



## Between Frankfurt and Vienna

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## **BETWEEN FRANKFURT AND VIENNA: TWO TRADITIONS OF POLITICAL ECOLOGY**

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### **Introduction**

In this paper we consider the conflicts between two traditions of political ecology. The two traditions might be crudely characterised as physicalist and culturalist. The first is apparent in much of the work in ecological economics in particular, but also in the materialist left and more practically in conservation policy. It is concerned with the physical and biophysical conditions for human and non-human flourishing. It typically employs physical indicators of human well-being and biophysical indicators of environmental change. It is typically concerned with the ways in which current economic and social systems meet physical limits in the capacity of the environment for resource provision, waste assimilation, and climate regulation. It is science based. In the tradition of ecological economics one can trace the influence of an older physicalist tradition found in the work of the left Vienna Circle, and in particular of Otto Neurath. The second tradition is apparent in a body of work that sees the environmental crisis as part of a wider cultural crisis in 'Western reason'. It is typically more critical of science and scientism as forms of ideology that are taken to underpin the environmental crisis. The reduction of practical reason to modes of instrumental rationality limits the possibility of a critical perspective on our environmental problems. One of the main sources of this body of work is the Frankfurt School.

This outline of the two traditions is crude. However, it does reflect a real tension within political ecology and the environmental movement more generally, in particular in its ambivalent relation to the natural sciences. On the one hand, the environmental movement is one that is science dependent. More than any other political movement it is reliant on scientific claims. Most environmental problems, such as those associated with climate change or rates of biodiversity loss, could not be even identified without the natural sciences. However, on the other hand, it is a movement that contains within it strong elements of science scepticism ranging from the concerns about the conflicts between scientific expertise and demands of democratic participation through to views that the sciences themselves are one source of the very environmental problems the sciences have identified.<sup>1</sup>

In this paper we examine one of the historical roots of the opposition between these two traditions of political ecology, in the debates between the left Vienna Circle and the Frankfurt School. In doing so we suggest the basis for at least a partial reconciliation. The chapter is in four parts. In section I we outline the history of the conflict between the

two traditions in some largely forgotten debates between Neurath and Horkheimer in the 1930s. In the following sections II, III and IV we examine the history and influence of the Vienna Circle and Frankfurt traditions by placing Horkheimer's and Neurath's papers in a larger narrative arc: sections II and III outline the influence of the work of the Vienna Circle in the development of the tradition of ecological economics; section IV considers the critique of instrumental reason that emerged from the Frankfurt school, developed in part in opposition to the positivism of the Vienna Circle. In section V we consider the legacy of the debate and outline some of the virtues of the approach offered with the tradition of the Vienna Circle and in particular as developed by Neurath for understanding the tensions between science dependence and science scepticism within modern political life.

## **I. The tale of two papers<sup>2</sup>**

In 1937 issue no. 1 of volume 6 of the Frankfurt School's journal, *Zeitschrift für Sozialforschung* (Journal for Social Research) contained two papers that might look unlikely cohabitants of the journal. The first was Max Horkheimer's 'The Latest Attack on Metaphysics' which developed a systematic critique of positivism which became central to the tradition of critical theory.<sup>3</sup> The paper marked a shift in the history of the Frankfurt School, from the interdisciplinary empirical research programme of the early work of the Institute for Social Research (*Institut für Sozialforschung*) to the central themes of critical theory that defined its second stage – in particular the criticism of instrumental reason that became central to one tradition of political ecology. In doing so it also marked a significant turn in the reception of the Vienna Circle, who were identified as the central object of the critique of instrumental reason. Here originated the familiar picture of the logical empiricists as committed to a technocratic and instrumentalist view of politics, unable to sustain any critical standpoint on existing society.

Given this, the second paper in the issue, 'Inventory of the Standard of Living', might look a strange companion piece.<sup>4</sup> The author, Otto Neurath, was a central target of Horkheimer's paper. Neurath's paper reformulated some of the themes in Neurath's long-standing attack on the attempt to capture changes in welfare in purely monetary terms. The paper belonged not to a politically conservative ideology unable to critically engage with existing social conditions, but rather to the politically radical tradition of the left Vienna Circle. It was continuous with Neurath's own critique of capitalism and his engagement in the socialisation debates that followed his involvement in the Bavarian revolution as director of the Central Economic Office. A feature of Neurath's contribution to the socialisation debates was the introduction of environmental dimension into the debates.<sup>5</sup> Neurath's contributions to the debates had a subsequent influence on the development of ecological economics, in particular through the work K. William Kapp.

The unlikely juxtaposition of these two papers had its own history and its own afterlife. The Frankfurt School and the Vienna Circle had first come into contact through an earlier meeting between Horkheimer and Neurath at The Hague in January 1936, where the two

had explored the possibilities for cooperation between the two groups of émigrés from Nazi Germany. In October and November 1936, Neurath twice visited the Institute for Social Research (then relocated to New York) for seminars on philosophy of science, metaphysics and dialectics, and the Institute provided financial support for Neurath's standard of living research reported in the 1937 issue of *Zeitschrift für Sozialforschung*. Horkheimer's subsequent letter to Neurath expressed a 'desire to continue to concern ourselves with logical empiricism'.<sup>6</sup> But although to Neurath the scene looked set for cooperation, the Frankfurt School saw things differently. In correspondence, Horkheimer made clear that a central aim of the meetings was to learn more of logical empiricism in order to develop a more effective critique. The perhaps clearest expression of the intention can be found in a letter from Horkheimer to Karl Wittvogel of October 1936:

'The scientific discussions, which are taking place in the Institute partly by invitation of external colleagues, currently concern mainly the problem of the so-called scientific philosophy. ... Since this philosophy is oriented exclusively towards the natural sciences and thus does not yield anything else but the meagre world view of some physicists, who in their own field may do excellent work but are barely competent in these more general theoretical questions, the whole thing amounts to an apology for the conduct of natural science, to a misunderstanding of history and its theory and to a fight against the methods of thinking that are shared by us. ... In light of the confusion which this philosophy currently inspires in academic and non-academic circles, the Institute intends in the near future to effect a critique of this tendency, perhaps even by means of several articles in the *Zeitschrift*. To this end we seek to orient ourselves by means of lectures by members of this circle and to become expert in it.'<sup>7</sup>

Following further exchanges with Adorno about the work of logical empiricists, Horkheimer wrote in February, 1937: 'I have completed the work very quickly since basically it does not merit spending too much time on it.'<sup>8</sup>

In June 1937, Neurath was still considering Horkheimer as an author for his International Encyclopedia of Unified Science.<sup>9</sup> Unsurprisingly, given the different understanding of the possibilities for cooperation, the polemical nature of Horkheimer's published critique—'The Latest Attack on Metaphysics'—came as a surprise: 'At first the shock rendered me speechless.'<sup>10</sup> Neurath drafted a response but Horkheimer declined to publish it, claiming that the *Zeitschrift* 'is not intended to furnish a platform for opposing views'.<sup>11</sup> The cooperation between the two schools thus came to an end; the scene was set for the subsequent history of mutual suspicion.

Along with the criticisms of the Vienna Circle and Neurath by Hayek, who as we show below developed a remarkably similar account of their technocratic politics and scientism, Horkheimer's paper and the critical accounts of logical empiricism that followed in subsequent issues of the *Zeitschrift* played a large role in defining the subsequent picture of the Vienna Circle and the use of 'positivism' as a term of academic abuse.<sup>12</sup> The picture was always a caricature. On the one hand, Horkheimer's criticism of logical empiricism echoed some of Neurath's criticisms of what was to emerge as the

mainstream orthodoxy of ‘logical positivism’, in particular the relative neglect of history and social science. Moreover, the view ascribed to logical positivism as committed to a technocratic politics was one that Neurath himself explicitly rejected. On the other hand, Neurath’s reply to Horkheimer invoked features of Horkheimer’s own early materialism which were rejected in the later developments of Critical Theory, such as the re-autonomization of philosophy and the increasingly radical criticism of science. Neurath developed a response to the problems which afflicted Horkheimer’s later work – problems which were highlighted by later theorists in the Frankfurt tradition like Habermas: the very radicalness of the Frankfurt School critique of reason made it difficult to sustain without undermining itself. Indeed, it is in its own critical engagement with the place of science in modern political life that Neurath’s anti-technocratic politics retains a theoretical and practical significance that has been obscured by the Frankfurt School critique.

## **II. Neurath: socialist calculation and ecological economics**

Neurath’s 1937 paper ‘Inventory of the Standard of Living’, developed a set of claims about the measurement of ‘life-conditions’ that persist in more recent discussions of well-being in ecological economics. The first was that the concept of standard of living is multidimensional: ‘The attempts to characterize the standard of living are like those which try to characterize the “state of health”. Both are multidimensional structures’.<sup>13</sup> The different components of the standard of living will include health, free-time, the interest of work, social relationships, aesthetic experiences etc. many of which, like health, are themselves multidimensional. Some of these will have specific cardinal measures, some only ordinal measures. However, Neurath argued, none can be caught in a single measure, particularly a single monetary measure. More generally, he rejected any summative view of well-being: ‘We cannot regard [the standard of living] as a weight made up of the sum of the weights of the various parts’.<sup>14</sup> Decision-making and social planning on this account need to use specific in-kind measures of the components of human well-being.

“Measurement in kind” characterises the point of departure in furnishing the data for further deduction. These fundamental data we shall designate as the “basis of life”, the environment in the broadest sense: supplies of raw material, all sorts of sources of energy, inventions, human abilities, existing towns, streets, trains, canals, etc....<sup>15</sup>

Those welfare measures themselves would form part of a larger system of in kind measurement for decision making which would consider the wider determinants of well-being.

Neurath’s argument for an economy in kind had formed the starting point for both Weber’s and Mises’ contributions to the socialist calculation debates.<sup>16</sup> His plans for ‘total socialisation’ presented during the Bavarian revolution of 1919 (during which he acted as director of socialisation) were radical in rejecting not only monetary units for calculation in a socialised economy, but any single unit of calculation, including the

labour time units advocated by many socialists. Because a socialist economy would only consider the use-value of goods, it would have to be a non-market 'economy in kind' in which money-values would no longer form the basis for economic calculation:

‘We must at last free ourselves from outmoded prejudices and regard a large-scale economy in kind as a fully valid form of economy which is the more important today in that any completely planned economy amounts to an economy in kind. To socialize therefore means to further an economy in kind. To hold on to the split and uncontrollable monetary order and at the same time to want to socialize is an inner contradiction.’<sup>17</sup>

While specific in-kind measures would be necessary for different determinants of living standards in such an economy, there would be no single unit of comparison or measurement for decision-making. Choice would therefore require direct comparisons of alternatives. ‘There are no units that can be used as the basis of a decision, neither units of money nor hours of work. One must directly judge the desirability of the two possibilities.’<sup>18</sup>

In his opening contribution to the socialist calculation debates, Mises agreed with Neurath that no single unit for comparing options was available in a fully socialised economy. However, he argued that in virtue of this fact a full socialised economy could not be rational.<sup>19</sup> Rational choice about the employment of higher-order production goods requires commensurability, i.e. rational economic decision-making requires a single measure on the basis of which the worth of alternative states of affairs and uses of productive resources could be calculated and compared in order that we can choose between ‘the bewildering mass of intermediate products and potentialities of production’. In market economies, money provides a common unit of measurement for comparing options: ‘calculations based upon exchange values enable us to reduce values to a common unit’.<sup>20</sup> Non-market economies, in particular socialist economies, lack such a common unit of comparison. Hence, rational economic choices are only possible in market economies; socialist economies do not allow for rational choices.

Much of the subsequent debate in the socialist calculation debate focused either on the possibility of the use of monetary measures within a socialist economy – a possibility raised in particular by the more neo-classical defences of socialism offered by Oskar Lange and Fred. M. Taylor – or on the possibility of alternative single units such as labour time or energy units. Neurath rejected both alternatives:

‘Even some socialists have agreed with Mises’ thesis - without calculation with *one* unit, an economy is *not* possible; socialism does not acknowledge any calculation with *one* unit; it follows that socialism is impossible – and therefore try to establish that in the socialist society there also can be such a calculation. For us it is essential that *calculation in kind in the economic plan has to be the moneyless basis of socialist calculation of economic efficiency.*’<sup>21</sup>

His arguments for this position in part revolved around the multidimensional nature of well-being. Decisions founded on monetary measures would not be able to incorporate the full

range of constituents of human well-being into social choices. However, the arguments also had a directly intergenerational component. With respect to intergenerational decision-making in particular, neither money nor the main alternatives – labour time and energy units – could deal with the different dimensions of value involved.

‘The question might arise, should one protect coal mines or put greater strain on men? The answer depends for example on whether one thinks that hydraulic power may be sufficiently developed or that solar heat might come to be better used, etc. If one believes the latter, one may “spend” coal more freely and will hardly waste human effort where coal can be used. If however one is afraid that when one generation uses too much coal thousands will freeze to death in the future, one might use more human power and save coal. Such and many other non-technical matters determine the choice of a technically calculable plan ... we can see no possibility of reducing the production plan to some kind of unit and then to compare the various plans in terms of such units...’<sup>22</sup>

The arguments here with Mises turn on different conceptions of practical reasoning. Neurath’s arguments presuppose his rejection of a conception of practical reasoning that assumed that any choice could be subject to a purely formal procedure which would result in a particular optimal outcome. Neurath characterised this view as ‘pseudorationalism’ - the view that the job of reason is to discover an ‘optimal’ decision and that there exist formal rules of reason that unequivocally determine that decision. Such rules or optimal choices were not always possible: ‘Rationalism sees its chief triumph in the clear recognition of the limits of actual insight.’<sup>23</sup> It is a mark of the pseudorationalist to believe that there are such rules of insight that determine answers to all decisions. Pseudorationalism exists both in the domain of action and also of thought, for example in the belief that there are rules for the scientific method which if followed eliminate falsehood and lead to ever nearer approximations to the truth.<sup>24</sup>

Neurath’s contributions to the socialist calculation debates have had a lasting influence in ecological economics.<sup>25</sup> His influence is not to be found in any specific model of socialism; rather it lies in his defence of the two claims, articulated in the 1937 paper on the standard of living and in his early contributions to the calculation debates, about the multidimensionality of welfare and its dependence of a variety of environmental conditions. These claims later found their way into ecological economics through the work of Kapp, whose own doctoral dissertation, *Planwirtschaft und Aussenhandel*, had been concerned with Mises arguments against socialism.<sup>26</sup> Kapp argued that as economists had become concerned with market models of socialism, they had forgotten what was at stake in the original debates between Neurath, Mises and Weber.<sup>27</sup> That was the problem of whether human well-being and its environmental conditions could be captured by monetary valuations:

‘By stating that “useful effects” or free “disposable time” are the measure of real wealth and thus of the quality of life Engels and Marx must have been convinced to have specified at least in general terms the alternative criteria for the planning and decision-making process in a socialist planned society. Few marxist writers

have taken up these hints while many have simply followed the general trend toward a subjective theory of value and price. The great exceptions were Otto Neurath and Max Weber... The formulation of environmental policies, the evaluation of environmental goals and the establishment of priorities require a substantive economic calculus in terms of social use values (politically evaluated) for which the formal calculus in monetary exchange values fails to provide a real measure—not only in socialist societies but also in capitalist economies. Hence the “revolutionary” aspect of the environmental issue both as a theoretical and a practical problem. In short, we suggest that environmental values are social use values for which markets provide neither a direct measure nor an adequate indirect indicator.’<sup>28</sup>

Neurath’s work therefore laid the groundwork for two important claims central to recent ecological economics: first, that rational social choices need to recognize the ways that economic institutions and relations are embedded within the physical world and subject to resource and ecological constraints; second, in part in virtue of this fact, that economic choices cannot be founded upon purely monetary valuations. Neurathian contributions to the socialist calculation debates thus formed one of the historical predecessors of the physicalist tradition of modern political ecology.<sup>29</sup>

### III. Neurath and Hayek

These two claims were also at the centre of a lesser-known exchange between Neurath and Hayek that had significant parallels with that between Neurath and the Frankfurt School. Hayek’s epistemic arguments against social planning were aimed not just at socialism, but at scientific tendencies in a wider group of theorists who, with Neurath, are typically seen as earlier precursors of the physicalist tradition of political ecology.<sup>30</sup>

Hayek’s criticisms of scientism and social engineering in his essays of the 1940s, “The Counter-Revolution of Science” and “Scientism and the Study of Society”, included amongst its targets writers such as Wilhelm Ostwald, Patrick Geddes, Frederick Soddy and Ernest Solvay, whose work on energy and economics was taken to exemplify a form of ‘scientific objectivism’ characteristic of an engineering mentality. All assumed that calculations in kind using physical in-kind—*in natura*—calculation units could replace monetary calculation in economic decision making.<sup>31</sup> Hayek criticised ‘the characteristic and ever-recurrent demand for the substitution of *in natura* calculation for the ‘artificial’ calculation in terms of price or value, that is, of a calculation which takes explicit account of the objective properties of things’.<sup>32</sup> Everything that Hayek opposed - scientism, ‘objectivism’, ‘physicalism’, socialism and *in natura* calculation—was united in the person who became his primary target: the ‘protagonist of modern “physicalism” and “objectivism”’, Neurath.

Hayek took all these theorists to commit the same epistemic errors that underpin the socialist project: the scientific identification of all knowledge with scientific knowledge; the belief that all this knowledge could be communicated to a single planning agency of technical experts; the assumption that this body of experts could use this knowledge to

calculate a socially optimal outcome. They succumbed to a rationalist illusion typified by the social engineer: ‘The engineer’s ideal which he feels the “irrational” economic forces prevent him from achieving, based on his study of the objective properties of the things, is usually some purely technical optimum of universal validity.’<sup>33</sup> The belief in the possibility of a technical optimum achievable by experts fails to acknowledge the limits on the knowledge that any particular individual can possess.

‘The application of the engineering technique to the whole of society requires... that the director possess the same complete knowledge of the whole society that the engineer possesses of his limited world. Central economic planning is nothing but such an application of engineering principles to the whole of society based on the assumption that such a complete concentration of all relevant knowledge is possible.’<sup>34</sup>

The illusion of what is called ‘rationalism’ ‘superrationalism’ or ‘Cartesian rationalism’ involves a failure to understand the limits of scientific reason: ‘it may ... prove to be far the most difficult and not the least important task for human reason rationally to comprehend its own limitations’.<sup>35</sup>

The scientific identification of knowledge with scientific knowledge fails to comprehend the significance for economic life of forms of knowledge that can be stated in universal terms, in particular of knowledge that is specific to time and place, and practical knowledge - knowledge how - that cannot be stated in propositional form. Such knowledge is distributed amongst different individuals in society and cannot in principle be passed on to a single planning agency. In contrast to a centrally planned economy, Hayek argued that the market acts as a co-ordinating procedure which through the price mechanism distributes to different actors that information that is relevant for the co-ordination of their plans - without requiring the centralisation of knowledge.<sup>36</sup> It allows different individuals to use their local and practical knowledge to best effect in coordination with others. Monetary prices on this account cannot be substituted by in-kind measurement. They are required in a complex and changing economy marked by a division of knowledge. There is no *in natura* alternative to the monetary measures. On this view, the tradition of ecological economics that is concerned with the physical preconditions of economic activity and in particular its ecological preconditions, and the use of non-monetary measures and indicators of economic activity falls prey to the same illusions as socialism.

In 1945 Neurath responded to these criticisms in unpublished notes and letters to Hayek which Neurath hoped would form the basis for a public exchange.<sup>37</sup> The exchange never happened – Neurath died later that year, and, in any case, Hayek showed little enthusiasm for such an exchange. In his response, Neurath did not deny his commitment to *in natura* calculation (although he took Hayek to mischaracterise the project) but rather denied that he commits the epistemic errors of which Hayek accuses him. He noted that Hayek’s criticisms of Cartesian rationalism paralleled his own earlier criticisms of pseudorationalism, and agreed with Hayek that ‘pseudorationalism is dangerous and may sometimes support totalitarianism.’<sup>38</sup> Describing himself as the ‘arch-enemy of the ‘illusion of complete knowledge’, Neurath argued that Hayek had mischaracterised the views of the logical

empiricists, and in doing so had failed to acknowledge their common ground. Neurath's own rejection of pseudorationalism and the illusion of complete knowledge emerged from his version of logical empiricism. In response to Hayek he invoked a series of claims about the sciences that he was in part responsible for placing at the centre of the philosophy and sociology of science. Scientific theory is underdetermined by empirical evidence: 'there are often several systems of hypotheses for the explanation of the same complex of facts'<sup>39</sup>. Evidence itself is uncertain and provisional – observation or protocol statements are open to revision. Theories are a mass of statements that are logically interconnected and confront the world as a whole, not individually. In the metaphor often repeated, we are like sailors who have to patch up their boat at sea. There exist no methods or rules of science that can be employed to definitively confirm or falsify theories. For Neurath, Popper's philosophy of science exemplifies pseudorationalism in the realm of theory: he wondered why Hayek mixes in bad epistemic company.<sup>40</sup>

In Neurath's work these features of science are deployed against the claim that there exists an optimal solution to all economic and social choices.<sup>41</sup> Given the uncertainties and unpredictability involved in the practice of science, the assumptions of optimality look implausible. Correspondingly he rejected the possibility of any technocratic decision making procedure undertaken by experts. However, in contrast to Hayek, this includes a rejection of the claim that rational choices require decision procedures employing monetary units. Neurath rejected the claim that in-kind calculation is not required in social choices. In doing so he contested Hayek's characterisation of in kind calculation: the units in Neurath's account of in kind calculations are not simply the physical units, in the sense of material conditions of human activity, but also the social dimensions of life. The inventory of the conditions of life includes data 'concerning work load, morbidity, mortality, food, clothing, housing, educational possibilities, amusement, leisure time etc.'<sup>42</sup>—'the environment in its broadest sense'.<sup>43</sup> Social and institutional relations come within that characterisation: 'a change in a man's food and shelter is of less importance than a change in his state of being bullied or humiliated by certain institutions'.<sup>44</sup> Self-government, freedom and other human relations belong to the 'happiness conditions' of human beings.<sup>45</sup> His complaint against the technocratic movement was not simply that it based its arguments on mistaken epistemic assumptions, but that the measures it considered were too narrow. If Neurath can be understood as a precursor to ecological economics, then his is a version that includes not only the narrowly physical conditions of human well-being, but also its social conditions.<sup>46</sup>

#### **IV. Horkheimer and the critique of instrumental reason**

The influence of the Frankfurt School on modern political ecology is much more widely recognised than that of the Vienna Circle.<sup>47</sup> From Horkheimer and Adorno comes the theme that modern science and the 'enlightenment project' are tied to the domination of both nature and humans beings: 'What men want to learn from nature is how to use it to dominate it and other men. That is the only aim.'<sup>48</sup> The subsequent history of this view is well known. Marcuse radicalised this position, by arguing that the liberation of humans and nature requires a new science founded on different interests that will employ new concepts and new facts. Habermas was less radical: in his terms, while natural science is constituted by an interest in technical control, there is no problem as such with either this

interest or the forms of scientific knowledge within their proper domain in the relation of humans and non-human nature. The problem lies rather in their extension beyond their appropriate domain through the colonisation of the life-world by instrumental reason. Varieties of these different themes from the Frankfurt School are to be found in more recent political ecology.

The work of Horkheimer, in particular *The Dialectic of Enlightenment* co-authored with Adorno, is the starting point for this tradition of argument. The central claims of this text were developed after Horkheimer's exchanges with Neurath. However, Horkheimer's 'Latest Attack', which appeared alongside Neurath's 'Inventory' in the *Zeitschrift für Sozialforschung*, was a transitional paper—both in the history of the Frankfurt School, and in the subsequent history of political ecology. It marked a shift from the early programme of interdisciplinary materialism typical of the first phase of the work of the Frankfurt School to the articulation of Critical Theory, typical of the second. The exchanges with Neurath, which took place in 1937, and predated the critique of instrumental reason and of the enlightenment project that began around 1940, belong to this transitional stage in Horkheimer's development of critical theory. However they do anticipate many of the problems with which Adorno and Horkheimer would face in their later work.

Horkheimer's criticisms of positivism in the 'Latest Attack' deploy earlier arguments he put forward in 'Materialism and Metaphysics', where he had claimed that positivism denies the possibility of critical reflection on the social and historical context of science itself. Positivism, he had argued, fails to acknowledge the ways in which knowledge is dependent on social action and in consequence 'positivism necessarily understood science itself in an unhistorical way'.<sup>49</sup> In 'Latest Attack' the claim that positivism is necessarily unreflective and ahistorical in its account of the sciences is tied to a failure of positivism to provide a critical perspective on modern society in general and the role of science and instrumental reason in particular. Only by placing science in the context of its history in the 'life process of society' can a critical perspective be sustained.<sup>50</sup> Positivism allows of no such critical stance.<sup>51</sup> The identification of knowledge with the special sciences leaves it unable to develop a critical stance on the social role of those sciences. Lacking such a perspective, positivism is unable in particular to criticise the role of science in the support of the existing social order: 'In view of the fact that the ruling economic powers use science as well as the whole of society for their special ends, this ideology, this identification of thought with the special sciences, must lead to the perpetuation of the status quo.'<sup>52</sup> Positivism is in this sense necessarily conservative.

In his unpublished rejoinder to Horkheimer's essay, Neurath responded by defending the possibility of critical reflection on the sciences from a naturalistic perspective. He denied that it is possible to pursue reflection from a philosophical stance beyond empirical control. However, while there is no philosophical position beyond the science to which the sciences have to answer, rational reflection on the individual sciences is still possible:

'Whatever is claimed with one scientific discipline can be criticised by a more comprehensive scientific standpoint, without regard to any divisions between the

disciplines, but *we know of no court of appeal beyond the science that judges science and investigates its foundations*. ... Horkheimer makes it sound as if the Unity of Science Movement assigns special authority to isolated individual sciences. Its basic idea, however, is that special importance is granted to the entirety of science and not to take too seriously the often traditional division into single disciplines.<sup>53</sup>

Logical empiricism on this account is compatible with reflection on the sciences of a naturalistic kind - reflection that draws on the wider sciences, where 'science' includes any systematic empirical inquiry, including everyday empirical knowledge, and the history and sociology of science. In this regard it is important to note that the Vienna Circle was not homogenous. It was a conversation, not a set of doctrines, and Neurath's own naturalism diverged from other strands of thought within the Vienna Circle. For example, Neurath's arguments for a more broadly conceived metatheory of science that included history and sociology of science contrasted with Rudolf Carnap's perceived reduction of philosophy to a 'logic of science' characterized by strictly formal methods. From the vantage point of a sociologically informed conception of scientific self-reflection, the possibility of social determination of scientific belief and reflexivity about that fact could be fully acknowledged:

'Historical changes do not only alter that which we call "theoretical formulations" or "constructions" but also the stock of protocol sentences. ... [W]e must remember that "constructions" and "raw materials" cannot be sharply separated. Some of our observations prove themselves to be very stable, but in principle nothing is certain — everything is flux. It is plain that a consistent thinker will seek apply these considerations, which are based on experience, to his own life and will ask himself how he would act, how he would argue if would be positioned differently. He will realise that decisive changes in the pursuit of science are not only determined by intensive reflections of a generation of scholars, but also what happens in social life generally, which the scholars are part of.'<sup>54</sup>

This naturalistic reflexivity on science itself formed the background of Neurath's own scientifically informed scepticism about the claims made from the special sciences, especially when applied in political decisions. Far from informing a technocratic politics, it provided the grounds for Neurath's scepticism about technocratic politics. What Neurath objected to in Horkheimer's critique was his return to 'certain ideas of German idealism', which assumed a philosophical standpoint outside of the sciences from which criticism can proceed. Neurath rejected the claim that '*there exists a method outside of science which, basing itself on everything that can be stated scientifically, can criticise science, especially by characterising their historical situation in a fashion that is alien to the sciences*'.<sup>55</sup> Correspondingly, he distinguished between Horkheimer's reports of the empirical work of the Frankfurt School (in particular his introduction to *Authority and the Family* which employed a language which is 'amenable to empirical control'), and his philosophy, which represented a retreat into idealist metaphysics of 'Hegel, Kant, the neo-Kantians and Husserl'.<sup>56</sup> The problem with the latter is that the criteria for deciding the correctness or otherwise of statements become obscured. 'Horkheimer assumes a vantage point "outside" of science (which works *only* with "*Verstand*") in order to be

able to analyse the entire practice of science by means of “*Vernunft*” and to show in a “proper”, non-scientific fashion all that lies behind it.’<sup>57</sup>

Neurath’s criticisms highlighted a shift within Horkheimer’s own relation to the idealist philosophical tradition. The interdisciplinary materialism that marked the first stage of the work of the Frankfurt School had itself been premised on a rejection of a division between the sciences and philosophy.

‘Materialism requires the unification of philosophy and science. Of course it recognizes that work techniques differ in the more general pursuits of philosophy and the more limited tasks of science, just as it recognizes distinctions of method in research and the presentation of research. But it does not recognize any difference between science and philosophy as such.’<sup>58</sup>

Horkheimer’s early account of the possibility of critical reflection on the special sciences parallels that provided by Neurath in his response to Horkheimer’s 1937 position.<sup>59</sup> It appealed to the possibility of historical and sociological understanding of the sciences. In response to Max Scheler’s criticisms of the materialist demand that philosophy and science be unified, Horkheimer offered the following remark:

‘The real meaning [of the materialist demand] is the exact opposite of any attempt to absolutize particular scientific doctrines. It requires instead that every piece of knowledge be regarded, not of course as a purely arbitrary creation, but as a representation by particular men in a particular society, context and moment of time ...’<sup>60</sup>

Neurath’s reply to Horkheimer insisted on a naturalistic reflection of science on itself, and thus involved a restatement of Horkheimer’s own earlier materialist concerns in order to challenge the later Horkheimer’s idealist arguments about the autonomy of philosophy from science. The shift is not yet fully explicit in ‘Latest Attack’ and ‘Traditional and Critical Theory’, but becomes so in ‘Postscript’ to ‘Traditional and Critical Theory’ where Horkheimer responded to Marcuse’s ‘Philosophy and Critical Theory’ in which critical theory is represented as ‘the heir not only of German idealism but of philosophy as such.’<sup>61</sup> Within this later work, the early interdisciplinary materialism is abandoned. In the *Dialectic of Enlightenment* Horkheimer and Adorno wrote:

‘Even though we had known for many years that the great discoveries of applied science are paid for with an increasing diminution of theoretical awareness, we still thought that in regard to scientific activity our contribution could be restricted to the criticism or extension of specialist axioms... However, the fragments united in this volume show that we were forced to abandon this conviction.’<sup>62</sup>

Given the ‘indefatigable self-destructiveness of enlightenment’, philosophical reflection has to forgo ‘the affirmative use of scientific and everyday conceptual languages’.<sup>63</sup>

## V. The Legacy of an Unresolved Dispute

The central question that Neurath raised for Horkheimer's position in its shift from his earlier empirically grounded reflection on the social context of the sciences concerns the criterion for determining the acceptability or rejection of competing claims about science and about the social world in which science develops. As Horkheimer noted in his reply to Neurath: 'The weakest point of my piece was pointed out by you, naturally, on page 13 of your reply. "Horkheimer nowhere indicates by means of which control one can determine when a point of view is 'correct' and when it is 'incorrect'.'"'<sup>64</sup> Having noted it Horkheimer did not reply to this criticism.

The grounds for his critical perspective became even more pressing in his later work. Thus Neurath's critical comment took on increasing significance given the later trajectory of the work of Horkheimer and the Frankfurt School towards the critique of science to which its later influence on environmental thought is best known. In *Eclipse of Reason*, reason as such is taken to be based in an interest in the domination of nature: 'The disease of reason is that reason was born from man's urge to dominate nature, and the "recovery" depends on insight into the nature of the original idea, not on a cure of the latest symptoms.'<sup>65</sup> In developing his critique of reason, Horkheimer wants to avoid irrationalism. His critique aims to remain within the norms of reason itself. The critique is a 'self-critique': 'in such self-critique, reason will at the same time remain faithful to itself.'<sup>66</sup> The problem here is how this self-critique can be sustained without undermining itself. As Habermas notes 'the radical critique of reason proceeds self-referentially; critique cannot simultaneously be radical and leave its own criteria untouched'.<sup>67</sup>

The problem left its own legacy within the Frankfurt School. In the work of Horkheimer it led to the retreat from political engagement that marked his later work. If reason is to avoid being instrumental it is to be divorced from action; the self-critique of reason thus leads to the conservative political quietism of Horkheimer's post-war work. But the legacy is also apparent in the wider work of the Frankfurt school, particularly in the area in which it has been most influential on environmental thought – the critique of science and instrumental reason. As outlined above, this critique subsequently took two different directions, in the work of Marcuse and Habermas. Marcuse maintained the central claim that science is constituted by an interest in the domination of nature: 'science, by virtue of its own method and concepts, has projected and promoted a universe in which the domination of nature has remained linked to the domination of man'.<sup>68</sup> The modern natural sciences project an understanding of nature as 'potential instrumentality, stuff of control and organization'.<sup>69</sup> In the hands of Marcuse this is taken to imply that liberation of both humans and nature requires a new science constituted by different interests, employing new concepts and arriving at new facts. 'Its hypotheses, without losing their rational character, would develop in an essentially different experimental context (that of a pacified world); consequently, science would arrive at essentially different concepts of nature and establish essentially different facts.'<sup>70</sup> However, Marcuse specifies neither the criteria for reasoned choice between theories nor the nature of the new concepts. The idea of a new science with its 'essentially different facts' is left as a utopian promissory note without content.

The other direction of travel is that offered by Habermas. While Habermas also takes science to be constituted by an interest in technical control, he rejects the claim that this can be overcome – that there could be a new natural science constituted by a different interest: ‘The idea of a New Science will not stand up to logical scrutiny...’<sup>71</sup> The problem is not that the natural sciences are constituted by an interest in technical control, but rather the expansion of sphere of instrumental reason beyond its proper domain. The problem becomes one of colonisation. In jettisoning the radical criticism of scientific reason and recasting the problem in these terms, Habermas attempts to provide what is absent in Horkheimer and Marcuse: his conception of communicative rationality offers an account of what norms of reason apply outside the sphere of instrumental reason. Dialogue is rational to the extent that it is free from the exercise of power and strategic action. Participants are equal in their communicative capacities to state and evaluate arguments, such that the judgements of participants converge only under the authority of the good argument. This account of communicative reason, which has its roots in Kant’s account of the enlightenment project, provides the basis of a deliberative model of democracy that has had particular influence on environmental political thought.<sup>72</sup> On this view of political deliberation, the claims of the original Frankfurt critique that have remained important are those that concern the scientisation of politics and public opinion that comes with the extension of instrumental reason beyond its proper domain. Here, technocratic politics involves the elimination of the practical sphere of public debate about norms, and the subsequent reduction of political issues to matters of technical reason.<sup>73</sup>

Although this model of a deliberative politics is important in the environmental sphere, its deployment in practice departs significantly from the Habermasian account of deliberative democracy. The science dependence of environmental decisions, problems and politics has meant that where formal and informal public deliberation has been central to public life – in areas such as biodiversity loss, GM crops, climate change, pollution and resource depletion – a central issue has been the place of science in that deliberation. Thus, for example, many of the formal experiments in new deliberative institutions such as citizens’ juries and citizens’ panels have been applied in areas of public policy that involve scientific expertise that is the subject of internal and external controversy. The problem of a decline in public trust in scientific expertise therefore forms the starting point of many practical applications of deliberative institutions, particularly those applied to responding to environmental risks.<sup>74</sup> However, this is precisely the area in which the Habermasian framework seems unable to provide a solution.

As we noted at the outset of this paper, the tension between science dependence and science scepticism has become a central problem in public life in general, and environmental politics in particular. Public decisions in the modern world rely on claims by experts - the grounds for which are opaque to direct inspection by the citizen and, indeed, by other scientists. Nor is this opacity eliminable. The capacity to make and evaluate particular claims in the special sciences relies on a background of training within particular scientific practices. It relies on particular competences and know-how not all of which is open to explicit articulation. In most matters, both citizen and scientist rely on the competences of others. Habermas’s assumption of equality of competence that is built into the model of communicative rationality fails to acknowledge the existence of

epistemic inequality, even in the ideal conditions of his non-coercive speech community. Hence Habermas's own position is unable to adequately address one of the central problems of science in modern democratic politics: the tension between science dependence and science scepticism.<sup>75</sup>

It is precisely here that the Neurathian tradition offers insights that absent in Frankfurt tradition of criticism of technocratic reason. A myth that has been bequeathed by Horkheimer's and Adorno's criticisms of the logical positivists is that it is necessarily committed to a technocratic politics:

'Positivist philosophy, which regards the tool "science" as the automatic champion of progress, is as fallacious as other glorifications of technology. Economic technocracy expects everything from the emancipation of the material means of production. Plato wanted to make philosophers the masters; the technocrats want to make engineers the board of directors of society. Positivism is philosophical technocracy.'<sup>76</sup>

This is a myth that is also sustained from a very different perspective by Hayek's criticisms of logical empiricism. Both have defined the subsequent reception of logical empiricism. As we showed at the end of section 3, it is false that the Vienna Circle and Neurath in particular were committed to a technocratic politics. His rejection of technocratic politics is founded on two sets of claims: the absence of a single unit of comparison that could be employed to arrive at a technically optimum outcome for many decisions; and epistemic claims about the limits of scientific expertise which show the technocratic ideal of the discovery of an optimal solution to social decisions to be untenable..<sup>77</sup>

Neurath's naturalistic critical reflection on the sciences is far more sensitive to the tensions between science dependence and science scepticism than the apparently more radical criticisms developed in the first generation Frankfurt School theorists and the account of colonisation in the second. The tension was articulated explicitly in some of Neurath's later works: 'Our life is connected more and more with experts, but on the other hand, we are less prepared to accept other people's judgements, when making decisions'.<sup>78</sup> While unlike Habermas, Neurath does not offer a detailed account of a deliberative theory of democracy, his account of democracy as 'the continual struggle between the expert... and the common man'<sup>79</sup> offers much that is absent from Habermas's theory.

The bifurcation of the two traditions of political ecology has a long history. The historical story told in this paper shows the roots of that bifurcation. Its purpose has not however been only historical. In revisiting the conversations of 1937 and their consequences, our aim has also been to show how a partial reconciliation is possible – and suggest what the virtues of such a reconciliation might be. Environmental politics and decision-making cannot avoid its science dependence. Understanding the environmental challenges we now face - the physical limits in the capacity of the environment for resource provision, waste assimilation, and climate regulation – is necessarily science-based. The radical criticisms of the sciences as forms of ideology that are committed to the domination of nature sit uneasily with their role in specifying these challenges. There are, however,

significant problems with the role that scientific expertise plays in democratic deliberation, and the conflict between epistemic inequality with democratic equality. But there is reason to believe that the two different traditions of opposition to technocratic politics can be brought together. The kind of naturalist scepticism found in the work of those in the left Vienna Circle speaks centrally to the deliberative environmental politics that has emerged from the Habermasian tradition of the Frankfurt school. Here, at least, there are grounds for reconciliation between the two traditions of political ecology.<sup>80</sup>

## Endnotes

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<sup>1</sup> For different perspectives on this tension see S. Yearley, *The Green Case*, London: Harper Collins, 1991, and J. O'Neill, *Ecology, Policy and Politics: Human Well-Being and the Natural World*, London: Routledge, 1993, chs.8-9.

<sup>2</sup> For further detail about the 1937 papers and their background, see J. O'Neill and T. Uebel, 'Horkheimer and Neurath: Restarting a Disrupted Debate', *The European Journal of Philosophy* 12 (2005), 75-105. Parts of this chapter draw on this paper.

<sup>3</sup> M. Horkheimer, 'Der neueste Angriff auf die Metaphysik', *Zeitschrift für Sozialforschung* (hereafter: *ZfS*) 6 (1937) 4-53, transl. 'The Latest Attack on Metaphysics' (hereafter: 'Latest Attack'), in Horkheimer, *Critical Theory. Selected Essays*, New York: Seabury Press, 1972 (hereafter: *MHCT*), 132-187.

<sup>4</sup> O. Neurath, 'Inventory of the Standard of Living' (hereafter: 'Inventory'), *ZfS* 6 (1937) 140-151, repr. in Neurath, *Economic Writings. Selections 1904-1945* (ed. by T. Uebel and R.S.Cohen), Dordrecht: Kluwer, 2004 (hereafter: *ONEW*), 513-526.

<sup>5</sup> See J. O'Neill, 'Socialist Calculation and Environmental Valuation: Money, Markets and Ecology', *Science and Society* 66 (2002) 137-151; J. O'Neill, 'Ecological Economics and the Politics of Knowledge: the Debate between Hayek and Neurath', *Cambridge Journal of Economics* 28 (2004) 431-447; J. O'Neill, 'Austrian Economics and the Limits of Markets' *Cambridge Journal of Economics* 36 (2012) 1073-1090; T. Uebel, 'Incommensurability, Ecology and Planning: Neurath in the Socialist Calculation Debate 1919-1928', *History of Political Economy* 37 (2005) 309-342; T. Uebel, 'Calculation in Kind and Marketless Socialism. On Otto Neurath's Utopian Economics', *European Journal for the History of Economic Thought* 15 (2008) 475-501.

<sup>6</sup> Horkheimer to Neurath, 24 November 1936, in M. Horkheimer, *Gesammelte Schriften, Band 15, Briefwechsel 1931-1936*, ed. by G. Schmid Noerr, Frankfurt a. M.: Suhrkamp, 1995 (hereafter: *MHGS* 15), 743. Translations from sources for which no translation is indicated in the bibliography are by the present authors.

<sup>7</sup> Horkheimer to Karl Wittvogel, 19 October 1936, in *MHGS* 15, 778-779. See also Horkheimer to Adorno, 22 October 1936, in *ibid.*, 688-689, which anticipates the essence of Horkheimer's later article, and Horkheimer to Henryk Grossman, 27 November 1936, in M. Horkheimer, *Gesammelte Schriften, Band 16, Briefwechsel 1937-1940*, ed. by G. Schmid Noerr, Frankfurt a. M.: Suhrkamp, 1995 (hereafter: *MHGS* 16), 750. Both are quoted in H.-J. Dahms, *Positivismusstreit. Die Auseinandersetzungen der Frankfurter Schule mit dem logischen Positivismus, dem amerikanischen Pragmatismus und dem*

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*kritischen Rationalismus*, Suhrkamp, Frankfurt a.M.: Suhrkamp, 1994, 85-86 which provided the first discussion of these interactions between the Frankfurt School and the Vienna Circle.

<sup>8</sup> Horkheimer to Adorno, 22 February 1937, in *MHGS* 16, 48.

<sup>9</sup> Neurath to Horkheimer, 10 June 1937, quoted in Dahms, *op. cit.*, 147-148.

<sup>10</sup> Neurath to Horkheimer to, 21 June 1937, in *MHGS* 16, 178

<sup>11</sup> Horkheimer to Neurath, 29 December 1937, in *MHGS* 16, 344, 348; cf. 30 January 1938, *ibid.*, 37.

<sup>12</sup> See sect. 4 below.

<sup>13</sup> Neurath, 'Inventory', *op. cit.*, 146/520.

<sup>14</sup> *Ibid.*, 143/516.

<sup>15</sup> *Ibid.*, 149/524.

<sup>16</sup> See L. v. Mises, 'Die Wirtschaftsrechnung im sozialistischen Gemeinwesen', *Archiv für Sozialwissenschaft* 47 (1920), trans. 'Economic Calculation in the Socialist Commonwealth' in F.A. Hayek (ed.), *Collectivist Economic Planning*, London: Routledge and Sons, 1935, 89-130; L. v. Mises, *Die Gemeinwirtschaft*. Jena; Fischer, 1922, trans. of 2nd ed. 1932 *Socialism*, London: Cape, 1951 (hereafter: *Socialism*); M. Weber, *Wirtschaft und Gesellschaft. Grundriss der verstehenden Soziologie*, Tübingen: Mohr (Siebeck), 1921, 4th rev. ed. 1956, trans. *Economy and Society. An Outline of Interpretive Sociology*, Berkeley: University of California Press, 1978, ch.2, sections 12-14.

<sup>17</sup> Neurath, *Wesen und Weg der Sozialisierung*, Munich: Callwey, 1919, trans. 'Character and Course of Socialisation' in Neurath 1973, *Empiricism and Sociology* (ed. by M. Neurath and R.S. Cohen), Dordrecht: Reidel, 1973 (hereafter: *ONES*), 135-150, at 145.

<sup>18</sup> *Ibid.*, 146.

<sup>19</sup> Weber's position was more careful than that of Mises. Weber distinguishes formally rational economic action concerned with the degree to which quantitative calculation is possible and substantively rational economic action which is concerned with how far economic provision is in accordance with some ultimate values. Weber argues that formally rational economic action is not possible in an economy in kind, but allows for a departure between formally rational economic action and substantively rational economic action. Mises makes no such distinction.

<sup>20</sup> Mises, *Socialism, op. cit.*, 99.

<sup>21</sup> Neurath, *Wirtschaftsplan und Naturalrechnung*, Berlin: Laub, 1925, trans. 'Economic Plan and Calculation in Kind' in *ONEW*, 405-465, at 430.

<sup>22</sup> Neurath, *Lebensgestaltung und Klassenkampf*, Berlin: Laub, excerpts trans. 'Personal Life and Class Struggle', in *ONES*, 249-298, at, 263.

<sup>23</sup> Neurath, 'Die Verirrten des Cartesius und das Auxiliarmotiv', *Jahrbuch der philosophischen Gesellschaft an der Universität Wien 1913*, 45-59, trans. 'The Lost Wanderers of Descartes and the Auxiliary Motive' in Neurath, *Philosophical Papers* (ed. by R.S. Cohen and M. Neurath). Dordrecht: Reidel, 1983 (hereafter: *ONPP*), 1-12, at 8.

<sup>24</sup> See also Neurath, *Was bedeutet rationale Wirtschaftsbetrachtung?*, Vienna: Gerold, 1935 transl. "What is meant by Rational Economic Theory?" in B. McGuinness (ed.), *Unified Science*, Dordrecht: Kluwer, 1987, 67-109. For discussions of this aspect of the socialist calculation debate see J. O'Neill, 'Who Won the Socialist Calculation Debate?'

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*History of Political Thought* 27 (1996) 431-442; J. O'Neill, *The Market. Ethics, Knowledge, Politics*, London: Routledge, 1998.

<sup>25</sup> This is not to say that Neurath himself was always a particularly ecologically minded thinker in particular in the way the terms are currently understood. For example, he wrote sympathetically about monoculture in agriculture; see Neurath, 'Das gegenwärtige Wachstum der Produktionskapazität der Welt', in M.L. Fledderus (ed). *World Social Economic Planning. The Necessity for Planned Adjustment of Productive Capacity and Standards of Living*. 105–141. trans. 'The Current Growth in Global Productive Capacity' in *ONEW*, 475-504, at 489.

<sup>26</sup> K. W. Kapp, *Planwirtschaft und Aussenhandel*, Geneva: Georg & Cie., 1936.

<sup>27</sup> K. W. Kapp, 'Review: *Einführung in die Theorie der Zentralverwaltungswirtschaft* by K. Paul Hensel', *American Economic Review* 45 (1955) 682-685, at 682.

<sup>28</sup> K. W. Kapp, *Environmental Policies and Development Planning in Contemporary China and Other Essays* Paris: Mouton, 1974, at 38.

<sup>29</sup> See J. Martinez-Alier, *Ecological Economics*, Oxford:Blackwell, 1987, 2nd ed. 1990.

<sup>30</sup> See Martinez-Alier, *op. cit.*

<sup>31</sup> See F.A. Hayek, 'The Counter-Revolution in Science', *Economica* 8 (1941), repr. in Hayek, *The Counter-Revolution of Science. Studies in the Abuse of Reason*, New York: Free Press, 1952 (hereafter: *FHCR*), 183-356, and "Scientism and the Study of Society" *Economica* 9-11 (1942-1944), repr. in *FHCR*, 17-182.

<sup>32</sup> Hayek, *FHCR*, 170.

<sup>33</sup> *Ibid.*

<sup>34</sup> *Ibid.*, 173.

<sup>35</sup> *Ibid.*, 162.

<sup>36</sup> See Hayek, "Economics and Knowledge", *Economica* 4 (1937) 33-54, repr. in Hayek, *Individualism and Economic Order*, Chicago: University of Chicago Press, 1948 (hereafter: *FHIEO*), 33-56; *FHCR*, 176-177; 'The Use of Knowledge in Society', *American Economic Review* 35 (1945), repr. *FHIEO*, 77-91.

<sup>37</sup> See Neurath, 'Physicalism, Planning and the Social Sciences: Bricks Prepared for a Discussion w/Hayek', 26 July 1945, and Neurath-Hayek correspondence, both in *Otto Neurath Nachlass, Wiener Kreis Archiv, Noord-Hollands Archiv, Haarlem, The Netherlands* [hereafter *ONN*].

<sup>38</sup> Neurath to Hayek, 11 January 1945, in *ONN*.

<sup>39</sup> Neurath, 1916. 'On the Classification of Systems of Hypotheses'. In Cohen and Neurath 1983

<sup>40</sup> 'You see Logical Empiricism ... is essentially 'pluralist' whereas Karl Popper is essentially 'absolutist' – remember he think that there is one world picture "the best" etc.. He thinks we can isolate instances of a negative character and destroy a hypothesis definitively by that etc.... I am wondering how you the fighter for freedom and toleration feel yourself in full agreement with scholars who are absolutists and not in full agreement with scholars, who like me, destroy the totalitarian outlook with the roots.' (Neurath to Hayek, 26 July 1945, *ONN*) Compare Neurath, 'Pseudorationalismus der Falsifikation', *Erkenntnis* 5 (1935) 353-365, trans. 'Pseudorationalism of Falsification' in *ONPP*, 121-131.

<sup>41</sup> Neurath, "After Six Years." *Synthese* 5 (1946) 77-82, repr. *ONEW*, 549-555, at 552.

<sup>42</sup> Neurath, *ONEW*, 420.

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<sup>43</sup> Neurath, 'Inventory', *op. cit.*, 149/524.

<sup>44</sup> Neurath, 'International Planning for Freedom', *The New Commonwealth Quarterly* April 1942, 281-292, July 1942, 23-28, repr. in ONES, 422-440, at 425.

<sup>45</sup> *Ibid.*, 427.

<sup>46</sup> For a more detailed discussion of these debates between Neurath and Hayek see J. O'Neill, 'Ecological Economics and the Politics of Knowledge', *op. cit.*. The arguments in this section draw on this discussion. See also: J. O'Neill, 'Knowledge, Planning and Markets: A Missing Chapter in the Socialist Calculation Debates' *Economics and Philosophy* 22 (2006) 1-24; J. O'Neill, *Markets, Deliberation and Environment*, London: Routledge, 2007; J. O'Neill, 'Pluralism and Economic Institutions', in E. Nemeth, S. Schmitz and T. Uebel (eds.), *Neurath's Economics In Context*, Dordrecht: Kluwer, 2007, 77-100; J. O'Neill, 'Austrian Economics and the Limits of Markets', *op. cit.*

<sup>47</sup> See, e.g., A. Biro (ed.), *Critical Ecologies: The Frankfurt School and Contemporary Environmental Crises* Toronto: University of Toronto Press, 2011; R. Eckersley, *Environmentalism and Political Theory: Towards an Ecocentric Approach* Albany: SUNY Press, 1992, ch.5; T. Hayward, *Ecological Thought* Cambridge, Polity Press, 1994, ch. 1; S. Vogel, *Against Nature: The Concept of Nature in Critical Theory* Albany: SUNY Press, 1996.

<sup>48</sup> T. Adorno and M. Horkheimer, *Dialektik der Aufklärung*, Querido, Amsterdam, 2nd ed. Fischer, Frankfurt a.M., 1972, trans. *Dialectic of Enlightenment*, Seabury Press, New York, 1972, at 4.

<sup>49</sup> Horkheimer, 'Materialismus und Metaphysik', *ZfS* 2 (1933) 1-33, trans. 'Materialism and Metaphysics' in *MHCT*, 10-46, at 36.

<sup>50</sup> Horkheimer, 'Latest Attack', *op. cit.*, 159.

<sup>51</sup> *Ibid.*, 145.

<sup>52</sup> *Ibid.*, 179.

<sup>53</sup> Neurath, 'Einheitswissenschaft und logischer Empirismus. Eine Erwiderung' (hereafter: 'Erwiderung'), *ONN*, at 10

<sup>54</sup> *Ibid.*, 2.

<sup>55</sup> *Ibid.*, 4.

<sup>56</sup> *Ibid.*, 14.

<sup>57</sup> *Ibid.*, 12.

<sup>58</sup> Horkheimer, *MHCT*, 34.

<sup>59</sup> This is not to say that Neurath and Horkheimer shared the same view of the relationship between philosophy and the sciences. In Horkheimer's early writing and practice, the role of philosophy 'as a theoretical undertaking orientated to the general' ('Die gegenwärtige Lage der Sozialphilosophie und die Aufgaben eines Instituts für Sozialforschung', in *Frankfurter Universitätsreden* 27 (1931), trans. 'The Present Situation of Social Philosophy and the Tasks of the Institute of Social Research' in Horkheimer, *Between Philosophy and Social Science: Selected Early Writings*, Cambridge, Mass.: MIT Press, 1993, 1-14, at 9) was to provide a theoretical unification for the special sciences. Philosophy integrates the sciences by posing the questions to be addressed by empirical work and organising the material at a theoretical level, as in the interdisciplinary programme of the Institute from 1931 to 1937. It was comprised of 'investigations stimulated by contemporary philosophical problems in which

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philosophers, sociologists, economists, historians, and psychologists are brought together in permanent collaboration to undertake in common that which can be carried out individually in the laboratory in other fields' (ibid., 10). By contrast, philosophy had no such special place in Neurath's account. Indeed, it is not clear what space existed at all for philosophy in critical reflection on the sciences: 'Some people [...] still wish to separate the discussions of the conceptual foundations of the sciences from the body of scientific work and allow this to continue as "philosophising". Closer reflexions show that this is not feasible and that the definition of concepts is part and parcel of the work of unified science.' ('Physikalismus', *Scientia* 50 (1931) 297-303, trans. 'Physicalism' in *ONPP*, 52-57, at 52)

<sup>60</sup> Horkheimer, *MHCT*, 35.

<sup>61</sup> Horkheimer, 'Philosophie und Kritische Theorie', *ZfS* 6 (1937) 625-31, trans. 'Postscript', in *MHCT*, 244-252, at 245.

<sup>62</sup> Adorno and Horkheimer, *Dialectic of Enlightenment*, *op. cit.*, xi.

<sup>63</sup> *Ibid.*, xii.

<sup>64</sup> Horkheimer to Neurath, 29 December 1937, *MHGS* 15, 344-349

<sup>65</sup> Horkheimer, *Eclipse of Reason*, Oxford: Oxford University Press, 1947, repr. New York: Seabury Press, 1974, 119.

<sup>66</sup> *Ibid.*, 120.

<sup>67</sup> J. Habermas, 'Bemerkungen zur Entwicklungsgeschichte des Horkheimerschen Werkes', in A. Schmidt and N. Altwicker (eds.) *Max Horkheimer heute: Werk und Wirkung*, Frankfurt a.M.: Fischer, 1986, 163-179, transl. 'Remarks on the Development of Horkheimer's Work' in S. Benhabib, W. Bonss and J. McCole (eds.), *On Max Horkheimer*, Cambridge, Mass.: MIT Press, 1993, 49-66, at 57.

<sup>68</sup> H. Marcuse, *One-Dimensional Man*, New York: Abacus, 1968, 135.

<sup>69</sup> *Ibid.*, 126.

<sup>70</sup> *Ibid.*, 136.

<sup>71</sup> Habermas, 'Technik und Wissenschaft als Ideologie', in Habermas, *Technik und Wissenschaft als 'Ideologie'*, Suhrkamp, Frankfurt a.M., 1968, 48-103, trans. 'Technology and Science as Ideology', in Habermas, *Towards a Rational Society*, Beacon Press, Boston, 1970, 81-122, at 88.

<sup>72</sup> J. Dryzek, 'Ecology and Discursive Democracy: Beyond Liberal Capitalism and the Administrative State' *Capitalism, Nature and Socialism* 3 (1992) 18-42; J. Dryzek, *Deliberative Democracy and Beyond: Liberals, Critics, Contestations*, Oxford: Oxford University Press, 2000 ch.6; R. Eckersley, *Environmentalism and Political Theory: Towards an Ecocentric Approach* Albany: SUNY Press, 1992; R. Eckersley, 'The Discourse Ethic and the Problem of Representing Nature', *Environmental Politics* 8 (1999) 24-49 (1999)

<sup>73</sup> This is a constant in Habermas' work ever since his *Theorie und Praxis*, Frankfurt a.M.: Suhrkamp, 1963, 2nd ed. 1971, trans. *Theory and Practice*, Heineman, London, 1974; see also his 'Verwissenschaftlichte Politik und öffentliche Meinung', in R. Reich (ed.), *Humanität und politische Verantwortung*, Zürich, 1964, 54-73, trans. 'The Scientization of Politics and Public Opinion' in Habermas 1970, 62-80.

<sup>74</sup> See, for example, O. Renn, T. Webler, P. Wiedemann (eds.), *Fairness and Competence in Citizen Participation. Evaluating New Models for Environmental*

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*Discourse*, Dordrecht: Kluwer, 1995, and Boston Renn *et al* (1995) and O. Renn, 'The Challenge of Integrating Deliberation and Expertise: Participation and Discourse in Risk Management', in T. L. MacDaniels and M.J. Small (eds.) *Risk Analysis and Society: An Interdisciplinary Characterization of the Field*, Cambridge: Cambridge University Press, 2002.

<sup>75</sup> For an extensive discussion of this claim see J. O'Neill, 'The Rhetoric of Deliberation: Some Problems in Kantian theories of Deliberative Democracy', *Res Publica* 8 (2002) 249-268.

<sup>76</sup> Horkheimer, *Eclipse of Reason*, *op. cit.*, 41.

<sup>77</sup> See the quotation from Neurath, 'After Six Years', *op. cit.*, in §4 above.

<sup>78</sup> Neurath, 'Visual Education: Humanisation vs. Popularisation', unfinished ms., repr. in E. Nemeth, F. Stadler (eds.), *Encyclopedia and Utopia. The Work of Otto Neurath*, Dordrecht: Kluwer, 1996, 245-335, at 251.

<sup>79</sup> *Ibid.*

<sup>80</sup> Earlier versions of this paper were read at *Political Thought and the Environment* Cambridge University, May 25-26, 2012 and the University of Helsinki, May 7, 2012. Our thanks for the many helpful comments made on those occasions.