becomes subject or medium to an ongoing technical agency, that someone or something is doing something in or through me, unbeknownst to me.

To be sure, this is what many scientists say also about genetically modified foods. And indeed, if the intervention stops at the production of a new phenotype and if the genetic modification is for all practical purposes inert when I ingest it, the example of these foods would cease to be an example of naturalized technology. If it is nevertheless presented here as a prominent example along with ambient intelligence and envisioned nanoscale devices, this is because it is this question precisely that is at issue in the debates on genetic engineering. The technology appears uncanny because we cannot judge the reach of its agency but must somehow assess what various sources tell us. We are acutely aware that we cannot track the effects and that even so-called experts can find it difficult to determine the mere presence or absence of the genetic modification.

If there is a gray zone between nature technologized and technology naturalized, it results not from a lack of definition, but from our attributions of agency. For those who believe that radio waves are causally efficacious beyond the transmission of a signal, the atmosphere itself will have an uncanny agency that may affect our health permanently and unbeknownst to us. Instead of foregrounding that technology helps us control nature and render it calculable, such worries foreground that technology has become a pervasive presence with incalculable effects, that we are subject to it just as we were subject to nature uncomprehended and uncontrolled.

From all of this emerges a philosophical characterization of technology naturalized. It has been suggested so far that this kind of technology does not give us control of nature but that, like uncomprehended nature, it operates in the background of our actions and lives, unknown and unknowable to us. Though it may have effects on us or produce effects through us, we cannot represent its agency since we do not even perceive its presence or absence – instead of knowing it, we merely know of it. The looming presence and potential efficacy of technology that might be operating behind our backs does not serve to extend our freedom or our will. It appears instead as a mere constraint, even perhaps as a threat. Technical reach and intellectual grasp have come apart; the humanly induced workings of technology therefore no longer signify mastery of nature but take on the aspect of nature itself.

All these characterizations involve a stark dichotomy. On the one hand there is brute nature. It is not perceived, represented, or understood, there is no rationality, control, or exercise of will in this nature. It is therefore thought to be uncanny, incalculable, perhaps threatening.[7] On the other hand there is technical control and rational understanding that transform brute nature into a set of calculable forces, that harness these forces and direct them towards human ends. This dichotomy is as traditional as it is simple, it expresses the Weberian picture of progress through rationalization and disenchantment of the world. According to this picture, the very

[7] Of course, this is also a perfectly unsubstantial, purely negative conception of nature. Only a fully comprehended nature can serve as a normative ideal (e.g., as a precarious ecosystem). The brute uncomprehended nature that awaits to be rationalized is only a depository of (as of yet) inscrutable processes and principles.

purpose of technology is to liberate and protect us from nature and natural necessity, be it in matters of food and shelter, death and disease, or labor and leisure. Nature technologized thus began with cooking and agriculture and continues everywhere where bits of nature are locked up inside certain techniques and devices and geared towards social ends. This dichotomous view resonates in thinkers as far apart, perhaps, as Karl Marx and Martin Heidegger, and found its most powerful expression in Kant's distinction between noumena and phenomena, between the unknowable things-in-themselves and the objects of experience.

Technology naturalized is opaque, takes on the character of uncomprehended nature precisely in that genetic modifications, breathable nanoparticulate sensors, environmentally distributed and embedded computers are no objects of experience. They are thus, in effect, examples of noumenal rather than phenomenal technology.[8]

According to Kant, the noumena or things in themselves are nature unrepresented in experience, if it is possible to speak of this nature at all. We do not and cannot know the things in themselves or nature "as it is", with the one tenuous exception, perhaps, of our own nature as free, intellectual beings. This unknowability of the noumena can be described as a limit to theoretical understanding. Put positively, however, it represents the characteristic effort of modernity to push back the alien and uncanny otherness of nature. How things appear to us as phenomena in experience is already structured by the mind, already subject to mathematization and intellectual control. As opposed to brute nature, the phenomena are already civilized. If there is such a thing as noumenal technology, therefore, it is a kind of technology that retreats from human access, perception, experience, and control, and thus takes on the aspect of uncivilized, unrationalized nature.

4 Production vs. Conception

If technology is a human creation that involves human knowledge and serves human needs, it would appear to be firmly rooted in phenomena. On the face of it, then, it should appear absurd to speak of technology that exists beyond human perception and experience among the things in themselves. Even if we grant that ordinary consumers or citizens may encounter some very specific technologies as incalculable and uncanny, something they do not control and something that, like nature, serves as a mere background that structures their actions and lives, this is surely not true for those who develop and implement this technology.

One way to respond to this obvious objection is to appeal to a famous precedent, a by-now classical account of noumenal technology which indicates how even scientists, engineers, and political decision-makers are confronted with its noumenal aspect.

[8] The following provides a synopsis of Nordmann (2005a), a first approach to the issues addressed here.