Chapter 2
Ethics and Technology

2.1 Introduction

In the previous chapter deliberative public engagement towards technology policy was presented as a necessary means to achieve democratically legitimate and socially robust outcomes when risks, costs and other social and environmental benefits and burdens are distributed asymmetrically between social groups and ecological systems. The arguments within this book are grounded in a normative ethical commitment to deliberative democratic control of technology governance despite the various drawbacks associated with representativeness and legitimacy discussed in chapter 1. The grounding assumption is that pluralistic involvement of heterogeneous publics in participatory Technology Assessment (PTA) can assure that decisions are substantively fairer than those that are based upon technical expertise alone. Public trust in institutions gained through fair and open decision-making may help to foster broader acceptance of controversial technology proposals when they would have been otherwise objected to. At the very least, the processes and methods of PTA legitimise public objections, in the sense that they are transparent to decision-makers and based upon a process of justification through open deliberation. This procedural fairness aspect of decision-making has been shown under certain circumstances to alleviate public scepticism towards implementing institutions and to build public support for decisions taken, even when they are politically unpopular amongst an affected community (Gross 2007; Renn et al. 1996). However, though it provides opportunities to enhance democratic legitimacy, this should not be confused with an assessment of the ethics of technology policy and practice, as these two facets are ontologically distinct.

I begin this chapter by aiming to delineate the concept of the ethical legitimacy of technology from the political legitimacy that stems from broad public support. This is important because these two interrelated facets are often discussed side by side in popular discourses about the public acceptability of socially and ethically contentious technologies (SECT). Ethical issues have often risen to the forefront of public debates about technological control (Paula 2001); and care must be taken not to conflate one with the other. To illustrate this point, I return to the nuclear

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power example. Continuous public debate over new nuclear build has shown fluctuations in support influenced by the outcomes of global events. In particular, the 2011 Fukushima Daiichi nuclear power plant crisis in Japan caused a number of European nations including Germany, Italy and the United Kingdom, to reassess the validity of their nuclear new build programmes, regardless of whether or not such proposals were likely to be affected by similar environmental conditions that caused damage in Japan (factors such as regional seismic activity, flooding and institutional control). Political will to continue with the expansion of nuclear power in Europe has been heavily influenced by public concerns over safety in the wake of this catastrophe. Risk is culturally mediated and so individuals anchor their understanding of the concept of technological safety through pre-existing biases, heuristics and social representations. Whether or not it is right or fair to implement new build nuclear power on the basis of these culturally mediated values and perceptions, is itself a significant ethical issue. However, perceptions of fairness are not the same as actual fairness. Deciding what is fair involves attention to a variety of factors, such as how certain locations will bear greater risks than others, the overall benefits to society from low carbon electricity versus the harms from nuclear catastrophe or leaking radioactive waste repositories, or the meta-ethics of decision-making processes which include or exclude certain voices. It also raises an important distinction between different forms of values that citizen actors may hold. Questions over the ethical legitimacy of SECTs stand independently of the strength of public concerns over safety, as intensifying public fear does not equate to the technologies becoming more dangerous.

Continuing a policy of new build nuclear power may be a less popular political decision in the years following the 2011 Japanese nuclear crisis, but assessing the technological desirability of nuclear power based solely upon public favour would reduce justification to *argumentum ad populum* - an appeal to the popularity of a decision, though this alone is insufficient to suggest that a technological proposal is ethically justified. We are presented with the *Is-Ought* distinction (Hume 1739), questioning how to relate a descriptive analysis of the values and judgements held by citizen actors based upon prevailing views about trust, safety, and perceptions of fairness; with a prescriptive normative ethical assessment of the actions and consequences of its implementation.

2.2 The Challenge of Technology Ethics

Just as we must not conflate normative ethics with descriptive ethics, similarly, when describing the different kinds of values that people hold towards technological developments it is important to distinguish ethical principles with other sorts of expressed values. In all cases of SECT, public judgements about acceptability embody a range of aesthetic, cultural, religious and political values as well as ethical ones. To give an example, Genetically Modified Organism (GMO) controversies in the UK were frequently framed in media discourse in terms of ‘Frankenstein Foods’, involving the ‘tampering with nature’ or ‘playing God’. Such responses are frequently portrayed in the emergent media and

academic commentary as reflecting particular sorts of public morals, though in many respects such discourses reflect positions more akin to aesthetic values. They reveal distaste and concern for hubris in scientific advancement, and suggest that modern society should maintain the integrity of a construct called *Nature*. Though such values are extremely important in the wider discussion of the acceptability of SECT, a value system that posits GMOs as creating a Frankenstein food does not mean that such biological research processes are *de facto* ethically unjustified. Just because something is unnatural does not automatically make it wrong. This conflation of ethical and aesthetic axiologies with an instinct of revulsion is termed a 'yuck factor' by bioethicist Arthur Caplan (1994). Schmidt (2008) illustrates this point by asking us to imagine living in a drought-stricken area, to be told by an engineering firm that from now on your drinking water would come from recycled sewage. Though the concept of reclaimed sewage has the potential to ensure long-term safe water resource usage, and ease pressure on aquifers and other limited water supplies, the first reaction to the proposal might be to feel a sense of repugnance. It is undoubtedly an instinctive reaction. Rejecting fearsome or repugnant things, especially when those things are unfamiliar, has been an important part of our evolutionary development. What Schmidt suggests is that if this yuck factor is shared by large groups of (voting) people then the collective repugnance can fuel a social force with the power to shape public policy making in ways that are not always desirable. Yucky reactions may be valid, useful even, for the individual. They provide an important warning sign for gauging the social acceptability of technological proposals. It is not necessary or desirable to brand those that find technologies repugnant as irrational, or Luddites (or whatever other name calling often gets used in these debates). Nor should we attempt to exclude them from public discourse. What I suggest, however, is that the ethical assessment of the technology must not be swayed entirely by such rhetoric; in other words decision-making over what is right in technology and environmental policy must not devolve into moral panic without room for independent philosophical justification.

Yucky feelings about technology are complex in their make-up because they mix together ethical judgements, instincts and other forms of social, cultural, religious and aesthetic values and norms. Separating or at least identifying these different facets is a significant problem for the assessment of SECT and unravelling this problem requires philosophical guidance. This has proved challenging, in part because of a general paucity of philosophical perspectives within the field of Technology Assessment. Though a vast array of perspectives on the political and cultural acceptability of specific technological risks has emerged within the social sciences, perhaps surprisingly, there is comparatively little research from the traditions of normative ethics. Academics within this field have largely tended to avoid the discussion of technologies that belong to the domain of engineering (Roeser and Asveld 2008). For social scientists committed to re-examining the values inherent to the design and implementation of technological artefacts, there has been a concerted effort to shift the focus away from a sole examination of instrumental values such as efficiency, safety, utility, reliability, and ease of use, towards examining the substantive values of

technology in a social and cultural context. In liberal democracies, such values would likely include liberty, justice, privacy, security, friendship, comfort, trust, autonomy, and transparency (Flanagan et al. 2008). Understanding the nature and justification of these broad values through the lens of normative ethics has, however, proved challenging.

2.3 Technology Blindness in Normative Ethics

It is clear that risk bearing technologies co-evolve with moral thought and action; though this process has rarely been acknowledged, let alone thoroughly understood by moral philosophers. This is because normative ethics as a discipline within moral philosophy has tended to focus upon the role of human actors, their conduct and the consequences of their actions. The term *normative* is often defined as describing the effects of the particular structures of culture that regulate the functions of social activity (Phillips 1979); normative ethics is thus by extension, concerned with those prescriptions and abstract theories that provide shape to the outcome of social activities. In doing so, dominant normative traditions have distinct concepts of what should constitute the moral good, and hence varying conceptions of what is right and wrong. Normative ethics is a social and political philosophy with a practical goal. It prescriptively guides and governs the conduct of human nature. A normative ethical theory can never list right and wrong actions (even if it were a very long list), the theory must obtain some level of abstraction from the particular and a degree of generality in order to successfully deal with differing circumstances and actors in a comprehensive and systematic way. The aim of this branch of ethics is to bring unity to the multifarious judgements, evaluations, rules and principles that exist in society by trying to develop a coherent set of procedures to represent, organise and justify them. The goal is to arrive at a set of moral standards that regulate the conduct of moral actors, which may involve stipulating the habits that one should acquire, the duties that one should follow, or the consequences of behaviour on others.

Normative ethics has, to an extent, been dominated by contractarian theories such as Kantian deontology (with a focus upon the duties of the individual), Benthamite utilitarianism (with a focus upon maximising the benefits to or welfare of the greatest number), or Rawlsian notions of justice (with a focus upon the conditions for redistributing social benefits). Though these normative ethical theories have been richly elaborated in the moral philosophy literature, I avoid a discussion of the relative merits of each in turn, as the focus within this book is upon the meta-ethical conditions of technology assessment, rather than a focus upon a single normative approach. It is important to note, however, that these normative theoretical approaches have, in turn, strongly influenced the disciplines of applied ethics of which technology ethics is a part. Applied ethics is often construed as the process of making normative ethical theories practically useful tools for real-world decision-making. Applied ethics has often involved overlaying specific normative theories on specific situations or fields of knowledge where

there is a strong need for ethical guidance and critical evaluation. It is potentially sub-divisible into *special ethics*: investigating areas of human endeavour where moral guidance is needed such as environmental ethics, business ethics, bioethics and so on; and *practical ethics*: concerned with providing tools or techniques to allow practitioners within these fields to make better informed judgements by critically assessing a range of normative positions. Applied ethics has tended to involve doing the philosophical work of ethical assessment within the theoretical and conceptual realm of normative ethics and then applying, or perhaps imposing that theoretical work on practical decision-making. In this way it can be understood in the same way as other applied disciplines such as applied mathematics or biology whereby a pool of theory is applied in a top-down manner to a real-world context.

This is rather simplistic portrait of applied ethics, however. The field has, in recent decades, moved away from the rather staid debates that dichotomise deontological-versus-utilitarian normative analyses, and the inevitable arguments over which should be applied. A range of alternative moral philosophies have emerged that variably focus upon other aspects of ethical decision-making and moral action beyond discussions of duties-versus-consequences. For example there has been a resurgence in theoretical discussion that emphasises the value of practical moral wisdom (Nussbaum 1986); virtues, moral narrative and individual character (MacIntyre 1984), concepts of care and feminist ethics (Kheel 1993; Shrage 1994), or else upon the psychological, subjective, imaginative and metaphorical nature of ethical reasoning (Dunn 2004; Haidt et al. 1993; Kekes 1991; Werhane 2002). Just as I do not wish to outline each individual normative theory, similarly a discussion of the nature of and relationship between normative and applied ethics is also beyond the scope of this book. The meta-ethical challenge, so to speak, is to understand how individuals come to ethical judgements, and how these can be shaped by normative theoretical considerations to reach a philosophically robust evaluation of ethical issues. In doing so, we must examine how ethical judgements are formulated, and how technology as both artefact and social process fits into such judgements. Rather than seeking a mono-theoretical solution, I aim in this chapter to reflect upon what counts as justification in the ethical assessment of technology.

One of the principal meta-ethical points I wish to consider, is that the dominant traditions of normative ethical reasoning, whether deontological, utilitarian, justice or virtue-based have tended to focus upon the moral actor as the centre of analysis. In doing so there is a tendency to then ascribe a neutral role to technologies. These dominant normative ethical traditions have tended to frame technologies as passive objects that are manipulated by moral actors, so normative ethics has commonly focussed upon behaviours and norms adopted by the users and developers of technology, and have had less to say about the ethical status and agency of the artefacts themselves. Early work in the field of technology ethics focussed upon the responsibilities of engineers, scientists and technicians; in particular the openness and transparency of their professional practice. Much of what we understand as technology ethics today had its roots in engineering ethics,

one of the specialist ethics disciplines. Engineering ethics has been principally concerned with developing stringent ethical codes of practice for practitioners. Issues such as *whistle-blowing* predominate - whereby engineers take responsibility upon discovery of unethical practices, or the adverse social and environmental consequences of specific technological innovations. More recently, however, this focus on engineering practice has been viewed as inadequate, or at least incomplete. This inadequacy of engineering ethics lies in its incapacity to assess the ethical consequences of technology in full, simply due to the fact that engineers are not the only important actors in technological design, governance, application and use. Indeed technology assessment as a discipline is partly geared towards reducing the moral authority of engineers in shaping the outcomes of technology development processes.

Though the ethical ramifications of engineering professional practice are undoubtedly important, our technologically mediated world requires a more holistic and visionary perspective on ethical mattes. As Johnson and Powers (2005) suggest, the social world is filled with human-made objects, which enable and inhibit human thought and moral action, informing how we think, act, and arrange ourselves into social units and institutions. Technological artefacts, knowledge processes and practices serve to dichotomise the human-made from the natural world, though the two are of course deeply intertwined. The natural world has been so affected by technological development that some such as Allenby (2004), suggest that we now live in the age of the Anthropocene - an increasingly anthropogenic, technologically mediated planet. This is important because our concept of technology ethics cannot remain focussed solely upon the bearers and appliers of technical knowledge – scientists and engineers, because as Mitcham's (1994) model from the previous chapter suggests, technology is not just about artefacts and designers, it is a form of volition, ubiquitous and integral to our way of living and being in the natural and social world. It covers our aspirations, social networks and personal identities. Magnani (2007) extends this point to suggest that humans are increasingly integrated with nonhuman artefacts and technical processes, and are therefore deserving of an entirely new understanding as hybrids or 'things' as a means of according them the proper respect. We must conclude, therefore, that our technology ethics must extend to understanding not only how engineers or technologists behave when faced with artefacts that harm or benefit the social and natural world, but also how they shape and inform social and cultural practices, individual experiences, communities and environments in their development, use and governance. Most importantly we must learn how technologies co-evolve with our social ethics.

2.4 Actor-Network Theory and Technology Ethics – Bridging Disciplinary Divides

In resolving this meta-ethical problem, I turn first to the insights of the allied fields of Social Studies of Scientific Knowledge (SSSK) and Science and

Technology Studies (STS). These disciplines have been instrumental in revealing the power that technology holds within society. As previously mentioned in chapter 1, STS has revealed the co-evolutionary development of technologies within society, whereby not only are cultural and moral values implicitly embedded within technological design practice, but also that with every new technological development the social world shifts, and reacts – moulding our values and practices. This entangled relationship between social actors, values and technological artefacts has been explored by one prominent strand of SSSK called Actor-Network Theory (hereafter ANT).

Actor-Network Theorists, notably Michael Callon and Bruno Latour, have been concerned with the nature of technology within social networks, studying the interdependent social practices that constitute work in science and technology. What differentiates ANT from traditional sociological understandings of social networks is that it views the actors that constitute the network of science and technology as consisting not only people and social groups, but also artefacts, devices, and entities. ANT asserts that social networks are heterogeneous, containing many dissimilar elements, and thus can be understood as socio-technical systems (Latour 1987, 1995; Callon 1987). Ultimately ANT is a theory of semiotics - asserting that entities take form and acquire attributes through relationships with other entities. An ANT analysis involves every aspect of a technology's development, planning, policy, use and disposal, drawing together diverse elements such as building materials, contractors, designers, workers, machinery, environmental systems, even the paper upon which the proposals are written and the blueprints for design. ANT purports to show how all of these artefacts have a generalised symmetry (Latour 1993) – i.e. they must be described in the same terms as social agents within the network, and thus these heterogeneous elements become epistemologically related as *actants*. Actants take shape by virtue of their relations with one another, with no special status given to human agents over animals, or non-human artefacts. Action is a process where each of these elements is caught up in the web of relations. The ontology of ANT is therefore flat structured between material and ideational elements. Under a principle of generalised symmetry the heterogeneous actants have equal footing, thus the theory rejects technological determinism and social determinism as descriptors of technology development and social change (Callon 1987).

ANT emphasises actantiality forged through alliances and negotiations between human and non-human actors, so power is accumulated and maintained through alliances with technologies, materials and other non-human allies, as well as those with other people. Change is understood as a process of stability or instability within relationships between human and non-human elements; thus it is construed as a process of struggle to hold relationships in place. Relations need to be repeatedly "performed" or the network will dissolve, so analytical attention focuses on the ways in which different actants attempt to increase the remit of their actions by holding other (actors and artefacts) in place, and escaping this holding effect that others impinge upon them (Latour 1993). Different actants may be "enrolled" as "allies" to reinforce network relationships and the stability and

form of these actants should be seen as a function of the interaction of heterogeneous elements as these are shaped and assimilated into a network of assemblages (Law and Hassard 1999).

Though a full discussion of the strengths and weakness of ANT is beyond the scope of this book, it is important to note a general flaw in ANT's conception of technology networks due to the inherent complexity of the task it sets. An ANT researcher must question the point at which she must stop including new artefacts or actors in the web of inter-related action; a consideration termed the 'problem of selection' (Walsham 1997). The decision of actant inclusion or exclusion involves specific judgements, to avoid an endless circular, descriptive process of network analysis. As such, ANT has been criticised as unnecessarily 'long-winded', involving nothing more than a descriptive account of all the involved actants within a network (ibid). Indeed the problem of the actant relationship is that the intentionality derived from human reasoning is largely absent from the analysis, as actions are borne from interactions and alliances of heterogeneous human and non-human elements. Though generalised symmetry presents an ontologically controversy for the social sciences, ANT has value in its capacity to explain why technology implementation, policies or social endeavours succeed or fail, by paying attention to the changes that occur in the integrity of the networks in which these elements are embedded (referred to as the Entelechy). Latour (2005) argues that the crumbling of a network is the reason for failure of a particular technology. The failure of technology is when programmes for development are halted due to adverse public reactions, like the 2011 German nuclear policy example, can be reviewed in relation to success or failure of the networks within such technological proposals are embedded, and of the networks that implementing organisations failed to build, extend or stabilise.

ANT is particularly pertinent to the discussion in this book due to its evolving relationship with moral philosophy. At first glance, it appears that ANT and normative ethics show significant incompatibilities. As mentioned before, normative ethics has traditionally focussed upon the individual and the choices that are available to them. This is problematic to an ANT conception of technology ethics, because it asserts that technologies and other artefacts have ethical value and influence within complex actor-networks. An ANT-focussed ethics of technology would include the analysis of influence that technological artefacts exert within the social realm. As we have seen, such an approach contrasts with some of the dominant modes of thinking in normative ethics that conceptualise technology as a set of tools in the hands of rational moral actors. Studies of technology ethics have often maintained that technologies are fundamentally ethically neutral because it is the cognitive process of individual moral judgement that controls how they are used. This instrumental vision of technology posits them as a means to an end and so the choice of technological means to solve problems is thus a morally neutral affair (Van De Poel 2001). Such an instrumental vision of technology as a passive tool is inadequate because it brackets moral action away from the tools and resources that enable or inhibit such moral action. We must consider that when actors formulate specific goals to be met by a technology, that this cannot be

separated from the development and choice of technological means to meet those goals. In other words, technologies are not always developed with clear goals in mind and their development can influence the social and moral choices after they have been realised. For example a number of medical advancements such as Aspirin and Penicillin have changed the way medicine is practiced (in suppressing fever and killing bacteria respectively) but neither was specifically "invented" with those clear consequentialist ethical goals. The development of technologies does not involve a single objective or set of choices, there are always a number of alternatives with differing environmental and social effects, each of which has unforeseen consequences, both desirable and undesirable, so one cannot truly argue that technologies are in any sense value free or ethically neutral. With this in mind, ANT has relevance to ethical assessment of technology, although in many respects, we would be ill-equipped to deal with the moral problems of technology using the language and concepts of ANT alone. When using ANT in the assessment of social ethics there are a number of important obstacles; some theorists such as Walsham (1997) and Bijker (1993) have raised concerns that ANT studies of technology networks show a fundamentally 'amoral' and 'apolitical' stance, encouraging the devaluation of the role of human actors. As neither actor nor artefact is given priority over the other, the so-called 'actantiality' of each is a reflection of the quality that provides actants with their actions, with their subjectivity, their intentionality and with their morality (Latour 1999). Essentially the networked relationships between actants is what gives them moral value. As a result, ANT appears at odds with much of the body of modern moral philosophy.

The principle antagonism between ANT and normative ethics is based in part, upon the language used. ANT tends to use a rather peculiar language to describe the ethical issues of actant relationships: it discusses technologies in terms of their success or failure, winning and losing according to the stability and strength of their respective networks. This language is something of an obstacle when trying to assess which technological artefacts are morally desirable, and similarly there is a paucity of concepts for examining the underlying political choices that influence technology decisions. The focus on winning and losing has led some critics of ANT to accuse theorists of adopting confrontational and even militaristic terminology (Radder 1992) whereby the success of technologies is put in terms of strategies and alliances, and hence allies and opponents; a terminology that has an implicit morality all of its own. In short, ANT has been accused of de-humanising decision-processes by placing technological artefacts on equal footing with human actors, and thus lacking the vocabulary to adequately assess the moral aspects of technology decisions (Radder 1992; Winner 1993). As Radder (1992) and Keulartz et al in particular (2002) recognise, we have an enormous body of ethical theory on the one hand which tends towards simplistic, instrumental views of technology, but a broad and complex conception of human moral action; and on the other, science and technology studies (specifically ANT), that has a complex constructivist conception of technology but a distinct and rather peculiar conceptualisation of ethical values. The ultimate goal of a successful technology ethics is thus to bridge the two disciplines in a manner that retains the practical

value of both theory approaches while providing a cohesive and practically useful philosophy of the social ethics of technology decisions. Part of this bridging effort involves a focus on the language and concepts used, and one important project within technology ethics is find the right vocabulary to assess the complex ethics of sociotechnical systems.

2.5 Ethical Theory and Participatory Technology Assessment Practice

The relative ethical neutrality of technology in moral philosophy is not the only challenge facing a deliberative, public-focussed ethical assessment. One must also question the value of applying normative ethical theories to a technology in order to achieve a just outcome for society. At the risk of generalising about normative ethical theory, one must be wary of theoretical monism when using and applying normative ethical theories. Normative monism is the assertion that an ultimate set of guiding principles can be discovered through rational inquiry, one that has practical benefits in freeing societies from prejudice and dogmatism; setting forth comprehensive systems from which to orient one's judgements, carving up the moral landscape so that one can systematically arrange the relevant issues and think more clearly and confidently about moral problems (Pojman 1995). There are those moral philosophers that react against a perceived cultural pluralism and ethical relativism within Western society, suggesting that relativism reveals a loss of confidence in traditional authorities and inherent value of ethical theories in elucidating moral problems. Such proponents of normative theory suggest that a rational approach to ethics is vital if society is to survive and flourish. To the normative monist it is believed that one can then clarify how principles and values relate to one another and crucially offer some guidance on how to live. Though I paint the picture of normative theoretical monism with a broad brush, we can generalise to an extent in saying that monists assert that what is right and wrong does not change between societies, or time frames; in stark contrast to ethical relativism, which highlights the flexibility of ethical systems to change with time, across civilisations and societies, emphasising traits such as transience and reflexivity. Relativism is an expression of the idea that there is no single true doctrine in ethics; there are different views and some may be true for some people, while others are true for other people (Blackburn 2000). If relativism holds that unconditional truth cannot be ascribed to any one ethical position or theory, then it in turn provides support for the notion of pluralism and toleration; if no single belief or set of beliefs is superior to any other in terms of truth then all must be accorded equal respect.

Herein lies the meta-ethical dilemma for PTA. The politics of democratic nations within which PTA practices are embedded, are (at least nominally) culturally pluralistic, seeking to ensure that policy-making remains open to diversity and does not arbitrarily exclude minority positions or marginalised voices. If one were to accept the foundations of such pluralism within society, one must also question whether such pluralism should extend to an acceptance of a

broad array of ethical values held by different groups, cultures and communities. The challenge lies in finding a role for normative and evaluative ethics in a culturally diverse world. Though a breadth of perspectives is necessary, one must also be committed to finding some metric or standard against which to measure the validity of those ethical values: a fundamental meta-ethical problem for incorporating prescriptive ethical theories into pluralistic political decisions.

Throughout this book I argue for a comprehensively deliberative approach to assessing the ethics of technology given this problem of pluralism. If we were to base our justification solely upon monistic normative theory then we would tend to appeal to general and universal decision-rules that remain abstract, regardless of the specificities of the case. This is a challenge to participatory-deliberative decision-making, because this mode of thinking is by contrast, case specific, culturally plural and philosophically diverse. Therefore, neither a single ethical theory approach nor a multitudinous set of ethical theory approaches can adequately provide a practical solution to the problems presented, given the universal character of the ethical standards they purport and their competing definitions of the moral good. Hence there is a general incompatibility between the application of specific normative theories and pluralistic deliberative decision-making.

The problem stems from the role of negotiation, consensus building and the pragmatic value of theory in both cases. In participatory-deliberative decision-making the emphasis is on the practical implications of negotiation between and, in some cases, consensus building among participants. Encouraging conflicting and antagonistic groups to accept and validate one another's values and positions involves compromise, mutual learning and negotiation between the involved parties. It is this quality that allows deliberators to reach agreements, or at the very least clarify the terms of their disputes, reaching a 'consensus about dissent' (Raiffa 1994), with the hope of improving the quality of the decisions that are made. Monistic normative ethics is largely incompatible with this approach. In normative ethical justification, negotiation is at the very least undesirable. One of the central elements of a negotiation process involves convincing others to accept the accuracy or plausibility of information that will influence their decision. To a normative ethical theory that is grounded in metaphysics, processes of negotiation are at best inappropriate and at worst, counter-intuitive to the search for objective ethical truth. Moral philosophers have been rather reluctant to rely upon the negotiation skills of individuals, due to this clash with the ontological validity of theoretically coherent maxims or rules.

To put it crudely, if we were simply to apply a normative ethical theory as a straightforward applied 'tool', this would create a 'top-down' ethics, with metaphysics at the top and technological design and governance practice at the bottom. If we were to adopt an ethically relativist approach we would begin with public moral values and judgements and extend these upwards to the evaluation of design and governance. However, both of these approaches are inadequate. A top-down approach would exclude the plurality of perspectives that emerge from public responses to new technologies. It would, in essence, produce another form of technocracy, though this time one of ethical absolutism. Aside from the problems of meta-ethically justifying one theory or corpus of rules over another, it

would also add significant political difficulties to what are likely to be difficult and protracted decision-making processes. If a philosopher were to wade in to a debate over a SECT, analyse the 'right' course of action and then apply it without recourse to public input, then this would likely cause people to react negatively to the judgement, thus antagonising affected stakeholder actors to the detriment of the decision-making process.

The counter to this of course is that it would be similarly unacceptable to simply allow participants in a Technology Assessment process to decide on what is right or fair, simply on the basis of their own opinions, prejudices or unconsidered moral judgements; which could be considered reactionary, and philosophically destitute. Nor could they simply choose from a selection of theories and decide the most appropriate course of action on the basis of applying theory to case. A robust ethical TA process must try to bridge this divide, allowing those involved to both engage with, evaluate, critique and conclude a course of action from a both a 'bottom-up' perspective, in the sense of engaging with individual stakeholders' broad array of ethical views and values, and top-down in the sense of maintaining 'ontological validity' i.e. being grounded in an understanding of the philosophical conception of ethics, and I return to this issue in the next chapter.

2.6 Whose Ethics Counts?

Finally within this chapter, there is one other meta-ethical consideration that we must attend to: one that bridges this to the previous discussion over the involvement of citizen actors in TA. If we accept that technology ethics is complex and co-evolves with society, that it must be assessed by more than just the engineers, and involve more than simply the application of normative ethical theory, then the next question then becomes, whose ethics do we consider as important or valid, and who should be in charge of deciding what is right? As I stated in the previous chapter, it is important to assess the values implicit in technological development in the context of participatory governance, through a TA process that incorporates a range of voices and perspectives. In practice, however, this is not always the case.

When the question of ethics arises in complex socio-technical debates over new technologies, very often the first response by governing organisations is to establish an independent council or ethics committee designed to address and evaluate the problem. This has become common practice, internationally, where science and technology ethics is deliberated upon within the context of national and governmental ethics commissions or other forms of institutionalised oversight bodies, as a means to guide and inform moral practice. This is most prominent in the field of bioethics; for example, in the United States within the last thirty years, a variety of bioethics commissions have played an advisory role to the White House and Congress on health and life science issues. In Europe there are examples of powerful committees such as the German Ethics Council or the UK's Nuffield

Council on Bioethics, and Siegetsleitner (2011) notes that similar models have emerged in the Developing World (for example Gabon, Ghana, Guinea, Jamaica, Togo and the Republic of El Salvador). In other instances, councils or committees have emerged around specific forms of technology from international bodies such as the standing ethics committee of the Human Genome Organisation (HUGO) and the Nanoethics Advisory Board to and the Food Ethics Council. These groups are commonly composed of experts from diverse academic and professional backgrounds charged with assessing the 'ethical impacts' of proposed technologies such as gene therapies, human cloning, novel foods or nano-technologies.

We must question then from what form of expertise are these councils and advisory bodies composed. Siegetsleitner (2011) continues by stating that most commissions are comprised of experts in the fields of medicine, biology, law, political and social sciences, theology and philosophy. Though medical and biological scientists contribute their medical and scientific expertise in an expert advisory capacity, legal experts propose legal formulations and social scientists can comment upon social values and political context; we must question firstly whether experts who are not philosophers can contribute to the evaluation of ethical issues, and secondly, whether the philosopher can do any better.

2.6.1 The Role of Scientists and Philosophers in Ethical Assessment

In the previous chapter, the role of the technical expert was under scrutiny, alongside the shift in reliance upon scientific and technical expertise towards participatory-deliberative technology policy. In a number of scientifically advanced democratic nations, including the UK, scientific and technical knowledge has lost some of its privileged status. Decisions over the implementation of SECTs, be they GMOs, nanotechnologies or nuclear energy are no longer framed solely in terms of technical criteria and by those that are deemed to have expert judgement. When it comes to discussing issues of ethics, however, 'the scientist' (however this category is defined) has two main roles in public debate. The first is to maintain specific standards of research ethics. Research ethics mainly focuses upon standards of practice in scientific practice (and indeed other forms of social scientific, arts and humanities research). Research ethics covers issues such as protecting research subject's autonomy and welfare in human and animal experimentation, protecting anonymity and scientific protocols to reduce heuristic bias in the reporting of findings, avoiding misconduct through plagiarism and falsification of data, and complying with safety standards and regulatory controls. Like engineering ethics, these standards of ethics are practice-oriented, concerned with maintaining the highest standards of professional conduct. However, scientists also engage with ethics in a second manner. It is often the case that scientific specialists are called upon to explain the mechanics of the scientific processes involved in controversial scientific developments, however, they are also

often required to provide ethical commentary on them (Miah 2005). Part of the new public-facing role of the scientist in this era of 'impact' driven scientific research is now to weigh in to key debates on the social and ethical value of scientific findings, and consequently the implications to society, to the economy, and to the natural environment from new technologies that emerge from basic scientific findings. This is inherently problematic from a meta-ethical perspective, as scientific and technical experts often lack specific insight into the ethical implications of the scientific discovery itself. As Turner (2001) states:

> "…if experts are the source of the public's knowledge, and this knowledge is not essentially superior to unaided public opinion, i.e. not genuinely expert, the public itself is presently not merely less competent than the experts but is more or less under the cultural or intellectual control of the experts."

Scientists and engineers certainly possess expertise, but expertise and familiarity with a research topic and its consequences should not be confused with expertise in the application of normative ethical theory, nor in providing robust moral judgements. Given the aforementioned problems of public controversy emerging over technocratic decision-making, it appears that scientific input into ethical assessment can be flawed due to a lack of demonstrable competence in making ethical judgements. In short, scientists are not ethics experts, and if technology policy is significantly shaped by the proscribed moral viewpoints of scientific authorities, then this is, in essence another form of technocracy, one that would likely exacerbate further public conflict. If competence is the issue, then one line of thought suggests that the scientist should simply be replaced by the ethicist. In practice this has sometimes been the case in these ethics advisory bodies. Moral philosophers have been called upon to apply a specifically formulated moral judgement based within theory, in the rather top-down manner alluded to earlier. Such judgement is therefore expected to be philosophically purer or more robust than one which any 'ordinary', non-specialist citizen could provide. This is in essence another type of top-down ethics, but one of expertise rather than ontology.

2.7 Conclusions

Thus far I have referred to the concept of 'top-down' ethical decision-making in describing a process of applying ethical theory perspectives to technology problems in the classical applied manner. Examining the roles of scientists and philosophers within ethics councils and committees does however raise a second instance in which ethics could be considered top down, in the sense of the specialist-centred assessment of technology development and implementation. Ethical assessment that is top-down in the sense that it is primarily based upon specialist input is deeply contentious. The advice of specialists, whether they are professional

philosophers or not, is insufficient to ensure a balanced judgement even when there are a selection of viewpoints available (Reber 2006). This is because despite their technical or ethical theory expertise, such 'experts' have no special insight into right and wrong, justice and injustice. As Rawls (1995) argued, there are essentially no experts in moral matters, philosophers have no more moral authority than other citizens. Trained ethicists have no superior competence or knowledge on normative matters to specially qualify them as moral arbiters and their opinions are not qualitatively 'better' than that of the non-expert because trained ethicists have no special access to or monopoly on moral truth. They may possess technical competence, however normative problems are not technical questions (Baylis 2000; Imwinkelried 2005). Therefore one must question whether ethical experts can adequately represent the diversity of moral values and viewpoints that emerge from PTA processes. Given that ethicists are (in the main) adherents to specific normative perspectives, can such experts really speak on behalf of public interests? I contend that that an expert or ethical-specialist centred approach presents a new form of 'ethical technocracy' that mirrors all the previous criticisms of techno-science centred policy-making, and so in fashioning a decision which is both ethically and politically legitimate, we must consider alternative arrangements that place ethical assessment back into the hands of the non-specialist citizenry who are ultimately affected by SECTs. In order to do this though, we must encourage our citizens to consider a range of ethical theory perspectives, reflect upon the judgements that they make, and the cultural, religious and moral biases inherent in those judgements, and then make ethically robust decisions that are attentive to the decision at hand. In the following chapter I outline the meta-ethical groundwork of an approach designed to achieve this aim.

References

Allenby, B.R.: Engineering and Ethics for an Anthropogenic Planet. In: Emerging Technologies and Ethical Issues in Engineering, pp. 7–28. National Academies Press, Washington DC (2004)

Baylis, F.: Expert Testimony by Persons Trained in Ethical Reasoning: The Case of Andrew Sawatzky. Journal of Law, Medicine and Ethics 28, 224–231 (2000)

Bijker, W.E.: Do Not Despair: There Is Life after Constructivism. Science, Technology and Human Values 18(1), 113–138 (1993)

Blackburn, S.: Relativism. In: LaFollette, H. (ed.) Ethical Theory. Blackwell Publishing, Oxford (2000)

Callon, M., Hughes, T.P.: Society in the Making: The Study of Technology as a Tool for Sociological Analysis. In: Bijker, W.E., Hughes, T.P., Pinch, T.J. (eds.) The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology, pp. 83–103. MIT Press, Cambridge (1987)

Caplan, A.: If I were a rich man could I buy a pancreas? Indiana University Press, Bloomington (1994)

Dunn, R.: Moral Psychology and Expressivism. European Journal of Philosophy 12(2), 178–198 (2004)

Flanagan, M., Howe, D., Nissenbaum, H., Weckert, J.: Embodying Values in Technology: Theory and Practice. In: van den Hoven, J. (ed.) Information Technology and Moral Philosophy. Cambridge University Press, Cambridge (2008)

Gross, C.: Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance. Energy Policy 35(5), 2727–2736 (2007), doi:10.1016/j.enpol.2006.12.013

Haidt, J., Koller, S., Dias, M.: Affect, culture, and morality, or is it wrong to eat your dog? Journal of Personality and Social Psychology 65, 613–628 (1993)

Hume, D.: Treatise on Human Nature: of Virtue and Vice in General. Oxford University Press (1739)

Imwinkelried, E.J.: Expert Testimony by Ethicists: What Should be the Norm? The Journal of Law, Medicine & Ethics 33(2), 198–221 (2005)

Johnson, D.G., Powers, T.M.: Ethics and Technology: A Program for Future Research. In: Mitcham, C. (ed.) Encyclopedia of Science, Technology, and Ethics, pp. xxvii–xxxv. Thompson Gale, Farmington Hills (2005)

Kekes, J.: Moral Imagination, Freedom and the Humanities. American Philosophical Quarterly 28(2), 101–111 (1991)

Keulartz, J., Korthals, M., Schermer, M., Swierstra, T.E.: Pragmatist Ethics for a Technological Culture. In: The International Library of Environmental, Agricultural and Food Ethics, vol. 3. Kluwer, Dodrecht (2002)

Kheel, M.: From Heroic to Holistic Ethics: The Ecofeminist Challenge. In: Gaard, G. (ed.) Ecofeminism: Women, Animals, Nature, pp. 243–271. Temple University Press, Philadelphia (1993)

Latour, B.: Science in action. How to follow scientists and engineers through society. Harvard University Press, London (1987)

Latour, B.: We have never been modern. Harvester Wheatsheaf, Hemel Hempstead (1993)

Latour, B.: La science en action: introduction à la sociologie des sciences (Science in action: introduction to the sociology of science). Gallimard, Paris (1995)

Latour, B.: On Recalling ANT. In: Law, J., Hassard, J. (eds.) Actor Network Theory and After, pp. 15–25. Blackwell, Oxford (1999)

Latour, B.: Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford University Press, Oxford (2005)

Law, J., Hassard, J.: Actor Network Theory and After. Blackwell, Oxford (1999)

MacIntyre, A.: After Virtue: A Study in Moral Theory. University of Notre Dame Press, Indiana (1984)

Magnani, L.: Morality in a Technological World: Knowledge as Duty. Cambridge University Press, Cambridge (2007)

Miah, A.: Genetics, Cyberspace and Bioethics: Why not a public engagement with ethics? Public Understanding of Science 14(4), 409–421 (2005)

Mitcham, C.: Thinking Through Technology: The Path between Engineering and Philosophy. University of Chicago Press, Chicago (1994)

Nussbaum, M.: The Fragility of Goodness: Luck and Ethics in Greek Tragedy and Philosophy. Cambridge University Press, Cambridge (1986)

Paula, L.: Ethics: the key to public acceptance of biotechnology? Biotechnology and Development Monitor 47, 22–23 (2001)

Phillips, D.L.: Equality, justice and rectification: an exploration in normative sociology. Academic Press, London (1979)

Pojman, L.P.: Ethics: Discovering Right and Wrong. Wadsworth Publishing Company, Belmont (1995)

Radder, H.: Normative reflections on constructivist approaches to science and technology. Social Studies of Science 22(1), 141–173 (1992)

Raiffa, H.: The Art and Science of Negotiation. Cambridge University Press, Cambridge (1994)

Rawls, J.: Reply to Habermas. The Journal of Philosophy 92(3), 132–180 (1995)

Reber, B.: The Ethics of Participatory Technology Assessment. Technikfolgenabshätzung - Theorie und Praxis 2(15), 73–81 (2006)

Renn, O., Webler, T., Kastenholz, H.: Procedural and Substantive Fairness in Landfill Siting: A Swiss Case Study. Risk: Health, Safety & Environment 7(2), 145–168 (1996)

Roeser, S., Asveld, L.: The Ethics of Technological Risk. Earthscan, London (2008)

Schmidt, C.W.: The Yuck Factor When Disgust Meets Discovery. Environmental Health Perspectives 116(12), 524–527 (2008)

Shrage, L.: Interpretative Ethics, Cultural Relativism and Feminist Theory. In: Shrage, L. (ed.) Moral Dilemmas of Feminism, pp. 162–184. Routledge, London (1994)

Siegetsleitner, A.: Ethics in Trouble: A Philosopher's Role in Moral Practice and the Expert Model of National Bioethics Commissions. In: Garner, B., Pavlenko, S., Shaheen, S., Wolanski, A. (eds.) Cultural and Ethical Turns: Interdisciplinary Reflections on Culture, Politics and Ethics, pp. 41–50. Inter-disciplinary Press, Oxford (2011)

Turner, S.: What is the Problem With Experts? Social Studies of Science 31(1), 123–149 (2001)

Van De Poel, I.: Ethics, Technology Assessment and Industry. TA-Datenbank-Nachrichten 2(10), 51–61 (2001)

Walsham, G.: Actor-Network Theory and IS research: Current status and Future Prospects. In: Lee, A.S., Liebenau, J., DeGross, J.I. (eds.) Information Systems and Qualitative Research, pp. 466–480. Chapman and Hall, London (1997a)

Werhane, P.H.: Moral Imagination and Systems Thinking. Journal of Business Ethics 38, 33–42 (2002)

Winner, L.: Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology. Science, Technology & Human Values 18(3), 362–378 (1993)