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Bounded action: Hannah Arendt on the history of science and the limits of freedom

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Abstract

The article asks why and how Hannah Arendt framed *The Human Condition* as a history of modern science. It answers that, in telling the history of instrumental rationality and the work of the experimental scientist, Arendt accomplished three main things. First, by identifying science as a form of 'work' she could demonstrate the significance of her threefold division of human activity into labour, work and action, highlighting the dangers of their indistinction. Second, Arendt used the form of organization typical of scientists – a professional community founded on standards of objectivity – to warn against the substitution of the appearance of publicity for true openness. Finally, she identified the transgression of the boundaries of action as the site where a political community might become visible to itself, taking the unsuccessful attempts of post-war 'public scientists' to reckon with their past as a cautionary tale. Her account of modern science thus allows her to define freedom through its dependence on human-made boundaries, politicizing the very act of history-writing.

Keywords

action, freedom, Hannah Arendt, history of science, the public sphere, work

> To live together in the world means essentially that a world of things is between those who have it in common, as a table is located between those who sit around it; the world, like every in-between, relates and separates men at the same time.[1]

What are the limits of human action and what does it mean to see action as inherently bounded? In what follows, I turn to Hannah Arendt's account of modern science as the

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medium through which she explores the problem of bounded action and its meaning for human freedom and the political community. As I will show, political action, the ultimate expression of freedom for Arendt, is constrained by its dependence on a world of things, on a unique form of objectivity and on the ability to distinguish between kinds of human activity. All three are linked through Arendt's focus on instrumental rationality of the kind epitomized in the work of modern scientists. The meaning of human boundaries and their transgression is revealed in the depth of world and earth alienation, a problem which frames *The Human Condition* not only as a history of science but more broadly as the history of the relationship between thinking and doing and between the limited public spaces of intellectual elites and a truly open, pluralist public realm.

As historians of science have recently suggested, a specific kind of mechanistic logic of 'things' forms a crucial piece in the story of the development of modern science. The final decades of the 19th century mark the heyday of an approach to science – from physics to economics – that organized knowledge by way of analogy from phenomena to small mechanical models.[2] Writing in the 1950s, Arendt's insistence that the 'thing character of the world' (HC, 93) opens a space for liberatory human action, echoes this story while problematizing it, and ultimately, politicizing it. From scientists' reliance on mechanical analogies, Arendt extrapolated an elementary form of human engagement with each other and with nature. From the crisis of 'things' and objectivity in science, she further drew a wider existential crisis of humankind. Finally, as a theorist of action and of narration as modes of self-actualization, she described a political sphere capable of telling the story of this crisis as a way to transcend it. All three moves relied on the underexplored link she drew between modern science and her category of 'work', the making of things through skill and design.

Arendt's history of modern science as a form of work is based on her unique division of all human activity into three categories: labour, work and action. This division, I propose, defines the very relationship between boundaries and freedom. 'Labour' includes those kinds of activity which attend to nature's processes of birth and decay, rendering human life indistinguishable from all other life. 'Action' describes the uniquely-human ability 'to take an initiative, to begin . . . to set something into motion' (HC, 177), the essence of Arendt's definition of freedom.[3] In between labour and action is the category of 'work': all activity related to the creation of things. The world of things, the source of all boundaries, makes room for action, over and above the life sustaining efforts of labour. In this way, Arendt's categories go beyond an exercise in classification, acting on each other in both constructive and destructive ways.

The project of thinking the boundaries of action is intertwined with Arendt's reflection on the meaning and significance of instrumentality in modernity. In that, her work resembles contemporaneous critiques of modern science and technology by Martin Heidegger and the Frankfurt School.[4] Nevertheless, it is a central contention of this article that Arendt is as much a *defender* of instrumentality as she is a critic. Instrumental rationality is crucial for setting up the infrastructure of the common world, for keeping boundaries and for creating a space for human relationships. Its crisis, and the threat to human action and freedom, stem from the inability in this way of thinking to account for the inevitable transgression of boundaries, and their consequent collapse.

Arendt's focus on the role of things in shaping the modern human condition further highlights the ongoing tension between doing and thinking, which permeates her entire project. *The Human Condition* famously sets off from the imperative, and increasing impossibility, to 'think what we are doing' (HC, 5). Contemplation, a form of thinking completely divorced from human activity, is the main culprit in what Arendt sees as the philosophical dismissal of human activity as valuable in its own right – a central motivation for her book. Other forms of thinking, however, carefully track Arendt's threefold division of human activity. In a striking passage, generally overlooked by readers, she paints a picture of the life of the mind, to name her important later work, almost perfectly analogous to the active life:

> Thought and cognition are not the same. Thought, the source of art works, is manifest without transformation or transfiguration in all great philosophy, whereas the chief manifestation of the cognitive processes, by which we acquire and store up knowledge, is the sciences . . . The activity of thinking is as relentless and repetitive as life itself . . . Cognition . . . like fabrication itself, [is] a process with a beginning and end, whose usefulness can be tested, and which, if it produces no results, has failed . . . The cognitive processes in the sciences are basically not different from the function of cognition in fabrication; scientific results produced through cognition are added to the human artifice like all other things.
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> Both thought and cognition, furthermore, must be distinguished from the power of logical reasoning which is manifest in such operations as deductions from axiomatic or self-evident statements . . . In these human faculties we are actually confronted with a sort of brain power which in more than one respect resembles nothing so much as the labor power the human animal develops in its metabolism with nature. The mental processes which feed on brain power we usually call intelligence . . . Obviously, this brain power and the compelling logical processes it generates are not capable of erecting a world, are as worldless as the compulsory processes of life, labor, and consumption.

There is, therefore, a type of thinking which most closely follows the principles of work: cognition, the language of modern science or instrumental rationality. This threefold division of thinking also encapsulates Arendt's story of the dangerous decline, first of 'thinking' and eventually of 'cognition' itself, with the rise to dominance of the process-like forms of calculating 'intelligence'.

Why did modern science assume this form of thinking and then abandon it? In what follows, I show how a certain type of scientific praxis, rooted in more concrete forms of fabrication, gave rise to a way of thinking that closely resembled it. Arendt's account of science, in other words, leads her from the fabricated objects, experimental systems and even facts of science, as well as scientists' forms of social organization, to a broader scientific world view. It was their collapse that made way for their opposite: thinking recast as a form of labour.

Despite a recent turn to 'work' as well as the problem of science and technology in Arendt's thought, the two are often studied separately,[5] obscuring the complexity of her position on instrumental rationality. In the first two parts of this article, I examine what it means to see work as a boundary keeping activity, focusing on the three conditions, or

boundaries, by which work must regulate itself: the creation of finite things (rather than the unleashing of infinite processes); the self-mastery of the artisan, applying herself only to that which she can control; and the limited public sphere in which things and mastery are exhibited.

In the third part, I turn to Arendt's account of modern science as a form of work, and, in her view, the most prominent site of modern transgressions.[6] Instrumental, experimental science – the product and sign of modernity – stands, in this account, as a threat to human action and a truly open public sphere, a threat even greater than the 'rise of the social' (the depoliticized, administrative state), which readers have most frequently cited. Modern science as a form of work and an instrumental logic was ultimately responsible for the subversion of action, precisely *by adopting its main tools*: organization, publicity and objectivity. Arendt's discussion of the immense power garnered by *homo faber* through her limited and exclusive public sphere, epitomized in the organization of modern science, thus stands as a warning against the unqualified embrace of any and all forms of a fabricated common world and the substitution of the appearance of publicity for true openness.

The final part of the article proposes a possible way out of the predicament of bounded action in modernity. One solution, I argue, can be found in between Arendt's categories of work and action, in the unique boundaries offered by the *actions* of promising and forgiving. The two actions go beyond the fabricated boundaries produced through work and have the power to limit and safeguard against the uncontrollable processes sparked by action. As actions, however, they require the presence of others and are in effect relationships (HC, 237). The task in the face of the transgression of human boundaries is, therefore, the opening up of a public sphere broad enough to allow a political community to reckon with its own transgressions and, possibly, to forgive itself. Under this interpretation, Arendt's attempt to tell her own, much criticized version of the history of modern science, finds its justification as just such an act of public reckoning.

Boundaries and transgression

Arendt's unique idea of work provides the basis for her account of the history of the modern world – which she narrates through the history of modern science, bringing together modern doing with modern thinking. As opposed to labour and action, work is a clearly delineated activity: bound by time, place and the plan of the worker, modelled after an artisan. As such, it allows Arendt to discuss the relationship between boundaries and freedom, between the three categories of activity, and – through the collapse of boundaries and interpenetration of categories – the movement of history itself.

As it stands between and against labour and action, work is defined as that activity which 'provides an "artificial" world of things;' 'within its borders' Arendt explains 'each individual life is housed, while this world itself is meant to outlast and transcend them all' (HC, 7). The work of *homo faber* takes its distinguishing marks from the process of fabrication, the making of things, which confer their unique characteristics on their makers: stability, permanence, autonomy, skill and mastery, design. The condition of work is therefore 'worldliness' in two separate senses. First, it could refer to the

mode of work and its significance – to produce the human artifice, the accumulated and related sum of things of human, or artificial, making. Second, it describes the basic condition for the possibility of work – that it should take place within a world, that it should be of the world and preserve the latter as a world.

The world itself is 'distinctly different' from the life cycles and natural necessities which condition the activity of labour. The 'things' that make it up are distinct from the goods of subsistence and consumption that grow and decay with these processes. Labour and work comprise opposite relations to nature and life on earth: the first 'mixes' with it, sustains it and attends to the immediate needs it brings forth, while the second stands against it, opposes it and protects humans from its effects (HC, 136). Worldliness is also distinct from the plurality and immediacy of human relationships which are the conditions of action. Work and action, therefore, comprise different relations to the world, the first responsible for erecting it as a stable and permanent dwelling place for human life and the second for making that life truly human by establishing and maintaining relationships among its inhabitants (HC, 134; 41).

Finally, each of these activities differs with respect to its temporality. As an integral element of the life process, labour has 'neither beginning nor an end' (HC, 144). Work not only has a willed and controllable beginning but is generally oriented towards an end, as a purpose and as a finished process which ends with the finished product: 'to have a definite beginning and a definite, predictable end is the mark of fabrication, which through this characteristic alone distinguishes itself from all other human activities' (HC, 144). Action, which is fleeting and of no significant duration, can nevertheless serve as the beginning of something new, start a new process.

Combined, the categories of the *vita activa* make our life uniquely human. More often than not, however, they are at odds with each other, and it is their mutual clashing and invasion which shape history: a distinctly human history, moved by human agency and marked by events, rather than processes. Arendt's philosophy of history is, as I will show, founded on her threefold division of human activity. It is determined in large part by the integrity of the boundaries between activities and by their repeated contestation. As Bernard Flynn observes, 'Arendt characterizes an epoch in terms of the relative positions – dominant or subordinate – of the different spheres [of the *vita activa*] in relationship with one another', that is, on the changing hierarchy between labour, work and action.[7] As hierarchies shift, Flynn explains, labour, work and action lose something of their integrity. These shifts are characterized by the 'displacement of the defining characteristic of one sphere from one domain to another, and this displacement has the character of a transgression'.[8] As work rises to dominate action, for example, politics and freedom are themselves changed, as the erection of walls and laws takes the place of the spontaneous eruption of new collective forms. Similarly, when labour rises over work in modernity, all objects of permanence become transient, as instrumental thinking makes way for immediate consumption.[9]

Should we therefore see the principle of bounded action as the fortification of rigid boundaries between the categories of activity? Patchen Markell has warned against this type of 'territorial' reading of Arendt's intentions.[10] The majority of readers, he

claims, see action as a privileged category, the centre of Arendt's concerns, and one she shields from the dangerous invasions of work and labour. In this view, categorical-influence is a fundamental problem and Arendt's proposed solution is their sharp delineation and complete segregation of activities, as though separated by walls.[11]

Markell, on the other hand, subscribes to a more fluid and porous interpretation, one that emphasizes the necessary overlap and codependence of activities. His reading relies on the centrality and importance of work for Arendt's project, reinterpreting the three categories as 'the fraught conjunction of two different pairs of concepts, labor and work, and work and action', or in other words: two main *boundaries*.[12] Though crucial in pointing the way to a re-examination of work and its significance, Markell's account, focused on the work of art and the role of appearances more broadly, obscures some unique features of work as a new mode of scientific production.

Rather than choose between a porous or territorial reading, in this article I point to the fundamental role work plays in our ability to make distinctions in the first place, and propose to see work, or fabrication, as the sphere of activity responsible for setting limits to all human activity. Positioned as it is between labour and action, work and fabricated things act as a boundary. Like all artefacts, moreover, boundaries take on two opposed meanings. They can act as rules and walls, separating activities and spaces and policing hierarchies. But they can also relate, bringing people together and allowing their views to converge and their stories to be told.[13] Consider for example Arendt's description of the Greek polis (an important example in Markell's reading) and the role actual walls had in defining not only public spaces but the very meaning of citizenship as the interaction of public persons, that had to emerge out of the hidden, private world of the household.[14]

What makes categories stable on the one hand and porous, dialectic and vulnerable to destructive 'invasions,' on the other, is the degree to which they are rooted in human agency and human relationships. As *products* of human activity, the boundaries between activities are not merely their phenomenological manifestations nor are they an exercise in purely intellectual classification. For Arendt, human actors, not eternal and incomprehensible processes, shape both the course of history and its conditions of possibility (HC, 307; 42; 296),[15] as she makes manifest in the three personifications of the *vita activa* – the *animal laborans* of labour, *homo faber* of work and the 'man of action'. This agent-centred history further explains the important place of transgression in the story of modern science and world alienation and justifies, I believe, Flynn's use of this term to describe the relationships between categories. By incorporating her phenomenology of activity into a historical account, Arendt gives this history a wider normative and political significance. Her history of doing is filled with actors that are often described through their psychology, desires and weaknesses no less than their intellectual and practical efforts. By allowing people to move and condition her history in their actions, work and labour, Arendt creates a space in which questions of accountability may be discussed: the elusive accountability for technological development and the forms of thinking it promoted, and which promoted it in turn.

Homo faber and the conditions of work

Work stands within the *vita activa* as a bounded, boundary keeping activity. The fabrication process has a definite beginning and an end, it bestows a final form on ideas and artefacts, and can serve as a buffer and barrier. As nature and human affairs subject people to their flux and change – the sheer force of bodily need or the unpredictability of action – the world holds a unique ability to remain constant and stable. Keeping to boundaries is thus a basic condition of working, but it is also the foundation of all activity: the protective divide between nature and a sturdier artificial world, and the one between the public and the private, by which the realm of action is delineated. For work to produce boundaries, therefore, it must always also impose limitations on itself: to understand the 'natural' limits of its capabilities and to artificially enforce them.

The mastery implied in work – the very opposite of the passive adherence to the dictates of nature that is characteristic of labouring – is key in explaining its ability to protect human identity and freedom. It is derived from the idea of fabrication as the work of a skilled artisan in the isolation of her workshop, 'master of h[er]self and h[er] doings' (HC, 144). *Homo faber* professes full mastery over the things she creates, killing and interrupting natural processes, extracting nature's materials and transforming them through the work of her hands and specially crafted tools into objects (140). Her mastery includes mental tools – 'yardsticks, measurements, rules and standards' (166) – to achieve 'fitness and precision' (144), and is guided by mental images – models and blueprints, which precede and outlast the work process (HC, 141; 96). It also embeds certain values and ideals onto her world view. These are instrumental values, 'entirely determined by the categories of means and ends' (143); an end to be achieved in a finalized product.[16]

The proper limit of mastery is always the human-made, making the line between nature and the world a line between that which can and cannot be mastered. *Homo faber* professes mastery over means as well as ends, but never over nature itself, which precedes all material extracted from it and remains radically different. Her work is inherently destructive, especially towards nature, a justified form of violence completely subordinate to a means/end logic and to the greater human need for stability and protection (HC, 153; 141). What happens, then, when *homo faber* exceeds the proper bounds of her mastery? For Arendt, this is precisely the story of modernity, as the boundary of life and artifice is challenged by technology, the expansion of automation, the transformation of production and the manipulation of electricity and eventually nuclear power. The problem as she sees it, lies as much in the extension of mastery over nature as it is in the 'naturalization' of the artificial world, the invasion of nature into the human artifice: it lies in the growing non-distinction of work and labour.

Arendt marks the discovery and application of electricity as a decisive moment for the history of technology. Electricity marked a categorical, and therefore dangerous, change in the basic conditions of work. If the forces of nature until that point were manipulated and imitated by the tools of *homo faber*, electricity was the first force she was able to produce herself, to channel directly into the very artifice which comprises the human world (HC, 148–9). Electricity, moreover, was the herald of much greater forces, which could be unleashed at will but not controlled: an open-ended production process which

could no longer be fully contained (150, ff. 13). This particular advance in technology not only compromised the line between a stable world and the immense forces which press upon it from without but introduced another kind of transgression: the loss of complete mastery over the produced object.

The twist in this story is that at the very same time that *homo faber* vastly extended her mastery, she also lost control of the symbols of her mastery – her tools and machines – which were completely subsumed under the activity of labour. Manufacture became an endless production process which yielded nothing but consumer goods, 'labor products' (HC, 124) of short duration, to answer the needs of body and species, and many tools were created with the sole purpose of easing the pains of labouring. The very organization of production, along with *homo faber*'s fundamental values, underwent a major shift. While organized work had been divided according to skill and specialization, binding workers 'by their differences' (HC, 124), almost all production following its mass industrialization became a form of divided labour. Finally, the new cultural adoration of comfort, pleasure and sheer production power meant that 'the ideals of *homo faber* . . . permanence, stability and durability, have been sacrificed to abundance' (HC, 124). The world of machines became little more than 'second nature' and in effect ceased to be a world at all.

Two fundamental limits of work thus emerge from Arendt's discussion of technology and the line between work and labour: the confinement of mastery to the human-made and the deference to things in their finality. Another important condition – a limited public sphere – is revealed through the relation between work and action. Action, which is fleeting and unpredictable, needs work in order to give permanence to its achievements and relations, and provide it with worldly content; it has to have a common world in which to operate (HC, 182; 204). The world, therefore, is not only a barrier against nature and necessity but the stage for action and the space for freedom.

More than any other aspect, it is publicity which exemplifies the mutual dependence, at times dangerous interpenetration, but also the essential difference between work and action. The world, through its permanent constructs, can relate people and separate them, as well as separate and bridge the public and the private realms themselves. Whether an action is remembered or not and whatever its consequences in the 'web of human relationships', it requires visibility and a designated space in which to take place. These spaces may be architectonic, or they may be reified human arrangements, but they require a boundary between the significant and insignificant, the seen and the hidden (HC, 90–1). In this context, fabrication is first and foremost the site of reification, bringing the private and subjective into the public light of human interaction and communication.[17] Reification, for Arendt, is the double emergence of a thought and idea from privacy and subjectivity into publicity and objectivity; it has the power of bridging this fundamental divide without undermining it (50, 56).

Note, however, that Arendt uses the term 'objectivity' here in a sense that is pointed and highly critical, anticipating her broader critique of modern science and its doomed search for an Archimedean point from which to observe the world, in the final chapter of her book. Objectivity here stands for the 'thing character of the world' (HC, 9) as it lays the foundation for a truly open public realm where action and politics can unfold. Public things, or things that have emerged into public view to be seen, heard and used, create

tangible and durable positions which define individual perspectives and opinions, positions from which to act. 'Though the common world is the common meeting ground of all', Arendt writes, 'those who are present have different locations in it . . . being seen and being heard by others derive their significance from the fact that everybody sees and hears from a different position' (HC, 57). For Arendt, objective reality, 'the reality of the public realm', is grounded in this ability to converge upon a single object from multiple perspectives, 'the reality rising out of the sum total of aspects presented by one object to a multitude of spectators . . . ' (HC, 57).

Arendt's notion of objectivity, in other words, anticipates contemporary notions of 'perspectival objectivity', which challenge the idea of objectivity as a universal 'view from nowhere.'[18] It also echoes similar ideas among Arendt's contemporaries, Heidegger and Gadamer,[19] and in general, places her among some of the more vocal critics of modern science both then and now, as I discuss at length in the next section. The emphasis on a perspectival reality and a plural public realm, moreover, is not unique to *The Human Condition*, but is rather an evolving theoretical occupation for Arendt, beginning with her earlier essay, *Philosophy and Politics* (1954) and culminating in the 1967 essay *Truth and Politics*.[20] Looking at these earlier texts helps make sense of the centrality of work and fabrication in connection with the ideal of a perspectival objectivity. In *Philosophy*, Arendt describes the dialogic nature of thinking and the significance of opinion, *doxa*, as 'what appears to me:' not a subjective stance but the essence of commonality, and later – of objectivity. In *Truth*, these themes are developed further as Arendt foregrounds her unique take on identification: thinking 'from a place in which I am not'. 'I form an opinion', she writes, 'by considering a given issue from different viewpoints, by making present to my mind the standpoints of those who are absent; that is, I represent them' (*Truth*, 241). This, for Arendt, is the mode of political thinking.

Perspectivalism, erecting a plural and open public sphere, is one of the more noble functions of work. Importantly, however, perspectivalism is not characteristic of *homo faber*'s world view. Instrumental rationality has a limited scope and a narrow, means-ends logic and perspective. The idea of a perspectival reality not only transcends *homo faber*'s limited perspective but warns, as contemporary theorists continue to do, of the dangers of identifying this perspective with the universal, 'objective' point of view (in the colloquial sense) that became the hallmark of modern scientists. For this reason, it is important to remember that work itself relies on a much narrower sense of publicity. Unlike the true openness of a perspectival reality, the public realm most suitable for the creative process of fabrication is a *limited public sphere*, on the model of the Greek *agora*.

Following the artisan metaphor, publicity for *homo faber* consists in the emergence of the finished product from the isolation of the workshop to be displayed in the marketplace. The *agora*, according to Arendt, was a space for limited human interaction. It was centred on the display of products in their intrinsic use and beauty and of the fabricator's skill, which earned her both material gains and, more importantly, recognition (HC, 159–60). There is, therefore, a great difference between work and action in the type of publicity and organization they require. The artefacts of *homo faber* most properly emerge into a personalized and local market, 'a public realm of h[er] own' (HC, 159), where skill and use-value (as opposed to value-in-exchange) are on display. All human

interaction in this market place, and by extension in the sphere of work itself, is of one kind, and tends towards various degrees of standardization, 'transformed, deprivatized and deindividualized, as it were, into a shape to fit them for public appearance' (50). It is, moreover, the model for all kinds of enclosed and limited public spheres which belong to 'non-political communities', among them scientific communities (160). Arendt has, therefore, two notions of the public sphere: a truly open, perspectival one, and a limited, more intimate and regulated one.[21]

The generally overlooked duality inherent in Arendt's notion of publicity might explain, and partially resolve, the controversy around her account of 'the rise of the social': the problematic turn to public housekeeping in the modern state, destroying the public–private divide and politics itself. Though frequently interpreted as a nostalgic, depoliticized and exclusionary notion of the public sphere, overrun by an agonist competitive spirit,[22] the dual notion of the public sphere supports more recent attempts to salvage the rich content of publicity, including the political potential of economic objects, in Arendt's account.[23] While a true public sphere is defined by its openness, many other forms of appearance and publicity rely heavily on exclusion and self-limitation. It was in these more limited, administrative sites that the public–private line had eroded, as action both invaded work and more fully succumbed to its main principles.[24]

Before turning to the story of modern science, it is worth dwelling on two moments in the history of instrumental rationality, which, according to Arendt, helped breach the divide between work and action by undermining *homo faber*'s limited public sphere. First, 'the exchange market on which h[er] products [were] displayed' (HC, 162) underwent a qualitative shift, propelled by the exponential growth of markets that brought about a grandscale degradation of things in their autonomy and '"intrinsick natural worth"' (164). Relative, interpersonal exchange values, characteristic of *action*, replaced autonomous use values. The economic system also introduced remote and interchangeable actors and objects, uniform standards of diminishing local significance, and actions which could no longer be controlled and contained.

The second transgression of work's limited public sphere was the substitution of making for acting, that is, the expansion of the standards of work to the realm of politics. The attempt to order and organize human affairs in direct opposition to their basic conditions – plurality, open-endedness and uncontrollability – had the most devastating results both for action and for the world. This is in fact the locus of Arendt's critique of instrumentality. At least in part a defence, this critique was never aimed at scientists and developers of technology for advancing too quickly for the moral sciences to keep up – an approach she denounces at the outset (HC, 46). Only partially related to 'progress', this fundamental breach dates back to Plato's political philosophy and differs from it only in the degree of standardization afforded by modernity. Instead of the flux and unpredictability which mark human relationships, the Platonic tradition preferred standards and rules, a controllable, enclosed system, the 'solidity of quiet and order' (HC, 222) where one 'remains master of his doings from beginning to end' (220). In light of this transgression, freedom was sacrificed for self-sovereignty, power gave way to physical strength and force, and change was no longer a matter of speaking and acting

in concert but rather the violent destruction of an old order for the sake of 'making' a new one (228).

Arendt's account of work thus lays out three basic conditions which *homo faber* must uphold in order to perform her boundary keeping work. These are (1) the deference to things in their finality, (2) the limitation of her mastery and (3) a limited public sphere. While central in the production and protection of borders, order, and a stable, objective in-between for human affairs, *homo faber* does not have exclusive jurisdiction over the boundaries of the *vita activa*. Boundaries are not self-evident or 'natural', but rather open ended and, ultimately, collaborative projects. Their dangerous and repeated transgression, particularly in the modern age, raises the need to constantly think and rethink boundaries – a practical, political task, which cannot be left to *homo faber* alone.

Science and the *vita activa*

The final chapter of *The Human Condition* is dedicated to 'tracing modern world alienation to its origin'. It examines how the modern age changed humanity's orientation towards the world, both in thinking and in doing. More specifically, it is the story of the rise of 'instrumentality' to prominence as a world view and practice. The most significant indicators of this new mode thinking about the world are the reversals in hierarchy between the *vita activa* and the *vita contemplativa*, and within the *vita activa* itself. The crux of the modern reversal, heralded by modern science, lies in the idea that knowledge and truth are *made* rather than *given*: a form of knowledge produced by people and human devices, rather than given to their senses and mind for contemplation. Modern science, therefore, as a Galilean, experimental and worldly science first and foremost, epitomizes for Arendt the problem she identifies along the boundary of thinking and doing: a growing inability to fruitfully reflect on the outcomes of human enterprise.

Crucially for Arendt, science properly becomes a form of work only in modernity. It wasn't, therefore, its rise to prominence which led to an instrumental age, but rather the ways it incorporated instrumental thinking which made it a world changing force. The great successes afforded science by tools and experiments, on the one hand, and through the enclosing of a distinct and separate sphere in which to operate, on the other, are what made it a powerful model of instrumentality. And it was through the immense influence of science that this ideology, typical of *homo faber*, could far exceed any of its former roles and replace not only action but contemplation, as the highest form of human thinking and being.[25]

The rise of instrumentality

Arendt identifies three events as the beginning of the modern age: the discovery of America, the Reformation and the invention of the telescope. All three are inherently worldly, displaying different aspects of the work of *homo faber*. Two of them, moreover, are directly linked to a new tool- and measurement-based science. Not only the telescope, 'the first purely scientific instrument ever devised' (HC, 249), but the immense project of mapping the earth, mark the ascent of *homo faber* as maker of tools and standards.

Galileo's invention of the telescope allowed an earthbound being to look beyond her earthly horizon. It thus simultaneously affirmed the human body, its perceptions and its position, while undermining regular sense perception. His 'dramatic' experimental demonstration of the laws of falling bodies further contributed to the alignment of heaven and earth under one set of laws, but also to the adoption of an external point from which to observe the earth (HC, 258). Finally, the experiment itself, and the central role it was to receive in any future demonstration, gave prominence not only to experience, skilful control, and fact, but to the gradual limitation of all human knowledge to that which could be modelled and mimicked with human instruments (278). Similarly, the new maps and measurements of the earth, followed by innovations in the means of transportation and communication, undid the 'call of the distant' (250), substituting the unexplored horizons of the world with a ready at hand globe.

While the affirmation of 'the certainty of sense perception' (HC, 260) lasted a relatively short while, the implicit rejection of the earthly standpoint grew rapidly and can be seen as one of the primary causes for abandoning any truth that is 'given' to perception. As traditional certainty was overturned, the turn inward had accelerated, epitomized in Descartes' doubt and the reaffirmation of the thinking and doubting mind as the basis of all knowledge. The senses could not be trusted, establishing the prominence of the human-made over the given (279), which Arendt summarized with Heisenberg's famous formulation: in modern science 'man encounters only himself' (261).

Another central aspect of modern science as a form of fabrication is revealed in the fact that its inventions could constitute *events* in the first place. As a form of reification, fabrication gives tangibility and publicity to an idea, opening it up to the unexpected that characterizes human affairs. But publicity and reception are never uniform, and the kind and scope of public spheres opened up by science varied significantly. The 'difference in relevance' of Galileo's invention of the telescope lay not only in its factual confirmation of earlier speculation but in the different 'publics' and public reactions by which it was received. The excitement, and later despair, brought on by the telescope within the 'numerically small, politically insignificant milieu of learned men' (HC, 258) remained distinct from the response in the general public. The latter's attention

> was drawn, rather, to Galileo's dramatic demonstration of the laws of falling bodies . . . For what most drastically distinguished the new world view . . . was the assumption that the same kind of exterior force should be manifest in the fall of terrestrial and the movements of heavenly bodies. (HC, 258)

In other words, the public was far more impacted by the apparent continuity between heaven and earth than by the thrill, and later dread, of enhanced human capacities.

For Arendt, these reactions continued to fluctuate and influence each other as public spheres continued to be redefined. Her story of world alienation aligns with similar arguments made by contemporaries like Thomas Kuhn and Michael Polanyi, who conceived scientific knowledge in terms of a collective enterprise, which is also limited and exclusive in important ways: a 'normal' science rarely interrupted by true revolutionary events.[26] One of the new science's most notable achievements, and the one which brought it even closer to the ideals of fabrication, was the persistence and relative

stability of the scientific milieu. It was the scientific community which gave *homo faber* the scientist a 'public realm of h[er] own' (HC, 159), a limited public sphere of experts. While it took the world centuries to fully realize the potentialities of the new science and to change accordingly, 'the human mind', claims Arendt, 'changed in a matter of years and decades' (HC, 271).

The scientific societies (and the Royal Society in particular) were in many senses political organizations, as any organization is, as far as Arendt's classification is concerned:

> whether its aim is to act upon society and secure its members a certain position within it or – as was and still is to a large extent the case of organized research in the natural sciences – to act together and in concert in order to conquer nature.[27]

The great ambitions of the new science in its 'gigantic task' necessitated 'the collective effort of the best minds of mankind' (HC, 278). But the societies were also limited and exclusive forms of public spheres, and in that sense remained mostly apolitical: 'members had to agree to take no part in matters outside the terms of reference given it by the king, especially to take no part in political or religious strife'. This limitation, moreover, 'tempts' Arendt to conclude that 'the modern scientific ideal of "objectivity" was born here' (HC, 278).[28]

Both aspects of this example are central. First, that 'modern science as "the organization of thought" introduced an element of action into thinking' (HC, 278), and, second, that this organization was limited by definition, protecting *homo faber* from extending her mastery and skill beyond recognition. This dual characterization of the scientific community further explains how events could take place in the realm of *homo faber*, that is, through their publicity in growing circles. It also shows how an important component of the scientific community – objectivity, its primary source of validity and its first criterion of truth – is bound to its own self-limitation.

Through their mutual relations and by acting in concert, scientists 'developed their own moral standards and their own code of honor' (324) while becoming 'one of the most potent power-generating groups in all history' (HC, 324).[29] The power of the new, enclosed scientific communities facilitated the reversal between contemplation and the active life, which included the adoption of a new set of values and standards of judgement. The need to 'make sure' or to guarantee a theory 'works' had become commonplaces (HC, 291). The dominance of doing, moreover, and especially of making, meant a severe contraction in the scope and meaning thinking could receive. Thought had come to be completely circumscribed by the kind of doing attached to fabrication and became instrumental in the most literal sense. Philosophy, formerly the guide of contemplation, was now the handmaiden of making; but making 'had no use for a handmaiden' (294). To 'think what we are doing', in other words, became a discourse of experts, outside of the open public realm.

The transgressions of science

Science not only raised instrumentality to hegemonic status, but, in so doing, transgressed its boundaries, deeply altering the fundamental character of work in its insular

and intimate relation to objects. Transgression involved both the objects of *homo faber*'s inquiry and the perspective from which she handled them, well exemplified by the 'original sin' of Galileo's invention. The telescope had 'turned in on itself' only when it led to the adoption of a particular perspective: the Archimedean point. The transgression, therefore, did not lie in exposing the limits of the senses, the lack of distinction between heaven and earth, or the expansion of earthly mastery to the cosmos. Rather, it lay in the convergence of all three in an imaginary, foreign and removed point of view (HC, 263; 284).

The Archimedean point, whether it was located in outer space or internalized, like the Cartesian solution (HC, 284), implied alienation from the earth: the rejection of the human position as embodied, earthbound inhabitants of a world. It also meant the substitution of truly external points of reference, outside of themselves, with conjured up ones of their own making (264). The Archimedean point allowed *homo faber* to imagine her mastery as cosmic and truly 'universal' and to apply this non-earthly perspective to things done on earth (268). As she turned inwardly for new guarantees of certainty, she found them in the mathematical formulas by which she could describe her internal processes of cognition (266). Newtonian physics, even more than the Cartesian doubt, exemplifies the new hubris by which the laws of the universe – uniform time and space – could be seen both as absolute and accessible (270).

This new position and perspective had come to *homo faber* at great risk and costs. Her basic mistrust of the senses, and of any truth which she had not produced herself, eventually eliminated the possibility of a truly common world. It undermined the things of the world as seen and heard, the revelation of people in their unique actions, and of things in their commonness. At least from the perspective of scientists and other 'men of letters', the senses could no longer 'fit man into the reality which surrounds him' (HC, 274) and left people united only through their common processes of cognition, their sameness.

At stake was a multiple transgression of the boundary between labour and work. Work invaded labour by substituting the given with the fabricated, but was itself transformed by it when it gave way to the flow and necessity of cognitive processes. Indeed, we find that Arendt invokes Heisenberg a second time, this time to describe not the fabricated world but the rise of formal logic and other kinds of 'cognitive labor', the necessity of logic, and the process character of cognition (HC, 266). 'Man' now 'encounters only himself' as a labouring body subject to necessity.

Under the sway of the analytic deconstruction of the sensible, scientific work gained a 'vicious', yet highly successful circularity by which projected mathematical reductions yielded predictable results, neither of which were fully explicable (HC, 287; CSSM, 47–8). The status of things, the objects of the mind and the senses, was further undermined by the objects chosen for scientific inquiry. By studying and imitating processes in the lab, by making history – conceived as the process of coming into being – the organizing framework for all sciences (HC, 296), the very objects of science were gradually eliminating any distinction between work and labour, elevating the condition of life, the life of the species, to the status of the highest good (319).

It was through these transgressions that *homo faber* suffered her ultimate failure, just as conditions seemed 'so extraordinarily propitious' (HC, 312), that is, just as fabrication

and instrumentality had become the dominant world view. Within her closed community, the scientist could forgo the most basic human orientation towards the world – her ability to understand the external world as such, and her own explanations of it – while maintaining her ability to manipulate it (HC, 287). The sheer success of this circle, of applicability beyond understanding, provides another explanation for why and how acting eventually found its outlet in science, in the introduction of cosmic forces and processes into nature and earth (268).

Reckoning with a history of transgression

Arendt's story of world alienation is not merely a tale of mutual breaches and invasions between activities, but one which engages the question of historical agency and accountability. Crucially for this story – and for the limitations she points to in science as a form of thinking grounded in making – *homo faber* never relinquished her attempt at boundary-setting and self-limitation. For one, much of scientific practice, in its methods and tools, kept the limit of human knowledge close in sight. The senses were supplemented by instruments because they were seen as more 'perceptive'. Experiments had limited the scope of scientific explanations to an intentionally reduced model of reality. Indeed, the subjection of Newtonian physics to new limitations of relativity in the 20th century can be seen as evidence of at least an implicit awareness of earlier transgressions (HC, 263), while Heisenberg's principle of uncertainty had reinscribed an observer, and her limits, into the experimental record (CSSM, 52). Finally, the scientific community, prescribing and applying uniform standards and allowing scientists to serve as judges of their own work, kept scientific endeavour under various types of control.

But it was the insufficiency of these attempts to prevent the ultimate collapse of the modern world and the beginning of a new, 'yet unknown', atomic age, that marks the heart of the political problem Arendt identifies in a post-WWII reality. By invoking the work and philosophy of 'public' physicists like Heisenberg, Einstein, Schrödinger and others, Arendt's final chapter joined a wider, primarily German 1950s debate on the place and public role of scientists. In her recent biography of Werner Heisenberg, Cathryn Carson discusses the concept of *Verantwortung* – the sense, invoked by scientists themselves, of personal responsibility, obligation and power – and the call to 'rebalance the relation between intellect and power'.[30] Arendt's position in this debate is unequivocal. In its self-limitation, post-war science merely exposed the persistent obstacles for an instrumental thinking to reflect on boundaries.[31] The question of the limits of science, she claims at the outset of her book, 'cannot be decided by scientific means; it is a political question of the first order' (HC, 3).

But what is the political project of boundary-setting and a reflection on boundaries? A political boundary must adhere to the impossibly high standards Arendt sets up for a truly open public realm and a public reckoning with past breaches of the world's common infrastructure. The insufficiency of science lies precisely in its closedness, in the instrumentalism which keeps it confined to means and ends, always project-oriented and increasingly process-oriented. Though the book can be taken as a comprehensive argument against the aptness of scientists – and politicians – for this task, it doesn't elaborate

how such a question or project could be approached politically: how the enclosed public spheres of modernity may be opened up to true public judgement and scrutiny.

Still, Arendt does more than merely point out the urgent need to rethink what we do. There are many ways to read *The Human Condition* as the story of the rise and fall, success and transgressions of its central protagonist: *homo faber*. With an eye to the book's preoccupation with ancient philosophy and the *vita activa* in the ancient world, one may want to join Kimberly Curtis in seeing it as a tragic tale.[32] Each transgression, in this reading, is the result of an opposite desire, and the protagonist's eventual fall – an inevitable outcome of thinking itself. It is a tragic catharsis in contemplating humanity's undoing by its own hands. Tragedy, however, offers little in the way of a political, or even practical, solution to the modern problem of transgression. Similarly, an absurdist reading, that takes *homo faber* as a Kafkaesque figure framed and implicated by an endless and senseless process,[33] is in keeping with the book's themes, but offers even less in the way of a solution.

Instead, I propose a reading that takes as meaningful the physical proximity of the book's account of the modern age and its discussion of forgiveness. Forgiveness offers an important and almost exclusive means by which to relieve blame. As a form of action which undoes previous actions, it is unique in its ability to set a living boundary to actions. Along with promising, it is the ultimate boundary which relates, and it requires a public sphere in which to operate: 'closed within ourselves, we would never be able to forgive ourselves any failing or transgression because we would lack the experience of the person for the sake of whom one can forgive' (HC, 243). This claim may be extended to the scientific community, and the political community in which scientific and administrative 'problems' are defined and 'worked out'. Enclosed on the one hand, and acting on mute nature, on 'populations,' or other semi-public things, it lacks any ability to forgive itself. To relieve *homo faber* from her tragic fate, she must first find the means to radically open up her closed sphere of reference.

In this sense, *The Human Condition* acts not exclusively as a defence or an accusation but a form of a trial. It is a trial of history itself which attempts not only to scrutinize plural perspectives and stories but to identify the places of transgression so that they may be contended with, perhaps even forgiven.[34] The book thus constitutes a dual call: to rethink the boundaries of doing and to reckon with the history of alienation as an agent, deed-based history. In that, I propose, it is laying out and engaging in a judgemental history: a form of justice which does not rely on procedural adherence to rules and standards but to the weighing of stories and histories against each other. The telling and writing of a 'judgemental history' can be seen as a model for re-establishing boundaries beyond fabrication, as the product of human relationships.

Conclusion

In this article, I have put forward three main claims: that freedom is bounded by the human condition and the nature of the active life; that an agent-centred history is a history of acts and transgressions, of making and destroying, that calls for reflection and judgement; and that publicity and openness are not synonymous and that confusing the two is dangerous. A thorough reading of two of *The Human Condition*'s more

neglected chapters – Arendt's account of work and her account of modern science – provides important insights into the kind of boundaries human life must contend with if it is to be free. These are the human-made boundaries that create and sustain a world in common, and those other boundaries, which must emerge from them and are the joint effort of a community not to police itself, but, as I have suggested, to reckon with the consequences of its actions.

Arendt offers us an answer to the question: What kind of a thing is a boundary? Namely, it is a fabricated thing, part of the human artifice and the realm of work, where palpable objects both relate and separate people and spaces, and are the basis of our ability to draw distinctions. Boundaries do not reside in our self-sovereignty, a model Arendt wholeheartedly rejects, but in what self-mastery can produce: a reified idea, a durable object, a common space and a buffer from the processes of birth and decay. These boundaries alone, however, are not enough to protect humanity from its actions and transgressions, those types of doing and thinking which set off unpredictable processes. It is here that her discussion of promising, and especially of forgiving, as the counterparts of action, suggests another kind of boundaries: boundaries that constitute relationships.[35]

Human activity, as history shows, is filled with transgressions. Indeed, for Arendt, there is no history without the dramatic shifts and changes in the ways we labour, work and act – without the mutual invasions of these categories, which often undermine their unique abilities to sustain both life and world. These transgressions, however, don't signify a regime of crime and punishment – a set of rigid rules and boundaries of which human progress ought to take heed, and which the political community must enforce. Arendt does not suggest in her account of morbid alienation that electricity, or even atomic energy, should have been abandoned or avoided. Neither can a reader immediately draw conclusions from this model of conditioned being for contemporary advances in artificial intelligence or genetic engineering. The boundaries of the human condition may very well change along with shifting definitions of human life.

Transgression, as I have discussed it in this article, is a site where the political community might become visible to itself through the unique function of forgiveness:

> the undoing of what was done seems to show the same revelatory character as the deed itself. Forgiving and the relationship it establishes is always an eminently personal (though not necessarily individual or private) affair in which *what* was done is forgiven for the sake of *who* did it.[36]

The notion that boundaries are fabricated, in a classification that separates fabrication from action, tells us something about the role rules play within human society, the meaning of self-limitation and how to recognize a familiar threat in new and strange developments. Freedom in Arendt's model relies on self-limitation only when the latter is combined with radical openness. The scientific community, in her 17th-century idealization, offers a contested model of objectivity: it thrives on a relatively intimate, and exclusive, form of publicity and has the power, through its forms of organization, to preserve some of the key elements of a world in common. But it had propelled humanity into a state of world alienation when it confused its highly regulated perspective with a universal view from nowhere, and when its exclusive, limited publicity was, and often

continues to be, mistaken for a true public sphere. For this reason, it is not the model for political openness and cannot provide the tools for a political reflection on boundaries. It cannot offer a solution for the crisis of the objective world, which, for Arendt must instead be addressed through the perspectival objectivity of public narration.

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Notes

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1. Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), 52. Hereafter HC.
2. See, for example, E. Roy Weintraub, *How Economics Became a Mathematical Science* (Durham; London: Duke University Press, 2002); Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995); Harro Maas, *William Stanley Jevons and the Making of Modern Economics* (New York: Cambridge University Press, 2005).
3. See Hannah Arendt, *Between Past and Future: Six Exercises in Political Thought* (New York: Viking Press, 1961), 151.
4. Martin Heidegger, *The Question Concerning Technology, and Other Essays* (New York: Harper & Row, 1977 [1954]); Max Horkheimer, *Critique of Instrumental Reason; Lectures and Essays since the End of World War II.* (New York: Seabury Press, 1974).
5. While readers are increasingly paying attention to the centrality of work, they have focused primarily on the work of art. See Patchen Markell, "Arendt's Work: On the Architecture of The Human Condition," *College Literature* 38, no. 1 (2011): 15–44; Bernard Flynn, "The Places of the Work of Art in Arendt's Philosophy," *Philosophy and Social Criticism* 17, no. 3 (1991): 217–28. Notable exceptions include Bonnie Honig's and Stephen Klein's separate discussions on the role of 'things' as public intermediaries and Ashley Biser on things as a form of orientation in a fluctuating reality. See Bonnie Honig, "The Politics of Public Things: Neoliberalism and the Routine of Privatization," *No Foundations* 10 (2013): 59–76; Steven Klein, "'Fit to Enter the World': Hannah Arendt on Politics, Economics, and the Welfare State," *American Political Science Review* 108, no. 4 (2014): 856–69; Ashley N. Biser, "Calibrating Our 'Inner Compass' Arendt on Thinking and the Dangers of Disorientation," *Political Theory* 24, no. 5 (2014): 519–42. Similarly, growing attention to the role of science in Arendt's thought has begun to remedy years of neglect. See Kimberley F. Curtis, "Hannah Arendt, Feminist Theorizing, and the Debate over New Reproductive Technologies," *Polity* 28, no. 2 (1995): 159–87; Pieter Tijmes, "The Archimedean Point and Eccentricity: Hannah Arendt's Philosophy of Science and Technology," *Inquiry* 35, no. 3–4 (1992): 389–406. On the place of public scientists in the nuclear age, see Cara O'Connor, "Arendt, Jaspers, and the Politicized Physicists," *Constellations* 20, no. 1 (2013): 102–120. On the influence of post-war

histories of science on Arendt's narration of modern science, see Waseem Yaqoob, "The Archimedean Point: Science and Technology in the Thought of Hannah Arendt, 1951–1963," *Journal of European Studies* 44, no. 3 (2014): 199–224.

6. As a point of clarification, it is important to note that, for Arendt, and therefore for the purposes of this article, 'modern science' designates a historical period which began with Galileo's experiments and ended at the inception of the atomic age. Her rather idiosyncratic retelling of the history of science is best seen as an attempt to recover a 17th-century origin story for science as mode of thinking, doing and organizing, which was, in her view, becoming obsolete. On Arendt's close adherence in her framing of this story to the work of French philosopher of science Alexander Koyré, and, to a lesser extent, Alfred Whithead and Edwin Burtt, see Yaqoob, "The Archimedean Point," 211. On her departure from common histories of science both in her own time and since, see Tijmes, "The Archimedean Point and Eccentricity."
7. Flynn, "The Work of Art," 218–19.
8. Flynn, "The Work of Art," 218–19.
9. On the transgressions and growing hostility between labour and work in Arendt's account of technology, see, Maren Klawiter, "Using Arendt and Heidegger to Consider Feminist Thinking on Women and Reproductive/infertility Technologies," *Hypatia* 5, no. 3 (1990): 65–89; Curtis, "Feminist Theorizing." On the conflict of work and action see Dana Richard Villa, *Arendt and Heidegger: The Fate of the Political* (Princeton, NJ: Princeton University Press, 1996); Ashley Biser, "From Telescope to PCR: Arendt on How We Use Our Tools" (Annual Meeting, Western Political Science Association, Albuquerque, New Mexico, 2006).
10. Markell, "Arendt's Work," 16.
11. Markell, "Arendt's Work," 16.
12. Markell, "Arendt's Work," 19.
13. Arendt emphasizes the duality of boundaries through the genealogy of the term 'law': the Greek word *nomos* conflates laws with hedges or walls, while the Latin word *lex* connotes relationships (HC, 63, ff. 62). See also Christian Volk, "From Nomos to Lex: Hannah Arendt on Law, Politics, and Order," *Leiden Journal of International Law* 23, no. 4 (December 2010): 759–79. The dual role of boundaries, both relating and separating, explains how Arendt's notion of freedom as the ability to 'to call something into being' and of action as completely unpredictable and without boundaries (HC, 191–2) can be reconciled with a notion of action as inherently bounded. See also Arendt, *Between Past and Future*, 151. Though politics is, in her view, the exact opposite of adherence to binding rules, not least the rules dictated by one's sovereign will – the Rousseauian archetype of politics as self-mastery that Arendt famously criticizes – political action is nonetheless *conditioned* by the world of things.
14. HC, 196–7, see also Markell, "Arendt's Work."
15. As Dana Villa and Waseem Yaqoob have both argued, Arendt's historical account comes as a direct challenge to Martin Heidegger's ontological history which preserves a primary role for Being in setting the horizon of human life: 'rather than treating science and technology in terms of unfolding essences, Arendt sought to stress their contingent development as part of a parable about the unpredictability of human action:' Yaqoob, "The Archimedean Point," 206; Villa, *Arendt and Heidegger*, 71–4. Yaqoob further helps situate Arendt's approach to history by observing the duality in her critique of Marx. Arendt, he claims, criticized Marx for 'treating history simultaneously as nature and akin to the domination of nature' and for 'lauding the capacity of humanity to direct the course of history' by acting on nature. If history

is not to be confused with a natural process, neither is it subject to the mastery of human agents. See Yaqoob, "The Archimedean Point," 202.

16. Along similar lines, Andrew Tyner has recently showed how our imagination, which Arendt defines as the capacity to imagine a different world, can itself act as a boundary. Used either prospectively, as the basis for action, or retroactively, as the basis for judgement, the imagination in Arendt's account must be limited by the constraints of an actually existing world. See Andrew H. Tyner, "Action, Judgment, and Imagination in Hannah Arendt's Thought," *Political Research Quarterly* 70, no. 3 (2017): 523–24.
17. Arendt's favourable application of the term reification illustrates the broader importance she ascribes to the instrumental approach, in contrast with the Marxist tradition, which identifies reification with alienation. See Hanna Fenichel Pitkin, "Rethinking Reification," *Theory and Society* 16, no. 2 (1987): 263–93.
18. At the intersection of feminist and critical race theories and science studies, Arendt's critique of instrumental rationality and especially her idea of perspectival reality re-emerge in the methodological ideal of perspectival objectivity. Led by figures like Sandra Harding and Patricia Hill Collins, perspectival objectivity aims to replace the view from nowhere and the unsustainable claims of scientific objectivity to universality and neutrality. In this sense, *The Human Condition* can and should be seen as an early chapter in this revision of the ideals of science and the study of their broader social and cultural implications. See, for example, Sandra Harding, "After the Neutrality Ideal: Science, Politics, and 'Strong Objectivity'," *Social Research* 59, no. 3 (1992): 567–87; Patricia Hill Collins, "The Social Construction of Black Feminist Thought," *Signs: Journal of Women in Culture and Society* 14, no. 4 (1989): 745–73. As historians of science have further shown, the 'view from nowhere' was itself a technologically conditioned, historically situated development that replaced a view of objectivity grounded in the unique position and judgement of the scientific observer. See Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* 40 (1992): 81–128; Lorraine Daston, "Objectivity and the Escape from Perspective," *Social Studies of Science* 22, no. 4 (1992): 597–618.
19. Andrew Brennan and Jeff Malpas, "The Space of Appearance and the Space of Truth," in *Action and Appearance: Ethics and the Politics of Writing in Hannah Arendt*, ed. Anna Yeatman, Phillip Hansen, and Magdalena Zolkos (New York: Continuum, 2011), 47–50.
20. Arendt, *Between Past and Future*, 295–312; Hannah Arendt, "Philosophy and Politics," *Social Research* 57, no. 1 (1990): 73–103.
21. As Danielle Allen has noted, Arendt's 'dark times', when the public realm is neither held in common nor illuminating, are often marked by individuals' retreat, or banishment, into invisibility and the warm consolation of enclosed, limited spheres of fraternity. These enclosures, therefore, are as much *homo faber*'s to transcend, as they are the 'man of action's' to 'descend' into, each in turn posing a critical challenge to politics. See Danielle Allen, "Invisible Citizens: Political Exclusion and Domination in Arendt and Ellison," *Nomos* 46 (2005): 49–50.
22. Hanna Fenichel Pitkin, *The Attack of the Blob: Hannah Arendt's Concept of the Social* (Chicago: University of Chicago Press, 1998); Seyla Benhabib, "Feminist Theory and Hannah Arendt's Concept of Public Space," *History of the Human Sciences* 6, no. 2 (May 1, 1993): 97–114.
23. Klein, "'Fit to Enter the World'."
24. Kirstie M. McClure, "The Social Question, Again," *Graduate Faculty Philosophy Journal* 28, no. 1 (2007): 85–113.

25. This is not to say that science is utterly utilitarian. Rather, it is a search for useless knowledge closer to art and philosophy (HC, 287), directly opposing the idea of instrumental thought as a form of will to power and Heidegger's notion of technology. See also Hannah Arendt, "The Conquest of Space and the Stature of Man," *The New Atlantis*, 18, no. 1 (2007), pp. 1–135. hereafter [CSSM]; Villa, *Arendt and Heidegger*, 182–84.
26. Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962); Michael Polanyi, "The Republic of Science: Its Political and Economic Theory," *Minerva* 38, no. 1 (2000): 1–21.
27. HC, 271, ff. 26.
28. 'Objectivity' in this instance reflects the colloquial sense of the term, in contrast with Arendtian perspectival objectivity, as discussed in the previous section. Nonetheless, and importantly, it is still rooted in the world of things and in the instrumental rationality that had come to define modern science. In other words, there is an ongoing tension in Arendt's invocations of the concept of objectivity between her own definition and the historical meaning of the term – the target of her critique.
29. Arendt's account is echoed in contemporary histories of science, which highlight the centrality of 'things', communal organization and the problem of replication to the foundation of scientific objectivity and authority. See, for example, Porter, *Trust in Numbers*; Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* no. 40, Special Issue: Seeing Science (Autumn, 1992), pp. 81–128.
30. Cathryn Carson, *Heisenberg in the Atomic Age: Science and the Public Sphere*, Publications of the German Historical Institute (Washington, DC; Cambridge, England; New York: German Historical Institute; Cambridge University Press, 2010), 175.
31. In light of more recent histories of objectivity one may add that this enclosure had been compromised in the 19th and 20th centuries by what Arendt might call an invasion of labour into the very organization of science as work: the rapid expansion of the scientific community through the expansion of its standards and criteria, which demanded greater internal regulation and homogenization of tools and measurements, and introduced a less than skill-based division of labour for an ever-expanding and heterogeneous workforce. See Daston, "Objectivity and the Escape," 597–618. That Arendt herself was at least aware of this process is evidenced by the analogy she draws between science and modern markets as a standardized system of exchange-value (HC, 307).
32. Curtis, "Feminist Theorizing," 181.
33. Hannah Arendt, *Essays in Understanding, 1930-1954*, ed. Jerome Kohn (New York: Harcourt, Brace & Co, 1994), 70–71.
34. I borrow the term 'trial of history' from Leora Bilsky's reading of Arendt's account of the Eichmann trial, as it managed, through its failures of proper procedure, to become a stage, or battleground, for competing histories. See Leora Bilsky, "Between Justice and Politics: The Competition of Storytellers in the Eichmann Trial," in *Hannah Arendt in Jerusalem*, ed. Steven E. Aschheim (Berkeley: University of California Press, 2001), 236.
35. Notably, Arendt alludes to the existence and importance of this type of boundary in her reference to Montesquieu, 'whose concern was not with laws but with the actions their spirit would inspire" and therefore "defines laws as *rapports* subsisting between different beings' (HC, 191).
36. HC, 241.