father, reassures them that he has no gender preferences. This is visually undermined when the father is later depicted painting the nursery blue. While the children help prepare the nursery, the following pedagogical conversation takes place:

> "I wonder what the baby will be like", said Mary after a while. "A little bit like Mummy, a little bit like me," said Daddy. "You see it starts as two tiny cells, one from me, one from Mummy." (Allan and Neurath 1963)

Rather than asking how the two tiny cells come together in the first place, John simply asks what the baby looks like at that point, and then says he hopes it grows before being born". Whether this is a realistic line of questioning from a 5-year-old who is still in the "why?" age, is another matter! While spoken by a child character, these questions are formulated to direct child readers' attention to specific aspects of the topic of reproduction, while avoiding others (Sauerteig 2009).

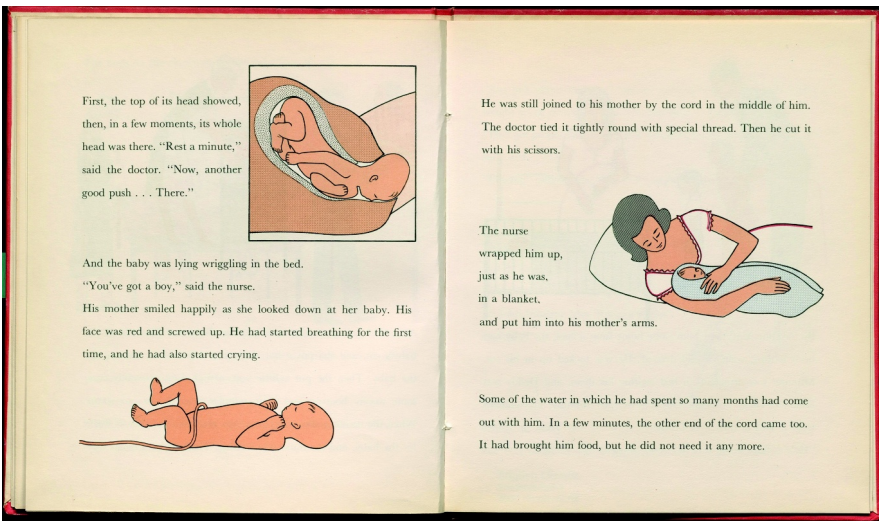


Figure 6: *How the Baby Came* (1963) by Dorotheen Allan, ill. Marie Neurath.The verso page shows the baby coming out of the birth canal and the newborn baby on his back with the umbilical cord still attached. The recto page shows the mother in bed, holding the swaddled baby. Private collection.

In contrast to more recent British children's books (Hunt 2002) and German books on reproduction from the 1960s (Sauerteig 2009), *How the Baby Came* depicts a homebirth, rather than a hospital birth. However, the older children are at school and the father at work while the mother gives birth. Only a doctor and a nurse are present to witness the birth.

Like *A New Life Begins*, *How the Baby Came* does not shy away from visually depicting the baby emerging from the vagina (Figure 6). Again, the cross-section close-up focuses on the baby rather than the woman's body as a whole. Unlike in *A New Life Begins*, the verbal text stresses that the mother must work hard and push. However, the birth is directed by the doctor: "Rest a minute," said the doctor. "Now, another good push . . . There." (Allan and Neurath 1963). Here, the ellipsis is used as an effect to illustrate the moment in which the baby is born. Although in the verbal text the new-born baby is described as "crying" with a "red and screwed up" face, the visual text depicts him with a placid look on his face and with the same skin color as the mother. There are no hints of blood anywhere, neither literal, nor representational.

6 Discussion and concluding remarks

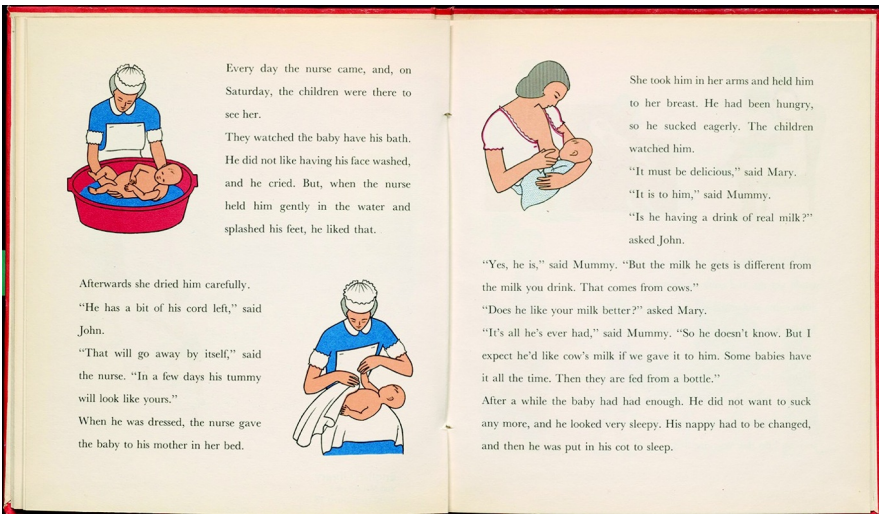


Figure 7: *How the Baby Came* (1963) by Dorotheen Allan, ill. Marie Neurath. The recto page shows a nurse bathing and drying the newborn baby. The illustration overleaf shows the mother breastfeeding the baby. Private collection.

The intimate tenderness depicted between the mother and the man in the final spread in *A New Life Begins* (1961) (Figure 4) is not found between the parents in *How the Baby Came* (1963), though the father does bring his wife flowers and tea in bed. In *How the Baby Came* (1963), it is the nurse who bathes the baby and gives him to the mother to feed while the older siblings observe and ask questions. The father is visually and verbally absent from these scenes (Figure 7). In fact, it is difficult to imagine the father in *How the Baby Came* (1963), in his immaculate suit, embracing the mother from behind while she breastfeeds their child. The father is shown as engaging with his older children but is never depicted holding the new baby. While in *A New Life Begins* (1961), males are relegated to ghostly supportive figures, the father in *How the Baby Came* (1963) appears less often than the mother.

Given Epstein's (2017) observation that twenty-first century English-language picturebooks for children depicted breastfeeding less often than Swedish children's picturebooks, it is noteworthy that both *A New Life Begins* (1961) and *How the Baby Came* (1963) include specific visual and verbal representations of breastfeeding. In the former, both children observe the mother breastfeeding their new brother, offering comments such as "It must be delicious". During this exchange, bottle feeding is also mentioned as a hypothetical alternative: "Some babies have it [cow's milk] all the time. Then they are fed from a bottle". The emphasis on nursing in these texts could reflect the ideological importance of breastfeeding in Britain at this time.

In both books, the birthing mother is distanced from the birth through close-up cross-sectional representations of the baby being born. In terms of the "scripts of motherhood" (Sauerteig 2009, 130) offered, the pain and effort of childbirth is downplayed in favor of an emphasis on the baby itself and the mother's happiness at having a new child. Both picturebooks omit overt references to human sexuality and sexual intercourse. However, A *New Life Begins* (1961) implicitly links human reproduction and sexual reproduction in other mammals, such as rabbits. The topics of pregnancy and birth are explained frankly, and in child-centered terms in both books. In *A New Life Begins* (1961), the reader is addressed using the second person *you*, and explanations use familiar metaphors from the realm of plants and comparisons related to the child's own life. Pedagogical use of a few carefully selected colors highlights the biological processes. In *How the Baby Came* (1963) the implied child reader is invited to identify with the child characters, who are also the ones initiating the pedagogical conversations. The questions they ask, and the ones they do not ask, all form part of the narratives of pregnancy and childbirth within these texts.

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Part III: **Reception of the Isotype Picturebooks and the Isotype Method**

Sonja Schreiner

A Viennese Wonder World of Isotype: Marie Neurath and Schönbrunn Verlag

1 Introduction

In 1956, the then renowned Viennese publishing house Schönbrunn Verlag, in close cooperation with the printer Graphikon Wien, distributed a trio of Marie Neurath's children's books. The carefully selected portion of the series *Wonders of the World*, published by Max Parrish, London, was translated literally as *Wunder der Welt*.[1] This first contact with Isotype books[2] in the German-speaking world took place approximately a decade earlier than the Westphalian publishers Zimmermann Verlag and Engelbert Verlag, both located in Balve, decided to distribute another successful series Marie Neurath had edited with several partners for older children: *They Lived Like This in . . .*, translated as *So lebte man in . . .*: It filled many volumes – e.g., *They Lived Like This in Ancient Egypt*, translated as *So lebte man in Ägypten*, or *They Lived Like This in Ancient Palestine* (*So lebte man in Palästina*).[3] The series was designed for older children (and young adults), clearly showing the publisher's and the readers' interest in the growing crossover segment. Finally, in 1971, the Carinthian publisher Verlag Buch und Welt, Hans Kaiser (Klagenfurt) put six more books into press, thereby creating a series entitled *About . . .* which included books from different creative periods of Marie Neurath:

Über Raketen und Raumschiffe = *Rockets and Jets* (1951)
Über die Urzeit der Erde [*About the Primeval Times of the Earth*][4] = *The Wonder World of Long Ago* (1954)

1 The chapter is not a translation study in the strict sense, but nevertheless provides an insight into the sometimes considerable differences between the original and the translation and tries by an in-depth analysis of some passages to explore the reasons for these changes.
2 For profound information on the Isotype concept, cf. Burke, Kindel, and Walker (2013).
3 Nota bene: The important and precise adjective 'ancient' is missing in all German titles of the voluminous series, portraying cultures and epochs all over the world.
4 Translations in square brackets are mine and are indicated in particular, when the German text differs significantly from the English original.

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Über Telefon, Funk und Fernsehen = Around the World in a Flash. How Messages are sent around the World via Telephone, Telegraph, Radio and Television (1954)
Über das Atom = Inside the Atom (1956) (Figure 1)
Über die Lufthülle der Erde [*About the Atmosphere of the Earth*]= *The Wonder World of Earth and Sky* (1960)
Über Planeten und Sterne [*About Planets and Stars*] = *Wonders of the Universe* (1961)

The books listed above were based on a new edition by Aldus Books, London, and not only translated, but also adapted and modernized. They include photographs in black and white, but also in color and substitute the characteristic Isotype covers by photos, and in one case – *Über die Urzeit der Erde* – by a drawing. Furthermore, the advertising texts on the back flaps address an adult reader, using the formal "Sie" instead of "Du", thereby following the publishing house's usual policy: In contrast to Schönbrunn Verlag, Verlag Buch und Welt did not specialize in children's literature parallel to books for adults.[5] It thus at the same time put more weight on the gatekeeper who had to decide if s/he buys this book or another and less on the intended young recipient who got it as a present.

These diverse and significant changes make the series totally different from the Isotype-based and child-oriented trio fifteen years earlier, which occupied a special position in the Viennese publisher's portfolio.[6] Schönbrunn Verlag distributed a broad variety of novels for adult and young readers (i.e., from Stefan Zweig to Karl Bruckner, and Mira Lobe). It also published international fairy tales, picturebooks for young readers and nonfiction for adults. Therefore, it was logical to integrate nonfiction for young readers (of different ages) as well. The Austrian selection from Marie Neurath's more diverse oeuvre, originally published as *Parrish Colour Books for Children*, taken from a broad and diverse series, reflects what was deemed appropriate for the interests of its Austrian target audience: British and Austrian children live(d) in different surroundings (e.g., fauna and flora), had a different educational background, and – last but not least – the adults raising them had different moral attitudes, concerning alleged (biological) taboos, resulting from Anglican resp. Catholic education.

Information about the publishers (Max Parrish and Schönbrunn Verlag) and their lists first: each Austrian "informational picturebook," a term coined by von

5 For details on the publishers' portfolios, cf. websites like https://www.booklooker.de/ (3 October 2024) or https://zvab.com (3 October 2024).
6 Unfortunately enough, it was not possible to get access to any archivalia or documents of the (no longer existing) publishing house.

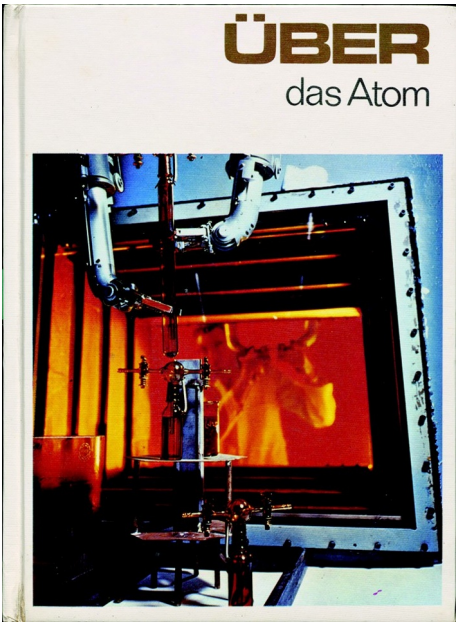


Figure 1: Cover of *Über das Atom* (1971) by Marie Neurath. The photograph shows a robot handling uranium in a nuclear power plant. Private collection.

Merveldt (2018), is 32 pages long.[7] Each volume of the (British and the Austrian) trio is intended for a specific age-group. The three of them (Neurath 1956a, b, c) appeared at the same time and quite soon after the English originals (Neurath 1948, 1952, 1954a): *If You Could See Inside* became *Außen – innen. Was ist drinnen?* and was written for children 6 years and older. *The Wonder World of Animals* was translated as *Die Wunderwelt der Tiere*, destined for children 8 years and older. *Speeding into Space* was entitled *Flug durch den Weltraum*, meant for children 10 years and older. The back flap of each picturebook informs the reader or the gatekeeper, a parent or other adult choosing and buying it for a child (Neurath 1956a, b, c, s.p.) about its content, addressing the young readers more explicitly as the Carinthian volumes would do fifteen years later. In addition, it announces the other volumes waiting for keen recipients in the bookshops, thereby functioning as commercial advertising:

7 This makes a difference of four pages in two of the three translated titles, because *Speeding into Space* (Neurath 1954a) and *The Wonder World of Animals* (Neurath 1952) consist of 36 pages each.

WUNDER DER WELT[8]
Farbige Anschauungsbücher für Kinder und Jugendliche von 6 bis 16 Jahren. Bildtafeln nach Methode Neurath: einfach, typisiert, übersichtlich und klar. Mit knappen, leicht verständlichen Texten.
Bisher erschienen:
Außen – innen, was ist drinnen? (ab 6 Jahre)
Die wunderbaren Dinge, die in einem Ei, einem Vulkan, einem Leuchtturm, einem Bergwerk, einem Wespennest, einer Windmühle, einer Pyramide, einem Fährschiff usw. vorgehen.
Die Wunderwelt der Tiere (ab 8 Jahre)
Vom Leben und von den Gewohnheiten seltener Tiere: Wal, Präriehund, Schnabeltier, Fledermaus, Elefant, Biber, Seebär, Känguruh, Stachelschwein, Gürteltier u. a.
Flug durch den Weltraum (ab 10 Jahre)
In leicht faßlichen Bildern werden die grundlegenden Probleme der Weltraumschiffahrt veranschaulicht: Überwindung der Anziehungskraft der Erde, Dreistufenrakete, Station im Weltraum, Bewegung im schwerelosen Raum, Landung auf anderen Planeten usw.
Jeder Band 32 Seiten, Halbleinen, Preis S 24,-, DM 3,85
Die Reihe wird fortgesetzt.

[Wonders of the World. Colorful Picturebooks for Children and Young Adults aged 6 to 16. Plates in Neurath's Style: simple, typified, openly layouted, and clear. Accompanied by short texts, which are easy to follow.
Appeared until now:
Outside – Inside, what is Inside? (from 6 years on)
The wonderful things happening in an egg, a volcano, a lighthouse, a mine, a wasp's nest, a windmill, a pyramid, a ship etc.
The Wonder World of Animals (from 8 years on)
Life and habits of rare animals: whale, prairie dog, platypus, bat, elephant, beaver, seal, kangaroo, porcupine, armadillo etc.
Flight through Space (from 10 years on)
Pictures easy to grasp demonstrate the basic problems of space travel: overcoming the pull of earth, three stage rocket, space station, moving under weightless conditions, landing on another planet etc.
Each volume 32 pages, half linen, Price S 24,-, DM 3,85
Series to be continued.]

These handy books in quarto format are sturdy, attractive, and – above all – affordable. The purchase price is given in Austrian Schillings and German Marks, indicating that they were sold in both countries and – supposedly – also in Switzerland. The Isotype-logo, characteristic for the innovative series, has moved from the middle of p. 2 to the bottom of p. 1 and is additionally printed on the cover.

8 Caps in the originals.

Unfortunately, the books for the 12-, 14- and 16-year-old readers were never published in Vienna.[9] This suggests that the booklets were slightly too different from what Austrian children and teenagers were used to, a commercial reason why the series was not continued.

2 What differs – and why?

If one looks closely at the cover pages (and the illustrations inside) and reads the texts carefully, quite a wide range of differences between the British and Austrian versions are evident.[10] This exact comparison shows the high impact of the illustrations (cf. Dawood), their eye-catching function; in traditional terms one can see the impact of the Horatian motto *ut pictura poesis* (*Ars poetica* 361); in technical terms the emblematic structure of the illustrator's presentation, clearly showing the intimate relationship of text and illustrations,[11] a somewhat different, reader-orientated perspective; and (in business terms): the publisher's marketing strategy.

No British cover is identical with its Austrian counterpart – a phenomenon, also found in other publications for each target group, no matter what its age.[12] Furthermore, some passages have changed slightly, sometimes whole pages (i.e., chapters) are missing, the headings differ somewhat, but the Isotype images remain the same.

Finally, many books sold on the US-American book market,[13] did not make it to Austria by the 1950s. One might guess that a publication like *The Wonder World of Long Ago* (Neurath 1954b), dealing with dinosaurs and prehistoric animals, fulfilled its task to show unknown and unfamiliar things to Austria: Except for in the Museum of Natural History in downtown Vienna there was no possibility to see a dinosaur's skeleton. But – as shown above – the German translation *Über die Welt der Urzeit* was only published in 1971; the book was one out of six that was not dedicated to technical matters, but to a strange and mysterious period of early history. Following this narrowed and reductive perspective, *The Wonder World of Seashore*

9 Austrian libraries – including the National Library – do not store more titles.

10 For translating children's literature, cf. Blümer (2016) and O'Sullivan (2021).

11 An important volume on illustrations in nonfiction picturebooks is Goga, Hoem Iversen, and Teigland (2021). Marie Neurath is not mentioned, Isotype only as cross-reference to Burke, Kindel, and Walker (2013).

12 E.g., the *Harry Potter*-series (even with different covers for young and adult readers respectively), Agatha Christie's novels with completely different optics, depending on the country, where the books are printed, etc.

13 The books were distributed by Lothrop, Lee & Shepard, Boston.

(Neurath 1958) was thought not to correspond to the world view of Austrian children, because there was no sea there. *The Wonder World of Birds* (Neurath 1953) contained so many birds unknown to Austria, that it would have had to be reduced to very few pages (or have needed many newly created illustrations and texts). *Railways under London* (Neurath 1948) was seen as too futuristic for a central-European country without a single metro station.[14] And finally, *A New Life Begins* (Neurath 1961) among other themes with non-human animals as protagonists showing a human birth (*A Baby comes into the World*; cf. Benmayer) was far too daring for the rather prudish, conservative, and then very Catholic Austrians:[15] Marie Neurath had developed and refined a way to open nature's secrets to the curious eyes of young readers and was not afraid to write about topics very close to alleged taboos, illustrating them without bowdlerizing.

3 Comparison

In the English originals and the Austrian translations,[16] the percentage of illustration(s) and text(s) changes in direct relation to the adaptation to the respective target group. In this very sense, *If You Could See Inside* (Neurath 1948) and *The Wonder World of Animals* (Neurath 1952) differ slightly, but both clearly from *Speeding into Space* (Neurath 1954a) (Figure 2). Furthermore, the book for the older recipients becomes less colorful and, at the same time, more technical and systematic. That *Speeding into Space* differs from the two other books, may also depend on its topic, but the main reason for its different design was the declared intention to produce books that looked more suitable for older children and young adults.

Respecting the interests of the respective target groups also determines the different cover motifs: *Speeding into Space*[17] and *Flug durch den Weltraum* (Neurath 1956c) both show a rocket, but its design and coloring differ slightly. The

14 Plans for a metro in Vienna date back to 1840, but not earlier than 1969 the start of the construction began. The opening to the public was in two steps: 1976 and 1978 (cf. https://de.wikipedia.org/wiki/U-Bahn_Wien, 3 October 2024).

15 Sex education lessons were introduced in Austrian schools in 1970, while in the United Kingdom Cecil Reddie as an educational reformer started in 1889.

16 The name(s) of the translator(s) are not indicated in the Viennese editions of the 1950s, while they show up in the Carinthian volumes published in 1971.

17 *Speeding into Space* is freely accessible (https://archive.org/details/speedingintospac00neur, 3 October 2024), after registering to the non-profit online platform, offering thousands of titles in a virtual library.



Figure 2: Cover of *Flug durch den Weltraum* (1956) by Marie Neurath. The illustration presents a rocket moving into space. Private collection.

rocket is more colorful in the Austrian picturebook, but the image features a dark sky instead of the blue one of the British original. Even during the Cold War each young reader was supposed to associate rockets with space travel not with the military. The picturebooks were published at a time when humankind dreamed of vast galaxies, and the USA and the Soviet Union in 1954 started the so-called 'space race'. Laika, the dog, was to be victimized in 1957, as first mammal in orbit. Yuri Gagarin would be the first human in 1961 and survive. Be that as it may, the hen on the cover of *If You Could See Inside* is replaced by the tunnels under the fortress (Neurath 1948 & 1956a, 13) – probably because Austria (as was the United Kingdom) boasts many medieval buildings of the kind and most children see castles as marvellous places for thrilling adventures. A chicken would have been rather unspectacular. A similar procedure is found in *Die Wunderwelt der Tiere*, which shows beavers on its cover – the individuals from Neurath 1952 & 1956b, 19), while the British original presents five different – partly exotic – species (deer, rabbit, badger, armadillo, elephant). The Austrian version focuses on a species widespread in the Alpine republic, and thereby offering a chance for children to spot a real beaver (Figure 3). The British original offers species to be found in the UK (or the US) and animals known from the Commonwealth (or from zoos).[18]

18 The British *Spotter's Guides to . . .* by Usborne Pocket Books, distributed as *Kennst du diese . . .* [*Do you know these . . .*] and *Wir entdecken und bestimmen . . .* [*We detect and explore . . .*] by Rav-

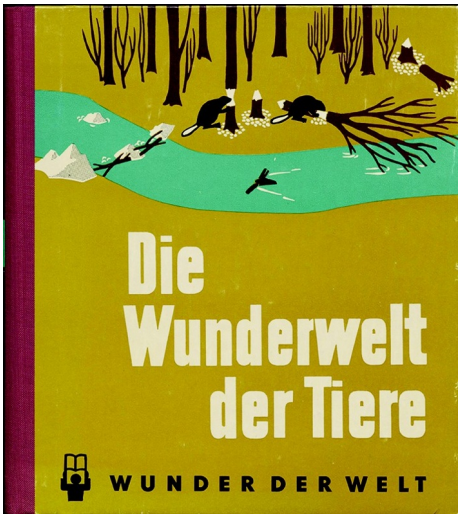


Figure 3: Cover of *Die Wunderwelt der Tiere* (1956) by Marie Neurath. The illustration shows beavers who construct a dam on a river. Private collection.

A closer look at the individual volumes will show the techniques used. Some (e.g., deletion of chapters) will recur frequently; others (e.g., peer review by a specialist) remain unique.[19]

3.1 *Speeding into Space* vs. *Flug durch den Weltraum*

Many nonfiction books depend on the work of specialists. In the case of the three books published by Schönbrunn Verlag, only the book on space travel was thought to need a scientific advisor:

> The pictures and text of this book have been carefully examined by Kenneth W. Gatland, a founder-member of the British Interplanetary Society and author of "Space Travel". (Neurath 1956c, 4)[20]

> Die Bilder und der Text dieses Buches wurden von Kenneth W. Gatland, einem Gründungsmitglied der Britischen Interplanetarischen Gesellschaft und Autor des Buches „Space Travel" („Raumschiffahrt"), sorgfältig geprüft. (Neurath 1954a, 4)

ensburger from the late 1970s on, are based on the same principle: The young readers get the possibility to stroll around their surroundings and find as many animals, plants, or stones as possible; on the other hand, they offer the chance to learn about exotic species that live in other regions of the world or about extinct creatures (e.g., dinosaurs and prehistoric animals).

19 Peer review would again be a sign of (scientific) quality in the Carinthian series from 1971.

20 Gatland and Kunesch (1953).

Because of their high degree of specialization, most headings of the chapters are quite analogous in both versions – except of chapters 5, 9, and 13;[21] marked with an asterisk (*) in the list below. Two chapters are missing (marked with "°" below), which total four pages. Otherwise, the book would have had more than 32 pages;[22] and this would not have fit into the concept of Schönbrunn Verlag:

(1) A Thousand Times Farther Than Ever Before	Tausendmal weiter als je zuvor
(2) Getting Away from the Pull of the Earth	Fort von der Anziehungskraft der Erde
(3) The Spiral Course that Makes the Climb Easier	Der Aufstieg in Spiralen ist leichter
(4) Flying too Fast to Fall	So schnell, dass man nicht fallen kann
(5) * Shaped Like an Arrow to Cut through the Air	Wie ein Pfeil durchschneidet das Schiff die Luft
(6) Dropping the Fuel Tanks to Lighten the Load	Die Treibstoffbehälter fallen – das Schiff wird leichter
(7) When a Man Will Weigh Nothing at All	Wo der Mensch kein Gewicht hat
(8) Stepping Out into Empty Space	Aussteigen in den leeren Weltraum
(9) * Firing a Pistol to Move about	Kein Schritt ohne Pistolenschuß
(10) Speaking Where Voices Cannot Carry	Wo man die eigene Stimme nicht hört
(11) The Spinning Station in Space	Die Station im Weltraum
(12) How Can We Land on a Moving Station?	Landung auf einer Station, die sich dreht
(13) * Blazing Heat and Flying Metal	Schutz gegen Hitze und Meteore
(14) Reaching a Moving Speck in Space	Wie erreicht man einen sich bewegenden Punkt im Weltraum?
(15) Strange Worlds Which Men May One Day See	Welten, die wir wohl einmal betreten werden
(16) ° Slowing Down the Journey Home	–
(17) ° From Moving Earth to Moving Planets	–
(18) Distant Worlds Men May Never Reach	Ferne Welten, die wir kaum je erreichen werden

Some terms sound old-fashioned from our point of view and also perhaps from the perspective of a 10-year-old child in the 1950s; the reason for their use are the specifics of British units of measurement; whereas "feet" are translated as "Spannen", "miles" are transformed to "kilometres" (cf. Neurath 1956c, 10 & Neurath 1954a, 10):

> Noch nie hat sich der Mensch weit von der Erde entfernt: auf dem Rücken eines Pferdes sprang er einige Spannen[23] hoch, in Ballons oder Flugzeugen flog er bis zu einigen Kilome-

21 Numbering mine. The chapters are counted neither in the British original nor in the Austrian translation.

22 The Carinthian series of 1971 would be reduced to 29 pages.

23 Emphases (underlining) mine.

> ter Höhe. Weiter aber ist er nie gekommen. Zweistufige, unbemannte Raketen sind bis über 400 km emporgestiegen. Selbst der nächste Nachbar unserer Erde, der Mond, ist tausendmal weiter. Werden wir ihn je erreichen? (Neurath 1956c, 5)

> Men have never yet travelled far from the Earth: a few feet on horse-back, a few miles in balloons and airplanes. No more. Double rockets have soared two hundred and fifty miles away but have never carried passengers. Even our Earth's nearest neighbor, the Moon, is a thousand times farther than that. Shall we ever reach it? (Neurath 1954a, 5)

The English chapters left out in the Austrian translation contain extensive information on travelling back from space to earth and the duration of this voyage. The full texts are as follows:

> Imagine you are on a ship just beginning the last stage of the homeward journey – from space-station to Earth. Before the ship leaves the station, both ship and station are moving so fast that the Earth cannot pull them down. *So the ship must begin slowing down from the moment it starts.*[24] This it does by pushing with its jets in the opposite way as the station, but more slowly. It spirals downwards, still tail first, using its jets as a brake against the growing pull of the Earth. When the ship enters the air it must go slower still, or it may become hot and catch fire. So it turns nose-first (to make use of its streamlining) and trails out parachutes to slow it down. Finally the pilot lowers the undercarriage and the ship glides down on to the runway. (Neurath 1954a, 33)

> Our Earth (shown green) and Mars (shown blue)[25] both move round the Sun, but Mars has farther to travel and takes almost twice as long to make complete the circle. To keep their journey as short as possible, the travellers of the future will set off to Mars when that planet is well "ahead" of the Earth. Their long voyage, shown by the black line, will take about nine months. During that time the Earth will have made three-quarters of its journey round the Sun, overtaking Mars. To make the shortest possible journey home, travellers will have to wait fifteen months, until the Earth and Mars are back roughly where they were when the outward voyage starts. By then Mars will have completed one more circle round the Sun; the Earth will have completed two. The return journey will take another nine months. The great planet Jupiter takes a much longer and slower journey round the Sun than Mars does. It is so far away that the voyage would take nearly three years; in that time Jupiter would have done less than a quarter of its tremendous journey. But the Earth would have circled round the Sun almost three times! (Neurath 1954a, 34–35)

Austrian readers were not party to all these fascinating details; but in the concluding chapter, where gender equality is – in comparison to the British original – less explicitly marked ("boys and girls" become "children") some facts from the deleted chapters mentioned above are supplemented in shorter form, whereas other details are skipped:

24 Italic script used in the original.

25 Here, the text explicitly refers to the illustrations.

> Many scientists believe that some boys and girls[26] now living will one day reach the Moon and the Sun's planets. But will men ever reach the stars? No, because the stars are burning hot – many of them bigger and hotter than our own sun. Some stars may have cool planets circling round them, but if it would take five days to reach the Moon, it would take many lifetimes to reach these distant worlds. (Neurath 1954a, 36)

> Viele Wissenschaftler glauben, daß manche Kinder, die heute leben, eines Tages den Mond und einige Planeten[27] betreten werden. Aber werden die Menschen je die Fixsterne erreichen? Nein; die Sterne sind ja glühend heiß – viele von ihnen sind größer und heißer als unsere Sonne. Manche Sterne werden von ausgekühlten Planeten umkreist, aber während die Reise zum Mond fünf Tage, die zum Mars etwa neun Monate und die zum Jupiter fast drei Jahre dauern würde, wären viele Lebensalter nötig, um jene fernen Welten zu erreichen. (Neurath 1956c, 32)

Deletions and reductions, not to say simplifications, but also significant changes are characteristic of another of Marie Neurath's picturebooks translated into German, namely *Die Wunderwelt der Tiere*.

3.2 *The Wonder World of Animals* vs. *Die Wunderwelt der Tiere*

The Wonder World of Animals[28] differs conceptually from its Austrian translation; the headings give an initial hint about where these changes will lead the interested reader and responsible gatekeeper:

(1) Smallest and Biggest	Die Kleinsten und die Größten
(2) The Biggest Baby in the World	Das größte Baby der Welt
(3) Forest Animals Too Young to Climb	Waldtiere, die zu jung zum Klettern sind
(4) Keeping Young Animals Safe and Warm	Wie Tierkinder sicher und warm gehalten werden
(5) ~ It Looks like a Mouse, It Flies like a Bird	Die fliegende Maus [The Flying Mouse]
(6) The Strangest Animal of all	Das seltsamste von allen Tieren
(7) Watchmen of an Animal City	Eine Tierstadt stellt Wachtposten auf
(8) Teeth that Fell Trees, Paws that Build Dams	Zähne fällen Bäume – Pfoten bauen Dämme
(9) A New Town in a New Lake	Eine neue Stadt im neuen Teich
(10) + Living Through the Long, Hungry Winter	Wie man den langen Winter übersteht

26 Emphases (underlining) mine.

27 The Austrian translation does not explicitly state that it is our solar system (and that other comparable systems may exist).

28 *The Wonder World of Animals* is freely accessible (https://archive.org/details/wonderworldofani00neur/, 3 October 2024).

(11) Beating the Enemy Without a Fight	Wie man den Feind ohne Kampf besiegt
(12) & The Kangaroo Kicks, the Porcupine Pricks	Das Känguruh teilt Fußtritte aus, das Stachelschwein sticht
(13) A Lost Elephant is Left Alone	Ein verlorener Elefant bleibt allein [. . . stays alone]
(14) ° A Lonely Giant Becomes a Servant	–
(15) ° The Battle to be Leader of the Heard	–
(16) # The Struggle Among the Seals	Die Reisen der Seebären [The Journey of the Seals]
(17) % Which lives Longest?	Wer lebt am längsten? [Who . . .]

Generally speaking, the animals in the Austrian picturebooks seem to live safer, happier, and more secure lives than their English counterparts. This is shown by a heading that sounds less dangerous and harmful (marked with "+"), when the Austrian animals survive the long winter, while the British have to overcome a long and hungry winter.

Other expressions are simplified (marked with "~") describing the bat, or anthropomorphized (marked with "%") by replacing the neutral 'which' by the personal 'wer' [who], a substitution animal activists of today are as used to as calling young animals 'babies' or 'children', realized in the original and the translation.

Sometimes the translation is anthropomorphizing in a larger sense, e.g., "a room of their own" (Neurath 1952, 10) for harvest mice (identical with 'separate space for them') is translated as "ihr eigenes Zimmer" (Neurath 1956b, 10), without any doubt meaning 'a children's room of their own". The same is true for the beavers' "homes" (Neurath 1952, 19) vs. their "Wohnungen" [flats] (Neurath 1956b, 19–20). Rarely has the anthropomorphism and closer personal relationship of the English original, visible in the personal pronouns, been lost in translation: "The opossum simply pretends he is dead." (Neurath 1952, 25) vs. "Die Beutelratte stellt sich einfach tot." [. . . to be dead] (Neurath 1956b, 25)

In only one case (marked with "&") was it impossible for the (mnemonic) English rhyme in the heading to be reproduced in the Austrian text. Furthermore, the platypus is compared to a mole in the original: "Claws out, web folded back, the platypus digs like a mole." (Neurath 1952, 15). Now, Austrian children are not told about the mole: "Das Schnabeltier gräbt mit den Krallen, die Schwimmhäute schiebt es zurück" [. . . digs with its claws, folds back the webbing] (Neurath 1956b, 15).

In analogy to *Speeding into Space*, two chapters (marked again with "°") are missing, because the British original once more runs to more than 32 pages, and – more importantly – the content does not correspond to most peoples' idea of a fairy tale: An elephant who is not part of a herd is captured and gets a master. For the rest of its life, it will be subject to abuse as working animal (Neurath 1952,

30–31). In the Austrian version there are only two sentences, added in the chapter before, implying the elephant's unfree future:

> Ein einsamer Elefant ist leicht zu fangen. Bald wird er ein Diener des Menschen werden. (Neurath 1956b, 29)
>
> [A lonely elephant can be captured easily. Soon he will become a servant of the humans.]

The British chapter ends with "To be alone in the forest is dangerous." (Neurath 1952, 29). The following chapter, deleted in the Austrian translation, reads as follows and begins with the first of the two German sentences, as shown above (the second sentence is the final sentence – in a shortened version, leaving out the physical burden of the original story):

> An elephant living alone is not hard to capture. While some men follow its movements, others build a big enclosure, leaving a gap in the fence. Men with lighted torches chase the elephant inside and the gap is quickly closed with a strip of fence. Hiding in the trees are men with ropes. They lassoo the elephant and tie it up. Later two tame elephants are brought into the enclosure. The captured elephant, tied up between them, learns to obey the keepers' orders. Soon it will be a strong, patient servant, carrying heavy loads for its master. (Neurath 1952, 30–31)

Catching elephants is part of England's colonial past and thereby familiar to British children, but seems to have no place in the German translation: For Austrian children, elephants are exotic animals from Africa or India, which they may know from the zoo or the circus.

In the case of the second deletion, stags are fighting for dominance in their herd. Austrian children were not to be confronted with this underlying sexual side of animals presented as peaceful in fairy tales, children's books, novels, or films. At the same time, this deliberate reduction made the Austrian readers miss the circle of life presented in this piece of text, split up into six steps – the only case where numbers structure the presentation:

> 1. Last spring these stags shed their branching horns, called antlers. Now, in summer, they are growing new ones. 2. The mother deer do not live with the stags in summer. 3. They and their young ones stay together in small herds. 3. In October the stags fight each other fiercely, charging and wrestling with their strong antlers. 4. The stag who proves the best fighter becomes the leader of a big herd. He claims all the grown deer as his wives. 5. In winter the father stags leave their herds and live in the forest. Soon they will shed their antlers once more. 6. The mother deer and their young, now beginning to grow up, again live in small herds with no stag to lead them. (Neurath 1952, 32–33)

However, not only was the radical method of skipping a passage used to make the book fit Austrian readers' expectations, but a mitigating translation, beginning

with the heading (marked with "#"), presented a less harsh and less brutal reality; the (male) seals are no longer struggling, fighting or as a gang of young bulls attacking (bullying!) an older individual. They are on a journey and only rarely fighting. It is only the British seals that migrate from California to Alaska, the Austrian ones swim in the Pacific Ocean, heading north and returning south; furthermore there is more terminology in the English text (e.g., 'bull' or 'cow', replaced by 'male' and 'female' or simply the name of the species):

> Jedes Jahr ziehen die Seebären im Stillen Ozean[29] viele hunderte Kilometer nach Norden. Die männlichen Seebären schwimmen im Frühling voraus. Die kräftigeren Tiere treiben die schwachen Alten und die ganz Jungen in das Land hinein – fort vom Meer. Dann teilen sie die Küste untereinander auf: einen großen Streifen für jeden starken Seebären. Im Juni kommen dann in großer Zahl die Weibchen, die viel kleiner sind. Jeder starke Seebär sammelt ungefähr fünfzig Weibchen um sich. Wenn einer versucht einem anderen seine Frauen wegzunehmen, dann beginnt ein heftiger Kampf. Bald nach der Ankunft der Weibchen kommen sie jungen Seebären zur Welt. Im Spätsommer, wenn die Jungen schon schwimmen können, zieht die ganze Herde wieder südwärts. (Neurath 1956b, 30–31)

> Every year seals swim hundreds of miles, from California to islands near Alaska. The bull seals come first, in spring. The more powerful bulls drive the old weak ones and the very young ones inland, away from the sea. They then share the beach among themselves, one big strip for each strong bull. In June the cow seals arrive in great numbers. Each strong bull collects about fifty cows as his wives. If one tries to steal another's wives, a fierce fight begins. If an *old*[30] bull tries to steal a wife, several strong ones attack him. Soon after the cows arrive, the baby seals are born. In late summer, when the young ones can swim, the whole herd swim back to California together. (Neurath 1952, 34–35)

Although it downplays natural behavior, the book contains much useful information to improve children's minds. E.g., the chapter *Die Kleinsten und die Größten* (*Smallest and Biggest*) is very instructive its handling of mathematical proportions in a way reminiscent of Friedrich Justin Bertuch's successful attempts to make his young readers sensitive to size in his *Bilderbuch für Kinder* (1790–1830),[31] an encyclopedia that still inspires modern readers.[32]

Pedagogically elaborated it provides an incentive, a real "cliffhanger," to read more, to turn page after page, and to broaden one's knowledge:

> Wenn wir die Zwergmaus so klein zeichnen wie oben auf dieser Seite, dann würden wir 12 Seiten brauchen, um den ganzen Wal im selben Verhältnis zu zeigen. – Wie heißen die anderen Tiere? Ihr findet sie alle in diesem Buch. (Neurath 1956b, 5)

29 Emphases (underlining) mine.

30 Italics used in the original.

31 See Schreiner (2017, 2020).

32 https://interlinking.bbf.dipf.de/index.php/Hauptseite (3 October 2024).

> If we draw the harvest mouse to the size shown on this page, we need twelve pages to show the whole whale. What are the other animals? You will find them all in this book. (Neurath 1952, 5)

And indeed, in the next chapter we are introduced to a family of Blue Whales (Neurath 1952, 6–7).[33] Similarly, when the opossum is introduced (Neurath 1952, 8), Austrian children do not learn the species nomenclature, but only the more general German translation "Beutelratte", which in fact denotes more than one species (Neurath 1956, 8).

Anyway – *hélas!* – never trust a printed book, even if labeled as nonfiction of high quality, for the concluding chapter *Wer lebt am längsten?* (*Which Lives Longest?*) is full of errors in both versions about the life spans of various species. Furthermore, the British "boy" is generalized to "Mensch" [human], and therefore the Austrian child becomes an "adult" whose life expectancy is even higher than in the original – and both numbers are quite optimistic for 1952 or 1956:

> All these animals were born at the same time as the boy. The hedgehog and the fox die before the boy is ten years old; nearly all the rest die before he is forty. The elephant and the lion live to be almost seventy. But the boy can live to be a man of ninety. (Neurath 1952, 36)

> Alle diese Tiere wurden zur gleichen Zeit geboren wie der Mensch. Der Igel und der Fuchs sterben, bevor der Junge zehn Jahre alt ist; die meisten anderen sterben, bevor er vierzig wird. Nur der Elefant und der Löwe werden fast siebzig. Der Mensch aber kann neunzig Jahre alt werden oder sogar hundert [or even hundred]. (Neurath 1956b, 32)

Our third and last picturebook of the Austrian trio, written for the youngest group of readers (6 years and older) exhibits fewer differences between the original and the translation, offering many different things, a *mixtum compositum* of material, in both languages.

3.3 *If You Could See Inside* vs. *Außen – innen. Was ist drinnen?*

The greatest changes in this interesting hodgepodge presented in *If You Could See Inside* (Neurath 1948) and *Außen – innen. Was ist drinnen?* (Neurath 1956a)[34] can be found in some headings and some snippets of text. Sometimes the translation is literal *(a)*, sometimes only the grammatical structure of the two languages dif-

33 A little too simplistically not to say incorrectly translated as "blaue Wale" [blue whales = whales of blue color] (Neurath 1956b, 6).

34 The British original can be found here (without registration): https://www.marieneurath.org/ (3 October 2024).

fers, requiring more verbs in English, but more nouns in German *(b)*, sometimes the Austrian text is more neutral, using fewer adjectives *(c)*, sometimes the expression is completely different *(d)*; mixed options are possible too:

(1) *(a)* A fairy palace inside a hill	Ein Märchenschloß im Berg
(2) *(b)* Digging for buried treasure	Verborgene Schätze unter der Erde
(3) *(a)* Inside a fiery mountain	In einem feuerspeienden Berg
(4) *(d)* If they could see inside[35]	Im Berg unter der Burg [In the Mountain under the Fortress]
(5) *(c)* A strange way to look at a house	Ein Schnitt durch ein Wohnhaus [A Cut through a House]
(6) *(c–d)* The underground home of the mole	Eine Wohnung unter der Erde [An Apartment underground]
(7) *(b)* The lonely house that stands in the sea	Das einsame Haus im Meer
(8) *(a)* The paper house which the wasps build	Das Papierhaus, das die Wespen bauen
(9) *(b)* How the wind is used to raise water	Wie der Wind das Wasser hebt
(10) *(a)* The pyramid which has stood 5,000 years	Die Pyramide, die schon seit 5000 Jahren steht
(11) *(a)* Inside the deep sea	Im tiefen Meer
(12) *(a–b–c)* The wonderful thing that happens inside an egg	Im Ei geschieht ein Wunder
(13) *(b)* The train that goes to sea	Der Eisenbahnzug auf dem Meer
(14) *(a–b)* Can we see inside a balloon?	Sollen wir in einen Luftballon hineinschauen?

In the first chapter, only the Austrian version has the technical term ‘Tropfsteinhöhle’ [stalactite cave]. The English only describes the “sparkling columns of colored rock hanging down from the ceiling and rising up from the floor” (Neurath 1948, 6). Vice versa, in chapter 8 only the English text gives the term ‘wasp-paper’ (Neurath 1948, 20). The English original uses more *termini technici*, while the Austrian translation tends to paraphrases explaining the technical information. But one cannot simply generalize: In chapter 3 the Austrian text is alone in glossing, “Ein solcher feuerspeiender Berg heißt Vulkan.” [Such a fire-spitting mountain is called a volcano.] (Neurath 1956a, 10). More explanation can be found in chapter 4. The translation of the heading differs considerably, and the text becomes significantly longer due to the addition of a consequence (Neurath 1956, 13: “Ja, hätten sie solch ein Zaubermesser wie wir und könnten den Berg durchschneiden, so würde ihnen das nicht passieren!” [Well, if they had such a magic knife as we do and if they could cut through the hill, this would not happen to them!] vs. “If they

35 Underlined in the English original. The heading refers to the title of the book, linguistically playing with the personal pronoun.

had a magic knife and could cut through the hill!" (Neurath 1956, 12–13). A part of the corresponding illustration is used as a cover (Figure 4), while in Great Britain hen and egg are used as eye-catcher. But: The development inside an egg (chapter 12) gives more terms in the Austrian text ("Keimfleck" [germ spot], Neurath 1956a, 28 & "Dotterhaut" [yolk membrane], Neurath 1956a, 29), while it does not name excretion (in the original "waste", Neurath 1948, 29), but fully concentrates on breathing – another purification to make it more suitable for children.



Figure 4: Cover of *Außen – Innen. Was ist drinnen?* (1956) by Marie Neurath. The picture shows an intersection of a mountain with a castle on top. Private collection.

Furthermore, the presentation of the text differs. In all chapters comprising two pages with text written right beneath the illustrations, the English text is presented in long lines across the page-opening (e.g., Neurath 1948, 8–9), while in Austrian translation the text fills the first page first and continues on the next page afterwards, forming six shorter lines (e.g., Neurath 1956a, 8–9).

Not all texts are of the same length: "Deep foundations make the house strong." (Neurath 1948, 15) finds no equivalent in the Austrian book, but "Oft sind viele Mühlen nötig, bis es die Seehöhe erreicht." [Often many mills are necessary to (make the water) reach the sea level.] (Neurath 1956a, 22) This increasing number of mills is missing in the English original (Neurath 1948, 22).

While the few lines describing the "house" ("Wohnung" [flat], Neurath 1948 & 1956a, 16) of the mole (chapter 6) – the smaller the children, the higher the anthropomorphizing factor[36] – are rather similar in both languages, except for the desig-

36 The same method is used in *Die Wunderwelt der Tiere.*

nation of the inhabitants in the German heading, the text describing the lighthouse (chapter 7) is different. No wonder. There is not a single lighthouse in Austria! In addition, the British heading "One of the most exciting homes" becomes "Eines der sonderbarsten Häuser" [one of the strangest houses] (Neurath 1956a, 18); its function ("damit es den Schiffen den Weg zeigt") [thereby showing the way to the ships] (Neurath 1956a, 18) is repeated in the German text alone, thereby concluding it. Chapter 10 is full of more architectural details in the original, while the technical details in chapter 11 are almost identical.

Probably the most significant change had to be made in chapter 13, where the English readers travel from London, the capital of their home country, to Paris, but the Austrian recipients travel the other way around – simply a question of perspective: from the mainland to the British Isles. Furthermore, the "English Channel" (Neurath 1948, 30) is translated as "Ärmelkanal" (Neurath 1956a, 31), the name still used today. Another telling facet concerns British wit and Austrian humor: The concluding pun at the very end (chapter 14) is the same; the balloon is gone; but the slightly neutral English "Oh!" (whispered or uttered with stiff upper lip) becomes the emotional German interjection "Oje!" [hélas! resp. oh no!] (Neurath 1948 & 1956a, 32).

4 Conclusion

When Marie Neurath left Austria, she took with her her intellectual creativity, an innovative method, well thought-out ideas, and a tireless will to show the wonders of the natural world to children. This was her painful personal fate, but owing to her enormous potential, her emigration also caused intellectual loss and brain drain to her (chosen) home country's scientific community.

Only three books out of a much larger number (cf. Blumesberger 2013) constituted the first step back to Austria – in a slightly altered form, fitting Marie Neurath's view on the world, published by a Viennese company that wished to expand its portfolio from nonfiction for adults to nonfiction for young readers. It would take fifteen years, until six more volumes were published in Carinthia, with fewer Isotype elements and greater conformity with the standard presentation of non-fiction. *They Lived Like This in . . . = So lebte man in . . .,* published in Germany, were the logical link between the two groups of Austrian volumes, because this series was still based on Isotype, but to a lesser extent than in *Wonders of the World = Wunder der Welt*.

Schönbrunn Verlag considered the adaptation of translations to some extent and cover-design as necessary to ensure the attractiveness of the picturebooks available on the Austrian book market of the mid-1950s. An extensive series was

announced, only a trio was realized. "All good things come in threes" a proverb cited *ad nauseam* says. Anyway, another three and three more would not have been a bad idea, at least for curious girls and boys eager to learn about the world around them – without any need for the expensive travel only a very few could afford during those years. As intellectual compensation, Marie Neurath gave them all the opportunity of learning by reading – that what the Austrian artist, author, and musician André Heller in one of his most famous songs, uttering a timeless aphorism, called "the true adventures inside the head."[37]

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37 Heller, André. "Die wahren Abenteuer sind im Kopf". *Abendland.* Vienna: Angelo, 1976. Most recently (2021), the Austrian artist published a picturebook with Zsolnay – *Tullios Geburtstag* [Tullio's Birthday] – illustrated by Maïté Kalita and Esther Martens, assisted by many children (mentioned on the back flap). The rather short text works as a frame around the main story, Tullio's dream, which is shown in fantastic pictures (full of Heller's art) and gives the opportunity to each single reader to create her or his own story.

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Marnie Campagnaro

Histories of Visual Education: The Reception of Marie Neurath's Books in the Italian Postwar Milieu

1 Introduction

In an essay on gender dynamics in modern architecture and design, presented in the anthology *Women Designers, Craftswomen, Architects, and Engineers between 1918 and 1945* (2017), Rixt Hoekstra highlights the overlooked contributions of Marie Reidemeister, later known as Marie Neurath: "[. . .] many books have been written about the Austrian philosopher of science Otto Neurath, but who knows the story of his yearlong assistant, and later wife, Marie Reidemeister?" (133).

Marie Neurath, a German graphic designer, scientist, children's writer, and visual educator, made significant contributions to the field of visual education. Her work was instrumental in popularizing the pictorial infographic system known as Isotype, an acronym for "International System of Typographic Picture Education". She embarked on this endeavor in the 1920s, when she became involved with the so-called Vienna Method of Pictorial Statistics, which was led by Otto Neurath (Burke and Sandner 2022). Their aim was to develop a groundbreaking visual system to disseminate complex political, social, economic, and scientific data through pictorial charts and educational images, providing a global perspective on visual communication.

In a later work, Marie Neurath (1974) underscored the concept underlying this project: the use of standardized pictorial representations to facilitate access to knowledge for individuals with limited education, fostering a broader understanding of social issues (e.g. housing shortages, child and maternal welfare, high infant mortality), transcending language barriers and combating social inequalities.

The project enlisted Gerd Arntz, a young German artist renowned for his distinct illustrative style and expertise in wood engraving and linocut. Arntz played a pivotal role as the illustrator of Isotype's remarkable pictograms, characterized by their clear black-and-white contrast and simplified woodcut signs. These pictograms were aesthetically appealing due to their clarity and precision, making them highly understandable and effective in conveying scientific and didactic information. While Otto Neurath and Gerd Arntz were central figures in the development of this innovative pictorial grammar, it was Marie Neurath's coordination of a multidisciplinary team consisting of several scientific and historian experts

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(statistics, history, art, medicine, cartography, geography, engineering, etc.) as well as artists, printing technicians, designers and bookmakers that allowed data, scientific texts, and standardized pictograms to be seamlessly converged into visually cohesive and highly aesthetic educational projects.

Between the late 1940s and early 1970s, Neurath and her team produced a substantial collection of over eighty books specifically designed for young readers, which included translations into multiple languages. Notably, Italian publishing houses demonstrated a keen interest in Neurath's books, leading to the introduction of her informational picturebooks into the Italian children's book market in the 1950s and 1960s. The acquisition of copyrights and subsequent publication of Neurath's books in Italy was undertaken by the publishing house Fratelli Fabbri Editori. These books were incorporated into the children's series 'Piccola Enciclopedia' (Little Encyclopedia).

The objective of the present study is to examine the Italian corpus, and a comparative analysis will be made between the Italian adaptations and the original English versions, focusing on the modifications introduced for the Italian market. This chapter aims to explore the underlying rationale behind the reception and the subsequent modifications introduced in the Italian adaptations of these books.

In the first section, I will present the historical significance of Marie Neurath as a visual educator and the ideals embedded in her children's books. This section is relevant as it provides foundational context on Neurath's innovative contributions to visual education, which set the stage for the subsequent adaptations in Italy. The second section of the chapter will provide an overview of the Italian cultural and editorial milieu and children's literature during the 1950s and 1960s. Subsequently, I will discuss the publishing house Fabbri Editori, shedding light on its motivations for incorporating Neurath's books in its series 'Piccola Enciclopedia'. Further, illustrative examples will be presented of the Italian versions of Neurath's books. A comparison of Neurath's original works and their Italian adaptations will accentuate noteworthy visual and graphical elements, highlighting the pronounced disparities between the two versions. Finally, drawing on these findings, I will present some concluding remarks and broader implications of the Italian graphic adaptation of Neurath's works, and provide insights on the perspectives and approaches prevalent in visual education within children's books in Italy during that historical period.

2 Unveiling the historical significance: Marie Neurath as a visual educator

Marie Neurath is credited with creating the name Isotype (Burke, Kindel and Walker 2013). Her insights on transforming silhouette-based systems into effective informational visual artifacts laid the foundation for some of the most significant principles in contemporary graphic design.

The Isotype language was developed with the intention of providing visual tools to enhance comprehension and aid viewers in grasping ideas and concepts (Nemeth 2019). Specifically, it aimed to summarize, exemplify, and compare complex scientific data within textual descriptions. Neurath assumed the role of "transformer" (Neurath and Kinross 2009), which involved several key responsibilities (Neurath 1974). For example, she had the crucial task of extracting essential facts from data presented in words and figures and transforming them into a comprehensible visual form. It was her responsibility to understand the data, gather necessary information from experts, determine what information was worth conveying to the public, and devise effective ways to make it understandable. Additionally, she had to establish connections between the information being presented and general knowledge or other information provided in different charts. As a transformer, Neurath (1974) acted as "a trustee of the public" (136). To bring the vision to life, transformers produce a detailed "blueprint" (136) of the chart, making critical decisions regarding elements such as the title, arrangement, typography, number and color of symbols and captions. This model served as a guide for the artist's work in creating the final visual representation.

Neurath's perspective and expertise in transforming complex data into accessible visual forms revolutionized the field of graphic design, anticipating the principles and practices employed in contemporary nonfiction children's books. Frequently impacted by this design paradigm, either knowingly or unknowingly, some artists have undertaken modern reinterpretations of Isotype design in informational or hybrid nonfiction picturebooks. The Italian artist Iela Mari, together with her husband Enzo, created in the Sixties and Seventies such wordless picturebooks as *La mela e la farfalla* (The Apple and the Butterfly, 1960), *L'uovo e la gallina* (The Egg and the Hen, 1969), and *L'albero* (The Tree, 1973), with a rigorous use of signs and a very limited but impactful color palette in order to poetically and informatively narrate natural cycles. The Japanese picturebook author Taro Miura utilized stencils and silhouettes in his works such as *Ton* (2004) and *Tools (2005)*, to give voice to the world of manual labor. Similarly, the Portuguese illustrator Madalena Matoso, in picturebooks like *Cá em casa somos* (At Home, We

Are . . ., 2009), and the Brazilian illustrator Yara Kono, in picturebooks such as *Batata chaca-chaca* (Shake-Shake Potatoes, 2016), combined silhouettes with meticulous page composition. Their careful selection of contrasting color palettes, rich in stylized patterns, resulted in original, hybridized nonfiction picturebooks capable of strategically simplifying and grouping elements (Kindel and Walker 2010) of the body, food, the kitchen, and more.

Driven by a strong desire to advance the application of the Isotype method in the field of education, Neurath developed children's books following the death of her husband in 1945. This production continued until the 1970s. The informational books she created for schools, libraries, families, and other educational settings were regarded as powerful tools for children's emancipation.

The process of team-based design used in the creation of these books was also emancipatory in nature. It involved a dedicated team of individuals committed to producing materials specifically tailored to engage and captivate a particular audience. Crucially, this process adhered to principles and rules that emphasized the complex and articulated relationship between verbal and visual language in informational books. Moreover, it embraced a spirit of collaboration, with ongoing review and feedback integral to the design process itself (Walker 2013, 2017).

Marie Neurath's profound expertise in selecting, coding, combining, interpreting, and transmitting knowledge through visually appealing narratives, coupled with her meticulous oversight of every aspect of the team-based design process, led to the creation of exquisitely crafted informational books, which remain captivating even today.

Her books provided children with immersive experiences, introducing them to various subjects, such as landscapes, animals, plants, and technologies. They employed clear visual structures and informative content, enabling young or inexperienced readers to navigate the complexities of scientific language, technological advancements, and historical themes.

For Neurath, young readers were not passive recipients of information; rather, they were actively engaged in the reading experience. This active involvement was facilitated by the graphical design. The books featured captivating visual illustrations spanning innovative double-spread layouts, using techniques such as cross-section and magnification, balancing the proportion and layout of text and images, stimulating curiosity, and inviting exploration. Neurath demonstrated an impressive ability to incorporate various conceptualizations of readers (Mallan and Cross 2014), such as a curious observer, a collector of knowledge, a connector of ideas, and even a co-creator (Goga 2020). This multifaceted approach allowed readers to question and reexamine the explanations put forth in the books, which were meticulously supported by numerical data, facts, and carefully crafted illustrations.

Employing these innovative strategies, Neurath skillfully conveyed valuable information, emphasized noteworthy correlations and advancements, and captivated the audience through the use of double-page spreads, a thoughtful and precise amalgamation of colors, and cross-sectional drawings (Walker 2017). The use of these graphic techniques was intended to interest readers, capture their attention, and present visual arguments, fostering active viewer engagement while harnessing the power of temporal and spatial comparisons. Neurath exhibited meticulous consideration for the reception of the material and its influence on the ultimate recipient. Throughout the development process, she proactively involved teachers and children in reviewing sketches and draft texts, fostering a collaborative approach (Walker 2013). This method ensured the accuracy of information and the effectiveness of the visual representations. By employing this approach, Neurath's books nurtured and satisfied the inquisitiveness of children, stimulating their cognitive engagement through the images, which impacted readers in varied and important ways (Dussel and Priem 2017).

Marie Neurath's pioneering work not only influenced contemporary graphic design but also laid the groundwork for the adaptation and reception of her educational methods in various cultural contexts, including Italy.

3 The transformation of the Italian cultural and editorial milieu: Italian children's literature in the 1950s and 1960s

In 1957, coinciding with the inclusion of Marie Neurath's books in the catalog of Fratelli Fabbri Editori, *Editoria e pubblica opinione* (Publishing and Public Opinion) by Giambattista Vicari was published. This work meticulously documented the intricate knowledge dissemination, editorial pursuits, and reading practices in Italy. The Italian cultural milieu was characterized by a persistent lag in reading habits, indicative of a prevailing cultural backwardness. Even today, a significant proportion of Italians are disengaged from the practice of reading books. The readership primarily gravitates towards fiction, followed by biographies and historical works. There is far less interest in scientific, technical, and popular-science volumes. It is evident that the majority of readers are concentrated within the upper, middle, and lower bourgeoisie, while the popular masses, including artisans, workers, and peasants, remain largely disconnected from this cultural pursuit.

To address this challenging scenario, an intervention involving the publication of so-called *libro-sintesi* (summary books) designed to engage non-readers

has been proposed (Piazzoni 2023, 190). These books could be facilitated through unconventional channels, such as tobacconists and bakeries, given the scarcity of newsagents and even fewer bookshops. The dire state of reading in Italy is further underscored by a survey that the ISTAT (Italian National Institute of Statistics) conducted in 1957, in which Italy was ranked at the bottom in terms of book consumption across Europe. The survey highlighted a lack of expenditure on book purchases, modest circulation of titles, and a chronic scarcity of bookshops and public libraries. Nevertheless, gradual improvements have been observed over time.

The years from 1958 to 1963 have become known as Italy's economic miracle (Crainz 1997). The growth in industrial output was impressive, and the country enjoyed practically full employment. The increased levels of income experienced during this period led to improved economic conditions and more disposable income for individuals. This financial stability provided individuals with the means to invest in cultural pursuits, including the purchase of books for themselves and their children. Further, the urbanization processes that occurred during this time had a profound impact on society (Ginsborg 1989). The migration of individuals from rural areas to urban centers resulted in new opportunities, increased access to educational resources, and exposure to a more diverse range of cultural experiences, fostering an environment conducive to the revitalization of children's literature.

Coinciding with this economic miracle, there was an important debate on the establishment of the *scuola media unica* in Italy, a mandatory and free education system for all children aged 11 to 14. This reform was one of the most significant postwar educational changes and fueled political and pedagogical debates in Italy (Borruso 2022; Galfré 2017; Santamaita 2021). Research indicates that this reform played a crucial role in provoking and shaping the educational landscape of the time, particularly towards the end of the 1960s (Pironi 2020). The period also witnessed an increased availability of leisure time (Zago 2017), notable advancements in scientific progress, and the emergence of new media languages. One technology, in particular, that played a significant role was television, which showcased the immense power and potential of visual communication.

In response to the societal transformations occurring during that time, Italian publishing houses actively sought out new pedagogical tools to facilitate children's understanding of these changes. Recognizing the need to adapt to the evolving cultural and technological landscapes, publishers embarked on a quest to develop innovative approaches and materials that catered to the educational needs and interests of young readers (Finocchi and Marchetti 2004). These efforts aimed to bridge the gap between the transformations happening in society and child-

ren's comprehension, ensuring that children could actively engage with and make sense of the changing world around them.

The confluence of these factors played a pivotal role in driving the transformative shift observed within Italian children's literature during this period with the establishment of new publishing houses, the revitalization of existing ones through the introduction of new series dedicated to children's literature, and a substantial increase in production (Boero and De Luca 2009). The cultural milieu was vibrant, characterized by conferences, exhibitions, and the recognition of literary achievements through prizes bestowed upon writers and illustrators of children's publications. For instance, in 1962, the "Premio europeo Città di Caorle" was founded by the Istituto di Pedagogia dell'Università di Padova to honor works of children's literature distinguished by stylistic quality and narrative acumen (Fava 2016). This recognition was complemented by the emergence of specialized literary journals such as *L'Indice d'oro* launched in 1950, *Schedario* in 1953, followed by *Lo specchio del libro per ragazzi* in 1963 and *Il Minuzzolo* in 1965, further underscoring the growing significance and scholarly attention accorded to this literary domain (Boero and De Luca 2009; Ascenzi and Caroli 2019). Additionally, the debut of the International Children's Book Fair at the Palazzo di Re in Bologna, which first took place from 4 to 12 April 1964, highlighted the increasing importance of children's literature on an international stage (Grandi 2015). These collective efforts fostered an environment conducive to experimentation, innovation, and the flourishing of Italian children's literature (Campagnaro 2017).

Seizing on this trend, Fratelli Fabbri Editori channeled its resources and efforts into specific editorial initiatives, including the development of distinctive book series with a focus on scientific subjects tailored specifically for children. Recognizing the increasing appetite for literary engagement, these collections were strategically crafted to cater to the burgeoning enthusiasm of young readers and their families for educational and informative materials.

4 The book policy of Fabbri Editori and Marie Neurath's works: A perfect match?

Fabbri Editori emerged as a pioneering force in children's book publishing, demonstrating a steadfast commitment to investing in and revitalizing this literary market. The company was founded in 1945, but it was in the 1950s that the two Fabbri brothers – Dino, the art man, and Giovanni, the science man due to their respective disciplinary passions, backgrounds, and commitments in art and sci-

ence within their publishing house – introduced many relevant changes. Innovations included the use of offset printing, recognition of the importance of colors in children's books, an emphasis on "formal beauty", and the powerful and effective interrelation between text and images (Carotti 2004). In 1952, Fabbri Editori officially commenced publishing children's books, an organic progression resulting from its prior endeavors in the realm of educational textbooks (Carotti and Sacchi 2004). Through this strategic expansion, Fabbri Editori solidified its position as an influential player, helping to reshape the landscape of Italian children's literature. The publishing company experienced rapid growth in the children's book market, showing a strong interest in the relationship between text and images. Fratelli Fabbri Editori demonstrated a profound understanding of the intrinsic value of merging textual proficiency with visual aesthetics to captivate young readers. To accomplish this objective, the company meticulously assembled a team of skilled professionals, including illustrators, authors, translators, and paper technicians, all operating under the coordinated guidance of Dino and Giovanni Fabbri. Their collaborative endeavors yielded exceptional outcomes, particularly in the volumes produced throughout the 1950s (Carotti and Sacchi 2004).

During the 1950s and 1960s, Fratelli Fabbri Editori developed numerous informational book series, encyclopedias, and nonfiction narratives. This period saw a profound transformation in Italy, characterized by the abandonment of traditional agricultural practices and a swift evolution toward a modern industrial nation. The economic boom bolstered the purchasing power of families, resulting in increased cultural consumption. Fabbri Editori's novel encyclopedias and informative books emerged as a response to these new cultural demands. The company sought to do more than simply provide children with a compilation of factual information. Instead, it aimed to acquaint them with the remarkable advancements that were taking place in the field of science during that era (Carotti and Andriani 2010).

In 1957, the company made the strategic decision to separate the production of fictional books from those focused on imparting information. A range of new informational book series was established, including scientific, environmental, historical, and literary books as well as specialized encyclopedias targeted toward young readers.

Neurath's books proved to be a seamless fit for Fratelli Fabbri's innovative nonfiction editorial project. Her works were rigorous, featuring highly aesthetic combinations of text and images. The beauty lay in their ability to clearly and effectively capture and visually communicate the complexity of reality – whether the natural world or technological evolution – through precise visual images and accurate graphic representations. Her visual language avoided ambiguous solutions, ensuring that descriptions of phenomena, comparisons of dimensions, and

representations of quantities were clear and easy to understand. The clear and precise information, accompanied by colorful images, often played a leading role in understanding. These books featured enticing tables of contents that guided readers in their pursuit of knowledge, ultimately presenting young readers with an innovative and enjoyable cultural environment to explore. For Fratelli Fabbri Editori, Neurath's books were the perfect match.

Accordingly, Neurath's books entered Fratelli Fabbri Editori's catalog in 1957 in a new series called 'Piccola Enciclopedia' (Little Encyclopedia). The series started in 1957 and ended in 1968, with 56 volumes in total.

The books had slightly different formats for the hardcover and paperback editions – varying from 16 × 22 cm for hardcovers to 15.50 × 21 cm for paperbacks – and were printed both in black-and-white and in color. Of the full collection, 22 of the 56 were Neurath's works. The series also included books from other prolific international authors, such as Herbert Spencer Zim (14 books), an American naturalist, author, and editor who was the founder and editor in chief of the Golden Guides series of nature books (pocket-sized introductions for children to such subjects as fossils, zoology, rocks and minerals, codes and secret writings, and more), and Millicent Ellis Selsam (8 books), a biologist, teacher, and prominent figure in the fields of biology, education, and children's science literature with over 130 published works on diverse subjects, including botany, zoology, and environmental science. Nonetheless, Neurath was the major author, and her books accounted for 40% of the entire series.

5 Comparing Neurath's original books with the Italian adaptations

The comparative analysis begins with an examination of the cover design employed in the Italian adaptations of Neurath's books. Notably, all 56 volumes of the 'Piccola Enciclopedia' series utilized a consistent illustrative cover format (see Figure 1). A discernible triangular division structured the page into three distinct segments, comprising three smaller triangles. The covers featured two primary and contrasting hues. Augmenting the graphic composition, two or three additional boxes complemented the overall layout. Within each box, a photograph or, on rarer occasions, an illustration corresponding to the subjects featured in the inner double-spreads – ranging from avian species, botanical specimens, geological formations, volcanoes, and scientific advancements to contemporary technologies, such as television, telephones, and rockets – was placed.

In comparing the original works and their Italian adaptations, a conspicuous difference can be seen: the artistic allure and innovative graphic design that characterized Neurath's original covers are regrettably absent in the Italian renditions, raising concerns about the adaptation of her original works within the Italian market.



Figure 1: Covers of the Italian adaptations of Neurath's books in the "Piccola Enciclopedia" series.

To assess the level of innovativeness displayed in Neurath's books, it is useful to conduct a comparative analysis of her work and that of another notable author of informational books featured in the series: Millicent Ellis Selsam. I pay particular attention to book number 17 in the series titled *Dal telegrafo alla televisione* (From Telegraph to Television; the original title was *A Message Round the World*), authored by Neurath and published in Italy in 1958. This work will be juxtaposed with the book *Giocare con le piante* (Playing with Plants), authored by Millicent Ellis Selsam, which holds the distinction of being the opening installment of the series, published in 1957.

Neurath's book offered a detailed, in-depth explanation of the scientific development of technological communication systems. Her narrative approach introduces readers to the dynamics of telegraphic communication through the story of a volcanic eruption, which becomes the catalyst for understanding how news is transmitted globally. In the subsequent double-spread, Neurath meticulously depicts the intricate mechanisms of the telegraphic communication system, clearly illustrating its function (see Figure 2). The following spread extends this

visualization, showing the global dissemination of telegraphic messages through underground cables, highlighting the system's broad-reaching impact.

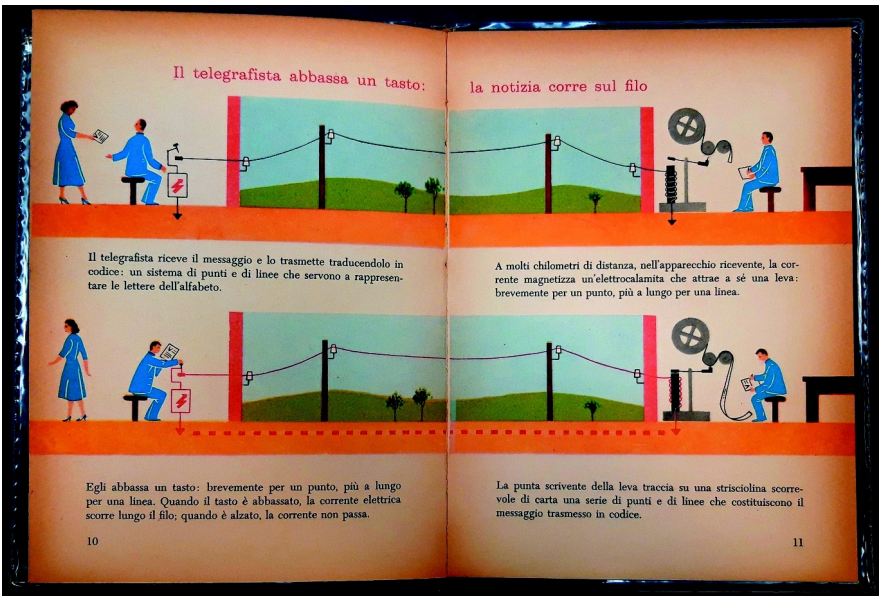
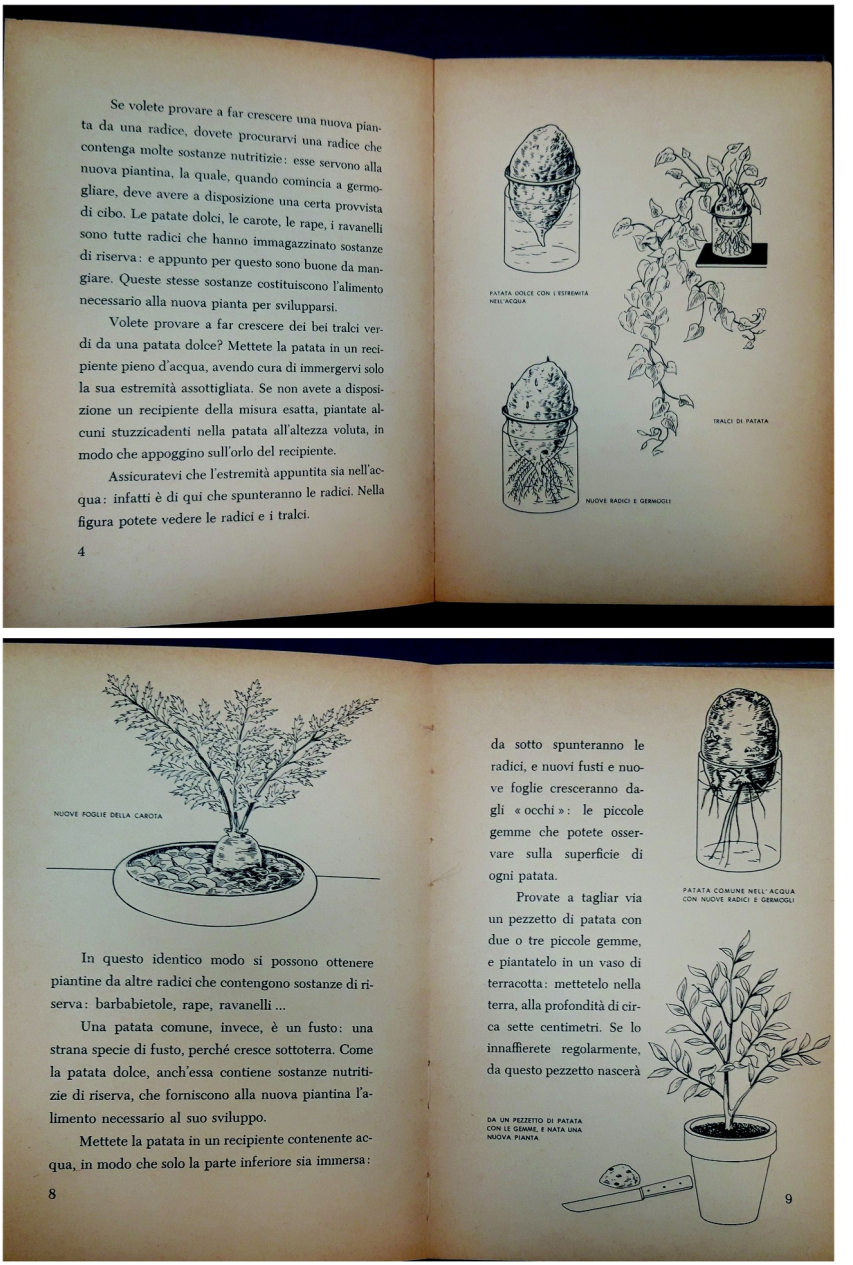


Figure 2: *Dal telegrafo alla televisione* (From Telegraph to Television, 1958) by Marie Neurath. Depiction of the telegraphic communication system's mechanism in the Italian adaptation, where, differently from Neurath's original work, personalized clothing, an enriched chromatic palette, and additional background details have been added. Public Library Sormani, Milan.

Neurath's illustrations effectively convey two central aspects: the process of soliciting assistance during emergencies and how news about a volcanic eruption spread globally, reinforcing her ability to visually simplify complex concepts. In contrast, *Giocare con le piante* (Playing with Plants, 1957), the inaugural volume of the series by Millicent Ellis Selsam, adopts a didactic structure. Selsam's book relies heavily on text, establishing a direct, sometimes patronizing dialogue with the reader, and focuses on hands-on activities, such as cultivating sweet potato roots. The black-and-white illustrations serve primarily as complementary visual aids, offering isolated, step-by-step instructions for growing plants (see Figure 3).

The comparative analysis highlights clear differences in their educational approaches. Neurath combines visuals and text to simplify complex technology, inspiring curiosity and wonder, particularly in her telegraphy spread, which presents multiple actions in a clear sequence. In contrast, Selsam's illustrations serve as practical, step-by-step guides for hands-on learning about plant growth.



Se volete provare a far crescere una nuova pianta da una radice, dovete procurarvi una radice che contenga molte sostanze nutritizie: esse servono alla nuova piantina, la quale, quando comincia a germogliare, deve avere a disposizione una certa provvista di cibo. Le patate dolci, le carote, le rape, i ravanelli sono tutte radici che hanno immagazzinato sostanze di riserva: e appunto per questo sono buone da mangiare. Queste stesse sostanze costituiscono l'alimento necessario alla nuova pianta per svilupparsi.

Volete provare a far crescere dei bei tralci verdi da una patata dolce? Mettete la patata in un recipiente pieno d'acqua, avendo cura di immergervi solo la sua estremità assottigliata. Se non avete a disposizione un recipiente della misura esatta, piantate alcuni stuzzicadenti nella patata all'altezza voluta, in modo che appoggino sull'orlo del recipiente.

Assicuratevi che l'estremità appuntita sia nell'acqua: infatti è di qui che spunteranno le radici. Nella figura potete vedere le radici e i tralci.

4

PATATA DOLCE CON L'ESTREMITÀ NELL'ACQUA

TRALCI DI PATATA

NUOVE RADICI E GERMOGLI

NUOVE FOGLIE DELLA CAROTA

In questo identico modo si possono ottenere piantine da altre radici che contengono sostanze di riserva: barbabietole, rape, ravanelli ...

Una patata comune, invece, è un fusto: una strana specie di fusto, perché cresce sottoterra. Come la patata dolce, anch'essa contiene sostanze nutritizie di riserva, che forniscono alla nuova piantina l'alimento necessario al suo sviluppo.

Mettete la patata in un recipiente contenente acqua, in modo che solo la parte inferiore sia immersa:

8

da sotto spunteranno le radici, e nuovi fusti e nuove foglie cresceranno dagli « occhi »: le piccole gemme che potete osservare sulla superficie di ogni patata.

Provate a tagliar via un pezzetto di patata con due o tre piccole gemme, e piantatelo in un vaso di terracotta: mettetelo nella terra, alla profondità di circa sette centimetri. Se lo innaffierete regolarmente, da questo pezzetto nascerà

PATATA COMUNE NELL'ACQUA CON NUOVE RADICI E GERMOGLI

DA UN PEZZETTO DI PATATA CON LE GEMME, È NATA UNA NUOVA PIANTA

9

Figure 3: *Giocare con le piante* (Playing with Plants, 1957) by Millicent Ellis Selsam. Black-and-white illustrations in the Italian adaptation entitled demonstrating the process of cultivating sweet potato roots through a didactic and descriptive approach. Public Library Sormani, Milan.

Both spreads evoke wonder, but Neurath focuses on technological communication, while Selsam emphasizes natural processes and experiential learning.

I have purposely selected these two examples because they have been previously examined and compared in a critical analysis by the scholar Lina Sacchetti in her book *Storia della letteratura per ragazzi* (History of Children's Literature) published in 1962. Sacchetti utilized these books from the 'Piccola Enciclopedia' series as references for her analysis.

> The *Little Encyclopedia*, 40 volumes edited by Fabbri and written by French and Anglo-Saxon experts, constitutes an introduction to the study of, above all, zoology, botany, biology, chemistry, astronomy, etc. Some books are clear and enjoyable, even for eight-year-olds; others present the material in a way that is too concentrated and not easily assimilated, for example *From the Telegraph to the Television* by M. Neurath, who is the author of many volumes in the series. The books by the American M. F. Selsam, *Playing with Plants*, *Playing with Climbing Plants*, and *Playing with Trees*, are also easy and valuable for the stimulus they give to the child to participate, with their own experience, in the wonderful discoveries of secrets hidden in nature. Overall, the books of the Little Encyclopedia can be referred to ages 8–12 years. (Sacchetti 1962, 212; my translation)

According to Sacchetti, Neurath's books present an excessive amount of condensed information that be difficult for young readers to handle. Additionally, Sacchetti expresses confusion regarding the perceived lack of reader engagement with Neurath's books, suggesting that they fail to stimulate children's active participation and their own experiential involvement in the exciting discoveries of nature's hidden secrets. In contrast, Selsam's book appears to accomplish this task.

If we consider the immediacy and relatability to children, Selsam's spread might be more impactful in evoking these feelings. The tangible process of growing a plant from a root is a more direct and accessible way for children to experience wonder and discovery. The natural world's visible changes and growth can be more awe-inspiring on a personal and experiential level compared to the more abstract technological process depicted by Neurath.

One might question why Sacchetti chose to compare two books so different in topics and content, rather than selecting similar ones. In the same series, for instance, there was the Neurath's book *Il meraviglioso mondo delle piante strane* (The Wonder World of Strange Plants, 1958) which effectively showcases the beauty and cycle of nature.

The Neurath illustration accompanying the first page "La ninfea si schiude all'alba" (The Water Lily Blooms at Dawn) demonstrates an effective integration of visual and textual elements, challenging Sacchetti's assertion that Neurath's books contain excessive condensed information that can be difficult for young readers to handle. The illustration (see Figure 4) uses a simple yet effective graphical design and color palette to represent water, the sky, and the plant's growth,

respectively. The layout is divided into four horizontal panels, each depicting a different stage of the water lily's blooming process, from being closed underwater at night to fully open during the day. This sequence is easy for children to follow, as the minimalist style focuses on essential elements without unnecessary details, maintaining clarity and engagement.

Contrary to Sacchetti's claim, the Neurath illustration does not overwhelm but rather educates effectively through its simplicity and clarity. The peaceful and reassuring scenes create an inviting reading experience. This Neurath illustration successfully stimulates curiosity and understanding, providing a compelling counterpoint to Sacchetti's critique.

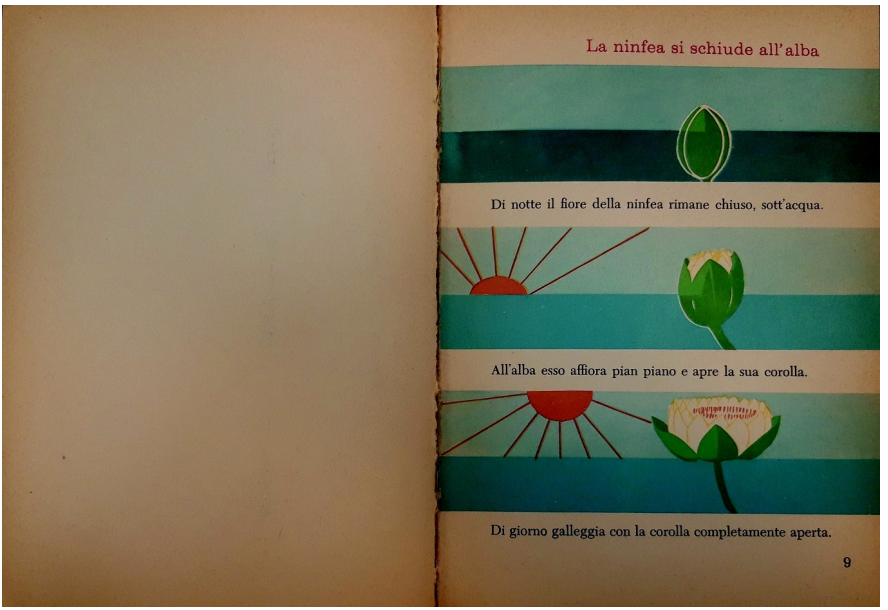


Figure 4: *Il meraviglioso mondo delle piante strane* (The Wonder World of Strange Plants, 1958) by Marie Neurath. The illustration "La ninfea si schiude all'alba" (The Water Lily Blooms at Dawn) effectively integrates visual and textual elements, challenging Sacchetti's assertion of excessive condensed information. Public Library Sormani, Milan.

However, Sacchetti's statement is relevant to this article as it highlights three key aspects that contribute to understanding Italian perceptions of children's books. Furthermore, they shed light on the adaptation process and the problems regarding how Neurath's works were perceived in Italy at the time, emphasizing the cultural and editorial changes that affected their reception. First, Neurath's books, distinguished by their clear and essential graphical elements as well as their em-

phasis on visual education, can be regarded as remarkably innovative within the realm of Italian children's literature during this period. However, it is plausible that Italian children's cultural landscape was not yet sufficiently receptive to embrace Neurath's visual theory, despite the transformative tendencies highlighted in the introductory section of this chapter.

Second, the act of actively engaging children in the reading process, using both text and images, while encouraging them to draw comparisons and utilize the dual-language approach, was intended to foster a sense of trust in the images in order to facilitate the reader's independent comprehension. However, this was a futuristic notion that was not readily embraced by Italian scholars, teachers, parents, and publishers of that era. Indeed, Italian children's literature would have to wait until the years surrounding 1968, characterized by turbulence, protest, and countercultural agitation, before experiencing a real transformation (Antoniazzi 2018; Heywood 2018; Todaro 2018).

Third, Sacchetti's analysis of Neurath's books presents an additional puzzling aspect. The foremost concern revolves around the unfortunate fact that what Fratelli Fabbri Editori published were not the original versions of Neurath's works. Instead, the publisher made the decision to translate the original texts into Italian while, inexplicably, altering all the illustrations and visual graphic solutions. In fact, the publisher enlisted the services of two illustrators, P. Bergami and F. Ghiringhelli, to redraw all of Neurath's original illustrations. Superficially, this may have appeared to be an innocuous endeavor. However, it is my contention that these visual adaptations, albeit only acknowledged on the title pages of the initial books 6, 7, and 8 in the series, had far-reaching consequences that significantly affected the beauty, innovativeness, and overall effectiveness of Neurath's works.

It is crucial to note that the illustrations and graphic visual solutions were among the most impactful and innovative aspects of Neurath's work. Moreover, a salient feature of Neurath's books was the meticulous selection and seamless integration of every element within the publication's content, encompassing visual and graphical components. Each aspect was thoughtfully curated and skillfully balanced to ensure a harmonious and coherent overall framework for the book. This deliberate attention to detail not only enhanced the immersive experience for children but also facilitated their understanding of the subjects presented, making the books both engaging and educative. Consequently, the publisher's modifications compromised the integrity of Neurath's groundbreaking visual approach of transforming silhouette-based systems into effective informational visual artifacts. Further, they diminished the clarity of her visual representations and the educational efficacy of her message.

Conversely, it is intriguing that the publishing house decided to adapt the illustrations while keeping the text virtually unchanged. Despite the alterations to the visual elements, the Italian translations of Neurath's original texts remain faithful, verbatim renditions of the English texts, preserving the original content and accuracy.

I would like to analyze the Italian adaptation, *Il meraviglioso mondo degli animali* (1958), of the original book *The Wonder World of Birds*. Specifically, I will compare the double-spread entitled "Per proteggere la famiglia" (To protect the family).

The double-spread depicts the female hornbill sealing herself inside a tree with a paste of bark and saliva, while the male feeds her and their chick through a small slit. The chick hatches, and when ready, the male breaks down the wall, ensuring his family is safe and well-fed. I will focus solely on the visual adaptation because the text remains essentially the same. This is significant; the modification pertains only to the visuals, not the verbal story (see Figure 5).

Neurath's original version features bold colors and simple lines, using a limited palette of black, white, and orange. This approach clearly and straightforwardly depicts the hornbill sealing the nest, the male feeding the female and chick, the chick hatching, and the male breaking the wall when the chick is ready. The simplicity helps readers understand the narrative without distractions. This clean and precise style, characteristic of the Isotype style that Neurath pioneered, has a timeless quality due to its focus on clarity and universal understanding. Its graphical minimalism and clarity make it adaptable and relevant even decades later, avoiding the risk of looking dated because it does not rely on detailed environmental context.

In contrast, the Italian adaptation employs a more varied color palette, including shades of blue and brown, which provides a naturalistic look. The illustrations follow the same sequence of actions but include more detailed backgrounds and additional visual elements. This richness in detail creates a perhaps more visually engaging and emotionally compelling experience. However, the added context and intricate drawings slightly detract from the clarity of the primary actions. Moreover, the additional environmental context can make the illustrations feel anchored to the era in which they were drawn, contrasting with the timeless quality of Neurath's original style. This detailed approach can indeed look dated after several decades, as the specific artistic techniques and choices reflect the time period in which they were created.

Neurath's approach aimed for simplicity, universality, and immediate comprehension, avoiding unnecessary details. The Isotype method's focus was on clear, concise communication of complex ideas, which remains effective over time. The lack of extraneous or redundant details keeps the illustrations focused and prevents them from becoming outdated as artistic trends evolve.



Figure 5: *The Wonder World of Birds* (1953) by Marie Neurath (above) and *Il meraviglioso mondo degli animali* (1958) by Marie Neurath (below). The spread in the English edition uses a simplified, clear Isotype method for easy comprehension, while the Italian adaptation adds detailed backgrounds and colors, complicating the narrative. Otto and Marie Neurath Isotype Collection, University of Reading; Public Library Sormani, Milan.

Examining the specific actions depicted, Neurath's simplified style ensures that the sequence of events – sealing the nest, feeding through the slit, the chick hatching, and the eventual breaking of the wall – is presented straightforwardly and easily. This clarity is crucial for educational effectiveness, allowing young readers to grasp the hornbill's behavior without confusion. The Italian spread, although richer in visual context, can sometimes overwhelm the primary narrative with additional environmental details, potentially complicating the understanding of specific actions.

For nonfiction educational purposes, the clarity of Neurath's double-spread in depicting actions makes it a more reliable tool for young readers to understand the hornbill's behavior. Thus, the decision to employ different illustrators for the visual reimagining of Neurath's original illustrations raises concerns about the fidelity of the Italian versions to her artistic vision. By entrusting this task to other artists, the publisher inadvertently altered the aesthetic qualities and inherent essence of Neurath's visual compositions. Hence, the adaptations failed to fully capture the distinctive allure and innovative character of her original illustrations.

Also, a comparison of Figures 6–8 reveals a notable transformation in the visual presentation of Neurath's original works, particularly concerning the adoption of Isotype's clear and graphical visual format. This original format has been entirely substituted with an older, more traditional illustrative style in the Italian version, as discussed above. As a consequence, the new rendition has a diminished aesthetic impact. Moreover, the illustrations in the Italian version suffer from a loss of both accuracy and precision compared to the original works. Further, the Italian version, in its adaptation, starkly deviates from Neurath's use of a restricted color palette, a defining characteristic that significantly contributed to the enduring contemporary appeal of her original works. Regrettably, the Italian rendition appears to have underestimated and disregarded the significance of adhering to those specific colors.

Indeed, colors played a pivotal role in the visual language of Neurath's infographics and book design. As Neurath herself asserted, she gave careful consideration to avoiding an excessive proliferation of colors, each potentially carrying multiple connotations. The underlying objective was to ensure that visual elements could be easily grasped by readers and ideally etched into their memory. Neurath's conscious adoption of a limited color palette was motivated by the desire to avoid confusion, which might arise from an overabundance of colors (Neurath 1974). Tragically, all these meticulous considerations and intentions were disregarded in the Italian adaptation. In fact, when comparing Neurath's original work to the Italian version in the double-spread featuring the hornbill (see Figure 5), it is clear that the adaptation's use of a more diverse range of colors has negatively affected the visual clarity. Although the additional colors may enhance visual attractiveness,



Figure 6: *If You Could See Inside* (1948) by Marie Neurath (above) and *Il libro del come e del perchè* (The Book of How and Why, 1957) by Marie Neurath (below). The Italian version of "A Fairy Palace inside a Hill" starkly deviates from Neurath's restricted color palette, a defining characteristic that contributed to her works' appeal. Otto and Marie Neurath Isotype Collection, University of Reading; Public Library Sormani, Milan.

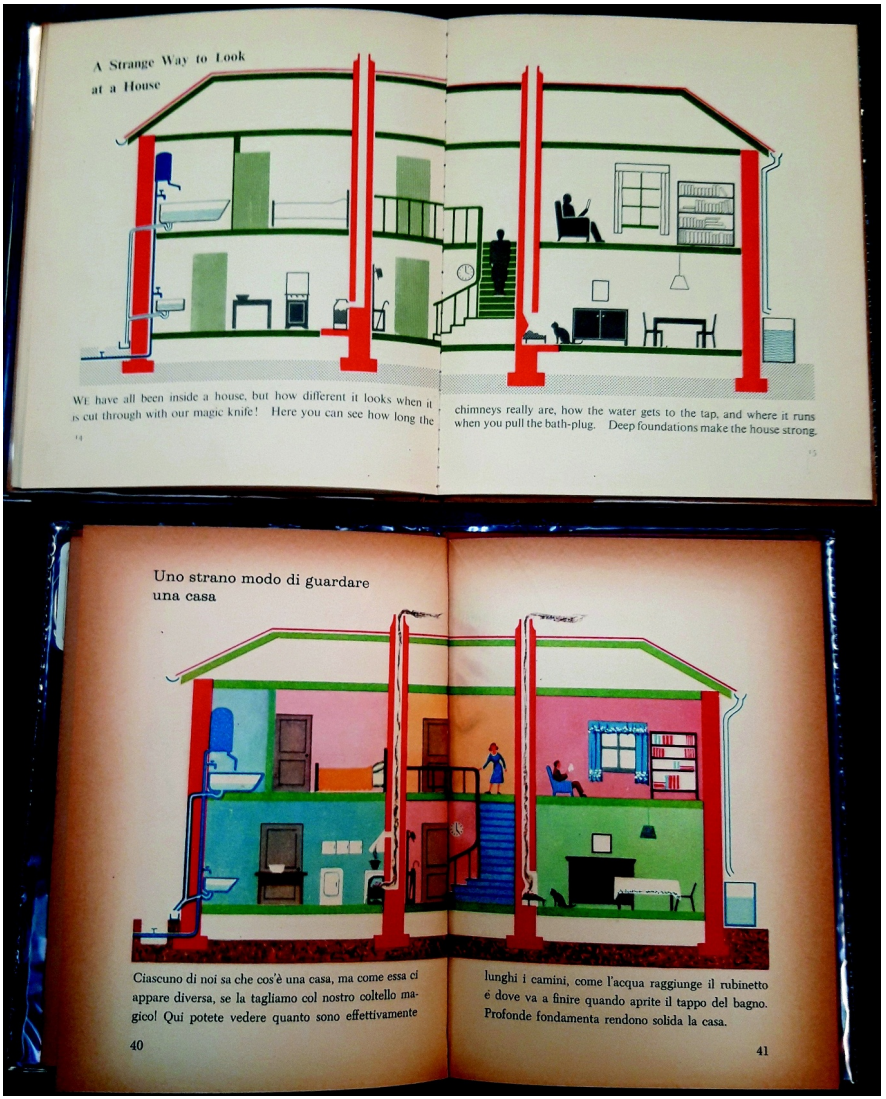


Figure 7: *If You Could See Inside* (1948) by Marie Neurath (above) and *Il libro del come e del perchè* (The Book of How and Why, 1957) by Marie Neurath (below). "A Strange Way to Look at a House": the Italian illustrators integrated ornamental elements like tablecloths, blankets, sheets, and a boiling pot, transforming the interior into a dollhouse with clearly defined gender roles. Otto and Marie Neurath Isotype Collection, University of Reading; Public Library Sormani, Milan.

they have also generated a sense of confusion regarding the depicted activities, thereby weakening Neurath's initial goal of ensuring ease of comprehension.

In the Italian adaptations, the dimensions of the pictures were diminished, while the typeface of the text appears larger with more space between lines. Additionally, instead of using a square format, the Italian version adopted a rectangular template for many illustrations.

Similar observations can be made regarding the ensuing double-spread (see Figure 7). The Italian illustrators curiously integrated ornamental and superfluous elements within the depiction of the house, such as a tablecloth, blankets, sheets, and a boiling pot on the stove that symbolizes a dish of pasta. This transformation from the interiors of the house in Neurath's volume *If You Could See Inside* is evident. Moreover, in the Italian version, a woman at the top of the stairs is ready to descend to prepare dinner, while the husband sits comfortably in a chair reading.

In this analysis, I emphasize how the images redone by two Italian illustrators have distorted the concept of Neurath's visual language. Neurath consistently opposed embellishment and decoration, opting instead for a minimalist color palette and a rigorous schematic style. The remake, which increasingly appears as a betrayal, has resulted in images that have lost their precision and the visual impact of the Isotype style (the Italian version's figures are fully detailed with clothes and faces). They also introduce elements of inaccuracy, which is significant for a informational book on science. Furthermore, they convey an ideological framework absent in Neurath's original work, which was crafted by a woman scientist. In Neurath's original illustrations, two people were depicted inside the house, but it was not possible to identify their gender, thus avoiding any implication of domestic roles. Conversely, in the Italian version, gender roles are clearly defined: the man is sitting in the armchair reading a newspaper while the woman at the top of the stairs is likely going down to prepare dinner.

The disparity in the visual educational approach is markedly evident also when examining the ensuing double-spread, which focuses on the ancient pyramids of Egypt (see Figure 8). There are distinct dissimilarities in the dimensions and proportions of the two renditions of the same pyramid. In Neurath's original double-spread, the text is deliberately placed on the left side, allowing ample white graphical space to envelop the pyramid illustration. The apex of the pyramid aligns with the height of the title. Neurath's deliberate choice accentuates the sense of grandiosity inherent in the ancient architecture, which has withstood the test of time for five thousand years. Furthermore, Neurath's visual and graphical care in emphasizing the stability and grandeur of the pyramid through her choice of layout and design reinforces the viewer's perception of the pyramid's magnificence. The visual and graphical layout of the double-spread serves to both am-

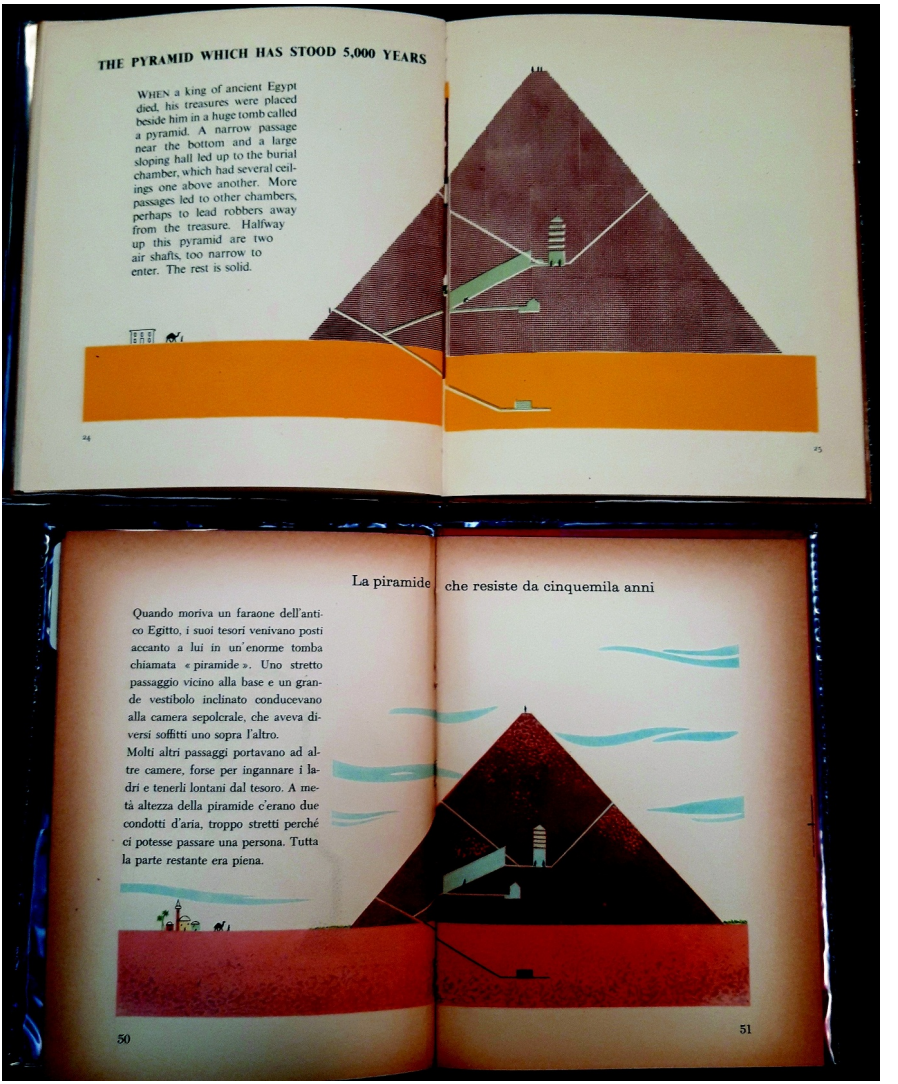


Figure 8: *If You Could See Inside* (1948) by Marie Neurath (above) and *Il libro del come e del perchè* (The Book of How and Why, 1957) by Marie Neurath (below). "The pyramid which has stood 5,000 years": A comparison of both images shows differences in dimensions and proportions, where Neurath's layout emphasizes the pyramid's grandeur and stability, while the Italian version introduces extraneous elements like clouds, diminishing the visual impact and sense of magnificence. Otto and Marie Neurath Isotype Collection, University of Reading; Public Library Sormani, Milan.

plify the impact of the pyramid's magnificence and captivate readers with an aesthetically pleasing and unforgettable presentation of this historically impressive architecture.

Conversely, in the Italian version, the sense of proportion and the implied implications are lost altogether. Extraneous elements have been introduced, the pyramid's height is halved, and the decorative presence of clouds further diminishes the pyramid's visual solidity and enduring nature. These alterations significantly impact the perception of the pyramid. The awe-inspiring visual magnificence in Neurath's original work is entirely missing in the Italian rendition.

Moreover, the Italian redesign of the pyramid exacerbates challenges related to accuracy and precision. For instance, the Isotype figure of a human being originally positioned in Neurath's book at the entrance of the tunnel leading underground is absent in the Italian version, as the depiction of this figure would have been too diminutive to reproduce effectively, rendering it virtually invisible.

6 A sort of conclusion . . . or a new start?

Children's books were an ideal platform for Marie Neurath to employ Isotype's methods. In these editorial projects, she tried to avoid the pitfalls of oversimplification, maintaining a fine balance between clarity and intellectual engagement for a young audience. Her approach resonated with children's curiosity and their innate desire to comprehend the mechanisms governing the world around them. Given that young readers are more drawn to visual elements than textual ones, these books could easily transcend linguistic barriers and find publication abroad.

However, the analysis and comparison of Neurath's original children's books with their Italian adaptations reveal that the Italian publishing house Fratelli Fabbri Editori made critical illustrative alterations, including changes to the covers, dimensions, graphical layouts, and illustrations, seemingly without due consideration of or respect for Neurath's intentions. This raises questions about whether the Italian publisher was fully aware of Neurath's educational perspectives regarding her creative process and the guiding principles she used to create engaging and informative visual content for children's books. In fact, according to Neurath's principles, simplicity and accuracy were paramount for effectively conveying information; each line and color within the illustrations held a purposeful message for the readers. Furthermore, she stressed the value of precise drawings that would not only foster children's enthusiasm but also resonate with them. An essential aspect of her approach was ensuring that the details incorporated in the illustrations

were meaningfully relevant. Moreover, Neurath felt that new elements should only be added to enhance the clarity of the visual statement, rejecting their inclusion as mere decorative elements. In essence, she believed that every component of the picture should serve a useful purpose for facilitating comparisons (Neurath 1974).

Unfortunately, the significance and ingenuity of Neurath's visual design, as well as the essence of her educational children's books, were compromised in the Italian adaptations. The resultant disparities in these adaptations hindered a comprehensive understanding of the true impact and innovation of Neurath's work. Consequently, the Italian versions missed a valuable opportunity to uphold Neurath's principles and preserve her visionary approach to create influential and visually engaging educational materials for young readers.

Why did a publisher like Fratelli Fabbri Editori – so interested in science and nonfiction, so keen on accurate and reliable informational books – decide to adopt such an inexplicable editorial policy towards her books? This perplexing editorial policy calls for examination and analysis.

At this stage of my research, historical research in the Fratelli Fabbri Editori archives did not reveal the editorial policy or the reasons behind the choices to visually adapt Neurath's original works. The historical archives specifically related to my research on the Fratelli Fabbri Editori archive and the 'Piccola Biblioteca' series, including correspondence between the brothers Fabbri, Neurath, and illustrators Bergami and Ghiringhelli, did not provide any relevant information. They only contain a folder of contracts related to Ghiringhelli's illustrations for various publications, which are not pertinent to my research. No correspondence or other documentation remains concerning Neurath or Bergami.

In light of this, I may speculate on some possible reasons for these adaptations. One possible hypothesis is that the publisher failed to grasp the innovative nature of her books and their efficacy in educational contexts, perhaps indicating a lack of awareness regarding the significance of her visual approach. It is plausible that Fratelli Fabbri Editori deemed Neurath's visual solutions unsuitable for the Italian children's educational market. As a result, the publisher opted to replace her illustrations with redrawn versions and graphical modifications, disrupting the harmonious interplay between text and visuals that Neurath meticulously crafted in her scientific visual narratives, likely because the publisher did not find her illustrations engaging enough for its target readers.

This is probably one of the reasons that pushed Fratelli Fabbri Editori to ask illustrators to enrich Neurath's illustrations with a richer palette of colors and include more detailed elements about the environment, both human and natural settings, such as the rich domestic decorations inside the house, the colorful and accurate feathering of the hornbill, or the nuances of the trunks of the trees. According to Fratelli Fabbri Editori's experience and publishing policy, these en-

hancements were likely intended to enrich the environmental settings and make the reading experience both scientifically accurate and emotionally engaging, helping young readers feel more connected to the content.

The specific reasons behind Fratelli Fabbri Editori's decision, however, remain unclear, leaving some pertinent questions unanswered. The matter of copyright ownership of the images is particularly noteworthy, raising questions about how the Italian publisher acquired the right to modify Neurath's illustrations in such a manner. These reflections leave space for further investigation, presenting an opportunity for continuing research in this domain, into Neurath's appealing work and production, and for gaining a deeper understanding of the broader histories of visual education and their impact in the European postwar milieu.

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Ilgım Veryeri Alaca

Relating and Comparing Marie Neurath's Work with Informational Books from Türkiye

1 Introduction: Considering Marie Neurath's impact in Türkiye

German author and graphic designer Marie Neurath's innovative works had a revolutionizing impact on picturebook design that has spread to other countries, and its influence on informational picturebooks is probable. In view of the long-standing cultural cooperation between Türkiye and Austria that goes back more than five centuries, this tradition of exchanges of artistic production and knowledge that ranged from printing technologies to book arts could be considered a conduit for Neurath's ideas. The migration of Austrian scholars to Türkiye in the twentieth century strengthened this understanding between the two countries, likely raising awareness of each countries' curriculum and reading materials.

To shed light on how Neurath's influence extended to Türkiye, I will start this chapter by examining the age-old relationship between the Habsburg and Ottoman Empires. The historic relations between the two countries served as the backbone of the international entwinements in the twentieth century between Austria and Türkiye that give the exchange of ideas a frame of reference. I will then build on this to make a comparison with Neurath's picturebooks and Turkish informational picturebooks. To understand and trace the chronological transformation of Neurath's potential influence on the making of picturebooks in Türkiye, this chapter examines a selection of children's books published over almost three decades, from the 1940s to the late 1960s. The books published in this era and those that I examine in particular range in subject matter from the natural sciences to aviation. This range allows one to scrutinize how visuals and texts were utilized to convey information, systems, processes, and data, drawing parallels to Neurath's preferred set of themes. This is helpful in allowing a framework to emerge from which one can extract some conclusions. Among these books examined, I offer a focused analysis of two books *Let's Look at the Sky* (1952) by Marie Neurath and *Gökyüzünde Neler Var?* (What is in the Sky?, 1965) by İsmet Konuk for a thorough comparison. To this end, I touch upon particularities of these two books by looking at their texts and images, including the basic design principles that were utilized for various storytelling strategies. I chart similari-

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ties and differences between these two publications and reflect on the underlying reasons for these. By focusing on certain themes and how information was passed on to young audiences under similar and differing circumstances, this study of the content extends to include an analysis of text–picture relationships that demonstrate where Neurath's style has potentially influenced Turkish picturebooks and where it has not.

2 Cultural and educational bonds between Austria and Türkiye: An overview

Some of Neurath's influence likely filtered to Türkiye through educational exchanges between the two countries in the early twentieth century. These cultural exchanges that can be traced back to as early as the sixteenth century involved archaeology, travel writing and, in time, photography primarily due to the geographical proximity of the Ottoman and Habsburg Empires. Book arts and their related printing technologies have been a foundation for these exchanges for decades. In the nineteenth century, Austrian binders and book artists created photographic albums that were sought after by Ottoman elites. Austria produced high-caliber lithography, one of the techniques utilized for these prints. Moreover, numerous paper-based labels for products in Türkiye were also printed in Austria (Öztuncay 2006).

In the nineteenth century, numerous Austrian scholars and teachers relocated to Türkiye and by the early twentieth century approximately fifteen Austrian schools (for example the Österreichisches Sankt Georgs-Kolleg, known today as St. George's Austrian High School) were established, though their number would later decrease (Kangler 2006). While the myriad exchanges that have occurred between the two countries will not be discussed in detail here, it is worth mentioning that after the dissolution of the Ottoman Empire, the founder of the Turkish Republic, Mustafa Kemal Atatürk, supported continued cooperation. For example, the Friendship Pact that was signed between the two countries in 1923 initiated numerous exchanges, such as an envoy of four Turkish pedagogues to Austria in 1928. Raşit Öymen (also known as Hıfzırrahman Raşit), for instance, set down education-related observations in Vienna at the time of Otto Glöckels in his book *Mektepçiliğin Kâbesinde* (Kaaba of Schooling, 1928), enriched with photographs (Kangler 2006, 98). This book charted detailed observations, ranging from curriculum to teacher education, that turned out to be a valuable resource at the time (Aslan 2021). An example of the print-based collaboration between educational institutions in Türkiye and Austria is *Canlı Alfabe* (The Animated Alphabet, 1954), which took three years to finalize (Figures 1–2). This picturebook that was mass-produced to become part of the primary-school curricu-

lum was written by Osman Yalçın and supported by the eminent publisher Ramazan Arkın. The initial sketches were executed by painter Ömer Uz in collaboration with Davut Akidil, supervisor of Istanbul primary schools. The book was approved by the Ministry of Education and its production reveals collaboration with experts in Vienna. Although the book was written and printed in Turkish, these illustrations benefited from the know-how of graphic artists in Austria who worked for the Austrian Ministry of Education, Head of Publications. From the paratexts of *The Animated Alphabet*, we understand that the final illustrations, color-based decisions, and typographic design were either reworked or fine-tuned in Austria. This collaboration may not be easily decipherable on the surface, as local and familiar images were already prioritized in the compositions, e.g. a traditional Turkish house built from wood. Nonetheless, details of a clock that is reminiscent of Black Forest cuckoo clocks from Germany also used in Austria may be regarded as an impact of both sides on the final work. This publication hints that all measures were taken to make this book as fine as possible for schoolchildren of that era in Türkiye, feeding upon Austrian partnership. The continued cultural exchanges were manifold and initiated by diverse instances and, at times, adversities such as wars.

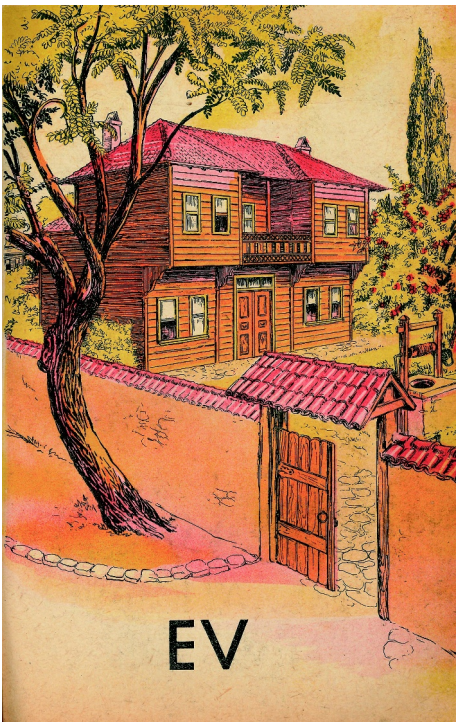


Figure 1: *The Animated Alphabet* [Canlı Alfabe] (1954) by Osman Yalçın. Colored illustration shows an open door to the yard of a traditional wooden house with trees and a well. Private collection.



Figure 2: *The Animated Alphabet* [Canlı Alfabe] (1954) by Osman Yalçın. The illustration hints at the morning routine of a child who is about to wake up in his bedroom. Private collection.

During World War II, Austrian scholars fled the turbulent war years for Türkiye and worked there e.g. as professors at the Istanbul Technical University or Istanbul University, among many other institutions (Demir 2011). The level of migration was high and those that found safe harbor in Türkiye brought with them their extensive academic knowledge that left a deep impression on the country. For instance, architect Clemens Holzmeister designed the Turkish Grand National Assembly, among other buildings in the newly established capital city Ankara (Baykan 2019). Art historian Oktay Aslanapa (1993) mentions how the foundational work of Ernst Diez enriched the teaching of art history at Istanbul University in 1943. The new ideas were embraced and woven into the fabric of the reforms introduced by the newly created Turkish Republic, albeit gradually mainly due to their varied reception in large cities and in rural areas.

Posters were designed by various institutions to present certain statistics to the country's citizens. During the tenth anniversary of the Turkish Republic, these posters at "pavilion stands in international fairs" echoed Austrian sociologist and economist Otto Neurath's pictographic language and utilized visuals to raise public awareness of social matters in the late 1930s. In particular, the Coal Exhibition Catalogue in 1935 and the Institute of Mine Explorations in 1938 made

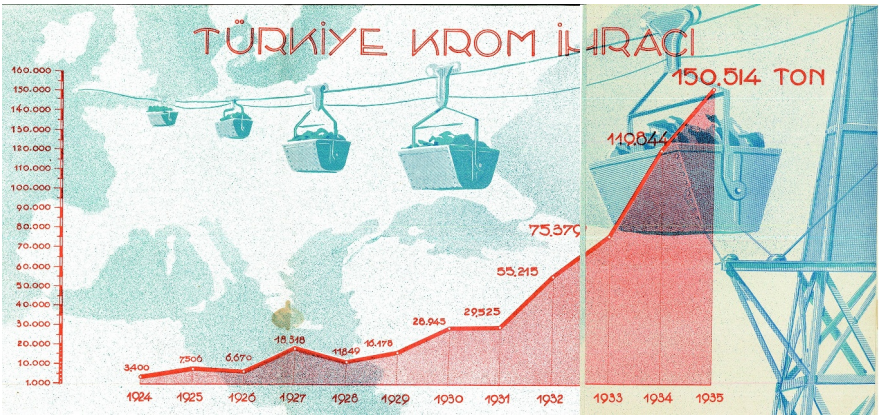


Figure 3: Infographics of the Institute of Mine Explorations, 1938. The graphic presents Türkiye's export of chromium above and world coal export below. Courtesy of Sinan Niyazioğlu Collection.

use of infographics to convey information about their ongoing work (Figures 3–4). These informational visuals and posters were especially designed to announce specific developments in Türkiye as a part of official presentation of nationwide outcomes, namely growth rates in mining, finance, agriculture, maritime transport, increase in literacy rates, births, and the establishment of new schools (Niyazioğlu 2021, 255–258). These posters are core sources for the reception of Isotype in Türkiye. When we study an informational book for adults produced by the leading political party, Cumhuriyet Halk Partisi, statistics about the country utilize classic tables and graphs besides those statistics that encapsulate visuals. For instance, in an image presenting the number of health professionals, we see a comparative visual for the years 1923–1937. This data supported by figures shows how the number of doctors and pharmacists, alongside other related professionals, had increased in the preceding fourteen years after the foundation of the Turkish Republic (CHP 1938, 362). While this visual makes it easier to recognize the change over the years with the help of the figures, it is different from the visual statistics that Neurath utilized. Neurath's visuals had often made use of repeating imagery, but this book encapsulated changing sizes of a single image according to the shifting numbers, a technique that Neurath dismissed (Neurath 1980, 75). In the statistics annual published by the State Institute of Statistics, all information is transmitted through text, which hints at the utilization of visuals only on special occasions (Anonymous 1941).

Other institutions employed comparable visual language tailored for their specific purposes, indicating a budding awareness of Otto Neurath's work in Türkiye (Figure 5). The Kuleli Military High School, as one example educational insti-

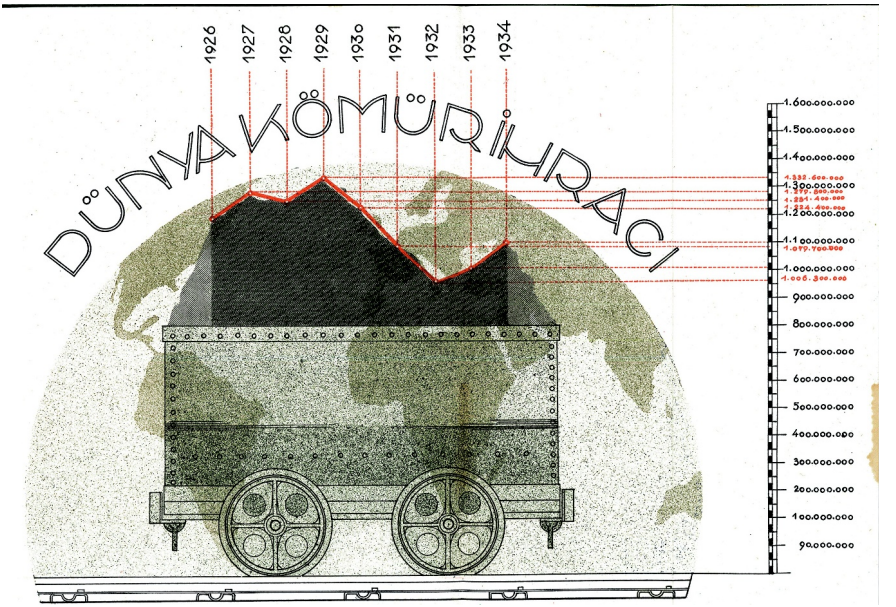


Figure 4: Infographics of the Institute of Mine Explorations, 1938. The graphic shows the detail of world coal export presented in Figure 3. Courtesy of Sinan Niyazioğlu Collection.

tution, created in 1937 a poster to chart the end-of-year success of its students through different colored bars. Brown bars presented the total amount of students whereas blue bars were used for those who had passed all their exams. Red bars indicated those who needed to improve their marks and black indicated failing students (Niyazioğlu 2021). This reproduction of Marie Neurath's techniques in a Turkish context was a proof of dialogue that will be more deeply mined to discover further connections. Before exploring these connections, it is helpful to examine the informational books that were developed in Türkiye.

3 Informational books in Türkiye

Informational books published primarily for children existed long before the twentieth century and predated the establishment of the Turkish Republic. As such, it is worth mentioning that the masterfully crafted children's books were also published as translations or adaptations from foreign works that hint at the depth of this topic. These are rare examples that likely were available only to the wealthier strata of society and in many cases did not reach the general public.

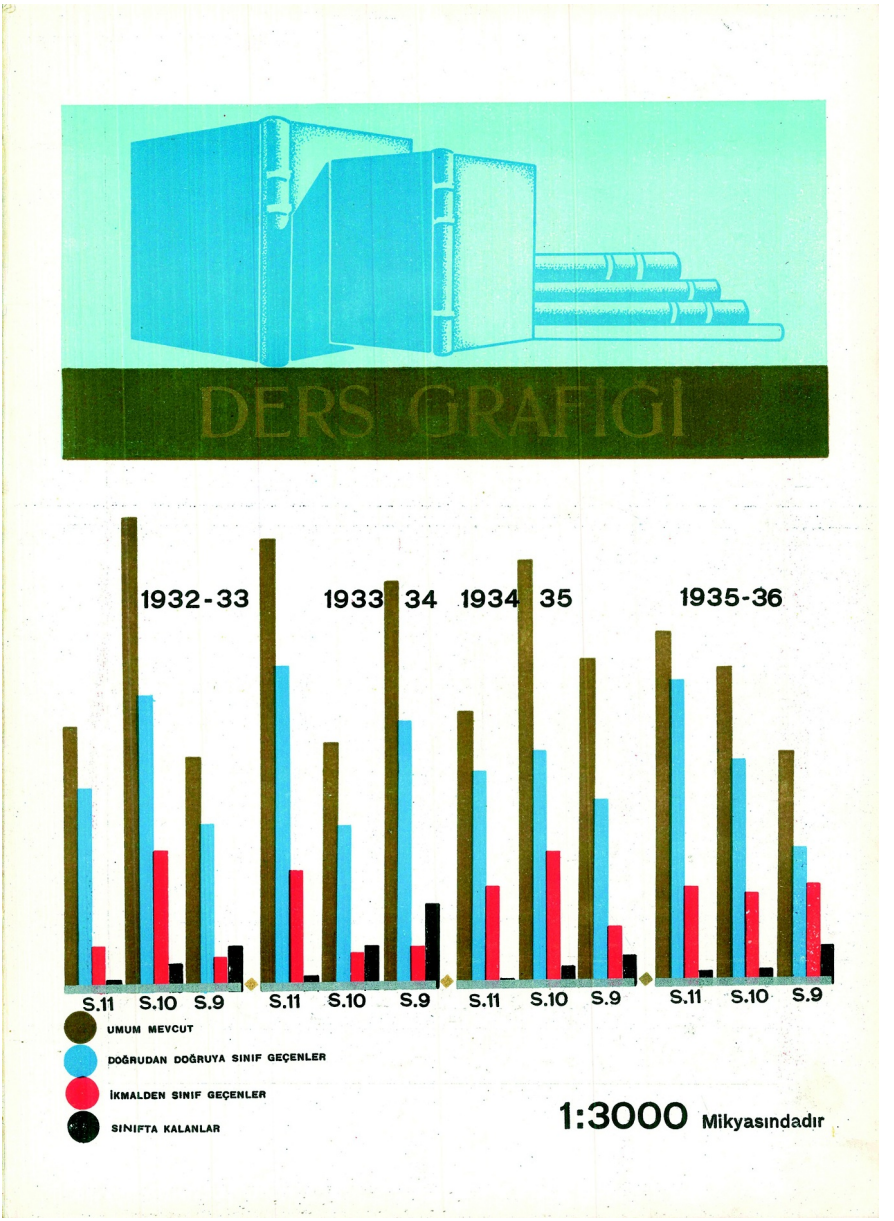


Figure 5: Kuleli Military High School Infographics, 1937. The graphic is about school comparative records of Kuleli Military High School between 1932–1936. Courtesy of Sinan Niyazioğlu Collection.

Since these examples were in print prior to Neurath's time, they are excluded from my comparison. Benjamin C. Fortna (2011) indicates that innovations and technology – in short, what is new – were represented in children's literature as early as the nineteenth century and continued into the twentieth. Even before the foundation of the Turkish Republic, children's periodicals boasted such images on their covers as spaceships, planes, hot air balloons, and the telephone.

In the early republican era, the themes of flight and flying were highly popular. Illustrated books on this topic can be regarded as an extension of the research and development of the airplane construction that took place in Türkiye in the early days of the Republic (Yavuz 2013) and as such closely related to national industrial developments and ideals. Aykut Canlı (2022) notes how literary publications and ephemera about aviation-related topics were on the rise after the foundation of the Turkish Aviation Society (Türk Tayyare Cemiyeti) in 1925. As part of supporting civil aviation, aviation-related courses and activities were introduced in primary schools in the 1930s, involving hands-on activities such as building models of gliders. These publications alongside educational activities aimed to inspire an interest in aviation among children by introducing various technical details or parts of planes.

Considering that the early twentieth century was a time of transition in Türkiye, with the fall of the Ottoman Empire, from the traditional to the modern with the establishment of the Turkish Republic, it is worth contextualizing the times before delving more deeply into analysis of image and text. Hence, the modernization attempts started much earlier in the eighteenth and nineteenth centuries, for instance by founding new schools, enriching or changing curricula, sending envoys and students to Europe, including Vienna, and studying international educational materials (Korkmaz 2006, Akyüz 1994). As such, the educational reforms could be recognized as a follow-up to all these earlier steps towards the drastic change that took place in the early twentieth century. These were times when successive turbulence generated by the Balkan Wars (1912–1913), World War I, and the War of Independence had left the country economically and socially exhausted. As such, the new regime's strategy placed significant emphasis on prioritizing the pivotal role of education and literacy.

Kemal Atatürk, the founder of the Turkish Republic, envisioned knowledge and science as cornerstones for the sustainable development of the new regime, pinpointing the radical educational turn supported by numerous reforms for modernization. Educational reforms brought unification of education as well as the alphabet reform (1928), aiming for a modern and secular system that prioritized scientific thinking (Atatürk, as quoted in Gençkaya 2011, 29). This was reflected not only in informational books but also in mass media, such as magazines, stamps, and ephemera that transmitted information to the general public

quickly and cheaply. Scientific knowledge was frequently transmitted via magazines geared towards a crossover audience, including children and at times teachers in order to inspire, instruct, and suggest hands-on experiments about a given subject matter (for science-based articles in magazines in the early years of the Turkish Republic, see Demir 2020). Among these subjects, health and hygiene emerged as a noteworthy strategy for supporting a robust youth. This was closely linked with the difficulty in reestablishing stability after so much havoc; the government had to educate its citizens in such matters as the health-related issues that the nation faced. These publications were mostly monochromatic and encouraged cooperation with institutions such as the Red Cross.[1]

Besides informational books, magazines and ephemera, guidebooks for families and teachers were also utilized. For instance, in schools, handbooks were distributed to teachers in order to give tips and guidance on how to reproduce basic drawings of sometimes complex processes as a part of children's education. An example of this is a guidebook authored by Kemal Kaya, *Sınıf Yazı Tahtasında Öğretim Resimleri* (Educational Drawings for the Blackboard, 1958), that demonstrates the types of diagrams that could be copied onto the blackboard as the title of the book implies. This suggests that it was unlikely that there were informational books available for each student and teachers had to find alternative ways for transmitting scientific knowledge, such as drawing images in class for students. This black-and-white book presented cross sections of selected objects, architecture, or living things produced to aid the teacher's drawings on the blackboard. Kaya's book was for teachers' use, something that challenges this comparison with Neurath's works geared specifically for children. Nonetheless, it is worth mentioning that Kaya's book presents an ant colony underground or a beehive, a drawing of an aqueduct, cross section of a pyramid and an egg. These drawings depicting cross-sections that may trigger child's attention showed a resemblance to Neurath's subject matter. We do not possess much evidence of Marie Neurath's books in archives or libraries in Türkiye, and none have been translated into Turkish, which makes it hard to draw conclusions about the shared points in Kaya and her work which may benefit further examinations. My recent research showed that Neurath's books cannot be found to this day in many libraries in Türkiye. The next section will offer a deeper analysis by comparing a children's picturebook by Neurath and a Turkish informational book, in order to attain a better view of core elements that were critically used in these books.

1 On health-related informational books during the early Turkish Republic, see Veryeri Alaca et al. (2025).

4 How basic design supports meaning making

The illustrations and text combined with the overall graphic design in picturebooks foster a certain level of design literacy through their visual choices. These can be analyzed by studying selected basic principles and elements of design. When we talk about principles, we can point to the importance of unity and emphasis that is clearly vital in Neurath's books. This may be linked with layout that considers the flow of text and images in harmony that will be discussed in this section. With regard to basic design elements in her books, what emerge as chief components are shape, texture, and color (Lauer and Pentak 2000).

Here, I will start with the use of color as a leading element, before going on to discussing other elements more briefly during my comparison. Annette Werner (2011) studied the importance of the use of color in picturebooks. She states that color is more likely to create interest and trigger memories of the illustrations when compared to black-and-white or monochromatic books. Symbolic use of color is significant in this case, as it gives a specific message to the viewer without the direct use of text. Werner references Lee, Tomilawa, and Dodd in stating that "children classify objects and develop concepts better when based on color than when using form or function" (40). Furthermore, she talks about "ideational function" that enhances the narrative and enriches the information attained from the visual language used (40). According to Marie Neurath, it was more important for color to convey an interpretation of what it represents, increasing the effectiveness of the charts, rather than selecting colors merely based on what is aesthetically pleasing to the eye (Walker 2013, 408). In cases where color was used in charts, Neurath would likely select black for a bar graph that represented something like carbon, making a connection between the local color of the shape and its origin. In monochromatic visuals, "tone and pattern" was used to indicate the varying substances (Walker 2013, 410). Neurath's books sometimes had as many as nine colors, or sometimes just a few, depending on the cost allocation for the printing. In analyzing examples from Türkiye, many early twentieth-century examples are created either in black-and-white or with a few colors, with a greater color range generally only coming later. Some examples of these black-and-white books were part of the school curriculum and the lack of color was a cost-saving decision.

Here, I present two books from Türkiye that explore the topic of the sky (see Figures 6 and 7) in order to begin a comparison with Neurath's work *Let's Look at the Sky* (1952). *Gökyüzü ve Yıldızlar* (The Sky and the Stars, 1945) was printed before Neurath's book and *Gökyüzünde Neler Var?* (What is in the Sky?, 1965) after, and they reflect a change in publication preferences in time. In Kemal Kaya's *The Sky and The Stars* text dominates over the black-and-white



Figure 6: *Gökyüzü ve Yıldızlar* (The Sky and the Stars, 1945) by Kemal Kaya. The book cover illustration presents a falling star, the moon and Saturn in the night sky. Private collection.



Figure 7: *Gökyüzünde Neler Var?* (What Is in the Sky?, 1965) by İsmet Konuk. Ill. Adnan Turani. The cover illustration presents a woman and a man in their trench coats gazing at the sky. Private collection.

images. The cover is the only exception, with deep blue used for the sky and yellow for the stars, but the earth is still monochromatic. Although the artist of the illustrations is not mentioned in Kaya's book, the cover composition is quite similar to the cover image of Neurath's book. This reveals parallel tendencies in depicting generic scenes by choosing the most elemental forms. The anonymity of the illustration here hints at the emerging standards of children's book illustration in Türkiye, where the author dominated in publication. Hence, the artist of the illustrations is not found in Kaya's book.

Kaya presents the nonfictional information in a tone reminiscent of literary narration that makes reference to ancient beliefs about the sky and the universe, and this gives the reading a tale-like atmosphere. Scientific information is intermixed with stories from the past. The book presents current scientific beliefs, and this is juxtaposed with past myths. For instance, telescopes for studying planets like Mars are discussed on one side, while on the other side there is a tale of the Greek god of war Mars. In that manner, this book compiles varied information and presents it to its readers in a multifaceted manner.

Published nearly a decade later in Türkiye, *What is in the Sky?*, written by İsmet Konuk and illustrated by artist Adnan Turani, is a picturebook covering almost the same topic as Neurath's *Let's Look at the Sky* (1952). Author İsmet Konuk was a well-known geography teacher and he penned numerous textbooks on geography for primary-school and secondary-school children. He also wrote children's books about the world, Türkiye's geography, and specific cities including Istanbul, Ankara, and Bolu. He was a faculty member in the Department of Social Sciences, History, and Geography at the Gazi Education Institute in Ankara, and in the period 1967–1973 at the Robert College in Istanbul (Kaya 2013; RC Quarterly 2005). We see that both books cover issues such as solar eclipses, constellations, the polar star, and the movement of the planets with differing approaches to their depictions. For example, Neurath presents more images and fewer words on each page, something that makes good use of negative spaces and leaves some room to breathe in its layout. The visual elements are vignettes at times that float in space and geometrically fit into the typographic units. On certain pages the illustrations make a bold movement in space and dominate the double-spread, while in other pages the verso and recto have separate illustrations. Vignettes start from the title page and enrich the rest of the book when necessary. Each page presents a unique layout that is energized with textual and typographic elements. In contrast, *What Is in the Sky?* dedicates almost the same amount of page surface to its text and images. While Neurath's book can be regarded as an image-driven book, this work is a text-driven one, as the layout utilizes running text continuously. In this case, Neurath's work creates "visual focal points that lead the reader into the spread" (Haslam 2006, 146). However, Turani does not use vi-

gnettes, except for one instance, and all images come in rectangular frames that do not cater to an interplay of shapes on the page. In that manner, the layout of *Let's Look at the Sky* invites a more dynamic reading experience than *What is in the Sky?*. One reason for this may be the fact that Adnan Turani had mainly worked as a painter, not as a book designer, while Neurath cooperated with a team of designers.

Neurath's color choices also differ from Turani's in substantial ways, even though some hues like blue and yellow are shared across the two books. In Neurath's book, red and orange are integrated into the compositions, recalling a triadic color scheme. As this color scheme makes use of hues from the three discrete parts of the color wheel, it is considered to enliven the visual atmosphere (Lauer and Pentak 2000). This is true in Neurath's work where warm colored sections immediately draw our attention and activate the surface. For instance, we see a warm colored circular shape on the page as a red dwarf compared to white dwarfs (Figure 8), all floating in deep black space (Neurath 1952, 35). When Neurath's book presents the Northern and Southern Lights, we also see expressive strips of yellow and orange covering the recto page. This page is striking, especially complimenting the subtle black verso page where sunspots are explained. The two pages are interconnected visually and thematically as the "electrified particles" reach the poles from space (verso), and accordingly the atmosphere changes color on the recto page (Neurath 1952, 10–11). In that manner, the pages in Neurath's book flow into one another with diverse implementations of color to sustain a balanced use of differing hues, making for an invigorating start to each page. The text is superimposed on different backgrounds of white, black, and even red, encouraging a more enjoyable reading. In contrast to Neurath, *What Is in the Sky?* primarily presents a more realistic coloring of its theme, making use of a complementary color scheme of blue and yellow. The images, utilizing colors from opposing parts of the color wheel, often imply contrast (Lauer and Pentak 2000). They are mostly dark blue, underscoring the depth of space in contrast to the white, yellow, or orange shapes.

While Neurath's book centers around one style, Turani employs two distinct styles in his illustrations. In *What Is in the Sky?* there are images that are more abstract and others that are more realistic. For instance, visuals that depict ancient people during a ceremony to protect themselves from a lunar eclipse or a shepherd observing the moon are almost lyrical depictions, where additional colors such as greens are incorporated. While there is an artistic approach in Turani's illustrative style in some images, it is tempered by the aim to depict information with clarity in others. For instance, we see a close-up of the earth when it was newly formed, supported by another one that presents a cross section of the earth's strata in a more scientific approach in this book. In Neurath's work, the

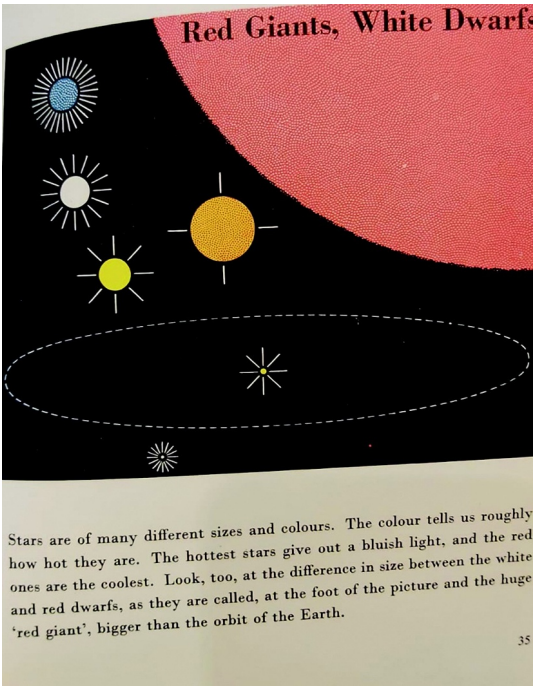
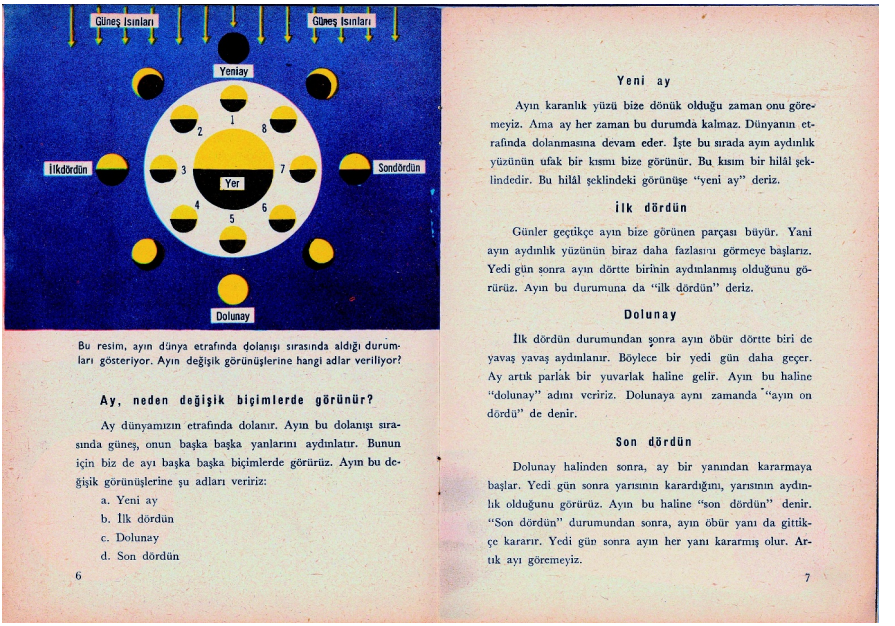


Figure 8: *Let's Look at the Sky* (1952) by Marie Neurath, p. 35. The illustration presents a page with the deep space image having a large red giant at the right corner and a text from Marie Neurath's book. Otto and Marie Neurath Isotype Collection, University of Reading.

mostly monochromatic frames present sequences from real life to contextualize the changes in planets, the sun, or the moon. The graphic versus painterly illustration preferences in the two books can be traced in utilization of textures as well. While both books make use of flat surfaces, Turani's brushstrokes add a layer of artistic touch to the mountains, the face of the moon, or the Milky Way. In Neurath's work, the textures come forth as more systematic patterns, either to present shadows or to add a distinction to a surface area such as a planet against the black space. Throughout Neurath's book, visual emphasis is attained by isolating a form in order to detach it from its background. At times, the object is the only image on an otherwise blank page, which is a technique used in *Let's Look at the Sky* but not in *What Is in the Sky?*; in the latter, all negative spaces are painted fully. When Turani painted a background, it was mostly to anchor selected imagery like the Milky Way or stars. The approach that was frequently utilized by Neurath, presenting information step by step or at times in a sequence

that helped the viewer to follow the processes, is not as widely seen in Turani's illustrations.

Nonetheless, despite these differences there are parallels, such as the people observing the sky and the depiction of planets, that indicate shared visual strategies. Neurath additionally includes certain points of attraction that may allure the child, such as a telescope, red giants, and the rings of Saturn. In contrast, *What Is in the Sky?* supports the selected content by including various idioms in relation to the stars, and this book discusses ancient beliefs about celestial occurrences such as the lunar eclipse in its text. Based on these preferences, Neurath's book presents the dominance of shape over atmosphere, whereas Turani's work prioritizes the unified picture over singled-out shapes in the compositions. Nonetheless, certain depictions in both books follow parallel paths that will be mentioned here.



Bu resim, ayın dünya etrafında dolanışı sırasında aldığı durumları gösteriyor. Ayın değişik görünüşlerine hangi adlar veriliyor?

Ay, neden değişik biçimlerde görünür?

Ay dünyamızın etrafında dolanır. Ayın bu dolanışı sırasında güneş, onun başka başka yanlarını aydınlatır. Bunun için biz de ayı başka başka biçimlerde görürüz. Ayın bu değişik görünüşlerine şu adları veririz:

a. Yeni ay
b. İlk dördün
c. Dolunay
d. Son dördün

6

Yeni ay

Ayın karanlık yüzü bize dönük olduğu zaman onu göremeyiz. Ama ay her zaman bu durumda kalmaz. Dünyanın etrafında dolanmasına devam eder. İşte bu sırada ayın aydınlık yüzünün ufak bir kısmı bize görünür. Bu kısım bir hilâl şeklindedir. Bu hilâl şeklindeki görünüşe "yeni ay" deriz.

İlk dördün

Günler geçtikçe ayın bize görünen parçası büyür. Yani ayın aydınlık yüzünün biraz daha fazlasını görmeye başlarız. Yedi gün sonra ayın dörtte birinin aydınlanmış olduğunu görürüz. Ayın bu durumuna da "ilk dördün" deriz.

Dolunay

İlk dördün durumundan sonra ayın öbür dörtte biri de yavaş yavaş aydınlanır. Böylece bir yedi gün daha geçer. Ay artık parlak bir yuvarlak haline gelir. Ayın bu haline "dolunay" adını veririz. Dolunaya aynı zamanda "ayın on dördü" de denir.

Son dördün

Dolunay halinden sonra, ay bir yanından kararmaya başlar. Yedi gün sonra yarısının kararmış, yarısının aydınlık olduğunu görürüz. Ayın bu haline "son dördün" denir. "Son dördün" durumundan sonra, ayın öbür yanı da gittikçe kararır. Yedi gün sonra ayın her yanı kararmış olur. Artık ayı göremeyiz.

7

Figure 9: *Gökyüzünde Neler Var?* (What Is in the Sky?, 1965) by İsmet Konuk. Ill. Adnan Turani. The double spread presents mainly text with one fourth of the layout dedicated to a graphic about the phases of the moon circling the earth. Private collection.

In both books, a double-spread is dedicated to the changing phases of the moon, with piercing yellow and black contrasts for shadow and light (see Figures 9 and 10). When we look closely at Neurath's version, the pictorial language is more graphical and technical, and frames delineate the sequence of the phenomenon

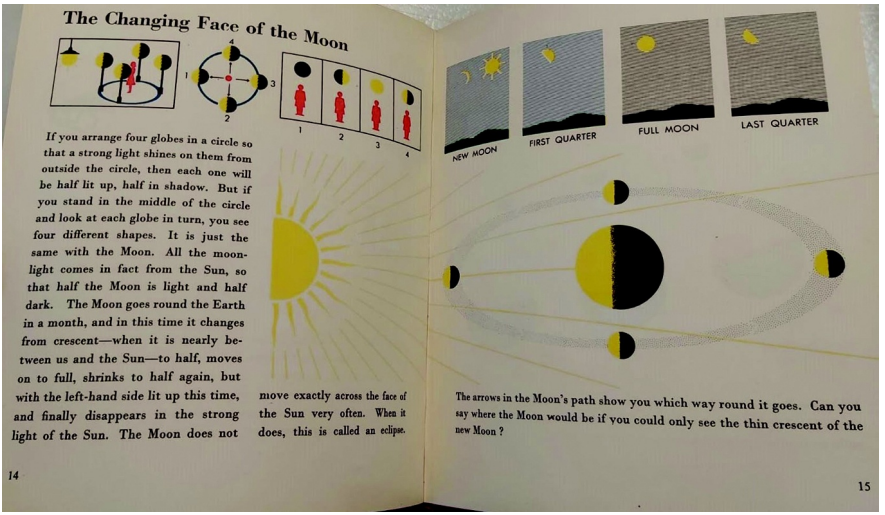


Figure 10: *Let's Look at the Sky* (1952) by Marie Neurath, pp. 14–15. The double spread presents mainly graphics with one third of the layout dedicated to text about the phases of the moon circling the earth. Otto and Marie Neurath Isotype Collection, University of Reading.

in concise steps to give a clear and comprehensive explanation. This section thoroughly demystifies what we observe from earth by clearly explaining the phases of the moon as it changes shape. The information is divided into small units that ease the delivery of different topics step by step. Here, in a double-spread, we see two sets of sequential images and a larger one covering approximately two-thirds of a page's surface to convey an understanding of this issue. In addition to a conceptual graphic of the moon and the sun, the reader (depicted as a figure in red) is presented with potential hands-on experiments that could be carried out with a globe and the light source. The text refers to the importance of where one holds the light as it hits the globe, mimicking sunlight as it hits the moon, and thus the importance of position during this observation is emphasized.

Four phases are listed in both books: new moon, first and last quarter, and full moon. While Turani dedicates individual paragraphs to each phase, Neurath explains these phases with four aforementioned frames indicating a clear pictorial tendency. In an additional visual, Neurath situates a human figure exposed to these four spheres that encircle her from four different sides. The position of the figure and the spheres against a light source helps the reader envision the change of shadow and light areas of the moon itself. Turani also presents the phases of the moon by presenting a circular graphic. Hence, the absence of the figure in the middle makes it more challenging to grasp the moon's transformation. The ab-

sence of the color red also scatters our attention among circular shapes. Besides image-based differences, there are choices that vary based on the texts as well. Neurath's text ends with a question designed to encourage further thought of the phases of the moon: "Can you say where the Moon would be if you could only see the thin crescent of the new Moon?" (Neurath 1952, 15). Concluding a topic with a question supports problem-solving and stirs up debate and additional questions about the topic while making the act of reading more interactive.

The differences in these two books may relate to the varied backgrounds of their creators. As a part of his higher education, Turani studied in Germany from 1953 on a scholarship. He worked with various artists in the Munich, Stuttgart, and Hamburg academies of fine arts. Upon his return to Türkiye, he made an artistic and academic career working in various universities including Gazi, Hacettepe, and Bilkent in Ankara. While Turani launched his career as a painter, he also worked with various printmaking techniques, including lithography and illustrated children's books. Thus, his cover for this book seems to feed upon printmaking technologies such as stencils or the screen-printing method. In his art, Turani was influenced by abstraction and implemented it in his artworks across media (Turani 2023). *What Is in the Sky?* vacillates between a visually graphic language and a more painterly one compared to Neurath's book; in the latter the images are more consistent with one another. In sum, the resemblances in the two works insinuate parallel concerns in depicting the sky but with solutions that are shared only to a certain degree.

5 Bonds between Neurath's books and Turkish informational books

Studying Neurath's books and those informational books produced in Türkiye reveal the various evolutions of design in the same period, with many parallel characteristics yet certain diverging ones. Considering the exchange of ideas, students, experts, and educational materials that was ongoing with Austria, the continued cooperation between the two countries likely brought Neurath's influence to Türkiye. Apart from the posters developed that are reminiscent of Otto Neurath's work, there is no direct evidence in support of this and further inquiry is required. Even after Marie Neurath was forced to move to the UK to escape the ravages of World War II, we nonetheless still elaborate on traces of her strategies in informational books in Türkiye. Here, it will be possible to give a brief overview of convergences as well as diverging preferences in the making of these books.

The first parallels we see are in the subject matter. Of the texts selected for study here, both Neurath's books and those books produced at the same time in Türkiye focus on nature and physical-environment topics as well as technological advances. In terms of new technologies, however, Türkiye's informational books often reflected the utilization of those technologies – for instance electricity – in everyday life, while Neurath focused on the peculiarities of advanced technologies and scientific knowledge, such as explaining the functioning of the atom and its innate structure. We do not see the same specialized analysis in illustrated books produced in Türkiye. Yet, it is possible to come across translations, most often of encyclopedias mainly from Europe that discuss parallel scientific topics (see the books translated as *Gökküşağı: Modern Ansiklopedik Bilgiler* by the permission of the Istituto Geografico de Agostini, Novara, Italy, 1967). When we look at what has been produced in Türkiye in terms of illustrated books or picturebooks, agriculture followed by health tend to dominate as leading topics.[2]

In terms of storytelling, Neurath's picturebooks cultivate more than one topic, as in *Machines that Seem to Think* (1954), a strategy that was practiced in periodicals rather than picturebooks in Türkiye. Neurath's vigilantly selected topics are often introduced with a curious title and tied to daily life, so as to raise the child's interest. In many cases, informational books from Türkiye presented a single theme that would be studied extensively rather than a grouping of various topics.

In terms of visuals, Neurath's visual language is minimal and the color palette is distinctive. Her books utilized abstracted graphics of real forms and applied color in a systematic way. The graphics and charts in Neurath's works were consistently used throughout her publications with a masterful graphic layout. In informational books from Türkiye, charts and graphs were not as commonly used when compared with Neurath. Where two-dimensional images were regularly found in Neurath's works, similar books in Türkiye utilized more realistic imagery created often by painters and not necessarily designers. Furthermore, abstraction of realistic forms and figures was utilized to a higher degree in Neurath's works. Text-heavy content came forth in Turkish informational books, whereas Neurath's work centered on visual storytelling and image-based explanations. In contrast, in many books from Türkiye, visuals in the layout were easily

2 Demiray, Kemal and Ali Rıza Özgüç. *Önce Sağlık* [Health Comes First]. Ankara: MEB, 1964.
Asena, Orhan. *Hastaya Nasıl Bakılır* [How to Take Care of the Sick]. Ankara: MEB, 1965.
Çilenti, Kamuran. *Ekinlerimizi Koruyalım* [Let's Protect Our Crops]. Ill. Hüseyin Özcan. Ankara: MEB, 1964.
Demiray, Kemal. *Harman* [Threshing]. İstanbul: MEB, 1961.

recognizable through their painterly depictions and did not necessarily challenge the readers with their visual language.

Neurath's picturebooks fostered a sustained design literacy and efficiently utilized the minimal nature of graphic language. These practices were only partially integrated into those books from Türkiye that have been studied in this chapter. Despite all these differences, reducing the color palette in order to cut printing costs was common to both sides. In many cases, Neurath's works still had more color. In sum, though the design approaches differed, the aim to make knowledge accessible, especially scientific knowledge, to the general public was a shared purpose in all the picturebooks under investigation.

6 Underlying mechanisms and contexts of book production for Neurath and book makers in Türkiye

As mentioned earlier, Neurath's work was groundbreaking and as such diverged from the many authors and illustrators who were publishing books in Türkiye alongside their other occupations at the time. By comparing the works of Neurath with those books being published in Türkiye, it is possible to uncover how the differing geographical settings and sociopolitical contexts influenced the production process in ways direct and indirect. This comparison explores two key elements of the underlying principles of the selected picturebooks' overall creative process and their visual language. First, influences that shape her visual language are critical to Neurath as they helped her formulate a universal language through Isotype. As such, her picturebooks convey basic to complex information to its audience that reinforce visual reading strategies for easy understanding. Of course, Otto and Marie Neurath's work in Austria was interrupted as early as 1934 with their relocation to the Netherlands. Their full-fledged endeavors recommenced only after a challenging move to the United Kingdom in the 1940s (Lupton 1986). These events were life-changing experiences that, firstly, uprooted Marie Neurath from a source of deep influence, namely the museum and, secondly, transplanted her into a completely foreign land. Once in the United Kingdom, she had to start connecting with publishers in order to continue reaching out to wider audiences. This personal journey is unlike what many of those authors, illustrators, and publishers from Türkiye at the time experienced. When we look at Türkiye following World War I, the War of Independence, and the establishment of the new Turkish Republic, it was a time of upheaval but also a time to start anew. The new regime

introduced reforms that impacted every level of life, from government and public healthcare to even informational books. In that manner, reaching the masses and democratizing education through printed media was a shared aim for both parties, but accomplished through differing strategies.

Neurath's creative preferences aimed for a visual language that could be grasped by the masses. Thus, given the complexity of some of the content and abstraction of graphics, it is hard to prove if this aim was fully achieved. Empirical studies would be beneficial in order to understand the impact of these books on readers. Neurath's overall design preferences were inclined to simplifying objects to their bare minimum, color-coding choices to convey a system, and utilizing technical charts that showed the operations of machines or systems. Neurath reflected on Isotype and formulation of symbols as follows:

> Isotype has always tried to start from the familiar and build up on it; it does this in all its charts and in the design of symbols. Many symbols are self-explanatory, many can easily be grasped and remembered when only explained once. (1949, 22)

As such, stripping forms down to the bare minimum so that they may symbolize a form made them very different from photographic reality, which could be another challenge that the viewer needs to decipher. When we look at the Turkish context, however, we find book illustrators that had a more artistic training, often with higher education in Europe. Due to their educational focus on art, painting, and at times printmaking, a selection of Turkish books tended to be more artistic than technical even when depicting scientific topics. When we examine the illustrations, book covers, and posters of İhap Hulusi, a renowned graphic artist of the Turkish Republic, the realistic imagery comes forth as a preferred style (Merter 2008). Given that the new regime had adopted the Latin alphabet, the informational books could be beneficial for the adults relearning to read and not just for children. Accordingly, sometimes photographs were also utilized alongside realistic illustrative styles to help understand often text-heavy books. Photographs came in handy and were found useful in supporting the textual content of books in Türkiye at a time when professional illustrators were only gradually taking the lead. In contrast, most of Marie Neurath's books utilized illustrations rather than photographs.[3] In sum, reaching the masses was a strategy of the Turkish Republic and the alphabet reform was at the core of this strategy, as the new letters were easier to master. In that sense, the utilization of images together with the Latin alphabet were two sides of the same coin that was

3 We see the utilization of photos in Marie Neurath's book *Über Telefon, Funk und Fernsehen* (From Telegraph to Telstar, 1971).

strategized. Nonetheless, many of the informational books conveyed their messages more with their texts than their images. Most of these books were mainly geared towards school use.

Secondly, Neurath had a team that she could work with on a series of publications and she could carry out more research before and during production. Whereas in Türkiye many books were created by one author and one artist in smaller series. This situation can be regarded as a drawback for those books published in Türkiye and a winning situation for the books authored by Neurath. While Neurath's books present a consistent design strategy as a result, the informational books from Türkiye were not as standardized, even though certain series were compiled with tendencies towards homogeneity. When we observe this gradually changing trajectory of informational books in Türkiye at that time, the predominance of translations is worth mentioning, as they influenced the publication environment to a certain degree. The listed influences, visual and verbal language preferences, and the amount of collaboration all played key roles in generating the diverging outcomes between the selected books investigated in this chapter.

Though books seemed to be streaming into Türkiye, Turkish books at that time scarcely reached the international market. In contrast, Neurath's work was so innovative that it has been able to hold its own in the international book market for decades and has been translated into many languages. The wide availability of these books in English would also bring a clear advantage. Turkish picturebooks often bridged fiction and reality, responding to local needs. The content presented real-life experiences and encouraged learning for different parties, and it revealed unique local tendencies that could be exemplary for other countries that have a large rural population.

7 Roadmaps and crossings

Consequently, it is hard to pinpoint the exact reason for why we do not find any of Marie Neurath's books in Turkish, hence a look at the books published in that same era may be telling. As Türkiye went through myriad reforms in the early twentieth century, many of the illustrated books did not apply abstract design elements, but rather they presented incidents directly from real life that could appeal to the public in rural areas as well as in cities. Realistic works not only informed but also reflected the lifestyles of those years. Many of these books often prioritized content over book design and aimed to educate and empower citizens starting from an early age. Considering that a general reading culture based on

the new alphabet was emerging, children's books were still scarce and children's libraries were not widespread. Oral storytelling traditions existed to an extent and the circumstances did not match those of Neurath's circle. Her works entwined modern design and Isotype graphics and these visuals could be estranging at first sight for the Turkish audience, and perhaps did not resonate with one another immediately.

In conclusion, this chapter aimed to compare informational books from Türkiye with Neurath's work, looking closely at an era when scientific knowledge was valued. While pictorial realism and the use of linear perspective was on the rise in the early years of the twentieth century in Türkiye, leaving abstraction relegated mainly to crafts, Neurath's simplification in formulating pictograms, symbols, flat and two-dimensional visual space had already become a patently recognizable style that was stupendously hers.

The popularity of symbol, pattern, motif, and abstraction that once held prime place in arts and crafts – but not necessarily in children's literature – diminished as Westernization encroached on Türkiye, a complex subject that deserves a separate study of its own. In Neurath's case, the stripping down of images to the bare minimum brought forth the storytelling potential of basic design elements, including shape and color, in their most elemental states. In that way, the visual language of Neurath in itself can be nourishing for a child, despite the differing subjects that she covers. Neurath's visuals wrapped around curious texts, covering an array of subjects and remarkably illuminating scientific knowledge in her picturebooks, are a manifestation where the graphics, shapes in their purest form, and design altogether take precedence and convey a visual literacy perhaps as important as the subjects that they transmit.

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Gernot Waldner

Isotype Reloaded: An Interim Report on a Project in the Footsteps of Marie Neurath

1 Marie Neurath's engagement with visual education at the Social and Economic Museum of Vienna

The chapter gives an overview of the activities of the Social and Economic Museum in Vienna (1925–1934), with a focus on the work of Marie Neurath. Subsequently, a current project by the successor museum, attempting to follow in Marie Neurath's footsteps, is presented. Before she became a renowned author of children's books, Marie Neurath worked with Otto Neurath, who would later be her husband, in a museum "dedicated to the present" (Neurath 2021a [1925], 5). Founded in 1925, the Social and Economic Museum did not display rare objects, instead it educated the general public about social and economic changes leading from the past to the present. The success of this museum that operated internationally – between 1925 and 1934 more than 30 exhibitions in seven countries were on display (M. Neurath 2013 [1978], 527–531) – was due to several reasons. The museum was established at the time of the so-called Red Vienna, a period of Social Democratic government after the first free elections in the Austrian capital in 1919. For the first time, women were allowed to cast their votes and all votes counted equally; previously, landowners' votes had counted more. The newly elected government set new standards in housing and social and educational policies that define the city to this day (Schwarz et al. 2019, 12–15). Since anti-Semitic and nationalist organizations (the Deutscher Klub, Bärenhöhle) dominated the universities (Taschwer 2022, 50–55), the city government created and supported its own educational institutions such as workers' libraries, adult education centers, independent research institutes, further learning centers, and precisely this museum. The matter-of-fact presentation of the city's achievements, ranging from introduced school lunches and new parks to tens of thousands of community housing units, did not stop the museum from depicting critiques of the city government, such as the extent to which women's emancipation was still lagging behind political demands (Leichter 1932). In addition to the focus on the city, however, the museum's educational activities were international from the very beginning.

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Political affinities, such as international union associations, and intellectual convictions, such as the global nature of local economics, shaped the museum's orientation. Already in his first draft for the museum in July 1924, Otto Neurath noted that "[i]t is important to show the whole of the earth's surface with its variety of economic forms in different eras, in order to reflect how the capitalist order gradually takes hold of the whole world and eradicates all other forms of economy" (Burke 2013a, 29–30). This early piece anticipates the museum's permanent exhibition that ran for seven years from 1927 in the Vienna City Hall, in which one was guided by Marie Neurath and other staff members through global history as a sequence of economic eras (Burke 2013a, 42). However, the numerous projects and various museum employees worked at the Society and Economy Museum for different reasons. Sometimes, outstanding artistic or intellectual abilities were more important than shared political views, as e.g. in the case of the style-setting artist Gerd Arntz (Stadler 2021, 123). Also for Marie Neurath, it was her professional expertise, a state examination in physics, and training at an art college that brought her to Vienna. In September 1924, she traveled from Göttingen to Vienna to visit her brother, the mathematician Kurt Reidemeister, who taught at the University of Vienna and had met Otto Neurath through colloquia of the Vienna Circle. Her studies of physics with Max Planck and her drawing skills refined at the Braunschweig School of Art must have made a lasting impression on Otto Neurath (Burke 2013a, 35). Her combination of natural sciences and fine arts was of great importance for a museum working in what today would be called a transdisciplinary manner. A brief listing of employees and partners further outlines how wide the museum's range of collaborators was: Gerd Arntz, the constructivist painter from Düsseldorf, the artist El Lissitzky,[1] the author and educator Paul Otlet (Brussels), Lothian Small and Marie Louise Berg from the League of Nations, the famous typographer Jan Tschichold from Prague, *Survey Graphic*, and the Russel Sage Foundation in New York, the pacifist Vredeshuis in The Hague, the World Association for Adult Education and the BBC, the Russian embassy, geographers, statisticians, writers, and other academics (M. Neurath 2013, 527–531). The intellectual exchanges with the Bauhaus (László Moholy-Nagy, Heinz Allner, Lotte Beese) are well documented (Galison 1990). The museum's internationality is reflected not only in its orientation and personnel, but also in its de facto work. The most important publication during the Viennese period (1925–1934), *Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk*, is a

1 Otto and Marie Neurath became friends with Lazar (El) Lissitzky and Sophie Lissitzky-Küpper. They met in 1928 in Cologne, the Lissitzkys visited the Neuraths in Vienna (M. Neurath 2013 [1978], 529), and later they met regularly in Russia during the launch of the Izostat Institute (Minns 2013, 261).

loose collection of graphics and maps produced in Leipzig, the artisanal quality of which is outstanding. The atlas provides an overview of world history, the production and distribution of major economic goods, the current political systems, colonial domination, and the prevalence of slavery at the time (Figure 1). Charts like the latter show that democratic participation cannot be taken for granted. Overall, the goal was to provide working people with an overview of the facts of the world. Conceptual connections between this early phase of Marie Neurath's work, in which colonial politics were a recurrent topic of visualization, and her projects of the 1950s when she carried out educational work in former African colonies (Kindel 2013, 448–497), remain a desideratum of research.

2 Users in the center: Museum and school

The concept, amenities, and organization of the museum were innovative. As stated, Otto Neurath felt that an empirical, global education was necessary for informed citizens in a democracy (Neurath 2021b [1928], 126–132). Photographic projections, interactive maps, geological and architectural models were designed, and Gerd Arntz created stylistically striking symbols, maps, and pictorial statistics. The organization of the museum was centered around the visitors: with questionnaires, flyers, and journals, and through interaction, the museum tried to continually improve the exhibitions from visitors' feedback, increasing the effectiveness of knowledge transfer (Kraeutler 2008, 143–174). Within this organization, Marie Neurath headed the Department of Transformation, a task for which she seemed particularly well suited because of her earlier training in Göttingen. She coordinated scientific expertise, graphic design, and visitors' comments, that is, she adapted scientific arguments graphically in order to generate visitors' sustained interest in social and economic facts (M. Neurath 2017, 27–32). This direct interaction with visitors also served as a way for the museum to improve itself. Both in conversation and through a questionnaire distributed after a tour of the museum, critical comments were solicited from visitors. The first part of one of these questionnaires (Nemeth 2021, 74) asks for overall feedback on the exhibition, including general impressions, personal preferences, matters that were confusing, and wishes for future graphics. The second part of the questionnaire is addressed to the teachers who visited the exhibition with their students. This part asks about the school level, the graphics seen, the behavior of the students, the preparation for the visit, and the follow-up in class. One question is dedicated to the speed of understanding, i.e. what was slow to be understood and what was grasped immediately by the students. The museum also asked in which school subjects the pictorial statistics could be used and

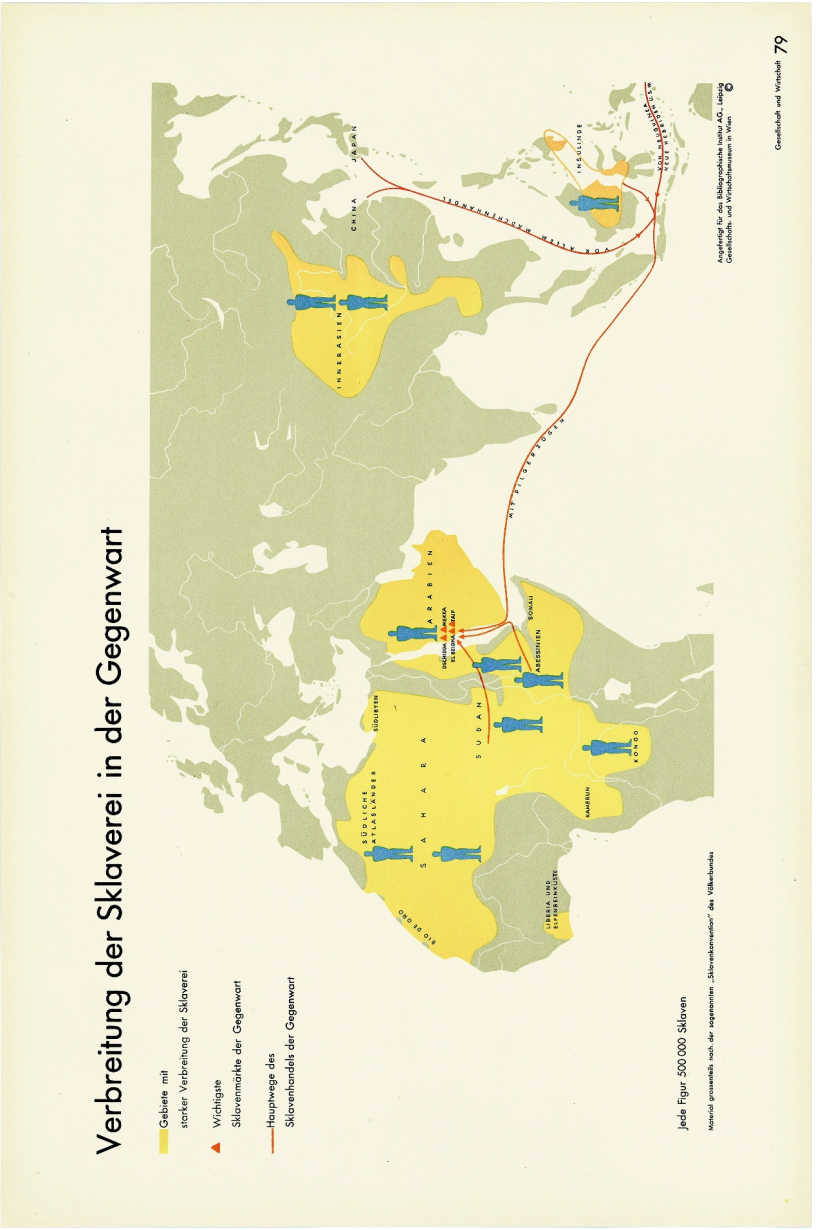


Figure 1: Verbreitung der Sklaverei in der Gegenwart, Gesellschafts- und Wirtschaftsmuseum. Published in a portfolio containing 100 graphics, the map shows the contemporary distribution of the slave trade worldwide. It is therefore a paradigmatic example of familiarizing a non-educated audience with the world, allaying fears and emphasizing challenges.

how the so-called Viennese Method of Pictorial Statistics might be adopted in school. Finally, it is noted that the first part of the questionnaire is specifically for young people and their responses have special relevance for the museum. The fact that comments like these were taken seriously is also evidenced by the numerous variants of improved graphics that have survived to the present day (Kinross 2013, 156–163).

During her time in Vienna, Marie Neurath gained pedagogical experience with children's and adolescents' interaction with graphics. Few autobiographical notes of her personal encounters are available, but the museum's publications provide a detailed sense of the scope and types of pedagogy employed. In the early 1930s, the museum intensified its cooperation with schools; a publication by Otto Neurath with the telling title *Bildstatistik nach Wiener Methode in der Schule* (The Viennese Method of Pictorial Statistics in School) provides an overview of these activities. As this book states at the beginning, in 1933 collaborations were ongoing with schools in Vienna, Berlin, and Mannheim (Neurath 2021c [1933], 267), and the first international successes were achieved in Zagreb and at a world congress for pedagogy in Geneva. Later the Mundaneum in Vienna, an institution founded with Paul Otlet, was conceived to spread picture pedagogy throughout the world, albeit this did not exist for long (Wright 2014, 199). In order to further cooperate with schools on several levels, the book makes different suggestions for how pictorial statistics could be used in school. First, the process of production established in the museum is made transparent, in order for teachers to guide a similar process in class. Otto Neurath offers answers to pertinent questions: How does one choose a certain statistics? What factors have to be considered when rounding numbers? What are the options for arranging the symbols? Some graphics already produced by students in Vienna were printed at the end of the publication to demonstrate the feasibility of this approach (Neurath 2021c [1933], 328–330). The second form of collaboration was the adoption of the museum's teaching materials for use in schools. The museum provided a number of teaching aids, namely ready-made graphics in various formats, for group work in large format and for individual collections in small format. The museum also exhibited large magnetic boards, probably inspired by advertising companies, on which symbols could be moved to realize quantitative changes over time (Neurath 2021c [1933], 331–333). Third, Neurath makes suggestions for how pictorial statistics can be used to bridge lower and higher levels of schooling. He explains, for example, that the concept of "relative density" is quite demanding in algebraic terms, yet easy to grasp graphically, because it simply stands for a certain number of symbols in a constant area. Without wanting to overturn the curriculum, Neurath therefore suggests using graphic education as a point of resumption, i.e. introducing the graphic notion of relative density at an early stage of schooling and, at a

later stage, referring to the already familiar representation when calculating the same concept (Neurath 2021c [1933], 297). Fourth, the charts displayed by the museum were used to break down the isolation of individual school subjects and stimulate a synergy between them. Several proposals to combine history, physics, mathematics, chemistry, and geography are put forward (Neurath 2021c [1933], 301–303). Above all, the concrete examples and responses from teachers, which Neurath gives here in rudimentary form, vividly illustrate the use of graphics in schools. For example, for teenagers inclined to naturalism, it is suggested to try out stamp shapes (Neurath 2021c [1933], 302). For six-year-olds, on the other hand, a kind of choreography is mentioned in which students line up one behind the other, with the one in front representing the set, thereby introducing set theory (Neurath 2021c [1933], 303). For the same age group, it is recommended to use picture stories first, before arriving at social or economic statements using the same symbols (Neurath 2021c [1933], 298). In order to illustrate established practices in the schools, shorter quotations from researchers, teachers, and students are also printed here (Neurath 2021c [1933], 334–336). These quotations are promotional in nature. More detailed and critical accounts of teachers' experiences with the atlas *Gesellschaft und Wirtschaft* and other teaching materials were published in the journal of the museum and collected by Marie Neurath (Burke 2013b, 201–203).

For Marie Neurath to make her unintended transition from museum education to the writing of children's books after her escape from Vienna in 1934, it would become important to be aware of children's and young people's visual wishes. What do they want to see? How could their curiosity be stimulated? The visitor-centered museum most likely helped her to get an impression of these preferences. In the early 1930s, the museum published its own journal in which readers were invited to name topics they would like to see visualized (Gesellschafts- und Wirtschaftsmuseum 1931). In this way, the museum developed decentralized means of learning key facts about the world. As noted, many of the large graphics were reprinted in smaller format and could be purchased at the museum; individual collections from this period have been preserved. The question of how one's own work is received by an anonymous public is not a trivial one. In the case of Marie Neurath's work, it can be said that she had been in direct contact with viewers of graphics for years, and that she was probably able to give them the verbal clues to appreciate a graphic in its details long before she wrote books for children. Unfortunately, more detailed documents about this feedback process have been lost. While a blank feedback form has been preserved (Nemeth 2021, 74), to my knowledge no completed form has survived. Probably such documentation had to be left behind in Austria in 1934 when the Neuraths had to flee Vienna for political reasons. In the Netherlands and the United Kingdom, the feedback process no longer played as great a role as it did in Vienna, due to the

lack of governmental support and the financial loss the museum had to suffer. What concrete feedback led to what improvements and for what reasons remains therefore unclear, leaving these forms of teaching, which have remained innovative to this day, underdetermined.

In 1934, when democracy ended in Austria with the disempowerment of the country's parliament based on martial law, the Social and Economic Museum was closed by decree, and its assets and inventory were confiscated (Halusa 2021, 101–104). Marie Neurath and part of the team fled first to the Netherlands, then in 1940 from The Hague to England to escape the German Wehrmacht. In addition to the loss of financial resources and museum objects, the Neuraths also lost their social network: existing collaborations with scientists, schools, and other educational institutions could not be easily replaced. Marie Neurath's turn to the book as a medium of artistic expression should also be considered from this perspective. During Austrofascism and National Socialism, the museum in Vienna reopened under a different name (Österreichisches Institut für Bildstatistik, i.e. "Austrian Institute of Pictorial Statistics"); the aim was no longer cosmopolitan education but largely political agitation. After 1945, a student of Otto Neurath, Franz Rauscher, headed the museum, which has since been known as the Österreichisches Gesellschafts- und Wirtschaftsmuseum (Austrian Museum of Society and Economy). To this day, there are commonalities with the institution where Marie Neurath worked in terms of cooperation with schools and public institutions, and in the graphical presentation of social and economic data (Halusa 2021, 105–114). Apart from the loss of the congenial team (Gerd Arntz, Marie Neurath, Otto Neurath), the differences from the historical museum are that international exhibitions and collaboration with scientists could no longer be continued and the feedback-based process of transformation was no longer practiced. The support of the Social Democratic municipal government during the 1920s was replaced after 1945 by workers' and employers' representatives, such as those established in other post-fascist countries to ensure social peace (Maier 2016). Overall, this new political support made it more difficult for the museum to pursue a clear orientation, as diverging interests needed to be met. Since the one-hundredth anniversary of the first democratic elections in Vienna, in 2019, the museum has been trying to reconnect with the work of Marie Neurath and her husband Otto Neurath. A museum archive has been set up and certified by the international council of museums, and guests from the USA (Ersan et al. 2021) and Mexico (Perez 2021), for example, have been invited to discuss possible ways of building on the historical museum. Although research on discrimination has assumed that multiculturalist education hardly exists in Germany (Gomolla 2017, 138), Salvador Perez chose precisely the pictorial-statistics approach because this medium, deriving from the multiethnic Vienna of the interwar period, is suitable for multilingual minorities in Mexico (Perez 2021, 248–251).

3 Following in Marie Neurath's path

Our workshop "Isotype Reloaded" attempts to reestablish the collaboration with scientists and the process of transformation in the museum. Tina Frank and Valerie Danzer from the University of Arts Linz are responsible for the graphic design, Sarah Zublasnig and Fabian Reyer bring in their expertise as educators, Tom Marschall as curator, while Andreas Lehner, Christiane Thenius, and I cooperate with schools and scientists. Since the majority of visitors to the Austrian Museum of Society and Economy are 13- to 17-year-old students, a recent study edited by the sociologists Jörg Flecker, Veronika Wöhrer, and Irene Rieder, which deals with students of about the same age group in Vienna, became the scientific basis for our workshop. The study took place over several years and examined the reproduction of social inequality, institutional attachments, autonomy, and entitlement, as well as belonging and acceptance, both qualitatively and quantitatively. The time frame of the study centers on the transition from the Neue Mittelschule to further forms of schooling or apprenticeship (Rieder 2020, 7–8). In Austria, the educational path for children splits at the age of 10. Formally, the choice of which school a child attends thereafter is free, with the restriction that the child must meet a certain grade average. Factually, there are topographical and social constraints that strongly cast doubt on this paradigm of free choice. Children can attend a gymnasium or a higher vocational school that is completed with a Matura, i.e. permission to study at a university. The alternative school form, the Neue Mittelschule, is a strong indicator of social disadvantage, especially in urban areas (Kazepov et al. 2020, 52). Moreover, the number of immigrant children at this type of school is significantly higher than at high schools (Vogl et al. 2020, 66–70). Our workshop processes the statistical data and sociological findings of the study in order to empower these school students from mostly disadvantaged backgrounds, and to show them ways of pursuing different educational pathways. For us, empowerment means showing young people concrete ways to pursue their interests, as well as finding solutions to their everyday problems. Furthermore, it is our concern to highlight past political reforms of the educational system in order to show that improving opportunities for people is also a political matter. Today, in some districts of Vienna, almost half of the residents are excluded from the democratic process because they do not hold Austrian citizenship (Stadt Wien 2022). Without a reform of the citizenship law, this democratic deficiency cannot be remedied. Our workshop aims to raise awareness of this deficiency. In the course of 2022, we developed two parts of the workshop and tested them with students.

In the first test run, we had the chance to try out our workshop with two classes at once. In total, about 50 students participated in the rehearsal workshop,

which took place in the museum. After some general games meant for the participants to get to know one another, the two parts described below followed. The entire test run lasted about three hours, and the teachers had not prepared their students in any particular way, although one teacher taught economics and geography and her students were aware of certain developments, such as demographics. Other than this incidental prior knowledge, there was no specific preparation for the classes for the workshop. It was in the workshop itself that the students were prepared to work with the graphs. One class came from a prestigious high school, while the other class was a polytechnic program designed to fulfill the last year of compulsory education. Without being able to provide the sociological data of all participants in detail, it can be assumed that we were dealing with two socially very different groups. From participants' demeanor and confidence, the social differences were apparent to everyone in attendance. Even small differences, such as the boys from one school never taking off their jackets, were noticed by students from the other school. In a conversation with the sociologist Jörg Flecker, one of the authors of the study, we were warned not to reproduce the implicit hierarchy that exists socially between different educational degrees when addressing these degrees in the workshop. The literature also warns that addressing social differences can lead to the reproduction of those differences, i.e. mentioning discrimination does not diminish its effects (Goel 2017, 150). In the workshop we avoided any such differentiation, but we could not help but notice that the difference between both groups was palpable.

A frequent answer to a general question on our feedback sheet about what the students in the workshop had not liked, was "the other class". Nevertheless, we learned a lot from the details in this trial run. Regarding the general problem of the setup, it is important to know that it is difficult for socially different classes to participate in the workshop together and that the interaction between two classes of these types needed to be better mediated; our games presented as icebreakers were not sufficient. Since it is rare in today's museum that two classes so different participate together in one workshop, we will not expand this introductory part in more detail. However, within the first part, easier tasks and more difficult ones are provided, so that the workshop itself can be tailored to a specific class. The original museum where Marie Neurath worked was primarily aimed at working-class children. Of course, the various exhibitions were open to all, but the documented school projects and collaborations with teachers were undertaken in proletarian districts of Vienna (Gesellschafts- und Wirtschaftsmuseum 1933, 50–53).

4 Introducing Isotype to students

The workshop is designed for small groups of 5–7 students and each group is led by a facilitator. The first part of the workshop provides an overview of the distribution of education for working adults and ties in with the Vienna Method of Pictorial Statistics co-developed by Marie Neurath, a way of representing statistical data (Burke 2013a, 62–75). This method is well suited for getting an initial overview of quantities, but its functionality goes beyond this first view of things. The main principle of this method is to visualize quantities by repeating the same symbol, whereby each symbol is assigned a definite number specified at the bottom of the chart. This simple principle lends the graphs an operational dimension: both relative ratios and absolute numbers can be calculated. Besides the operative dimension, another purpose of this representation – compared to other forms of visualization – is a higher degree of memorability, which has recently been confirmed by empirical tests (Schreder et al. 2021, 217–237). While it was planned that the first version of our workshop would confront students directly with a graph, Fabian Reyer convinced us to explain the principles of the chart itself, in order to make it transparent for the students why this simultaneously more clear and more complicated form of depiction was chosen.

The first sequence of graphics serves as an introduction to Isotype (Figure 2). First, an abstracted map of Vienna is shown. This is a geographic form that most students can relate to, since the city's marketing also regularly uses this form. In case the shape of the city would not be recognizable, we added the flow of the Danube River. This dividing line within the urban area is known to most; the two districts beyond the Danube are called "Transdanubia". The geographic symbol thereby explained will be inserted in the upper-right corner of the following chart in a reduced size, so that in connection with the heading it should become clear that the following is about Vienna. The second graphic adds symbols for the inhabitants and describes for what number of inhabitants a given symbol stands. The third graphic arranges the inhabitants so that it is easier to count them, because there are ten in a row. The fourth chart of the introduction introduces the concept of "working population", which is defined by government statistics as the age group older than 25 and younger than 64. After each graphic, the moderator asks the students specific questions in order to consolidate the central statements of the individual items together. How many figures are in one row? The insight that there are ten figures facilitates further estimations and calculations. How can the percentage of a group of people be calculated? The basics of percentage calculation can be introduced or repeated in this way. How do you calculate an absolute number? Assigning the symbols in the caption is practiced in this way.

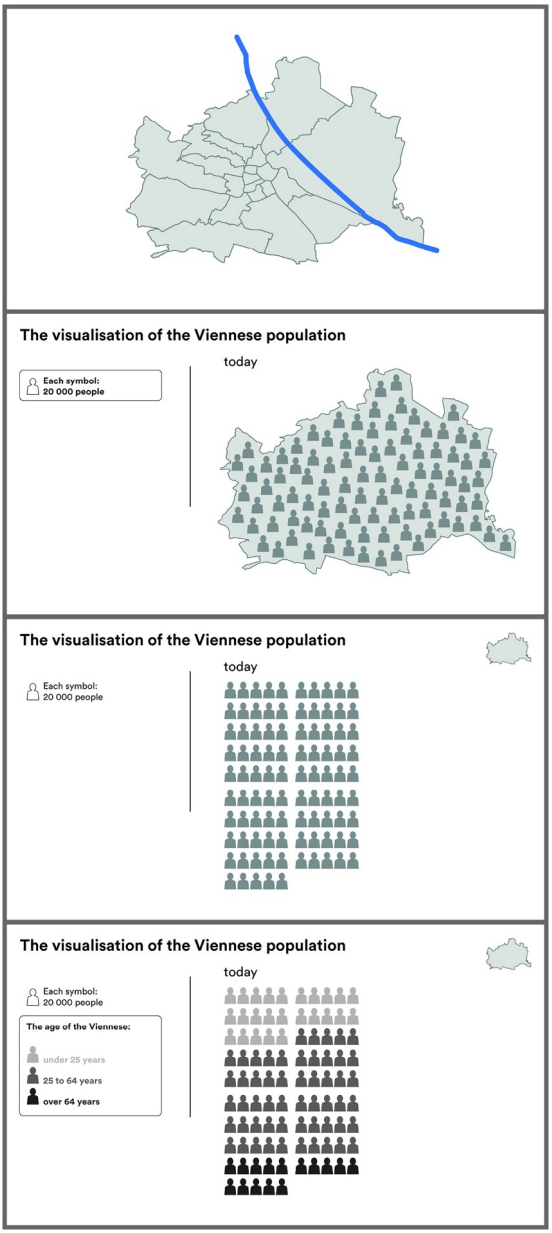


Figure 2: Austrian Museum of Society and Economy, 2023, graphic by Valerie Danzer. The introductory graphics serve to convey reduction: how does one depict individual aspects of a topic and how does one combine them? All aspects are introduced by moderators using questions and suggestions.

5 How education changed over time

After being introduced to the principles of Isotype in this way, students spend more time on a single graphic (Figure 3). The facilitator asks the students a series of questions or raises assertions in order to understand the information laid out in the chart in detail. On the left side of the following table are questions and assertions for the facilitator, while the middle column notes what he or she could address, and the right column states the respective goal of each unit. In some parts, we refer to Marie Neurath's description of how she used the Vienna Method of Pictorial Statistics for teaching (M. Neurath 2017, 34–35), e.g. have students perform simple calculations to comprehend social developments.

The structure of the table, i.e. the flow of the quiz game, follows a conceptual scheme. First, questions are asked that can be answered mathematically (lines 1 to 7), and in the final rows concepts are addressed that seemed important to us (Table 1). Line 8 discusses the difference between facts and opinions, whereby the emphasis that facts exist seemed more important to us than potential problems that may arise with any "fact," such as the empirical survey method. Line 9 introduces the idea that the school system has changed considerably and may continue to change in the future: politics defines schooling. Line 10 distinguishes between intelligence and education, because it was important to us that educational certificates not be conveyed as an indisputable value. In the first test of the workshop, our focus on educational degrees intimidated some of the students from the polytechnic program, because many of them will not achieve a high level of education and were aware of this unlikelihood. Of course, the presence of the high-school class heightened this awareness even more. Equally important, we felt, was a concluding explanation of why dealing with officially collected data seems relevant, which is why, in the age of fake news, we included the distinction between facts and opinions. We also altered our thematic explanations to make some topics more pertinent for students. The prejudice of migrants taking away natives' jobs is a recurrent slogan of right-wing parties in Austria and can be rebutted by looking at the data presented. We based an idea of globalization on everyday objects, such as clothing or possible professions. This approach echoes a chart that the Neuraths created in England, which displayed the global nature of a supposedly typical British breakfast (Kraeutler 2008, 152). Some of the students from the high school were already aware that there has been an apprenticeship obligation in Vienna since 2017. Accordingly, after completing compulsory schooling everyone is obliged to complete a further apprenticeship until the age of 18. The fact that this compulsory training does not yet play a role in the chart is due to the fact that the chart also shows people who completed their compulsory schooling before 2017. We will use this obvious question to underscore the point that policy

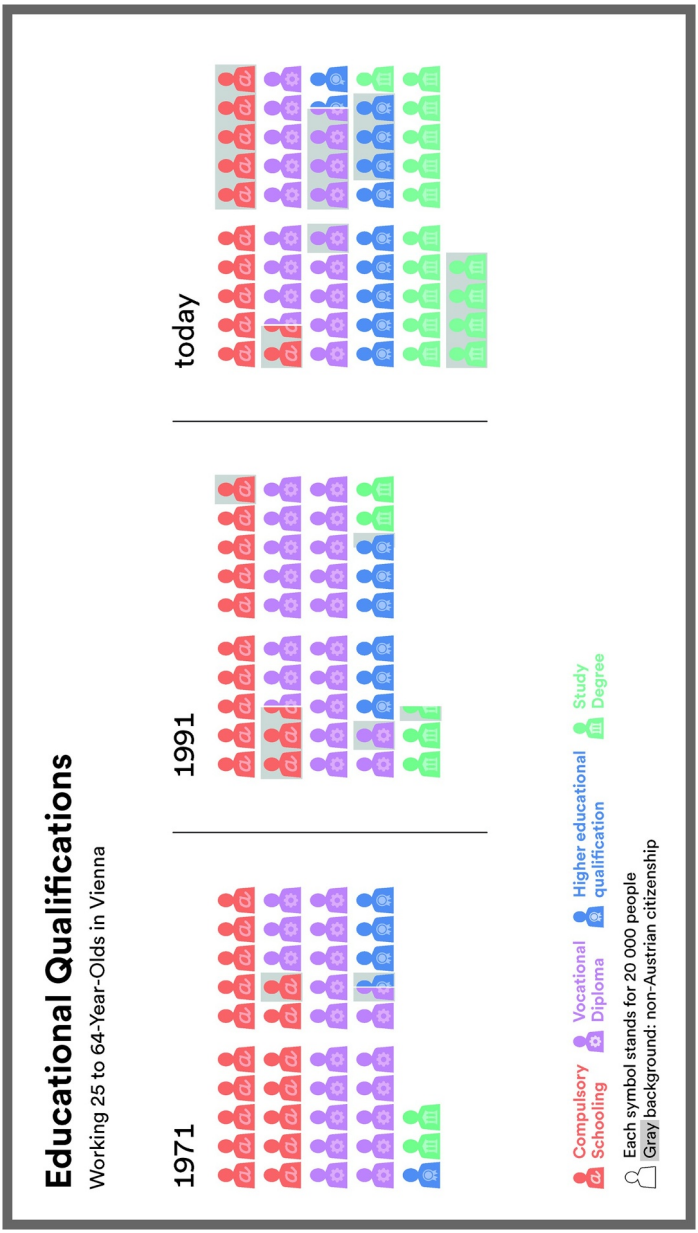


Figure 3: Austrian Museum of Society and Economy, 2023, graphic by Valerie Danzer. The graph provides a dense overview of the development of educational qualifications for the working population in Vienna. The individual aspects of the graphic are discussed in a moderated quiz by the presenters, see the table.

Table 1: This table provides guidance for the facilitators working at the museum. Christiane Thenius and I discuss and rehearse the entire process with the facilitators, and the table is intended to serve as the basis for their own teaching.

Number	Question/Assertion	Topic	Target
1	Today an educational degree is more frequent than in 1971 or 1991.	Looking at the graphic together, overview of percentages of each group, calculating or estimating percentages, comparing relative and absolute increases.	Understanding the development and importance of educational qualifications for one's own educational path.
2	Many jobs that did not require an educational degree no longer exist in Vienna. What are two reasons for this development?	Introductory questions: Where are your clothes produced? Why didn't anyone study computer science or install photovoltaic units in 1971?	Identifying technological development and globalization, recognizing the international character of one's own world.
3	How many people with non-Austrian citizenship work in Vienna today? How many with Austrian citizenship?	Counting the figures and multiplying by the ratio, calculate relative and absolute result.	Identifying the share of non-Austrian workers in Vienna.
4	What percentage of non-Austrians today have a higher education? "Higher education" means more than compulsory schooling. What was this proportion in 1971?	Counting non-Austrians with higher education. Division: result of the count by the total, i.e. the result of the first part of the third row of this table.	The proportion of non-Austrians with higher education has increased significantly.
5	What percentage of Austrians today have a higher education? What was this proportion in 1971?	Counting non-Austrians with higher education. Division: result of the count by the total, i.e. the result of the second part of the third row of this table.	This share has also increased massively. Briefly repeat the interim result: the share of persons with higher education has increased significantly, regardless of citizenship.

Table 1 (continued)

Number	Question/Assertion	Topic	Target
6	In Vienna today, people with Austrian citizenship are better educated than people of other citizenship.	What is the ratio of the educated to the less educated in different decades? How does the ratio between persons with Austrian and other citizenship change?	The assertion is untrue for 2019. Education and citizenship do not correlate.
7	In 2021, 160,000 people in Vienna were unemployed. Could they replace all employees of other citizenship?	Address the prejudice that foreigners take jobs away from Austrians. If all unemployed people had a job in their place, how many jobs would still be unfilled? 220,000 jobs held by foreigners in 2019 would be unfilled.	To understand that the Viennese labor market depends on foreign labor.
8	All previous conclusions are just an opinion. You can also see it all differently. Why is this statement wrong?	Discuss examples for which the term “opinion” seems absurd. Having an opinion about gravity, an opinion about how wide a door is, an opinion about the number of fingers on one hand.	Make participants aware of the difference between facts and opinion.
9	In Austria, not everyone could always go to every school. When you look at the graph, when must something have changed? Who can change it?	Explain the reforms of the 1970s: free access to public transportation for students, free textbooks, open high schools and open universities.	Politics affects who gets what education.
10	Are education and intelligence the same? Who does not hold an educational degree but could still be considered intelligent? What is the purpose of educational degrees?	No, people without educational qualifications are also intelligent (young, late in life, no recognized degrees). Educational degrees are only a record of a certain intelligence, so the labor market knows roughly what someone is able to do.	Distinguishing between intelligence and education. Putting a hierarchy of educational degrees into perspective.

directives play a central role in education. The question about extracurricular factors influencing educational pathways is a central argument of the sociological study *Wege in die Zukunft* (2020) edited by Jörg Flecker, Veronika Wöhrer, and Irene Rieder, foreshadowing the second part of the workshop.

6 Empowering students

While the first part takes a macro perspective on the development of educational levels, the second part works with biographies of fictional students. In one chapter of the study on parents' influence on the educational path of adolescents, it is stated that a supportive or obstructive attitude on the part of parents does have an impact on the educational success of adolescents, but that success is not determined by the parents (Zartler et al. 2020, 147–169). This was a crucial clue for our transformation process. Precisely because certain pathways are not determined, we saw an opening for empowerment in providing the compensatory strategies to all students participating in the workshop. According to the study, some adolescents managed to, for example, cope with an authoritarian father by resorting to other social resources such as siblings, teachers, friends, or acquaintances from leisure activities. The historical museum had students design pictorial statistics about themselves, so that personal problems could be addressed without shame (Neurath 2021c, 328). The participants in our workshop talk about anonymous avatars based on young people in the sociological study, whose problems and possible solutions likely overlap with theirs. These avatars are all labeled with positive and negative qualities in the domains of parents, surroundings, school, autonomy. First, students are given a brief written biography of an avatar. Their first task is to identify five domains within the text and then find the respective passages on a wall (see Figure 4).

After each group analyzed one avatar and recorded their results on a chart board, students are asked to add a plus (for positive) or a minus (for negative) to each category. Is the family situation good for the character? Does the character have future plans? Overall, we divided the positive and negative qualities in such a way that each avatar can learn something from another avatar. For example, in the case of the avatar Alina the circle of friends is negative, because none of them thinks about future goals (Figure 5). The circle of friends of the avatar Salim, on the other hand, has a positive connotation because he talks to some people in his school orchestra about his future plans. Through this comparison, the students learn firstly to think about biographies in specific categories and secondly to identify possible offsets. In a final step, the students' creativity is chal-

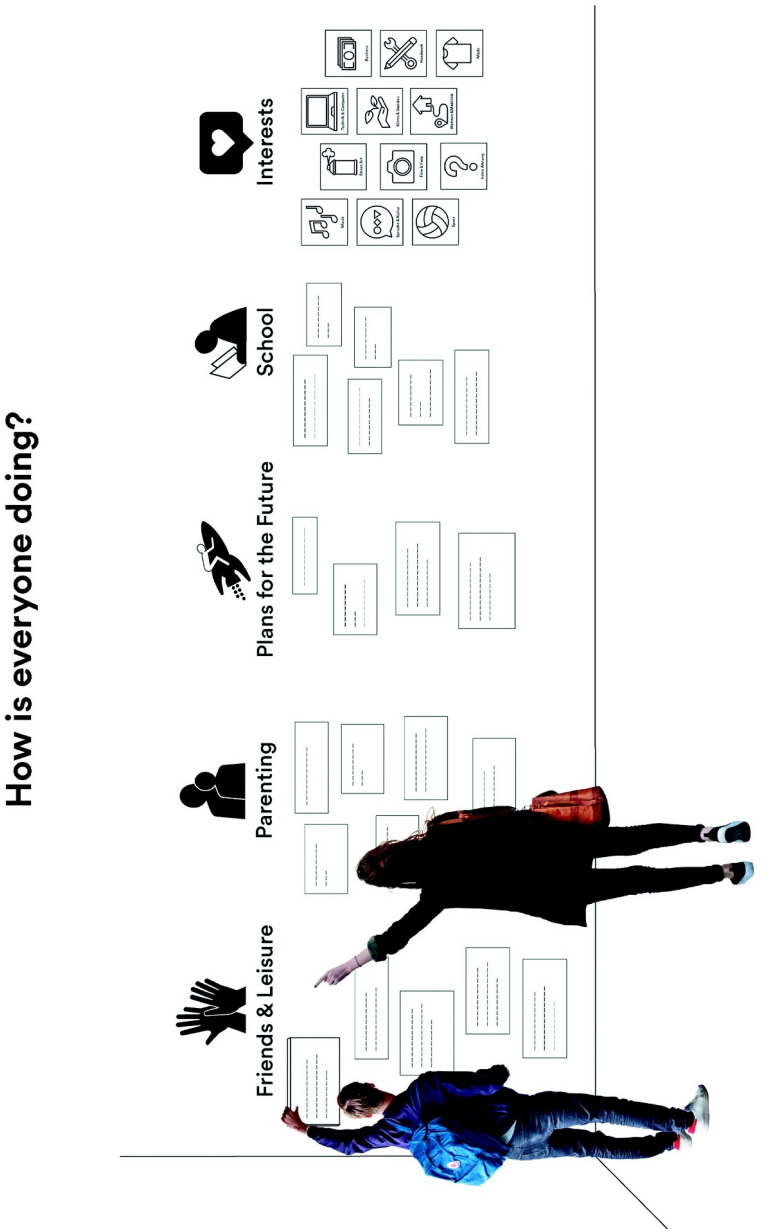


Figure 4: Austrian Museum of Society and Economy, 2023, graphic by Valerie Danzer. After students become familiar with the fictional biography of a peer, they try to find the matching statements on a wall. In the process, they involuntarily encounter other life circumstances: how parents, friends, plans, and interests can differ individually.

lenged. They should now make concrete suggestions for their avatar on how the negative areas could be improved. To stay with the example given, of course not every avatar will want to play in a school orchestra. However, in the short biographies of the avatars there are hints as to which form of leisure activities might suit the respective avatar. The creative task of the students is therefore to turn a potential that is inherent in the biography of an avatar into a concrete hobby through which he or she could meet new acquaintances. But how can one find a hobby that can be pursued in Vienna without financial overhead? In order to help the students, we plan to present actual leisure activities that are freely available in Vienna on a pin-board (sports clubs, learning centers, counseling centers, youth housing, etc.). The range of low-threshold leisure activities on offer in Vienna is comparatively large, which also has to do with the city's history going back to the 1920s, i.e. to the time of Marie Neurath. These activities range from rap in municipal housing to summer courses in various areas and tutoring based on a buddy system (Stadt Wien, Magistratsabteilung 13, 2023). Students could benefit by simply taking one of the pinned notes and moving from helping the avatar to helping themselves. In this way the suggestions for the avatars will be real, so students themselves could also benefit from them.

For the second part of the workshop, the improvements resulting from our test run concerned the choreography. Our attempt to moderate all small groups centrally proved to be redundant, so the plan is, as in the first part, to provide each small group with its own moderator. Realistically, however, the museum will not always have such a large number of facilitators available, so the individual steps must also be worked out in written form. What also needs to be worked out in more detail is at what point the students get their own pinned notes, i.e. when will they be allowed time to infer from the advice of the semi-fictional avatars back to their own lives and take away concrete ideas from the workshop. Overall, the workshop was well received by students, and we were particularly pleased with some demands for additional charts, which might lead to a long-term interest in the museum, as was the goal of Marie Neurath. The collaboration with the sociologists who recorded the study, the continuous international exchange, the avoidance of shame through anonymized knowledge, and active demands for political rights also connect us to Marie Neurath's early work. Our discussions about the improvements of the workshop are characterized by the state of autonomy that the Austrian Museum of Society and Economy holds. As mentioned, the museum has received an official certificate of quality for a newly established archive. At the same time, all individual projects including ours are dependent on the benevolence of donors and visitors. The workshop should be a success for the financial sponsors (City of Vienna, Ministry of Culture), and it is the museum's conviction that an enjoyable time can be created for young people that has little to do with school. Of

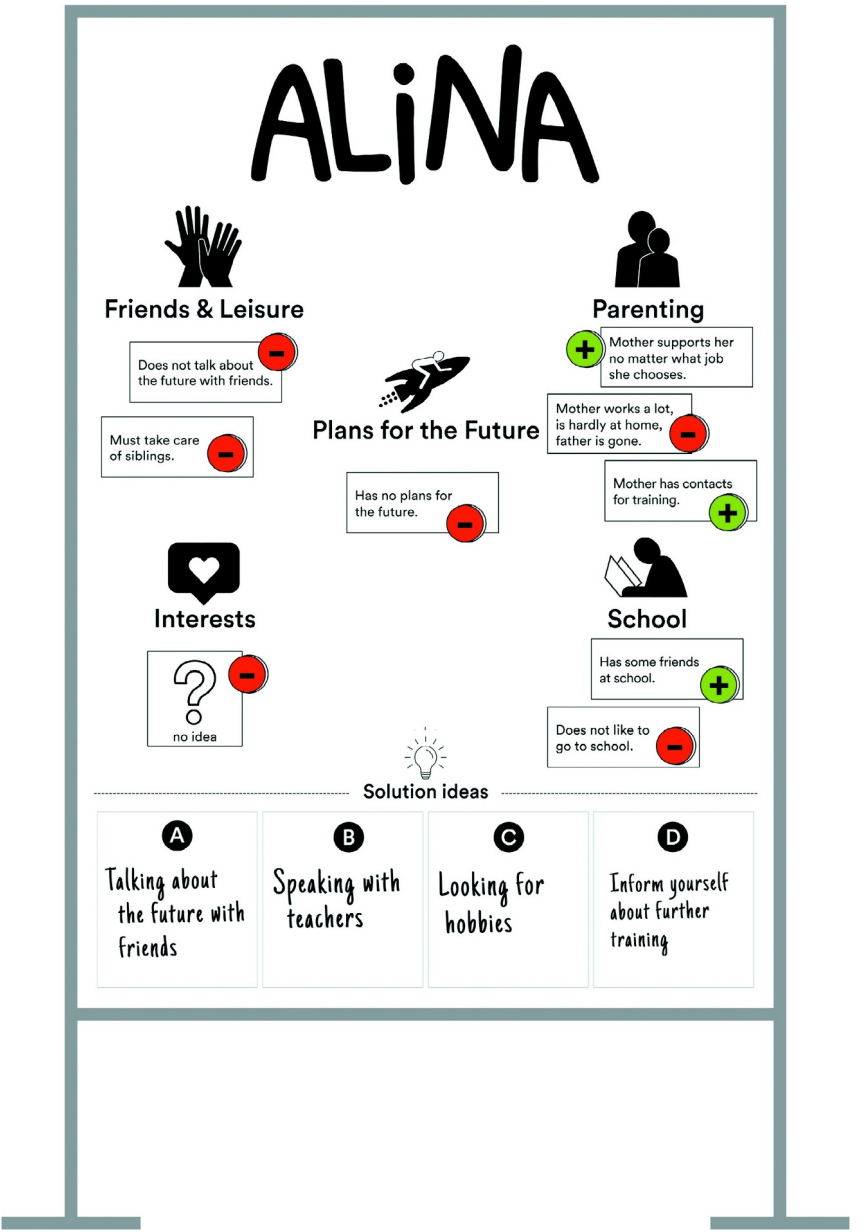


Figure 5: Austrian Museum of Society and Economy, 2023, graphic by Valerie Danzer. After the individual aspects have been assigned and evaluated (with a plus or a minus), it is a matter of making suggestions for the negative aspects. These suggestions can be adopted from other characters and thus help to improve the life of the participant's own character, Alina.

course, there are also some examples where young people's choices were not those that would have been beneficial to themselves in the longer term (Pelling 2022). The resulting tension between the requirement to provide a good time for all and that of imparting a particular form of knowledge is one that has pervaded pedagogy for ages, but in our case it is concrete, as both sponsors and students must make a contribution to the continued existence of the museum. Our aspiration is to base the pedagogical developments that will be made after the next feedback loops on evidence from questionnaires and facilitation work. We hope to walk this narrow path between heteronomy and autonomy in the spirit of Marie Neurath, and we also believe that the increase of empirical knowledge is indispensable despite all reservations (Supik 2017, 200–204).

7 Conclusion and outlook

Our workshop tried to take up the legacy of the transformation process initiated by Otto and Marie Neurath. Based on a sociological study, we developed a workshop that continues at least three aspects of the historical museum. First, we continue to work with sociologists. They will accompany our further test workshops and see if we adequately deal with the knowledge they have gained and pass it on productively to the students. Second, we continue the work of Isotype and use pictorial statistics to transmit empirical facts of today's society to young people in the form of games, showing them the key data of the world, not without pointing out that politically there is the possibility of gradually changing the world. Third, we adopt from Marie Neurath the approach of anonymous transmission of knowledge. While she used statistics to avoid personal shame, we rely on fictional short biographies of young people whose experiences are based on the sociological study. In this way, we want to enable the participants of our workshop to reflect on the hardships of life without having to expose themselves, and at the same time show them ways to improve their lives.

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