Making the world better?

Our technologies are an expression of our core values. Which is why we must be careful what we want from nanotechnology

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IT IS a serious fallacy to think that technology is ethically neutral. Far from it. Whether it is nuclear power or wind power, railway engines or siege engines, PCs or WCs, the artefacts and systems of technology are always a reflection of the values, concerns and aspirations of the society that produces them. As a technology becomes embedded in a society, it reshapes those values in turn, often unseen.

Even research science is not completely value-free. A collaboration of European nanotechnology researchers called Nano2Life has set up an ethical board, of which I am a member, to identify the likely ethical and societal issues that will arise as its blue-sky projects turn into real-world applications. Already it has been noticed that the choices made in some basic research projects we are examining are setting a trajectory for future developments. For example, the development of tiny devices to perform a complete genome analysis on a single chip depends on manipulating certain material properties. But it is also influenced by a value judgement that rapid genetic analysis is an important priority. In this way, certain values become embedded in the products. Again, early research on nanoparticles and surfaces has led to transparent suntan lotion for rich tourists, but not much for the world's urban poor. The trend is towards breakthroughs that primarily benefit ourselves.

We've been here before. In the early 1990s, the biotech industry claimed the moral high ground by saying that genetically modified crops were needed to feed the world. In *Engineering Genesis*, our study of the ethics of GM in the mid-1990s, the Society, Religion and Technology Project at the Church of Scotland looked in vain for concrete examples bearing out the claim. Our group found the overwhelming emphasis in GM research was on crops aimed at western farmers and largely irrelevant to hungry people. Ten years on, that imbalance and its hypocrisy have still been only slightly redressed.

The direction of new technologies depends on the world views and values they are driven by. With something as novel, as highly technical and as remote from the person in the street as nanotechnology, whose are the values that its emerging applications embody? Will it be a product of widely shared values of society as a whole, or only of an elite? With GM, the technology embodied too many values that were at odds with society.

So what about nanotechnology? A researcher may be motivated by scientific curiosity and the need to find funding. If pressed to provide a bigger picture, he or she may cite human progress. But progress in what sense? If you believe the transhumanists, a group that advocates the use of technology to expand human capabilities, nanotechnology will drive forward human evolution by extending human capacities beyond their biological limits. Ask the UK or Scottish governments, and they will say technological progress is primarily about economic growth, creating jobs and increasing competitiveness. But for others, technological progress is about the quality of personal life, affluence, comfort and consumer choice, or deeper values like environmental goals, social justice, global health and poverty, or spiritual and religious goals.

Nanomedicine may be motivated by the desire to alleviate human suffering. But its very strength in making precise functional interventions in the body could become a weakness if the small-scale focus loses sight of the whole person. Medicine is more than just engineering. Ailing humans are
more than bundles of tiny defects that need correcting. European medicine has been especially shaped by a Christian interpretation of compassion that sees humans as more than merely sick bodies. The lesson is not to let new technologies start to redefine our humanity by some scientific norm of human functional perfection. We are more than a bag of genes and functions to be enhanced if we can afford it. Our religions, philosophies, arts and cultures offer more rounded perspectives that point to ethical restraints on our technical capabilities.

Nor is it enough to leave it to market forces. With GM food, this approach singularly failed to spot the ethical problems that ultimately led to its rejection in Europe. If nanotechnology is to avoid a similar waste of investment, we must find better ways of incorporating basic values and seeing where there are synergies with society and disjunctions. Nano2Life is one example among many who are trying to grapple with this.

A bigger picture is needed. Rather than attempting a misguided manipulation of evolution, as the transhumanists have suggested, what research choices should we be making to create something with a value to a broader section of society? For this we need to stand back and look at human and environmental needs in a global perspective and then to ask what the needs to aim for are. As a Christian, I suggest there are some values from European culture about the whole person we would be foolish to let slip.

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