SHAPING SELF AND WORLD: TECHNOLOGY AND THE STRUCTURE OF SPACE

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Shaping Self and World:

Technology and the Structure of Space

By

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Abstract

Much of human existence is mediated through, if not outright dependent on, technology. This includes our experience of space, not as a scientifically quantified structure containing all things, but rather as a region of action and perception. What I shall call lived space arises through activity and perception in the world; it is thus the result of a constitutive act and not something pre-existing 'out there' in the world. Technology is a way to perceive and act in the world, thus the technology that is available will determine in part how lived space is constituted. But the human is not simply a disinterested user of technology as a tool. There is a feedback effect, whereby the self is shaped through its encounter with technology. By exploring Heideggerian phenomenology of space and technology, I will thus argue that space and self are structured by technology.

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Introduction

This thesis seeks to explore the question: How are we in the world? I will be investigating two modes of being-in-the-world: 1) the spatial and 2) the technological. There are complementary modes of being-in-the-world that I will not be discussing; time, for example, is the logical companion to space, but my focus is by necessity limited to these two.

I will be proposing a scheme that relates the self to the world, via space and technology. That is:

Dasein

{self— space/technology—world}

As Heidegger describes it,

> Self and world belong together in the single entity, Dasein. Self and world are not two entities, like subject and object…but self and world are the basic determination of Dasein itself in the unity of the structure of being-in-the-world. (Heidegger, *Basic Problems* 297)

What is it, then, that brings about this unity? In other words, what is it to be a self and to have a world? Or, again, what is it to be *present*? I believe that space is what gives us a world, and the kind of space we experience determines the type of world we have and the type of beings that we are. Space arises from the set of possibilities for action that we have. Largely these possibilities are decided by biology: we see a certain spectrum of "visible" light, hear a certain range of frequencies, we walk upright and we enjoy wonderfully dexterous hands and digits. But the list of evolutionary gifts that we enjoy

does not include a host of abilities enjoyed by other species, abilities that give those creatures a very different space and 'self' (though it is hard to say that a flower or ant is a self).

Space is thus one of the central structures of being-in-the-world. To have an object or world is to have space between you and that object, to be able to differentiate between self and object (remembering that self and world both part of the same structure). But to have an object is also for it to be subject to your actions, for it to be present, close by, or available. One way to do this is through technology.

As a preliminary foray into the discussion, consider: I can reach out and grasp an object, say a hammer or a glass of water. If these objects can carry action significance Heidegger refers to them as available or ready-to-hand [*Zuhandenheit*] and not merely occurent or present-at-hand [*Vorhandenheit*]. As technologies, they operate within my sphere of reach to make a world of a certain character—one that is hammerable and drinkable. The hammer creates a relationship to nails (and so the joke: When all you've got is a hammer, everything looks like a nail). The technological aspect of the hammer is not the fact that it is a *gadget*, that it was created by humans to effect our ends; rather, it is its ability to create relationships, to make sense of my desire to connect blocks of wood. Indeed, in part it creates the very conditions for which I even *have* a desire to do so. The technology of hammering establishes the relationship between wood and nails, me and a shelter, that opens up a field of space in which I can be a carpenter and live in a wooden house. We therefore make objects and the world present to us through technological means; technology describes the structural relationship between the self

and object. So the type of technology we have determines the type of space we have and the kinds of objects that can be made present to us (and vice-versa: the objects that we can be present to).

In order to elaborate this relationship, the plan of the thesis will be as follows: Chapter one will develop the definition of space I will be working with. I will be comparing what I call a scientific definition of space, which treats mainly with measurable and measured quantities, with lived space, a phenomenological, Heideggerian concept of space as network of interests and action. It is my contention in this chapter that ultimately, lived space is a component or way of being-in-the-world.

The aim of chapter two is first to give a definition of technology. I begin with some "misunderstandings," some common views that name only a small part of what technology is and does. My goal is to broaden the reader's understanding of what counts as technology: not just the obvious high-tech gadgetry of modern life, but the material world we surround ourselves with, the organizational structures of society, and the technical knowledge we possess. My second and chief objective of this chapter is to deepen the reader's understanding of technology. Heidegger's seminal thought and writing on technology point the way to a new theory of technology: It is a way of life, a world.

Finally, in chapter three, I will bring space and technology together, demonstrating that they are both components of being-in-the-world. (The above diagram of Dasein is meant to illustrate this relationship.) Not only this, technology affects space as a mode of being, in turn deeply affecting our own being.

Chapter 1

Scientific and Lived Space:

Descartes, Newton, Kant, Heidegger

In this chapter I will be contrasting two different theories of space, their relation, and their comparative priority to one another. These two types of space are what I will be calling *lived space* and *scientific space*. Scientific space is a very familiar concept to most people since the Modern era. Starting with Descartes, through Newton, and Kant, there is now a well-established tradition of treating scientific space as primary, as 'the way the world is.' It is as if, through scientific methodology, we can get a glimpse of the world, measure it, map and plot it on a Cartesian coordinate system. Newton himself believed that space was a homogenous whole, that seeing space scientifico-mathematically was like achieving God's perspective. Space in effect exists in God's omnipresence, his being everywhere. Newton did, however, believe that a distinction existed between the true quantities of space and our measurement of these true and absolute quantities with absolute space being invisible to the senses. Nevertheless, his theory rests on a belief that true, that is, scientific knowledge, is based on our ability to measure and quantify the world around us. This quantification is a main feature of Newtonian science and science in general. Subjective, qualitative feelings and evaluations are superseded by 'objective' (and, it is presumed, more accurate) measured quantities.

In contrast, there is lived space, given to us in the phenomenological tradition. Starting with Husserl, moving to Merleau-Ponty and Heidegger, there is an increased emphasis on the importance of the lived body as constitutive of experience, especially

space. Descartes is generally blamed for a stark division between the mind and the body; his philosophy gives pre-eminence to the mind as the seat of the self. Soul and mind are essentially interchangeable for Descartes, with the mind or soul animating the body as a 'ghost in the machine.' In contrast, phenomenology's suppositionless starting position will lead us to the world as we experience it, theory-free. One conclusion arrived at, contra Descartes, is that we experience the world, not as minds trapped in bodies, but from the perspective of the lived body. The work of such phenomenologists as Husserl and especially Merleau-Ponty enforces the importance of our embodied experience and brings a unity to mind and body, rather than disparaging or dismissing the body's contribution to the self.

Indeed, it is in Heidegger that I find the most convincing alternative to the scientific account of space, and this is in large part due to his compelling, if not overt, treatment of the body. More accurately, Heidegger is concerned with our very mode of being, what he calls Dasein. This technical term does not specifically refer to a particular embodied perspective, but rather to the system and structure by which we exist and act in the world.

I will thus explore both conceptions of space, especially as they apply to human experience. I am not championing one over the other, lived space over scientific space; rather my goal is to highlight the primacy of lived space as we encounter it in the world. That is, our primary mode or experience of space is not measured, homogenous, scientific space, but a much more immediate, non-reflective, experiential space, defined by our embodied nature. As such, it is subject to change (through technology, for example). This

is not to say that it is a 'better' way of structuring space, that it trumps scientific space. However, as far as embodied human experience and the phenomenological perspective go, scientific space is necessarily secondary to our primary mode of experiencing space as embodied beings. It is only *after* we perceive and act in lived-space that we can abstract from it and make a science of it. The function of this chapter is thus to establish an understanding of lived-space such that, in terms of my overall project, I will be able to demonstrate how technology dramatically shapes our spatiality.

While the concept of space has had many important philosophers debating its nature, I will not attempt here to give a comprehensive account of this long history. I will begin with an explanation of scientific space, using especially a Newtonian-Cartesian formulation. I will then proceed to something of a halfway point between Newton's absolute space and Heidegger's action space, that is, Kant's peculiar notion of space as a category of the intuition. Finally, I will arrive at the crux of the chapter, with the phenomenologist Martin Heidegger's quite different theory of space and his introduction of the concept of Dasein. There is a crucially important role for the body, or embodied being, in this theory, and space is seen not primarily as an abstract theoretical entity but as a component of daily life, revealed through normal experience.

1.1 Scientific Space – Descartes and Newton

In the *Scholium* to the *Principia Mathematica*, Newton supplies definitions for space, time, place, and motion. These definitions did not appear in the first edition of this work as Newton believed such definitions were not necessary, the concepts being "well

known to all" (Newton, "Absolute" 322). In the second edition however, Newton provides them for clarification purposes. He realised that "common people" have a specific conception of space and time, one that is limited to them as sensible objects. This is not the scientific-mathematical sense that Newton was concerned with, and thus his stipulations in the *Scholium*.[1]

The definition of space which Newton gives is part of a tradition starting with the ancient Greeks and extending through the Middle Ages, with some important differences (Torretti §1). The main characteristics of Newton's space are that it is boundless, quantifiable, contains all things, and is homogenous or uniform. Before Newton, the Greeks conceived of the void as a boundless space, but unlike Newtonian space, the void was not the 'container' of all things. The void extended endlessly, but existed *outside*, beyond the fixed celestial bodies. It truly was a void, containing nothing. It is in the Middle Ages that being the container of all things is added to the concept of space. Sixteenth century philosopher Bruno provides a definition of space that concretises the then-current thinking:

> Space is a continuous three-dimensional natural quantity, in which the magnitude of bodies is contained, which is prior by nature to all bodies and subsists without them but indifferently receives them all and is free from the conditions of action and passion, unmixable, impenetrable, unshapeable, non-locatable, outside all

[1] Note this division of the "common people's" conception of space and time, which relies on experiential sensible knowledge, versus the scientist's abstract mathematical model. This will become more important later in this chapter, as it is exactly the contrast I am elucidating.

> bodies yet encompassing and incomprehensibly containing them all (Bruno quoted in Torretti §1).

This is the conception of space that Newton inherited, with one important addition. For the Greeks, geometry was the study of the relations and properties of figures. Newton, following Descartes, conceived of geometry as the science of space. But Descartes believed that space was nothing but the extension of body and thus there was no such thing as empty space, a container (which leads to certain difficulties in the development of physics). Newton used Cartesian coordinate geometry, which distinguishes three infinite planes, but he distinguished bodies from the infinite space that contains them. Newton therefore added the concept of empty space to Descartes' theory, which was devoid of such an idea.

Three key distinctions that Newton makes in the *Scholium* are absolute-relative, true-apparent, and mathematical-common. In his definition of space, Newton is setting up a dichotomy similar to the episteme-doxa debate of philosophy. His goal is to differentiate the views of sensible space of the common people from the more accurate definition of space of the scientist. Thus, there is absolute, true, and mathematical space versus relative, apparent, and common space. True knowledge of space is of absolute space and we cannot have sensible perceptions of it; rather we only perceive relative positions of bodies in absolute space. Newton thus suggests that we abstract from our senses in an effort to "consider things themselves" (Newton, "Absolute" 325). Interestingly, Kant, working squarely within a Newtonian framework, places the perception and constitution even of space and time within the intellect of the subject as

transcendental ego. For Kant, the things in themselves, the noumenal, are thus *a*-spatio-temporal, as they exist outside of our phenomenal experience.

Another important aspect of Newton's theory of space, indeed the grounding of this theory, is that space is God's sensorium. Newton makes this dramatic claim in the *Opticks*, and what exactly he meant by this has been debated since. One plausible analysis is that 'sensorium' can be understood as God's presence in the world, that God is present at every point in absolute space and every instant. God's utter regularity and reliability thus guarantees the same regularity to space and all the laws of nature. This is why we can confidently do Newtonian physics, for example, without worrying that the gravitational constant will change from moment to moment or from place to place. This is not an uncommon move for philosophers of the period. Descartes does the same thing in the *Meditations* when he appeals to God to guarantee the solidity and regularity of the world.

The goal of the Newtonian physicist is thus something akin to achieving a God's-eye-view, insofar as God is here characterised as the apotheosis of the rational, mathematical physicist. The point of math and physics is to transcend relative, apparent, and common sensible perceptions of space and achieve knowledge of the absolute. In this respect, the absolutely ideal position from which to 'observe' is from God's perspective, which is necessarily non-bodily and for which space appears as it is, uniform. From this position, we experience space in its primary mode and, thanks to Descartes, we can map it using his three coordinate system.

1.2 Kantian Space

In the *Critique of Pure Reason*, Kant provides an analysis of space in the Transcendental Aesthetic. Kant, deeply influenced by Newton, is working in the tradition of conceptualising geometry as the science of space. As such, his motivation is to ground geometry as a priori synthetic knowledge. He believes that his account is the only one that "makes intelligible the *possibility* of geometry" as such knowledge (71). As with Newton, space is the container of all things for Kant. It is represented to us as "an infinite *given* magnitude" (69). All objects of sensation are necessarily found in this space, without exception (67). I quote a passage from the Aesthetic, as it mirrors Bruno's above:

> [W]e can represent to ourselves only one space; and if we speak of diverse spaces, we mean thereby only parts of one and the same unique space. Secondly, these parts cannot precede the one all-embracing space, as being, as it were, constituents out of which it can be composed; on the contrary, they can be thought only as *in* it. Space is essentially one; the manifold in it, and therefore the general concept of spaces, depends solely on limitations. Hence it follows that an *a priori*, and not an empirical, intuition underlies all concepts of space (69).

Here Kant is obviously dealing with space as unified, homogenous, and boundless. It is only through the introduction of limitations to the whole of space that we can conceptualise figures and objects found within space. Interestingly, Kant diverges from Newtonian space in several key ways. First, Kant believes that space (and time as well) is not derived from experience. Keeping in mind that Kant wants to ensure the grounding of geometry and the other sciences, he must deal with a prioris. He thus attributes space to a

function of the mind of the transcendental subject. It must be "presupposed" in order for there to be any possibility of objects to exist. The relations between my sensations and the objects they refer to, and the relations between objects themselves, do not generate or provide the idea of space. Space comes before them so that they may be represented to me at all. Space is thus a priori for Kant, for although we may be able to abstract all objects from space and think it empty, "we cannot represent to ourselves the absence of space" (68).

Kant concludes from this exposition that space is the "subjective condition of sensibility." This is an interesting departure from Newton's division of absolute and relative, apparent and common. It might be interpreted as Kant doing away with absolute space. It is equally plausible that Kant's conception of space is a fusion of Newton's perspectives. Space is absolute in its limitless extension and being container of all things, but it is grounded and dependent on the observer's experience. Indeed, Kant explicitly makes the division of the phenomenal and noumenal realms, stating that "space is not a form inhering in things in themselves" (73-74). These things in themselves (the noumenal) remain unknown to us, and we have only our sensible representations of them (the phenomenal) which by necessity are spatiotemporal. The corollary of this is that the noumenal world is not spatiotemporal; as it lies outside the bounds of sense it does not come under the intuition. Kant could therefore be read as preserving Newton's absolute space, with all its characteristics intact, but translating it into the language of the subjective observer. What is apparent or relative is so by absolute necessity, and to talk of actual space, not as we apprehend it, but as it is, is nonsensical.

Einstein's explanation of space (and time as well) has much in common with Kant. The theory of relativity abolishes absolute space and as such it is a dramatic break from Newtonian physics. There are no privileged perspectives for Einstein, which led him to state, echoing Kant, that "space and time are modes by which we think."

One last point to consider is what to make of Kant's assertion that "it is solely from the *human* standpoint that we can speak of space, of extended things" (71, my italics). This certainly seems to be in contradiction to Newton's assertions about God and the project of science. Newton's claim is that space is God's sensorium. Kant is thus explicitly contradicting this by calling space a category of human intuition. Presumably, God can "see" the things in themselves. But if this is so, God sees them outside of space and time. Perhaps a better way of putting it is that God comprehends the noumenal world completely, through pure reason (Kant could hardly disagree). In that case, it is hard to know how to treat the "God's sensorium" thesis in Newton. I do not have a definitive answer but I suspect it does not much matter. Kant's point was to move space and time squarely into the realm of human experience, and I think it is a fruitful and perceptive measure. However, Kant is still burdened with the Newtonian model of space, and thus human phenomenal space is in fact not much different from Newton's absolute space. Despite the fact that Kant turns space into a subjective category of the intuition, the character of that space is not different from Newton's: it remains boundless, undivided, and contains all things. It is not until much later philosophers come along that the initial promise of a human-agent-centric space is brought to fruition.

1.3 Heidegger and Space

A quite different way of theorizing space is in what I believe is its primary mode, space as we experience it as embodied beings. This is not quite the same claim that Kant is making, that we constitute space as a category of our intuition. Kant was still working with a Newtonian conception of space and the Cartesian concept of the subject as a disembodied cogito, so while the subject indeed constitutes space, this space is still absolute, boundless, undivided, and limitlessly extended. As mentioned, Einstein did away with these objective qualities of space. However, his theory is still scientific in that it relies on abstract theoretical description to explain a component of every day life. The point of relativity is to bring to our attention the relative nature of space. But it also admits that we only ever experience our *own* perspective and this requires a phenomenological explanation.

In *Being and Time*, Heidegger examines the historical and temporal situatedness of the existential self. He develops a concept called Dasein, the condition of being-in-the-world. This is a particular type of being enjoyed by certain entities (humans) whereby they disclose their own being and also the being of other entities. A tree therefore is not Dasein, because it does not disclose its own being. However, it does exist as part of the structure of Dasein, which does not directly translate to 'human being' but encompasses the network of objects and interests, the human included. So the tree is part of Dasein in that I climb it, burn it for warmth, or use it to build a hut for shelter.

Spatiality thus takes on a very important role for Heidegger and for this new way of looking at existence. There is no separate Cartesian ego inhabiting its own 'place'

removed from the world. To be is to be in the world, and this is to be thoroughly 'thrown' into a network of interests, possibilities, and projects. Thus the 'worldhood' of the world is its relatedness to our everyday activities as it is filled with pragmatic concerns of human existence (Sheehan §3). The meditating Cartesian who doubts the existence of the outside world (even if it is only a methodological tool to ground science) is a ludicrous figure for Heidegger. Dasein moves through the world with circumspective care; it does not hole itself up in a cabin. The objects of the world (like Descartes' wax) get their significance as they relate to human goals, gaining or losing significance as human interest changes. If I discover that stone makes for a better shelter, then the significance of the tree as building material changes.

Space and spatiality are thus fundamentally important to our mode of being, but in an altogether different way than the scientific space of Descartes, Newton, or Kant. The space of Dasein is not a boundless, uniform, all-encompassing container, given as primary and in which we find ourselves. Measured scientific space is secondary and does not explain being-in-the-world. It is an abstraction from what is our primary experience of space. I should note here that Dasein is an historical process and thus it has a crucial temporal component besides the spatial. There is no doubt that space and time are tightly intertwined, and the same observations I make about the former can equally be applied to the latter. Time, just as much as space, is subject to modification, and the two inform one another: A long trip is both 'long' in terms of distance travelled and time elapsed. My subsequent discussion however will be limited to Heidegger's treatment of space.

Heidegger bases the spatiality of entities in the environment on the worldhood of the world, distinguishing between the available and the occurent (*Being and Time* 135). The occurent would be what Descartes' wax is to him: a geometric solid with a certain extension, dimensions, and coordinates in abstract space. That which is available for Heidegger is quite different; it has a *closeness*, not of measured distance, but in terms of its possibility of manipulation. Rather than merely occupying a random spatial location, it has a place (as in the expression "everything in its place") in that it *belongs* somewhere in a particular arrangement that fulfills a need (136). The classic example from Heidegger is the hammer. In his language, it serves as equipment, for hammering nails or tent pegs. Thus its measurable spatial coordinates are less important to our goal of hammering than its possibilities of manipulation. A perfectly idealised imaginary hammer of optimal dimensions is useless for driving nails. I will return to Heidegger's hammer in a moment. For now, the more general point is that equipment occupies a region or place that is not the same as Newton's absolute space. The region is the totality of that which is within the range of possibility, a place for equipment that serves my ends. So, the Renaissance guildsman who sleeps on the same table at which he eats and works is always within the same position of absolute space. But the region of his workshop may as well be on the other side of town for all the relation it bears to his breakfast space in terms of his divergent ends. The worldhood of the world thus refers to the world *of the agent*, just as space for a living, engaged Dasein is not a removed theoretical entity. Worldhood refers to the 'horizon' (to put it in Husserlian terms) that constitutes the being's range of

interests. Being-in-the-world is having such a horizon that is constituted and changes through circumspective action.

Thus Heidegger gives us three features that being-in-the-world, or Dasein, is not. First, as indicated above, it is not being occurent. Secondly, it is not an occurrence at a position in space. And third, it is not even Being-ready-to-hand at some place. The first two make sense in Heidegger's framework, but the last distinction seems counterintuitive. Is this not exactly opposite to what I just said, summarising Heidegger's own point? His point here is that Dasein is a network or structure, and thus not strictly 'placial.' To make sense of this we must introduce the peculiar Heideggerian concept of deseverance [*Ent-fernung*]. To desever is to abolish distance, to make things less remote. This does not necessarily translate into bringing them closer *in scientific space*. Even if we only recognise the object's remoteness, we have desevered the 'distance' in this recognition. This is the peculiar activity of Dasein that other Being lacks, according to Heidegger. "Two points," say a hammer and nail, "merely have a measurable distance between them" (*Being and Time* 139). But Dasein places them and itself within a framework (pardon the pun) of house building, where the hammer, nail, wood, and the agent operating them act together as parts of a teleological system. The goal is, immediately, to drive the nail into the wood, in order to build a shelter and workspace, so that the agent has somewhere to sleep and work, so that he or she can eat, so that... Deseverance is thus the process of making things available and putting them to use. This means to bring things within our region, and once again, this is not primarily to bring

them within a certain spatial distance to us; the closeness need not be physical (*Being and Time* 140).

There are many instances of deseverant technologies that operate at great distance, in fact whose whole purpose is to act over such spatial distance. As Heidegger himself remarks, radio abolishes distance, making information available quickly, across short distances. What are the 'distances' of radio we are dealing with? Certainly, a measure of the distance from my ear to the radio, from my radio to the radio station's antenna, is meaningless. Heidegger is concerned with the human measure of deseverance. Therefore, it has little to do with empirical scientific measurement. When asking for directions, one might say that the corner store is "a good walk" away (Newfoundlanders are notorious for this). Heidegger suggests that even when we *do* know and give exact distances (as was my experience when asking for directions in Germany, interestingly) this still relates to the way as Dasein we desever these distances. This is a radical claim, as it is counter to anything present in Newton or Descartes. The phenomenological experience of walking, driving, or flying an exact measurable distance is something distinct from that measure. The 'what it *feels* like' of the act is something that cannot be captured in the science of measurement. Heidegger's point is that measurable quantities are not exhaustive of our primary experience. It could certainly be the case that a mountain is eight-thousand metres high, or a marathon twenty-six miles long. But when we climb the mountain or run the marathon, the actual experience of the height or the length of it is not something that we first express to ourselves in terms of a quantified measurement. The measurement of the distance is thus secondary or peripheral to the

central nature of the act. Quantifiable spatiality need not even arise as a component of our experience, unless we consciously reflect and impose a system of measurement. It is the same with music: the measurement of note values and pitches does not capture the experience of actually listening to the piece being performed.

Another key divergence from Newtonian space is disclosed in the following: "What is ready-to-hand in the environment is certainly not present-at-hand for an eternal observer exempt from Dasein: but it is encountered in Dasein's circumspectively concernful everydayness" (Heidegger, *Being and Time* 140). This is to say that a being 'purified' of any spatiotemporal body cannot enter into the same relations of being that Dasein enjoys. A model of space (and time) that rests on such an absolute and abstract conception is out of touch with the primary, everydayness of things as they are available. Newton's God actually *misses* the structures of significance, the hammer's use as driver of nails, as this is something only embodied Dasein can grasp. The available is not translated into the language of the occurent; it is simply lost.

This point is emphasised in Heidegger's discussion of subjectivity and objectivity. The subjective is by no means a second-rate way of viewing or experiencing the world as compared to the objective. In Newton, this is the exact dichotomy he proposes, with relative, common space, space that is sensibly perceived, contrasted with absolute space, the space of science and mathematics. Heidegger argues that far from Newton's idea that by accessing absolute, objective space we intuit the world as it 'really' is, it is subjectivity that uncovers the world at its most real (*Being and Time* 141). When we persist in thinking of the world objectively, we lose sight of its primary nature as we

experience space as embodied beings. To be sure, Heidegger does not deny that a science of space is possible or desirable, only that it is not the primary or most fundamental sense of space. It is possible to "lay bare pure homogenous space," which presumably is Newton's project (*Being and Time* 147). But this metrical science of space comes *after* and loses the original quality of circumspective experience. This science of space does not deal with places, regions, and the available, but with positions in coordinate space, following the Cartesian model. When we measure and abstract from experience, we move to a different level or treatment of space, but it is important to remember, as Heidegger stresses, that this does not imply we are somehow transcending a corrupted human perception in favour of a purer insight. As Robert March remarks, the idea is flawed that science and mathematics are getting at Nature as it really is. Much of Newtonian physics, for example, operates on principles that idealise nature, giving us frictionless surfaces, infinite planes, and perfectly parallel lines. These conceits are fabrications and approximations and should not be thought of as somehow more real than our own experience of nature (March 24-25).

1.4 The Role of the Body

The here-there dynamic of Dasein is crucial in understanding Heideggerian space, and there is a distinction to make between the Husserlian conception of the body and Heidegger's treatment. Heidegger was a student of Husserl's, and as such he borrowed many important ideas from his mentor. Husserl, founder of the phenomenological movement in philosophy, placed the lived-body of the subject at the zero or null-point of

orientation. As I move about and look around, objects in my perceptual field are presented to me. The body itself can appear as one of these objects, but not in the exact same sense. I can walk around a table, look at it from different angles; importantly, as I distance myself from the table, it recedes from my perception, or approaches as I move towards it. The body is unique in that it cannot undergo this phenomenal change. This is because "my Body is the permanent null-body, and it can thereby undergo no change in horizon but can indeed 'assume any position in space'" (Husserl 273-4). The horizon of all objects of perception is constituted by and surrounds my body; my body is thus the central point of orientation for all other objects. Out of this centre point, "Objective space," as Husserl calls it, unfolds. This space is homogenous, and all points are equal. I then move myself through the points of this Objective space, but with my Body as the constant null point (265).

Though influenced by his mentor, Heidegger does away with this concept of the body as null point that Husserl developed. When we desever distance, bringing something close, we do not mean that we move it to a closer spatial position to the body, or as Heidegger calls it, the "I-Thing encumbered with a body" (*Being and Time* 142). For something to be close by is for it to be available, as I have already mentioned. This means that the thing is made relevant to concernful being-in-the-world, not that it occupies a particular position. Further, as Elmar Holenstein claims, Dasein's own position is not truly important as a zero-point of orientation. Dasein "is essentially de-severance...it is spatial;" the "here" of Dasein is only relevant or knowable in terms of the "there" (Heidegger, *Being and Time* 142). This may sound like it borders on the

nonsensical, but only if we are stuck thinking in a Newtonian paradigm of space. Heidegger is working with a concept of spatiality that does not plot objects on a grid. The activity of deseverance that characterises Dasein is one that gives structure to objects, but not by mapping out their position. My "here" is truly "there" in the sense that my attention and concern are fixed elsewhere than on myself. When I am looking at the clock, the yonder place that Heidegger speaks of is my being at the clock. In other words, I am not consciously thinking of my body in its relation to the clock but focusing my attention on that object. My goal in reaching for the hammer is the hammer, not to have the hammer contiguous (in the scientific sense) with my hand.

This is an important point that Elmar Holenstein picks up on in "The Zero-Point of Orientation: The Placement of the I in Perceived Space." Holenstein agrees with Heidegger, though he suggests that the latter does not pursue the point far enough. The point of Holenstein's paper is to critique what he sees as several unquestioned and untenable suppositions of Husserl's phenomenology. The main critique is that the thesis that the lived-body of the perceiver is always the zero-point of orientation is wrong. In all circumstances, the zero-point is "the most powerful figure." This can certainly be the lived body in the right context, but that this is so all the time is false (Holenstein 90). The lived-body enjoys no special privilege over other objects in orienting the world spatially.

Holenstein gives two examples. In a darkened room, full of homogenous space, a slanted line is projected on the wall; we can easily tilt our heads and make this line straight. This is an instance in which Holenstein considers the body the zero-point of orientation (61). As he notes, this situation of finding oneself in homogenous space is rare

(usually relegated to such experimental apparatuses or Newtonian musings!) The link to Newton is fairly obvious. The blackened room represents absolute space, void of objects, but existing independently of them. We then insert a) a subject and b) a projected line, and see what happens. But Holenstein describes a second, more true-to-life experiment. Instead of a single line being projected in the room, we project more familiar images full of objects, perhaps a picture of a real room. When *these* images are slanted, there is a strong tendency to see them as vertical: "This tendency is so strong that even the floor, upon which the observer is standing, *seems to be slanted contrary to the tilted images*" (Holenstein 78, my emphasis). Holenstein's point is to demonstrate how in this case the body is not the zero-point of orientation. In terms of a here-there relationship, the lived-body accommodates itself to the object of perception. It does not establish itself as a privileged point that maps objects in their spatial relation to it; space is always constituted as a network with the body and the intentions of the subject. Thus when I find myself in a city square, I do not feel that I am at the center, from which the square unfolds. The center of the square, with its imposing statue or fountain, is intuited as the center of gravity and not my body. Note that this is yet a non-quantitative mapping; it is a qualitative feeling that I am not at the center of the scene but at the periphery, oriented towards the central point.

Holenstein thus offers his corrections to Husserl's theory. Husserl might be thought to be halfway along from escaping Cartesian coordinates by focusing on the lived-body as constitutive of space rather than space being a homogenous pre-existing whole. But even the zero-point must go as a vestige of this coordinate system. This is the

move that Heidegger makes. The difficulty Heidegger has is in avoiding the language of spatiality as it is used scientifically to talk about what interests him, the spatiality of networks of *significance*, of places of interest and activity for Dasein. As Holenstein puts it, "[t]he subject always already finds itself stretched inside a network of needs that attracts it soon over here and then over there" (69). This is where deseverance plays its role in eliminating the distances between Dasein and the things it needs to exist. There is then no space yet to even fix a zero-point of orientation, be it the lived-body or anything else. There is no such thing as "a subject which is proximally still worldless and which emits a space out of itself" (Heidegger, *Being and Time* 146). I think this is the point Holenstein would be trying to make, in agreement with Heidegger, if Holenstein were to take his argument just one step further: "I am there, outside, with the seen things… I do not experience things as if I were peering out from my dark lived-body like a lighthouse guard. Rather I am in space open to all sides, *I am presently where my gaze rests*" (Zutt, quoted in Holenstein 69, my emphasis). The image of the self as a lighthouse keeper peering out from the lighthouse of the lived-body is not quite fair to Husserl. But it is an apt way to describe the post-Descartes characterisation of the mind and body as two distinctly separate entities.

Above I suggested that Kant's transformation of space into a category of intuition can be read as a first step towards making space and spatiality more 'subjective.' I will return to this point once more with a fresh perspective gleaned from Heidegger to argue against this interpretation. Making space a condition of possible experience which belongs to humans and does not exist within the world does not fundamentally change the

character of that space. Heidegger refutes Kant entirely on this point, saying that "space is not in the subject" (*Being and Time* 146). Further, the world is also not in space. Space in this pre-theoretical sense is what Heidegger calls region, and it is encountered through the interaction with the available, as explained above. Thus space does not belong to the subject as a priori, in Kant's sense, because it can only arise where there is circumspective action of Dasein. There is no space existing 'out there,' waiting to be filled with objects, nor is there space 'in here,' inside my head so to speak, waiting to be applied to the objects of perception. This also means that my body, primarily, is not an object plotted in space (though it could be treated as such, as when we make a science of human motion).

1.5 Conclusion

In Heidegger's *Being and Time*, we have a dramatic reconceptualisation of space. He rejects a long history of space that starts with the Greeks and sees its culmination in the theories of Descartes and Newton. Indeed, as I have suggested, Heidegger's theory of space goes much deeper, in that it explores and explains the very nature of our being as Dasein. For Heidegger, it is impossible to disentangle spatiality from existence, to treat it as an abstract subject of scientific study. While a science of space is possible, it is not a study of Dasein's spatiality; we lose the character of the everydayness when we attempt such a study.

Descartes, Newton, and Kant gave us a quantifiable, measurable science of space. This was their interest as Modern mathematicians, scientists, and philosophers. But it

would be a mistake to suppose that because their conceptualisation of space is presented as exact and objective, that it must be true or more accurate than the concept that Heidegger later explored. These scientific ideas only arise because of a prior and more fundamental experience. This experience of course is the subjective experience of space, as Heidegger describes it, whereby we find ourselves (in fact only *are* ourselves) in a network of interests and possibilities. A return to and examination of this type of space is thus crucial not only to understanding space as a phenomenon, but to understanding ourselves and most importantly for this thesis, understanding how we are affected by technology.

If we dispense with a notion of objective space and come to understand lived space as a constitutive act, we must recognise that this lived space is malleable. My contention is that what space will be like is going to be powerfully influenced by our technology. Thus, we must have a solid understanding of what technology is, and that is the function of my next chapter. With a deeper understanding of lived space and technology, I will be in a position to unite them in chapter three.

Chapter 2

Technology

If an examination of spatiality and its relation to our own human existence is essential, then I find it equally crucial that we examine a component of our existence that has become inseparable from the everyday; that is, technology. In this chapter, I will thus be shifting my focus to address this second main topic. I will not be putting space aside altogether; there will be some suggestion as to how the two will be brought together in the final chapter, where I will discuss the interrelation of space and technology and the powerful effect the latter has on the former. Keeping in mind that this is the ultimate goal, I will be tailoring my discussion to those aspects and characteristics of technology that most obviously and directly apply to space. I will not be offering a definitive, comprehensive, once-and-for-all discussion or explanation of technology – in other words, I do not pretend that I will nail down the essence of technology. My belief is that defining essences is tricky business and not always fruitful. In this case, my goal is to broaden and deepen the reader's understanding of technology: First, technology is much more common than we may first realise, permeating almost every aspect of our existence. Secondly, technology places us in certain relations (embodiment and hermeneutic) with the world. These relations are non-trivial and are in fact critical in shaping self and world. With this understanding of technology, I may bring together space and technology and see how the latter impacts our constitution of the former.

2.1 What is Technology?

I will begin by examining and exposing some traditional ways of thinking about technology that are not strictly speaking accurate. I will propose and challenge a common view of technology as a parallel to the common, scientific view of space we saw in the last chapter; the space of Newton and Descartes, which is represented through quantification and measurement. I am arguing against the same notion of technology that Heidegger challenges, that which he calls the instrumental and anthropological explanation. It claims that technology is an ensemble of tools built by humans with the purpose of fulfilling a goal (Heidegger, "Question Concerning Technology" 36). It is the sort of theory most frequently discovered in popular culture, in magazines and TV shows such as *Popular Science*, *Popular Mechanics*, and *TechTV*, and even such august publications as the *Economist*, which publishes quarterly 'technology' updates. It is also found in our dictionaries. The three definitions of technology supplied by the OED refer to "the study and use of the mechanical arts and applied science...the application of this to practical tasks in industry...[and] a tool" used for such purposes. There is here a close association between technology and machinery, gadgets, and tools that get stuff done. And that is in many ways a sufficient and satisfactory definition. But, as Heidegger stresses, it might be correct while not yet being true ("Question Concerning Technology" 36). In other words, there is nothing incorrect about it per se, but a different definition could have more explanatory power. Similarly, a scientific definition and examination of space is well and good, so long as we do not lose sight of the *prior* nature of space that is based in human activity and interest.

Along these lines, Samuel Ijsseling offers what he terms three "misunderstandings" of technology. While I do not necessarily agree that they are misunderstandings per se, I do agree with the spirit of Ijsseling's singling them out. They are ways of thinking about technology that do not lead us to the types of insights that emerge when we think about the subject in the manner that I will shortly outline. But for now, briefly, the 'misunderstandings:'

1. Technology is a totality of technical devices.
2. Technology is applied science.
3. Technology is something we can use or not use (Ijsseling 410-411).

The first misunderstanding is what I have referred to above as the 'gadget' definition. There are two problems with this definition, one more obvious, the other a little more subtle. First, what counts as a "technical device" is very broad, broader indeed than we might expect. The clock is technology, or the microwave, the typewriter, the internal combustion engine, the cell phone: these are all technical devices. It is not hard to convince someone of this. I believe the gadget definition of technology is rooted in our contemporary experience of these ever more complex devices, especially electronic ones. Laptop computers, PDAs, GPS units – these are all very obviously highly advanced technologies. But my pencil (and not necessarily a mechanical pencil) is also a piece of technology. So is a nail or a hammer, a hoe, a shovel. The very basic tools of the Stone Age, flint axes for example, are also technology in the gadget sense. Our current gadgets are simply more refined, more complex, their inner workings more incomprehensible. The clock, when it was first introduced, was not the clock we now know. A modern

atomic clock subdivides the second into millions of parts. But the first mechanical clocks, which can be dated at least back to the thirteenth century, only measured the hour. The mechanical clock merely refined fuzzy time-keeping techniques to a greater degree of precision. By c.1345, "the division of hours into sixty minutes and of minutes into sixty seconds became common" (Mumford 16). Prior to that, the movement of the sun through the sky, casting a shadow on a sundial, approximated some sort of hour and even that simple sun dial is a technical device.

The second aspect of the first misunderstanding is this: Even if we broaden the concept of what counts as a technical device in this manner, we have yet not broadened it enough. I referred to this misunderstanding as the 'gadget' definition because it focuses on concrete, material items. But the list of all such technical devices still does not include all things that are technology. There are immaterial technologies, technical knowledge, organisational structures, that do not refer to things we can see, or touch, or wield. They have no buttons or handles, but they are technological. A bureaucracy is an example of such an immaterial technology. The workers, offices, and forms filled out in triplicate are certainly physical, but the structured hierarchy, standardisation, limited responsibility of individuals within the system, and impersonal nature of the dealings of a modern bureaucratic system equally qualify it as technology. I will call this sort of technology 'inconspicuous' and I will return to it shortly.

Ijsseling's second misunderstanding refers to our experience of technology after Modern science, where the two (science and technology) have become almost inextricably intertwined (411). Today, one cannot theorise about sub-atomic particles

(science) without smashing atomic nuclei together in massive particle accelerators (technology). Nor can we peer into deep-space gathering data about the age and makeup of our universe without sophisticated radio and optical telescopes. One of the main characteristics of science from the Modern period onwards is that it is so technologised. (Some writers refer to the phenomenon of *technoscience* to highlight this relation). Of course, this cuts both ways. Modern technology is highly dependent on advances in scientific understanding. We would never have our radio telescopes if we did not understand the principles of electro-magnetic waves. Then again, we would not understand *those* if we had no experimental apparatus to detect them. And so it goes, the two linked in a mutually informing and beneficial relation. Technology is therefore no more applied science than science is the product of technology.

But science and technology were not always as closely bound as they are nowadays. There were pre-Modern times when "[s]cience [was] not always thought of as having necessary or even close relations to technology" (Ihde, *Philosophy of Technology* 3). In the Ancient period, science was rather tied to philosophy; much speculation of Thales, Anaximander, Anaximenes, Heraclitus, and Democritus, to name a few, was in effect questioning Nature itself: What is the nature of Nature? To this they each had interesting theories and speculative answers: Air, water, number (Pythagoras), nous, and finally, with Democritus, the atom. These ancients were like scientists without technology, with no laboratories or experimental apparatuses to test their claims. The existence of Democritus' atom had to wait over 2000 years for the technological means of its experimental verification. Even more dramatically, despite the fact that "human

activity from time immemorial…has always been technologically embedded," it is without doubt that no scientific theory preceded the very first use of simple hand tools in our ancestral past (Ihde, *Lifeworld* 20).

One may wonder what it matters, to think of technology as inextricably tied to science. The point of this examination is to show how many of our ideas and attitudes concerning technology are insufficient in that they miss important features of the phenomenon. Highlighting the gadget fallacy shows how technology is a lot more common and pervasive than we might initially think. We are constantly surrounded by technology, even though we might not realise or recognise it. I stress the fact that technology is not reducible to or the same thing as applied science for the same reason that I argue technology is not a bunch of gadgets, so that we do not lose sight of our object and confuse technology with the products of *big science*. The canal diggers of Industrial Revolution-era England were not men of science; they were practical men. Their technologies were pragmatic inventions that emerged out of necessity and in response to the type of world they lived in. There was no scientific theory behind their practices but a need to function with their world. If we treat technology merely as applied science, we will miss out on this element of the technological.

Ijsseling's final misunderstanding is chiefly an ethical one. Technology is not neutral. It does not sit inert, waiting to be picked up, put to good or bad use, then set back down (Ijsseling 411). As Jacques Ellul puts it, "the human being is no longer in any sense the agent of choice." A new surgical option merely is; there is no choice (80). We do not

walk around in a non-technological world, deciding here to use technology, there, not.[2] Rather, "technology is a world: our world" (Ijsseling 411). And this world 'strives' for total efficiency and integration. This is the thesis of the autonomy of technology, and my aim here is not to get entangled in it. I will say that I believe the ethical questions surrounding technology need to be given long and serious consideration, but that will not be the direction of this thesis. What we can take away from this third misunderstanding is that technology is in fact our world. One thing that is certainly true today is that we cannot decide *not* to use technology. I sleep in a bed on a mattress, covered in blankets. I flick a switch to turn on the lights, bringing electricity into my home. I wash in a bathroom full of mirrors, plumbing, and tile work. I prepare breakfast in a kitchen with a toaster, microwave oven, refrigerator, and drawers and cupboards full of utensils. Before going outside I don my coat, my hat, my boots... Every single item I have listed is part of the technological fabric of my world. One day at work, I might find myself so disgusted with the oppressive, totalising character of technology that I decide to rid myself of it once and for all. I discard my computer, my car, and my cell phone. I sell my house, my bicycle, my guitar. My books better go too, although I'll certainly miss them, not to mention my clothes. I walk out into Nature, naked, finally free of the trappings of technology. But it is cold, and I am hungry, and it is getting dark. Better build a fire, sharpen a stick, set a snare. Some clothes would be nice, maybe made of animal hair, fur, or feathers. Of course, a shelter would be ideal, even something as rudimentary as a lean-to. But wait! I've caught myself falling back into the old trap of technology. As benign as

[2] We might indeed choose to not use a particular technology or set of technologies, as do the Amish, Luddites, hippies, and other groups, but *everyone* uses *some* technology. No one lives in the Garden.

my simple tools seem, I swore off technology, desperate to avoid the treadmill of autonomous technological 'progress' that consumes my 'natural' existence.

I hope my hypothetical renouncement of technology has shown that to avoid technology altogether is truly a monumental feat. In contemporary times, we are literally surrounded by it. As I write, I am sitting in a chair, at a computer, in a house, heated by a furnace, lit by electricity. But even hundreds or thousands of years ago, if I were writing this same essay, it would hardly be different. Rather than a metal and plastic chair produced in a factory, it would be wooden, shaped with hand tools by a carpenter. I would write with a quill pen on parchment or perhaps papyrus, sitting in a draughty stone house or straw hut. Even the language itself that I use is a form of technology, a complex system designed to communicate information. My point is this: If there was a time when humans lived in a state of nature, utterly devoid of technology (in the 'Garden,' as Ihde imaginatively puts it (*Technology and the Lifeworld* 12)) it was very short lived indeed. Technology is our world. Even such Luddites as Ted Kacyzynski, the infamous Unabomber, *machined his own screws*.

2.2 Heidegger's 'Question'

Having gone through these misunderstandings as a means of preliminary introduction, let us delve a little deeper into the matter. Heidegger is one of the seminal thinkers in the philosophy of technology. His essay, "Question Concerning Technology," begins: "In what follows we shall be *questioning* concerning technology" (35, italics in original). In the course of this questioning, Heidegger assures us that unless we realise

that "the essence of technology is by no means anything technological," we will be forever blind to this "essence" (35). I take this to be at the core of Heidegger's philosophy of technology: "Bringing-forth brings hither out of concealment forth into unconcealment," and specifically, "[t]echnology is a way of revealing" (38). Technology "reveals whatever does not bring itself forth and does not yet lie here before us" (38). Thus, technology is not merely tinkering, producing nicely turned pots out of clay, or steam engines out of iron, but a revealing of potentialities and capacities, of "whatever can look and turn out now one way and now another" (39). The craftsperson or artisan gathers his or her materials and tools, envisions the finished project, and executes it in space and time. He or she therefore reveals a potential state or form.

The essence of technology for Heidegger lies in this revealing. His project is to consider the questions and problems of epistemology as ontological, to consider the question of Being as it reveals itself in different historical epochs, and to explore the revealing-concealing character of truth. Any revealing, any bringing forth into unconcealement, necessarily leaves something else hidden or concealed. To 'think technologically' or to live in a technological society are very specific modes of being that disclose certain features of the world while occluding others (with medical science, the death of shamanism, perhaps). Modern technology, according to Heidegger, perverts the revealing power of technology by treating the world as standing-reserve [*Bestand*] ("Question Concerning Technology" 41). By this, Heidegger means that the world is revealed to us as a mere store of energy. The mountain is a store of coal, iron ore, and uranium; the oceans, a store of fish to be harvested; the Arctic, an untapped oil well.

There is thus a fundamental shift, argues Heidegger, in the way *modern* technology reveals the world. We place demands on this world to fulfill our hunger for energy and resources, driven by a technologically fuelled lust for dominance over Nature.[3] There is a key difference between building a bridge over the Rhine and damming it with a power works: In a devastatingly wry moment, Heidegger answers his critics who might object, "But the Rhine is still a river in the landscape, is it not?" To this he replies, "Perhaps…but in no other way than as an object on call for inspection by a tour group ordered there by the vacation industry" ("Question Concerning Technology" 41).

There is a lot to unpack in Heidegger's theory of technology. I will begin by accusing him of an element of Romanticism, as if building a bridge over the Rhine were a pure act of communing with Nature. This is not an uncommon position for many, who, when describing mechanised agriculture, for example, turn to violent metaphors to describe the 'ripping' and 'slashing' of the soil.[4] These images are absent when describing the ox-pulled plough and the hand hoe, despite the fact that the blades of either also 'rip' and 'slash' the soil. Romanticism aside, the most interesting aspect of Heidegger's theory is that technology is a *revealing*. Its concrete manifestations might be of objects that are made with purpose to do useful work, but that does not define technology's essence. The instrumental and anthropological definitions of technology are indeed *correct* ("uncannily correct" as Heidegger puts it ("Question Concerning Technology" 36)) because they agree with the deeper essence of technology as revealing.

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[3] Which perhaps finds its origins in the Baconian maxims of mastery over Nature.

[4] "And all is seared with trade; bleared, smeared with toil; / And wears man's smudge and shares man's smell: the soil / Is bare now, nor can foot feel, being shod." – Gerard Manley Hopkins, "God's Grandeur."

The world is revealed to us in a certain way; in this case it is *enframed* as standing-reserve, as a resource to be disposed of to fulfill human ends. We produce tools and artefacts to effect these ends, and when we abstract from these two components, we arrive at a *correct* instrumental and anthropological definition of technology, built on the *true* essence of technology as a revealing.

Heidegger's ontology of technology shows, in agreement with Ijsseling, that there is a deeper dynamic between us and our technology than that of tool user. Technology changes revealing and introduces a whole host of possibilities for Dasein: We find ourselves as beings with a world. What kind of world is this? It is a spatially structured world, as we saw in the first chapter. It is also a world full of technology, not just gadgets that we pick up and put down at will, but things that make us and our world possible. Since our first use of technology, we continually modify our world but also ourselves as a pole of being-in-the-world. Consider the world we find ourselves in today, and as an example, the role the technologies of car-culture have played in making it possible.

The automobile is not simply a neat gadget, in that it is a discrete thing, a clever engineering solution made of myriad specialised parts of various materials, which gets us from place to place. First of all, the automobile does not exist in a void. It requires roads to drive on, gas stations to fill the tank, an expansive parts industry with manufacturers, suppliers, wholesalers, and retailers, not to mention garages and mechanics to keep it functioning. It exists, following Ijsseling, Ellul, Ihde, and others, in a totalising system that requires a vast network, just so that I may have a car sitting in my driveway. Second, there is no denying that the automobile gets me from place to place. But from which and

to what place does it get me? In "Auto-Mobility and the Route-Scape," Gary Backhaus addresses just this issue. Every technology exacts a price. The gadget definition suggests that whether I get to work by foot, by bus, or by car makes no difference: they are simply modes of transport. Backhaus points out that they are much more; they are modes of life, or I will say, modes of being-in-the-world.

Above I argued that technology is not an independent gadget and we independent users of that gadget. Together with our technology, we form an interconnected whole. The car is thus not just another device we employ to move about in our world; it has a great impact in determining who we are and what that world is: "[T]he automobile has become an aspect of our very own Being, which includes being-with and being-in, for it informs the fundamental structures of our experience of the life-world" (Backhaus 97). Specifically, "automobile use," Backhaus says, "has led to spatial organizations that level the significance of the landscape to that of road-mapping-for-transportation" (101). In its negative analysis, automobility treats landscapes as places that need to be paved. Destinations are chosen for us in advance by virtue of the fact that we must follow the roads. And the nature of these destinations reveals further impacts on our being-in-the-world; Backhaus is particularly exercised about the phenomenon of suburbanisation and consumerism (echoing Heidegger's commentary on the Rhine and the tourist industry) (101). The whole structure and spatial demands of car-culture predetermine our choices of where to live and shop, if not necessitating, then at least strongly encouraging us to drive from our suburban homes to big-box shopping complexes and back. The automobile, more accurately, the automobile culture or, even better, *world*, necessitates a

very fixed, definite, and limited set of features. The possibilities opened to me by owning a car are in direct relation to the possibilities closed off, and thus the world I live in and the space I move through are different if I own a car.

How is this so? As a car-owner, part of my identity is tied up with the fact that I own a car: I am a *motorist*. I also belong to and identify with a certain socio-economic class that is wealthy enough to pay for the vehicle itself, auto insurance, gas, tune-ups, etc. I am able to fling myself through space at speeds of a hundred kilometres per hour and more. Distance becomes less relevant, as I can easily jump in my vehicle and drive to the store or my friend's house for a visit, something I might have otherwise reserved for special occasions if I had to walk. The ceremony of a visit to a 'distant' (relatively speaking) friend changes if I drive there in fifteen minutes or walk there in an hour ("You walked all this way to see me?!"). Negatively, I also might find myself less fit; whereas I used to walk and bike everywhere, I now drive. I get far less exercise and burn fewer calories. Not only that, it is far easier for me to consume *more* calories, as the drive-through of a fast food restaurant is mere minutes and very little effort away. I thus find myself getting a little soft around the middle, maybe even obese. I also think differently because of this new ease of transport. All my destinations seem much closer now that I do not have to walk or wait for the bus. I might fall into the motorist's trap of road-rage: everyone is in my way, impeding my easy progress across the pavement. But all is not doom and gloom (despite Backhaus' protestations): My life is also richer in ways because of my car. I become a member of a motorist society. I enjoy the sheer experience of driving, the wind whipping through my hair, the radio blaring. The ability to travel at

great speed, even if I do not have a destination, is a thrill in itself. I get to visit my friends and family more often. I can work in the city but live in the country. There are thus pros and cons to any technology. To remain value-neutral, we might just say that every technology brings with it certain enabling features, but also problems of compatibility. It is difficult for example to reconcile the needs and desires of motorists with those of pedestrians or with the exigencies of climate change for that matter.

Of course, we need not limit ourselves to transport technology, though it is obviously related to space. A world with street lamps, be they candle, oil, gas or electric-powered, is a different world than one without. Street lamps light my way at night. They transform dark, potentially dangerous spaces, creating new possibilities. For many years, my friends and I played Frisbee in the park from 10pm to 12pm. This would have been impossible (or at the least much more difficult and dangerous) without the few lampposts lighting our game. Our casual late-night games are a version of the nightly professional sporting events held under blaring, many-thousand watt bulbs that transform day into night, an unusable baseball field or soccer pitch into a successful venue for professional sporting events. Early in our evolutionary history, long before electricity and outdoor lighting, fire was our source of light in the dark. A torch would have allowed us to explore deep into caves, even to make homes within their dark recesses. A pit fire becomes a focal point of activity, and not just for cooking and eating. It creates a warm, illuminated, and safe space for our ancestors to gather and share a meal and probably tales of the hunt. These various lighting technologies, in similar ways, serve to produce

useable space, in the sense that they create the grounds for activities that are otherwise impossible.

It should by now be obvious that far from being a neutral collection of gadgets, technology in all its forms has a profound impact on us and our world. What I would most like to avoid is a conception that as humans, we have a set of predefined goals that we then seek to meet by adopting now this technology, now that. This is certainly a potential interpretation, but it does not properly credit the bilateral relationship between us and technology. A new technology, like the automobile, creates a brand new set of values, possibilities, and interpretations of ourselves and the world. As Jonas asks, "who had ever wished to have in his living room the Philharmonic orchestra, or open heart surgery, or a helicopter defoliating a Vietnam forest? or to drink his coffee from a disposable plastic cup? ... or to see clones of himself and others walking about?" (19). Technology compels us to think and act differently, sometimes consciously, sometimes unconsciously. It demands a new set of paradigms to explain who we are and what we are doing. There is even neurophysiological evidence to support this argument. Dr. Mike Merzenich says:

> Our brains are different from those of all humans before us. Our brain is modified on a substantial scale, physically and functionally, each time we learn a new skill or develop a new ability. Massive changes are associated with our modern cultural specializations. The Internet is just one of those things that contemporary humans can spend millions of "practice" events at, that the average human a thousand years ago had absolutely no exposure to. Our brains are massively

> remodelled by this exposure--but so, too, by reading, by television, by video games, by modern electronics, by contemporary music, by contemporary "tools," etc. (quoted in Olsen).

Imagine a caveman and modern man. They are not the same type of people who happen to use different gadgets to achieve their similar ends. They are radically different people living in radically different worlds with divergent goals and values. Certainly there are very fundamental goals and values that are shared by most humans through time: the desire for sustenance, for example. Even this is not universal, however, as with those who are suicidal or want to be euthanized. We might qualify and say that the *vast majority* of people desire sustenance. But it is a gross oversimplification to say that a caveman's desire to be fed and my desire to be fed are the same desire. If we are to cash out what it actually means to say "I desire to be fed today" in contrast to what the caveman means, we see that they are drastically different desires. I desire to get up in the morning, rummage through my fridge and cupboards, and produce a meal out of items procured via a previous expedition to a nearby grocery store. The caveman gets up in the morning and desires to grab his spear, stalk a deer in the woods, and kill, skin, cook, and eat it. I have *never* had that desire.

The difference of goals and values is even more evident when we consider high technology. To what end would a caveman employ the Internet? He would not be able to put it into action, to make any sense of it. No caveman ever complained about the speed of dial-up and wished for broadband access, or more storage space, or that his package from Amazon.com would arrive more quickly. Indeed, the Internet could not exist in the

caveman's world nor could the caveman exist in the Internet's world. Another way of putting it is to say that the Internet cannot be revealed to the caveman or again, is not available to him. Self and world are two poles of the same structure and the technological developments that allow for the Internet to exist precisely preclude the possibility of cavemen. In short, you cannot know what the Internet is, understand it, and use it *and still be a caveman.* Finally, the technologies of the Internet, or automobility, or space travel are not just discrete gadgets or artefacts, but encompass non physical systems, structures, and knowledge to which the caveman has no access. I will thus suggest in the next section that though the physical artefact is the most conspicuous type, there are also non-material manifestations of technology.

2.3 'Inconspicuous' Technology

So far, despite my earlier protestations, I have been talking largely about gadget technology. But as I mentioned there are other important spheres of technology that are not as immediately obvious or concrete as machine technological artefacts. It is my claim that humanity and technology are inseparable. Without technology, we do not have the equipment to survive in the state of Nature. The creation myth of Prometheus and Epimetheus is instructive in this regard, and I introduce it as a way of illustrating some of the sweep of technology as I will be treating it: Having given out all other gifts to the animals, Prometheus steals and gives man the gift of technique to guarantee his survival. But the gift of technical knowledge is not enough for man, when it refers only to smithing, weaving, spinning, and inventing; in short, mechanical or machine-related

technology. Humans also required a socio-political technology of how to live together, to build states and governments. The myth concludes with Zeus himself eventually giving man these techniques, and humanity flourishes ever after.

From this myth we can glean a new way of looking at technology, seeing it not simply as physical things, but as systems. Even seemingly simple, independent technologies imply a larger system of both physical and non-physical technologies. For example, a simple pocket watch can be viewed as a physical technological artefact in this materialistic conception of technology. This is certainly true. It is made of metal and glass and other materials, fashioned into springs, gears, cogs, and arms. But as an artefact, it also represents an integrative system. First, a watch is not atomic; it is a collection of parts. These parts must be carefully assembled in just such a way that they function properly. This logically implies the necessity for skilled craftspeople with highly specialised knowledge; in short, watchmakers. But even if a watch was very simple, like a sundial, made of one undivided piece, we would need some way to produce it in the first place. The knowledge that the watchmakers possess, that they learned from their parents, siblings, teachers, or fellow guild members, is *technological knowledge*. It *refers* to physical, technological artefacts, but it is still not identical or reducible to them. The knowledge of how all the pieces of a watch fit together, the finely tuned motor skills required to assemble such tiny parts, are highly developed technological skills separate from the watch itself. Further still, watchmakers cannot and would not exist if they could not dedicate a large part of their time, energy, and intellectual capacity to learning their trade and amassing all this technological knowledge. If watchmakers were also expected

to bake bread, clean chimneys, argue in court, and drive cabs, they would probably not be very accomplished in their trade. Equally true, even if they were not required to perform the duties, but were expected simply to be knowledgeable about other fields, especially advanced, highly scientific and technologised disciplines, our poor watchmakers would have their brains so full that there would scarcely be room for anything pertaining to watches. We therefore need some sort of societal organisation that allows for specialisation. We need social technologies that provide the division of labour. This organisation is itself a technique, a non-physical technology that creates the conditions for watch makers, cabbies, geologists, and doctors. I am not suggesting that *first* we must get our organisational technique straight and *then* can we set about specialising. The two processes occur organically at the same time, the one informing the other. In addition, it is important to note that besides the organisational technique, we also have as an end result something novel: the watchmaker, cabbie, or doctor. In short, the technician.

A perfect (if fictionalised) example of this social organisation or hierarchy as technology is found in the *Republic*. In his search for a definition of justice, Plato via Socrates sets out to build the just state. The rationale behind this exercise is that, the state being very large, it will be more easily discernible what makes it just. The lessons learned from studying justice in the state can then be applied to the soul. What is interesting for our purposes is the step-by-step analysis Plato provides of the building of the state. Whether or not the state as described, with its tripartite structure of worker, guardian, and philosopher-king is actually practical in reality is irrelevant. Rather, the focus on the division of responsibility and labour, present already 2,500 years ago (and certainly

farther back still) is evidence of a technological approach to societal organisation. The imaginative Greek state builders arrange the parts, not watch springs or gears, but people with various duties and functions, into a coherent and functional whole. The finished state is a complex piece of technology, not at all unlike the watch. It is just in that everything is in its place; everyone has an assigned task which they fulfill.

It is therefore evident that it is not *just* the physical bits and pieces that go into a watch or a car that are technology. The *know-how* that allows those parts to be assembled at all, the conceptualised blueprint, and the operating organisational scheme are themselves technological. One last example will suffice to illustrate this point. In evaluating the strengths of the Greek hoplite soldiers, an analysis which only discussed their weapons, armour, and other equipment, all very obviously technological artefacts, would be incomplete. We need also to consider what strategies and tactics the Greeks had at their disposal. Not just *what* the hoplites fought with, but *how* they fought and *who* they were. The technologies of warfare employed by the hoplites include their battle formations, their use of the massed push or shove, even whether to wield the spear over- or underhand. A chain of command must also be established, where the main battle plan is communicated from the officers to the rank-and-file soldier. The Spartans were famous among the Greeks for a highly integrated socio-technological program whose sole aim was the production of exceptional hoplite warriors and the *structure* itself of this society was a technological answer to the question of how to produce such fearsome warriors.

The organisational structures found within a state or army or the technical knowledge required to build a watch are therefore just as much technology as the gadget

or technical device. Technology is thus pervasive to the degree that almost every human transaction involves a human-technology relation. I want therefore to explore the nature of these relations: specifically, the embodiment and hermeneutic properties of technology.

2.4 Human-Technology Relations: Embodiment and Hermeneutic

In this final section, I move to a more immediate, personal examination of technology using two distinctions provided by Don Ihde. Ihde is a phenomenologist and philosopher of technology in the Heideggerian, hermeneutic tradition. His books, *Technology and the Lifeworld*, and *Technics and Practice* rehearse a series of phenomenological examinations of the first-person experience of technology in use, what he calls "a phenomenology of human-technology relations." The intent of his examinations is to discover "the features of this ambiguous relation" (*Lifeworld* 72). To this end, he develops four types of human-technology relation, of which I will be looking at the first two, the embodiment and hermeneutic properties of technology. My main goal in examining this pair of distinctions brought forth by Ihde is to give us some tools to analyse how deeply technology affects space.

The first human-technology relation is embodiment. When we embody technology or technics, we take the technology into our experience of the world. That is, the technology transforms our perception and bodily sense. The common example of this is of visual technologies. Ihde's scheme,

I—glasses—world

represents the fact that the technology comes between the subject and object as mediator (*Lifeworld* 73). The eyeglasses allow the wearer to see the object, and it is only *through* (quite literally) the glasses that the seeing can take place. In this case, the technology itself is not the object of attention. The glasses should, again quite literally, be as transparent as possible to the user that they recede from her experience. Although I do not wear eyeglasses, I do wear sunglasses, and if the lenses are smudged or the frames so thick that they obtrude into my visual field, the experience of using that technology becomes a chore. To use Heidegger's terminology, the glasses become like the hammer with a broken handle. The hammer sticks out as an object: "It ceases to be the means of praxis and becomes an obtruding *object* defeating the work project" (Ihde, *Lifeworld* 80). This is the core principle of human-technological interactions. Embodiment relations are only possible if the technology is transparent. Ihde offers this scheme as a representation of embodied technology:

(I—glasses)—world.

Here, the subject and the technology have become one, so to speak. My glasses "become part of the way I ordinarily experience my surroundings." Thus, "[t]echnics is the symbiosis of artefact and user within a human action" (*Lifeworld* 73).

The astute reader will have noticed that the eyeglasses, when embodied, are no longer occurent or merely present-to-hand. There is no distinction, as in Ihde's scheme, between the 'I' and the 'glasses', the user and tool, the subject and object. Human-technology-world converge in being-in-the-world (this relation will be fully disclosed in the third and final chapter). For now, consider that the glasses, when first worn and the

user is not *used* to them, are still occurent or present-to-hand. A technology or technique is thus fully mastered when it disappears to the greatest possible extent from our awareness of it as object; that is, when it becomes part of the structure of experience and not the content.

Ihde's eyeglasses are a very personal and proximally close technology. They only function when they sit on the user's face. As such it is easier to see how they are assimilated into the subject's experience and sink into her body image. Further, they do not offer new or drastically different powers to the user, rather they restore as much as possible the natural sight of the subject. They are also a very simple, monosensory technology. But an embodiment relation can take place with technologies that are very complex by comparison, and afford "whole-body motility" such as driving a car (*Lifeworld* 74). For every learner, the first experience of driving a car is clumsy, self-conscious, and usually nerve-wracking. Conscious effort and attention is directed towards pushing the pedals just right, turning the wheel precisely, and strictly obeying traffic signs. As a student improves, the movements become more coordinated and jerky starts, stops, and turns become smoother. Parallel parking strikes terror in the hearts of novice drivers, and even some seasoned ones. But when well learned, as Ihde points out, the driver 'feels' rather than sees the curb at such-and-such a distance from the driver-car's body (74-75). The body image, thus, "is not fixed but malleably extendable and/or reducible in terms of the material or technological mediations that may be embodied" (Ihde, *Lifeworld* 74).

There are countless other illustrations, only limited by imagination. A well-worn example, used by Wittgenstein, Polanyi, Merleau-Ponty, Dreyfus, and now myself, is of the blind man's cane:

> We hand the blind man a cane and ask him to tell us what properties it has. After hefting and feeling it, he tells us that it is light, smooth, about three feet long, and so on; it is occurent [present-at-hand] for him. But when the man starts to manipulate the cane, he loses his awareness of the cane itself; he is aware only of the curb (or whatever object the cane touches); or, if all is going well, he is not even aware of that, but of his freedom to walk, or perhaps only what he is talking about with a friend. Precisely when it is most genuinely appropriated equipment becomes transparent (Dreyfus 65).

The myopic woman's glasses and the blind man's cane are two very different technologies, but they ultimately serve the same function: to allow the user to perceive the world. More deeply, they allow the user to extend their spatial presence in the world, bringing objects into and closer to consciousness. Deeper still, I propose a modification to Ihde's scheme: the intersection of I-glasses-world should be represented as:

(I-glasses-world)

These are not three distinct entities; rather, they are all bound together in the mutual process of being-in-the-world.

Ihde's second human-technology relation is the hermeneutic. This involves 'reading' or interpreting a technology. The technology becomes an object, not a Heideggerian object, but a written text to be deciphered. Ihde states that "writing is a

technologically embedded form of language" and I agree (*Lifeworld* 81). But language itself is also a technology, a means of conveying information.[5] Take the example of the thermometer, as Ihde does. Before its invention, we had no quantitative measurement of temperature. We could go outside and *feel* the cold or heat. If we want to relay information about the temperature to another person, we engage in the first hermeneutic transformation, and we need a technology to do so. So we invent qualitative statements such as, "It's cold outside" or, "The fire is hot." Then we got more creative with our language, introducing 'tepid,' 'lukewarm,' and 'scalding' into our vocabulary. These utterances transform a first-person spatiotemporal experience of the world into a communicative act. As hermeneut, you have to interpret my saying, "The soup is really hot!" or "It's really cold outside." My conception of hot and cold might be quite different from yours, and my warnings that you should bundle up might not be the best advice.

When we introduce the thermometer, we add a level of refinement that did not previously exist. The concept of temperature as an accurately measurable quantity has as much to do with the technology itself as the phenomenon it measures. That is to say that the phenomenon of temperature was not out in the world all along, waiting to be discovered. The technological means of measuring molecular motion (temperature) in part *created* temperature. With thermometer in hand, I no longer need to tell you that it's hot or cold outside. I can give you simple measurement: "It's 12 degrees out"—you decide whether you need a jacket.

[5] And not necessarily in the form of propositional content. "Ouch!" and "Yahoo!!" also carry information: pain and excitement.

The key to the hermeneutic transformation is that, unlike embodiment relations, the instrument itself is what is perceived, and through the instrument I read the state of affairs to which it refers (*Lifeworld* 86). The point of the eyeglasses is to look *through* them, not at them. This is reversed in hermeneutics: I no longer need to go outside and feel the hot or cold; I simply look at my thermometer hanging outside (actually, I check the weather network). Therefore, Ihde diagrams the hermeneutic relation thusly (86):

I-(thermometer-world)

Or more generally:

Human-(technology-world)

Notice in this scheme the movement of the brackets to surround (technology-world) rather than (human-technology). Within the brackets, there is a potential for a malfunction between the technology and the world it refers to, what Ihde terms the "enigma position." Certainly, a malfunction in the form of a misreading can occur between the human and the (technology-world), but this can be made conscious and corrected. Observer ignorant of internal malfunction. The is the internal 'enigma' between technology and world. There is an opacity between human and (technology-world) that is not always resolvable. If the instrument does not correctly refer "its reference object or its world cannot be present" (Ihde, *Lifeworld* 87). This is especially critical if direct confirmation of the proper functioning of the device is impossible.

As an example, let us consider whether or not the Moon is in fact made of green cheese. Having experienced green cheese on Earth, I might seek visual confirmation by inspecting the Moon through a telescope. If it does its job properly, the telescope brings

the distant Moon closer, and what I see is the Moon. This is not trivial, because I do not want my observations to be affected by chromatic aberrations or fuzzy images caused by an inferior instrument. Thus, to fully embody the technology and extend my vision over a great distance, the telescope needs to be a good one.

But suppose that my visual inspection proves inconclusive, and I decide that what I really need is a chemical analysis of the Moon's composition. So I send a lunar probe to the Moon's surface to take a core sample. I equip it with a radio transmitter, and after touching down, acquiring a sample, and performing the chemical analysis, the probe transmits the data back to my lab on Earth. I do not now have in my possession a hunk of Moon to smell and taste, but a coloured spectrograph representing the chemical makeup of the Moon, still hundreds of thousands of kilometres away. But the *information* that will ultimately prove or disprove my hypothesis that the Moon is made of green cheese is much, much closer; it is right in front of me, on my computer screen. If all is functioning properly, then I can read the text of the printout and infer what the Moon is made of. In this example, I can even compare the data to a similar analysis of Earth green cheese and see if the spectrographs agree.

But now I am going to introduce a kink: on the way to the Moon, the probe is bombarded with cosmic rays that knock the chemical analyser out of whack. The data that it transmits back to Earth is corrupt. There is a breakdown in the (technology-world) relation, but I have no idea that this is the case. All I have to go by is the chart, and the malfunctioning technology is opaque to me. My reading of the Moon's composition is inaccurate, not because of any failing on my part, but because of this malfunction

(assume I am adept at reading such spectrographs)[6]. I could in principle fly to the Moon, extract another sample, and this time eat it to confirm the technology's results. But practically, for me, this is impossible. My worldview is thus wrong; I now believe, falsely, that the Moon is made of green cheese.

This view is certainly not incorrigible. Further tests and technologies could rehabilitate my beliefs; however, this is not always the case. As I said, in *principle* I could retrieve a chunk of Moon, spread it on a cracker, and taste it. But there are many domains in which any sort of direct confirmation is in principle impossible. This is where we see technologies at their most powerful in introducing new modes of experience, and it is on this idea that I will conclude.

Ihde refers to *vertical* and *horizontal* trajectories of transformation (*Lifeworld* 78, 90). The telescope is a horizontal transformation of our already existing visual experience. It makes things bigger, making distant objects visible or more detailed. A horizontal transformation denotes that the object being perceived or acted upon does not fundamentally change in character. With the telescope, the object appears larger, but as Ihde suggests, it still maintains a spatial isomorphism to the un-enhanced perception (imagine zooming in on a planet with greater levels of magnification). A vertical transformation is like that of the above chemical spectrograph, or of spectrographic astronomy. The image of the spectrograph is only very tenuously analogous to the object, either moon rock or star. In the case of a star, a spectrograph translates a many-light-years-distant, massive three-dimensional object into a coloured band on paper or a screen.

[6] That is to say, assume that I am a *technician*, one who has mastered a set of technologies. To the uninitiated, the colours mean nothing; they are not part of their world.

There is little remaining spatial isomorphism between the read-out and the star as there is with a telescope image. Taken one step further, the star can be translated and represented as pure digital information, an elaborate sequence of ones and zeroes, which now has no spatial isomorphism whatsoever (Ihde, *Lifeworld* 90-91). The star is present in different ways depending on which technology is used to 'look' at it, whether it be through the spectrographic band, the telescope, or a digital printout.

Therefore the main idea to take away from this chapter and point us to the next is that technology plays a vital role in our constitution of the world. Examples of embodiment relations such as eyeglasses or seeing canes show us how technology structures space. They also demonstrate how dependent we are on technology: without the cane, the blind man would *really* be blind. Hermeneutic relations are a bit more opaque and they do not necessarily yield spatial experiences (as when we transform the star into an expression of ones and zeroes). But the example of the green cheese bears out the point that hermeneutics still structure our world: Although in principle possible, realistically speaking, I cannot fly to the Moon and taste a piece of it to confirm whether or not it is made of cheese. Thus I am entirely dependent on whatever technology is going to tell me about how the world is. Or to put it another way, (and the thermometer makes this point as well): technology defines my world. And as my diagram suggests, me with it. It is an ontology of the subjects, objects, concepts, and ideas of the world. The exact relation of human-technology-world will have to be worked out in detail in the final chapter.

Chapter 3

Technology and Space as Being-in-the-World

This third and final chapter will gather the threads of the preceding chapters and focus on being-in-the-world. The argument consists of three interrelated points:

- Space is a mode of being-in-the-world.
- Technology greatly affects our experience and having of space.
- Thus, technology shapes our being-in-the-world because it shapes the way we have space.

There is an interrelationship between self, technology, and world (in this case, the spatiality of the world) that I wish to outline here and that will ultimately demonstrate that our way of being-in-the-world is profoundly technological. Our spatiality is structured through technology and more generally, our life experience.

Having argued in chapter one that space is a mode of being-in-the-world, and having outlined what technology is in chapter two, my last task is to demonstrate how technology affects the way we constitute space. In claiming that it has such an effect, I am also in fact arguing that technology itself is a mode of being-in-the-world, that as Dasein we employ technology not just instrumentally, but ontically. That is to say that technology plays an integral role in the constitution of our world, in the creation of what there is.

I will begin with an examination of the interesting case of Cheryl Schiltz, a woman whose sense of balance was lost and eventually restored through medical technology. I will then move to an examination of a different family of technologies:

modes of transportation. These examples are meant to illustrate the plasticity of lived space, very different than the fixity of scientific space. My discussion will then move to the general implications of technology for Dasein. To be-in-the-world is in part to have space. Space is not something pre-existing that we simply experience; it is a structure of our experience, and further, it is a structure that is moulded through technological means. In the creation and use of technology, the nature of the human-space-world relation is determined.

3.1 The intriguing case of Cheryl Schiltz

As I argued in chapter one, space is a mode of being-in-the-world. Specifically, I am dealing with bodily, lived space. Clearly this requires a *body*. But what constitutes a body? It is obvious by this point that the body is not limited to the biological body Nature has endowed us with. To varying degrees, the blind man's cane, the motorist's car, or the cochlear implant of a deaf woman are assimilated, *embodied*, to become part of the body image and ultimately part of the self. The brain projects a body-shaped image onto our actual body, but this image is not the organic body itself. The brain can be made to project an image that is different than the physical body. This is the problem of the phantom limb, where although there are no actual tissue or pain receptors, the amputee can feel their limb in space and feel pain in it. "People with actual limbs don't usually realize this, because the body image of our limbs are *perfectly projected* onto our actual limbs, making it impossible to distinguish our body image from our body" (Doidge 188). However, the body image can be expanded to include inanimate objects, like the seeing

cane, whereby the blind man feels the curb as if he were touching it, for in fact, he is. In *The Brain That Changes Itself,* for example, Doidge describes how he was made to assimilate a tabletop into his body image:

> Then Ramachandran performed an even simpler trick. He told me to put my right hand under the table, so my hand was hidden. Then he tapped the tabletop with one hand, while with his other he tapped mine under the table, where I couldn't see it, in an identical rhythm. When he moved the spot where he hit the tabletop, a bit to the left or right, he moved his hand under the table exactly the same way. After a few minutes I stopped experiencing him as tapping my hand under the table and instead—fantastic as it sounds—started to feel that the body image of my hand had merged with the tabletop, so that the sensation of being tapped seemed to come from the tabletop (190).

This experiment and the experience of the blind person or motorist show that the bodily space we inhabit is not strictly circumscribed by the limits of the biological body but is malleable and can be extended. One way to do this is through technology by assimilating objects into the lived body that in turn alter our constitution of space.

This is demonstrated dramatically in the case of Cheryl Schiltz. It epitomises our ability to change not just ourselves but specifically our sense of space through technology. It also draws together various threads of our discussion of the body, lived space, and embodiment and hermeneutic relations. Briefly, Cheryl's vestibular apparatus, the three semicircular canals in the inner ear, was almost totally destroyed by a post-operative over-administration of the antibiotic, gentamicin. Gentacimin is known to have

this side effect in excessive dosages and in Cheryl's unfortunate case, it left her with only two percent of the vestibular function. The vestibular apparatus detects motion in three-dimensions and gives us our sense of orientation. Without it, Cheryl's sense of balance was obliterated; she could no longer orient herself in space and she felt like she was constantly falling. Cheryl was a Wobbler, the name sufferers of this unfortunate affliction call themselves. Miraculously, a new technology restored her sense of balance, but not by replacing or repairing the vestibular apparatus in the ear. Rather, Paul Bach-y-Rita, a pioneer in the field of neuroplasticity, developed a device that consists of an accelerometer attached to a helmet and wired to a thin strip of electrodes that is placed on the tongue. As the wearer of the device moves their head, the accelerometer sends signals to the electrode, and the wearer experiences a tingling sensation moving across the tongue, mirroring the motion of the head. Eventually, the wearer learns to associate the location of the tingling on their tongue with their position in space. So if the head is tilted forward and to the left, the electrodes fire on the front-left part of the tongue (Doidge 2-6).

This technology is an example of both an embodiment *and* hermeneutic relation in the sense I have explained them in chapter two. In fact, we can understand these relations as the *mechanism* by which we assimilate technology into our lived body and hence into our experience of lived space. As embodiment relation, the balance device transforms the perceptual, bodily sense. You must imagine yourself using the device and how it feels if you are to fully appreciate the power of this transformation. When you tilt your head, at first you feel only tingling moving on your tongue. As you move your head

back and forth, the tingling moves back and forth. When you tilt to the left, the tingling moves left, and so for the right. At this stage you are a hermeneut, reading the signals and consciously performing the transposition. But at some point, the tingling on your tongue becomes more than just that. Your brain begins to reinterpret the signals it is receiving, correlating the position of your head with the position on your tongue of the electrode stimulus. After trying out the device, Doidge reports: "I soon forget that the sensory information is coming from my tongue and can read where I am in space" (6). This is the same experience the blind man from chapter one must have when he first begins to master the use of the 'seeing' cane.

What is most remarkable about Bach-y-Rita's device is that the sensations on the tongue cease to be objects of perception, the *content* of experience, and become the *form* of spatial structuring or organisation. The sensations on the tongue cease to be discrete, conscious events that are the focus of our attention. They are like a fly bite that stops itching only after we forget about it. The technology vanishes and the user is in a world in which she can balance herself and move about in space. This is not at all dissimilar from the natural experience of vision. No one feels light impinging on their retinas; they *see* an object. Bach-y-Rita's balancing device, like the eye, becomes the mechanism through which one can have a spatial world. This process is largely taken for granted until we encounter pathological cases of people who lack the right equipment. In healthy humans, this equipment is biological and it buys us spatial experience; it allows us to be-in-the-world spatially. If the vestibular apparatus is damaged or destroyed, we lose this faculty, but as Cheryl's case demonstrates, it can be restored technologically. In other words, we

can use a different device (Bach-y-Rita's helmet instead of the semicircular inner-ear canals) to constitute lived space.

This example leads to my next main point, that technology greatly affects our having of space. The technology of Bach-y-Rita's helmet restored space for Cheryl. This represents a profound transformation of her experience: she went from being a depressed, despairing "Wobbler" whose world was chaotic, to being a comfortable, happy, balanced individual. The goal of Bach-y-Rita's research and his device was to return the patient as close as possible to biological normalcy of function. But we can easily imagine a technological alteration or 'upgrade' to our biology that would give us a different spatial experience. This technology could come in many different forms, and in the following section, I will focus on how different methods of transportation lead to differing constitutions of space.

3.2 Getting there: Transportation technology

> Take the old objective of travel. Railroads and ocean liners are relevantly different from the stage coach and from the sailing ship, not merely in construction and efficiency but in the very feel of the user, making travel a different experience altogether, something one may do for its own sake. Airplanes, finally, leave behind any similarity with former conveyances, except the purpose of getting from here to there, with no experience of what lies in between (Jonas 25).

Jonas' observations on travel technology are provocative and they point in the right direction, but they do not go far enough. It is true that new technology is *relevantly different*...not merely in construction and efficiency *but in the very feel of the user*. The phenomenological experience of using the technology, be it of transport or otherwise, represents something entirely novel and the technology offers a new set of possibilities and sometimes dramatic actions. But further still and more fundamentally, this also means that the world of the user and the user him or herself is changed in conjunction with the technology. Specifically, space is constituted radically differently. In keeping with Jonas' observations, I will take some time to examine four modes of transportation, from the mundane to the fantastical, to show that progressively more advanced methods of transport are not simply more efficient at moving us through space, but they contribute to a different constitution of space itself. As I progress from one example to the next, keep in mind the character of lived space that I have been discussing: not a scientific quantity of distance that must be travelled, but a spatial network of objects and places of interest that can be made present to a subject.

The subway

In my travels, I am always delighted and confused by subway transportation[7]. The subterranean world of tunnels, tracks, and ticket booths is in stark contrast to the city above. Upon entering the subway station, this mirror world that exists solely to defeat distance more efficiently than above-ground transportation, one disappears and re-emerges on the other side of town. There is no experience of the in-between of the above-

[7] Which Lewis Mumford lovingly refers to as "the extravagant mechanical devices...which were built in response to the disorganization and speculative chaos of the megalopolis" *Technics and Civilization* 426.

ground city compared to walking, taking the bus or tram, even driving (Backhaus' much-derided mode of transport). Indeed, many deem this a blessing and it is largely the point of taking the subway. Nevertheless, it engenders a different experience of the relation between places. As I sit on the subway and stare at the transit map, whizzing along beneath the city streets, I must perform the hermeneutic translation of trying to figure out just where exactly I'm going to end up. Reading the intersecting multi-coloured lines on the map is an acquired skill, no different from my attempt to figure out the lines of the spectrograph. Walking around downtown connects locations in my head via my bodily action: motion through space. When I take the subway, I frequently stagger back out into the light and it takes a few moments, and a few wrong turns, before I re-establish my location. Of course, one can learn this new mode of space, integrating the subway and city worlds into a new, cohesive map, just as one can learn to decipher a spectrograph.

The airplane

Similar to the subway, one disappears into the airplane. Unless the passenger has a window seat, they do not see the landscape pass. At any rate, no one, window seat or not, sees the landscape and they certainly do not experience it once above the clouds. Travel time is significantly reduced from all other modes of transport. In combination, these factors modify our relation to spaces. Flying from New York to London takes mere hours. There are no geographical impediments (besides some weather/turbulence) and no contact with the in-between. Thus flying is a sort of levelling of the experience of travel; besides variation in the time of flight, there is little different about flying to Paris than to

Tokyo. As an exaggeration of the subway, we disappear into one terminal and reappear in another, hundreds or thousands of kilometres away. Space contracts, distance becomes less relevant; journeys are easier and thus more frequent, the associated cost, risks, and investment of time being much reduced.

The teletransporter

Let me indulge now in a little speculation, science fiction even, and depart from real-world examples. Picture a teletransporter as it is usually conceived in the bold imaginings of our science fiction. The traveller steps into one pod or platform and emerges on another, perhaps close by, perhaps vastly distant. Like the airplane, there is no in-between experience. The teleporter is the extreme manifestation of physically moving oneself through space, abolishing distance to the utmost. This creates a disconnected network of nodes that I can jump between, with no need (or perhaps possibility) of *ever* discovering or exploring the zones in-between. All space becomes a series of places—the destination, not the journey. With automobility, we saw through Backhaus' examination that auto routes create a network of destinations we are invited, even forced to visit.[8] With the transporter, we can push this to the extreme, where all places are pre-defined and equally available instantaneously. Space in this instance would be severely modified. There would be no bodily sensation or feeling of how far apart things are, unlike the airplane which retains a vestige of this: the accelerations and decelerations of take-off and landing, turbulence, and the time it takes to travel. Indeed,

[8] If there is no road, I can't go there, and maybe I don't even want to.

in terms of my definition of space, it no longer makes sense to speak of the 'distance' between places as a measured quantity. The only relevant criterion is in what relation I can put myself to those places and their objects, to make them present to me.

The digital universe

The most speculative of all and fullest transformation of space is in imagining a fully digitised universe. We might picture a scenario in which all human minds are downloaded onto computer hardware, a vision I might add that is not my own wild speculation but one that is seriously held and defended by Ray Kurzweil and Nick Bostrom, to name only two of its supporters (Bostrom, Kurzweil). In this vision, humans and computers have merged in something called the Singularity. Computerised implants in the body and brain slowly augment and replace our organic biological processes until the line between computer and human being is erased. Ultimately, so the vision goes, we may depart from our physical bodies and upload our selves onto a computer (Kurzweil 198-202). What this would look and feel like is certainly hard to imagine, but just in terms of transportation, of 'getting there,' I think we can profitably compare this experience to something we do quite naturally on the internet, that is, jump from webpage to webpage, following one hyperlink after another at our whim. Imagine if your entire world was like this. If you want to enjoy a nice meal at a fancy restaurant, you could load up a restaurant program of some sort. Instantly, all of your senses would be engaged with the sights, sounds, odours, tastes, and bodily feeling of being at that restaurant. To go shopping, you load up the mall program, and you immediately have total access to a vast

array of goods which you can pick up, try on, taste, etc. You would also have instantaneous access to a host of data on each product, from manufacturer specs to other user's comments. After making a purchase, perhaps you would bounce over to the Moon to enjoy a moonwalk in your new sneakers. Unfettered by a physical body in 'real' space, you would not need a slow and expensive space shuttle to get there, or a cumbersome space suit to protect you. For that matter, why not live on the Moon?

Fantastical, to be sure, but something like this is already happening with our current computer technology. A myriad of online programs allow users to live alternative existences. From *World of Warcraft* to *Second Life* and the *Sims*, there are many new modes of experience to be enjoyed on the Internet. By day my computer is my office. All of my documents and files are stored on my hard drive, neatly arranged in folders. When I start up my web browser and visit Amazon or eBay, the computer is now my shopping mall. And when I really want to escape the physical limitations of my computer room, I can fire up *Second Life*, a 3-D digital online world, where I happen to be a real estate agent, selling virtual property and making a real profit (Weeks). In some variations of *Second Life* that use maps of the real world and not the fantasy island of Linden, I can be a 500 kilometre-tall giant and walk across the Earth's continents, fly alongside the Space Shuttle, or stand inside a weather map (Roush). If that isn't dramatic enough for my taste, in *World of Warcraft*, a popular online fantasy-themed game, I can utterly transform myself from a simple masters student into Falcor, Defender of the Alliance, travel across the imaginary land of Azeroth, and slay mythical monsters for fame and fortune in a fuller realisation of the escapism of fantasy novels and films.

The networked computer is what allows for this dramatic transformation of my life experience, magnifying my possibilities and creating new spaces of action. Like the Renaissance guildsman of chapter one, my home office is but one region of action. I do not physically move my body through coordinate space when I visit Amazon and buy a book. Nor do I dress up as a dwarf and travel to a mythical land. But each of these regions places a new set of options, possibilities for action before me. To return to Heideggerian parlance, the computer and the worlds created and accessed by it make available a new set of equipment, or a new framework in which I exist as Dasein. This process, deseverance, has nothing to do with quantified measurements of space. How far away is Azeroth? How far between Azeroth and Linden? Could you plot them all on the same map? Are they actually, physically *real*? Of course not, but that is hardly the point. My actual experience of these worlds is what counts, the circumspective experience of moving through them, interacting with their objects, and pursuing my goals. Thus lived spatiality exists in a scientifically non-spatial realm. A "3-D" computer simulation presents us with a world or object that appears to be in three-dimensional space. Of course, this is an illusion. In *Second Life*, people build virtual buildings. But I can't plot on a map of the real world where those buildings are. The entire digital realm is 'flat' with respect to measured distance. The files that I store on my computer's hard drive are similarly 'flat'. Though we speak of files and folders these are hermeneutic transformations. The actual data consists of 1s and 0s. We speak of how much 'space' we have on a drive, how much data we can 'fit' into it. And to an extent, this is accurate, because the drive's physical structure is indeed in space, and the amount of data it can

hold is limited by its physical dimensions (amongst other things). But notice the difference between a hard drive's platter and the virtual world that my computer represents to me, perhaps hundreds of kilometres in size, with spatial dimensions analogous to my real world experience. Where does all this space come from? It comes from us and it represents our ability and desire to move through this space, to perform actions within it and make it meaningful. My cat has no idea what I'm doing as I sit in front of a flat screen. The most that interests him about it is the movement of the mouse cursor, and even that has lost its novelty.

3.3 Galileo and the loss of the heavens

The role technology plays in constituting our world and especially the spatiality of that world is further evidenced when we consider some historical examples. The conception the Greeks had of the 'heavenly spheres' was based on a theoretical, proto-scientific worldview. This theory rendered the stars and planets as part of the heavens, on a different plane of existence than the Earth, and ultimately inaccessible to humans. The Greeks did not believe that the stars were simply spatially distant from the Earth, that they could one day approach them merely by travelling the distance between the Earth and the stars. This also entails that they did not believe the stars were within their realm of action. The heavenly bodies were occurent in the Greek worldview, but not available. That is to say that the Greeks could not make themselves present to these stars, could not occupy the same space and interact with the stars as part of their world. Many years later, Galileo shook the scientific and religious communities of his day when he confirmed,

through the technology of the telescope, that the moon was not a perfect sphere, that its surface was in fact pitted and jagged. Besides the fallout from the Catholic Church, this discovery contributed significantly to a shift in perception and experience of space. Suddenly, the perfect celestial bodies were confirmed to be of the same stuff as the Earth, and the space separating them from us was no longer qualitatively different or special. There was no longer a difference in kind, a conceptual gap between us and the heavens.[9]

This is an example of what I call the 'spatial aspirations' of a culture or society being altered. The technology a society has in part shapes its possibilities of action in space. The Greeks looked at the heavenly bodies and did not see stars and planets they might one day visit. Similarly, in ancient Rome, when a son went off to war for eight years, he effectively disappeared, only present through infrequent and slow-moving letters. His family's expectation of communication was greatly reduced compared to now, when we have many instantaneous and sensory-rich communication technologies: telephone, email, instant messages, and video conferencing make distant people present to us. Certainly, this not the same type of presence as if they were *actually* here with us, face-to-face. As Ihde points out, like the glasses, the telephone is an example of an embodiment relationship. The telephone ought to recede into the background to be an effective instrument. It obtrudes as an object, defeating our attempts at communication, when there is a poor connection, the battery runs out, or the signal drops. But even when the telephone is working perfectly, "the ordinary multidimensioned presence of a face-to-face encounter does not occur" (Ihde, *Lifeworld* 78). The experience of using a telephone

[9] Kant's noumenal world is *in principle* outside our domain of experience, not just 'a long ways off' but not even in space.

exhibits similar properties as the face-to-face encounter, but it also brings a new kind of spatiality with relevant differences:

> [T]he spatial significations are changed...It makes little difference whether you are geographically near or far, none at all whether you are north or south...This telephonic distance is different both from immediate face-to-face encounters and from visual or geographical distance normally taken (78).

In desevering distance, the telephone thus does not care, so to speak, about a geographical, measurable space. It creates its own space within which the conversing parties meet. So long as the transmission is clean and lag-free, I could be talking to my next-door neighbour, no more than a dozen metres away, or a distant friend, halfway across the world. The phenomenological experience of the telephone call is identical in either case (though the subject matter and my relative excitement may add their own character to the conversation). If I do not have access to a telephone, or if it has not yet been invented, I cannot engage in certain actions and potentialities.

This phone space of near-distance is something unique and only accessible through the mediating power of the technology. The telephone and its associated system of cables, radio towers, operators, and telecom providers describe a world and a way of life that allows and invites certain actions; likewise with transportation technology and with Galileo's telescope and his astronomical theory. I chose these examples specifically to highlight how the constitution of space is deeply affected by whatever technology happens to be going. But I also chose them to show how in shaping space these

technologies have an impact on our being-in-the-world. This is to say that not only lived-space but our life experience is technological.

The telephone example is particularly apt because it very obviously involves action at a distance. The ability to transmit and receive messages over long distances, instantaneously, is an absolutely world-changing phenomenon. Heidegger's peculiar notion of deseverance explains how we transcend space in this fashion, and it is thus on that note that I will conclude.

3.4 Deseverance and Presence

Deseverance is to bring something near, to abolish distance. But not necessarily to bring something near physically (i.e. its particles, mass, matter). We desever the newspaper when we pick it up in our hands or walk towards it. But we desever the *news* when we *read* the paper. We could listen to the same news item read over the radio, or cried in the town square, or see the images on a television broadcast. The technology itself, the gadgetry, is not the point. The effect of deseverance is the point and the mode of deseverance will vary according to the technology employed. Visual images, the radio report, or the print story each convey a different sense of the event. The important thing about the media technologies, however, is their similarity to each other, and to all the other forms of technology I have been discussing. When I say that deseverance is to abolish distance, I am not talking about the physical, measurable, scientific quantity of the space. Rather, I am talking about the making present of self to world and world to

self. It is at this fundamental level that we find technology's power, in revealing actions, potentialities and perceptions of Dasein that can turn out now one way and now another.

It was not so long ago that we did not have the ability to surf the Net, or record and broadcast high-definition images with sound, or print still photographs and newspaper copy, or hop on a jet and fly across the world, or scribble a note to oneself with a pen and paper, or write at all, or communicate with language, or think (?). Technology has had an enormous impact on our world. It has *created* the world we live in at the same time that it has shaped us. What a telescope, whether optical or radio, and a microscope have in common with a television broadcast, and a hydroelectric dam on the Rhine, is that they all bring close perceptions of and possibilities for action in the world. The excitement or horror of the news story, or the knowledge of astronomy and quantum physics, and the power of electricity: these are available through technology's desevering character.

CONCLUSION

> Our ability to create models—virtual realities—in our brains, combined with our modest-looking thumbs, has been sufficient to usher in another form of evolution: technology. That development enabled the persistence of the accelerating pace that started with biological evolution.
>
> We were the first species on Earth to combine a cognitive function and an effective opposable appendage (the thumb), so we were able to create technology that would extend our own horizons (Kurzweil 433, 487).

In closing, I would like to return to my discussion of computer technology and a digitised universe: My argument has been that we are not ready-made human selves with predefined goals and desires. Part of Kurzweil's vision echoes this idea, that through enhanced technology we will not simply be the same types of beings, only with more things to do and more ways to do them in the digital world. Rather, what it is to be human will be profoundly altered. Along with the digitisation of our selves comes a massive increase in the potential for action and perception in the world, thanks to computers millions of times more powerful than a biological brain. It is hard to fathom how different human experience would be if we were all a million times more intelligent than any of our geniuses. With almost limitless processing power, our minds could entertain many ideas, pursue a multitude of activities, and interact with other minds, all simultaneously. This could seriously call into question the idea of *a* self, if our thoughts as patterns of

knowledge were free to mix and mingle with those of others, there being no barriers of communication as mundane as brains locked within craniums. This would also profoundly alter our constitution of space and it could entirely lose its apparent character of being a three-dimensional grid in which we find ourselves and objects. Our being-in-the-world is defined by limits, by the interplay of what is available, what is merely occurent, and what is occluded or removed from our experience. People, objects, and ideas could be ever present, thus never removed or distant from consciousness. This is the key: Everything could be equally available, in the Heideggerian sense.

It is a simple fact of physics and biology that I cannot communicate unaided with someone on the other side of the globe. If I have no possibility of action, whatever is on the other side of the globe is not available to me, does not exist in my space or constitute part of my world. Some technologies and the knowledge they produce require more drastic retellings and reinterpretations of the world. A Medieval monk did not believe he could travel at one-hundred kilometres an hour (he couldn't). He did not expect to see the Earth from space or communicate instantly with his family in a distant town (he didn't). Yet all of these actions are spheres (spaces!) of potentiality *and* actuality for us, though they are utterly closed to the monk. More advanced technology grants us these abilities, and thus the mental expectations that these things are not only desirable, but possible. Quite easily done, even! Technologies create a certain mentality, a set of expectations and rules about the world that we follow because we know of no further possibilities. When Edison invented the light bulb, in one way or another, he *willed* there to be a world that was illuminated by electricity, day and night. When Oppenheimer worked on the

Manhattan project, he thought: 'Let there be a world in which a single bomb can devastate a city. Let there be a world in which I am become Death.' Before these technologies of illumination and destruction, those worlds were not available.

As Dasein, we beings have an organizational structure of experience. One of these structures is space. The things we experience are arranged into objects of significance. Sensations of colour and edges are turned into tables and sabre-toothed tigers. Biology takes us so far; the operations of the brain that turn Hume's atoms of sensation into objects are largely unconscious processes. Things appear to us as above, below, underneath, but also *impossibly* high or *dangerously* close, as they relate to our interests (perhaps of not being killed). We are tempted to abstract this lived sensation into something we call objective space and baptise this as *the* way the world is, but this is a mistake. Space is a way to be-in-the-world. As we have progressed beyond biology, we have used technology to shape that space and thus our being-in-the-world. Technology is therefore a second structure of experience, which is to say that it is a mode of presence. To make myself present to you, I might write a letter and send it across the globe. It no longer matters if you are here next to me (in 'objective' space) to share a face-to-face experience. You are present in a new mode, mediated by written language and the vagaries of the postal service, and this presence is a technological achievement.

Human beings are therefore the types of creatures that define themselves through technology. Our different technologies are literally what allow us to be-in-the-world in certain modes that are otherwise impossible. Animals have ways to be in the world too, claws, eyes and ears, smell, that are determined by the natural endowments they have

received from evolution. Humans are no different in that respect, except that our gifts include a complex brain. From this we create novel technologies of our own devising, some which radically alter our being-in-the-world and the structure of space. Unlike the animal, which due to the naturally evolved technologies it possesses is more or less stuck in one way of being, we humans have a certain, even a great, degree of control (though not always conscious!) over the technologies that we adopt and through which we define our being. The structure of lived space as a mode being-in-the-world, the self, and the world are all radically altered by technology.

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