

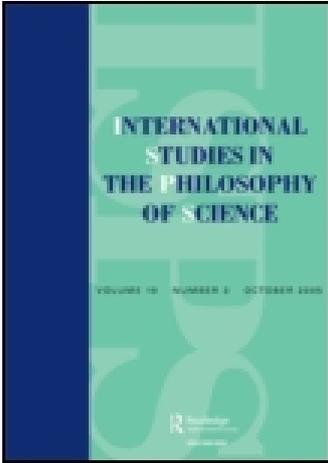
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Publisher: Routledge

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## International Studies in the Philosophy of Science

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/cisp20>

### Otto Neurath: Philosophy Between Science and Politics by Nancy Cartwright, Jordi Cat, Lola Fleck and Thomas E. Uebel

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Published online: 10 Jun 2008.

To cite this article: Kathleen Okruhlik (1998) Otto Neurath: Philosophy Between Science and Politics by Nancy Cartwright, Jordi Cat, Lola Fleck and Thomas E. Uebel, *International Studies in the Philosophy of Science*, 12:2, 175-191, DOI: [10.1080/02698599808573591](https://doi.org/10.1080/02698599808573591)

To link to this article: <http://dx.doi.org/10.1080/02698599808573591>

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## CRITICAL NOTICE

## *Otto Neurath: Philosophy Between Science and Politics* by Nancy Cartwright, Jordi Cat, Lola Fleck and Thomas E. Uebel

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*Otto Neurath: Philosophy Between Science and Politics* by Cartwright *et al.* (1996) is a welcome addition to the growing literature on the history of logical positivism. It is divided into three parts, each separately authored. Part one, called "A life between science and politics", is a translation of the revised version of Lola Fleck's 1979 doctoral dissertation, slightly augmented by passages inserted to establish bridges with parts two and three of the larger book. It is an intellectual and political biography that stresses Neurath's work on war economies and his models for full socialization. Part two, written by Thomas E. Uebel, is called "On Neurath's Boat". It traces the evolution of the famous metaphor for human knowledge through five appearances between 1913 and 1944, using this as a vehicle to chart the development of Neurath's naturalism as well as his various holisms and anti-foundationalisms. Part three, "Unity on the earthly plane", is jointly authored by Nancy Cartwright and Jordi Cat. It examines Neurath's attack on scientific method and the transformation of his understanding of the "unity of science" project. The authors argue that he moved from thinking of unity in terms of a unified *picture* to thinking of it in terms of a toolbox that makes unified *action* possible.

Lola Fleck's biography does not deal at great length with those aspects of Neurath's thought that one might characterize as straightforwardly epistemological, and only a few pages are devoted to his activities in the Vienna Circle. Instead the focus is on his economic writings and his social-political theory and practice. In his early work, Neurath maintained that war economies differ from peacetime economies in two main respects. During war, questions of profitability must be secondary to questions of productivity, and monetary exchanges are replaced by barter, with the result that an economy in kind slowly replaces a monetary economy (p. 15). Thus, Neurath believed that a war economy might actually be useful in facilitating the transition to a more desirable economic order. The effects of the First World War disabused him of the illusion that a war economy could be counted upon to increase overall productivity and prosperity, but he continued to believe that a war economy could facilitate the move to an economy of kind. Neurath had the opportunity to put many of his ideas into practice during the war. In the course of his military service for Austria, he became Head of the

General War and Army Economics section as well as director of the Museum of War Economy in Leipzig. After the war, he joined the Social Democratic Party.

According to Neurath, the economic standards of a socialist society are directed toward happiness rather than profit. He rejected a utilitarian approach to treating happiness from an economic point of view, preferring instead a kind of social Epicureanism. Whereas utilitarianism focuses on the strivings of *individuals* for happiness and leaves the outcome to the interplay of various forces, social Epicureanism assumes a *collective* interest in the maximization of happiness. For Neurath, a socialist economy was an administrative economy, i.e. one based on a plan created by a Central Economic Administration. His model was oriented toward consumption; it organized production from the top down and provided for the central distribution of products. There was no money, no buying, no selling. Neurath did not say much about the principles of distribution, but it appears that "equal treatment of all" must be assumed. Fleck suggests that Neurath did not really answer the concern that this might lead to "socialist tyranny" but indicates that he would have been deeply opposed to this outcome. She cites his 1920 declaration that "Socialisation can only last if it respects men in their variety and does not impose a new subjugation" (p. 39). The upper echelons of Neurath's administrative hierarchy were, of course, in some sense accountable to the various workers' councils (which included representation by housewives as well as farmers and factory workers). On the other hand, Neurath was also quite explicit in maintaining that socialization must be in large measure a top-down process. His interest lay in what could be established *scientifically*, and experts of many kinds were assigned an important role in his model for full socialization.

Neurath considered his model a development of the basic ideas of Marx and Engels, but there are various ways in which he was unorthodox. One of the most amazing is his separation of the economic from the political and from power relations generally. He maintained that his model for full socialization was compatible with a large variety of political systems. This belief about the separability of economic reform from politics appears to be important for understanding some of Neurath's activities c. 1919. During the Bavarian Revolution, he was appointed president of the Central Economic Administration (sometimes called the "Central Planning Office"). When the first Bavarian Soviet Republic was established, Neurath moved immediately to put his plans into action. The first Republic lasted only about six days, and when it fell he was arrested and held briefly. But when the second Soviet Republic was declared immediately thereafter, Neurath stayed on as head of the Central Economic Administration. He thought that the leaders of the second Soviet Republic "applied Russian experiences to the German situation" (p. 52), but he retained his position, contrary to the preferences of the Communist leadership, because he had the support of the workers. The second Soviet Republic endured from 13 April until Munich was conquered on 2 May. There were 500 dead, 300 wounded, and numerous summary executions. Neurath was arrested and charged with high treason. He was convicted and sentenced to 18 months incarceration in a fortress, but was deported to Austria before serving his full sentence. Many of his fellow revolutionaries were treated far more harshly: one received the death penalty, one was murdered in prison, others received longer sentences than his. Neurath's defense centered on the claim that he was a very apolitical fellow, interested only in the purely technical aspects of socialization. Otto Bauer, with whom Neurath had worked in the Austrian war ministry, wrote in his friend's defense: "At bottom [Neurath's] socialism is authoritarian. He recommends enforcing from the top down a planned order and a transformation of economic life by a government over and above

society. He does not care whether this is the Austro-Hungarian army command, a democratic parliamentary government or a council dictatorship". He just wants a chance to organize his "demand-satisfaction-economy". Not surprisingly, perhaps, Bauer also writes: "A Marxist can accuse him of not understanding that all social reform is determined by the constellation of political powers under which it takes place" (quoted on p. 55).

When Neurath returned to Vienna, Austria had become a federal republic with Vienna as one of its states. The labor movement and the Social Democratic party managed to retain sufficient influence in the republic to bring about significant reforms in the education, social, and health care sectors. This was particularly true in what came to be known as "Red Vienna". Fleck devotes the penultimate section of her biography to showing "how Neurath's ideals of social change fitted into the dominant political milieu of Red Vienna and how his philosophical ideas continued to develop in tandem with his political activities" (p. 56). There are subsections dealing with his involvement in the cooperative housing movement, the Museum of Economy and Society and the Vienna Circle.

As general secretary of the Austrian Cooperative Housing and Allotment Association, Neurath was successful in getting some very distinguished modern architects to work with the housing movement, and he was instrumental in establishing the Museum for Housing and Urban Development in Vienna. He also resumed his career as a successful lecturer, now dealing with women's rights as well as housing and socialization. As the cooperative housing movement began to run out of money, Neurath managed to get the old museum remodelled and reopened as the Museum of Economy and Society. The chief task of the museum was to develop methods to inform the public about research results in sociology and economics. Here Neurath and his colleagues developed "the Vienna method of picture statistics"—a method of visual education based on very simple, abstract symbols designed to transmit information to children as well as adults, regardless of language barriers or educational limitations. This method was exported all over the world and was later called ISOTYPE (International System of Typographical Picture Education).

The transition to a discussion of Neurath's philosophical development in the context of the Vienna Circle is rather abrupt. Having followed his thought and activity in the economic and social realm through the 1930s, we are suddenly transported back to 1906 when he returned from school and participated in the so-called "First Vienna Circle" with his friends and former fellow students Hans Hahn, Olga Hahn and Philipp Frank. The group discussed recent developments in physics, logic and mathematics, influenced according to Neurath's own account by the French conventionalists, pragmatism, Mach, Einstein, modern logic and empirical sociology. The dominant mood was, of course, empirical and anti-metaphysical. Neurath himself was quite interested in Comte's arguments for the unity of human knowledge. He thought that if progress could be made toward a universal science, "the division of science into individual disciplines will no longer result in the isolation of the researcher. Instead research of a more general summarising type will determine the common principles and thus elucidate the idea that one can present an overview of the system of the sciences, whereas nowadays it faces chaos" (quoted on p. 75). This passage is interesting, especially in light of arguments later in the book that Neurath's understanding of the unity of science changed very significantly as he grew older and in particular that talk of "common principles" and "an overview of the system" were surrendered in favor of a less systematic, less representational understanding of unity.

Most of the discussion of the activities of the later Vienna Circle covers familiar ground. Neurath worked vigorously to promote the activities of the group. And despite his sense of being somewhat devalued by Schlick, whose social-political position was very different from his own, he tried always to create unity in the group and emphasized the common goals of its members. Themes that will be treated extensively in parts two and three of the book are introduced briefly in this section, including Neurath's coherentism and anti-foundationalism, his physicalism, and the role he played in the protocol sentence debate. Some of this material appears to have been interpolated by the other authors, since it clearly reflects their views and pre-occupations rather than Fleck's.

The very last section of part one deals with Neurath's exile in the Hague and Oxford. In 1934, the Ernst Mach Society was dissolved by government authorities on the grounds that it disseminated Social Democratic propaganda. The Museum of Economy and Society was also targeted, and Neurath's colleagues were able to rescue only a small amount of material which followed them into exile in the Netherlands. Despite a somewhat difficult existence there, Neurath was very active in conference organization between 1934 and 1939. These conferences led to the launching of the international Unity of Science movement and to the establishment of the International Encyclopedia of United Science. In 1940, at the first signs of the German invasion, Neurath fled to England. After a brief internment, he settled in Oxford, where he appears to have been very happy. He liked the "British muddle", the diversity and freedom that English life permitted, and he saw no conflict between that and his planning goals: "I disagree totally with those who think of sacrifice of personal freedom because they want planning.... The most terrible thing would be if people got power to bully other people" (quoted on p. 87). Neurath lectured, wrote, and continued to promote ISOTYPE. He died at home in mid-conversation on 22 December 1945; he was 63 years old.

As must be obvious, the strength of this biography lies in the way it fills in the development of Neurath's economic theories and his efforts to put these into practice rather than in tracing the development of his ideas in what later came to be called "philosophy of science". The latter task is reserved for Fleck's collaborators in parts two and three. In the Introduction to the book as a whole, the authors quote Neurath: "The thinking of a man during his whole life forms a psychological unity, and only in a very limited sense can one speak of trains of thought *per se*". This thesis, they say, fits Neurath himself perfectly. They go on to quote as follows: "The phenomena that we encounter are so much interconnected that they cannot be described by a one-dimensional chain of statements". This, they say, is the thesis of their book, with respect to Neurath's own life and work (p. 2).

Ironically, though, one thing the book lacks is the unity and interconnection one might hope for. In the biography itself, for example, the lack of integration of Neurath's Vienna Circle activities with his economic theories and political activities has been noted already and will be relevant again later. There is also less sense of character and personality than in the very engaging and readable "Memories of Otto Neurath" in *Empiricism and Sociology* (Neurath, 1973). There are a number of things one could say in response, most obviously that this is an *intellectual* biography, and so the comparison with the "Memories" is not apt. Further, the aims of Fleck's dissertation were different from those of the present book, and we should just be grateful that her important work is now available in English translation. Both of these are fair responses. And yet it seems that the force of Otto Neurath's personality was a major factor in the influence that his

ideas enjoyed so that a purely “intellectual” biography (even one that includes political action) may not be enough. In any event, when someone gets around to writing a full biography, we may hope that it also includes more about each of Neurath’s three wives: Anna Schapire, Olga Hahn and Marie Reidemeister. Schapire, who died after childbirth in 1911, had studied philosophy, literature and economics with Neurath in Vienna and Berlin. She wrote her doctoral dissertation in Switzerland and then worked on the history of the women’s movement (as well as actively participating in it). Olga Hahn, brother of Hans, was a member of both Vienna Circles. Although blind, it was she who was the true parent to Anna and Otto’s son until her death in 1937. And Marie Reidemeister, sister of the mathematician Kurt, was a key figure in the Museum of Economy and Society and the development of ISOTYPE. We learn just enough here about each of these women to want to know more.

Part two, “On Neurath’s Boat”, is the most densely argued section of the book. Uebel opens with a nice overview of the Boat’s five appearances: in 1913, 1921, 1932, 1937 and 1994. The third Boat is perhaps the one best known to most readers: “We are like sailors who have to rebuild their ship on the open sea, without ever being able to dismantle it in dry dock and reconstruct from the best components” (quoted on p. 89). The boat is the enduring symbol of Neurath’s anti-foundationalism, although it was later adopted by Quine to represent his own naturalism. Uebel argues that there are three distinct holisms that underlie the attack on foundations:

- (1) The holism of theory in the face of data, with the consequent thesis of underdetermination (a holism that Neurath shared not only with Duhem and Poincaré, but also with his Vienna Circle colleagues).
- (2) The dependence of thought on antecedent concept formation (a view that Quine would also come to share).
- (3) The reciprocal relationship between theory and practice.

Uebel argues that it is the third holism that is the most complex and the most important in accounting for Neurath’s distinctive stance. The boat metaphor addresses a central problem in the relationship between theory and practice: how can we make our *conventional determinations of order responsive to experience*? There is no solid base in personal experience; the answer lies in *negotiation*. On this interpretation of Neurath, “Scientific knowledge is a communal project that has to hold itself in place”. Argumentation is embedded in “a multi-dimensional context of discursive practices”, and “we are condemned to conceptual contingency” (pp. 93–94). This is an early indication of one of the book’s themes: that in his opposition to foundationalism and normative epistemology and in his emphasis on communal practices and discourse, Neurath might be more comfortable than some of his colleagues in today’s “postmodern” environment. The adjective is used in a loose, descriptive sense; and those aspects of Neurath’s thought that are thoroughly “modern” are stressed at other times.

Uebel pursues three hypotheses about the development of Neurath’s thought in the first Vienna Circle:

- (1) that “developments in social science prior to the First World War complemented the challenge of the new physics and provided additional independent impetus” to the development of the logical empiricists’ new theories of scientific knowledge (p. 97). Brief mention is made here of the influence of Tönnies, Simmel and Weber;
- (2) that Neurath adopted his radical position partly “to legitimate the pursuit of a

social science oriented towards emancipation” (p. 99). This is one place where Neurath’s *voluntarism* is particularly important. Given his conventionalism, we have to *choose* subjects for investigation and *choose* how to organize our science. This is true of all science, and so (says Uebel) “pursuit of an emancipatory social science requires no more theoretical justification than any other science” (p. 101);

- (3) that Neurath’s conception of science represents his answer to the problem of the status of conventions in science: he naturalized conventions “by transposing Mach’s pragmatism ... to the domain of social practice” and to a discourse theory of science (p. 100).

Uebel suggests that the first two hypotheses characterize Neurath’s distinctive interests in the first Vienna Circle but that the third spans his entire intellectual development. Not surprisingly then, it is the answer to the question about the status of conventions that receives the most attention here.

Mach’s opposition to metaphysics and his naturalistic impulse were retained by Neurath and find their echo in his insistence on “controllability” as a hallmark of scientific assertions and in his own brand of naturalism. But Mach’s reductionism, based on the coordination of primitive terms with measurable elements of experience, had to be given up in light of what was learned from the French conventionalists. The orthodox view of the second Vienna Circle, with its distinction between observation terms and theoretical terms that are then connected by correspondence rules, can be seen as one answer to the question of how to bridge the gap between facts and scientific principles once Mach’s reductionism has been surrendered. One of the main theses of the present book is that Neurath’s anti-realism was much more radical than that embedded in orthodox logical positivism because it extends to the observation statements themselves. Observation statements provide no foundation; they too are corrigible. “The challenge was global, the response holistic” (p. 106).

By 1910, some of the most distinctive elements of Neurath’s scientific metatheory were in place. Machian reductionism had been rejected, but the Machian emphasis on the unity of science was retained. Duhemian holism had been extended beyond theoretical physics to encompass all of science, and universal science was conceived as “a historically located, collective enterprise with a practical intent” (p. 109). But the more radical anti-realism lay in the future, and the unity of science was understood at this point in terms of a systematization that mirrors reality.

In order to trace the transition from the Duhem Thesis to the Neurath Principle, Uebel considers three aspects of Neurath’s anti-foundationalism: normative, radical descriptive, and metatheoretical. Normative anti-foundationalism denies that there is an empirical basis for values. This is a position Neurath shared with other members of the Vienna Circle. The latter two anti-foundationalisms marked Neurath’s separate path of development and led to the launching of his first Boat.

By 1913, Neurath had made the move from the Duhem thesis to his own principle that when confronted with a recalcitrant observation sentence, we must choose between changing *the sentence itself* and changing the system into which it is to be integrated. This move requires an acceptance of anti-foundationalism at the level of practical fact: none of our observation reports represents raw data. This, says Uebel, presupposes that knowledge is essentially linguistic rather than directly mappable on to the experiential. It means that “knowledge is twice over unfounded. Not only can theories only be confirmed as wholes at any one time, but our thinking at any one time depends on the

thinking that came before” (p. 124). This kind of historical conditioning foregrounds cultural determinants of thought.

In rejecting *metatheoretical* foundationalism, Neurath was extending the Duhemian result *vertically* (as the expansion from physics to all of science had extended it *horizontally*). What was being ruled out in this instance was philosophical system building of a Cartesian or Kantian sort as well as Laplacean excess in physics, ideal-type methodologies in social science, and attempts to ground conventionalism in evolutionary biology. “The system builder”, said Neurath in 1913, “is a born liar ... The complete system remains an eternal goal which we can only seemingly anticipate” (quoted on p. 128). Incompleteness is a condition of all human knowledge. In that same year, Neurath’s Boat makes its first appearance:

We are like sailors who are forced to reconstruct totally their boat on the open sea with beams they carry along, by replacing beam for beam and thus changing the form of the whole. Since they cannot land they are never able to pull apart the ship in order to build it anew. The new ship emerges from the old through a process of continuous transformation. (quoted on pp. 130–131)

An important factor in Neurath’s rejection of metatheoretical foundations was his opposition to “pseudo-rationalism”, which he viewed as a corruption of the enlightenment belief in rationality. The chief triumph of enlightenment rationalism had been its recognition of the *limits* of insight, whereas pseudo-rationalism tried to use “insight” to answer questions far beyond its proper scope. Given his very radical anti-foundationalism, though, how could Neurath hold on to the positive part of the enlightenment project, its ideal of controllable rationality for science? Uebel’s answer lies in Neurath’s emphasis on the primacy of practical reason. An adequate metatheory of science will have to take into account not only cognition but also *conation*. It is the *will* that sets unconditional values and the final ends of human action, not thought. This means, on Uebel’s analysis that “the unconditional values that provide parameters for assessing the instrumental values studied by science lie outside science itself” (p. 132). We *decide* the ends of science together. Scientific knowledge is only instrumental in nature; therefore its use must be evaluated relative to these ends. So, for example, the legitimacy and rational controllability of critically engaged social science derives from its utility for reform or revolution.

Since cognition cannot determine the conventions of science, we have to introduce “auxiliary motives”, devices to deal with decision under uncertainty. These are aids for conation, not cognition, and may include such devices as rolling dice, abiding by majority opinion, and deferring to authority. Their use is defensible insofar they help to select and sustain a desirable course of action. So the answer to questions about the role of Mach’s principle of economy or simplicity and the unity of science comes into focus. “The aim of unity”, says Uebel, “is an auxiliary *motive* of scientific theorising, whose rational legitimacy derives from the utility of the practical decision to adopt it” (p. 135).

One danger, of course, is that the rejection of foundations can lead to unbridled relativism. So when writing his *Anti-Spengler* while imprisoned in 1919, Neurath no doubt had to consider the dangers of his own position in order to refute the insuperable cultural relativism of *The Decline of the West*. He focuses on Spengler’s view that “the statements of one culture about any facts cannot be judged by another ... ‘Truths exist only for a certain kind of men’ ” (quoted on p. 137). Neurath argues that communi-

cation is possible and that the commonalities presupposed for communication are a sufficient basis for the objectivity of science.

In that we do recognise [others] as people there already lies the assumption that they have something in common with us ... In order that two people might talk to each other at all they require certain things in common. If these were lacking, the two 'humans' would confront each other as two quite alien creatures; words and gestures would not even be 'meaningless signs', they would be mere changes. (quoted on p. 141)

The shared aspects of human experience provide enough intersubjective ground for the pursuit of science and for the rejection of Spengler's claims about the impotence of rational inquiry.

Because Neurath's second Boat makes its appearance in this context, Uebel associates it with anti-relativism. If one abstracts from the context, however, and looks only at the metaphor, it is not clear that the changes to the metaphor itself are designed to ward off relativism. In the first Boat, recall that the sailors replaced "beam for beam" using beams they had carried with them. In the second Boat, "by using old beams and driftwood [and the rest of the vessel for support], the ship be shaped entirely anew, but only by gradual reconstruction" (Quoted on p. 139). If anything, the modifications in the metaphor seem to point toward a heightened emphasis on opportunism, novelty and historical contingency in the scientific enterprise.

Uebel portrays the third (1932) Boat as marking the articulation of Neurath's theory of science as a theory of scientific discourse. There are two important influences here. One, of course, is the protocol sentence debate within the Vienna Circle. Having taken the linguistic turn with his colleagues, Neurath had to show *contra* Carnap that social character of science cannot be circumvented. He applied the action-theoretic approach to the domain of linguistic representation so that personal beliefs were shown to be secondary to public discourse. The other influence cited by Uebel in this regard is Neurath's "undogmatic Marxism". Neurath twice quoted in his published work the following passage from Marx's *German Ideology*: "[L]anguage is practical consciousness that exists also for other men and for that reason alone it really exists for me personally as well" (quoted on p. 148). From 1931 on, Neurath used a kind of private language argument against Carnap's methodological solipsism and in support of his own brand of physicalism.

Neurath argued that protocols as reconstructed in the *Aufbau* are not intersubjectively testable; the physicalist language, therefore, must be primary. Even for language to be usable *by the same individual* over time, there must be constancy of use. It is the precondition of the testability of even an individual's "inner speech" that distinguishes Neurath's physicalism from Carnap's on this analysis. If the protocol language is to be usable and to provide epistemic justification, then it cannot be phenomenalist; it must be intersubjective. Throughout this book, Neurath's physicalism is sharply distinguished from reductionism of any kind. His commitment is simply to a *language* that describes publicly accessible things in space and time rather than one that builds up from essentially private experiences.

Such a language is in some respects irredeemably messy. It cannot be tidied up and regimented so that a logical calculus can operate on precisely defined terms. This is the aspect of the third Boat that Uebel highlights. In 1932, Neurath wrote:

There is no way to establish fully secured, neat protocol statements as starting

points of the sciences. There is no *tabula rasa*. We are like sailors who have to rebuild their ship on the open sea, without ever being able to dismantle it in dry dock and reconstruct it from the best components. Only metaphysics can disappear without a trace. Imprecise 'verbal clusters' [*Ballungen*] are somehow always part of the ship. If imprecision is diminished in one place, it may well reappear at another place to a stronger degree. (quoted on p. 155)

*Ballungen* assume central importance from this point on in the book. Both Uebel, and later, Cartwright and Cat focus on them as critical to a proper appreciation of the distinctive character of Neurath's mature position. Indeed, it is probably fair to say that the authors see their emphasis on the role of *Ballungen* in Neurath's thought as one of the major and most original contributions of their work. The German word, sometimes translated as "clots" in Robert Cohen's writing on Neurath, is rendered by Fleck as "agglomerations". Uebel speaks not only of "clusters" but also of "compressions"; Cartwright and Cat refer to "congestions". Neurath's own description is translated as "mixtures of expressions (precise and imprecise concepts)"—"conglomerations" (p. 153).

The ineliminability of *Ballungen* precludes the "clean" language that Carnap needs to get even his physicalistic reconstructions off the ground; it rules out the possibility of precise definitions, fixed once and for all. Neurath claimed that one can go neither "behind" nor "before" language, which is historically conditioned and social in character. Uebel interprets the claim that we cannot go *behind* language as a rejection of Carnapian protocol sentences and his claim that we cannot go *before* language as a rejection of traditional epistemology. The conflict between Carnap and Neurath is seen ultimately as a disagreement about what a theory of science should do. Although both were seeking "a tolerant and tolerable world", Carnap thought this could be achieved by isolating "a core of cognitive content in our theories of the world indifferent to opposing metaphysics" in order to achieve a conception of knowledge "unafflicted by interests high or low", whereas Neurath did not believe this was possible (p. 159). Uebel connects this to Neurath's understanding of knowledge as action and therefore inextricably connected to practical aims. He says that Neurath "did not believe in the possibility of a neutral stand of science between competing metaphysics, nor of a conception of knowledge unafflicted by interests" (p. 159). It is not altogether clear how this interpretation is supposed to relate to the earlier explication of the role of values and interests in science. Recall that on the earlier account, science is viewed as entirely instrumental; the values and interests lie outside science proper although they provide the aims relative to which science is evaluated. This later account seems to suggest that the interests and values are inside science itself, and in this respect it sounds much more like recent analyses of science (by feminists and others) that emphasize the ineliminability of these elements, even from "good science". It is not clear whether Uebel sees no conflict between these two interpretations or whether he believes that this is an aspect of Neurath's thought that changed over time. The issue is important enough and interesting enough to merit closer treatment.

Uebel suggests that Neurath owes us some positive account of knowledge and that indeed he provided the beginnings of such an account in his own theory of protocol statements as *Ballungen*. For Neurath (quoted on p. 160), "A complete protocol sentence might for example be worded like this: 'Otto's protocol at 3:17 o'clock: [Otto's speech-thinking at 3:16 o'clock was (at 3:15 o'clock there was a table in the room perceived by Otto)]' ". In a brief description of a view he has developed in more detail

elsewhere, Uebel suggests that we can schematize Neurath's proposal regarding the steps to be followed in the conventional determination of the acceptability of scientific data claims as follows,

protocol (thought [stimulation state {'fact'}])

where the successive decomposition of the schematized protocols (the "deletion of brackets") is tied to the satisfaction of various conditions. Those that are linked to the unpacking of this schema include the institutional condition, the doxastic condition, the stimulation condition, and the 'factual' condition. Although the exegesis of Uebel's interpretation is too brief here to be very helpful, the important point is that Neurath's account is based on the contingencies of scientific practice. He did not seek counterfactual "rational reconstructions" of science but a realistic assessment of its practices, where these practices are irreducibly *social* in character. The contrast with Quine and most latter-day "naturalizers" is instructive. Whereas Quine and his followers see a mutual containment of epistemology and psychology, "for Neurath there is a mutual containment of epistemology and sociology—if one still wants to speak of epistemology at all!" (p. 162). This is an approach to naturalizing epistemology that seems potentially much richer and more promising than one that focuses narrowly on cognitive psychology.

Neurath emphasizes the centrality of action and the importance of participation in revolutionary movements. Although he shared much in common with Wittgenstein, including a social view of language and a contextual view of justification, he was not prepared to leave everything "as it is". He wanted his theory of science to be useful in the struggles of the day. He achieved this in large measure by "tak[ing] Conventionalism literally and plac[ing] voluntarism at the centre of his theory of science as social practice" (p. 162). It must be remembered, however, that if Neurath is being presented here as something of a deconstructionist, it is as one who is working toward a renewal of enlightenment criticism. The relationship to American pragmatism is also interesting. Uebel quotes (p. 164) Dewey's remark that Neurath was "the one pragmatist" among the logical positivists; they were "all scholastics, with the exception of Neurath". One cannot help but wonder whether the relationship between positivism and pragmatism might have worked out differently if it had been Neurath's version of positivism that was exported to the United States in the 1940s and beyond.

The fourth and fifth Boats do not receive much detailed discussion. The fourth repeats the point about *Ballungen* but is deployed "against *the system* as the 'limit' of scientific research" (quoted on p. 163). Because this is closely tied to the Unity of Science program, most discussion is deferred to the book's third part. Neurath's fifth and last Boat concludes his 1944 *Encyclopedia* monograph. The emphasis appears to be on pluralism and tolerance, other topics that will also receive attention from Cartwright and Cat in part three.

In that final part, "Unity on the earthly plane", the emphasis is on Neurath's view of unity as an instrument for action and on the many ways in which his approach differs from the usual pyramid-reduction view of unity associated with logical positivism. We have already seen that in his early writing on unity, Neurath seems to have had in mind a single unified *theory*. The argument here is that from at least 1919, Neurath's focus was on *practice* (and prediction) instead. So, for example, if one wants to be able to accurately predict the outbreak of forest fires in order to formulate adequate policy and plans for action, it is necessary to be able to draw upon not only natural sciences such as meteorology but also upon social sciences regarding human behavior and interven-

tion. The coordination and orchestration of the sciences in the service of action is the auxiliary motive behind Neurath's mature program for the unity of science. It is not driven, on this account, by a commitment to any kind of reductionism—ontological or theoretical, vertical or horizontal. And it is not limited to the unification of two large blocks, social and natural science, but aims instead at “the practical unification of the rich variety of special disciplines in all their detail” (p. 167). The unification of the sciences mattered more for Neurath than for other kinds of socialists because he aimed at *full* rather than piecemeal planning. He also placed very heavy emphasis on the importance of international cooperation. “Metaphysical terms divide”, he said; “scientific terms unite” (quoted on p. 179). By the time Neurath founded the Unity of Science movement in 1934, the need for unity was, as the authors say, “tragically clear”.

In order to achieve “unity without the pyramid”, Neurath adopted an alternative model: the encyclopedia. From 1934 until his death, Neurath promoted “encyclopedism” at both the theoretical and practical levels:

As a model it was to describe how the unity of science could realistically be conceived. As a project it was meant to guide scientists towards a progressive realisation of the model. At both levels the ‘encyclopedia’ had first and foremost international scope and historical grounding. (p. 179)

Both as a model and a project, it appears to have been patterned after the French *Encyclopédie*. Neurath saw his Marxist scientism as a tool of emancipation in the struggle against irrationality and obscurantism, especially as these were embodied in Catholicism and Nazism. “If the French *Encyclopédie* was a model of co-operation and effort that became a liberating *machine de guerre* in the French Revolution, so ... an international Encyclopedia [could be] worldwide” (p. 181).

Neurath's Encyclopedia project was to comprise about 100 pamphlets on all sorts of topics, an alphabetical index so that the collection could serve as a dictionary as well, and a visual thesaurus. At the First International Congress for Unified Science at Paris in 1935, the project was approved, and Neurath expressed the “hope that on the broad basis of scientific empiricism there may develop *unité de la science et fraternité entre les nouveaux encyclopédistes*” (quoted on p. 182). During the same year, in a passage remarkable for its embodiment of what we might call both “modern” and “postmodern” sensibilities, he wrote:

I have suggested the term “encyclopedia” primarily in opposition to the term “system” by means of which a kind of total science based on axioms is postulated, [a total science] that has to be discovered as it were. Such a notion is especially dubious if one starts to give the outlines of such a system—a fact that has already been pointed out by the leader of the French encyclopedists, D'Alembert. (quoted on p. 188)

By the end of the Second World War, Neurath was speaking of *orchestration* of efforts in order to counteract any idea that unity was to be imposed from the top down: “We intentionally reject the idea of forming anything like a programme, and we stressed the point that actual co-operation in fruitful discussion should demonstrate how much *unity of action* can result, without any kind of authoritative integration” (quoted on p. 182).

Cartwright and Cat stress three main implications of the realization of the Encyclopedia project as a historical task:

- (1) it materializes Neurath's belief that “our thinking is a tool” and that “scientific attitude” and solidarity go together;

- (2) it reflects his Marxist-inspired view that, *contra* Descartes, science is a historical, public, and social enterprise; and
- (3) it provides a theoretical model of what unity of science could be like (p. 182).

The authors maintain that, in the end, Neurath did not even require *consistency* among the statements of the various sciences although there was a middle period (c. 1932) when he argued for consistency without reduction. There seem to be two difficulties with the case being presented here. The first is that the textual evidence offered to support this interpretation seems to leave open other alternatives. The second is that it is not clear how Neurath could have given up consistency while maintaining a coherence account of truth (or even a coherence account of justification). If one gives up on consistency, what is left of coherence? And if one gives up a coherence account of truth and justification, what is left except precisely the kind of correspondence relation to a pre-packaged world that Neurath wished to deny?

Cartwright and Cat consider the possibility that the consistency requirement might be plausible even after Neurath's realization of the full consequences of *Ballungen*: perhaps a modest kind of single theoretical picture may still be possible: "a patchwork with great gaps and large regions of overlap" (p. 187). But then they reject this idea as incompatible with Neurath's image of reality as an infinite continuous manifold. They stress the difference between the patchwork and Neurath's "mosaic pattern of the sciences". They seem to presuppose that the consistency requirement entails that the resulting "patchwork quilt" will (partially) mirror some unique and pre-existing system in the world that we discover rather than create. It is not clear that any of this follows. When Neurath says "'The' system is a great scientific lie" (quoted on p. 187), the venom seems to be directed against the idea that only *one* system is possible. And when he says in the passage cited above that he rejects "a kind of total science based on axioms, [one] that has to be discovered, as it were," this does not seem to preclude a kind of weak systematicity (based on coherence), created rather than discovered, built piecemeal rather than imposed from above in one fell swoop. There would seem to be a lot of middle ground between *a priori* axiomatization of a single system alleged to map one-one on to an independently regimented reality, on the one hand, and surrender of all systematic constraints, even consistency, on the other. To deny the existence of this middle ground would seem to presuppose some excessively metaphysical conception of truth. For someone like Neurath, whose coherence theory is adopted precisely to *avoid* such metaphysics, the possibility of making contingent, historically conditioned patchworks must be retained.

In moving on to their account of Neurath's attack on method, Cartwright and Cat tell us that before 1931, his view contained the following three elements: (1) anti-foundationalism; (2) theoretical pluralism (a consequence of Duhemian holism: data bases are not enough to fix theoretical structures; auxiliary assumptions are required); and (3) the thesis of historical conditioning (of bases, auxiliaries and theories). They argue that the introduction of *Ballungen* in 1931 led to a new doctrine: (4) there are no logically determinate connections between data and theory. Even after auxiliary assumptions are fixed, the bearing of data on hypotheses is underdetermined. This leads to the introduction of a new element of conventionalism in Neurath's thought: because terms of everyday life are messy congestions, no determinate relations can obtain between them and the clean, precise terms of advanced science. The connections that join theory and data cease to be rigid, once this view is adopted, and themselves become subjects of choice. Hence, the increased scope for conventionalism. As Neurath saw it, this is a

point that Popper as well as Carnap failed to appreciate: “complex (messy) statements of little cleanliness—*Ballungen*—are the basic material of the sciences” (quoted on p. 193, slightly corrected here).

Recall that Neurath’s model for protocol sentences required the inclusion of the name of the protocolist (e.g. “Otto”) and a perception term as well. Cartwright and Cat point out that the rejection of the epistemological immediacy of protocols follows as a corollary. Neurath wrote in 1932 that “... such a protocol is not ‘primitive’ in Carnap’s sense, because one cannot get around the ‘Otto’ and the ‘perceiving’” (quoted on p. 197). The problem of interpretation, of how we get from the pure uninterpreted world to the world of experience does not exist for Neurath, because the world comes interpreted in the protocols of scientists.

Based on Neurath’s recognition by 1934 of the implications of *Ballungen*, especially the denial that (*Ballungen*-laden) protocol statements stand in any fixed relation of logical comparability to theoretical hypotheses, Cartwright and Cat argue that it makes sense to divide the Neurath Principle into two different theses, Special and General. The Special Neurath Principle (1932) tells us that in case of conflict “the cancelling of protocol statements is a possibility”. The General Neurath Principle (1934) is, on this reading, more radical: “All content statements of science, and also their protocol statements that are used for verification, are selected on the basis of decisions and can be altered in principle” (quoted on p. 204). The authors argue that the role of decision is much more far-reaching in this case than it was in the Special Principle, and this accounts for its characterization as more radical. Popper charged that Neurath’s Principle would lead to arbitrary decisions, and he criticized Neurath for failing to provide a method of theory testing. But Neurath did not believe that there is such a thing as a general scientific method. We decide on the basis of extra-logical factors how to revise our stock of statements. The decision is neither arbitrary nor logically compelled. We look for empirical/scientific reasons to inform each decision, and that is the best we can do. There is no “higher” method; everything lies on “the same earthly plane”.

Given the importance they attach to *Ballungen* in the development of Neurath’s thought, it is not surprising that Cartwright and Cat wonder about the origins of the concept. In the end, they attribute it to three main sources: Duhem, members of the “young historical school”, and proponents of the Marxist materialist conception of history. From Duhem’s “symbolic indetermination” of theoretical facts by practical facts, one can derive the imprecision of *Ballungen*. But *Ballungen* are not only imprecise, they are also dense and complex; and these two properties are not part of the Duhemian argument. This is one point where Cartwright and Cat place a great deal of weight on the importance of the social science background to Neurath’s thought. Just as the context provided by developments in physics is crucial to a proper understanding of much of the activity of the Vienna Circle, so it is important in the case of Neurath’s contributions to locate his thinking within the context of ideas and debates in the social sciences. Other thinkers of the time were also concerned with the density of events. For them it was generally a metaphysical doctrine; for Neurath, it was a concrete empirical claim about particular historical events that later was transformed into a claim about language and its use. Among the social science figures cited as relevant in this regard are Weber, Rickert, Schmoller and Meyer. Weber, for example, emphasized the *complexity* of reality and its *density*, its nature as a “homogenous” and “fluid” manifold. He used the ontology of congestion in his efforts to separate and demarcate the methodologies of the social and natural sciences (although Neurath, of course, did not follow him in

this respect). Cartwright and Cat also stress the influence of Plekhanov, Labriola, and other Marxist historians, arguing that there is a strong resemblance between Neurath's doctrines regarding *Ballungen* and certain Marxist doctrines about how to study history. The basic idea appears to be that the historian starts with the *complexus* as the primitive datum and arrives at an analysis of factors and categories only through a subsequent process of abstraction. History itself remains single and indivisible. The authors maintain that "The density of *Ballungen* missing from Duhem's views on scientific abstraction is the exact analogue at the linguistic level of this complexus that Labriola introduced at the conceptual level" (p. 239). Like Labriola and Plekhanov, Neurath rejects the idea that there is a fundamental distinction between the social and natural sciences. Sociology, history, and similar disciplines must be pursued scientifically or not at all. Marxism itself must not be understood as an alternative philosophy but as an empirical science.

It must be confessed that the sections on the historical origins of *Ballungen* are not the clearest of the book, at least for a reader who is not already immersed in the debates of the period. In speaking of various congestions, there is a great deal of traffic between talk at different levels: the levels of historical events, concepts and language. The central theses regarding *Ballungen* seem to be: that experience comes to us as a dense manifold rather than pre-packaged in neat, clean bundles; that consequently, the concepts of everyday language do not relate to experience in the way that those with logical atomist tendencies might like to think; and that, therefore, the relationship between reports of experience and the clean, precise terms of an ideal advanced science will itself be somewhat imprecise and messy rather than amenable to strict logical regimentation. Experience is all tangled up in itself, so that although we may try to disentangle certain strands or factors in it, we must never lose sight of the elements of conventionalism and voluntarism that are present in that activity. If this is roughly right as a sketch of *Ballungen* (and perhaps it is not), then some of the accounts of the social science background, although interesting, do not seem to be worked out yet in a way that furthers the reader's understanding of Neurath's specific project.

In the midst of all this, there is a short section dealing with the separability of planning and politics in Neurath's thought. This is related to the point made earlier about Neurath's decidedly un-Marxist view that economic planning could proceed independently of politics and power. Here the separability is treated as an apparent counterexample to Neurath's insistence on the interconnectedness of all human activity. After other passages are marshalled to reinforce Neurath's views about the economic "closed whole", the apparent inconsistency is allowed to stand with the remark that at least this shows that Neurath did not hold his beliefs about interconnectedness as a piece of *a priori* metaphysics! (p. 235).

The authors contend that the congestion of events is the common thread that connects Neurath's encyclopedic version of unity and his attack on scientific method. Neurath saw science and other human activities proceeding through negotiation, not regulation. Where Popper and others wanted rules, Neurath wanted "more information, more discussion, more science". In the end, though, what is required is a *decision*. Cartwright and Cat describe the situation this way:

Nothing will fix what we should do. There are no ultimate rules. There are only hard decisions and hard scientific tasks, not arbitrary but reasoned. Yet the reasons themselves are supported only by more hard decisions and hard scientific work. (p. 247)

Neurath recognized the need to work collaboratively with those with whom one disagreed. He wanted to work cooperatively with Popper and emphasized what they had in common rather than what divided them. As the authors point out, when he wrote the Vienna Circle and Unity of Science manifestoes, Neurath expressed compromise positions that were sometimes rather far from his own.

In their Conclusion, the authors note that many of Neurath's positions and attitudes have a certain "postmodern" ring to them: no foundationalism, no mechanical method, no incorrigible given, no autonomous epistemology, "no spectator view of knowledge". Even his "scientism" cannot be portrayed as the expression of a metaphysical world view because that would presuppose a totality, a definitive whole. Neurath's scientific world *conception*, on the contrary, was something that human beings construct: the growing sphere of unified science into which individual researchers incorporate their findings.

Despite all this, the authors wish to stress that there are important respects in which Neurath is resolutely modernist. For reason to fulfill its enlightenment promise, it must be reconceptualized rather than denounced. And there is one remaining universalism: we are all in the same boat.

Hilary Putnam has famously suggested that Neurath's metaphor should be modified so that in fact we occupy an entire fleet of boats. In the interest of giving pluralism its full due, we are asked to imagine ourselves passing materials back and forth between boats, shouting encouragement from boat to boat, and occasionally changing boats (cited on p. 255). The authors of this book firmly resist any such modification. Not only has Neurath already put the "whole of culture" into his Boat, there are two things distinctive to Neurath's analogy that are lost in Putnam's revision.

Not only does Putnam substitute the new pathos of individualism for the old idea of collectivism. But also his little fleet of boats is more reminiscent of an afternoon on the Charles River than (to use Carnap's allusion to Neurath's metaphor), 'the boundless ocean of unlimited possibilities,' to say nothing of the turbulent seas across which Neurath tried to 'steer full sail'. (p. 255)

The unity that Neurath insisted upon was the unity of humanity and the unity of the world created through and for collective action. In the context of that unity, Neurath believed that pluralism can flourish: "Pluralism is the aura of this scientific world community of the common man. The encyclopedism of logical empiricism ... competes with no philosophy, and is anti-totalitarian through and through" (quoted on p. 255).

In ending the book on this note, the authors bring us back to what may seem like a contradiction, or at least a serious tension, to readers eager to find resonances between Neurath's thought and "postmodern" approaches to philosophy of science. Neurath's emphasis on large-scale planning, internationalism, and successful communication across diverse cultures is quite different in spirit from the ethnocentrism, communitarianism, and local limitations that characterize much postmodern philosophy. His commitment to "planning for freedom" betrays a sensibility quite unlike that of many postmodern opponents of foundationalism, reductionism, and methodolatry in the sciences. And Neurath's scientism, however modest and however qualified, gives his pluralism a flavor very different from that of more recent pluralisms. One of the most striking aspects of the present book is that it seems to suggest that Otto Neurath, whose name more than anyone else's is associated with unity of science, might feel pretty comfortable on the disunity bandwagon were he alive today. And, as we have seen, a strong case is made here that his understanding of unity is indeed quite different from

the received view associated with the pyramid-reduction model. In many respects, Neurath's approach is very attractive in that it attempts to combine tolerance with anti-relativism, emancipation with empiricism. The question that needs further attention is whether it can be made to work, whether apparent gaps and inconsistencies can be fixed.

The reader interested in these issues is likely to be left wondering exactly how to connect Neurath's apparent authoritarianism in his work on war economies with the anti-totalitarianism of the encyclopedic model. Part of the answer given by the authors is that Neurath's views changed over time. But because the economic models are treated in part one and most questions regarding epistemology and science are treated in the latter two parts of the book, the reader may be left wondering whether Neurath's thoughts on economic planning changed to mirror his encyclopedism in science. Could a socialist economy ever be implemented on such a model, or is there too much of a *laissez-faire* optimism here to make that feasible? As mentioned above, Neurath's apparent conviction that economic planning could proceed independently of considerations of power and politics is particularly problematic and deserves more attention. His enthusiasm for social engineering and technocracy is likely to sound very strange to postmodern pluralists. Neurath's emphasis on the need for plans (and meta-plans) never seems to have abated. But if one moves away from a Central Planning Office, then who does the "orchestrating" that is required for unified action? The Encyclopedia may be able to get along with a general editor, but a planned economy would seem to require something more.

Another question that deserves further attention is the relationship in Neurath's thought between values and voluntarism. The authors stress that Neurath refused to mitigate the importance of decision making by appealing (as, for example, Weber did) to the role of values in legitimating choices. But if we can (and must) decide which ends our instrumental science is to serve, how do we do this without tackling the value question? Neurath's answer seems to be that there are only empirical issues to decide. Even his own social Epicureanism was to be supported only by appeal to empirical evidence about what people as a matter of fact do find valuable. But then how does one separate instrumental science from the human ends it serves? If values are in the same boat with everything else, as the authors somewhat contentiously maintain, can the means-end picture of a value-free science in the service of other human aspirations (emancipatory or otherwise) be made to work? The relationship of values (even values understood in a modest, non-metaphysical sense) to Neurath's voluntaristic empiricism would seem to require further scrutiny and discussion.

Finally, there are times in the exposition when the authors' discussion seems to presuppose that we must choose between metaphysical realism on the one hand and a total disregard for truth on the other. The possibility of a more modest account of truth and a more modest realism (along roughly Kantian lines) does not seem to be taken very seriously. So, for example, Neurath's coherentism is taken as a theory of justification only. The argument for this claim is that Neurath expressed no view about what makes sentences true or false and that he found the whole idea of checking the truth of statements against reality senseless (pp. 79–80). But to argue in this way seems to beg the question against any coherence theory of truth, and it presupposes that truth must refer to more than conditions of admissibility or rational assertibility. Neurath himself said:

If a statement is made, it is to be confronted with the totality of existing statements. If it agrees with them, it is joined to them; if it does not, it is called

untrue and rejected; or the existing complex of statements of science is modified so that the new statement can be incorporated; the latter decision is mostly taken with hesitation. *There can not be another concept of 'truth' for science.* (quoted on p. 80, italics added)

This seems to be a pretty clear statement of a coherence theory of *truth*. There is no deeper truth that could in principle elude us forever and thus condemn coherence truth to second-class status. Instead coherence truth is the real thing (even if it is not the Real Thing). Late in the book (p. 244), we are told that “Neurath may not have cared about truth but he did care about effectiveness” and that “We must be careful not to expect Neurath to enter into the Kantian project of assuring us that knowledge is possible”. Both these claims appear to have false presuppositions, the first for reasons just sketched and the second because Kant *started* from the fact that we have knowledge. Science stands in no need of justification from the philosopher for either Kant or Neurath. There are, of course, many deep differences between them; but on questions of truth and justification, Kant and Neurath are not so far apart as this book sometimes seems to suggest.

Nonetheless it is a valuable and interesting book that repays careful reading. The recent avalanche of new material on the early history of logical positivism has provided welcome correctives to older accounts. The emphasis on logical positivism's continental roots as opposed to its later Anglo-American manifestation has been especially useful. The greater prominence assigned to the influence on logical positivism of contemporary developments in physics has also been welcome. But most attention to date has focussed on Carnap, and certainly not enough attention has been paid to the social science background to the Vienna Circle. *Otto Neurath: Philosophy between Science and Politics* takes important steps toward redressing the balance. And in the process, it gives a real sense of logical positivism's historical location at a juncture when questions about the relationship between science and politics, empiricism and emancipation were just as central and just as vexing as they are now.

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