Three – Number: Calculative Politics

The Problem of World

> The essence of man has been decided long ago. Namely, man is an 'organism [or creature, *Lebewesen*]' and indeed an 'organism' that can invent, build and make use of machines, an organism that can *reckon* [rechnen] with things, an organism that can put *everything whatever* into its calculation and computation [*Rechnung und Berechnung*], into the *ratio*. Man is the organism with the gift of reason. Therefore, man can demand that everything in the world happen 'logically'. (GA51, 90–1; see GA54, 100–1)

Aristotle's definition of the human continues to exercise Heidegger throughout his career. In this example, from 1941, he makes clear a theme that has been developing in his thought for many years. Indeed, the discussion of this phrase back in the *Plato's* Sophist course, quoted as an epigraph to this book, had made the link between the 'rational animal' and the question of calculation: 'connected with this definition is that of man as the being which calculates [*rechnet*], *arithmein*. Calculating does not mean here counting [*zählen*] but to reckon something, to be designing [*berechnend sein*]; it is only on the basis of this original sense of calculating [*Rechnen*] that number [*Zahl*] developed' (GA19, 17–18). Many years later, in the winter of 1942–43 that saw the German army defeated at Stalingrad, Heidegger declares that 'man as *animal rationale* is the "animal" that calculates, plans, turns to beings as objects, represents what is objective and orders it' (GA54, 232; see GA7, 52).

It is therefore worth noting that if the first chapter of this study traced concerns across the period of about a decade, and the second narrowed its focus to a very short span of time, this final chapter ranges across Heidegger's entire thought, though with an emphasis on

the period from 1936 to the end of the war. In a sense, this chapter's topic is Heidegger's mature political thought, a product undoubtedly of the thinking through of what had occurred between 1933 and 1934, but also of the sustained reflection his thought had brought to bear on a number of related issues. Chapters Two and Three, then, in part, show Heidegger offering two different responses to the key question Chapter One identified: the question of being-together politically, the wider realm to which *phronesis* is addressed. Chapter Two shows the immediate response in the face of the crisis; Chapter Three is the painful and painstaking rethinking of precisely this problem. The years 1933–34 are the time of crisis, in the Greek sense of *krisis* as a critical turning-point, a moment, one of decision, an *Augenblick*, a *kairos*. *Krisis* as a decision, related to *krino*, is a splitting apart, a separating, indeed an *Auseinandersetzung*. On reflection, across a longer stretch of time, a *khronos*, a more measured time that asks not only about the measure of time, other perspectives emerge. As Heidegger remarks early in his career, '*phronesis* requires *khronos*' (GA19, 140), '*bouleuesthai* needs *polun khronon*. As opposed to precipitous action, correct deliberation takes time' (GA19, 152). The key question is the extent to which the Heidegger of Chapter Three is only possible as a response to the Heidegger of Chapter Two.

The set of concerns that Heidegger mobilises to rethink this problematic notably includes the move from *logos* to *ratio*; the mathematicisation of this notion; the relation between these words that share a stem in the notion of *rechnen*; and the subsequent ordering of the world. We begin with the last of these, because it enables us to return to Heidegger's early writings with a new emphasis. This is because, though the phenomena of world is important in Heidegger in numerous places, what is interesting politically is how 1924's notion of being-in-the-*polis* becomes being-in-the-world in *Being and Time*. Although it might be tempting to see this merely as an apolitical re-rendering of Aristotle, it is more complicated than that in two registers: the scope of being-in-the-world and the way in which this is put together.

Being-in-the-world, as a fundamental structure of Dasein, is largely concerned with the surrounding environment, the *Umwelt*. This is made up of material things, and the analyses of equipment come in this context. In terms of the structure of *Being and Time*, this is the first three chapters of the first division, before Heidegger broadens the inquiry to look at encounters with others, in the *Mitwelt*, as was discussed in Chapter One. This is the first complication: being-in-the-

world is both an element of the *Mitwelt* and yet, in terms of the successive stages of Heidegger's argumentation, more limited, and therefore more circumscribed than the notion of being-in-the-*polis*. The second complication is that Heidegger wants to distance himself from many other understandings of what the world is. In part, this is about the mode of connection of the material world. We are not beings, who are in a world, but always already in a world in our being, being-in-the-world (GA2, 52–3). Similarly, the world is not constructed along mathematical, scientific lines, but encountered through experience and living.[1]

In *Being and Time*, Heidegger declares that 'in the ontology of the ancients, the beings we encounter within the world are taken as basic examples for the interpretation of being. *Noein* (or the *logos*, as the case may be) is accepted as a way of access to them' (GA2, 44). In his readings of the pre-Socratics, Heidegger uses Parmenides and Heraclitus to suggest that the world, the *kosmos*, is not 'present-at-hand beings as such [*vorhandene Seiende als solches*]', but rather a 'condition [*Zustand*]' or a 'mode of being [*Weise zu sein*']' (GA26, 219).[2] It is in that sense an ontological issue, concerned with how, rather than what, *is*, that is a question of the being of beings rather than beings themselves.

This stress on the ontological determination is important because, hinted at in *Being and Time*, and explored in much more detail elsewhere, is the fundamental question of the mode of connection. In a sense, this is a mathematical question, as we saw with issues concerning magnitude, calculation and measure in Chapter Two, and bears relation to understandings of arithmetic and geometry, numerical and spatial relations (GA22, 254; see GA56/57, 25–6). But Heidegger continually makes the point that the nature of mathematics is not itself a mathematical question; just as biology in itself is not biological and philology is not itself understandable through philology (see, for example, GA22, 5–6; see GA44, 117–18; N II, 111–12). The question of mathematics is not therefore one that can be reached by way of mathematics – that is, through proofs or concepts – but is a properly philosophical question. While the positive sciences can say something about beings, they cannot talk about *being* (GA22, 6–8). Their statements are exclusively about beings, which is why mathematics cannot be defined mathematically. 'The mathematician deals in numbers or spatial relations, but not in number as such, that is the being of numbers; he does not deal in space as such, the being of space, of what and how it is' (GA22, 8, see 293).

Heidegger certainly had some knowledge of mathematics that went beyond the merely philosophical. If our reading here is largely concerned with the ontological and political issues that arise from his discussions, this does not mean that only he knew this level. Between 1911 and 1913, as a graduate student, Heidegger took ten courses in geometry, calculus and algebra, alongside subjects in physics, chemistry and philosophy.[3] This was after he had left the theology faculty, and though his final dissertation was on judgement in psychologism (GA1, 59–188), and he later moved into philosophy, he used to examine mathematics PhD students, and continued to have an interest in mathematical issues.

For example, in a 1925 Kassel lecture on Dilthey (to appear in GA80) there is a discussion of the geometrical presuppositions of the theory of relativity, looking at elliptical and hyperbolic geometry.[4] On presenting his *Habilitationsschrift* to Freiburg in 1915, Heidegger offered three topics for the requisite trial lecture: 'The Concept of Time in History', 'The Logical Problem of the Question', and 'The Concept of Number'.[5] Only the first was delivered (GA1, 415–33), but it seems that the third was the original topic of the *Habilitationsschrift* itself, changed because of Heidegger's then desire to take up a chair in Catholic Philosophy.[6] Similarly, in the *History of the Concept of Time* course, he makes reference to the debate between Hilbert's formalism and Brouwer and Weyl's intuitionism. But, it has to be said, even here the aim is really to get to the question of foundations rather than to *do* mathematics (GA20, 4–5; see GA2, 9–10). It is also worth recalling the heritage of phenomenology: as Heidegger reminds his students, Husserl was 'originally a mathematician' (GA20, 28; see GA21, 31), and in a 1915 curriculum vitae Heidegger notes the importance of Husserl's *Philosophy of Arithmetic* (GA16, 38).[7]

There is not the space here to provide a detailed reading of Chapters II and III of the first division of *Being and Time*, which are entitled 'Being-in-the-World in General as the Basic State of Dasein', and 'The Worldhood of the World'.[8] A few remarks on one key issue are, however, necessary. This is the way Heidegger outlines four ways in which world is conceived. These are distinguished by two fundamental divisions – as ontic or ontological; and as including Dasein or separate from it. The first, ontic, exclusive understanding is 'the totality of those beings which can be present-at-hand within the world'; second, the ontological version of this, is the being of those beings. Third, ontic and inclusive, is an understanding of the 'wherein' each Dasein 'lives', either the *Mitwelt* of shared experience, or the

domestic *Umwelt* particular to a Dasein. The fourth is the ontological understanding of this, worldhood, what makes the third kind possible. Heidegger reserves his use of the term world for the third kind, the kind found in the term being-in-the-world. What is interesting is that the first is the common understanding, and the second the ontological casting of this 'world' (Heidegger reserves single quotation marks for the world in this first sense) (GA2, 64–5; see GA26, 231–2). As Heidegger makes explicit slightly later, the key operation in an ontology of 'world' is found in Descartes understanding of *res extensa* (GA2, 66).

As Heidegger declares in early 1930, '*logos*, *ratio*, *Vernunft* [reason], *Geist* – all these titles are disguises for the problem of world' (GA29/30, 508). (It is worth noting that the last three are also 'translations' of the first (see GA2, 32, and the discussion in Chapter One)). These four terms, with their association with four great thinkers – Aristotle, Descartes, Kant and Hegel – are guiding themes in Heidegger's investigation into the ontological determination of the world. Aristotle, Descartes and Kant were, of course, the projected subjects of the three divisions of the second part; Hegel is discussed in *Being and Time* only briefly, but largely in the context of Aristotle and time (GA2, 428–36). If Aristotle and Descartes will receive most treatment here, it is worth first briefly noting the issues raised in Heidegger's reading of Kant.

In the *Critique of Pure Reason*, Kant attempts to separate out world and nature, despite the fact that they are often conflated. The world is the 'mathematical sum-total of all appearances', a totality, that is in its large form as an aggregate or composition [*zusammensetzung*], as well as in the small form through division. Nature is 'this same world . . . when it is viewed as a dynamical whole and one does not look at the aggregation in space or time so as to bring about a quantity, but looks instead at the unity in the existence of appearances'.[9] The world, therefore, is the *totum* of beings, a mathematical totality, and nature the dynamic totality (GA26, 226).[10] What we find in Heidegger's pursuit of this issue is crucial, since he separates out 'the mathematical categories of quantity and quality, and the dynamic categories of relation and modality' (GA26, 226). Although Heidegger is at pains to point out that neither mathematical or dynamic here means anything too close to the use of those terms in physics, there is something very revealing here. 'For Kant's general ontology, the exemplary being is, of course, nature, i.e., beings-in-themselves as discovered by the mathematical science of nature' (GA26, 227; see GA25, 43–5).[11]

Dynamic categories deal with the that-being, the existential attributes of the nature of beings; mathematical categories deal with the what-being, the essential characteristics (GA26, 228). While the way Heidegger discusses this notion here, and the following course which provides a more thorough historical overview and discussion of Kant in the second division on 'Philosophy and Worldview' (GA27, see especially 239–58),[12] is rather underdeveloped, he is opening up in a productive way an issue that would dominate his thinking from the mid-1930s on. This is the question of calculation, and how mathematical models of seeing the material world are reductive and ultimately dangerous. In the course devoted to Kant from 1927–28, designed to work through the first *Critique* in detail, Heidegger's question is 'how must nature be determined and thought in advance, so that the entirety of this being as such can be accessible to calculative knowledge in a fundamental way?'. His answer, drawing upon the changes initiated by Galileo and Kepler, but most fundamentally, as we shall see, in Descartes, is this:

> Nature must be circumscribed as what it is in advance, in such a way as to be determinable and accessible to inquiry as a closed system [*Zusammenhang*] of the locomotion [*Ortsveränderunen*] of material bodies in time. What limits nature as such – movement, body, place, time – must be thought in such a way as to make a mathematical determination possible. Nature must be *projected* [entworfen] in advance unto its mathematical constitution. (GA25, 30–1; see GA2, 362; GA41, 103/102–3; GA15, 313–14)

There are several crucial issues here, notably the way in which what nature is is determined *in advance*, in other words that it being as such is determined in order to make observations about its particularities. Nature is understood as the movement of bodies through place, *Ort*, in time – the determinate characteristics of modern physics – but determined in a thoroughly mathematical way. Mathematics here is a particular sense, a modern sense, of composition and division. The limits of the system, the composition of the thought of nature, become the limits of nature itself. Nature ceases to be what it might be except in terms of the system through which it is understood. 'It is only on the basis of disclosing the mathematical constitution of nature that the knowing determination of nature obtains meaning and justification according to measure, number and weight [*Maß, Zahl und Gewicht*]' (GA25, 31–2; see GA21, 204). In Kant's thought this gets played out

in the conception that, instead of our cognition conforming to objects, objects actually must conform to our cognition;[13] and that the 'conditions of possibility of experience in general are simultaneously the conditions of possibility for the objects of experience'.[14] As Heidegger phrases it, 'there is already an *a priori* knowledge upon which each empirical measurement depends, i.e. to which this measurement must correspond and conform' (GA25, 56; see GA2, 362).

Heidegger returns to this theme again and again, adding nuance to his argument. His key point is that the break with previous understandings of nature is not that experiment is key, as the Greeks also experimented, nor that quantitative measure is used, because measuring and counting had been used in the Greeks and the middle ages (GA34, 61; GA41, 68–9/68). Nor is it that modern science works with facts and medieval science with concepts, because both work with both (GA41, 66/66). Rather, it is the way that they are conceived, in that in modern science 'a projection was made which *delineated* [umgrenzt] in advance what was henceforth to be *understood* as nature and natural process: a spatio-temporally determined totality of movement of masspoints [*Massenpunkten*]. In principle, despite all process and transformation, this projection of nature has not changed to the present day' (GA34, 61).[15] Indeed, following these changes, Heidegger suggests that philosophy itself demonstrates its propositions by geometrical means; *more geometrico*' (GA56/57, 18–19).

One of the telling instances is that Kant conceives of the proposition 'all bodies are extended' as an analytic judgment – that is, that the predicate is contained in the very idea of the subject – while 'some bodies are heavy' is a synthetic judgement, that is, it tells us something more, with an implicit stress on the 'some'.[16] Heidegger pursues this in a discussion of Kant's suggestion in the *Critique* that 'space is represented as an infinite magnitude [*Größe*] that is given'.[17] By magnitude, Kant does not mean a simple amount [*Großes*], that could be summed to another, but, Heidegger suggests, something like greatness [*Großheit*]. Kant uses the Latin *Quantum* rather than quantity [*Quantität*] to describe this. Where quantity is confined to the categories of unity, plurality and totality – modes of comparison – comparison is not the issue with *quantum*, magnitude. Heidegger cites Kant's *Reflexionen*, which suggests that 'the *quantum* wherein all quantities can exclusively be determined is . . . space and time'.[18] In other words, the quantum is the determination, the condition of possibility, for particular quantities: 'magnitude is that which makes possible anything that is determined as having a magnitude . . .

magnitude as greatness is itself neither big nor small [*Die Größe ist als Großheit nicht selbst groß oder klein*] (GA25, 118–20).[19]

It is worth remembering that, for the early Heidegger, as with so many other issues, his concern with measure and calculation is largely orientated around the reductive understanding of time. In the lecture on 'The Concept of Time', there is a brief discussion of measure in relation to Augustine's reflection of time in his *Confessions* (GA64, 111; see GA64, 18; GA60, 284–6; GA31, 120–1), and Heidegger bemoans the mathematicisation of time as a variable *t* to add to the mathematical coordinates of *x*, *y* and *z* later in the same lecture. 'Once time has been defined as clock time [*Uhrzeit*]', Heidegger declares, 'there is no hope of ever arriving at its original sense again' (GA64, 122).[20] It is in relation to this concern that we find most of the remarks in this topic in *Being and Time*, including brief discussions of Aristotle and Hegel on calculative time (GA2, 413–36; see also GA21, 251–62; GA24, 352ff; GA26, 256–9; GA64, 91–2),[21] although there are some additional comments in the discussion of the spatiality of worldhood (for example, GA2, 111–13).[22] Heidegger suggests that 'the connections between historical numeration, astronomically calculated world-time and the temporality and historicity of Dasein need further investigation' (GA2, 419 n. 4),[23] although Heidegger also references back to a lecture he gave in 1916 (GA1, 415–33).[24] These questions will be returned to in the discussion of Descartes below, for Descartes takes on a privileged position in Heidegger's reading of how the tradition has moved to this mathematical projection of nature. But before we move to this, we need to analyse how Heidegger thinks the question of number is determined in the Greeks.

Arithmetic and Geometry

Heidegger provides two detailed discussions of the question of number in his early work,[25] which are important both because they contain his most thorough discussion of ancient mathematics and because they are the foundation of his later work on issues of calculation more generally. The second is found in the Summer 1926 course on the *Basic Concepts of Ancient Philosophy*. Delivered at the very moment Heidegger was finalising the parts of *Being and Time* that were published – May to July 1926 – this course and the as yet unpublished one from the following semester on *History of Philosophy from Thomas Aquinas to Kant* (GA23) provide a broader but summary reading of almost the entire tradition. *Basic Concepts of*

Ancient Philosophy is interesting in general terms because it contains some of the most detailed discussions of the pre-Socratics to be found in the Heidegger of the 1920s.

Heidegger discusses how Thales, the first scientific philosopher, is also the first Greek mathematician, and this, he suggests, is not by chance. *Mathema*, that which can be taught, stands in place of science in general, and is useful both as a theory and as a practical tool, being related to maritime geography and the calculation of distances between coasts (GA22, 40, 51–2). Thales took the Egyptian geometry of empirical measurement, and turned it into an abstract and deductive process.[26] In relation to the Pythagorians and the representation of numbers in the geometric figure of the triangle, Heidegger contends that 'the Greeks did not think in a purely arithmetic manner, but more in the mode of spatial figuration and representation' (GA22, 221). He continues to suggest something whose implications, here, at least, are not worked through: 'Concerning this spatial figure, we apprehend the spatial as much as number. Number becomes *logos*, "concept", number makes possible the conceivable and definable nature of being' (GA22, 221). Elsewhere there is a brief discussion of Zeno of Elea, the thinker Aristotle would dispute in his analysis of movement in *Physics* Book IV (see GA22, 71–6, 237–40), and the notion of the *kenon*, the void, in relation to that of *topos* (GA22, 244–5, 319; see GA32, 176–7). This discussion culminates in the crucial assertion that the merit of Zeno's work is that it is neither time nor space which is the problem, but the continuum. The continuum – the mode of connection of being – is the phenomenon 'equally at the base of magnitude [*Größe*], space and time' (GA22, 76, see 239–40).[27]

The more important of the two discussions is found, yet again, in the crucial *Plato's* Sophist course. A few weeks into the course, Heidegger turns aside from his main aim at that point, which is the meaning of *sophia*, and discusses mathematics in some detail. It is this seemingly tangential discussion or excursus [*Exkurs*] that seems to me to contain the single most important *philosophical* discussion of number in his work. Indeed, as he declares immediately after this discussion, this is by no means unrelated to the wider concerns of this discussion: '*Metrein*, to take measure [*messen*], to determine, is the mode in which Dasein makes something intelligible. *Metron* and *arithmos* belong in the same realm as *logos*, namely the realm of *aletheuein*' (GA19, 126).[28]

The purpose of this excursus is first to examine *mathematike* in general, and second *arithmetike* and *geometria*. The mathematical

sciences have as their theme *ta eks aphaireseos*, that which shows itself as withdrawn from something, specifically from what is immediately given – *phusika onta*. In other words, mathematics is an abstraction from being. This is generally accredited to Thales. This abstraction is recognised by Aristotle when he speaks of *khorizein*, a separating, which links to the important word *khora*, which Heidegger here translates as 'place' [*Platz*]. For Heidegger, therefore, mathematics takes something away from its own place. But mathematics itself does not have a *topos*. This might have the ring of a paradox, as *topos* is often translated as 'space' [*Raum*]: Heidegger prefers 'place' [*Platz*]. (We should note here that Heidegger therefore sees both *khora* and *topos* as *Platz*, though he clarifies the latter with the additional word *Ort*, which is usually translated as 'locale' or 'place'.) Heidegger suggests that the *khorizein*, the separating, is for Aristotle the way in which the mathematical becomes objective. This is clearly linked to the *khorismos* of Plato's ideas, where the ideas have their *topos* in the *ouranos*, the heavens (GA19, 100–1).

In the *Physics* Book II, discussing the scope of natural science, Aristotle examines the mathematical objects of *stereon* and *gramme* – solids and lines. Whilst these can be considered as *phusika*, with a surface as *peras*, the limit of a body [*als Grenze eines Körpers*], the mathematician considers them purely in themselves (193b32).[29] Heidegger suggests that this negative description of the mathematical in Aristotle – 'that it is *not* the *peras* of a *phusikon soma*' – means that 'the mathematical is not being considered as a "place" [*Ort*]. Therefore, this abstracting, this extraction [*Heraussehen*] of the essence of the mathematical from the realm of *phusikon soma*, is essential, but *oyden diaphora*, it makes no difference [*macht das keinen Unterschied*].' By this, Aristotle means that the abstracting does not turn them into something else, but the 'what' of the *peras* is simply taken for itself. The *khorizein* therefore, this extracting, does not distort. Such an extracting is at play in the ideas generally. Now *khorismos* has a justifiable sense in mathematics, but not where *beings* are concerned. For the *phusika onta* are *kinoumena*, related to motion, and hence cannot be removed from their *khora*, their place [*Platz*]. Being and presence are determined in relation to a place, a *topos* (GA19, 101–2).

In Aristotle, Heidegger contends, there is therefore a clear differentiation between arithmetic and geometry – the former is concerned with *monas*, the unit; the latter with *stigme*, the point. *Monas* is related to *monon*, the unique or the sole, and is indivisible according to

quantity. *Stigme* is, like *monas*, indivisible, but unlike *monas* it has the addition of a *thesis* – a position, an orientation, an order or arrangement. *Monas* is *athetos*, unpositioned; *stigme* is *thetos*, positioned (*Metaphysics*, 1016b29–31). This addition – this *prosthesis* – is crucial in understanding the distinction between arithmetic and geometry. For those of us interested in the questions of space and place, it is frustrating that Heidegger does not provide an answer to the question of 'the meaning of this *thesis* which characterises the point in opposition to the *monas*?'. He recognises that a 'thorough elucidation of this nexus would have to take up the question of place and space', but at this point can only look at what is necessary to describe mathematics (GA19, 102–4).

In doing so, Heidegger clarifies the distinction [*Unterschied*] between *thesis* and *topos*; position [*Lage*] and place. Mathematical objects are for Aristotle, Heidegger says, '*ouk en topo*' (*Metaphysics*, 1092a18–20),[30] 'not any place [*nicht an einem Platz sind*]'. As I have discussed elsewhere, Heidegger is at pains to disregard any modern conception of space here, turning instead to *Physics* Book IV, which discusses the notion of *topos*.[31] The crucial issue is that *topos* has a *dunamis*, but this is not to be understood as force or power.

> *Dunamis* is here understood in a quite strictly ontological sense; it implies that the place [*Platz*] pertains to the being itself, the place constitutes precisely the *possibility of the proper presence* [Möglichkeit des eigentlichen Anwesendseins] of the being in question. This possibility, like every possibility, is prescribed in a determinate direction: every being has *its* place [*Jedes Seiende hat* seinen *Ort*]. The *dunamis* of the *topos* pertains to beings themselves as such . . . Each being possesses in its being a prescription toward a determinate location or place [*Platz, Ort*]. *The place is constitutive of the presence of the being.* [(GA19, 105–6)[32]

According to Aristotle, above/below, front/back and right/left are crucial to determining a place. But these determinations are not always the same, that is, though they are *absolute* within the world, they can also change in relation to people. This change is one of *thesis*, orientation, therefore *topos* is not the same as *thesis*. Geometrical figures have *thesis*, they can have a right or a left for us, but they do not occupy a place (208b22). Now if geometry does not have a place, what indeed is place? It is only because we perceive motion that we think of place, therefore only what is moveable [*kineton*] is in a place. Glossing two lines of the *Physics*, Heidegger contends that

'place is the *limit* [Grenze] *of the periekon*, that which delimits [*umgrenzt*] a body, not the limit of the body itself, but that which the limit of the body comes up against, in such a way, specifically, that there is between these two limits no interspace [*Zwischenraum*], no *diastema*' (GA19, 108).

While it is undoubtedly easier to take the extension of the material or the limit to the form as the place in itself, we should rather try to think place ontologically, remembering that place has a *dunamis*. Rather than an external determination of things in advance, place is rather an innate capacity of beings as such, their very constitute ability to be present: 'place is the ability a being has to be there [*Dortseinkönnen*], in such a way that, in being there, it is properly present [*dortseiend, eigentlich da ist*]' (GA19, 109).[33]

When geometry intervenes, what it extracts from the *aistheta* in order for it to become the *theton* is precisely the moment of place [*Ortsmomente*]. These moments of place are the *perata* of a physical body, and in their geometrical representation acquire an autonomy over and against the physical body. So geometrical objects are not in a place, but have directions – above/below, right/left, and so on. We can use this to give us insight into the positions as such, an *analysis situs*, even though geometry does not possess the same determinations. Every geometrical point, line, surface is fixed through a *thesis*, they are therefore *ousia thetos*. The *monas* does not bear an orientation, therefore they are *ousia athetos*.[34] Geometry therefore has a greater proximity to the *aistheta* than does arithmetic: arithmetic is more detached, more separate. The basic elements of geometry – point, line, surface – are the *perata* for the higher geometrical figures. But for Aristotle, in opposition to Plato, such higher geometrical figures are not *put together* out of such limits (231a24ff). A line will never arise out of points, nor a surface from a line, nor a body from a surface, for between any two points there is again and again a *gramme*. Heidegger takes this forward by discussing the unity that must arise in order for lines to be made of points, surfaces from lines, and so on. He relates these questions to arithmetic too, asking what is the mode of manifoldness of number? (GA19, 110–12).

In investigating this manifold [*Mannifgaltigen*], this mode of connection, Heidegger reminds us of the link between geometry and the *aistheta*. 'Everything in *aisthanesthai* possesses *megethos*; everything perceivable has stretch [*Erstreckung*]. Stretch, as understood here, will come to be known as continuity'. Aristotle derives this notion of continuity [*synekhes*] not from his work on geometry, but on

physics.[35] This occurs in *Physics*, Book V, in the discussion of co-being, being-together [*Miteinanderseins*], the *phusei onta*. This *Miteinandersein* is, of course, not the same as the being-with-another of human community, discussed in Chapter One, but, as we shall see, there are some important issues in their relation. There are seven forms of co-being.

1. the *hama*, the concurrent – understood as something concerning place, not temporality. The *hama* is that which is in one place.
2. *khoris*, the separate – that which is in another place.
3. *haptesthai*, the touching – that whose ends are in one place [*hama*].
4. *metaksu*, the intermediate – that which something, in changing, passes through. Such as a boat moving in a stream, the stream is the *metaksu*, the medium.
5. *ephekses*, the successive – where something is connected to something else, and between them there is nothing 'of the same lineage of being'. There might be something else, but not another of the same.
6. *ekhomenon*, the self-possessed – an *ephekses* determined by *haptesthai*. In other words, a succession where the ends meet in one place, the *hama*.
7. *synekhes*, *continuum* – a complicated form, since it presupposes the other determinations. It is an *ekhomenon*, but more, a *hoper ekhomenon* – more originary, not only do the ends of the elements of a succession meet in the same place, but the ends of one are identical with the other (GA19, 113–15; see GA22, 318–19).

'These are the determinations of being-with-another. The *synekhes* is the structure that makes up the principle of *megethos*, a structure which characterises every stretch' (GA19, 115). *Monas* and *stigme* cannot be the same, shows Aristotle, for the mode of their connection is different. For points are characterised by *haptesthai*, by touching, indeed they are *ekhomenon* – an *ephekses* determined by *haptesthai*. But the units (of arithmetic), the *arithmos*, have only the *ephekses*. The mode of connection of the geometrical, of points, is characterised by the *synekhes*; the series of numbers – where no touching is necessary – by the *ephekses*. To consider geometrical figures, therefore, we must add something over and above the *ephekses*. These additions – *megethos*, *pros ti*, *thesis*, *topos*, *hama*, *hupomenon* – ensure that the geometrical is not as original as the arithmetical (GA19, 115–16).

Heidegger is now steering his excursus back to the issue of *sophia*

through reference to Chapter Six of Aristotle's *Categories*, where there is a discussion of *poson*, quantity. Heidegger claims that what is posited in the *thesis* is nothing else than the continuum itself. 'This basic phenomenon is the ontological condition for the possibility of something like stretch, *megethos*: position and orientation are such that from one point there can be a continuous progression to the others; only in this way is motion understandable' (GA19, 118–19). The line, which is continuous, can have points extracted from it, but these points do not together constitute the line. The line is more than a multiplicity of points, it has a *thesis* (5a15–37). But with numbers there is no *thesis*, so the series of numbers has a constitution only by way of the *ephekses* (4b22–30). Because a *thesis* is not required to understand arithmetic, number, *arithmos*, is ontologically prior: it seeks to explain being without reference to beings – which is why Plato begins with number in his 'radical ontological reflection'. But Aristotle does not claim this. Instead, he shows that the genuine *arkhe* of number, the unit, *monas*, is no longer a number, precisely because it is without the mode of connection. Instead, the *monas* is that which is, the one, 'every *on* is a *hen*', every being is a one (GA19, 117). What this means is that 'for Aristotle the *monas*, the unit, is itself not yet number; instead the first number is two' (GA19, 111),[36] and therefore a more fundamental discipline is discovered, that which studies the basic constitution of beings, namely *sophia* (GA19, 120–1; see *Metaphysics*, 982a28).

We can see in this incredibly rich exegesis of Aristotle why Heidegger later suggests that '*Aristotle's* Physics *is the hidden, and therefore never adequately studied, foundational book of Western Philosophy*' (GA9, 242/185; see GA10, 92/63; GA69, 6).[37] It raises a large number of interesting and challenging points, of which this summary shows some of the ones I find most important or intriguing.

1. Mathematics is an abstraction, an extraction from, an extractive looking at [*Heraussehen*] being. There is therefore a *khorizein*, a separating, between mathematics and being.
2. Arithmetic's *monas*, the unit, is *athetos*, unpositioned; geometry's *stigme*, the point, is *thetos*, positioned.
3. Mathematical objects are positioned but do not have a place. For the Greeks, the objects they are abstractions from have a place. The modern concept of space is not present in either.
4. Place has a *dunamis*. This should be understood ontologically: every being has *its* place. Place is something belonging to beings as such: it is their capacity to be present.

5. The extension of material is not sufficient to understand place.
6. Motion is tied up with place. Only what is movable is in a place, but place itself does not move.
7. Everything perceivable has stretch, size, *megethos*. This is understood as *synekhes*, the *continuum*. This is a succession, not only where the ends meet in one place, but where the ends of one are identical with the next.
8. This is the crux of the difference between arithmetic and geometry: the mode of their connection is different.
   Arithmetic – succession where between the units there is nothing of the same lineage of being; and it is only with the second that there is truly number.
   Geometry – succession where the ends of one point are the ends of the next.
9. Therefore, though points can be extracted from a line, these points do not constitute the line. The line is more than a multiplicity of points, the surface more than a multiplicity of lines, the solid more than a multiplicity of surfaces.[38]

What Heidegger provides in this excursus is both illuminating as a gloss on Aristotle and crucial in opening up some issues in the history of the tradition. Is this distinction maintained, or does later thought challenge or ignore it? How does this happen and why is this important? It seems to me that the full implications of this excursus are not really returned to for many years. While Heidegger is interested in mathematical issues throughout his career, it is difficult to think of another passage where he discusses these issues *philosophically* in as much depth.

Descartes and Extension

Although geometry itself is mentioned only twice in *Being and Time* (GA2, 68, 112), it is behind the extensive critique of Descartes in that work, and was likely to have been explored in more detail in the promised but never published division (the second of Part Two) that was to treat Descartes explicitly (see GA2, 40).[39] As Heidegger notes, his preliminary remarks in the first division 'will not have been grounded in full detail until the phenomenological de-struction of the "*cogito sum*"' (GA2, 89). As I have tried to show in *Mapping the Present*, Heidegger's critique is both of Descartes' particular way of conceiving the subject, and also of the way in which he conceives of space. The more detailed discussion of this can be found in that earlier

work.[40] Heidegger's point is that rather than encountering a room in a geometrical spatial sense, we react to it as *Wohnzeug*, equipment for dwelling (GA2, 68; see GA24, 414). The way we react to space is much closer to notions of near/far or close/distant, not *primarily* determined by geometry and measurable distance, but by the more prosaic notions of closeness or nearness [*Nähe*], de-distancing [*Ent-fernung*] and directionality [*Ausrichtung*]. Space is encountered in everyday life, and lived in, not encountered in geometrically measurable forms and shapes. It is part of the structure of our being-in-the-world. Geometry is an abstraction from the world, but the results of this abstraction are taken by Descartes and Kant as fundamentals of our way of being.

Indeed, we can see how Heidegger's critique of Kant is, in certain key respects, a continuation of the critique of Descartes. Kant's metaphysics of nature is an ontology of *res extensa*, while the metaphysics of morals – which does not explicitly concern us here – is an ontology of the other side of the Cartesian division, the *res cogitans* (GA24, 197–8; GA20, 237, 322).[41] Instead of actually interrogating the being of the *sum* of the *cogito ergo sum*, or, in Kantian terms, 'the subjectivity of the subject', Kant is prepared to take Descartes' position forward 'quite dogmatically'. In other words, like Descartes, Kant failed to address the problem of both being and Dasein (GA2, 24; see 318–21). If this will have to suffice for one side, it is worth working through in detail how Descartes actually conceives of *res extensa*, and how this is developed in the thought of Leibniz. Indeed, Heidegger suggests that the way Descartes is understood in the tradition is 'at best only a bad novel' (GA41, 100/99).[42]

In Descartes' *Meditations on First Philosophy*, there is a clear distinction proposed between mind and body, with mind as *res cogitans*, and matter as *res extensa* – thinking thing and extended thing.[43] Extension is therefore at the heart of his project, as the central characteristic of nature. Initially, in the *Meditations*, properties of materials are put, like other things, into doubt. Descartes suggests that senses may be misleading, and therefore he will treat 'body, shape, extension, movement, and place' as figments of his imagination.[44] But, of course, all of these things put into doubt are retrieved in the movement of his thought.

> By 'body' I understand all that is suitable for being bounded by some shape, for being enclosed in some place, and thus for filling up space, so that it excludes every other body from that space.[45]

Descartes then discusses a thought experiment with a piece of wax. 'Let us direct our attention to this and see what remains after we have removed everything which does not belong to the wax: only that it is something extended, flexible, and subject to change'.[46] It seems clear that motion and change of shape have to be thought in relation to the substance to which they are attached, that is, an *extended* substance. Extension, Descartes contends, is contained within these concepts.[47]

> The unavoidable conclusion, then, is that there exists something extended in length, breadth and depth and possessing all the properties which we clearly perceive to belong to an extended thing. And it is this extended thing we call 'body' or 'matter'.[48]

The central properties of corporal things are 'namely, magnitude, or extension in length, breadth, and depth; shape, which arises from the limit of the extension; position, which the various shaped things possess in relation to one another; and motion, or the alteration of this position; to these can be added substance, duration and number'.[49] Where extension in length, breadth and depth constitute the being of the substance of nature,[50] the last three are derived from the analysis of the self, which Descartes distinguishes from a body in the following way: 'I am a thing that thinks and not an extended thing, whereas a stone is an extended thing and not a thing that thinks'.[51]

> I distinctly imagine that quantity, which philosophers commonly call 'continuous': namely, the extension of its quality, or rather the extension of the thing having quantitative dimensions of length, breadth, and depth. I enumerate the thing's various parts. I ascribe to these parts certain sizes, shapes, positions and movements from place to place; to these movements I ascribe various durations.[52]

This is the determination of the world, for Descartes, being is substance, extensible.[53] Geometry is the science that allows us best access to it. Descartes' *Discourse on the Method* is a theoretical prelude, to be followed by three examples – the *Dioptrics*, *Meteorology* and *Geometry*. With the first two, Descartes is merely trying to persuade us that his method is better than the ordinary one. But with the *Geometry*, he claims to have 'demonstrated it'.[54] There are two key points that I want to address: first, the distinction between Descartes' understandings of space and those of the scholastics; second, the revolution in geometry he undertakes. In the first the issue is the object of study; in the second it is the method.

There is a fundamental differentiation in scholasticism between *locus internus*, the space occupied by a body; and *locus externus*, the space or the external surface containing a body.[55] In the *Principles of Philosophy*, Descartes confronts this head-on.

> There is no real distinction between space [*spatium*], or internal place [*locus internus*], and the corporeal substance contained in it; the only difference lies in the way in which we are accustomed to conceive of them. For in reality the extension in length, breadth and depth which constitutes a space is exactly the same as that which constitutes a body. The difference arises as follows: in the case of a body, we regard the extension as something particular, and thus think of it as changing whenever there is a new body; but in the case of a space, we attribute to the extension only a generic unity, so that when a new body comes to occupy the space, the extension of the space is reckoned not to change but to remain one and the same, so long as it retains the same size and shape and keeps the same position relative to certain external bodies which we use to determine the space in question.[56]

The following article of the *Principles* pursues this point, and relates back to the experiment with the wax. Any attributes of a body can be removed – weight, colour, hardness, and so on – without it ceasing to be a body, save for the notion of extension. And extension, for Descartes, is exactly that 'comprised in the idea of a space', even an 'empty' [*vacuum*] space.[57]

> Thus we always take a space to be an extension in length, breadth and depth. But with regard to place, we sometimes consider it as internal to the thing which is in the place in question, and sometimes as external to it. Now internal place is exactly the same thing as space; but external place may be taken as being the surface [*superficiem*] immediately surrounding what is in the place.[58]

This is then very important, because Descartes is both introducing a notion of space, *spatium*, but erasing some of the distinctions hitherto felt essential. 'The terms "place" and "space", then, do not signify anything different from the body which is said to be in a place; they merely refer to its size, shape and position relative to other bodies.'[59] Place, for Descartes is more akin to position; and space to size or shape. Two different things in size and shape can occupy the same *place*, but clearly not the same *space*. And when something moves, it is its place that has changed, not its size or shape.[60] This is crucially

important, because it is space not place which lays claims for exclusivity. For Descartes, all corporeal nature 'is the object of pure mathematics'.[61]

Heidegger comments on this:

> Descartes asserts that what is distinctive in the *res naturae* is extensio, extension [*Ausdehnung*]; the natural thing is *res extensa*. Spatial spread [*Ausbreitung*] is indisputably one characteristic belonging to the things of nature experienced by us, but why did Descartes make this so distinctive, putting it forth as the fundamental determination? His intention is decisively a critical one, simultaneously negative and positive; negative: against the explanation of nature in medieval scholasticism, against the assumption of concealed forces; positive: with the intent of thus achieving a determination of the things and processes of nature, their movement, that makes scientific knowledge possible, with its corresponding provability and determinacy. Scientific knowledge is, however, mathematical . . . This is the construction of an idea of knowledge which presents itself first of all in the mathematical. But because mathematical knowledge is primarily related to what is spatial, extension is put forth as the primordial characteristic of substance . . . (GA33, 95/80)[62]

The second issue, that of the mathematical knowledge which is brought to bear on this issue is well illustrated in a letter to Mersenne. Mersenne had written mentioning that the mathematician Desargues has heard Descartes is giving up geometry. Descartes replied:

> I have only resolved to give up abstract geometry, that is to say, research into questions which serve only to exercise the mind; and I am doing this in order to have more time to cultivate another sort of geometry, which takes as its questions the explanation of the phenomena of nature.[63]

What we find here is in some ways a reversal of the move made by Thales. Geometry is no longer the Platonic ideal of mental exercise, but a science of the real world. Geometry and physics have the same *objectum*, 'the difference consists just in this, that physics considers its object not only as a true and real being, but as actually existing as such, while mathematics considers it merely as possible, and as something which does not actually exist in space, but could do so'.[64] For example, in the *Discourse on the Method*, Descartes says that the 'object dealt with by geometricians' is '*like* [emphasis added] a continuous body or a space indefinitely extended in length, breadth, and height or depth, divisible into various parts which could have

various shapes and sizes and be moved or transposed in all sorts of ways'.[65] Geometry is no longer simply an *abstraction* from being, but is seen as a generalisation of being. What Descartes does is to see geometry as equivalent to algebra. Just as algebra is symbolic logistic, geometry is a symbolic science. It is this, rather than the simple equation of arithmetic and geometry, that is his most radical break with the past.[66]

As Heidegger's ex-student Jacob Klein has shown, 'extension has, accordingly, a *twofold* character for Descartes: It is "symbolic" – as the object of a "general algebra", and it is "real" – as the "substance" of the corporal world'.[67] So, not only is Descartes moving geometry from abstract mental exercise to practical science – the foundation of physics, a study of the world – he assumes that the insights of geometry can tell us about the world. The concept of extension is not simply a geometrical property, *but a physical property*. Indeed, as Heidegger recognises, it is for Descartes 'the fundamental ontological determination of the world' (GA2, 89; GA22, 241, 244). As we noted above, it is a critique of scholasticism and provides the foundation for scientific knowledge (GA33, 94/80).

> The being of the world is nothing other than the *objectivity of the apprehension of nature through calculative measurement*. Contrary to all ancient and medieval knowledge of nature, physics is now *mathematical physics*. Only what is mathematically defined in the world can be properly known in it, and only what is thus mathematically known is *true* being . . . The proper being of the world is defined *a priori* by way of a particular and in fact possible kind of knowledge of the world as nature. (GA20, 245)

It is the *symbolic* objectivity of extension within the framework of the *mathesis universalis* that allows it to explain the being of the corporal world. 'Only at this point has the conceptual basis of "classical" physics, which has since been called "Euclidean space", been created'.[68] Newton is able to build on the developments through scholasticism and Descartes' work, and it reaches 'its first systematic and creative culmination' in his work (GA41, 77/76). For example, the first law of motion – that 'every body preserves in its state of being at rest, or of moving uniformly straight forward, except insofar as compelled to change that state by force impressed'[69] – is, according to Heidegger, discovered by Galileo, who only 'applied it in his last works and did not even express it as such', articulated by Baliani, attempted to be grounded metaphysically by Descartes, and then a

metaphysical law in Leibniz (GA41, 78–9/78). What this heritage provides is 'the foundation on which Newton will raise the structure of his mathematical science of nature'.[70]

What this means, and this is the crucial point, is that not only is the understanding of space as 'non-Euclidean' possible, but there is no such thing as Euclidean space. What we call Euclidean space is actually a seventeenth-century invention, based no doubt on the postulates of Euclid's *Elements*, but crucially introducing the idea that this is constituent of reality. Euclid, like Plato, sees his geometry as a mathematical system. It is the generalisation of this to explain the world that is the crucial element introduced in the seventeenth-century.[71] As David Lachterman, a student of Klein, has noted, we should ask *where* the lines, planes and points of geometry are actually found or installed. The conventional answer – 'Euclidean space' – has, he suggests, become so installed, so unrevolutionary, that we find it self-evident that some conception of 'space' *must* lie in the background of Greek geometry. But such an answer is so close to the need for such a 'space' in a modern mathematical physics of extended corporal entities and their motions that we should guard against accepting it as ahistorical. 'The locale of Greek geometry may be foreign to the modern conceptions of extension and space'.[72] Indeed, this is precisely what Lachterman argues. There is, he suggests, no term corresponding to or translatable as 'space' in Euclid's *Elements*.[73] *To khorion* 'is the area within a perimeter of a specific figure, while *topos* and *thesis* in the *Data* have functions determined by the contextual aims of that work as a "dialectical" foil to the *Elements*, not by a physics of space hidden in the background'.[74]

Lachterman's work is most valuable in showing that Euclid, who wrote in the wake of Plato's thought (though he never references him[75]), did not rely on this understanding of space defined by extension: indeed, not on a view of 'space' at all. So, Descartes' revolution is that not only does he introduce this word 'space' but, by conceiving of geometrical lines and shapes in terms of numerical co-ordinates, which can be divided, it turns something that is *thetos* into *athetos*; positioned into unpositioned. Indeed, for Descartes, it is the very nature of a body, *res extensa*, that it is divisible.[76] Atoms are impossible for Descartes, because we can continue to divide indefinitely. 'For if there were any atoms, then no matter how small we imagined them to be, they would necessarily have to be extended and hence we could in our thought divide each of them into two or more extended parts, and hence recognise their divisibility'.[77]

> In this discussion I have considered only curves that can be described upon a plane surface, but my remarks can easily be made to apply to all those curves which can be conceived of as generated by the regular movement of the points of a body in three-dimensional space [*par le mouuement regulier des poins de quelque cors, dans un espace qui a trois dimensions*].[78]

At the very beginning of the *Geometry*, Descartes boasts that 'all problems in geometry can be simply reduced to such terms that a knowledge of the lengths of certain straight lines is sufficient for their construction'.[79] Later he notes that 'in the method I use all problems which present themselves to geometers reduce to a single type, namely, to the question of finding the values of the roots of an equation'.[80] That is, geometric problems can be reduced to equations, the length (that is, quantity) of lines: a problem of number. The *continuum* of geometry is transformed into a form of arithmetic. The mode of connection of the geometrical for the Greeks is characterised by the *synekhes*; the series of numbers – where no touching is necessary – by the *ephekses*. Descartes' geometry, because of its divisibility, can only be *ephekses*. Descartes' understanding of space in terms of extension, in terms of mathematical co-ordinates, is a radical break with Greek thought. It is not a spatialising of calculation, but a calculation of space. The *continuum* is now a sequence of numbers, a multiplicity composed of units, *monas* as *hen*.[81] Geometry loses position just as place is transformed into space.

We will come on to some of the implications this has in a moment. While Heidegger certainly considers Descartes to be the essential and crucial break, it is important to note Leibniz here. Although Leibniz is not mentioned in *Being and Time*, Heidegger certainly recognises both the continuity and the distinction between his thought and that of Descartes in some of his early courses (see, for example, GA20, 241, 246, 322–5). In 1928, shortly after *Being and Time* was published, he devoted a lecture course to Leibniz in relation to logic (GA26) and the engagement continues into the following course (GA27). Heidegger also mentions that he discusses the *Monadology* in a 1929–30 seminar on 'truth and certainty in Descartes and Leibniz' (GA26, 87 n. 1); and in 1933–34 he gave a full seminar on this text. Related seminars – at least from their titles – were given in 1935–36, 1940–41 and 1944–45.[82]

In the 1928 course, Heidegger shows how the Cartesian move makes organic nature amenable to mathematical-geometrical theory. This was in particular a way of thinking about animals and plants,

matter in motion, a mechanistic understanding. When Descartes attempted to think about locomotion – that is *motio localis*, change of place, of movement – he did so without recourse to an understanding of force, partly because of its association with scholastic philosophies of nature (GA26, 91).[83] Leibniz, on the contrary, is concerned with reintroducing precisely this notion, that is, *dunamis* in a transformed Aristotelian sense: 'what remains invariable and constant is not the quantity of motion but the magnitude of force [*nicht die Quantität de Bewegung, sondern die Größe der Kraft*]' (GA26, 93).[84] To equate the extended with extension is mistaken, because it turns the magnitude of space into a substance itself (GA20, 323).[85] This theme is extended in a minor digression in the course on Aristotle's *Metaphysics* Book Θ from 1931.

> Leibniz turns against this determination of the being of natural things and says: The being of these substances does not lie in extension (*extensio*) but in activity [*Wirken*] (*actio*, *agere*). Two things must be noted in this new articulation of the being of natural things: (1) With this Leibniz does not want to eliminate the determination of *extensio*. This remains intact, but in such a way that it is acknowledged as grounded upon a more original determination of being in the sense of acting. (2) This concept of acting is now grasped in the context of our present problem such that the beings which are determined in this way now more than ever admit a mathematical determinacy. In this way it comes about that, in comparison with Descartes, a much more intimate and essential connection becomes possible between the mathematical method of measuring movement (infinitesimal calculus [*Infinitesimalrechnung*]) and the kind of being which is knowable, something we shall not enter into here. (GA33, 95–6/80–1)

For Leibniz, extension is thus not the fundamental determination, but a second order issue. That said, it does not lose its importance as an issue in itself. Second, acting, as the ground of extension, is itself mathematical. As Heidegger elaborates, the 'basic implications of this new formulation of the being of substances' applies to 'all substances, that is, all beings, not just the material things of nature' (GA33, 97/82). In a reassertion of Aristotle, Leibniz maintains that force is equally essential to the constitution of things, and that matter is but one part of the question,[86] something he developed philosophically in his *Monadology* (GA33, 101/86). Mathematical physics, with its understanding of force and the essentially mathematical characterisation of the world, emerges here (see GA33, 94/79).

The Measure of All Things

It is therefore clear that Heidegger has thought through numerous issues around the questions of calculation by the early 1930s. There are three key sources in the mid-1930s, all post-dating the Rectorial period, in which Heidegger returns to these themes with renewed vigour. These are the *Nietzsche* lectures; a course on Kant (1935–36); and the *Beiträge zur Philosophie (Vom Ereignis)*.[87] The *Beiträge* is a collection of manuscripts written in the years 1936–38, and first published in 1989, the centenary of Heidegger's birth and some thirteen years after his death (GA65). It is a vast book, over 500 pages in the German original, and it has often been seen as Heidegger's second major work, ranking with *Being and Time* in its importance.[88] This is an over-estimation, as the book we have is rather something of a workshop, a working out in rough form of a number of ideas that – originally intended for Heidegger's eyes only – are slowly brought to public attention in his lectures and publications. Nonetheless, it contains some remarkable possibilities.

While the detailed critique of Descartes in Heidegger's work in the *Nietzsche* lectures is in many respects close to what Heidegger said before, and is almost certainly a glimpse of what would have gone on in the unwritten Part Two of *Being and Time*, it is now developed in some important ways. Similarly, the lecture course on Kant is also close to previous material, but contains some important analyses. This particular course demonstrates in particular Heidegger's breadth of knowledge of classical and modern physics. However, it is in the *Beiträge* that the importance of these issues really becomes evident, because here we find the *political* issues explored in most depth.

One of Heidegger's central claims in *Being and Time* is that we have forgotten the question of being. Traditional philosophy, for Heidegger, has neglected the question of being in favour of studying beings. It is for this reason that at the very beginning of that book he quotes the passage from Plato's *Sophist* where the Eleatic stranger wonders what is meant by the expression 'being' (244a; GA2, 1). In the *Beiträge*, Heidegger suggests that there are three things that cause us to forget being: three concealments [*Verhüllungen*]. These are calculation [*die Berechnung*], acceleration [*die Schnelligkeit*] and massiveness [*Massenhaften*]. As we might expect from the three terms, the second two are dependent on the first. Calculation is grounded by the science or knowledge of the mathematical, and is set into power by the machination of technology. This is somewhat ambiguous, and

could seem to suggest that calculation is dependent on technology, but the suggestion is the reverse: technology is dependent on calculation, which is grounded in a particular way of thinking the mathematical. Technology merely makes this more apparent. This sense of calculation requires all things to be adjusted in this light; the incalculable is only the not yet calculable, and *organisation* is given priority. Acceleration, or the celebration of quantitative enhancement, particularly celebrated by the Futurists, is likewise so grounded, and massiveness is a particular way of reckoning, based on number and calculation (GA65, 120–1; see GA66, 217–20).

Heidegger suggests that it is with Descartes that this shift in understanding the mathematical occurs. The notion of *logos* had long since become distanced from the idea of speech, and had become the Latin *ratio*. But this becomes mathematical only in Descartes.

> By a certain interpretation of being (as *idea*) the *noein* of Parmenides becomes the *noein* of *dialegesthai* in Plato. The *logos* of Heraclitus becomes the *logos* as statement [*Aussage*] and becomes the leading theme [*Leitfaden*, textbook] of the 'categories' (Plato's *Sophist*). The combining of both into *ratio*, that is the related comprehension of *nous* and *logos*, is prepared in Aristotle. With Descartes *ratio* becomes 'mathematical'; only possible because since Plato this mathematical essence has been the focus, and is *one* possibility grounded in the *aletheia* of *phusis*. (GA65, 457)[89]

In Descartes, as we have seen, the *continuum* of geometry is transformed into a form of arithmetic. Geometrical lines and shapes are conceived in terms of numerical co-ordinates, which can be divided; and this is a mode of access to the material bodies of nature.

To illuminate the importance of this shift in terms of a human understanding of measure, it is worth considering Heidegger's comparison of Descartes to Protagoras. He does this by analysing Protagoras' saying '*panton khrematon metron estin anthropos*'.[90] Although Heidegger regularly returned to this topic, the most important discussion is from 1940, in a lecture course on Nietzsche entitled *European Nihilism*.[91] As Heidegger notes, this is usually translated as 'man is the measure of all things'. At first he suggests 'one might suppose that it is Descartes who is speaking here' – before clearly distancing himself from that way of reading it: 'we would be falling prey to a fatal illusion if we wished to presume a sameness [*Gleichartigkeit*] of basic metaphysical positions here on the basis of a particular sameness [*Gleichheit*] in the words and concepts used' (GA48, 175–6; N, IV, 91–2). While it might appear that 'all

metaphysics – not just the modern version – is in fact built on the standard-giving role of man within beings as a whole' (GA48, 161; N, IV, 86), this is a dangerous point to assume.

However, in the context of these lectures it appears evident that Nietzsche's role as the evaluator, and the revaluation of all values, equally falls into this model (GA48, 161–2; N, IV, 86–7). As Heidegger suggests, 'value translates the essentiality of essence (that is, of beingness) into the calculable, something that can even be estimated in terms of quantity and spatial extension [*Zahl und Raummaß*]' (GA47, 288; N, III, 176). This critique of values as calculative, of the relation between evaluation and accounting, is a key theme in the *Nietzsche* lectures, and indeed had been an early concern, dating from at least as early as the 1919 course *Phenomenology and the Transcendental Philosophy of Value* (GA56/57).[92]

But while Cartesian thought can even be found in the avowedly anti-Cartesian Nietzsche, Protagoras' phrase needs to be understood in a rather different manner. Heidegger suggests that 'experienced in a Greek way, the human of the basic relationship with beings is *metron*, measure [*Maß*]'. What he means is that they let 'their confinement [*Mäßigung*, moderation] to the . . . restricted radius [*Umkreis*] of the unconcealed become the basic trait of their essence' (GA48, 178; N, IV, 94). Indeed, the continuation of Protagoras' phrase is that 'man is the measure of all things, of beings that they are, of non-beings, that they are not' (see GA33, 197–203/169–74). The ellipsis above masks Heidegger's qualification that the restriction is particular [*jeweilige*] to the individual; his use of the word 'unconcealed' [*Unverborgenen*] is intended to make us think of the notion of *aletheia*. In this example of Greek thought, Heidegger suggests, being is presence, truth is unconcealment, and measure is of the unconcealed. Equally, we should remember that *khremata* is not just any old things, but specifically those things as they are used, things with value (see GA5, 103/78; GA41, 70/70; GA8, 190–1/186–8). The human 'I', rather than being the subject of a later period, is seen in relation to the beings it belongs to. In other words, to be the measure of all things – for the Greeks – is that the human lets themselves be revealed through the disclosing of *aletheia*. The measure of all things is the human.

In Descartes, the position is somewhat different. Heidegger suggests that

> The 'mathematical' is a standard of measure [*maßgebend*] for Descartes' conception of knowledge and knowing. But it remains for us to ask here,

> does Descartes simply take the already present and practised form of 'mathematical' knowledge as the model for all knowledge, or does he on the contrary newly define – in fact, metaphysically define – the essence of mathematics? The second is the case. (GA48, 201; N, IV, 113–14)

The mathematical – conceived in a new way – is the measure. Heidegger makes this point in a number of ways – essentially, the mathematical is not grounded in number, but number is grounded in the mathematical. Because mathematics is something grounded in *ta mathematica*, that is, the observation of what is, *mathesis* is learning, *ta mathematica* what is learnable. In these terms, 'modern science, modern mathematics and modern metaphysics sprung from the same root of the mathematical in the wider sense' (GA41, 98/97, see 69–71/69–71, 74–5/74; GA5, 78/59). Particular versions of mathematics – analytic geometry in Descartes, infinitesimal calculus in Newton and differential calculus in Leibniz – are all grounded on the 'basically mathematical character of the thinking' (GA41, 94/94). See, for example, the way in which, in *Rules for the Direction of the Mind*, Descartes inquires into *mathesis* as the basis for later inquiries into arithmetic, geometry and other sciences, and declares that 'the exclusive concern of *mathesis* is with questions of order or measure [*ordo vel mensura*]'.[93] In other words, the developments in new forms of mathematical thinking are not the reason for the predominance of mathematics, but the consequence of it (GA42, 52/30). Now, of course, Descartes' understanding of *res extensa* is dependent on his understanding of *res cogitans*, the human subject, the initial 'I am'. The *cogito* forms the basis for all that is knowable, *mathesis* in its broad sense. Such a shift also forces us to rethink the nature of truth, which is no longer understood as the unconcealment Heidegger finds in the Greeks, but as veracity, certitude, accord. The human subject takes the place of the integrated human (see GA48, 187; N, IV, 102). As Heidegger suggests:

> Descartes, with his principle of the *cogito sum*, forced open the gates of the domain of such a metaphysically comprehended domination. The principle that lifeless nature is *res extensa* is simply the essential consequence of the first principle. *Sum res cogitans* is the ground, the underlying [*der Grund, das zum Grunde Liegende*], the *subiectum* for the determination of the material world as *res extensa*. (GA48, 205; N, IV, 117)

As Heidegger notes in the *Beiträge*, the establishment of individual identity grounds the identity of other things. The principle of identity

'A = A' is '*grounded* [gegründet] in I = I [*Ich = Ich*]', rather than 'I = I as an exceptional instance of A = A' (GA65, 201). The fundamental determination of the world is extension, *res extensa*, but this is grounded on thinking, *res cogitans*. 'Man establishes himself as the measure of all measures [*Maßgabe für all Maßstäbe*] with which whatever can count as certain – i.e. as true, i.e. as in being – is measured off and measured out (reckoned up) [*ab- und ausgemessen (verrechnet)*]' (GA5, 110/83). A human notion becomes the measure of all things.[94]

Our view of the world is therefore not only shaped by our perception, it is also limited by it. The ontological foundation of modern science – this notion of calculation – acts to limit the ontic phenomena it, and we, are able to experience and to encompass. 'The step taken by Descartes is already a first and decisive consequence [*Folge*], a 'compliance' [*Folgeleistung*] by which machination assumes power as transformed truth (correctness), namely as certainty' (GA65, 132). It is worth noting here an important discussion of the notion of exactness in science. For Heidegger, the concept of 'exact' is ambiguous. We usually understand it to mean precise or accurate [*genau*], measured from [*abgemessen*], careful [*sorgfältig*], but if that is so then all sciences are exact in that they are careful to use the method appropriately. But 'exact' can also be seen to mean 'determined, measured and calculated according to the measure of numbers [*zahlenmäßig bestimmt, gemessen und errechnet*]', and then 'exactness is the character of the *method itself*, not merely how it is used' (GA65, 149–50).[95] In order for science to have some purchase on its subject matter, it must work with the way that subject matter is determined. When the modern concept of nature is conceived – as it is by Descartes – as 'accessible only to quantitative measuring and calculation', science must be exact (GA65, 150; see also GA5, 76–7/58, 79/60). We saw this in the discussion of world in relation to Kant above. Elsewhere, Heidegger cites Max Planck's statement that 'that is real which can be measured' (GA7, 52). In the Modern period, 'beings became transparent objects capable of being mastered [*beherrschbaren*] by calculation' (GA5, 65/48). But in so doing, making measure the determination, science allows what is essential to slip through our fingers. Though putting a stone on a scale will measure its heaviness as a calculated weight, a number, the burden has escaped us (GA5, 33/25; see GA65, 275–6; GA7, 171–2).

But though, like Heidegger, we might want to criticise this conception of the material world, of nature, as *res extensa*, it has

enormous consequences. The modern notion of measure, which derives from Descartes, sees beings as calculable, as quantitatively measurable, but as a determination of the world, 'it is the first resolute step through which modern machine technology, and along with it the modern world and modern mankind, become metaphysically possible for the first time' (GA48, 204–5; N, IV, 116–17). The modern physical theory of nature prepares the way not simply for technology but for the *essence* of modern technology, which is not in itself technological, but is a way of seeing things as calculable, mathematical, extended and therefore controllable. Technological domination means the destruction [*Zerstörung*] of nature (GA45, 53). This is the modern worldview, worldpicture [*Weltbild*], the world as picture – not a picture of the world, but 'the world grasped as picture' (GA5, 89/67).

The discussion is developed and continued in Heidegger's consideration of the issue of worldview [*Weltanschauung*]. In a very early course he had suggested that this is '*the task of philosophy*' and that '*therefore* a philosophical-historical consideration of the manner in which philosophy performs this task' is an essential inquiry (GA56/57, 8). In the *Beiträge*, though, Heidegger suggests that '"Worldview", like the domination of "worldpictures" is an outgrowth [*Gewächs*] of modernity, a consequence [*Folge*] of modern metaphysics' (GA65, 38). In a contemporaneous lecture course on Schelling, he notes that Kant coins the term, and that it develops from insights in Leibniz's work (GA42, 29/17). It is interesting to note here that a word given important currency by the National Socialist movement – who saw their 'system' of beliefs to be a *Weltanschauung* rather than an ideology[96] – is now criticised in a way which is akin to Nazi medical discourse: worldview is a tumour, an ulcer, a festering sore on the problem of modernity.[97]

The Politics of Calculation

What has been shown by the examination of Protagoras and Descartes is that in the first case measure is taken from the world to understand the human; in the second a human notion of measure is used to understand the world. Increasingly, Heidegger realises this is a political issue: indeed, it can be generally said that when Heidegger develops his earlier ideas on calculation after the Rectorial period there is a new political urgency. The *Beiträge*, for example, is an explicitly political text, written in secret, and both a product of Heidegger's political career and a response to it.[98] It needs to be seen

within the context of the time much more than is usually acknowledged. In particular, a running theme of the *Beiträge* concerns the problems of mechanistic, calculative ways of looking at the world. To take a few examples, the Nuremburg laws had been promulgated in 1935; September 1936 saw the Four Year Plan announced; the *Anschluß* with Austria, the Munich Agreement and *Kristallnacht* all happened in 1938.[99] The political themes of the *Beiträge* are not disconnected comments about world events at the time of writing but a very real response to them.

The word measure is *Maß*, which derives from *messen*, to measure or gauge. It is also related to the term *Masse* – the mass or the group.[100] Heidegger continually works with words that share this stem. We have already seen in the discussion of *Introduction to Metaphysics* in Chapter Two *Massenversammlungen*, the mass meetings; *Vermassung*, the reduction to a mass or measure, levelling down; and *Lebensmasse*, vital resources. In that period, Heidegger suggested that all had been condensed to extension and number. We have seen here how that measuring is indebted to Descartes. One of the most important related words in a political context is *Gemäßheit*, a word vital to National Socialism, which means conformity or accord, the removal of dangerous elements as things are brought together around a fixed measure or norm. *Ge-* denotes a bringing together, therefore *Gemäße* is a bringing together of measure, or a bringing things to the same measure. In this, it is directly related to the better known concept of *Gleichschaltung*, which implies political co-ordination, literally 'same wiring' or 'connection', the bringing into line and elimination of opposition, subordinating things to a common measure.[101] *Schalten* is to direct, govern or rule; *Schaltung* is connection or wiring. Because *Gleich* means same or identical, this implies a making similar, a forced conformity, an ordering around a prescribed norm.[102] Aside from the sarcastic reference noted in Chapter Two (GA38, 11), Heidegger does not explicitly analyse this notion but he does make some ambiguous comments about the related terms *eingeschalten* and *einschalten* – to switch on or connect up – in terms of the transformation of society, of peasants into workers in the 'provisions industry', 'of leading scholars into the managing director of a research institute' (GA51, 38). Rather, in the notion of measure, the issues are there in muted form.

The other key background theme is the gearing up of the economy, particularly in the Four Year Plan.[103] Section 74 of the *Beiträge*, for example, which is entitled '"Total Mobilisation" as Consequence of Originary Forsaking of Being', takes issue with the putting to use of

the resources of the country and the people within it. Heidegger characterises 'total mobilisation' [*totale Mobilmachung*], a notion developed in Ernst Jünger's work, as 'purely setting-into-motion'.[104] While the masses [*der Massen*] are put to service, the purpose is unclear (GA65, 143; see GA7, 70).[105] Equally, the calculative understanding of time found in Aristotle, Heidegger notes, does not simply begin the path toward mathematical basis of physics, but also for the ordering of all human comportment, including the time of the worker, *der Arbeiter* (GA54, 210; see GA52, 104).

It becomes increasingly clear to Heidegger, both in the *Beiträge* and perhaps more obviously in the *Nietzsche* lectures given in the period 1936–40, that neither Nietzsche nor Nazism is a solution to the problem of technology and the spectre of nihilism. As he suggests in 1940, following France's defeat, the modern 'machine economy', that is, 'the machine-based calculation of all activity and planning', requires new kinds of humans: 'it is not sufficient that one possesses tanks, airplanes and communication equipments; nor is it sufficient that one has humans, who can service them . . . only the Over-man [*Übermensch*] is appropriate to an absolute "machine economy"'. While it was Descartes who 'forced open the gates of this domain' (GA48, 204–5; N, IV, 116–17), Germany has beaten them at their own game.[106]

> The prepotence of Being in this essential configuration is called *machination*. It prevents any kind of grounding of the 'projections' that are under its power and yet are themselves none the less powerful. (GA47, 287; N, III, 175)

While, as before, time and space are discussed in terms of their calculative aspects,[107] there is the introduction of a new notion, that of 'the gigantic' [*Das Riesenhafte*] (GA65, 441–3). There are three obvious candidates for giganticism in 1930s Germany: the Leviathan, a state of unlimited and undivided sovereignty on the Hobbesian model; the Behemoth that became the symbol of the Nazi war machine; and the Hindenberg airship which had burst into flames in 1937.[108] But Heidegger means something more than this:

> The gigantic was determined as that through which the 'quantitative' is transformed into its own 'quality', a kind of magnitude [*Größe*]. The gigantic is thus not something quantitative that begins with a relatively high number (with number and measurement) – even though it can appear

> superficially as 'quantitative'. The gigantic is grounded upon the decidedness and invariability of 'calculation' and is rooted in a prolongation of subjective re-presentation unto the whole of beings (GA65, 441; see GA5, 95/72).

This theme of the quantitative as a quality in itself is important. The *quale* of something is its whatness, effectively its way of being, or, in the traditional sense, its essence. That the quantitative has become a quality is an important shift. The gigantic, for Heidegger, is not merely a quantity of dramatic proportions, but his name for this shift. Descartes sees the world as 'mechanical nature, that is, extension' (GA42, 103/59). What is important here is how the shift to seeing what is as what can be calculated plays out politically. As Heidegger notes in his 1937–38 course, the crisis of science is not to be understood in terms of minor problems that can be resolved within the existing order, but from something much deeper. It stems 'not from 1933, and not from 1918, and not even from the much-criticised nineteenth century, but from the beginning of the modern age'. The two dates Heidegger picks are significant – Hitler taking power and the end of the First World War. As Heidegger continues, though, this 'was not a mistake but a fate [*Schicksal*], and only a fate will overcome it' (GA45, 53–4). Essentially, the current malaise is seen in terms of the twin themes of order [*Ordnung*] and calculation. These two are related to each other in that dividing something into elements helps to establish control over it, as these can be organised, rendered and further divided, or grouped and forced into similarity.[109]

> All calculation lets what is countable [*Zählbare*] be resolved into something counted [*Gezählten*] that can then be used for subsequent counting [*Zählung*]. Calculation refuses to let anything appear except what is countable. Everything is only whatever it counts. What has been counted in each instance secures the continuation of counting. Such counting progressively consumes numbers [*Zahlen*], and is itself a continual self-consumption. The calculative process of resolving beings into what has been counted counts as the explanation of their being. Calculation uses all beings in advance as that which is countable, and uses up what is counted for the purpose of counting. This use of beings that consumes them betrays the consuming character of calculation. Only because number can be infinitely multiplied, irrespective of whether this occurs in the direction of the large or small, can the consuming essence of calculation hide behind its products and lend to calculative thinking the semblance of productivity – whereas already in its anticipatory grasping, and not primarily in its

> subsequent results, such thinking lets all beings count only in the form of what can be set at our disposal and consumed. Calculative thinking compels itself into a compulsion to master everything on the basis of the consequential correctness of its procedure. (GA9, 308–9/235)

Indeed, in Heidegger's discussion of the Nazi concept of 'new order' [*Neue Ordnung*] and the notion of *Lebensraum* the implied critique is notably not moralising, nor even explicitly political, but from the perspective of the greater problem of nihilism and the culmination of metaphysics in technology (GA48, 139–41).[110]

> Space and time comprise the framework for our calculative dominating ordering of the 'world' as nature and history. This calculating, discovering and conquering by measurement of the world [*Diese rechnende, entdeckende, erobernde Durchmessung der Welt*] is undertaken by modern human beings in a way whose distinctive metaphysical feature is modern machine technology. Metaphysically, it remains undecided in this process whether this procedure on the part of modern human beings – a procedure of conquering space and of time-lapse – serves merely to bring about a position within the planet as a whole that secures this humanity a suitable 'living space' [*gemäßen »Lebensraum«*] for its lifetime [*Lebenszeit*], or whether such securing of space and time is intrinsically determined in such a far-reaching manner as to attain new possibilities of this procedure of conquering space and of time-lapse and to intensify this procedure. Metaphysically, it remains undecided whether, and in what way, this will to planetary ordering will set itself its own limit. (GA53, 59)

Calculability is therefore the essential prerequisite for mechanism (GA65, 376), and more generally the notion of machination is dependent on this particular way of grasping the world. This is not merely to discuss the problems of Germany, but also – as was seen in *Introduction to Metaphysics* – Soviet Russia. Interpreting Lenin's famous suggestion that 'Bolshevism is Soviet power + electrification', Heidegger suggests that this means that 'Bolshevism is the "*organische*", that is the organised, calculating (and as +) conclusion of the unconditional power of the party along with complete technicisation'. What is decisive is not that, for example, they are 'always building more tractor factories', but rather 'the complete technical organisation of the world is already the metaphysical foundation for all plans and operations' (GA54, 127; see GA67, 150).

The notion of the gigantic would bear fruitful comparison with contemporary discussion of 'globalisation'.[111] Rather than conceive

of globalisation as a radical break with modern, state-based, territorial politics, we can recognise that it is, ontologically at least, the same, merely extending the calculative understanding of space to the globe instead of a single nation.[112] Similarly, the remarks on the link between 'the machine and machination (technology)' may illuminate this and related contemporary issues:

> The machine, its essence. The service that it demands, the uprooting that it brings. 'Industry' (operations [*Betriebe*]); industrial workers, torn from homeland and history [*Heimat und Geschichte*], exploited for profit. Machine-training, machination and business. What recasting of man gets started here? (World-earth?) Machination and business [*Machenschaft und das Geschäft*]. The large number [*die große Zahl*], the gigantic, pure extension [*Ausdehnung*] and growing levelling off and emptying. Falling necessarily victim to kitsch and imitation [*Unechten*]. (GA65, 392)[113]

Machination, in this sense, is closely related to the notion of technology, a recurrent theme of work in the late 1940s, which Heidegger also talks about in the later essays of the Nietzsche volumes.[114] It is the idea of 'completed [*vollendete*] metaphysics' (GA7, 79), dependent on a process initiated by Descartes, which has its 'own greatness [*eigene Größe*]' (GA5, 99/75). Technology, as will later be elaborated, 'contains the recollection of *tekhne*', a fundamental term in the development of Western thought, but also 'makes it possible for the planetary factor of the completion of metaphysics and its rule to be thought without reference to historiographically demonstrable changes in nations [*Völkern*] and continents' (GA7, 79; see 97). World-wars and their 'totality' are consequences of the forgetting of being; humans become raw material; leadership becomes the 'planning calculation of the guarantee of the whole of beings' (GA7, 91–2). Heidegger goes on to draw total mobilisation and worldviews into this orbit, along with organisation, and service. 'Such worldviews drive all calculability of representation and production to the extreme, originating as they do essentially in mankind's self-imposed instauration of self in the midst of beings – in the midst of mankind's unconditioned hegemony over all sources of power on the face of the earth, and indeed its domination over the globe as such' (GA6.2, 14–15; N, III, 175; GA67, 113–22).

One of the problems of worldviews is precisely this totalising aspect. If they claim to regulate all kinds of action and thinking, then necessity (something which would be outside their control) is

necessarily a problem. The idea of creativity, questioning the ground on which they stand, is impossible. Creativity becomes replaced by operations or management [*Betrieb*] (see GA5, 83–4/63–4; 97–8/73–4). We can note here the clear relation this has to the notions of *Gemäßheit* and *Gleichschaltung* – the removal of dangerous elements, the elimination of opposition, the bringing under a common measure. As Heidegger notes, the precedence of beings over being means that being is seen as '*koinon* in terms of the *hen*', the common is reduced to the one (GA6.2, 417). Heidegger suggests that, though they are incompatible, total political faith [*totale politische Glaube*] and total Christian faith are nevertheless both engaged in adjustment [*Ausgleich*] and tactics. This is because they share the same essence [*Wesens*]. Their total posture [*totalen Haltunzugrunde*] makes their struggle [*Kampf*] 'not a creative one, but rather "propaganda" and "apologetics"' (GA65, 41; see GA7, 92). Totalitarianism is dependent on this totalising understanding of the world, this conception of worldpicture.[115]

Somewhat cryptically, Heidegger suggests that

> Worldview is always 'machination' over and above what is passed to us, with the aim of overcoming and subduing it, with the means which are proper to, prepared by, though not brought to fruition – all of this slid over into 'lived-experience'. (GA65, 38)

The first part of this follows from what has been thus far discussed. The second, however, the link to the notion of 'lived-experience', is worth a little explanation. Elsewhere Heidegger asks 'What does machination mean?', and answers 'machination and constant presence: *poiesis – tekhne*. Where does machination lead? To *lived-experience*' (GA65, 107).[116] In a lecture course delivered at the time the *Beiträge* was being written, *Basic Questions of Philosophy*, Heidegger explains:

> At the beginning of modern thought, Descartes for the first time posited the certainty of the ego [*Ichgewißheit*], in which the human is made secure of beings as the object of their representations, and is the germ of what today, as 'lived experience' and 'experience' [*»Erlebnis« und »Erleben«*], constitutes the basic form of being human. It is one of the ironies of history that our age has discovered – admittedly very late – the need to refute Descartes, and takes issue with him and his 'intellectualism' by appealing to 'lived experience', whereas 'lived experience' is only a base descendent of the Cartesian *cogito ergo sum*. (GA45, 149)

A concept appealed to – particularly by the Nazi regime[117] – as a more authentic, more rooted way of dealing with the world than the cold calculation of technology is grounded in the same way of thinking which takes a human notion as the measure of all things. In the *Beiträge*, Heidegger is even more explicit:

> Now, however, since beings are abandoned by being [*Seyn*], the opportunity arises for the most insipid 'sentimentality'. Now for the first time everything is 'experienced' [*erlebt*] and every undertaking and performance drips with 'lived-experience' [*Erlebnisse*]. And this lived-experience proves that now even the *human* as a *being* has incurred the loss of being [*Seyn*] and has fallen prey to their hunt for lived-experiences. (GA65, 123–4)[118]

Although Heidegger had used the term in a number of places, notably a 1919 course, even there he recognised that 'the term "lived experience" [*Erlebnis*] is today so faded and worn thin that, if it were not so fitting, it would be best to leave it aside. Since it cannot be avoided, it is all the more necessary to understand its essence' (GA56/57, 66). For Heidegger, this is tied into the notion of *Ereignis*, which will assume centre stage in his late thought, and which is first worked through in detail in the *Beiträge*. An *Erlebnis*, in this sense, is an event, or a propriation [*Er-eignis*] (GA56/57, 69).

The key example of an *Erlebnis* in this course is our way of encountering a lectern. Heidegger suggests that when his students come into the lecture room they go to *their* usual place. He suggests they put themselves in his place – when he comes into the room he sees a lectern. Does he see it as brown surfaces, at right angles? Does he see it as a largish box with a smaller one on top of it? No. Rather he sees a lectern, which he has spoken at before. He does not first see the surfaces, then the surfaces as a box, then the purpose of it; rather a lectern, within an environment. The lectern only becomes an issue if it is too high, or there is something – a book, for example – obstructing its use. This way of taking an everyday object and discussing how we experience it is reminiscent of the kitchen table in the later lecture course *Ontology: The Hermeneutic of Facticity* or the hammer in *Being and Time*. Heidegger goes on to argue that a Black Forest farmer or a native from Senegal would experience the lectern in a different way. The farmer would equally not see the lectern as a box, but as the 'place for the teacher'; the native as something 'which he does not know what to make of'. Heidegger calls the latter

'instrumental strangeness' (GA56/57, 70–3). But in all cases essentially the same thing is happening:

> In seeing the lectern I am fully present in my 'I'; it resonates with the experience, as we said. It is an experience proper to me and so do I see it. However it is not a process [*Vorgang*], but rather a *propriation* [*Ereignis*] (non-process, in the experience of the question a residue of this propriation). Lived experience [*Das Er-leben*] does not pass in front of me like a thing, but I appropriate [*er-eigne*] it to myself, and it appropriates itself according to its essence. If I understand it in this way, then I understand it not as process, as thing, as object, but in quite a new way, as propriation. (GA56/57, 75)

Rather than the Cartesian division of subject and object, the division of human from the world, grounded on the *cogito* and the split between *res cogitans* and *res extensa*, we have a way of understanding that looks at the way we comport ourselves always already within a world [*Welt*]. Heidegger's hyphenated term being-in-the-world, used in *Being and Time*, shows that what we call 'being' is indivisible from the world or environment [*Umwelt*]. 'The world that is closest to us is one of practical concern. The environing world [*Umwelt*], and its objects are in space, but the space of this world is not the space of geometry'.[119] As he puts it in the *Kriegsnotsemester*, '*es weltet*', 'it worlds'. This use of the impersonal 'it' is related to Heidegger's interest in the term *es gibt*, which literally means 'it gives', and has the sense of 'there is', in the impersonal sense of the French *il y a*.[120] For Heidegger, both in this early lecture course and the *Beiträge*, it is *Ereignis* that *gives* being, time, space. In opposition to the worldview, to the view the human has of the world, the grid they use to comprehend, order and exploit the world, the world rather gives to us the view, the comportment (GA2, 211). It is this sense of experience, as a propriation, an *Ereignis*, that can be used to refute Descartes, rather than the 'lived-experience' that too stems from Descartes. In a sense, this is a reversal of the reversal of Protagoras: rather than the human being the measure of all things, the measure of all things is the human.

Just as he wants to try to rethink *Erlebnis* in a more originary way, so too with the notion of machination [*Machenschaft*], which Heidegger says is a mode of making [*machen*], and, although etymologically distinct, is related to the notion of *Macht*, power. The notion of *Machenschaft* is usually associated with 'a "bad" type of human

activity and plotting for such an activity', but Heidegger is interested in retrieving a sense of how it impacts on the question of being (see also GA69, 26–7, 46–7, 62–71, 228). The notion of *machen* is, however, unquestionably a human comportment: Heidegger adds '*poiesis, tekhne*' in parentheses here to underline the point. That said, he wants to stress that this comportment is only possible on the basis of a particular interpretation of beings, that is of *phusis*, the Greek term that encompasses nature and the physical more generally. *Phusis* is thought in relation to *tekhne*, 'so that what counts now is the preponderance of the makeable and the self-making [*Machbare und Sich-machende*] . . . in a word: machination' (GA65, 126). *Phusis* is not *tekhne*, but a reduction of the former into the latter is pronounced.[121]

> What does *machination* mean? That which is let loose into its own shackles? Which shackles? The pattern of generally calculable explainability [*berechnenbaren Erklärbarkeit*], by which everything draws nearer to everything else in the same measure [*gleichmäßig*] and becomes completely alien to itself – yes, totally other than just alien [*ja ganz anders als noch fremd wird*]. The relation of non-relationality [*Der Bezug der Unbezüglichkeit*]. (GA65, 132)

Heidegger provides a few examples of how he thinks calculative thinking holds sway in the contemporary age. For example, he shows how *Geisteswissenschaft* will increasingly 'be transmogrified into a pedagogical tool for inculcating a "political worldview" '. Heidegger has already noted how the major branches of industry and military Chiefs of Staff [*der Generalstab*] are more attuned to the uses of the mathematical, technical sciences (GA44, 15; N, II, 16). Science cannot be preserved in its old ways and means, but crucially, 'nor will the technical style of modern science, prefigured in its very beginnings, be altered if we choose new goals for such technology. That style will only be firmly embedded and absolutely validated by such new choices' (GA44, 16; N, II, 17). Philosophy is something entirely different, which seems to be the point of this discussion, but the issue is important. Here, in 1937, Heidegger is outlining the point of his technology essay.

In the second *Nietzsche* lecture course there is a discussion of the difference between Nietzsche's thought of force [*Kraft*] and that of physics. 'Physics, whether mechanistic or dynamic in style, thinks the concept of force always and everywhere as a quantitative specification

within an equation [*Maßbezeichnung innerhalb der Rechnung*]; physics as such, in the way it takes up nature into its representational framework, can never think force as force' (GA44, 90; N, II, 86; see GA7, 59).[122] Before he goes on to show that Nietzsche thinks force in a very different way, he notes that to call Nietzsche's thought dynamic would require us to think the Greek *dunamis*, and to realise that the opposition of the dynamic and the static is misleading.

> Given its frame of reference, physics always deals with sheer relations of force with a view to the magnitude of their spatio-temporal appearance. The moment physics conducts nature into the domain of the 'experiment', it co-posits in advance the calculative, technical relation [*die rechnerische, technische Beziehung*] (in the broader sense) between sheer magnitudes of force and effects of force, and with calculation it co-posits rationality [*mit der Rechnung aber die Rationalität*]. (GA44, 90; N, II, 86)

The last point is crucial, in that Heidegger is showing the integral relation between modern understandings of rationality and calculation. Rationality, *ratio*, has become mathematical, rather than concerned with relation and balance, or to the Greek term *logos*, much more associated with language than number.

One of the most extensive discussions of related themes comes in a course delivered shortly after the conclusion of those on Nietzsche, *Basic Concepts*.

> The modern habit of thinking time together with 'space' (already prefigured in the beginning of metaphysics with Aristotle) leads us astray [*führt irre*]. For according to this way of thinking time is considered solely in terms of its extension [*Erstrekung*], and this as a counting up [*Rechnung*] of fleeting now-points. Thought in modern terms, time like space is a parameter [*Parameter*], a standard scale [*Maßstab*] according to which something is measured and estimated [*gemessen und gerechnet*]. Space and time are essentially related to 'calculation' [*»Rechnung«*]. (GA51, 120; see GA53, 47–50, 53)

Heidegger highlights what he calls 'a metaphysical subjugation to technology', and notes that 'accompanying this subjugation within us is an attitude that grasps everything according to plan and calculation, and does so with a view to vast time-spans in order wilfully and knowingly to secure what can last for the longest possible duration' (GA51, 17). Here we find a reduction of the world to calculation and planning. Such comments clearly follow from those outlined since at least 1935.

> It is one thing when empires [*Reiche*] endure for millennia because of their continuing stability. It is something else when world dominions [*Weltherrschaften*] are knowingly planned to last millennia and the assurance of their existence is undertaken by *that* will whose essential goal is the greatest possible duration of the greatest possible order of the largest possible masses [*Massen ein wesenhaftes Ziel*]. (GA51, 17)

The obvious reference to the thousand-year Reich is put in language of range and scope – temporal extent, duration, order, mass – terms that a moment before were used to illustrate the problem of technology and its metaphysical subjugation. For Heidegger, 'this will has been the concealed metaphysical essence of modernity for the last three centuries', which means that Hitler here is a symptom of a much wider malaise. Indeed, the essence of modern technology is the same as the essence of modern metaphysics (GA5, 75/57).

> It appears in various predecessors and guises that are not sure of themselves and their essence. That in the twentieth century this will would attain the shape of the unconditional, Nietzsche had clearly thought in advance. (GA51, 17–18)

So while it existed in previous forms, it is in Nietzsche's thought that the unconditional form of the modern period (1941) first appears with clarity. Nietzsche here is seen both as the diagnostic, and potentially the problem.

> Participation in this will to man's unconditional mastery over the earth, and the execution of this will, harbour within themselves that subjugation to technology that does not appear as resistance and resentment [*Widerwille und Unwille*]. That subjugation appears as will, and that means it is also effective here . . . However, where one interprets the execution of this metaphysical will as a 'product' of the self-obsession and arbitrariness [*Eigensucht und Willkür*] of 'dictators' and 'authoritarian states', there speak only political calculation and propaganda, or the metaphysical naïveté of a thinking that ran aground centuries ago, or both. (GA51, 18)

In other words, those that think that this is *caused* by the actions of single individuals or states are mistaken. This is a wider problem. This is not based on the 'chance arbitrariness [*Zufälligen Willkür*] of dictators but in the metaphysical essence of modern actuality in general' (GA53, 118). Whether this attribution be through critique or celebration, it is flawed thinking.

> Political circumstances, economic situations, population growth, and the like, can be the proximate causes and horizons for carrying out this metaphysical will of modern world-history. But they are never the ground of this history and therefore never its 'end'. The will to preservation, and that always means the will to enhance life and its lastingness, works essentially against decline and sees deficiency and powerlessness in what lasts only a short while. (GA51, 18)[123]

Again, the very real crises of the modern ages are symptoms of a wider malaise. The will to power, to domination, to preservation and all the metaphysical baggage it carries is another stage in the long-running problem. The concluding lines of the published *European Nihilism* course provide Heidegger's summary assessment of the importance of this topic:

> The age of the fulfilment of metaphysics – which we descry when we think through the basic features of Nietzsche's metaphysics – prompts us to consider to what extent we find ourselves in the history of being. It also prompts us to consider – prior to our finding ourselves – the extent to which we must experience history as the release of being into machination, a release that being itself sends, so as to allow its truth to become essential for man out of man's belonging to it. (GA6.2, 229; N, IV, 196)

It is in the *Beiträge* that Heidegger makes many of these points for the first time, a working through of issues surrounding him. Mournfully, he remarks that the human 'might for centuries yet pillage and lay waste to the planet with their machinations, the gigantic character of this driving might "develop" into something unimaginable and take on the form of a seeming rigour as the massive regulating of the desolate as such – yet the greatness of being [*Seyn*] continues to be closed off' (GA65, 408). Heidegger argues that the originary, more rooted sense of *phusis* is lost as nature is seen as a being itself, 'and, after this demoting [*Absetzung*], ultimately reduced to the full force of calculating machination and economy' (GA65, 277). Nature becomes *res extensa*, an extended material resource. The natural no longer has any 'immediate relation to *phusis*, but rather is fully set-up [*gestellt*] according to the machinational' (GA65, 133). Heidegger talks of the human reduction and '*transition to a technicised animal*, which begins to replace the instincts, which have already grown weaker and less refined by the giganticism of technology [*der Technik*]' (GA65, 98). In this reduction, nature becomes merely scenery and a

place for recreation, and even in this arranged for the masses as a form of the gigantic (GA65, 277).

Very similar language would be used for the Rhine river in the later 'Question Concerning Technology' essay (GA7, 16–17). Here, Heidegger suggests that 'modern science's way of representing pursues and entraps nature as a calculable coherence of forces', it 'sets nature up to exhibit itself as a coherence of forces calculable in advance' (GA7, 22; see ID, 98–9/34–5). This way of thinking, as we have seen, prepares the way for technology, but more, for the *essence* of technology. Heidegger uses the crucial term *Ge-Stell*, framework or the set-up, to name this essence. Exact physical science is dependent on the particular casting of beings, essentially their calculability, in order to exist in itself, and for it to be the foundation of technology. The essence of technology is therefore prior to both. In the earliest form of this lecture, from 1949, the title itself was 'Das Ge-Stell' (GA79, 24–45).[124] In this piece, revised for delivery in 1953, Heidegger reaches a level of concision and clarity that the early sketches rarely achieve. But, in its published form, this essay appears peculiarly apolitical. What is striking is that the *Beiträge* dates from more than a decade before, in a very different situation, and that it and lectures from this time anticipate so many of the later essays' concerns. Indeed, realising the explicitly political context of the development of these ideas is extremely useful in both recognising their political import and understanding some of their more problematic claims.[125]

What we find in the writings and lectures of Heidegger in the 1940s is a curious balance of political remarks and a seeming depoliticising of his thought. In 1942, he comments on the entry of the USA into the war (GA53, 68); and later in the same course talks of the 'historical uniqueness' or singularity of National Socialism (GA53, 98, 106). After Stalingrad, with German defeat looking more and more likely, he notes that the 'planet is in flames' and calls for Germans to be 'strong enough in their preparedness for death' (GA55, 123, 181). And yet, when he returns to the notion of the *polis* and the determination of the human as the *zoon politikon*, although he again ties this to the *zoon ekhon logon*, no contemporary resonances are heard, and indeed Heidegger goes out of his way to deny them. In particular, he insistently argues that the *polis* simply cannot be understood as a 'state' (GA53, 100–7; see GA54, 100–1); and that we think the political in a Roman, rather than Greek way, that is imperially (GA54, 63), in relation to command and arrangement (GA54, 65). While there is undoubtedly here an implicit criticism of modern ways

of thinking the political, there is also a muted reinterpretation of some of Heidegger's own claims about the political going on. We find this, for instance, in the reading of the myth of the cave in the 1942–43 course, which, like the essays published around the same time on this subject, are seemingly almost entirely apolitical. What, then, is the political legacy of Heidegger's thought?

Notes

1. For a reading of this in terms of space, see Stuart Elden, *Mapping the Present: Heidegger, Foucault and the Project of a Spatial History*, London: Continuum, 2001, especially Chapter One.
2. There is a discussion of the world as *kosmos* in GA26, 218–23. For important developments, see Eugen Fink, *Spiel als Weltsymbol*, Stuttgart: Kohlhammer, 1960; and Kostas Axelos, *Le jeu du monde*, Paris: Éditions de Minuit, 1969.
3. See Thomas Sheehan, 'Heidegger's *Lehrjahre*', in John Sallis (ed.), *The Collegium Phaenomenologicum*, Dordrecht: Kluwer, 1988, pp. 77–137 for details; and John van Buren, *The Young Heidegger: Rumor of the Hidden King*, Bloomington: Indiana University Press, 1994, pp. 58–9.
4. Martin Heidegger, 'Wilhelm Dilthey's Research and the Struggle for a Historical Worldview (1925)', in *Supplements: From the Earliest Essays to Being and Time and Beyond*, edited by John van Buren, Albany: State University of New York Press, 2002, p. 171.
5. Letter of Heidegger, 2 July 1915, cited in Sheehan, 'Heidegger's *Lehrjahre*', p. 78.
6. Sheehan, 'Heidegger's *Lehrjahre*', p. 107; see Sheehan, 'Reading a Life: Heidegger and Hard Times', in Charles Guignon (ed.), *The Cambridge Companion to Heidegger*, Cambridge: Cambridge University Press, 1993, pp. 70–96.
7. See Edmund Husserl, *Philosophy of Arithmetic: Psychological and Logical Investigations*, translated by Dallas Willard, Dordrecht: Kluwer, 2003; and *Early Writings in the Philosophy of Mathematics*, translated by Dallas Willard, Dordrecht: Kluwer, 1994. For discussions, see J. Philip Miller (ed.), *Numbers in Presence and Absence: Study of Husserl's Philosophy of Mathematics*, Dordrecht: Kluwer, 1982; Robert S. Tragesser, *Husserl and Realism in Logic and Mathematics*, Cambridge: Cambridge University Press, 1984; Françoise Dastur, *Husserl:*

Des mathématiques à l'histoire, Paris: PUF, 1995; and the introduction to Edmund Husserl, *L'origine de la geometrie*, translated and introduced by Jacques Derrida, Paris: Presses Universitaires de France, 1962. Heidegger discusses Husserl's idea of formal analysis and ontology as *mathesis universalis* in GA56/57, 108.

8. See Elden, *Mapping the Present*, Chapter One.
9. Immanuel Kant, *Kritik der reinen Vernunft*, Hamburg: Felix Meiner, 1956; translated by Paul Guyer and Allen W. Wood as *Critique of Pure Reason*, Cambridge: Cambridge University Press, 1988; A418–9/B446–7.
10. Compare GA21, 245. In *Being and Time* (GA2, 244 n. 1), Heidegger suggests that the distinction between the whole and a sum – *holon* and *pan* in Greek, *totum* and *compositum* in Latin – has been familiar since the time of Plato and Aristotle (see also GA19, 81–2).
11. See also GA27, 43, 186–8; and on the distinction between mathematical and dynamical in Kant, see also GA31, 160–1; GA41, 193–5/190–1.
12. See also 'Vom Wesen des Grundes' in GA9, 123–75/97–135; and GA24, 5–14.
13. Kant, *Kritik der reinen Vernunft*, Bxvi.
14. Kant, *Kritik der reinen Vernunft*, A158/B197.
15. For a discussion, see Miguel de Beistegui, *Thinking with Heidegger: Displacements*, Bloomington: Indiana University Press, 2003, Chapter Four, especially pp. 90–1.
16. The examples come from Immanuel Kant, 'Prolegomena zu einer jeden künftigen Metaphysik die als Wissenschaft wird auftreten können', §2a, in *Kant's Gesammelte Schriften, Akademieausgabe*, Berlin: Georg Reimer and Walter de Gruyter & Co, 1900ff, Vol. 4, p. 266; translated by Gary Hatfield as 'Prolegomena to any Future Metaphysics That Will be Able to Come Forward as Science', in *Theoretical Writings After 1781*, edited by Henry Allison and Peter Heath, Cambridge: Cambridge University Press, 2002, p. 62. See GA41, 164/161.
17. Kant, *Kritik der reinen Vernunft*, A25, see B39.
18. Heidegger's reference is to 'II, 1038', though it is not clear to what edition this refers.
19. For a much longer discussion a decade later, see GA41, 198–204/195–201; 251–2.
20. See also Heidegger, 'Wilhelm Dilthey's Research and the Struggle

for a Historical Worldview (1925)', p. 172; and GA53, 47–50.

21. This is briefly discussed in Elden, *Mapping the Present*, pp. 13–14. Of Heidegger's later work, see GA54, 210–11; ZSD, 11/11, 14–15/14.
22. See also the discussion in relation to Hegel, especially the *Philosophy of Nature*, in GA2, 428–32. Hegel's Jena lecture course on this is described as 'very obviously nothing but a speculative paraphrase of Aristotelian physics' (GA32, 176).
23. See also the notes on calculated time in GA42, 188; and GA49, 112.
24. See also GA67, 126.
25. See also the discussion in relation to Kant, GA21, 380–7.
26. See Edward A. Maziarz and Thomas Greenwood, *Greek Mathematical Philosophy*, New York: Frederick Ungar, 1968, p. 7. The notion of geometry as a land-measuring device of the Egyptians is described in Herodotus, *The Histories*, translated by Robin Waterfield, Oxford: Oxford University Press, 1998, 109.
27. See GA56/57, 171–2, on the continuum in Rickert's work.
28. Jacob Klein, *Lectures and Essays*, edited by Robert B. Williamson and Elliott Zuckermann, Annapolis: St John's College Press, 1985, p. 23, notes that *arithmos* is *Anzahl*, a definite number, rather than *Zahl*, number in general. See also the essay 'The Concept of Number in Greek Mathematics and Philosophy' in this collection, and his *Greek Mathematical Thought and the Origin of Algebra*, New York: Dover, 1992 [1934].
29. See Plato, *Meno*, 76a: 'shape is that in which a solid terminates [*perainei*, that is, comes to a limit] . . . shape is the limit of a solid [*stereon peras skhema einai*]'. Compare Euclid, *The Thirteen Books of Euclid's Elements*, with introduction and commentary by Thomas L. Heath, New York: Dover, three volumes, Second Edition, 1956, Vol. I, p. 153: 'a limit [*oros*] is that which is an extremity [*peras*] of anything . . . a shape [*skhema*] is that which is contained by any boundary or boundaries [*periekhomenon*]'. Heath provides the Greek in his commentary on pp. 182–3. I have altered the translation.
30. The full sentence reads 'for place is peculiar to the individual things, and hence they are separate in place [*khorista topo*]; but mathematical objects are not anywhere [*pou*]'. Heidegger is therefore not quite justified in his interpolation of '*ouk en topo*' to Aristotle: such a formulation is not found in the text.

31. See Elden, *Mapping the Present*, pp. 19–20; GA9, 248–9/190; and GA53, 65–6. In GA54, 174, Heidegger describes *topos* as 'not mere position in a manifold of points, everywhere homogeneous'.
32. For a discussion of *dunamis* in relation to geometry, see GA33, 58–61/48–52. This course as a whole provides Heidegger's most sustained treatment of *dunamis* in Aristotle. See also GA22, 307–8, 317; GA41, 85–6/85; and GA9, 280/214, 285/218.
33. 'Being there' [*dortsein*] in this phrase *can* be understood in the concrete sense of being in place, being somewhere. It is *not* the same as Dasein, which has been translated as 'being there'. Dasein more properly understood is existence, being-*the*-there, the open, the clearing.
34. See Maziarz and Greenwood, *Greek Mathematical Philosophy*, p. 23, where they suggest this was found in the Pythagoreans, who saw 'the unit as a "point without position", and the point as "a unit having position"'.
35. See also GA18, 174, 186–7.
36. Heidegger's references are the *Metaphysics*, 1016b18, 1016b15, 1021a13; *Physics*, 220a17ff. See also the discussion in the Plato part of this course, concerning the one, the both or some, and the more, dependent on language rather than 'a mathematical interpretation of the world' (GA19, 420–1; see also GA18, 31–3).
37. For valuable discussions, see Helen S. Lang, *Aristotle's* Physics *and its Medieval Varieties*, Albany: State University of New York Press, 1992; and her *The Order of Nature in Aristotle's* Physics: *Place and the Elements*, Cambridge: Cambridge University Press, 1999. For a useful situation of Descartes in relation to these debates, see Jorge Secada, *Cartesian Metaphysics: The Late Scholastic Origins of Modern Philosophy*, Cambridge: Cambridge University Press, 2000.
38. While this is the case for place, it is not the case for time. For a full discussion, see especially GA24, 352ff.
39. The most extensive discussion of Descartes from this period is found in GA17, but this is largely tied to the concerns of this course with phenomenology, truth and falsehood and the *cogito* rather than geometry.
40. See Elden, *Mapping the Present*, especially Chapter One. For a critique of Heidegger's reading of Descartes on the subject, see Étienne Balibar, 'Citizen Subject', in Eduardo Cadava, Peter

Connor and Jean-Luc Nancy (eds), *Who Comes After the Subject?*, London: Routledge, 1991, pp. 33–57. For a discussion, see Simon Critchley and Peter Dews (eds), *Deconstructive Subjectivities*, Albany: State University of New York Press, 1996.

41. See GA6.2, 232; N, IV, 175–6; see GA48, 308: 'Kant does not simply repeat what Descartes had already thought before him. Kant is the first to think transcendentally, and he explicitly and consciously conceptualises what Descartes posited as the beginning of inquiry against the horizon of the *ego cogito*. In Kant's interpretation of being, the beingness of beings is for the first time expressly thought as a "condition of possibility", thus clearing the way for the development of value thinking in Nietzsche's metaphysics. Nevertheless, Kant does not yet think being as value. But neither does he any longer think of being in Plato's sense, as *idea*'.
42. On Heidegger's reading of Descartes generally, picking up on this phrase, see Robert Bernasconi, 'Descartes in the History of Being: Another Bad Novel?', *Research in Phenomenology*, Vol. XVII, 1987, pp. 75–102.
43. René Descartes, *Meditationes de Prima Philosophia*, in *Oeuvres de Descartes*, publiées par Charles Adam et Paul Tannery, Paris: Vrin, 1964ff, thirteen volumes, Vol. VII, p. 44; translated by Donald A. Cress in *Discourse on the Method* and *Meditations on First Philosophy*, Indianapolis: Hackett, 1980, p. 73.
44. Descartes, *Meditationes*, Vol. VII, p. 24; *Meditations*, p. 61.
45. Descartes, *Meditationes*, Vol. VII, p. 25; *Meditations*, p. 62.
46. Descartes, *Meditationes*, Vol. VII, p. 31; *Meditations*, p. 65.
47. Descartes, *Meditationes*, Vol. VII, pp. 78–9; *Meditations*, p. 93.
48. Descartes, *Principia Philosophiae*, in *Oeuvres*, Vol. VIII–1, p. 41; *Principles of Philosophy*, in *The Philosophical Writings of Descartes*, Cambridge: Cambridge University Press, two volumes, 1985, Vol. I, p. 223.
49. Descartes, *Meditationes*, Vol. VII, p. 43; *Meditations*, pp. 72–3.
50. Descartes, *Principia Philosophiae*, Vol. VIII, pp. 52–3; *Principles of Philosophy*, pp. 232–3.
51. Descartes, *Meditationes*, Vol. VII, p. 44–5; *Meditations*, p. 73.
52. Descartes, *Meditationes*, Vol. VII, p. 63; *Meditations*, p. 85.
53. On this, see in particular GA20, 215–26.
54. Descartes, letter to Mersenne, December 1637, *Oeuvres de Descartes*, Vol. I, p. 478.
55. See the editors' note, *Principles of Philosophy*, p. 227.

56. Descartes, *Principia Philosophiae*, Vol. VIII-1, p. 45; *Principles of Philosophy*, p. 227. See also *Regulae ad Directionem Ingenii*, in *Oeuvres de Descartes*, Vol. X, p. 442.
57. Descartes, *Principia Philosophiae*, Vol. VIII-1, p. 46. *Principles of Philosophy*, pp. 227–8. On Descartes in this regard generally, see Alexandre Koyré, *From the Closed World to the Infinite Universe*, Baltimore: Johns Hopkins University Press, 1957, p. 88–109.
58. Descartes, *Principia Philosophiae*, Vol. VIII-1, p. 48. *Principles of Philosophy*, p. 229.
59. Descartes, *Principia Philosophiae*, Vol. VIII-1, p. 46. *Principles of Philosophy*, p. 228.
60. Descartes, *Principia Philosophiae*, Vol. VIII-1, pp. 47–8. *Principles of Philosophy*, p. 229.
61. Descartes, *Meditationes*, Vol. VII, p. 71; *Meditations*, p. 89.
62. The most sustained reading along these lines is found in GA2, 89–101. See, in particular, the questions to be answered in the unpublished division on Descartes at GA2, 101. On mathematical construction, see also GA6.2, 382.
63. Descartes, letter to Mersenne, 27 July 1638, *Oeuvres de Descartes*, Vol. II, p. 268.
64. Descartes, *Oeuvres de Descartes*, Vol. V, p. 160; *Conversation with Burman*, translated by John Cottingham, Oxford: Oxford University Press, 1976, p. 23.
65. Descartes, *Discours de la méthode*, in *Oeuvres de Descartes*, Vol. VI, p. 36; *Discourse on the Method*, p. 19.
66. Klein, *Greek Mathematical Thought and the Origin of Algebra*, p. 206.
67. Klein, *Greek Mathematical Thought*, pp. 210–11.
68. Klein, *Greek Mathematical Thought*, p. 211; see his *Lectures and Essays*, p. 21.
69. Isaac Newton, *The Principia: Mathematical Principles of Natural Philosophy*, Berkeley: University of California Press, 1999, p. 416, reading with the first edition.
70. Klein, *Greek Mathematical Thought*, p. 211. See GA68, 108.
71. See Maziarz and Greenwood, *Greek Mathematical Philosophy*, p. 256. Compare to the birth of the classical *episteme* as outlined in Michel Foucault, *Les mots et les choses*, Paris: Gallimard, 1966.
72. David Rapport Lachterman, *The Ethics of Geometry: A Genealogy of Modernity*, New York: Routledge, 1989, pp. 27–8. For

good examples of this assumption, see Jeremy Gray, *Ideas of Space: Euclidean, Non-Euclidean and Relativistic*, Oxford: Clarendon Press, Second Edition, 1989; and Hermann Weyl, *Space – Time – Matter*, Dover, 1950.

73. This is confirmed by the work of Thomas Heath, both in his translation of the *Elements*, and his *A History of Greek Mathematics*, New York: Dover, 1981, two volumes. Although Heath occasionally uses the word 'space' in his translations, his glossary to the latter work (Vol. II, pp. 563–69) includes no word that is the equivalent of 'space', however, the entry for '*khorion*' reads 'area . . . *khorein apotome, sectio spatii*'. This lends support to the suggestion that the shift is made in the transition from Greek to Latin thought.
74. Lachterman, *The Ethics of Geometry*, p. 80.
75. Maziarz and Greenwood, *Greek Mathematical Philosophy*, p. 242: '[Euclid's] works make no allusion to Plato or Aristotle, or even to their strictly methodological views'.
76. Descartes, *Meditationes*, in *Oeuvres de Descartes*, Vol. VII, pp. 85–6; *Meditations*, p. 97.
77. Descartes, *Principia Philosophiae*, Vol. VIII-1, p. 51; *Principles of Philosophy*, p. 231.
78. Descartes, *The Geometry of René Descartes*, French–Latin–English edition, translated by David Eugene Smith and Marcia L. Latham, New York: Dover, 1954, p. 146/147.
79. Descartes, *The Geometry*, p. 2/3.
80. Descartes, *The Geometry*, p. 216/217.
81. See Euclid, *The Thirteen Books of Euclid's Elements*, Book VII, Definition 2, in Vol. 2, p. 277. As Alain Badiou puts it, 'the being of number is the multiple reduced to the pure combinatorial legislation of the one' – *Court traité d'ontologie transitoire*, Paris: Seuil, 1998, p. 141; *Theoretical Writings*, edited and translated by Ray Brassier and Alberto Toscano, London: Continuum, 2004, p. 59. See his *Le nombre et les nombres*, Paris: Seuil, 1990.
82. William J. Richardson, *Heidegger: Through Phenomenology to Thought*, The Hague: Martinus Nijhoff, Third Edition, 1974, pp. 667–70. In his notes to Richardson, Heidegger adds that the last was broken off after an hour as he was co-opted into the *Volkssturm*. On Leibniz, see also the extensive discussion in GA6.2, 397–416; and GA10.
83. Descartes, *Principia Philosophiae*, Vol. VII, p. 32; *Principles of Philosophy*, p. 216.

84. Gottfried Wilhelm Leibniz, *Philosophical Papers and Letters*, translated and edited by Leroy E. Loemker, Dordrecht: D. Reidel, Second Edition, 1969, p. 454.
85. G. W. Leibniz, *Mathematische Schriften*, edited by C. I. Gerhardt, Bd. VII: *Die mathematischen Abhandlungen*, Hildesheim: Georg Ohms, 1962, p. 18.
86. G. W. Leibniz, *Der philosophischen Schriften*, edited by C. I. Gerhardt, Hildesheim: Georg Olms, 1965, Vol. IV, p. 467. For a discussion, see John Sallis, *Force of Imagination: The Sense of the Elemental*, Bloomington: Indiana University Press, 2000, p. 134.
87. See also the remarks on the mathematical issues in metaphysics in GA36/37: for example, 29–30, 31, 33, 35, and so on. There are also some important remarks in the early lectures on Hölderlin. For an analysis, see Elden, *Mapping the Present*, Chapter Two, and, for example, GA39, 195, 255.
88. This appears on the dust-jacket of the German version, and has been picked up by, for example, Parvis Emad, 'The Echo of Being in *Beiträge zur Philosophie – Der Anklang*: Directives for Its Interpretation', *Heidegger Studies*, Vol. 7, 1991; and George Kovacs, 'An Invitation to Think Through and with Heidegger's *Beiträge zur Philosophie*', *Heidegger Studies*, Vol. 12, 1996. See also Reiner Schürmann, 'Ultimate Double Binds', in James Risser (ed.), *Heidegger Toward the Turn: Essays on the Work of the 1930s*, New York: State University of New York Press, 1999, pp. 243–68.
89. See GA8 213–14/210–11; and GA28, 30.
90. Cited in Plato, *Theaetetus*, 152a.
91. For earlier discussions, and more straightforward readings, see GA22, 86–7; GA27, 154; GA41, 45/46–7. In the last (1935–36) Heidegger declares that 'the *polis* was the measure for the Greeks. Everyone today is talking of the Greek *polis*'. Appendix 8 of 'The Age of the World Picture', apparently composed but not delivered in 1938, prefigures the 1940 argument in some important ways, particularly in terms of the relation to Descartes. See GA5, 102–6/77–80. See also GA90, 65–70.
92. See Ingo Farin, 'Heidegger's Critique of Value Philosophy', *Journal of the British Society for Phenomenology*, Vol. 29 No. 3, October 1998, pp. 268–80.
93. Descartes, *Regulae ad Directionem Ingenii*, Vol. X, pp. 377–8.
94. For a discussion, see David Farrell Krell, *Nietzsche and the Task*

of Thinking: Martin Heidegger's Reading of Nietzsche, PhD thesis, Pittsburgh: Duquesne University, 1971, pp. 53–9.

95. Heidegger had made a similar point many years before: 'For Husserl, a definite ideal of science [*Wissenschaft*] was prescribed in *mathematics* and the mathematical natural sciences. Mathematics was the model for all scientific disciplines. This scientific ideal came into play in that one attempted to elevate description to the level of mathematical rigour [*Strenge*] . . . Fundamentally, one does not even realise that a prejudice [*Vorurteil*] is at work here. Is it justified to hold up mathematics as a model for all scientific disciplines? Or are the basic relations between mathematics and other disciplines not thereby stood on their heads? Mathematics is the least rigorous of disciplines, because it is the one easiest to gain access to. The human sciences [*Geisteswissenshaft*] presuppose much more scientific existence than could ever be achieved by a mathematician . . . To bring mathematics into play as the model for all scientific disciplines is unphenomenological – the meaning of scientific rigor needs rather to be drawn from the kind of object being investigated and the mode of access appropriate to it' (GA63, 71–2; see GA9, 104/83; GA21, 8; GA27, 43).
96. See Victor Klemperer, *The Language of the Third Reich: LTI – Lingua Tertii Imperii: A Philologist's Notebook*, translated by Martin Brady, London: Athlone, 2000, pp. 98, 142–3; John Wesley Young, *Totalitarian Language: Orwell's Newspeak and its Nazi and Communist Antecedents*, Charlottesville: University Press of Virginia, 1991, p. 71.
97. For a critique of the Nazi view of science, particularly in relation to worldview, see also the excerpt from a 1938 seminar, Martin Heidegger, 'Die Bedrohung der Wissenschaft', in *Zur philosophischen Aktualität Heideggers*, Band 1, edited by Dietrich Papenfuss and Otto Pöggler, Frankfurt am Main: Vittorio Klostermann, 1991, pp. 5–27. For a discussion, see Trish Glazebrook, *Heidegger's Philosophy of Science*, New York: Fordham University Press, 2000, pp. 148–52.
98. Indeed, as Jean Greisch suggests, the publication of the *Beiträge* was brought forward from the plan Heidegger outlined at his death precisely to 'allow the insinuation that until the end of the war and perhaps even beyond he had been a Nazi wolf disguised in the shepherd of being's clothing to be refuted'. See Jean Greisch, 'Études Heideggeriennes: Les «Contributions à la

philosophie (A partir de l'*Ereignis*)» de Martin Heidegger', *Revue des Sciences Philosophiques et Théologiques*, Tome 73 No. 4, Oct 1989, pp. 605–32, p. 605. The original plan had been to publish the *Beiträge* only when all the lecture courses had appeared. See Friedrich-Wilhelm von Herrman, 'Nachwort des Herausgebers', GA65, 512–13. A contrary view of the political importance of the *Beiträge* is taken by George Kovacs, 'The Leap (*der Sprung*) for Being in Heidegger's *Beiträge zur Philosophie (Vom Ereignis)*', *Man and World*, Vol. 25 No. 1, Jan 1992, pp. 39–59.

99. On Heidegger and the Four Year Plan, see Theodore Kisiel, 'Heidegger's Philosophical Geopolitics in the Third Reich', in Richard Polt and Gregory Fried, *A Companion to Heidegger's* Introduction to Metaphysics, New Haven: Yale University Press, 2001, pp. 226–49, pp. 242–3, 324–5 n. 22.
100. For a discussion of the translation of this term in Freud and Reich's psychology, see the translator's note in Philippe Lacoue-Labarthe and Jean-Luc Nancy, *Retreating the Political*, edited by Simon Sparks, London: Routledge, 1997, pp. 167–8 n. 15. On the relation of *Seyn* to *Maß*, see also GA66, 318.
101. See also the much later comments about the domination of *ratio* being the 'rationalisation of all order, as standardisation, and as levelling out in the course of the unfolding of European nihilism' (GA9, 388/293).
102. For discussions of *Gleichschaltung*, see Klemperer, *The Language of the Third Reich*, pp. 154–8; Berel Lang, *Act and Idea in the Nazi Genocide*, Chicago: University of Chicago Press, 1990, p. 93; and Gordon A. Craig, *The Germans*, Harmondsworth: Penguin, 1982, p. 326.
103. See Kisiel, 'Heidegger's Philosophical Geopolitics in the Third Reich'.
104. Ernst Jünger, 'Die Totale Mobilmachung', in *Werke*, Stuttgart: Ernst Klett, ten volumes, 1960, Vol. 5; translated by Joel Golb and Richard Wolin as 'Total Mobilisation' in *The Heidegger Controversy*.
105. The notions of 'military service' and 'labour service' play a central role in Jünger's *Der Arbeiter* (in *Werke*, Vol. 6). As discussed in Chapter Two, Heidegger utilises them and sets up the idea of 'knowledge service' in his Rectorial Address.
106. The fullest discussion of the early years of the war and the philosophical issues at stake can be found in the manuscript 'Κοινόν. Aus der Geschichte des Seyns', GA69, 179–214.

107. See, for example, GA65, 191–4, 207–8, 371–88.
108. Theodore Kisiel, 'Measuring the Millennial Moment of Globalization against Heidegger's Summer Semester 1935, and Other Politically Incorrect Remarks', *Current Studies in Phenomenology and Hermeneutics*, Vol. 1 No. 1, http://www.ereignis.org/csph/2000/kisiel.htm; Franz L. Neumann, *Behemoth: The Structure and Practice of National Socialism*, London: Gollancz, 1942; Guillaume de Syon, *Zeppelin! Germany and the Airship, 1900–1939*, Baltimore: Johns Hopkins University Press, 2002.
109. See also the marginal note in *Wegmarken*: 'calculating: domination – ordering to place [*Bestellung*]' (GA9, 309/236 n. a).
110. See also the comments reported by Theodore Kisiel from the seminar 'On the Essence and Concept of Nature, History and the State', in 'In the Middle of Heidegger's Three Concepts of the Political', in François Raffoul and David Pettigrew (eds), *Heidegger and Practical Philosophy*, Albany: State University of New York Press, 2002, pp. 135–57, pp. 148–9.
111. See Kisiel, 'Heidegger's Philosophical Geopolitics in the Third Reich'; and 'Measuring the Millennial Moment of Globalization'.
112. See Stuart Elden, 'Missing the Point: Globalisation, Deterritorialisation and the Space of the World', *Transactions of the Institute of British Geographers*, Vol. 30 No. 1, March 2005, pp. 8–19.
113. See also the discussion in GA77, 6ff; and GA66, 16–25; GA67, 146, 150.
114. See also the seminars on Nietzsche collected in GA87; and GA66, 173–8.
115. Ten years later, Heidegger would make this explicit: 'Modern science and the total state, as necessary consequences [*Folgen*] of the essence of technology, are also attendant [*Gefolge*] upon it' (GA5, 290/217).
116. A few pages on, he writes '*Machination* (*poiesis – tekhne – kinesis – nous*) has a correspondence which was long held back and only now finally emerges with "*Lived-experience*"' (GA65, 132).
117. Klemperer, *The Language of the Third Reich*, p. 244: 'The word utilised most powerfully and most commonly by the Nazis for emotional effect is "*Erlebnis* [experience]"'.
118. In GA34, 140, Heidegger notes that, in relation to lived-experience, 'the Greeks knew no such thing, thank God'. See also

GA9, 324/247; and GA20, 375, for an early discussion of the problem of 'experiencing' [*Erleben*], and 'lived-experience' [*Erlebnis*], and the equally problematic 'decision' [*Entscheidung*]. On life more generally in the *Beiträge*, see Chapter Six of David Farrell Krell, *Daimon Life: Heidegger and Life Philosophy*, Bloomington: Indiana University Press, 1992.

119. Heidegger, 'Wilhelm Dilthey's Research and the Struggle for a Historical Worldview (1925)', in *Supplements*, p. 163.
120. On the use of 'es gibt' in the *Kriegsnotsemester*, see Theodore Kisiel, *The Genesis of Heidegger's* Being and Time, Berkeley: University of California Press, 1993, especially p. 42. The term appears in GA2, 212; and numerous other places in Heidegger's work.
121. See also GA65, 70; GA40, 121–2; and GA45, 177–81.
122. See also the comments in *Martin Heidegger in Conversation*, edited by Richard Wisser, India: Arnold Heinemann, 1977, especially pp. 42–3.
123. This is one of the very few places Heidegger even mentions the economic. For a valuable critique and elaboration, see Michael Eldred, 'Heidegger's Restricted Interpretation of the Greek Concept of the Political', www.webcom.com/artefact/untpltcl/rstrpltc.html
124. Indeed, in one of the essays appended to the lectures in the Nietzsche volume, which dates from 1941, Heidegger suggests 'machination (*Das Ge-stell*)', as the final stage of a history of being (GA6.2, 429).
125. I have in mind particularly the scandalous comparison of mechanised agriculture with the Holocaust, famine and hydrogen bombs. Heidegger suggests they share the same essence (not that they are in essence the same). What they share is the essence of modern technology; what distinguishes the first from the subsequent is a particular conception of the political – although Heidegger does not make this at all clear. See GA79, 27, and compare to the published GA7, 16. For a discussion, see Elden, *Mapping the Present*, pp. 74–8.