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The Uses of Rationality: Otto Neurath

Monika Poettinger

Bocconi University, Milan



Gustav Klimt, The Birch Wood (1903), oil on canvas

Abstract

Otto Neurath (1882-1945) wrote on rationality in the 1910s when he was interested in renewing the economic science on an empiricist fundament. He discussed rationality mainly in two contexts. Firstly, he analysed rationality as one of the means that humanity devised for taking decisions. In *Die Verirrten des Cartesius und das Auxiliarmotiv. (Zur Psychologie des Entschlusses),* a seminar held at the Viennese philosophical society in 1913 and later published, Neurath historicised the use and meaning of rationality, comparing it to religion and magic. In the wake of Ernst Mach, Neurath disputed the existence of universal truths or natural laws. Decisions would never cease to entail a measure of uncertainty and men would always err in the forest of Descartes, without any hope of ever exiting it. Rationality limited the pain of deciding exactly as other methods did and could not claim to be the way out of the forest. Rationality, though, even if its results did not stand the test of truth, constrained scientists to a continuous confrontation, avoiding arbitrary decision making on part of a minority. By applying scientific methods, a limited range of solutions could be offered, instead, to the democratic choice of the people. Scientists would not become the priests of future, imposing dictatorial whims on the majority. Contrary to Weber, Neurath so judged positively the rationalisation of the world because linked to democratisation. Secondly, Neurath discussed rationality as a fundament of economics, particularly criticizing the *homo oeconomicus* formulated by von Wieser. He did so in his *Nationalökonomie und Wertlehre, eine systematische Untersuchung*, published in 1911, and in *Das Begriffsgebäude der Wirtschaftslehre und seine Grundlagen*, published in 1917. Disputing the fact that rationality would steer humanity toward an ideal world ruled by natural laws, implied that man was not an irrational being in dire need of education and training: a pebble bringing the marvellous natural mechanism to a halt. With no available truth, it was impossible to measure the goodness or badness of a decision. Every decision would and should be legitimised by an auxiliary motive in respect to rationality. There was no reason to found the economic science on a man behaving rationally. Economic actions and economic policies should so be valued not in respect to their rationality but to their capability of enhancing the wealth and happiness of people. Neurath's economics was to be a science of happiness not of rationality.

Neurath, economics and rationality: the Viennese context

Otto Neurath (1882-1945)[1] wrote about economics mainly in the years between his dissertation in 1906 and 1917 when the "Zeitschrift für die gesamte Staatswissenschaft" published the summa of his economic thought, *Das Begriffsgebäude der Wirtschaftslehre und seine Grundlagen*[2]. Neurath, at the time residing in Vienna, was pursuing then an academic career in economics. In fact, in 1918, he obtained, thanks to Eberhard Gothein, Max and Alfred Weber, a professorship in Heidelberg. On the occasion, Neurath held the required public lecture on "War Economy, Administered Economy and Natural Economy" (Sandner, 2014, pp.103-105). In effect, Neurath's career based mainly on his achievements in war economics, appreciated by many contemporaries (Mises, 1919, p.125; Weber, 1978, pp.104-107). His participation to the key debates of his time, on the theory of value, the method of social sciences, the normative content of economics and the possibility of socialist calculation, instead, was much more controversial. Many harsh judgements were felled on his holistic attempt at a complete reform of the economic science on empiricist foundations[3]. Nonetheless his economic essays appeared in Gustav Schmoller's *Jahrbücher für Nationalökonomie und Statistik* (Otto Neurath 1906 and 1907) and *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft in Deutschland* (Otto Neurath 1910a), in Eugen Böhm-Bawerk's *Zeitschrift für Volkswirtschaft, Sozialpolitik und Verwaltung* (Otto Neurath 1911a), and in Max Weber's *Archiv für Sozialwissenschaft und Sozialpolitik* (Otto Neurath 1915a, 1915b and 1918b). Neurath also joined the *Verein für Socialpolitik* and his writings are present among its published and unpublished proceedings[4].

While Neurath revolutionised economics, he also was an active and enthusiastic member of the Philosophical Society of the University of Vienna (Blackmore, Itagaki, and Tanaka 2013, p.280). The Society was active from 1888 to 1938 and in those fifty years represented the main philosophical discussion forum in Vienna (Fisette, 2014). The openness of the society, to other disciplines and to extensive debates, was accentuated under the direction of Alois Höfler, particularly from the turn

[1] For a complete biography of Otto Neurath see Günther Sandner, 2014; Nancy Cartwright, Jordi Cat, Lola Fleck, Thomas E. Uebel, 2008; and Enza L. Vaccaro, 2005.

[2] Otto Neurath 1917, pp. 484-520.

[3] Uebel gives a colorful listing of all negative judgments by contemporaries on Otto Neurath, from Lujo Brentano's definition of Neurath as a "romantic economist of the Ancient Egyptian school" to the alternative stigmatizations as a "bourgeois professor" or as "communist" by Bukharin and Gesell. See Uebel (2004), p.75.

[4] The contributions have been republished in English in: Uebel and Cohen (2006) pp.292-298. For a critical appraisal see Nau (1913).

of the century to his death in 1922[5]. The Society reached then a steady membership base of over two hundred associates, among them economists as Schumpeter and Menger, while up to six hundred participants took part in the public lectures, held not only by philosophers but also scientists and mathematicians[6]. Neurath lectured eleven times between 1908 and 1924 (Table 1) and accordingly was the most prolific speaker of the Society. The topics he proposed were controversial and much discussed. Eight extraordinary sessions of the Society were dedicated to debates on Neurath's presentations (Table 1). Next to the participation in the gatherings of the *Verein für Socialpolitik* and his attendance to the economic seminar of the university of Vienna, the Philosophical Society was the intellectual circle where Neurath presented his major works and debated his ideas, refining and defining them. As shown in Table 1, listing Neurath's publications along all his lectures at the Philosophical Society, the same topics, from war to value, from natural laws to rationality, criss-crossed between academic publications in economics and public philosophy lectures.

Neurath's renewal efforts in economics clearly stem from the discussions held at the Society on the Machian heritage, Darwinism, Nietzsche and ethics, the origin of value, Platonic ideas, neo-Kantianism, causation and many more (Blackmore, Itagaki, and Tanaka 2013, pp.280-281). War, as a topic to be analysed scientifically, was the object of his first lecture, held in March 1908. As seen, the many publications later dedicated to war economics would become the basis of his professorship. The public discussions on a priori values and the calculation of maximum pleasure, held by Neurath in January 1910 and June 1912, would accompany the publication of his seminal essay on the problem of value in economics (Otto Neurath, 1911). Rationality, discussed with the title 'The lost wanderers of Descartes and the auxiliary motive' in January 1913, would followingly be the focus of an essay on the problems of war economics that included the main theses of Neurath's renewed economics (Otto Neurath, 1913b). In the following years, Neurath published his most important writings on war economics and the redefinition of the economic science (Otto Neurath 1917a, 1917b) and presented in front of the associates of the Philosophical Society their epistemological fundaments. He lectured on Mach, on alternative hypotheses and theoretical systems and the problem of choice, on Spengler and his historical methodology and finally, in February 1923 on 'The conceptual building of economic theory'. The following year, though, marks

[5] Alois Höfler (1853-1922) was among the founders of the Society in 1888. He acted as *Obmann* of the Society from 1898 to 1903 and was then elected President for life. He again held the position of *Obmann* from 1912 to 1922. (Blackmore, Itagaki, and Tanaka 2013, p.279).

[6] An English translation of the complete list of lectures held at the Philosophical Society is to be read in: Blackmore, Itagaki, and Tanaka 2013, pp.283-298.

the end of Neurath's participation to the Philosophical Society. The cause had been the death, in 1922, of Alois Höfler. His successor, Robert Reininger, inexorably limited the discussions to a minimum, restricted the topics to philosophical questions and favoured academic philosophers as speakers.

Blackmore, Itagaki, and Tanaka (2013, pp.281-282) venture to suggest that the ascension of Reininger and the changes he introduced in the gatherings of the Philosophical Society gave rise to many famous 'circles' of interwar Vienna. The circles collected former adherents of the Society that wanted to recreate a space for open discussion on scientific and philosophical topics. The best known and the most studied by historiography is Schlick's Circle, later institutionalised as Ernst Mach Association, that regularly met on Thursday's evenings in the Chemistry Building of the University (Stadler 2015). Under the guidance of Moritz Schlick, the so-called 'Vienna Circle' became the preferred locus of debate for many philosophers and scientists, among them Hans Hahn, Rudolf Carnap and Viktor Kraft. Otto Neurath, also, having held his final lecture at the philosophical Society in 1924, attended Schlick's Circle, soon becoming one of its driving forces. Karl Menger organised, instead, his *mathematisches Colloquium*, while many other professors, among them Heinrich Gomperz, Robert Reininger, Victor Kraft and Edgar Zilsel, set up their own gatherings. Most of them, though, were not as open as the Philosophical Society had been: participation was only upon invitation and therefore discussion mostly limited to people who shared basic assumptions.

In the interwar years, Neurath not only switched his attention from the Philosophical Society to the Vienna circle, but also reduced his economic writings to a minimum. In 1918, in fact, he had abruptly ended his promising academic career in economics by following his ideals down to the chaos of Munich's *Räterepublik*. During the process for treason that concluded the Bavarian Council Republic, Neurath's defense benefited from the favorable testimony of many friends, among them Max Weber[7]. Neurath escaped with his life, but lost the professorship in economics he had just obtained in Heidelberg. From then on, he dedicated his efforts to philosophy and to the democratization of knowledge by devising and directing museums and by experimenting with his renowned isotype language.

The end of his career as economist and the conclusion of his active engagement in the Philosophical Society marked a break in in Neurath's intellectual life, compelling him to search for

[7] Weber's testimony has not been preserved in official archives, but has been reconstructed from articles published by the *Münchner Neuesten Nachrichten*. See Horts Beier (ed.) Max Weber, Gesamtausgabe, vol. 16, Tübingen, Mohr Siebeck, 1988, pp.492-494

an alternative source of income and changing the style, content and editors of his writings. Neurath increasingly published on popular journals and newspapers and wrote educational booklets and popularization texts. Essays in academic journals, be they of economics or philosophy, vanished almost completely from his work. The only economic question he continued to write about, almost obsessively, was socialisation.

Neurath's former effort in redefining the economic science on his innovative epistemology was hardly understood by his contemporaries and soon discarded or forgotten. His conclusions, regarding the development of economic thought, the linguistic analysis of economic terminology, the relative and historical value of theories and the uselessness of theoretical systems, resurfaced in academic debates only at the end of the century. The same holds for his evaluation of rationality, an instrument of choice, in his eyes, comparable to religion or magic. History had made of rationality one of the characteristics of the modern man, stimulating democratic decision processes, but economics could not assume it as the basis of its analysis. Economics, for Neurath, had to study the consequence of choices on the wealth of people, leaving the wanderers of Descartes to freely search for their own way, be it rational or irrational, out of the forest.

Table 1

Selected works of Otto Neurath[8], his lectures at the Philosophical Society and the discussions at the Verein für Socialpolitik (1906-1924)		
Type	*Title*	*Date*
Essay	*Zur Anschauung der Antike über Handel, Gewerbe und Landwirtschaft* (Otto Neurath, 1906a; 1906b; 1907à)	1906-1907
Lecture	War and Moral Principles	5-03-1908
Book	*Die Entwicklung der antiken Wirtschaftsgeschichte* (Otto Neurath 1908)	1908
Book	*Antike Wirtschaftsgeschichte* (Otto Neurath 1909)	1909
Essay	*Ernst Schroders Beweis des 12. Theorems: Für die identischen Operationen gilt das 'Kommutationsgesetz'* (Otto Neurath 1909b)	1909
Essay	*Zum Dualismus in der Logik* (Otto Neurath, Olga Hahn 1909a)	1909
Essay	*Eindeutigkeit und Kommutativität des logischen Produktes* (Otto Neurath 1909c)	1909
Essay	*Zur Axiomatik des logischen Gebietskalküls* (Otto Neurath, Olga Hahn 1909b)	1909
Essay	*Diskussionsbeitrag über die Produktivität der Volkswirtschaft [Verhandlungen des Vereins für Sozialpolitik in Wien, 1909]* (Otto Neurath 1910d)	
Essay	*Definitionsgleichheit und symbolische Gleichheit* (Otto Neurath 1910c)	1910
Essay	*Über die Koeffizienten einer logischen Gleichung und ihre Beziehungen zur Lehre von den Schlüssen* (Otto Neurath, Olga Hahn 1910)	1910
Book	*Lehrbuch der Volkswirtschaftslehre* (Otto Neurath 1910b)	1910
Book	*Lesebuch der Volkswirtschaftslehre* (Otto Neurath, Schapire-Neurath 1910)	1910
Essay	*Zur Theorie der Sozialwissenschaften* (Otto Neurath 1910a)	1910
Lecture	The Concept and Range of Validity of the A Priori	17-01-1910
Lecture	Discussing the Lecture of January 17th on the A Priori	14-02-1910
Essay	*Nationalökonomie und Wertlehre, eine systematische Untersuchung* (Otto Neurath 1911)	1911
Lecture	The Problem of Maximum Pleasure	1-06-1912
Essay	*Das Problem des Lustmaximums* (Otto Neurath 1912)	
Lecture	The lost wanderers of Descartes and the Auxiliary Motive (Toward a Psychology of choice)	27-01-1913
Lecture	Discussing Neurath's Talk of January 27th on Descartes and Decision making	8-02-1913
Essay	*Die Verirrten des Cartesius und das Auxiliarmotiv (Zur Psychologie des Entschlusses), Vortrag gehalten am 27 Januar 1913 von Otto Neurath Wien* (Otto Neurath 1913a)	1913
Essay	*Probleme der Kriegswirtschaftslehre* (Otto Neurath 1913b)	1913
Essay	*Über die Stellung des sittlichen Werturteils in der wissenschaftlichen Nationalökonomie* (Otto Neurath 1913c)	1913
Lecture	Classification of Systems of Hypotheses (Concerning Optics)	2-03-1914
Essay	*Zur Klassifikation von Hypothesensystemen (mit besonderer Berücksichtigung der Optik)* (Otto Neurath 1914)	1914
Essay	*Prinzipielles zur Geschichte der Optik* (Otto Neurath 1915)	1915
Lecture	Mach's Position on the Problems of Gravitation and Inertia	15-12-1916
Lecture	Discussion of the Mach Lectures by Kraft and Neurath	8-01-1917
Lecture	More Discussion of Mach's Ideas and the Lectures by Kraft and Neurath	22-01-1917
Essay	*Das Begriffsgebäude der Wirtschaftslehre und seine Grundlagen* (Otto Neurath, 1917a)	1917
Essay	*Die Kriegswirtschaftsrechnung und ihre Grenzen* (Otto Neurath 1917b)	1917
Lecture	Schelling and Faraday (with experiments)	5-04-1918
Lecture	Discussion on both Principles: Natural Science is completely independent of Philosophy and Philosophy is repeatedly dependent on Natural Science (caused by Neurath's concluding remarks to his April 5th lecture)	6-05-1918
Lecture	Discussing the Question: Can and should there be a "Philosophy of Nature"?	27-05-1918
Lecture	More Discussion on Can and Should there be "Philosophy of Nature"	11-06-1918
Book	*Antike Wirtschaftsgeschichte* (Otto Neurath 1918a)	1918
Lecture	Spengler's Concept of Culture	14-05-1920
Lecture	Discussion of Culture and Civilization in Neurath's Lecture on Spengler	11-06-1920
Book	*Anti-Spengler* (Otto Neurath 1921)	1921
Lecture	Ernst Mach's History of Optics and Theory of Science	21-01-1922
Lecture	The Conceptual Building of Economic Theory. Logical Focus	26-02-1923
Lecture	The Philosophy of History Problem about the Development of Architecture	13-03-1924

[8] Publications on war economics and monetary politics have been left out of the selection. For a complete bibliography of Otto Neurath see: Marie Neurath, Cohen 1973, 441-459; Cohen 1983, 255-258.

The lost wanderers of Descartes aboard Neurath's ship

From the intense attendance to the gatherings of the Philosophical Society, Neurath acquired his *Problemstellung* in relation to epistemology, the value of mathematics, the role of ethics and the absolute refutation of metaphysics. He also defined there the language he used to tackle those same problems and his attitude toward semantic analysis. In 1946, Neurath, describing himself as a logical empiricist and looking back at the time of his intellectual development, wrote: "Many of us, beside myself, have been brought up in a Machian tradition, e.g., Franck, Hahn, von Mises. Because of this, we tried to pass from chemistry to biology, from mechanics to sociology without altering the language applied to them. We, as many others all over the world, were also influenced by scientists such as Poincarè, Duhem, Abel Rey, William James, Bertrand Russell, and I, in particular, by Gregorius Itelson[9]" (Otto Neurath 1946, p.497).

Collecting all these suggestions, Neurath came to define science as a logical construction, based on empirical propositions, that justified itself and self-explained itself. Science so renounced every external legitimation, be it an ideal and absolute truth[10], the correspondence to an objective reality or a group of epistemological rules. Given this definition of science, obviously, every distinction between natural and social sciences became irrelevant and the *Methodenstreit* lost all its significance. The same methodology could and should be used in biology, mechanics, chemistry and sociology. So Neurath in his scientific deed in 1946:

"As a sociologist I disliked all this talk about 'the national spirit', 'mentality of a ruler', etc. Why should we not speak here in the same simple way as in the laboratory? And, as an empiricist I asked myself how we might start from simple observation-statements, on which to base all further scientific discussions. So I developed my suggestions dealing with 'protocol statements' (cf. my ''Protokolsätze'', Erkentniss, 1932[11]), frequently discussed since then by various people. I disliked starting from a vague statement of 'something red' floating somewhere in the air and therefore I asked for a more exact formulation. Such a formulation always gives the name of the 'protocolist'

[9] On Itelson and his influence on Neurath see Gideon Freudenthal and Tataiana Karachentsev 2011, pp. 109-128.

[10] Neurath could not be clearer: "(…) we have no possibility of discussing the "truth" of anything, since there is no imagined arbitrator in the chair. Therefore I suggested that we drop the term "truth" with the whole of its large family. Everything will then be based on the comparison of statements with protocol-statements, leaving open the many ways in which such a comparison can be made. It is essential that all statements should be ''connectible", as von Mises happily puts it" (Otto Neurath 1946, p.501). Neurath excluded the existence of an absolute truth. Truth was a concept that in time had assumed different metaphysical connotations and semantic significances. See: Francesco Fistetti 1985, p.132.

[11] Neurath published this article as part of the controversy with Rudolf Carnap (1932a) that originated the famous debate on protocols (Carnap, 1932b). While Carnap supported an empiricist position, Neurath considered even protocols to be subject to revision. See: Uebel 1993 and Uebel 2009.

first and then adds his sayings. 'Charles told us he had seen a red table in his room on March 4th' seemed to me a fair start, which enabled us to ask the question, 'When, where, and how?' which we are accustomed to ask when we make an astronomical or chemical statement. With one stroke, I thought, I could overcome a certain cleavage always felt when scientists want to pass from 'sensual elements' to descriptive statements on stars and stones. My suggestion seemed to have the advantage that the 'when, where, and how' attitude could be maintained from the bottom to the top. This I call the 'physicalist' approach" (Otto Neurath 1946, p.499).

This simple account contains the core of Neurath's epistemology, refuting idealism and metaphysics, but also the kind of empiricism typical of the Vienna Circle[12]. Only several decades later would epistemologists elaborate what Neurath already affirmed in the first decades of the twentieth century (Haller 1985, p.11): science was only one of the methods evolved in history to construe the *Weltanschaaungen* through which societies explained themselves and justified their decisions (Otto Neurath 1913a) and rationality only a belated child of humanity (Otto Neurath 1913b, p. 440). Before science, man had conceived magic and then religion to absolve this function (Otto Neurath 1931a; 1931b).

This question, as seen, had been the object of Neurath's appreciated speech given to the Philosophical Society on 'The lost wanderers of Descartes and the auxiliary motive'. The lecture had been debated in a dedicated extraordinary session and later published on the journal of the Society (Otto Neurath, 1913a). Neurath began his argumentation by quoting the 'Discourse on the Method of Rightly Conducting One's Reason and of Seeking Truth in the Sciences' by René Descartes (2008). In detail, Neurath cited the third section of the discourse, where Descartes analyzed how to take decisions when applying his rational method was, for various reasons, impossible. The necessity to make choices in everyday life, in fact, constrained man, limited by insufficient information or time, to recur to alternative decision making mechanisms. If finding out the truth was impossible, Descartes suggested to choose according to what was more likely and plausible. To this end he strongly advised to rely on traditional thinking - the habits and customs of one's times -, to adapt to current mores and lastly to follow the chosen path to its end without erring. To elucidate his reasoning, Descartes represented limited rationality as a forest in which men were lost without the possibility to see, above the foliage, how to better proceed to exit. In such a situation, taking a route, whichever it was, on the basis of whatever reasoning line, was the

[12] Francesco Fistetti reasonably defines Neurath as the "Nietzsche of the Vienna Circle" (Fistetti 1985, p.127).

best course of action. Following such route without being distracted would then help to find a way out of the thicket (Otto Neurath 1913a, 45-46).

Neurath extended the provisory decision-making rules of Descartes from the practice of everyday life to thought. Thinking, affirmed Neurath, was characterized by a complex net of connected propositions that formed a complete image of the world. Much of this image was shaped by education and by social intercourse. Rational thinking could substitute one of these propositions or a few, never all. A lifetime was not enough to do so without recurring to non-rational choice (Ibid., 47). The same happened when choosing between two alternative systems, both logically flawless. Whatever the route taken to exit the forest of doubt, Neurath called the chosen method an auxiliary motive. In fact, the motive had always to be external, and so auxiliary, to the logic of the chosen system or the complexity of the construed Weltbild, because neither possessed an intrinsic truth value.

The oldest method that man had devised to solve the problem of choice had been chance: leaving decision to the roll of a dice. Otherwise man had relied on tradition, instinct, religion or the belief in oracles and horoscopes (Ibid., 50-53). Modern technology, though, could not be operated through these methods of choice. Modern man increasingly trusted on rational thinking to make her/his choices. By reaching logical conclusions from insufficient information, though, she/he actually applied a dangerous 'pseudo-rationality' to problems, ignoring the warnings of Descartes (Ibid., 54). Pseudo-rationality was no better than magic or mystical beliefs in deciding which action to take or which theory to think. While construing a new scientific worldview, an auxiliary motive, consciously chosen was still needed to free man from the forest of doubt.

Neurath's science so was in Weber's terms a historically determined rationality: the relation between ideas, the ends of human action, and the means to realize them, decisions. While Weber, though, saw in the process of rationalization an armor constraining man's freedom[13], Neurath[14] interpreted technology and the scientific method as instruments through which man could finally make his utopias come true and exercise his will on the world. How? Thanks to an enlightening encyclopedic effort to diffuse scientific knowledge. An effort so conceived that the greatest possible number of people could democratically decide which institutional setting would be the best to transform the desired utopia into reality. In his words: "(…) we logical empiricists want to

[13] See among others: Weber 1944; Weber 2002, p.185.
[14] On Neurath's criticism to Weberian sociology see: Otto Neurath 1931b, p.57.

show people that what physicists and astronomers do is only on a grand scale what Charles and Jane are doing every day in the garden and the kitchen" (Otto Neurath 1946, p.506). The scientist was in no way different from the common man. He only analyzed a greater quantity of data regarding the past (Otto Neurath 1968, p.106).

In this sense, scientists should and could not take the place of the magicians and priests of the past. The platonic ideal could not become reality[15]: "People of the totalitarian kind may try to make scientists the leaders of a new society, like the magicians, nobles, or churchmen of former societies. The encyclopedism of logical empiricism does not see why scientists, trained to discover as many alternatives as possible, should be particularly able to select one alternative only (one that never can be based on calculation) by making a decision or performing an action for other people with different desires and attitudes" (Otto Neurath 1946, p.505).

Contrary to the rationality of Weber's capitalism, Neurath's scientific method could not be a guide to exit the forest of Cartesio (Otto Neurath 1913a): "(…) in the end we have to reach a 'decision' not based on a calculus. One cannot test the future usefulness of a scientific technique beforehand; unpredictability here plays its part" (Otto Neurath 1946, pp.501-02). This point marks the substantial difference between Weber and Neurath (Fistetti 1985, p.127). While Weber's rationality ventured to become determining, Neurath's science could only propose alternative scenarios to the free decision of man.

If modern science could not definitively solve the problem of decision, what distinguished it, then, from magic, religion or totalitarian ideologies? They all represented solutions to the anguish of doubt, of having to decide in conditions of uncertainty, without the data necessary to act rationally[16]. Neurath, though, considered science to have one major advantage over the other alternatives: it hindered a governing minority from appropriating the decision capacity of individuals as in the case of magical faith, metaphysical ideologies, superstitions or totalitarian institutions. "The spreading of muddle – affirmed Neurath - does not seem to be as simple as the spreading of a successful technique. The frivolity of the race theory developed by the Nazis in many books, on character, physiognomics and heredity, did not even infect the mathematics, astronomy, chemistry, and physics of the Nazis very much" (Otto Neurath 1946, p.508). So "it is possible to sociologically analyze all ideologies one after another, those with a scientific character

[15] On the harsh criticism expressed by Neurath toward the use made of Plato's republic on part of supporters of Nazism, see: Soulez 1999.
[16] This view can also be found in Ernst Mach. See: Mach 1992, pp.448-49.

and those with an unscientific one" but in the end "the unscientific ideologies can be overcome only through a scientific attitude" (Otto Neurath, 1981a, p.350).

Encyclopedism implied cooperation, one of the peculiar characters of modern man, and thusly guaranteed personal freedom much more than any other decision-making system of the past. "Without pursuing utopian ideals, - wrote Neurath at the eve of WWII - men capable of judging themselves and their institutions scientifically should also be capable of widening the sphere of peaceful cooperation; for the historical record shows clearly enough that the trend has been in that direction on the whole and that the more co-operative man is, the more 'modern' he is" (Otto Neurath 1939, p.132).

In this light, Neurath positively judged the specialization that, from Renaissance onward, had characterized science, making it impossible for one man to comprehend the totality of knowledge (Otto Neurath 1918a, p.3). Scientists had been constrained to confront themselves continuously with one another, to decide which new protocol or new theory to include, being compatible, in the collective vision of the world, and select which ones to reject, in an unceasing process of redefinition and reconstruction of the *Weltanschauung* or *Weltauffassung*[17]. A definition of scientific activity that he inherited from his father (Otto Neurath 1946, p.498), the economist Wilhelm Neurath[18], and applied firstly to the fields of economics.

Neurath's style was simple and, in the wake of Itelson, rich in metaphors. The one of the ship[19], loved by Quine and quite famous[20], synthetically described the activity of scientific communities. "We are like seamen – wrote Neurath in 1921 – having to rebuild their ship at sea, without the opportunity to do it completely. When a beam is taken off, it must immediately be substituted, while the whole ship acts as a supporting structure. The ship will so be completely renovated, through old and drifting wood, but only in a gradual process" (Otto Neurath 1981b, p.184). Neurath's image bore a strong message: no science would ever be complete; no science could be rebuilt from scratch. Scientific innovation resulted from a collective decision process through which coalitions of scientists discussed, disregarded or approved changes in the currently prevailing scientific organizing of knowledge. Advancements followed negotiations among the diverse parts of the scientific community: a sociological process that could have erratic outcomes.

[17] The stance of Neurath in the debate on protocols has been the object or recent reappraisal with contrasting results. See: Uebel 1993; Nottelmann 2006; Uebel 2007; Uebel, 2009.
[18] On the influence of Wilhelm Neurath on the ideas of his son, see: Uebel 1995.
[19] On the origin of the seafarers' metaphor see: Cartwright, Cat, Fleck, Uebel 2008, pp.89-95.
[20] On the extensive use that Quine made of Neurath's metaphor see: Rabossi 2003.

In 1944 Neurath wrote again: “Imagine seafarers that in open sea want to change the form of their heavy vessel, transforming its plumpness into a fish’s slenderness. To rebuild the ship’s supporting structure and the careen, they use timber from the old structure and drifting wood. But they cannot make port to do the renovating work from base up. While they work, they remain in the old structure, amidst terrible storms and deafening waves. During the renovating they so have to pay attention not to create some dangerous leak. Step after step a new ship emerges from the old one, but while they work, seafarers already think of a new structure, not always being of one opinion about it. It will be impossible to foresee the exit of such a process. This is our destiny” (Otto Neurath 1981d, p.978).

The ship’s metaphor that so repeatedly showed up in Neurath’s work was firstly articulated in 1913 discussing war economics and its role in a new defined economic sciencee (Otto Neurath 1913b, p. 457). In the essay on *Probleme der Kriegswirtschaftslehre*, Neurath attacked the pretense of scientists to produce perfect and complete systems of thought with no defects or anomalies, allowing no changes or amelioration. Such “systematists” were “born liars” because a perfect system, in economics as in science, could only remain an eternal aim, never attainable (Ibid., p. 456). Trying to build such a deceitful system was neither a scientific nor a philosophical pursuit: “In logic, or physics, biology or philosophy we cannot put some undisputable statements on top and then logically derive from them an entire chain of thought. Inadequacies always contaminate the entirety of this ideal world, starting from the premises as from later consequences. No precaution can prevent this outcome, nor renouncing all previous knowledge, starting from a *tabula rasa,* to achieve a better result” (Ibid.). A clear accusation toward the systematic turn taken by economics in Vienna.

Neurath’s later use of the metaphor of the ship was so a consequence of what he himself had experienced in his early redefinition of the economic science in his early writings. In 1917, he summarized such efforts clearly unveiling the significance of the metaphor itself. “The reconstruction of the economic science attempted here – he wrote - wishes to maintain as much as possible of the past tradition. Something could be retained only changing its form or being completed, something had to be abandoned. As a result, some explanations, regarding different strata of the underlying problem, competed with one another. Some erroneous statements did not have to be refuted completely, but found a useful application in more restricted areas. To proceed in the right direction in this process of reconstruction it was also necessary to resort to past arguments” (Otto Neurath 1917a, p. 485).

Neurath was determined to build a new supporting structure for the economic science, employing concepts and logical constructions still in use - the timber of the old ship – or derived from the past - timber floating on the sea. The role of history in this process was crucial. It was not possible to make port with the ship of science, nor build a new edifice just with new instruments. As suggestive as the ship's, is Neurtah's metaphor of craftsmen: "Imagine craftsmen who are building a settlement, with a chest of drawers full of instruments, only part of which are well arranged and the usage of which is only partly known by them; imagine that, from behind, new instruments are continually put in the drawers, that some instruments are modified by unknown people, and that the craftsmen learn to use some of the old instruments in a way hitherto unknown, and now imagine further that the plans of our craftsmen dealing with the building of the settlement are changing too. This resembles to some extent the situation of our scientists." (Otto Neurath 1983, p.217). Parts of old theories had to be maintained modified or completed, perhaps with a validity in different or more limited fields. Some of the new components, furthermore, innovatively used concepts already known and perhaps once rejected. Along these lines, Neurath construed an economic science based on empirical data, widely collected in in-kind statistics, with the aim of studying the widest possible assortment of organizational structures and classifying them as to their economy, i.e. their capability to increment the wealth of humanity[21].

The economist, then, had to be a sociological technician, with a profound knowledge of the past, who was able to extract from the historical discourse possible organizational models[22], and who possessed a vivid imagination, necessary to build fictional utopias. The scope of Neurath's economics was to present politicians with the array of alternative organizations that would result from this research activity, arranged on the scale of prospective happiness of men (Otto Neurath 1931, p.17). The decision as to which organization transform into reality could not spring from economics alone. In the modern world, the economist could not be a politician anymore. While Colbert and Turgot had been among the best economists of their time, Bismarck stood in no comparison to Marx. Times had changed: "those who rule the destiny of states do not possess an extensive knowledge; those who possess extensive knowledge do not govern states" (Otto

[21] He wrote: "Scientific progress in economics is achieved when systems of empirical observations build abstractions and from these abstractions, then, new combinations are derived, the reality or feasibility of which is object of study. (…) In our research, so, only the elements and the relations among elements are strictly empirical, the complex organizations that can be derived from them, instead, are only partially to be met in reality" (Otto Neurath 1911, p.82).

[22] On Neurath's theory of historiography and his earliest writings in economic history, see: Poettinger 2012, pp.12-30.

Neurath 1913a, p. 56). Specialization, as seen, obliged to cooperation and rationalization to democratic forms of government.

A new economics without value or rationality

At the beginning of the 20th century, when Neurath returned to Vienna from Berlin with his 'Doktor' title[23], economics was shaken by a wild storm of change. The best minds of the time were engaged in innumerable debates and endless discussions. A creative destruction that had had its beginning in the *Methodenstreit*[24], but in time came to involve the very foundations of the youngest of sciences. "The classical system of political economy lays in ruins" (Schumpeter 1908, p.XI) wrote Joseph Schumpeter in his own dissertation in 1908, condemning the chaos resulting from the coexistence of manifold paradigms. The "bankruptcy of the science" (Ibid. p.V) seemed a menacing reality particularly to young scholars of the discipline. Neurath himself, in a youthful essay in 1903, wrote: "The 20th century takes over longstanding problems. Several very painful experiences lie behind us. Economic atomism has fallen out of favor. What will take its place is not at all clear. (…) That the foundations of the current economic system are faulty is becoming increasingly clear. Everywhere contradictions emerge that are not only of academic importance but affect the welfare and suffering of millions"[25]. Neurath's manifold attempts toward the unity of sciences and holism[26] were a forceful response to such fruitless divisions (Cartwright, Cat, Fleck, Uebel 2008, p.167). "Speculation – he would later write – is of interest only in shaping life and procuring happiness", discussions per se had no meaning aboard his ship of science (Otto Neurath 1928a, p.134).

In Vienna Neurath attended, between 1905 and 1906, the economics seminar held by Eugen von Böhm-Bawerk. The seminar is renowned for the participation, next to Neurath, of Otto Bauer, Rudolf Hilferding, Emil Lederer, Joseph Schumpeter and Ludwig von Mises (Hagemann 2012). The seminar concentrated on the theory of value and the criticism of Marx, but the liberal direction of Böhm-Bawerk granted participants the freedom to express their ideas and theories, so that often harsh and heated debates erupted. How unheard of and innovative Neurath's intended

[23] In Berlin Neurath attended the economics seminar of Gustav Schmoller and studied statistics with Ladislaus Bortkiewicz, becoming involved in the *Methodenstreit* and in the debate on Marx's theory of value. On this debate see: Heinz Dieter Kurz and Neri Salvadori 1997, pp.384-385.
[24] A critical appraisal of the *Methodenstreit*, instead, is to be found in David Wade Hands 2001, pp. 72-94.
[25] Quoted in Uebel 2004, p.16.
[26] On Neurath's definition of holism, in derivation from Quine, see: Sebestik 2011, pp. 41-57.

reconstruction plan for economics was can easily be deduced from the critics expressed on the occasion by fellow participants[27].

The first step in Neurath's renovation consisted in seeking a definition of the economic science that nullified the debate on the theory of value, a definition that at the same time could salvage and include such disparate theories as the ones of Walras and Marx. In 1911, in the essay on *Nationalökonomie und Wertlehre, eine systematische Untersuchung*, he affirmed: "We meet an old tradition selecting wealth as the object of political economy" (Otto Neurath, 1911, p.53). Such tradition, born out of Aristotle's Nicomachean Ethics, considered economics as the science that aimed at maximizing social wealth and had been relevant until Adam Smith, falling in discredit only with the rise of liberalism. Its historical development was sketched by Otto Neurath and his wife Anne Schapire in the reader of economic texts compiled in 1910 for his courses at the *Neuer Wiener Handelsakademie* (Neurath, Schapire-Neurath 1910) [28].

Neurath further defined the individual basis of wealth as *Lebenstimmung* (life mood[29]), a balance of pleasure and pain of Epicurean origin (Otto Neurath 1928b). Such *Lebenstimmung* was directly linked with all kind of human experiences, "eating, drinking, reading, perceptions of art, religious sights, moral reflections, love, hate, brave and cowardly behavior" (Otto Neurath 1917a, p. 485). Substituting *Lebenstimmung* to utility, Neurath denied that men acted only in consideration of utilitarian motives, rationally pursuing their happiness and pleasure[30]. Neurath's man operated according to rationality, but also following primary driving forces and traditional behavior. "If someone doesn't want to act overvaluing his own wisdom or the wisdom of others – wrote Neurath in 1913 – he will be obliged, in many cases, to resort to tradition or to his own impulses to decide his course of action, without being able to correctly evaluate the consequences of it, if not even feeling constrained to appeal to fate" (Otto Neurath 1913b, p.441).

[27] Ludwig von Mises in his memoirs remembered: "Especially disruptive was the nonsense that Otto Neurath asserted with fanatical force" (von Mises 2009, p.32). On this also: Kurz 1995, p.13.
[28] A definition of wealth exactly as his own, though, Neurath found only in Isaak Iselin (2011). On this noteworthy Swiss illuminist see: Sigrid-Ursula Follmann 2001.
[29] This the English translation of *Lebenstimmung* to be found in: Cartwright, Cat, Fleck, Uebel 2008, p.30.
[30] „Damit daß man das Glück zum Gegenstande besonderer Untersuchungen macht, soll weder zum Ausdruck gebracht werden, daß die Menschen ausschließlich im Hinblick auf das Glück handeln, noch auch, daß sie dies tun sollen, es soll damit auch nicht zum Ausdruck gebracht werden, daß das Glück im Weltgebäude eine besonders wichtige Rolle spielt" Otto Neurath 1917a, p. 488.

Neurath's felicitology (Otto Neurath 1917a, p.487) did not presume a *homo felix*, simplistic reduction of the modern man as was *homo oeconomicus*[31] and so was not limited to that "little island on the sea of unknown" (Otto Neurath 1913, p. 441) that was the realm of rationality. Neurath saved to men the possibility to err. He ventured to say: "Rightly many empiricist economists reproach theorists for eliminating mistakes and errors from their conceptions. This is even more preoccupying considering that in the thought of many economists it is exactly the error, the incapacity to evaluate the consequences of single actions, which characterizes our social order and particularly the market, causing its most typical damages" (Otto Neurath 1911, p.63).

Neurath maintained so a theory of value based on a subjective perception, but through his more precise definition of *Lebenstimmung* instead of utility, he increased its hermeneutical value. This way he also aimed at reconciling "men of action", usually diffident towards economics, to the discipline, offering an alternative to theories based on rational behavior that appeared to statesmen and entrepreneurs limited and diverting, incapable of grasping the problems of reality (Otto Neurath 1917b, p.8).

Having increased the hermeneutical validity of his individual theory of happiness, though, did not particularly help Neurath out of all problems involved in the further necessity to measure and compare individual *Lebenstimmungen* or even sum them up to groups' or nations' wealth indexes. He was already aware of all difficulties later encountered by welfare economics. In his essay on *Die Kriegswirtschaftsrechnung und ihre Grenzen*, published in 1917 on *Weltwirtschaftliches Archiv* (Otto Neurath 1917b), he clearly faced the impossibility to measure individual sensations, but also to compare them among different persons and groups[32]. The comparison of different *Lebenstimmungen* for a precise set of people proved feasible only assuming the existence of a political leader always driven by the consideration of general welfare. Such a statesman "is expected, in such indecisive cases as the ones described, to put himself so intensely in the shoes of all persons involved, at the same time, that he can compare the ensuing sensation with the one resulting from another state of happiness of the same group" (Otto Neurath 1917b, p.4). A benevolent dictator would so be needed to act upon the evaluation of different *Lebenstimmungen* of his people.

[31] On the critic of Neurath to the concept of *homo oeconomicus* particularly in the version of von Wieser see Otto Neurath 1911, p.64; Otto Neurath 1981c, p.32. Von Wieser himself replied to the critics young economists using Machian methodology, commenting Schumpeter's work (Wieser, 1911).

[32] An even lengthier discussion of the matter is to be found in: Otto Neurath 1917a, pp. 504-511.

Alternatively, a measurable proxy could substitute the comparison of individual or group happiness. “Given that the statistical elaboration of sensations is impeded by great difficulties, - wrote Neurath in 1913 - it is necessary to substitute it with the statistic of sensations’ causes” (Otto Neurath 1913b, p. 458). Nonetheless, it was equally impracticable to determine single causes of sensations. It would so be best to analyze entire sets of causes of *Lebenstimmungen,* as good air, a clean environment, a good state administration, the availability of food, housing and education, etc (Ibid, p. 459). In a later essay, Neurath added to these stimuli of sensations also the capacity of people to perceive pleasure and pain, a set of variables that changed in time and space (Otto Neurath,1917b, p.6). Similarities between Neurath’s theory and recent contributions of Amartya Sen to welfare economics[33], as well with statistical instruments as the human development index are unmistakable and should at least be mentioned.

Neurath further developed his new economic theory by defining as *Lebenslagen* those life conditions that influenced individual happiness. Life conditions included primarily goods and services available for consumption and consequently the productive forces and negative impediments of a country, but also “its state organization, the diffusion of innovative capability, the organizational know-how, stupidity and laziness and so forth” (Otto Neurath 1917b, p.8). All available data on those quantities should have been collected in statistical tables as had already been done, under absolutistic rule, by a class of clerks and civil servants of the like of Wenzel Anton von Kaunitz-Rietberg (Ibid.). Neurath, in his later statistical book *Modern Man in the Making*, published in 1939, realized this earlier intent and vividly represented statistics regarding *Lebenslagen* with Isotypes comparing the availability of food and drinks, raw materials and sources of power in United States and Canada, Europe and the Soviet Union (Otto Neurath 1939, pp. 66-68). Out of these collected data, Neurath further construed silhouettes for many countries, depicting the average length of life of female population, suicide rates, literacy and the possession of radio sets. The resulting isotype allowed an intuitive comparison of the wealth, in Neurath’s definition, of the respective nations. Compared, for example, with simple data on income per capita, the suicidal rate cast a shadow on the otherwise brilliant performance of US and Great Britain, while giving merit to traditionally considered poor countries as India, Spain and Italy.

All the cited magnitudes regarded in-kind measures, not monetary measures. Neurath was convinced that useful statistical data had to refer to quantities and not prices, and that the quoted

[33] On similarities between Neurath and Sen see: Leßmann, 2007.

indexes could better represent *Lebenslagen* than monetary income. The difference between the two types of measures of wealth, in-kind and monetary, had something to do with economic theories, but also with their originating *Weltanschauungen*. In-kind calculations had been typical of the tradition of universal statistics and economic planning of absolutist rule, while income statistics and price indexes had spread along with liberalism during the nineteenth century (Otto Neurath 1981c, p.30). Both represented sources of information useful to measure happiness, but the first, in Neurath's opinion, could be collected and evaluated also in absence of a market economy and so had a wider use along with a greater hermeneutical value.

At the beginning of time, Neurath considered *Lebenslagen* as fully determined by the natural and physical conditions of the world, in form of fields, minerals, forests, water supply, etc. He consequently defined such situation of the world at a precise time as *Lebensboden* (life basis) (Otto Neurath 1917a, p. 487). With the evolution of society, though, an order of society had emerged that could counter the effect that such primary conditions had on *Lebenslagen*: the *Lebensordnung*. This slow emergence of a *Gesellschaft* out of the originary *Gemeinschaft* had also led to the appearance of theories studying the dependence of individual sensations (pleasure and pain) from the newly established institutions (Otto Neurath 1913b, p. 442). A calculation of happiness had arisen, as to be found in Aristippus and Epicurus, that through mercantilism had developed all the way down to modern economics. On this point, Neurath particularly quoted James Steuart, also including excerpts of his A*n Inquiry into the Principles of Political Oeconomy* in his anthology of economic thought (Otto Neurath, Schapire-Neurath 1910, pp.96-124). Steuart had defined the task of the political leader to conceive many possible organizations of the state and then select the one that suited best his people. Steuart had moreover underlined the necessity to link the new organization to existing traditions and base it on the fact that people would choose the common good in their own interest (Otto Neurath 1913b, p. 443). Neurath's own definition of the economy derived from this tradition of thought.

Denominations were, as always in Neurath, full of significance: *Lebensboden* is the basis of life, *Lebenslage* is the condition of life, and *Lebensordnung* is the order of life. *Lebensboden* is historically determined, while *Lebensordnung,* as the institutional construction of the *Weltanschauung,* is determined by men and given only in a delimited time-span. Comparing the *Lebenstimmung* caused by a *Lebensboden* with the *Lebenstimmung* of another, gave as a result a judgment of relative happiness. Given the same *Lebensboden* to start with, instead, comparing the

Lebenstimmungen related to diverse *Lebensordnungen* resulted in a judgment of relative economy (Otto Neurath 1917a, p. 490).

The renewed use of old concepts on part of Neurath brought so to a definition of economies as the collected set of actions, prescriptions and attitudes – *Lebensordnungen* - having in any way influence on the happiness/wealth of men. In his words: "The scientific study of these economies, the Lebensordnungen determining the Lebenstimmungen, will be named economic theory, so to remain sufficiently near the linguistic habit to make it unnecessary to look for a new denomination" (Ibid., p. 492).

Neurath's spasmodic attention toward the lexical value of his definitions in the reconstruction of economic theory is apparent. Far away from any polemic or ideological intent, this attention for the language of economics stemmed from the debates held at the Philosophical Society. Neurath translated the rejection of metaphysical terminology, practiced by the younger members of the Society, into economics. This effort of linguistic purification, culminating in the later attempt to create a universal scientific jargon, begun already during Neurath's university studies. "Particularly I was busy with reading Adam Smith's *The Wealth of Nations* - he later remembered - along the lines of an analysis of language. I found out that such butchering criticism lacks constructive power and that a long self-education should be the first step. I altered successively my own terms in all my articles and books in accordance with my increasing Index by eliminating 'emotional', 'concealing' and 'confusing' terms" (Otto Neurath 1983, p.217). Between his writings of 1911 and 1917, in effect, the terminological evolution clearly reflects the intent to create an empiricist language for economics. The word 'capital' was one of the first victims of Neurath's empiricist purge. Empiricism as methodology needed an empiricist vocabulary. So Neurath in 1917: "I did not create all these concepts as an artificial intellectual game, but following the stringent necessity to adequately analyse every days' experiences and important present events through the observation of their singular components" (Otto Neurath 1917a, pp. 516-17). Nonetheless a linguistics reconstruction process could not do away with the past evolution of a science's jargon. "The reconstruction of the conceptual and linguistic framework here attempted – continued Neurath – must be limited to the essential. Attempting to create an entire new conceptual world with the related denominations would be futile. In fields of research as ours, unclearly defined, it is much too easy to end up in the wrong direction by adapting names and concepts, with terrible results. Every change imposed to an important concept, alters the entire conceptual structure, causing a chain reaction of redenomination" (Ibid.). Neurath had a very clear view of the relative

value of words' significance, particularly in science. "We must try to capture the world in a net of concepts and thoughts with multiple connections. Object of the whole science is to structure the net's connections so that every part of it can be used in a similar way". Therefore, "*from the old conceptual framework we inherited we won't be able to escape at once*. Its reconstruction always happens with the aid of the concepts of the past" (Ibid.).

As seen, Neurath exactly followed this research program and, uniting tradition and innovation in his definition of economics, extended the hermeneutic capacity of the science, at the same time recovering long lost knowledge. Neurath's economics, depending on the group of people the happiness/wealth of which was object of study, could include family's economy, political economy and even cosmopolitan economy, all subdivisions that, taken from Aristotle to Friedrich List, were now granted validity in new fields. Not only past economies, but also present and future *Lebensordnungen* possessed the right to be studied and classified as to their effects on people's sensations. Economics became thusly a comparative science based on empirical data statistically collected, but consisting of an infinite number of models, many of which with no relation whatsoever to reality.

In this sense, Neurath excluded any kind of ethical prejudice from restricting economic analysis. In his view, acquiring methods as war and smuggling should have been studied exactly as market exchange and production, being evaluated, by economists, only in their effect on people's *Lebenstimmungen*[34]. Economic analysis should also comprehend planned and war economies. To decide, though, which *Lebensordnung* to implement was not the task of an economist but of democratic decision-making.

[34] "That pillage – Neurath wrote – is prohibited by law, should not impede economists from studying it. Why should the consequences of trade and domestic manufacture be worth to be analyzed, while the effects of smuggling are ignored? In consequence of such considerations war has been vastly ignored by economists as a form of acquisition" (Otto Neurath 1917a, p.493).

Conclusions

Descartes had put humanity at work to build a new rational house of thought. While constructing their new home, though, people had to take decisions in conditions of uncertainty, with time constraints and insufficient information. A provisory house had so to be assembled on the fundament of traditional thinking and relying on historically determined habits and customs.

Otto Neurath denied the possibility to construe a new rational home from scratch while inhabiting a contingent lodging. Scientists were seamen on a ship destined to continuously renovate their leaking vessel at sea, in the middle of storms and tempests, with no hope of ever docking the truth. Without a land to navigate to, scientists had no way to evaluate the righteousness of their route. Descartes' method was, in this scenario, a decision-making process as any other in the history of humankind, no better than magics, religion or dictatorship. What many men practiced was a pseudo-rationality bent on convincing others of the justice of their choices.

Technological advancement, though, increasingly constrained men to specialisation in knowledge and deed and to continuous confrontation. As a result, an auxiliary motive emerged from the political or moral judgment of the majority, that resolved doubt and determined the form of the ship of science and its navigation course. Rationality could not guarantee the truth but could spread democracy.

Given these premises, individual rationality could not be, for Neurath, the founding hypothesis of economic behaviour and of the economic science. Man had to be happy, not rational. A judgement of economy could be felled only evaluating the effect of different institutional organisations, scientific theories, morals and whatever else men devised to enhance her/his life on people's wealth. Economics was a 'felicitology', not the science of rational behaviour. Economists had the task of offering to the democratic decision of people the greatest number of conceivable *Lebensordnungen,* along with a scientific measure of their impact on in kind variables approximating the wealth, in terms of augmented pleasure and diminished pain, of the population involved.

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