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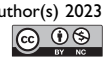

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Tempering the not-yet: Towards a social theory for the Anthropocene

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Abstract
The social sciences have established a plethora of ways to approach the future. Sidestepping any direct engagement with the not-yet has emerged as the dominant way to deal with its assumed non-factual nature. Social theory has laid the foundations for this bracketing with the three overarching key foci on function, meaning and structure. This article considers some of the consequences of treating the not-yet as immaterial for knowledge practices and shows the tradition to be no longer appropriate for the contemporary world. It frames arising issues through the significantly expanded perspective of the Anthropocene to revisit past approaches, explore contemporary challenges and trouble habits of mind in order to open up ways to take futurity and futuring seriously.

Keywords
Futuring and futurity, sociology of the future, the Anthropocene, time–space–matter, Weber

Social scientists tend to study the contemporary social world of which they are an integral part. Conventionally, this social world was conceived within cultural or national boundaries. In modern world, those boundaries are breached, as more and more social processes span the globe and extend into open futures. This opening out has deep structural consequences for knowledge practices and requires reassessment and revision. For many decades, efforts to encompass worldwide socio-environmental processes have been emerging that stretched conceptual and methodological traditions but were still manageable within the conventional theoretical traditions, as long as they primarily

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covered the spatial expansion. Under the terms of globalisation, cosmopolitanisation, global governance structures, the network society or the world of migratory movements, these efforts could be encompassed within the classical canon and its conventional tools of investigation and analysis. Notably, however, the *temporal equivalent* of this spatio-material expansion is yet to be integrated into the mainstream of investigations. This applies not only to an unimaginably vast past but, even more acutely, to an equivalent expansion into open futures. To focus discussion on the latter, I will make use of the expanded frame of the Anthropocene, as this allows me to gather up a wider range of insights under one umbrella that will allow me to both widen and more sharply focus on the discussion.

The Anthropocene signifies an era where human activity has become a key driving force that is altering the earth's history. It was proposed in 2000 by the Nobel Prize-winning scientist Paul Crutzen to express a great acceleration of human-caused change that is leaving geological records (Crutzen & Stoermer, 2000). The term encompasses forever pollutants that penetrate not just the most remote regions of our planet but are also found in water, soil and even the earth's atmosphere. It alludes to the human capacity to create life and alter its evolution. It further denotes a world of mass extinctions and loss of biodiversity, coupled with irreversible climate change that threatens to make the earth uninhabitable for humans, many fellow creatures and possibly most life on earth. While the Anthropocene has not yet been officially adopted as a new geological epoch, it has become a powerful socio-environmental signifier of human developments marked by impacts that exceed the collective capacity of vision and moral grounding, thus make it difficult to take responsibility for the resulting dispersed effects. Importantly for the purpose of this article, the complexity and systemic nature of significant changes encompassed within this term, together with the vastness of its temporal scope, challenge existing social theories.[1] Given their bounded reach in time, space and matter, traditional theories struggle to encompass these changes in terms not only of their complexity and interdependence but also in human reach to the depth of matter, across all of space and, crucially, over open times past and future.

In its futurity, much of this world is not material in the conventional sense but marked by latency and immanence. It is a world of deeds that may have only partially materialised, while much of it has not yet congealed into matter. It is a future of processes, whether these be chemical, biological, genetic, fiscal, political or cultural, to name just a few. These ongoing, future-oriented processes are set in motion by sociopolitical, legal, scientific, economic, institutional and everyday performative, enacting practices, rooted in the full range of institutional and disciplinary actions. While processes and actions associated with this future-in-the-making are producing complex multiple layers of past and present futures as well as future presents and pasts, social analysts and theorists charged to explain this socio-environmental world in-the-making predominantly tend to continue to engage primarily with society's spatial extension in conjunction with a historical past-based understanding.

The future, it seems, is primarily embraced to the extent that it can be utilised for use in the present through forecasts, predictions and probability calculations, all rooted in past- and present-based conventional factual knowledge, which neatly sidesteps the deeper problems and sticking points associated with the not-yet. This particular way

to approach the future has created a disjuncture between the seemingly unbounded capacity to produce open impacts that can extend from nanoseconds to thousands of years hence and past-based, bounded strategies. With a few notable exceptions, futures-in-the-making with their attendant potential impacts have thus far tended to escape critical social theory attention. Given that 'futures' have not yet emerged as (present) phenomena and symptoms, thus lack tangibility and (conventional) reality status, engagement with socio-environmental creations of open futures is not an easy task. Through the expanded perspective of the Anthropocene, it becomes apparent that futurity's 'non-materiality' is already lived through the consequences of previous futures-in-the-making, such as a dramatically changing climate and associated disasters, the unprecedented decline of species diversity, irreversible resource depletion and forever pollution. These key features of the Anthropocene require responses that are adequate to those processes, involving conceptual engagement with the nature of futurity that straddles social theory, ontology and methodology. In this article, I can offer no more than a few tentative suggestions and outline for some of the conceptual changes that might be necessary to begin this process of deep structural transformation in implicit assumptions, theory and conceptual tools for praxis.

Before I begin my exploration of required changes to the modes of seeing and acting, I would like to offer a brief note on the concept of tempering. Despite being primarily used in material sciences, tempering struck me as an intriguingly pertinent concept for a social theory engagement with the future. In the material sciences, it is used to express the power of uniting opposite and/or opposing processes, which produce materials that turn out to become both stronger and more resilient because of their bonding. In working with metals, for example, tempering means heating to soften in conjunction with cooling to harden as a means to increase the strength and toughness of metals. Two etymological roots are of interest here are as follows: the Latin *temperare*: to mingle, to constrain and to moderate; and the Old English *temprian:* to moderate, to bring to a proper or suitable state, to modify some excessive quality and also to restrain within due limits. Tempering demonstrates the power of joining disparate forces and of embracing the incompatible rather than replacing one substance or process with another. It celebrates the potential that arises with and from the fusions. Tempering, it therefore seems to me, is a rather apposite concept for critical theoretical engagements with complex, multiplex, unpredictable and highly volatile futures-in-the making that demand bringing together processes and ideas, which previously had been treated as separate. As Clark and Szerszynski (2021b, p. 75) note for another skills-based practice, they facilitate 'learning how to live in the midst of planetary volatility'.

Attention to crises can offer additional access points to the temporal complexity of futurity and futuring at the level of both substance and conceptualisation.[2] During periods of crises, old ways of doing things become ineffective and begin to get unsettled. As thought traditions lose their relevance for challenges that arise with emerging contexts, customary modes of existence require re-invention. Associated periods of anxiety, worry and desperation simultaneously carry within them the potential for opening paths to alternatives that previously were not up for discussion, often not even considered as possible options.

In times of crises . . .

In times of crises, the taken-for-granted becomes questioned. While established social structures and institutional patterns allow for daily routines and the formation of habits, major turmoil and social upheaval disturb traditions and customary ways of doing things; the future becomes uncertain. Habitual actions require little attention on the future, as they tend to be rooted in know-*how* and knowing how to go on. They enable and support the smooth accomplishment of daily life with its assuring focus on the present coupled with roughly predictable future patterns, rooted in knowledge and experience of the past. Any crises, in the form of ruptures to routines or major disturbances to the habitual rounds of daily existence, in contrast, tend to trouble the taken for granted and require expectations to be adapted. This, in turn, enforces shifts in temporal outlook. Examples of crises that provoked such concern with the social future range from personal illness to economic collapse, revolutions and wars affecting entire societies as well as environmental changes that have planetary impacts into open futures. During such periods, the previously assumed and expected become issues of concern, accompanied by a rise in unease with what is to (be)come, at both the personal and societal levels.[3]

Such shifts in perspective are clearly discernible in the history of social theory and praxis. In post-revolutionary France, for example, social thinkers from Turgot and Condorcet to Saint-Simon and Comte sought to ease the convulsive changes of their society into new desirable directions and smooth the paths to their emerging world.[4] Elsewhere in Europe, Marx and Engels created utopian visions for a world straining under accelerating changes wrought by new technologies and the downward spirals associated with capitalist economics that went hand-in-hand with the social changes that arose with the large-scale exploitation of fossil fuels. The upheaval of war too tended to be a catalyst for rethinking the social relationship to the future, World Wars 1 and 2 as well as the Vietnam War having been cases in point.

Responses to the political and economic revolutions of the eighteenth and nineteenth centuries were largely untroubled by the logic of science and its effects on social analysts' approaches to the future. This changed during the later nineteenth and early twentieth centuries. Both Emile Durkheim and Max Weber, for example, were acutely aware of the difficulties confronting any social study that sought to include features that could not be encompassed by the conventional understanding of sense data in general and incorporation of the not-yet in particular. This meant that engagement with the social future required attention. As a domain beyond the reach of the senses, it posed difficulty for empirical study. Every emerging social science perspective from functionalism and structuralism to action and interpretative theories or phenomenology had to find solutions to this difficulty. In each of these perspectives, proponents found unique ways to sidestep the futures problem, as indicated by the key terms marking their specific modes of knowledge practice. Focus on function allowed theorists to address social problem though asserted functions of parts for the whole that moved attention from instances of change to rates of change and from the futurity of individuals to engagements with results from actions of social aggregates. Interpretative approaches emphasised the role of meaning, which also was able to circumvent oriented change processes. Meaning allowed any temporal phenomena to be (re)settled in an atemporal present, surrounded

by a halo of meaning that required interpretation. In these cases, and later ones not mentioned here, the future with its inherent directional change processes affecting the present has been de-temporalised and brought back into the fold of past- and present-based analyses.

Over the last century, any naive approach to scientific study of the social future came to be questioned, and a number of implications flowed from this change in social theory and practice. Max Weber was the social theorist who delved most deeply into issues that arose from any study committed to the logic of science that involved sociocultural futurity. I will briefly visit some of Weber's responses in the next section of this article.[5] The wars in Europe during that period rekindled a social science engagement with the not-yet that precipitated explicit concern with better prediction and control. It spawned numerous futures institutes charged to devise better modes of foresight, horizon scanning and an array of methods to look into the future. Associated strategies to understand the future were rooted in a better understanding of the past and relied on statistical calculation to model anticipated changes, presented as probable futures. The results of these methods enhanced understanding not of process future in progress but of pasts masquerading as futures.

In the United States, the Vietnam War caused deep rifts in society and was accompanied by extensive self-doubt and questioning. During this period, a number of sociologists grappled extensively with the contradictions thrown up by a social scientific engagement with the not-yet (e.g. Bell 2003 [1997], Vols. 1 & 2; Bell & Mau, 1971). Gathered under the banner 'Sociology of the Future',[6] proponents provided approaches not only to analyse social reality but also to change it by identifying ways of directing social processes. In reaction to positivism, they focused on the study of possible futures which included values and responsibility and entailed an action-orientation that combined description, analysis, critique and a normative stance. They recognised the constitutive nature of knowledge and saw themselves as part of (rather than external to) the reality they studied. They focused not only on what *is* but also on what society *could* or *ought* to be. With that approach, proponents left behind much of conventional social scientific insistence on value neutrality and scientific detachment without, however, letting go of some of the principal assumptions that underpin scientific study. Ontologically, they agreed with George Herbert Mead (1980 [1932]) that only the present holds reality status, thereby relegating pasts and futures to the ideational sphere. Since they considered only the present to be real, the study of the not-yet involved investigation of images on the one hand and the production of predictions of the possible on the other. The latter entailed searching for real possibilities that were amenable to planning, projection and activation in the present. Values were central to this approach where social scientists thought of themselves as agents for change, engaged in future making and 'engineering' for the betterment of the human condition and considered themselves not as mere tools but as judges of ends to which their knowledge will be put. Despite the passionate attempts by sociologists of the future to encompass the not-yet within the sociological fold, their efforts foundered on the endeavour to square the logic-of-science circle and so did not survive the renewed groundswell of positivism. Emphasis on evidence-based science returned with emboldened vigour and remained largely intact

until the distributed crises of environmental issues and climate change enforced renewed engagement with the matter.

As environmental problems and human-caused climate change rose to increasing prominence, efforts to develop more sustainable modes of social existence become important and were accompanied by the need for theories to support those proposed, insights-based actions. Allied concerns focused attention on issues that were extended across time and space, often producing unpredictable, long-term outcomes. Some central concepts, such as risks, hazards, uncertainty, indeterminacy, reflexivity and unintended consequences indicated an engagement with the outer edges of the extended present, foregrounding unease with the social future. As such, they opened for investigation the difficult subject of ignorance and non-knowledge as products of scientific, political and economic rationality, calculation and control (Adam 1998, 2004; Beck & May, 2001; Böschen & Wehling, 2004; Ravetz 1987; Renn 2008; Wehling 2001; Wynne 2005). Towards the end of the twentieth century, therefore, the future emerged once more as a pertinent subject for social theory and sociological inquiry.

This more recent period of unease about the future was marked also by significant technological changes and electronic developments. In this context, science and technology studies recognised that expectations of outcomes played an important role in the reception, uptake and legitimation of scientific and technological innovations. Arising from insights of this field of sociological investigation, a network of researchers was formed under the banner of 'Sociology of Expectation'. They identified both a performative element of expectation and an inseparable tie between expectations, anticipatory action and agency (Borup et al., 2006; Brown 2003; Brown & Michael, 2003; Brown et al., 2000). Unlike earlier theoretical approaches to the future, which had primarily emphasised its mind-based nature, sociologists of expectation presented an approach more prominently grounded in materiality. Through efforts to track the dynamics of expectation, these scholars recognised that intense expectation mobilises resources, produces incentives, creates chains of obligations, silences (or at least side-lines) dissenting voices, justifies certain actions in preference of others and produces new networks. The resulting work stressed materiality, performativity, layeredness, rhythmicity and interpenetration of past, present and future in expectation. Attention to its largely implicit approach to the future brings to the fore some pertinent methodological tensions.

Anchored in the empirical tradition of science and technology studies, the 'Sociology of Expectation' has inevitable problems with the future as the empirically inaccessible realm of the not-yet. It must investigate the future from the position of the present with all the disadvantages and dilemmas that arise with inferred or reported 'unobservable' futurity. Moreover, it leaves unresolved some pertinent methodological questions about the study of futurity, that is, the future as process-in-progress. While stressing 'layeredness', its proponents failed to address the question of how this recognition translates into empirical investigations of the interpenetration and distinctiveness of present futures, future presents, past futures and future pasts. Furthermore, while acknowledging materiality, they sidestepped the issue whether or not futurity and the not-yet can be studied in any form other than an ideational sphere, that is, as memories of past expectations on the one hand, and historical accounts of change in public organisational and private expectations of innovative technologies on the other. Does this mean the future needs

to become present or past before it can be studied? That is to say, is the look at the future in fact a look at the *present* and the *past* in the form of present futures and past futures? The approach seems to leave untouched the question how the contradiction is reconciled between 'the future as a temporal abstraction that is constructed and managed' in the present (Brown et al., 2000, p. 4) and an insistence on the interplay of practice, materiality and embodiment, which is by definition temporally extended and layered into the realm of the not-yet, as the future 'under way', 'in progress' and 'in the making'. Finally, it seems to avoid confrontation with questions about the role of the investigator, that is, (a) how investigators committed to a constructivist and critical position on science and technology can avoid a normative stance and (b) how investigators can disentangle themselves from their own professional expectations, which influence why they do, what they do and how they go about doing it. Methodological problems arise when the recognition that investigators cannot put themselves outside the world of expectations is placed alongside explicit efforts to avoid a normative stance (Borup et al., 2006; Brown 2003, p. 18). Furthermore, numerous allied engagements with the future and futurity share many of the tension described above, to which I shall return later. To grasp the complexity of issues involved, I would like to briefly take the reader back to the beginning of the twentieth century when Max Weber addressed some of these and allied questions for the social sciences in his methodological writings (Weber, 1969 [1904–5], 1969 [1917]). Because this work has lost none of its pertinence since social scientists first brought to the surface their struggle to contain human futurity within their disciplinary endeavours, it is ideally placed to identify openings for change.

Through a futures lens: Max Weber's methodological writings

Weber considered futurity from three different angles of social analysis: the subject matter, the social investigator and the method of inquiry.[7] Since humans cannot escape their futurity, his writings suggest, futurity is de facto the proper subject matter of the social sciences. Equally, since social scientists as humans cannot escape their own futurity, this futurity too needs their attention. Regarding the method of enquiry, Weber showed that the logic of science makes the study of human futurity a hazardous and most difficult endeavour. With respect to the futurity of the subject matter of the social sciences, he pointed out that action is inescapably future oriented. At the micro level, the future is in play, for example, when choosing between options, allowing values and beliefs to guide action, deciding on the most appropriate means to ends, behaving rationally and acting with commitment. At the macro level, he saw modernity marked by a belief in progress and the pursuit of innovation, which in turn creates not just instability and fluidity but also incessant obsolescence. Furthermore, he considered modernity to be characterised by rationality, which renders, in principle (if not in practice), everything calculable and knowable by experts who inhabit niches of specialist knowledge. By implication, therefore, Weber acknowledged a dual orientation to the future: being *oriented towards* the future and *guided by* it for action in the present. The two ways entail different time orientations and subject positions with respect to the present and future. The former's vantage point is the present extending towards the

future, while the latter's direction works from the future to the present. This dual futurity, Weber suggested, permeates all levels of social existence.

While futurity constitutes an inescapable aspect of the subject matter of the social sciences, Weber saw it posing problems when scientific methods are applied to the study of that subject matter. That is to say, as a *science*, the social sciences are bound to the logic of science: to empirical investigation of the present, non-evaluative knowledge and projections based on past experience. As a *cultural* enterprise, investigations have to square the circle of studying the (future-based and future-creating) realm of ideas, values, goals, purposes and actions (key drivers of future making), with tools designed for the study of objects in motion where the future is irrelevant. To Weber it is therefore important to understand fully the kind of futurity that is accessible to the scientific mode of inquiry. For research conducted within the sphere of scientific logic, a number of important aspects of futurity are amenable to investigation: it is possible to establish means to existing ends, show the advantage of some means over others, calculate the various costs involved, assess the internal consistency between ends and calculate probable outcomes of present actions. This method, therefore, not only aids social control but also helps to clarify methods of thinking and identify the nature of ideas and assumptions (Weber 1969 [1904], p. 53).

The logic of science does not, however, permit scientists to comment on these ideas being right or wrong, good or bad. As Weber insisted, answers to questions about how the world *ought* to be are not in the gift of an empirical science. The logic excludes from its methods of investigation any evaluations, beliefs and ideals. This point resonates only too well with contemporary efforts to be mindful of the boundaries between objective and normative approaches to the study of the social. However, Weber was also at pains to point out that, in contrast to the physical sciences, cultural inquiries need to take account of individually pursued purposes, ideals, expectations and beliefs as well as socially constituted values, rules and moral codes. Weber therefore concluded that *sociocultural investigation requires a subject-specific mode of enquiry that is fundamentally different from the study of (physical) objects in motion*. For the sociocultural world beyond empirically accessible sense data, Weber 1969 [1904], pp. 89–107; 1917 [1904], pp. 41–46) proposed the construction of 'ideal types' (stereotypes) against which actual events and purposive, prospective activities could be plotted and compared. The construction of ideal types allowed him to conceive of future presents, and it admitted teleological explanation for the social sciences. Whether or not the 'ideal type' is the most appropriate tool for studying contemporary futurity is an open question that cannot be discussed here. I am convinced, however, that the contemporary socially constituted future needs subject-specific tools of investigation.

Weber's thoughts on the study of futurity did not end with his discussions on the subject matter and methods of the social sciences. Rather, he argued, in addition, that investigators' futurity too needed to become part of the methodological innovation. As *scientists*, Weber insisted, social investigators are bound to the logic of science. As *cultural* beings, they are future-creating and future guided in their actions. They make judgements about right or wrong, good or evil and analyse social phenomena in terms of their 'cultural significance', which in turn presupposes a value orientation. As *scientists*, they are captives of the pursuit of innovation and progress. As *cultural* beings, they are

guided by value relevance, moral concerns and questions about how we should live and what innovations are intended for. While the logic of science prevents social investigators to address such questions, it does empower them to acknowledge that their object of study is defined and circumscribed by their questions and methods and requires that they make clear where science ends and their indispensable politics begin. Thus, Weber explicitly acknowledged the methodological dilemmas that arise with investigations of a domain where both subject matter and investigators are future-oriented and future-bound, while the logic of the method is firmly past- and present-based.

Where then does this leave social theorists working at the early part of the twenty-first century? Looking back over approaches for the last century, as briefly outlined above, there is a discernible red thread weaving its way through the conceptual struggles. The coherence of this struggle relates to the presumed logic of science, which is taken as given, and variously attempted to be conquered with conceptual tools that are inappropriate to the task. In 'Objectivity of Social Science', Weber (1969 [1904], p. 68) suggested that 'A new "science" emerges where new problems are pursued by new methods and truths are thereby discovered which open up significant new points of view'. While this observation feels so apposite, it is yet to be implemented. For the rest of this article, I want to consider why this might be the case, explore some of the challenges confronting social theorists of the future and consider where appropriate openings for necessary changes might be found.

Challenges for a contemporary social theory of the future

When social theorists conceive of their contemporary subject matter as not just spatially but also temporally extended and unbounded, they are confronted with the need to develop new subject-specific tools for understanding. But here may lie a first problem: what exactly is the nature of the subject? What is the object of understanding the question? Before searching for new tools, there is a need to create some clarity about the subject matter and its reality status. A second question relates to the nature of science whose supposed logic imposes such crippling restraints for social theory and investigation – that is to say, which science is in question: the classical natural science of Newtonian physics, the science of the late nineteenth and early twentieth centuries that spawned such revolutionary conceptualisations in the natural sciences which have yet to penetrate to the core of social science understanding and conceptualisations, or the systematic investigation, which is encompassed in an older definition of 'science'? This question is not raised to propose a choice or to replace one inappropriate logic with a new and similarly inappropriate one but to create room for manoeuvre in a less tightly scripted and restricted conceptual realm. By pointing out some old and new ways of seeing and understanding the physical world, one can take heart that science as the activity of systematic study is not only allowed but required to be adequate to the object of its investigation.

The twentieth-century physics has turned upside down what was previously understood as reality and conceptualised as the relation between observer and observed. Its proponents established the centrality of both context and relations for the determination of facts and encompassed in their world not only non-local connections and

a-causal events but recognised, at the subatomic level, a dynamically patterned world of indivisible oneness that is resistant to abstraction and sequencing. Importantly, they demonstrated that any observation inescapably impacts, thus changes, the object of observation. Nature in this world appears as a complex, dynamic web of interdependent, mutually implicating relations (Bohm 1983). Instead of bits and objects in motion, this reality is characterised by energy patterns where matter can no longer be separated from its activity because it is inescapably temporal and demonstrates extension in times past and future.[8] As matter is experienced as both wave and particle, there is no longer a need to choose on an either–or basis. At the subatomic level, as Fritjof Capra (1983, p. 83) explains, 'the interrelations and interactions between the parts of the whole are more fundamental than the parts themselves. There is motion but there are, ultimately, no moving objects; there is activity, but there are no actors, there are no dancers, there is only the dance'. Furthermore, in the twentieth-century reality of thermodynamic physics, matter is transformed into unidirectional activity. The direction is given by the dissipation of energy and its transformation into a form that is no longer available for work (Prigogine & Stengers, 1984). To summarise, theoretical physicists working during the early part of the twentieth century encountered a world in which process, change and temporal futurity emerged as the central characteristics of reality, which therefore had to be theorised as such. If it was possible for theoretical physicists to so fundamentally reconceptualise their world in the face of findings that made no sense within the old framework of assumptions then, surely, the same kind of reformulation must be not just possible but encouraged for social and socio-environmental theorists whose reality can be no longer encompassed within their traditional terms of reference.

In a globalised world of unbounded networked processes and open futures-in-the-making, an appropriate reworking of our conceptual tools is a challenge for social theory of even greater magnitude than the earlier one addressed by Weber in his methodological writings, in which he sought to take account of futurity within an empirical mode of enquiry. To date, sensitivity to the socially constituted future has not yet brought forth a full integration of the lived and created future into social science investigation. In a way this is not surprising, given that the handicap imposed by the logic of traditional science tends to draw investigators into a range of conceptual and methodological dilemmas that reach deep into the disciplinary foundations. I would like to open up for debate some of these issues and suggest that this will involve addressing a number of underlying assumptions that hinder progress for a social theory that seeks to take seriously the futurity encompassed within the expanded framing of the Anthropocene.

To begin this process, I would like to suggest that many of the most intractable problems of contemporary existence are of the processual, futuring, time–space distantiated kind that fall outside the present-based domain of empirical science. The safe decommissioning of nuclear waste, the regulation of biotechnology and genetic modification of food, the creation of stem cell and nanotechnology products or the international efforts to deal with global warming, ozone depletion, hormone-disrupting chemicals and the cultural extinction of species are just some of the time–space distantiated process phenomena that are currently recognised as both potential and actual problems. Most of these belong to the human-caused changes encompassed in the Anthropocene. Going by the past records of the last century, there are likely to be many

more of these 'immaterial' futures in progress that have yet to materialise as symptoms, that is, as scientifically accessible products.[9] In all these examples, furthermore, the assumed scientific and technological controls tend to stand in an inverse relation to the created indeterminacies and uncertainties of outcomes as well as the loss of control over time–space distantiated impacts. Importantly, the crises have coalesced into compounds and thus have to be conceptualised in their complexity and mutual implication. It becomes a matter of urgency, therefore, to establish connections and relationships that, to date, have been largely sidestepped and bracketed.

Troubling habits of mind

The first cluster of conceptual habits to explore relates to the idea of 'the future', which suggests the existence of a single, simple truth called 'the future' that is separate from 'the present' and 'the past'. Yet, even the most cursory engagement with social theory approaches reveals that each social theory perspective deals with a different aspect of 'the future'. As I have indicated above, there are as many understandings as there are perspectives. This future may be considered real or ideal, planned, acted upon or in progress. It may be longed-for, revered or feared. Many consider it to be an empty domain to be filled with desires, choices and plans. As an empty not-yet it is considered 'out there' in a realm largely disconnected from the present and past while others insist that it is a crowded domain of past imaginations and activated designs already in the process of development, that is, futures-in-the-making to materialise sometime, somewhere. While all current not-yet futures are already encoded, if inaccessible in any one present, process futures-in-progress encompass an equally crowded past, whose traces still feature now and into open futures, irrespective of how far they reach (Adam & Groves, 2007; Whitehead 1969 [1929]). To look historically at social theory approaches to 'the future', it becomes apparent that there is no future in the singular.[10] There are only futures, and these are relative to implicit assumptions and perspective. Even as a mere figure of speech, therefore, 'the future' carries implicit assumptions that surreptitiously influence ways of seeing and acting. As such, it benefits from attention and foregrounding.

A further cluster of assumptions becomes apparent with even the briefest questioning of the idea that past, present and future are different domains, respectively, related to memory, perception and anticipation, with only the present afforded reality status while past and future are primarily associated with imagination. An early form of this understanding can be traced back to the fourth century AD and St Augustine's conversation with God when he addresses the enigma of time.[11] In contrast to later adaptations, St. Augustine concluded that time is an essential feature of the human spirit,[12] where it involves the interaction of memory, perception, anticipation and desire. St. Augustine's prolific writings featured in the centuries since in both philosophy and social theory. In the social sciences, both George Herbert Mead and Alfred Schutz, for example, have developed their respective social theory approaches to futurity from perceptions rooted in these early Christian thoughts. In *The Philosophy of the Present*, Mead (1980 [1932]) developed a corrective to the idea that past and future are separate domains of the mind by showing both of them to be tied to the principal of interaction, which he theorised as

processual sociality, constantly created and recreated in the light of emergence and new knowledge. From the standpoint of the emergent present, he suggested, the past is continuously recreated and reformulated into a different past as well as continuously reconstituted with reference to the future. While Mead's work went a long way to transcend old dualisms and the discontinuity of past, present and future, it did not yet offer a base from which to engage meaningfully with the reality status of the Anthropocene's futurity and the implication of its entire past. To embrace the Anthropocene as an enlarged frame for social theory demands not only a vast expansion of timescale that enables a vision of continuity to the beginning and end of time but also a rethinking of 'facts' in relation to process-futurity. Through the lens of geological eras, there emerges a world of clearly discernible continuity where cut-off points are mere conceptual stages in our planet's history of which individual lives are an integral part. Yes, there are lifespans of individual persons, animals or plants, but each is inseparable from the braided process of earthing. As such, this lens facilitates an understanding that sees things and beings in relation and in their mutually implicating interdependence.

A third cluster of conceptual habits requiring a shift in perspective emerges in relation to what is understood as 'a fact'. Conventionally, 'facts' are tied to specific ways of knowing, that is, to object thinking and an emphasis on the spatial and material. Object thinking brackets and thus conceals the temporal and invisible, the immaterial and unbounded in the subject matter. It negates becoming, creativity and ongoing transformation, despite this being key characteristics of life and social activity. Social facts can be facts only after they have been de-temporalised, that is, abstracted from the ongoing temporality of being-becoming and futuring, thus detached from their inherent processual and directional temporal extension. This means that object thinking affords 'observers' to see only time slices, facts as freeze-frames and moments frozen in time and space. Yet, social facts are not bounded in and of themselves: we make them so to render the temporality of social existence accessible and manageable, that is, to infuse the infinite, transient and contingent complexity of social life with clarity and simplicity. An atemporal stance on the temporally extended social, therefore, facilitates not only counting, measurement and classification but also the illusion of control on the one hand and 'objectivity' and 'ethical neutrality' on the other. As such, this way of understanding is deeply embedded in the principle of classification, where the world of ideas is separated from the sphere of facts, the realm of mind from that matter. 'Classing remains a static act', as Michel Serres (1982, p. 93) points out, 'it is the most effective obstruction against strong flux, to disperse it between baffles, to slow it down, to stop it, to freeze it'. This clarification is not intended as an argument against classification since it is essential for theory and analysis. Rather, it is to stress the importance of a keen awareness of the effects of classing, of the need to recognise both the imposition and its outcomes, as well as the effects of any conflation of the construction with any processes under consideration. From here it is but a small step to appreciate the effects of framing, classing and implicit assumptions on the creation of facts.

From a vastly expanded time frame, it is so much easier to acknowledge that enacted ideas have socio-physical (factual) consequences, with the proviso that some enacted ideas might take on material form quite quickly, while others, such as effects from low-level radiation or the use of fossil fuels, may not congeal into symptoms for an

extremely variable length of time. Equally, from this wider perspective, it becomes obvious that socio-environmental futures-in-the-making with time–space distantiated impacts need to retain their factual status (if in a different form to the one conventionally recognised as fact), thus need to be recognised as the bonding of material reality and the latent process-world: encoded, invisible and beyond the reach of our senses. This appreciation is crucial since, to date, the conventional factual demand for processual phenomena in progress has rendered these immaterial, with an implication that they are of no material consequences. Emphasis on the Anthropocene seems to overcome this problem by taking analyses out of their established framings and classifications and recognising cultural futures as created, together with their impacts in progress that are already under way: expected and unexpected, intended and unintended, material and immanent, latent and potential, unknown and unknowable.

Against the assertion of sociologists of the future that 'there are no future facts' (Bell & Mau, 1971, p. 9), the temporal widening of perspective better facilitates an understanding of a factual process-future-in-progress, that is, of an im/material future real. As such, it acknowledges the importance of an immanent process world of latency beyond empirical access that is nevertheless real in its processuality and consequences-in-the-making. This clearly involves a new sense of facticity, one that undermines conventional dualisms of facts and ideas, the world of things and products that are empirically accessible in the present and an ideational realm of values and purpose that elude such access due to their futurity. It is a sense that is rooted in temporalised complexity and an understanding of tempering that alludes to the power and increased resilience of melding what had been previously opposite and incompatible. It acknowledges the pertinence of a factuality rooted in the joining of facts *and* processes and, importantly, in the acceptance of facts *as* temporally extended processes together with the impact of their socio-environmental bracketing in theory and knowledge practice.

From an expanded perspective, this long-standing division between facts and processes could be seen as a battle between finite and eternal principles, between delimited entities and ongoing processes without boundaries, between conceptual constructions and sense-making on the one hand and the eternal braid of life's being-becoming and futuring on the other. To reconcile those worlds, it is not enough to join them with an 'and' or even a string of 'ands'. Rather, there is a need to understand the differences and grasp the constructed nature and limited view of the finite world in relation to its eternally braided, relational and processual latent other. When both are accorded value and given attention, then it behoves social theorists to engage in their mutual implications and understand the complex and often damaging effects of not only foregrounding one but rendering the other invisible.

A fourth consideration relates to the assumption that people can be divorced from their actions and resulting impacts that somehow ignorance and/or long periods of latency justify a break in accountability and obligation, thereby facilitating cultures of irresponsibility.[13] Today, however, the perspective of the Anthropocene directs attention to the inescapable human implication in planetary processes. It confronts human beings with their culpability and the disconcerting realisation that we cannot extricate our being, our work and our actions from their impacts somewhere, sometime. As Hannah Arendt noted in her seminal *The Human Condition* (1998 [1958], p. 190), 'the smallest act in the

most limited circumstances bears the seed of the same boundlessness, because one deed and sometimes one word, suffices to change every constellation'. This is the case because physical bases of existence, past, present and future are implicated in every social action, interaction and transaction. There cannot be any justification therefore for delimiting responsibility to actors' lifetimes or the level of certainty with respect to foreknowledge. However, to be faced with this uncomfortable realisation does not offer obvious or self-evident answers about how to respond to it. To embrace such implication involves acceptance of an inseparable past–present–future as well as time–space–matter interdependence that takes on board not only the complexity and uncertainty of process thinking but also an ethics that encompasses responsibility for outcomes that cannot be known with certainty and are likely to emerge as symptoms in some distant future. A social theory that fully embraces futurity thus needs to acknowledge that responsibility extends to the reach of social actions, which means it needs to be appropriate to the scale of influence and impacts. Such responsibility embraces not just spatial ecological footprints but also temporally extended timeprints (Adam & Groves, 2007). To seriously consider implication in social process-futures-in-progress therefore requires changes at the level of theory not just with reference to the subject matter and the role of theorists and social science practitioners but also the nature of the discipline and the habits of mind employed therein.

Reflections

Weber insisted that new problems require new methods of investigation and new knowledge practices that they do not need orthodoxy but new understandings, new conceptualisations, new theories and new methods. In the case of 'futures-in-the-making', it is clearly not sufficient to treat futurity and futuring as an aspect of mind only or to focus attention exclusively on past and present futures. Im/material real futures-in-the-making necessitate a fundamental overhaul at both the conceptual and methodological levels. If we allow ourselves to think the unthinkable, investigate the unknowable and rework conventional dualisms, we will have to do it with tools that are not currently found in our contemporary social theory tool kit. Moreover, if we not merely want to describe the world but critique and help to change it, there is a need to bring differences and interdependencies to the surface. When we start from a position that accepts that knowledge is constitutive, then we also have to recognise that we are implicated as creative participants in the world we seek to 'discover'. This means that we cannot plead detachment and have to let go of the illusion of non-involvement. As citizens and creators of knowledge, we are inevitably involved and cannot escape our status as future makers.

In this article, I have identified just some areas where the challenge of this insight and its implications had been left unfinished and others where it has not yet begun to be addressed. To press on with this work requires collective effort since all of us are implicated in the creation of socio-environmental-futures-in-progress. All of us are challenged to play our part in closing the gap between the relentless production of political, economic, scientific and technological futures, the (non)knowledge of their immanence and impacts and the responsibility for potential time–space distantiated

outcomes. As future makers, I want to propose social theorists are charged to render the invisible visible, make future presents tangible, give form to the latent not-yet and provide analyses that take futurity seriously as supreme realm of social practice and transaction. Engaging with such an opening out and widening of traditional perspectives entails recognition that *future presents* and futures-in-the-making are not only proving inaccessible to empirical study but are also posing a major challenge at the conceptual level. Some of our most basic assumptions and distinctions have proved to be deeply implicated in the difficulty of embracing this aspect of materiality.

In the age of Anthropocene, futures-in-the-making demand engagement with a not-yet that spans simultaneously nanoseconds and geological, even planetary periods of time. The traditional ways of choosing on an either-or basis no longer suffice when the complexities encountered involve multitudes of elemental layers that all mutually implicate each other: time, space and matter become indissoluble time–space–matter events that are difficult to encompass within traditional theories and methodologies. As Frederic Hanusch (2023, p. 10) suggests, 'How societies perceive their relationship to these large timeframes fundamentally changes worldviews'. For social theory engagement with futurity, therefore, the widened temporal frame of the Anthropocene and the fusion practice of tempering hold out the promise of being able to embrace 'the future' as process-fact. Instead of an empty future, tempering evokes an existing reality to be changed, revised and innovated. Instead of complete openness, it recognises the creation of something new on the foundations of already existing entities and processes. Instead of abstraction, it acknowledges insertion of the new into existing webs of interdependent processes. Instead of thinking in isolation, it works with the idea of moderation and enhancement through new processes and adjustments. And, finally, by evoking restraint of excesses, it acknowledges and appreciates what already exists, foregrounding the need for coexistence of the new with other processes already in progress. In conjunction with the expanded perspective afforded by a framing through the Anthropocene, therefore, tempering offers an opportunity to reunite knowledge, practice and ethics in contexts of compound crises and ruptured lives marked by intensified uncertainties and indeterminacies.

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Notes

1. See Clark and Szerszynski (2021a) and Hanusch (2023).
2. Futurity defines a future that encompasses its processuality; futuring denotes the creation of open futures.
3. As I show in previous work, social science concern with the future came to prominence in Europe at the periods of intense political turmoil between the middle of the eighteenth and nineteenth centuries, immediately after wars, with rising pollution and more recently with climate change, see Adam (2009b, 2011a, 2011b, 2022).
4. For an excellent treaty on this subject, see Manuel (1962).
5. For a full discussion of the temporal in Weber's Methodological Writings, see Adam (2009a).
6. For analyses of the United States' Sociology of the Future of the 1960s, see Bell and Mau (1971) also Moore (1966) and Toffler (1970).
7. In Adam (2009a), I have discussed in detail Max Weber's methodological writings with reference to cultural future matters.
8. For a more detailed argument with reference to social theory, see Adam (1990, chapter 2) and Adam (2004, chapter 3).
9. See Wynne (2005) who is arguing these points with reference of post-genomics knowledge.
10. For a pertinent example from the legal context, see Stokes and Pontin (2022).
11. Confessions, Book XI (354-430Ad) in Bourke (1983).
12. 'Spirit' is best thought of as a mind–consciousness–soul fusion.
13. For extended discussions on this subject, see Adam and Groves (2007), Adam (2022) Groves (2014) and Jonas (1984).

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