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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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