

ARTICLE

Marie and Otto Neurath: “Good Fellows in Science and Love”¹

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Abstract

This article presents the story of a partnership with a major impact on the development of visual means of communicating social science findings as a means to facilitate universal participatory democracy. It aims to highlight the neglected role of Marie Neurath as a data “transformer” in the origins of the visual language of ISOTYPE. It locates the partnership in the context of the politically and culturally turbulent times of anti-Semitism and forced migration during the middle decades of the 20th century, and highlights Marie’s contributions after the death of her partner. It concludes with a call for a more multifaceted and culturally inclusive picture of disciplinary history in the social sciences.

Keywords

Marie and Otto Neurath; women in social research; visual social science; public intellectuals; disciplinary history; Vienna Circle; Unity of Science; ISOTYPE; anti-Semitism and social exclusion

INTRODUCTION

Together, Marie, née Reidemeister (1898-1986), and Otto Neurath (1882-1945) made a major contribution to how knowledge about the social and natural sciences is communicated and disseminated to the public by visual means, processes that are now well embedded on the internet and in textbooks, exhibitions, newspapers, journals, and comparative and multi-disciplinary policy-oriented studies. When I first came across the sociological use of picture graphics drawn by Marie for Alva Myrdal and Viola Klein’s sociologically pathbreaking book on women in the labour market (1956), I was intrigued by her visually innovative skills of data presentation (Lyon 2020). Like most sociologists of my generation, I was already familiar with her husband Otto’s important role in the origin and development of the influential Vienna Circle of philosophers and scientists, all of whom shared an interest in the relationship between theories of science, logic, and mathematics and their empirical application in

¹ Quote from a letter sent by Otto to Marie, December 1940 (Sandner 2014: 269).

scientific practice.² In my wish to bring Otto's partner Marie to light in the much neglected history of women as creative research practitioners and methodologists, I initially assumed that I had come across yet another woman in need of rescue from the familiar story of patriarchal power exerted through a demanding partner and a history of intellectuals steeped in the theoretical "male gaze" (Honegger and Wobbe 1998; Evans 2001). On closer scrutiny, their story, which began in Vienna in 1924 and ended with Otto's death in Britain in 1945, proved to be a bit more complicated, as did Marie's much neglected role within it. Though her theoretical philosophical contribution to the development of the Vienna Circle cannot be described as of major significance, her role in Otto's ongoing important relationship with the group in the politically tempestuous decade leading up to World War II was a great deal more than that of a "faithful muse" (Sigmund 2017: 345).³

The 20th century created many stereotypes of solitary male geniuses and heroes, most of which can be applied to Otto—military strategist, imprisoned socialist revolutionary, scientist with a global mission, member of pathbreaking intellectual networks, social and environmental engineer, daring escapee from the clutches of Hitler, a physically and mentally larger-than-life man attractive to women—to list but a few. What could it have been like to live and work on a daily basis in the shadow of this giant? Mounting biographical material about Otto has brought glimpses of a multifaceted story of the relationship between abstract intellectual individual creativity and politically applied collaborative working *practice*. Unlike his more famous co-founders and participants in the milieu of the Vienna Circle, such as Hans Hahn, Rudolph Carnap, Karl Popper, Ludwig Wittgenstein, and Moritz Schlick, Otto's wide engagements in other more directly applied, and therefore unavoidably more political, fields than the logic and epistemology of science made him a marginal character in disciplinary history for a while. His rehabilitation from post-war obscurity came about largely due to the efforts of his widow. After his death, Marie, in collaboration with Robert S. Cohen, translated and brought together examples of the many strands of his intellectual and applied work alongside a collection of short personal memoirs (Neurath and Cohen 1973). But Marie's own contribution to their joint legacy remains largely unknown, some of the reasons for which Marie shared with many other able and productive intellectual women of her time.

In this article, I will attempt to interpret this story through the broad lens of some recent changing perspectives in the history of sociology: women as intellectually productive and creative agents in their own right; the role of multi-disciplinarity and collaboration, longstanding characteristics in the day-to-day practice of empirical research, yet excluded in a vain theoretical search for disciplinary boundaries; and finally, the institutional exclusionary factors of class, migratory status, and the ongoing politics of prejudice affecting both men and women. I will focus on Marie and the women, not

² The "Vienna Circle" is here used as an umbrella term for a grouping with changing membership over time. There is a rich philosophical literature on the group, and ongoing detailed recent research on the various contributions of O. Neurath. See Vienna Circle Institute, University of Vienna, Yearbooks, 4,9 and 13 (www.univie.ac/vcs/publikat/index.htm); see also Reisch (2005). My main recent source for the cultural context of the Circle has been Sigmund's *Exact Thinking in Demented Times* (2017). Though mathematician by profession, Sigmund offers an unusually rich sociological and cultural interpretation of the time.

³ Due to a long period of convalescence and COVID-19 isolation, the biographical material presented relies entirely on secondary sources and offers no new archival discoveries. The main sources on Otto Neurath used have been: Cartright et al. (1966); Neurath and Cohen (1973); Vossughian (2011) and Sandner (2019). Biographical statements on and by Marie Neurath appear in Neurath and Cohen (1973) and Neurath and Kinross (2009). I have also consulted an unpublished "autobiography" by Marie written shortly before her death in response to a request from the founder of the Vienna Circle Archives in Holland, Henk Mulder. See info@noord-hollandsarchief.nl, in this paper referred to as Neurath (1982). There are several new archival projects on ISOTYPE now underway at Vienna and Reading University (see relevant institutional websites).

on the many male “geniuses” involved, except in their relationship to the women as brothers, partners, and collaborators. This is a story of individuals with overlapping characteristics—men and women, natural and social scientists, theorists and practitioners, Jews and Gentiles, Austro-Germans and Anglo-Saxons—and it is written, to quote Rebecca Solnit, “in recognition that all categories are leaky and we must use them provisionally” (Solnit 2017: 1). This also holds true for the concept of “partnership,” ranging in meaning from the intimate and personal to the legal, professional, and commercial, in this case covering the whole spectrum. Even proper names can be described as “leaky” in this collaboration in that Otto worked and wrote under different names and pseudonyms, depending on the publication outlet, and as Marie notes, often in the name of the various “institutes” set up to accommodate his teams (Neurath and Cohen: 441). Marie herself was born Reidemeister and remained with that name until she married Otto twenty years into their collaboration. In more recent publications her own name, when not omitted, is often subsumed under the collective title “the Neuraths,” even for work she completed after his death. With respect for their shared democratic ethos, I will, to avoid confusion, refer to them by their first names.

Baert reminds us that after the term “intellectual” was coined in the 1890s, intellectuals have repeatedly engaged in varieties of partnerships to bring about progressive socio-political change in the name of a common humanity (Baert 2011). Such a combined conception describes well the public engagement for social progress that the Neuraths and their many intellectual friends—academic and political, theoretical and applied, male and female—participated in. But questions need to be raised about how such a “common humanity” is understood, especially at times when meaning struggles over who belongs and who does not run deep and become hate filled. This also applies to communities of intellectuals themselves. Many of the agents in this story, both men and women, were Jewish and all suffered the indignities of prejudice, exclusion, and persecution, a state-of-affairs they seldom spoke of themselves at the time or in retrospect. In his memoir of Jewish ancestors in Vienna during the century preceding World War II, Edmund De Waal writes: “Not talking about anti-Semitism was possible, not hearing about it was impossible” (De Waal 2011). Those who were not Jewish were nevertheless tainted by their closeness to Jews, by marriage or friendship, or by their shared political alignment with the social democratic movement, at the time (as well as later) often erroneously equated with internationalist communism, a “label that stuck,” as Christian Fleck has phrased it (Fleck 2011: 137). If, as Fleck and Andreas Hess have argued, the sociology of communism is an absent field in the history of sociology, so too is the sociology of social democracy in its many and varied intellectual and political expressions and the role of research-based social planning as a tool in the improvement of human lives within the field (Fleck and Hess 2011; Lyon 2017; for detailed descriptions of the many, and shifting, shades of “left” encompassed by the different members of the Vienna Circle, see Reisch 2005).

In his recent book on the intellectual and research partnership between de Toqueville and Beaumont, Hess shows that a complementary partnership incorporating both common and disparate domains of interest, mutual dependencies of various kinds, including differences in talent, interest, and financial resources, can enhance work in ongoing debate on an almost daily basis (Hess 2018). Through their very practical activities as personal assistants, researchers, data-collectors, translators, networkers, travel companions, fundraisers, and supplementary editors and writers, many collaborating women can equally be shown to undermine the myth of the solitary “genius” as the foundation on which intellectual progress rests. In Per Wisselgren’s analysis of influential couples in the early development of social science in Sweden, the significance of private routines in couples living and working together is noted with a basic conflict recurring between, on the one hand, the dream of a

more equal type of “comrade marriage” and, on the other, the demands from an external world expecting male leadership and authorship as well as customary norms with respect to career development and domestic responsibilities. This raises interesting questions: Did the relationships serve as a resource or a hindrance in public and professional contexts? What did work and partnership relations look like? (Wisselgren 2011).

In the following sections I will try to approach some of these questions by starting with the final, and most successful, international outcome of Otto and Marie’s collaboration published shortly before the outbreak of World War II. They were by then based in Holland as refugees and were to remain in exile throughout the war. Otto died shortly after the war ended in 1945. By then they had both become British citizens. Marie continued to develop their joint vision of a new kind of visual social and natural science until she died in 1986.

MODERN MEN – AND WOMEN – IN THE MAKING

In 1939, a very original, colourful, and forward-looking picture book entitled *Modern Man in the Making* was published by Alfred. A. Knopf in New York (Neurath 1939). It was the last collaborative work put together by Otto, Marie, and members of the team they had worked with for many years to develop visual, internationally comparative social statistics. The book was published in Otto’s name as Director of *International Foundation for Visual Education* in the Netherlands, where Otto, his then wife Olga, Marie, and their chief designer Gerd Arntz had moved to after being forced to flee Vienna in 1934 following the political success of the far right. The publication was supported by Waldemar Kaempffert, who was a science journalist for the *New York Times*, friend, and distant relative of Otto’s, and for a brief period, Director of the Museum of Science and Industry in Chicago. Otto and the team were given a generous commission by the publisher, who was aware of their need for financial support. In the Acknowledgements at the end of the book, Otto singles out for particular thanks “Miss Marie Reidemeister, who has worked with me from the beginning of our pedagogical and scientific activities, and who, as chief of the transformation department, with her combination of scientific judgement and ability for visualisation, did the preparatory work” (Neurath 1939: 159). The book was simultaneously published in Britain and issued in Dutch and Swedish translations and became a commercial success. It consists almost entirely of richly coloured and imaginatively drawn charts full of intricate pictorial symbols and was carefully planned “page by page” with, as Marie wrote, “Otto Neurath writing the text, and the charts – made by the essential team of Neurath, Reidemeister, Arntz – designed to fit just where they were needed” (Neurath and Kinross 2009: 60). The foreword explains how an “attempt has been made to evolve for this purpose a special picture-text style which should enable anybody to walk through the modern world that is beginning to appear about us and see it as he may see a landscape with its hills and plains, woods and meadows” (Neurath 1939: 7). Otto was at the time well known internationally as the originator of a worldwide international multi-disciplinary movement for the Unity of Science, including plans for the creation of a scientific Encyclopedia.

The book’s main theme is how to depict “modernity,” simply interpreted here as a world of rapid technical change, material growth, improved human health, and an emphasis on scientific outlook and orientation for the sake of social and economic progress. With a popular audience in mind, the charts aimed to illustrate the great strides made by humanity since the beginning of civilisation on a range of variables such as health, living standards, education, communications, political participation, trade, and productivity. The evidence, colourfully displayed, had been carefully assembled

using a large number of different international and national statistical sources available to researchers as well as references to further sources of data and readings drawn from sociology, political economy, philosophy, literature, history, medicine, politics, and anthropology, to mention but a few of the discipline areas covered. There is an emphasis on factual information, as well as a more “grounded” history as experienced by ordinary people from across the world, one of the sociological models in this being Helen and Robert Lynd’s book *Middletown* (1929). *Modern Man in the Making* treats evidence about colonial subjects, workers, and women as equally valid to that of the rise and fall of elites. But the book is neither proselytizing nor committedly ideological. As Christopher Burke points out, the book avoids words such as “progress,” “justice, and “normal,” with trends rather than causes indicated (Burke 2008: 24). Despite all the hard work that went into its production, the findings were emphasised as tentative and likely to be subject to revision as new evidence arose.

A couple of themes stand out: increased longevity, better health, improved living standards, growth in international trade, and migration, as well as the significant negative impact of disasters, both man-made and environmental ones, wars, plagues, earthquakes, and tsunamis over time. Whereas science could be shown to have responded to pandemics and occasional natural disasters with positive effect, wars were not yet treated as avoidable through improved international collaborative efforts. In all its attempts at simplicity, the book can be seen as a complex logical outcome of Otto and Marie’s shared faith in the power of empirical evidence to debunk historical myths and the power of global knowledge, democratically assembled and accessibly disseminated, to help create a more humane world. In her and Cohen’s first memorial volume in Otto’s honour, Marie chose to include Otto’s early passionately thorough attack on Spengler’s conservative “big-picture” history of inevitable cyclical cultural disintegration through “foreign forces,” an indication of her own commitment to this belief (Neurath and Cohen 1973: 158-213).

So how did Otto and Marie come to collaborate so closely on such a project, one that was conceptually highly original and “modern” for its time, but also painstakingly laborious in execution at the time? For this we have to go back and look closer at the role, power, and skills of women intellectuals at the turn of the 20th century.

INTELLECTUAL LIFE AND THE “WOMAN QUESTION” AT THE TURN OF THE 20TH CENTURY

It would have been hard to be a young man about to enter university in Europe at the turn of the 20th century without engaging with questions surrounding women’s emancipation and the many varieties of feminism passionately discussed at the time. Women, largely home-schooled at the time, had come out as writers, mathematicians, political pamphleteers, and social activists. Many were in search of political influence and better opportunities in higher education and the labour market away from the traditionally expected future of subservience. (Honegger and Wobbe 1998; Offen 2000). Such debates took place not only within the domain of the aristocracy and expanding commercial bourgeoisie, but equally amongst workers and trade union movements. They also cut across religious boundaries, Protestant, Catholic, and Jewish, each encompassing varying degrees of anti “liberated women” orthodoxy. As an ambitious eighteen-year-old student in Vienna, Otto intensively debated “the woman question” with friends and colleagues.

When the Swedish feminist and author Ellen Key came to give a lecture in Vienna, Otto listened with enthusiasm. Her topic was the establishment of an educational open-air folk museum in Stockholm

developed as a popular leisure centre (Sandner 2014: 28-29).⁴ Key's intellectual standing was not to be doubted, counting amongst her friends Rainer Maria Rilke, Stefan Zweig, and the first woman psycho-analyst Lou Andreas-Salome, who introduced Key's work to Freud. Her popular book *Das Jahrhundert des Kinder* (published in German 1901, in English 1909) was widely read. She caused rich debate not only because of her views on the need for state subsidised child care and co-educational school reforms, but also for her belief that familial love and maternal care, the essence of her gender as she saw it, could go hand in hand with individualist legal and political rights (see Offen 2000). Otto was unquestionably smitten, and a correspondence ensued in which his then girlfriend, Anna Shapiro—critical of Key's family-centrism—also became involved. Anna and her elder sister Rosa, later a renowned art historian and successful painter, were both organisationally active social democrats. Otto had met Anna after a period as a student in Berlin and military service. A few years older, she was an already accomplished writer, social democratic polemicist, poet, linguist, and student of economics and history at several European universities. What Otto lacked in private wealth he made up for with his boundless capacity for hard work and barrels of intellectual charm. They married in 1907 and soon published a textbook in social economics together. As part of another joint project, she translated Francis Galton's book, *Hereditary Genius*. Their partnership did not last long. Due to post-natal complications, a common condition at the time, Anna died shortly after their son Paul was born in 1911.

Otto expressed his profound devastation to friends and threw himself into good works of various kinds, including that of helping his old friend Olga Hahn, an equally brilliant woman and a graduate in maths and philosophy, whom he had known since childhood. Olga was the sister of mathematician Hans Hahn and, alongside Otto, one of the founder members of the Vienna Circle. Olga became blind and housebound whilst young, and in sympathetic support Otto organised friends to form a rota of visitors to read for her, himself included. Whilst married to Anna, he and Olga co-authored papers together on logic. After Anna's death Otto married Olga. Otto's son Paul claims he always saw Olga as "mother," despite his earlier years at boarding school, and attributed to her his greatest intellectual influence as "a first-rate mind," a quality which led to her friendships with many of Europe's great scientists at the time: Robert Frisch, Lise Meidner, and Max Born. Each proved helpful and supportive also to Marie later in life (Neurath and Cohen 1973: 29; Neurath 1982). The homes Otto and Olga set up together in Vienna became regular meeting places for Vienna's most intellectually and politically engaged activists, not all of them in political agreement, but all of them in search of good arguments and convivial spaces to engage in free from outside intrusions. We owe to both Otto's son Paul and Marie vivid descriptions of this welcoming household. When an earlier debating partner in the Vienna Circle, the mathematician Kurt Reidesheimer, originator of "knot theory," encouraged his sister Marie, at the time a student in Göttingen, Germany, to visit Otto and Olga whilst on a study tour of pedagogical reforms in Vienna, she was immediately hooked, both emotionally and intellectually. When offered an opportunity to stay and work with Otto, she immediately accepted.

Marie grew up with three lively brothers in a German household, short of money but rich in culture and learning. From a young age she showed an independent mind and early on became a convinced atheist and politically left wing, which caused some family friction throughout her life (Neurath, 1982). It was not only Otto's charm and the logic of scientific empiricism that caught her interest, but also their shared enthusiasm for radical social democratic politics and the new social science

⁴ This museum, *Skansen*, remains one of Sweden's most popular visitor attraction with a collection of houses and interiors collected over time from across the country.

museum in the process of being created with the purpose of educating the people of Vienna about the social and economic changes in their lives. With academic qualifications in physics and mathematics gained in Göttingen, as well as courses taken at arts school, she had turned to pedagogy and teacher training as a realistic career possibility. Her combination of skills was a perfect fit for the needs of this new enterprise that would require statistical, as well as pedagogical and artistic, skills in the interpretation and presentation of social science evidence to popular audiences. Though, as she mentions in her later biographical notes, her brother tried to draw her away from Otto's overpowering influence—calling her “just a Neurathecho”—she took the work offered with enthusiasm, having been assured by Otto he was looking for an “independent mind” (Neurath, 1982:32). She soon found cheap lodgings for herself, but ended up bicycling between various locations across town in daily support of Otto's many part-time assistants and projects. As it turned out, Otto's offer brought an exciting future rich in intellectual and political stimulation, much travel, and backbreaking practical work, but also a financially precarious hand-to-mouth existence in a close partnership demanding courage and self-sacrifice.

THE ORIGINS OF VISUAL SOCIAL SCIENCE AND THE ROLE OF THE TRANSFORMER

In the early 20th century, Vienna was famous for its modernist architecture and design, its science and technical museums, and its craft workshop exhibitions. Otto, in love with maps, military charts, and sketching since childhood, was already well experienced in museum and exhibition creation by 1924, initially as part of his war experience as manager of military resources in the German army during World War I. Most commentators on his civic and political engagement agree that this experience made a profound impression on his perception of how such “systems management,” including the use of public information campaigns for citizenship enrolment, could be used in peace time to reduce poverty, homelessness, and ignorance. On returning to Vienna in 1919, after a brief involvement with a failed political coup aimed at reforming Munich and Bavaria towards greater economic socialisation, which landed him in prison, he joined the Austrian Social Democratic Party. Due to earlier acquaintance with its leadership, particularly Otto Bauer, he gained a prominent role in its efforts, initially successful, to transform Viennese civic life in a more cooperatively “grounded” and egalitarian direction, particularly with respect to urban planning and public education. As Director of its *Siedlungsmuseum*, a museum devoted to the development of slum clearance and new housing estates, Otto had acquired space for the creation of urban maps and exhibits which attracted large audiences (Vossoughian 2011: 39). When Marie joined his exhibition team in 1924, a new venture of a social science-based museum devoted to more general civic education, the *Gesellschafts und Wirtschaftsmuseum*, was being planned to be housed in new premises in the Vienna Town Hall. The museum was to be jointly funded by the municipality itself, the Viennese Chamber of Workers and Employees, alongside leading social insurance institutions. Democratic engagement had to be paid for, and one of the rationales Otto gave for an educational civic museum was that of accounting to the people for their democratic approval the tax expenditures required (Neurath and Cohen 1973: 215–221).

The many and diverse technical tasks involved in this project were daunting and required a new kind of organisation that could distil available statistical information and more efficiently produce the visual materials suitable for crowd-pulling displays. As many biographical comments about Otto show, he was a fountain of ideas, but less aware of the practical hurdles that had to be overcome in executing them. He shares this weakness with some historians of his activities. Nader Vossoughian's

richly illustrated book about Otto's long engagement with community development has a great deal to offer historians of urban planning, architecture, and the disciplines of design and mass communication. However, it gives us less detail about the time-consuming day-to-day practice of assembling and summarising statistical research data for mobile exhibition boards and presenting them in an engagingly attractive, accessible, and more importantly from Otto and Marie's scientific perspective, quality assured way. For this we have to turn to Marie and Otto's autobiographical accounts (see Neurath and Cohen 1973; Neurath 1982; Neurath and Kinross 2009). At the core of these processes lay the role of the "transformer," a role created for, and in practice developed by, Marie. Her skills in mathematics, statistics, and pedagogy made her well prepared for the task of effectively reducing complex tables available in various local and national statistical yearbooks to simple attractive visual diagrams, true to the data and efficient in presentation, yet open-ended and flexible enough to respond to changing concepts and data availability. Initially, hired temporary staff made drawings, and it was Marie's role to "transform" them into meaningful arrangements after daily discussion with Otto. Such discussions continued over the weekend, when Otto and Marie would go on regular walking trips in the mountains whilst Olga visited her mother. According to Marie, the relationship with Olga was on the whole "without conflict" with Marie sharing music, book readings, and walks with her (Neurath 1982: 33). Marie joined Otto on conference trips and associated travel abroad, one of the first to the Welwyn Garden City development in Britain in 1928, after which they began to practice English together. Both Olga and Marie attended the conference in Prague that launched the Wiener Kreis Manifesto in 1929.

The design of each chart was a collective effort, as Otto and Marie repeatedly described it, and Marie regularly raced between home and various offices with sketches for discussion. As Otto was always keen on reducing charts for simplicity to be more easily graspable for pedagogic effect, the sketches went regularly back to the drawing board for revisions. They adopted the simplified Futura type script and the principle of using same-size figures in varying multiples, rather than figures of varying size, to avoid distortions. Colours were chosen according to their vision-enhancing complementarity and brightness, and applied with consistency. The final, and most important, role of the transformer was that of quality assurance. This was to be achieved through a two-pronged process of submitting drafts to academic discipline specialists for comments on the use of evidence drawn from statistical year books (not always reliable), and of gaining "grounded" insights and evaluations from exhibition visitors themselves, including, for example, children and school teachers (Neurath 1982:34). In this process, the transformer role was a "trustee of the public" in a two-way process between assuring the quality of the social science data and the experiences of the users of the information (Neurath and Kinross 1973: 78).

When new accommodation was offered for the museum in the Vienna Town Hall in 1927, architect Josef Frank joined as a consultant to modernise the dark high-ceilinged space. Frank was himself connected to the Vienna Circle through his brother Philipp Frank, a mathematician and physicist and later an émigré working at Harvard University. With a thorough professional training in building techniques as well as interior design, Frank became an important partner in the exercise. Frank shared Otto's distrust of professional "experts," favouring a more "grounded," humane, and participatory approach to design, and was already a long-standing associate in the Social Democratic work of Vienna's various housing projects for workers (Jewish Museum, Stockholm 2007). Display cabinets and lighting were designed to facilitate visitors attending in groups after work. Displays and charts had to be made to fit into portfolios to be portable and reusable for conferences and travelling exhibitions. Illustrative pictures were cut by hand, which was time-consuming. The young psychologist Marie Jahoda occasionally joined as a part-time researcher (Fleck 1998). The work pace was

relentless, and it became clear that more professional design support was needed for the growing amount of commissioned work. At Otto's invitation, German graphic designer Gerd Arntz joined in 1928. Known in Germany for his stark and modernist woodcuts of the life of workers, he became the chief designer of simplified abstract symbols. When he joined the team, he introduced the mass linoleum printing of symbols to facilitate the process and systematise the creation of charts.

As knowledge about the "Vienna Method" spread with the growing number of visitors, requests to either bring an exhibition or train staff on how to create materials came from a number of cities abroad, each with their own perceived national needs and agendas: Germany, Italy, Holland, and the Soviet Union. The latter created a new institute for pictorial statistics, ISOSTAT, as part of centralised party campaigns, and asked the Neuraths to provide staff training. Otto, Marie, and Arntz made repeated visits to Moscow, not always appreciated by hardworking collaborators left behind in Vienna, nor appropriately remunerated by the Soviet party authorities who began to treat the visiting social democrats as "social-faschisten" not appreciative enough of Stalin's increasing centralisation of power (Neurath 1982:42-46). The international horizon was further broadened with participation in and the provision of visual displays for global organisations, such as the *Congres Internationaux d'Architecture Moderne* based in Geneva. Funding for the work remained a permanent issue, however, especially after the stock market crash in 1929 and the political overthrow of the Austrian Social Democrats, a main source of the municipal funding.

As transformer-in-chief, Marie now had the role of instructor in the new techniques added to her portfolio of tasks. When "selling" the Vienna model of museums of "humanity" to America and the rest of the world in 1933, Otto emphasised the department of "transformation" as the most important one, acting between scientific specialists and technical design departments to ensure displays were correct, fascinating, and suitable for culturally diverse audiences (Neurath and Cohen 1976: 222). National "sub-offices," called variously "Mundaneums" or "Institutes," were set up abroad as local support. In practice, these were little more than a desk and part-time secretarial support. Otto's frustrations with some of the museum work seem to have evolved around failure by various "experts," be they party political ideologues, as in the Soviet Union, or aesthetically focused architects, to understand the meaning of "transformation" in the relationship between empirically established evidence and its understanding by a participating public, inhabiting the economic, social, and architectural world presented to them (see Vossoughian 2011).

Since their inception, public exhibitions have been acknowledged as political statements aggrandising rulers, revolutionary heroes, dictators, and rich entrepreneurs. Since Donna Haraway's detailed analysis of the history of the Natural History Museum in New York, and what she termed "Teddy Bear Patriarchy," few stones have been left unturned in the postmodern zeal of exposing the close relationship between public museums, the politics of their funders, the nature of evidence collection, and its "construction" for public education (Haraway, 1994). But this zeal for exposing what Frans Lundgren terms "the politico-didactics" of civic displays has left little room in the history of social science for greater understanding of attempts to de-politicize social information presented in a more valid, but also more democratic, and participatory way to facilitate exchanges between "experts" and ordinary citizens, and what quality assurance came to mean in such circumstances (Lundgren 2013; Sandner 2019).⁵ Marie and Otto's collaboration over "visual statistics" shows the need for a more in-

⁵ The museum devoted to the immigrant experience in the US, *Ellis Island*, has throughout numerous political upheavals and re-conceptualizations of immigration retained its quality of factual social science information through visual displays.

depth look at one of the shared “norms” of scientific practice at the time: the communication of its methods and findings to a universal public (see Merton 1942).⁶

THE PROJECT FOR THE UNITY OF SCIENCE AND ITS ACCOMPANYING INTERNATIONAL ENCYCLOPEDIA

Concurrent with the development of Vienna’s new civic museum, the lively discussions on the logical and epistemological foundations of knowledge continued in Otto and Olga’s flat and the demand on Otto’s writing for publishers grew, especially in relationship to the movement for the Unity of Science. Having incorporated the need for secretarial assistance in commissions improved their finances, but this meant that another task, that of typing to his dictation late into the night, was now added to Marie’s other work (Neurath 1982: 35). In his attempt to summarize the “dizzying array of Neurath’s thoughts and deeds,” George A. Reisch offers a scholarly overview of the origins and development of the Unity of Science movement, part of which included Otto’s proposal for an *International Encyclopedia of Unified Science* (Reisch 1994; see also Morris 1962). In their joint statement on the founding principles of the Vienna Circle drawn up by Carnap, Hahn, and Neurath in 1929, they noted how the anti-metaphysical sensibilities of the Circle pointed to the goal of a unified science in which the achievements of individual investigators would be linked and harmonized through a shared understanding of logic and scientific method. In Neurath’s view, this meant *all* sciences, including economics, sociology, and history. Reisch points to three core aspects of Otto’s commitment to this work: his epistemological faith that all the sciences could be united into a logically unified whole; his belief that his own broad and varied scientific and political interests could be integrated into such a coherent whole; and finally, his conviction that participatory and collaborative *planning* could act as an evidence-based problem solving and decision-making technique in both science and politics. He pictured (literally) the different sciences as making up a vertical “mosaic,” as opposed to a horizontal pyramid, in which history, political economy, and other empirical social sciences could be accommodated. The Encyclopedia was to be a helpful tool in Otto’s oft quoted metaphor of scientific practice: trying to mend a ship whilst at sea, using whatever skills and tools available on board (Neurath and Cohen 1973: 199). Though some of his fellow philosophers attended the Unity of Science congresses, Popper and Carnap amongst them, they did not all agree with Otto’s notion of collaboration and collective planning as a future direction for the sciences, but they did support his suggestion of the establishment of an “Encyclopaedie” of the state of science as a “living force.”⁷ It should, in Otto’s plan, be global and international in approach as well as practically useful, each volume accompanied by a set of pictorial diagrams in a universally accessible data Thesaurus.

This is where the work of Marie was again called upon. Given her earlier training in mathematics and science, Marie would not have been an outsider to these arguments, increasingly focusing on international collaborations and, for external political reasons, increasingly focusing on the search for alternative locations away from Austria and Germany. After the 1929 crash and the collapse of the Social Democratic Party nationally, the political and financial climate in Vienna was becoming more difficult. As nationalism grew, so did far right attacks on socialists, internationalists, peace advocates, and cosmopolitans, at the heart of whom were seen to be the Jews and their friends (see

⁶ In his initial paper on the shared “norms” of scientific practice, Merton calls the need for communication and collective ownership of science findings “communism,” and he refers to the British scientist, and well known communist, J. D. Bernal’s reference to the republican notion of the public as “citoyens.”

⁷ For a detailed discussion of these lively debates, see Reisch 2005.

De Waal 2011 for the ferocity of the anti-Semitic anger in Vienna during this period). Otto grew depressed about Austria being squeezed between the intimidating behaviours of Hitler and Mussolini, and Marie made regular visits to The Hague to establish closer working relationships there. In his detailed work on academic refugees to the US and Britain at the time, Fleck points out that Austrian intellectuals and professionals, many of them active in previously successful social democratic politics, stayed only loosely connected to the more conservative universities, which, with growing immigration from the East, closed down career opportunities for outsiders. Hence, they had to earn their meagre living from teaching or rely on occasional international support (Fleck 2011). As Marie herself wrote: “new contacts with the West were essential for our future, which looked increasingly threatened” (Neurath and Kinross 2009: 45). International collaboration with overseas scientists provided a growing source for such contacts. Marie became a regular attendee at congresses of the Unity of Science and its various planning meetings, bringing crates of hand-painted picture drafts for display by train, boat, or plane.

Reisch, however, refers to such collaboratively produced visual materials as Otto’s—“his”—throughout. To add insult to injury, he treats Marie’s and Cohen’s posthumously edited collection of memoirs and a selection of Otto’s writings (in Marie’s translation) as though it were a book written by Otto himself (as do Cartwright *et al* in their biography, 1966). He also largely avoids mentioning the fact that in between early discussions of these topics in Vienna and the Unity of Science’s first formal congress in Paris in 1935, Otto, Marie, and Olga had been forced to flee Vienna to avoid arrest, ostensibly for being “reds,” leaving many of their tools and materials behind.

FROM THE VIENNA METHOD TO ISOTYPE: EXILE IN THE HAGUE AND BRITAIN

As the financial depression deepened, and the polarised politics between the now right-wing state government and the still social democratic Vienna intensified, anti-Semitic attacks in Vienna grew more frequent, especially at the university. The future for the exhibition activities looked grim and the need for a move became more urgent. The team’s designer architect, Josef Frank, left with his Swedish wife for greater safety in Sweden in 1933.⁸ Marie summarised the dilemmas: Prague was ruled out as too dangerous, and the Moscow institute did not have anything intellectually attractive to offer, coupled with its persistent failure to pay the fees incurred for their work (Neurath and Cohen 1973: 62). They decided to relocate to Holland where a “place” was offered in the Library for the History of Economics, and a new name was invented: *International Foundation for Visual Education*. The move became more dramatic than initially anticipated. Otto, alerted by a coded message from Marie in Vienna, was forced to escape straight from Moscow. He travelled via Prague, helped by Philipp Frank—later to leave for the US—on a “doctored” passport provided by the Austrian Consul in Sweden. Marie and Olga followed, though not Paul, and together they set up a new home in The Hague in 1934, for the moment penniless but safe.⁹ Their initial financial dilemma was aggravated by fear of being deported for shortage of an income. Marie’s family sent regular monies to help,

⁸ From 1942 Frank spent a period lecturing at the New School for Social Research in New York before returning to Sweden in 1946. Alongside architectural work, he collaborated with Estrid Ericson and *Svenskt Tenn* in creating its popular Vienna-inspired Swedish modernist design, characterised by simple forms and bright warm patterns and colours (Jewish Museum, Stockholm 2007).

⁹ Paul Neurath was later arrested by the Gestapo and spent time in concentration camps. He escaped to the US where he worked as research assistant to Paul Lazarsfeld and became Professor of Sociology at City University New York. His book on his experiences in the concentration camps of Dachau and Buchenwald, *Society of Terror*, is a unique and powerful contribution to qualitative participatory sociology of ethnic and political persecution and oppression.

as did American publisher contacts. Later the same year, Arntz joined them, bringing what materials he could from Vienna, and work improved.

International contacts developed during the last years in Vienna now proved helpful. Work on the *International Encyclopedia of Unified Science* project continued unabated under Otto's leadership. The organisational committee for its first congress in Paris in 1935 included the first female Professor of Philosophy in Britain and active humanist, Susan Stebbing, a kindred spirit in her passion for mass education as a precondition for democracy (see Stebbing 1939). The University of Chicago Press agreed to publish the proposed volumes. In the end a staggering 26 volumes were planned, 260 monographs in all, and Carnap and Charles Morris became assistant editors. At Otto's insistence, the volumes included sections on applied disciplines such as education, law, engineering, and medicine (Morris, 1962). With eminent contributors such as Niels Bohr, Bertrand Russell, and John Dewey, there was a brisk sale of subscriptions, which brought needed income to support Marie and hired staff for the proposed accompanying ten-volume *Visual Thesaurus*. Several well-attended congresses followed in Prague, Scandinavia, Britain, and the US before the war. During an optimistically forward-looking discussion about their new future, the idea emerged to develop a picture-text style of wordless writing. Marie wrote modestly: "the idea came more from his [Otto's] brain than mine, but I did present one real gift to him at that time, the word "Isotype." This word, an acronym for *International System Of Typographic Picture Education*, a concept still in use, was the only contribution Marie gave herself credit for (Neurath and Cohen 2009: 63–64).

Other collaborative work that started in Vienna continued, such as work with the linguist and philosopher C.K. Ogden on visual additions to his proposed BASIC English (British American Scientific International Commercial English), based on a limited number of words. Financial support for this project came from Kegan Paul in Britain. They were soon invited to New York to work for the National Tuberculosis Association's mass pictorial information campaign aimed at non-English speakers. Further work was commissioned by other supporting publishers: Alfred A. Knopf for *Modern Man in the Making*, discussed above, and the Chicago publisher Compton for a children's Encyclopedia, each requiring many pictorial representations. They also received an invitation in 1936 to Mexico City to give instructions to a team developing a science museum. Travel meant working on sketches and ideas together on long train and boat journeys, but Otto turned down an offer to visit Trotsky, who at the time was living in Mexico City (Neurath 1982: 56). As Marie noted, all of these invitations led to their greater confidence in the belief that every kind of scientific statement was open to visual treatment (Neurath and Kinross 2009: 55). But political anxieties remained about what was happening in Europe, and they sent letters through intermediaries to friends and relatives in Germany and Austria for fear of causing damage to those who had remained. Book commissions were forthcoming, including one for a pictorial history of persecution and tolerance generously sponsored through Alfred A. Knopf by the US store owner and millionaire philanthropist Edgar J. Kaufmann (Sandner 2014: 243). Their last work in the Netherlands, most likely inspired by Marie's love of art, was a pedagogical exhibition about Rembrandt for a chain of department stores. With much of Europe in the grip of destructive fascism and war looming, it is hard to fully believe their expressed enthusiasm for these, each by itself limited, projects.

As German troops and bombers reached the Netherlands in April 1940, and German repressive laws on Jews and their associates came into immediate effect, Marie and Otto walked luggage-less through backstreets to the nearest harbour. After Olga's recent death they were on their own. They escaped on a small overcrowded boat and were rescued halfway across the English Channel by a British navy vessel. Arntz, a German "Aryan," stayed behind with materials and equipment. He was

soon recruited into the German army and later spent time in an Allied prisoner of war camp. He was freed to return to The Hague with Otto's help as guarantor of his anti-fascist credentials and worked with the Dutch Foundation for Statistics, but did not join them again.¹⁰ As enemy aliens, Otto and Marie were both transferred to internment camps. They were thrilled to be in England, internment being a minor issue in comparison to what they would have faced on the other side of the channel, but again they had no money, nowhere to go, and little hope of long-term institutional support. With the increase in the number of refugees, the need for personal and financial guarantors to avoid deportation intensified. Susan Stebbing offered personal support, as she had previously done for Rose Rand, and donations in kind were offered by other women (Cohen 2011).

After release from internment, and with an offer of seminar teaching in social science and logical empiricism for Otto as well as living space from the socialist economic historian G.D.H. Cole at Oxford University, Marie for the first time became formal co-director of the new Board of what was to be called the *Isotype Institute*, of which Stebbing remained Chair till her death in 1943. Otto and Marie were both to act as Secretaries and Directors of Studies, to protect the continuation of the Institute in case something happened to either of them, and to ensure permanent legal employment to avoid deportation as the anti-immigration climate grew harsher. In their sitting room in Oxford, work resumed with Marie remaining in charge of accounts and employment contracts alongside her other work as general researcher, illustrator, secretary, translator, transformer, and editor. The collaboration was further cemented when they married in 1941.

Wartime work came their way through Susan Stebbing and the Ministry of Information consisting of film work and book illustrations, particularly school books. The renowned documentary film maker Paul Rotha, later innovator at the new BBC TV, was making wartime information films and had plans for animations to strengthen the effects of diagrams using ISOTYPE pictorial statistics. Otto collected the information and Marie made the pictures, the first one on how to save household waste during the austerity of war. They drew up plans for a *Visual History of Mankind*, a series of illustrated books, with Gordon Childe, an archaeologist at the University of Edinburgh with an interest in the socio-economics of prehistory. It was complicated work, and Marie wrote: "I sat helpless in front of the many pages of information and said: I can't make a picture of this. But Neurath just said: of course you can. It concerned life in lake-dwellings built on stilts." Whereas Otto knew history well, she knew technical science and they discussed every page before going to production. (Neurath and Kinross 2009: 62-63). They received further book commissions. Wolfgang Foges, Vienna-born director of a book packaging firm and aspiring publisher, offered publication opportunities for a series of children's books on science and technology. Regular financial support from the philosopher C. G. Hempel and resumed monthly stipends from Edgar J. Kaufman, both in the US, also helped (Sandner 2014: 271).

Work for the Unity of Science continued. Two more international congresses for the Unity of Science were held in Britain and the US, as war broke out, and the sixth international congress of the Unity of Science was held in Chicago in 1941. A proposal to suspend the project was mooted in 1943, but in the face of Otto's charge of "defeatism," the threat of suspension was lifted. A new offshoot of the project, the *Journal of Unified Science*, was managed by Otto from Britain and he drew up further plans for international expansion and additional congresses (Morris 1962). In his enthusiasm, Otto again clearly underestimated the practical work involved and the project became rather a shadow of

¹⁰ Further biographical and archival material on Gerd Arntz can be found on the website: <http://www.gerdarntz.org>, including reference to his many designs for "the Vienna method" and ISOTYPE. I could find no evidence of any reference to Marie on this website.

his original plans. Alongside local libraries, Oxford's secondhand bookshops provided much of the underlying materials. Alongside ongoing teaching duties, he now turned his attention to the creation of a "pictorial autobiography" that would, as he saw it, be a first of its kind, and would incorporate visual evidence of his early love of military maps, scientific drawings, and hieroglyphs. This rather rambling attempt at "autobiography," which also aimed at exemplifying a limited vocabulary along the lines of BASIC, was only published posthumously, originally with Marie's help, from archival materials (Neurath 2010). For the purposes of this discussion, however, it should be noted that when his writing gets to the Vienna Museum of Social Sciences and the origins and principles of Isotype, his earlier "I" turns into a consistent "we" (Neurath 2010: Chapter 5). The work on the history of persecution also was never completed. But trying to differentiate Otto's many new book ventures with "visual" in the title that emerged during this period is difficult, and I will not try to do so. It is, however, hard not to feel sympathetic with Marie's plight in trying to do her best to "service" them all, including her own work on children's books.

With the end of the war in sight, "reconstruction" was again in the air. In 1945 the small town of Bilston, a deprived and polluted coal and steel mining town, invited Otto to become its consultant on community "happiness." The invitation came after Otto had given a talk on housing in Vienna to the International Friendship League—an organisation founded in 1931 to foster friendship across enmities in Europe—and impressed Bilston's town clerk with his community participatory approach to slum clearance and the development of housing estates. An exhibition was soon planned to enrol those who were to be re-housed into the planning process (Jeffreys 2016). In retrospect, this venture may not seem much in comparison to their earlier grand international aspirations, but it offered Otto and Marie fresh hope of a brighter, though intellectually less star-studded, future. Their long-term affections for Britain remained intact. A brighter future would not come to fruition, however. Otto died of a sudden heart attack shortly after the war ended in December 1945, leaving Marie to single-handedly further his and her own legacy.

LIFE WITH ISOTYPE AFTER OTTO

After Otto died, Marie was left in charge of the Institute and her own financial future. In her devastation over the loss of her best friend and their many daily conversations, she saw her new task as that of continuing their collective labours on her own. In this she was supported by their new network of local friends, many of them also refugees. She soon returned to Bilston and organised the planned exhibition to inform and enrol the town dwellers. As Marie's work there was done, an old colleague from Social Democratic Vienna and the first female member of its Association of Engineers and Architects, Ella Bigg—an émigré to Britain in 1936—became one of the architects working on the simple but sunnily white-painted terraced housing (Jeffries 2016).¹¹ Marie returned to Vienna and The Hague to settle legally tricky questions about the ownership and copyrights of Isotype titles and symbols. She stood up for her wish for independence and reached a series of compromises enabling Arntz to remain in employment in the Netherlands and herself in Britain to retain the title of the Isotype Institute. She also visited her now dispersed family in a war-ravaged Germany. Her desire to stay in Britain remained strong. With documentary maker Rotha at the BBC, she continued the collaboration over film production. Foges offered Marie and the institute accommodation at his firm in

¹¹ In an irony of history, the Bilston experiment, and others like it, was brought to an abrupt end when the conservative prime minister Margaret Thatcher in the 1980s, strongly influenced by the free market economics of another Viennese thinker Friedrich A. Hayek, privatised British local authority communal housing.

London, which after the war became a subsidiary of the publisher Max Parrish. Foges and Parrish continued working with her over a series of colourful children's books on "visual history" and "visual science": the history of agricultural machinery, the working of atoms, and various technical and engineering processes, including one diagrammatically and colourfully explaining the London Underground. A large number of very popular books were produced, many of which have become classics in an ongoing genre and are still in print.¹² In the 1950s, she was put in contact with the Prime Minister of Western Nigeria to create word-less picture pamphlets and wall charts for major public campaigns on emerging policy issues: education for all, voting procedures, and health, a campaign now seen as a classic in the field of mass communication and health promotion.

In the same decade, an invitation from Alva Myrdal, at the time Director of Social Science at UNESCO, and Viola Klein, Austrian immigrant in Britain and an ex-doctoral student of Karl Mannheim, led to new charts being drawn on women's two roles. The internationalism inherent in the combination of faith in universally comparative methods of social data collection and the need for successful democratic practice to make the results more accessible to the public, and the role of women in this faith, can be traced to emerging international organisations since the establishment of the League of Nations and the International Labour Organisation after World War I. This faith included belief in the principles of the linguistic Esperanto movement and its search for a new culture-free language to promote peace and understanding through its Committee of International Cooperation, of which Marie Curie and Einstein, amongst others, were members. Women—Eleanor Roosevelt prominent amongst them—and women's organisations stayed at the forefront of attempts to assemble and analyse comparative information on social issues. Such evidence, it was argued, could both enhance world peace and improve labour and family relations.

This original home for faith in collaborative internationalism re-emerged with the establishment of the United Nations and its associated agency for science and education, UNESCO, after World War II. Otto Neurath and Karl Mannheim—at the time known in the Anglo-Saxon world more as "educators" than academics—were both offered posts with UNESCO. They declined due to other commitments at the time, but "Otto's" work on visual presentation is still seen as part of its heritage. In a paper by Jenny Bangham on the UNESCO Department of Mass Communication's early attempts to tackle the issue of "racism" and prejudice in response to Holocaust revelations, Otto is given credit for influencing the campaign with "his" creation of visual representations to bridge the gap between popular and scientific knowledge. But simplified Isotype designs were ultimately found to be too "modernist" for American audiences, and with Allied funding essential, UNESCO adopted images more culturally sympathetic to a US audience. As Bangham notes, approaches to questions about "race" through explanations of the inner structure of genes proved more contentious as an object of mass campaigns than the politically less contentious inner workings of technical machinery. However, Bangham dubiously lists several children's books published in Marie's name after Otto's death, and cited as models of "modernist" aesthetics used to convey scientific objectivity, as joint Neurath productions (Bangham 2015: 87).

When Alva Myrdal was appointed Director of the Department of Social Sciences at UNESCO in 1951, she worked hard to establish the principle of researcher autonomy vis-a-vis national financial and ideological pressures of various kinds (Herman 1993; Rangil 2013). The conflicting role of its full-time civil servants and academic experts was not, in its ideal form, unlike that of Marie and Otto's conception of an autonomous "transformer" as a "trustee of the public." On the one hand, they had

¹² For a record of these books see *Transforming Science for Young People: Marie Neurath and Isotype books for children, Exhibition at Reading University 2020*: www.marieneurath.org

pledged allegiance to the international mission of the UN and its procedures, and, on the other, were continually subject to pressures for national allegiance in the selection of research agendas and practices. It was in practice more complicated and, as history shows, continues to be so for both researchers and civil servants. One of Alva's own proposed projects was to return to international issues relating to women in the labour market, for which she had access to a variety of national data. The young Viola Klein was invited to collaborate to give the project academic depth, and she invited her refuge friend Marie to provide the Isotype charts. *Women's Two Roles* (1956) became a kind of model for future social scientific research on the position of women (Lyon 2007). In analysing his experiences at UNESCO, British cultural historian Richard Hoggart describes the organisation as a "physically ill-coordinated man who has been required to skate on thin ice for a good cause" (Hoggart 2011: 42). One can but praise the many women who worked so hard to hold "him" and "his" internationalism up.

With the London publisher Max Parrish now less interested in Otto's half-finished projects on visual memory and history, Marie turned her attention to salvaging Otto's memory in the eyes of the intellectual world. She undertook a collaboration with Robert Cohen (recommended to her by Carnap) on a memoir and anthology in English of some of Otto's writings (Neurath and Cohen 1973). As further book commissions began to dry up and the publisher hosting the Institute in London was reorganised, a new location for the Institute was required. What had now been Marie's Institute for almost two decades came to "a real end, just as it had a real beginning," as she described it (Neurath and Kinross 2009: 75). The material assembled at the Institute was donated to Reading University, at the encouragement of Michael Twyman, a graphic designer who developed what is considered the first department of Typography and Graphic Communication in Britain in 1975. In the same year, an exhibition of the material was organised and Marie was invited to teach students and to assist with the cataloguing of the large archive. Alongside archives in Vienna and The Hague, it remains a major source of material for ongoing research about the history of Isotype. She continued to work with the department till her death in 1986, shortly before which her student Robin Kinross, with her help, assembled a book about the principles of Isotype in her honour. Without Marie's involvement, this biography would have been more exuberant in its praise of her intellectual and practical contributions to the development of the most famous visual picture language invented in the social and natural sciences.¹³

CONCLUSION: THE CREATION OF A LEGACY

One of the questions asked early in this paper was related to the contribution of collaborating partners to their joint legacy as creative public intellectuals. It must be said that "the Neuraths" did not make it easy for each other. Although Otto did not personally sign his work when he considered himself part of a team and officially thanked Marie regularly as his highly important "transformer," surviving publications of their joint work are in his name only. There were limits to his modesty with respect to his co-producer and second-in-command. The memoir and anthology which facilitated Otto's rediscovery, largely written and assembled by Marie, and other later works done by her, are regularly quoted in his name. In her devotion to him, Marie created a double-edged sword with respect to her own legacy due to what Kinross, who worked with her, described as her lack of pretension

¹³ The University of Reading also houses the Archive of Viola Klein, including a copy of her first dissertation, on the French novelist Celine, the preparation for which introduced her to the writings of Karl Mannheim's sociology of knowledge (Lyon 2007).

and self-effacing tendency to play down her own role (Neurath and Kinross 2009: 117-120). She has been taken to task by Günter Sandner (2014) for not giving enough credit to Otto's philosophical contributions and for understating the importance of his earlier relationships, and by Vossoughian (2011) for not being sufficiently critical of Otto's view of "the masses." Christian Fleck, in personal correspondence, has alerted me to her overreliance on often poor or manipulated statistical sources with little room for multi-variate analysis of hypothesised causal relationships, a fault she shares with Otto. But she has seldom been fully acknowledged for her own contribution to their joint legacy.

According to Hess, de Toqueville's earlier death left his collaborator Beaumont in charge of selflessly promoting, at his own expense, the memory of his lifelong partner lest his work be forgotten. He achieved this with considerable success (Hess 2018). Similarly, Marie was deeply concerned lest her husband, once the centre of a major intellectual network in a German-speaking country, would be forgotten in new immigrant foreign-language surroundings. Otto may have spoken fluent "broken English," as he himself said, but Anglo-Saxon academics did not speak German very well, if at all (Sigmund 2017:351). Marie shared this concern with the wife of Karl Mannheim, the psychoanalyst Julieska Mannheim, who ensured the translation and re-publication of Mannheim's major works after his equally premature death from heart failure shortly after the war. Britain had saved them all from the clutches of Hitler, but had also treated the original work of their famous husbands as linguistically and culturally obscure and not worthy of academic university promotion within existing disciplinary structures. In their efforts to make their husbands' work more accessible to a foreign English-speaking audience, they also simplified some of the depth of their work, which is now slowly beginning to be rectified (Lyon 2011).

Neither social nor natural science is gender blind, but they can be made less so by paying greater attention to the practicalities of its "enactment" in research practices. For a brief period of history, Marie and Otto Neurath created a visual language for the communication of social statistics that they hoped would enhance human understanding of each other and the world in which they lived, and in so doing, would assist in the creation of a more humane world. Today we have the visual "walk through the world" they envisioned and set in train at our fingertips on various internet platforms as more data are collected and made accessible, and as more sophisticated statistical models and algorithms are developed to interpret them. The turbulent political climate in which Marie and Otto lived, and the collaborative closeness with which they and their many friends and employees worked, makes disentangling their relative disciplinary contributions a test case in the complexity of what we call scientific progress. None of them were "marginal" in that they expressed no difficulties in forming a strong identity of their own, but they were "in the margins" both as citizens and later immigrants. This had major consequences for how their lives as public intellectuals were formed and received. They were carried through difficult times by groups of friends, connected through a gendered network of what Weber termed "eclectic affinities": overlapping cultural, political, and emotional commonalities, revolving around a shared passionate commitment to a view of open and accountable scientific methods as a universal pathway towards greater and more universal human well-being. A deeper study of the complexities of victimisation at this earlier point in history—when what counted as knowledge, truth, and falsity lost its meaning in a global "culture war" of prejudice, denigration, and exclusion—is an important task for future generations of historians of intellectuals in public. In this task I hope they will remember Marie.

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