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# A Cyborg's Choice

## Singularity or Sustainment?

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The materialistic consciousness of our culture ... is the root cause of the global crisis; it is not our business ethics, our politics or even our personal lifestyles. These are symptoms of a deeper underlying problem. Our whole civilization is unsustainable. And the reason that it is unsustainable is that our value systems, the consciousness with which we approach the world, is an unsustainable mode of consciousness.<sup>1</sup>

The philosopher Andy Clark argues that human beings are natural born cyborgs, since we shape and are shaped by the technologies we employ, able to cognitively incorporate technological innovations rapidly as extensions of our own capabilities and ways of being.<sup>2</sup> Tool making and tool use, the design of concepts, processes, artefacts, and increasingly complex information technologies – language use, the written word, the alphabet, the printing press, the radio, the television, the computer – are all milestones of human technological inventions and the evolution of modern humanity. The careful social and ecological

adaptations of illiterate and less technological, but by no means primitive, cultures to their local environment are still being ignored in our globalising technological monoculture. Who and what we are, and how we see ourselves in relation to the rest of the world, has for a long time been affected by the technologies we employ. Beyond the material dimension of design and technology, how we map our experiences of being in consciousness is an act of metadesign. Language use and conceptual thought remain among the oldest and most powerful technologies of the mind. Whether we regard the world and ourselves as meaningless coincidences in a material universe purely governed by physical laws, or as co-creative participants in a continuously transforming, sacred and meaningful process, determines how we understand and employ ethics, design, and technology.

Both materially and psychologically, how we design and use technologies affects *how* and *who* we are. Through their effect on our lifestyles and worldview, design and technology affect the interactions and relationships we form within our communities, societies and ecosystems. Awareness of our own co-creative agency as integral participants in the wider process that contains and defines our own being promotes the understanding that every act of design and all use of technology need to confront the central ethical questions: How do our actions transform the social and ecological process in which we participate? Are we designing in ways that future or de-future?<sup>3</sup> Are we participating appropriately in natural process?<sup>4</sup> Are our actions contributing to individual, community, ecosystems, and planetary health?<sup>5</sup>

As biological organisms, who depend on healthy communities, ecosystems and a healthy biosphere for our continued existence, human beings are inextricable participants in ecological and social process and therefore part of nature (read *kosmos*). So does it really make sense to regard any human creation – high technology included – categorically as ‘un-natural’? Should we not regard nature as the bigger envelope that contains and is partially expressed through humanity, culture, and technology? The dichotomies of ‘humanity and nature’, ‘technology and nature’, ‘mind and matter’, ‘self and world’ are not *real* per se. They are the result of metadesign. These dichotomies result from the use of a dualistic, rationalistic, materialistic epistemology – modernity’s most common mode of perception and conception – the analytical and classificatory consciousness<sup>6</sup> that separates subject and object, the observer and the observed, into dualistic categories. Most people are unaware of how profoundly their experience, values, and aspirations, their entire worldview, are still affected by metadesign impulses that go back to Descartes and even Plato.

The myth of objectivity – reliable knowledge or ‘facts’ that are independent of underlying ontological and epistemological metadesign – pervades our scientific, technological culture. Let me

therefore make it clear at the outset that what is presented here is an invitation to a dialogue about the relationship between design, technology and ethics. The aim is transdisciplinary integration, intersubjective consensus and synthesis. The discourse is necessarily presented through the author's own subjective point of view. In order to transcend dualistic thinking one has to be aware that to argue for one position (thesis) does *not* necessarily imply the negation of the partial validity of its opposite (antithesis). Synthesis can only ever be temporary and in acknowledgement of the complexity of interconnected ecological, social, and psychological processes; it can't explicitly include all points of view, while it nevertheless tries to do so implicitly. It is reached by focussing on common ground rather than disagreement, and remains open to the emergence of new insights.

To understand the relationship between ethics, design, and technology within the context of the complexity of our social, ecological, and psychological interactions and relationships, it is crucial to venture beyond dualistic either/or thinking. Novel insights, based on transdisciplinary integration and synthesis, will emerge from employing multiple epistemologies, and complementary modes of consciousness. To shift from the analytical and classificatory mode of consciousness, in which we predominantly live out our lives, to a holistic mode of consciousness, has some important conceptual and experiential consequences.<sup>7</sup> The poet-scientist Johann Wolfgang von Goethe (1749 – 1832) suggested:

Even the most unnatural is Nature, even the creation of the crudest philistines express some of Nature's genius. Who does not see Nature everywhere, will see her nowhere in the right way!

The first step towards a more holistic mode of consciousness is to begin to regard the evolution of life and consciousness – natural process – as a continuous transformation of a fundamentally interconnected whole in which we participate. If the human organism is perceived not by focussing on assumed separation from and therefore competition with nature, but rather as a nexus of interactions and relationships within a larger 'ecological organism' the dualistic categories of self and world dissolve. Craig Holdrege offers the following definition of the concept 'ecological organism':

The organism *is* interaction with other organisms within the context of a habitat. The single organism (or species) that is supposed to compete with others *does not exist*. It is far more appropriate to view organisms as members of a differentiable whole that has never dissolved into discrete entities.<sup>8</sup>

From this perspective, 'nature' is the larger envelope, understood as a dynamically transforming whole of which human beings are participating parts. Through conceptual metadesign – our epistemological and ontological assumptions and the organising ideas we employ – we are making sense of things from within that whole. An entirely new perspective on the relationships between ethics, design and technology opens up if we cultivate awareness of our participatory involvement in a holistic (fundamentally interconnected) process that shapes and defines us as we participate in the shaping and becoming conscious of this very process.

We are accustomed to thinking of mind as if it were inside us – 'in our heads.' But it is the other way around. We live within a dimension of mind which is, for the most part, as invisible as the air we breathe."<sup>9</sup>

Being able to entertain the notion of the 'ecological organisms' is one consequence of admitting insights gained from within a holistic and participatory mode of consciousness into our discourse, another consequence is what Gregory Bateson first called 'the ecology of mind'<sup>10</sup> can be understood more deeply. Bateson believed that the mounting ecological and social crisis could only be overcome through a shift in human consciousness from the notion of a 'skin encapsulated ego' to the notion of a 'relational self'. To him this larger conception of self is fundamentally interconnected with a larger mind that manifests through the process of life itself. Bateson wrote: "The individual nexus of pathways which I call 'me' is no longer so precious because that nexus is only part of a larger mind."<sup>11</sup> Albert Einstein tried to express the same realisation when he wrote:

A human being is part of the whole, called by us the universe. A part limited in time and space. He experiences himself, his thoughts and feelings, as something separate from the rest, a kind of optical delusion of his consciousness. The delusion is a kind of prison for us, restricting us to our personal desires and to affections for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty.<sup>12</sup>

As our circle of compassion and self-identification widens, the community for which we show ethical concern widens from individuals, to family and social groups, to national and cultural groups, to all of humanity, and beyond that, to the ecosystems we inhabit, and the wider community of life. The notion of 'ecological organisms' can help to comprehend what Aldo Leopold called the

ecological and social dimensions of ethics. “An ethic ecologically, is a limitation of freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social and antisocial conduct.” Leopold continues: “These are two definitions of one thing which has its origin in the tendency of interdependent individuals and groups to evolve modes of cooperation.”<sup>13</sup> Human, ecosystem and planetary health are interdependent.<sup>14</sup> This makes the future and health of all life an important ethical concern. We are who we are through the interactions and relationships we form with ‘all there is’ – the *kosmos* in which we participate.

The notion of ‘ecology of mind’ transcends and includes materialism by acknowledging that the *kosmos* can only become conscious of itself from within, through its participants, as there is nothing outside ‘all there is’. The whole is reflected back to itself through the participating parts. From within a holistic mode of consciousness, boundaries do not result in dualistic separation, but in a complex dynamic of interactions and relationships, that allow ‘relational selves’ to establish identity and ultimately become conscious of the underlying unity. The *individual* is *indivisible* from the community that gives identity and meaning to the organism through the reciprocity of interactions and relationships within the wider ‘ecological organism’.

Humanity is faced with increasingly rapid environmental and climatic change due to the shortcomings of past design decisions and the inappropriate use of inappropriate technologies. We are still largely unaware of what ‘the designed’ has itself ‘designed’ and how ‘the designed’ continues to affect ourselves and the social and ecological processes in which we participate. During the course of the 21<sup>st</sup> century, humanity in all its diversity will have to cooperate to solve the current crisis of unsustainability. The generations who are now alive have the ethical responsibility and creative opportunity to contribute to the emergence of a sustainable human civilisation, and to participate appropriately in the continued evolution of life as a whole.

The most fundamental changes that will facilitate the emergence of a sustainable human civilisation will be changes in awareness, value systems, and worldviews. Such metadesign changes take place in consciousness. They transform human identity and intentionality and thus cause downstream transformation of how we design and use technology. Changes in product and process design will occur in response to, and simultaneously cause further, changes in metadesign. A sustainable human civilisation will be characterised by an expansion of our ethical horizons to a worldcentric or kosmocentric ethics.

Global and national inequity holds a large proportion of humanity in a struggle for survival and economic improvement that makes them still unable to acknowledge the urgency with which humanity as a whole has to address the crisis of our civilisational

unsustainability. Not to mention ecological considerations, too many are unaware that genetic engineering, nanotechnology, robotics, and information technology are confronting us with fundamental ethical choices. Addressing poverty, inequity, and education are issues central to creating more sustainable societies, but not the focus of this paper. While facing these challenges, all of humanity has to assume co-creative responsibility for how human design and technology are shaping our world and affecting *how* and *who* we are. As Tony Fry has lucidly put it:

One of the fundamental consequences emanating from 'modernity' (as 'being modern') has been its created (con) fusion between 'the-being-of-the-world,' 'being-in-the-world', and 'world-making' – design philosophy is just starting to illuminate this enormous complexity. This undertaking is most simply expressed in a general statement of qualification of ontological design. It can basically be understood as – 'the things of the world that designers design, as they themselves contribute to the designing of modes of being in the world, and of the changing character of worlds themselves'.<sup>15</sup>

As the effects of our actions and designs radiate out across spatial and temporal scales, they affect our communities, ecosystems, cultures and the whole planet, as well as our personal well-being. Materially, human design is affecting the physical and biological world from the scale of nanometers to the scale of the planetary biosphere and beyond. In the immaterial dimension, human consciousness is creating complex maps of reality – making sense of our participatory engagement in the process of a continuously transforming and fundamentally interconnected now.

To fully appreciate how – as Winston Churchill expressed for architecture what applies to all of design – 'we shape our buildings, then our buildings shape us', it is important to acknowledge the ontological nature of design. To appreciate how our basic ontological and epistemological assumptions shape our experience, our value systems and worldviews and how these in turn affect our intentionality and the interactions and relationships we perceive and form, it is also important to acknowledge the epistemological nature of metadesign.

To reconsider ethical questions about how we participate in – affect and are affected by – complex and interconnected social and ecological processes can remind us of our co-creative entanglement with 'the-being-of-the-world.' The author's recent doctoral thesis explores further how human, ecological, and planetary health is fundamentally interdependent, and argues that health is a scale-linking, emergent property that connects the interactions and relationships of individuals, communities, and ecosystems to the state of the biosphere. In the face of fundamental

unpredictability and uncertainty, it calls for salutogenic, or health-generating, intentionality behind all acts of design in order to create sustainable solutions.<sup>16</sup>

“An ‘ethics of now’ crucially needs to confront our anthropocentric being **as a structurally unethical condition.**”<sup>17</sup> The emergence of a sustainable human civilisation critically depends on a planetary shift in awareness, which enables human beings to extend their personal circles of self-identification and ethical consideration outward: from self, community, ecosystem, bioregion and biosphere, beyond the perceived – but unreal – dualism between mind and matter into a mindful participation in the process of the *kosmos* revealing itself in consciousness.

Our awareness depends on how the metadesign we employ interprets and influences the experience of the coming-into-being of *being*. Joined-up, holistic thinking, and the wisdom of many minds, based on multiple epistemological and ontological perspectives integrated through dialogue, can facilitate more inclusive and integral decision making in order to guide appropriate participation and ethically informed action.

Design and technology are both expressions of *and* creative agents in the human way of ‘being-in-the-world.’ They express *and* influence a certain way of being as well as a way of seeing. Through their biophysical presence, and through the organising ideas that design and technology embody, they also engage fundamentally in ‘world-making.’

Martin Heidegger emphasised that the Greek root of the word technology, *techne*, “is the name not only of the craftsman but also for the arts of the mind and the fine arts. *Techne* belongs to bringing forth, to *poiesis*.” Furthermore, he pointed out “the word *techne* is linked with the word *episteme*. Both words are terms for knowing in the widest sense.”<sup>18</sup> This semantic insight emphasises that there *is* an upstream end to design and technology. What lies upstream is our way of knowing and perceiving the world. We bring forth a world based on how we see and know the world. Technology is not only an expression of what we bring forth, but also affects drastically how and what we see.

As we become aware of our relational existence within an ecology of mind, we become conscious of how “every act of knowing brings forth a world” and “all doing is knowing, and all knowing is doing,”<sup>19</sup> we can begin to appreciate the co-creative power of design as an expression of intentionality through interactions and relationships. Maturana and Varela emphasise: “cognition is effective action; and as we know how we know we bring forth ourselves.”<sup>20</sup>

Awareness of our individual and collective participation and transformation through interaction and relationships can lead to conscious metadesign guided by a life and future affirming, salutogenic (health-generating) intentionality. “Everything we do is



a structural dance in the choreography of coexistence.” Maturana and Varela point out that “*we have only one world we bring forth with others*” and conclude: “*at the core of all troubles we face today is our very ignorance of knowing*. It is not knowledge, but the knowledge of knowledge, that compels.”<sup>21</sup> Epistemological awareness critically informs ethical action.

This is a crucial insight for any informed discussion about the role of ethics in design and technology! The ontological perspective of design helps to “materialize ethics as a quality of the designing object-thing.”<sup>22</sup> The epistemological perspective helps to acknowledge the importance of organising ideas and conceptual metadesign as well as the ethical responsibility that comes with co-creative participation in social and ecological processes.

All human design and technology is based on certain intentions, attitudes, worldviews or organising ideas, through which we make sense of the world. Yet, at the same time, the artefacts and processes we create through design and technology also shape the world and thus how we perceive reality and our role within it. There is both an ontological and an epistemological dimension to design and technology! Fry writes:

All experience, all feeling, is refracted through mind and thus subjected to interpretatively designated meaning by those ideas and values taken into ownership by our culture and selves. So understood, ideas are not just consciously brought to the world to know it, but the world we know arrives through the embodied ideas we inhabit.<sup>23</sup>

Epistemologically and hermeneutically, “design is making sense of things.”<sup>24</sup> It does so through the structuring of the world, and experience, into meaningful categories and concepts, which leads to the formation of certain value systems and worldviews, informs intentionality, and is expressed through interactions and relationships.<sup>25</sup> Ontologically, design is a “feature of how human beings act in and on their world ... often triggered by the designing power of already designed ‘things-in-the world’ ... ‘the already designed’ acts reflectively as a foundation of designing (be it as incremental change or radical departure). ... The designing of the designed pervades”.<sup>26</sup>

The epistemological and the ontological perspective complement each other. We have to be careful not to create yet another either/or dichotomy by presenting ontological and epistemological notions of design as conflicting, rather than complementary. Beyond the simplistic dualism of either/or thinking we can learn to employ the kind of both/and thinking that does not deny either/or thinking but transcends and includes it through acknowledging the validity of multiple epistemologies and ontologies. Every ontological perspective obscures an insufficiently

reflected underlying epistemology, while every epistemology has its own basic ontological assumptions. Ontology and Epistemology are both employed to make sense of and ascribe meaning to our experience of participation.

The hermeneutic circle within which the part reveals the meaning of the whole while simultaneously deriving its own meaningful existence from the interactions and relationships within that whole, offers a metaphor for interpreting humanity's co-creative and participatory relationship to a constantly transforming *Kosmos*. Hermeneutically, metadesign and design interpret and express meaningful relationships. Being and meaning are linked through the conscious interpretation of participation. Every act of knowing is an interpretation of existence within the *kosmos* from within that undivided, whole, and constantly transforming process.

The Latin root of the word design, *designare*, means to name, to categorise, to order – or simply to designate meaning. The materialistic, mechanistic, and rationalistic ordering of experience that reveals reality within the 'framework' of our scientific/technological worldview and culture is a valid and powerful map of reality. Technology and reductionistic sciences are empowered by a particular epistemological perspective and basic ontological assumptions. They result from, and simultaneously create, a particular way of being in the world.

Recognised as such, technology and science – responsibly and ethically employed – will be important contributors to the age of sustainment, but the fundamental shift towards a sustainable human civilisation will take place in consciousness and result in an increased awareness of our co-creative agency and responsibility as participants in a fundamentally interconnected and interdependent whole. Only 'knowledge of knowledge' – epistemological and ontological awareness – will compel us to consider the ethical implications of our ways of being, knowing, and meaning-making. We need a culture-wide dialogue about the ethical implications of design and technology!

Appropriate actions are best informed by multiple perspectives. Acknowledging diverse points of view creates a wider knowledge base that allows for wisdom to emerge. The scientific, technological perspective offers just one of many epistemologies and ontological foundations that could contribute insights to a more inclusive and appropriate decision making process. Transdisciplinary integration and the acknowledgement of diverse points of view creates a more informed meta-perspective that can guide decision making in the face of fundamental unpredictability and uncertainty.

There are complementary ways of knowing and being, based on complementary epistemological and ontological positions. The world's remaining traditional, tribal cultures offer complementary ways of being and knowing in the face of a rapidly spreading technological monoculture. Many of such cultures situate all acts

of design and all technology use within the wider context of life as a sacred and connecting process. The *categorical* separations between 'humanity and nature', 'mind and matter', 'technology and nature', 'self and world', and the designing 'subject' and the designed 'object' are *in themselves* expressions of cultural metadesigning and the interpretation of meaning.

From a participatory perspective that acknowledges fundamental interconnectedness, such separations can only be appreciated as heuristic tools, rather than irreconcilable opposites, or mutually exclusive categories. From within the epistemological and ontological framework of analytical and classificatory consciousness such separations are valid, *but simultaneously* it has to be acknowledged that all dualistic categorising is the product of a dualist epistemology and a materialist ontology.

When reality is reduced to a purely materialistic universe composed of atoms and molecules, and explained through technological metaphors like the clockwork, the internal combustion engine, or the computer, it becomes easy to confuse the map and the territory. Once one particular epistemological and ontological position is culturally dominant and that culture spreads around the world through a process of globalisation, the dominant framework for designating meaning in correspondence to our experience of reality locks us into a certain habit of interpreting existence – a classificatory consciousness, rather than a participatory consciousness.

There is reciprocity between 'knowing', 'being', 'designing' and 'meaning.' They are interrelated aspects of the formation and interpretation of identity through interactions and relationships. Oblivious to this reciprocity our culture is locked into the mechanistic/materialistic worldview like a self-fulfilling prophecy – an autopoietic, self-making of our scientific/technological modernity defined by the boundaries of mind-made dichotomies. Our culturally dominant mode of consciousness and the metadesign we employ are alienating the individual from its social and ecological community.

Ecologically and socially, this can have precarious consequences. Every single act of interaction and relationship has an important ethical dimension, since it affects – to varying degrees – the transformation of both the whole and its participants. Rather than powerless cogs in a machine, we are co-creative agents in the processes that define who and how we are. Ethical considerations about how to participate appropriately in social and ecological process are born from this participatory awareness. Our individual and collective creative agency fundamentally affects the future of humanity and the continued evolution of life.

Most people are unaware of the fundamental organising ideas that structure their daily experiences, worldview, and value system, thereby shaping their aspirations and intentionality, which in turn affect our actions and designs. Nor do we see how the artefacts,

processes, and categories we create based on those foundations have, in and of themselves, creative agency. This is the result of confusing the map with the territory, what Peter Russell calls the consciousness of an unsustainable civilisation.

We have simplistically thought of human beings and other life forms as nothing but biological machines with differential degrees of complexity. We are now at a point where – if we do not succeed in establishing a central cultural dialogue about the role of design, technology and ethics in the creation of a sustainable human civilisation – we may use the machines we created to turn ourselves into machines. Are we really ‘natural born cyborgs’ as Andy Clark suggests, or is such a perspective only the consequence of the cultural dominance of mechanistic and dualistic metadesign?

The classificatory consciousness of modern science and rationalistic dualism have helped humanity to create powerfully transformative technologies, but without becoming more conscious of our underlying ontological and epistemological assumptions. Failure to observe how the technologies we employ change our life-styles and *who* we are, allows people to maintain the illusion that, just because we invented and designed our technologies, we are in control of them. The process of technological proliferation is already causing a drastic loss of biological and cultural diversity, and weakening as well as permanently altering life on Earth. John von Neumann, a pioneer of information technology, warned in the 1950s:

The ever-accelerating progress of technology ... gives the appearance of approaching some essential singularity in the history of the human race beyond which human affairs, as we know them, could not continue.<sup>27</sup>

Rampant technologists, yet intelligent and skilled inventors, like Ray Kurzweil or Hans Moravec, are heralding a future of genetically, and robotically enhanced humans with brain-computer interfaces wet-wired into their central nervous system. Beyond that, a post-biological ‘human’ future of hyper-intelligent computers and robots, which are informed by the digitalised versions of their biological, human predecessors’ ‘consciousness’ downloaded onto microchip. Kurzweil’s new book *The Singularity is Near: When Humans Transcend Biology* adds an important perspective to the dialogue about design, technology, and ethics. Kurzweil writes:

...I set the date for the Singularity – representing a profound and disruptive transformation in human capability – as 2045. Despite the clear predominance of nonbiological intelligence by the mid-2040s, ours will still be a human civilization. We will transcend biology but not humanity. ... By the second decade of this century ... most of computing will not be organised in ... rectangular devices but will be highly

distributed throughout the environment. Computing will be everywhere: in the walls, in our furniture, in our clothing, and in our bodies and brains.<sup>28</sup>

While I personally react to Kurzweil's tale of a fusion between biology and technology, and particularly to his limited interpretation of 'humanity' and 'consciousness', with profound discomfort, to dismiss his perspective outright would be dangerously narrow-minded. His book is a wake-up call to a much more dynamic way of thinking about the transition towards the age of Sustainment. It is conceptually important to acknowledge the rapidly accelerating pace at which technological innovations are converging to drive an unprecedented speed of cultural transformation on a planetary scale. The ethical and creative choice humanity faces today is whether to employ the power of design and technology to aim towards the singularity or the age of sustainment?

Technologies are being invented and applied without sufficient consideration of the 'futures' or 'defutures'<sup>29</sup> they are causing as the resulting designs continue to shape our world. To some extent, this has always been the case throughout human evolution and history, but now, both the pace of innovation and the profundity of the transformations affected are growing at a near exponential rate. To effectively navigate the uncertain and unpredictable path into the future based on socially and ecologically ethical action, humanity has to become aware of the epistemological and ontological foundations of design and technology.

In the face of rapid technological change, we have to act immediately, despite uncertainty and unpredictability, and begin to chart an ethically sound path across a constantly shifting terrain of environmental and social change. Is it appropriate to pursue technophilic immortality projects aiming towards 'digitalised consciousness'? Does not the concept in itself reveal a limited, mechanistic understanding of consciousness, humanity and reality?

A widespread and open dialogue about what visions of the future we regard as appropriate ethical, aesthetic and ecological choices will almost certainly lead to an entirely different application and awareness of technology. Such a dialogue is a prerequisite for the creation of sustainable lifestyles and a culture of sustainment. It would raise widespread awareness of how design and technology affect social and ecological processes, and ethical responsibility for our modes of participation. "Ethics can reconcile and combine two seemingly impossible propositions: dwelling in ways that 'future' *while* overcoming that which defutures."<sup>30</sup> Tony Fry suggests designers can facilitate this through the way that all design goes on designing:

Designers [...] could become key ethical agents in shifting the emphasis from the will-to change (a position that only the few

ever embraced) to an ontologically implicit willing of futures in the very fabric of designed and constructed existence. Ethics so posed [...] becomes the animatory matter of worlds that carries our being into the being of futures.<sup>31</sup>

Ecologically and socially literate design aims to create artefacts and processes that will participate appropriately in social and ecological process and therefore future, rather than defuture. Artefacts and processes created with this intention begin to express a culture of sustainment and thereafter contribute to the autopoietic replication of such a culture through their ontological nature as well as the epistemological assumptions and intentionality they express materially.

Designers can facilitate the transformation towards a culture of sustainment by positioning themselves as transdisciplinary integrators and facilitators during more inclusive, multi-perspective-based decision making processes that acknowledge aesthetic and ethical considerations based on multiple epistemological and ontological perspectives. Participatory awareness confronts us with the ethical choice between appropriate and inappropriate use of design and technology. The author has discussed this issue previously:

In a fundamentally interconnected and unpredictable world, where local actions have global consequences, the intentionality behind science and design needs to shift from aiming to increase prediction, control and manipulation of nature as a resource, to transdisciplinary cooperation in the process of learning how to participate appropriately and sustainably *in Nature*.<sup>32</sup>

The underlying assumption here is that while technology and humanity are always part of nature and thus natural, there are appropriate and inappropriate ways of participating in the wider social and ecological process of nature. In this context, all design and technology can either enhance health and promote the diversity and resilience of life and therefore *future* or they can decrease the diversity, resilience, and health of life and therefore *defuture*.

Trapped in the materialistic, dualistic and rationalistic epistemology of our technological culture, Kurzweil and Grossman suggest that technological inventions will allow us to live for ever and overcome death and our biological origin.<sup>33</sup> The quest for control and prediction of nature, and the quest for immortality, are ultimately motivated by a dualistic conception of self and world that separates the two into mutually exclusive categories, thereby alienating us from the sacred ground of being in relationship with a larger, living, transforming whole.

From a holistic perspective, overcoming the sting of death may well be possible, but through a shift in consciousness and

not through technological transformation of nature and ourselves. By identifying our essence as human beings with our co-creative agency in the conscious unfolding of a continuously transforming *kosmos*, more ego- or anthropocentric conception of 'self' are put into perspective and give way to conscious participation in an essentially symbiotic and synergistic process. As J.G. Bennett put it: "We have to stop thinking of ourselves as beings that do and come to understand ourselves as doings that be."<sup>34</sup> Or in Buckminster Fuller's famous words: 'I am a verb and not a noun!'

Our very being joins us to three and a half billion years of life's evolution. An individual lifetime can be regarded as a chapter in something much more meaningful if we begin to regard every being as a temporary manifestation of, and a nexus of relationships in, the evolution of life and consciousness. As participating parts in the transformation of a larger being, we reflect the whole process becoming conscious of itself. Through being, knowing, and meaning-making the underlying unity manifests in diversity. Sustainment of, what Whitehead called, 'life's continuous journey into novelty' requires us to rediscover all of life as the *sacred* ground of our being.

Technologically based visions of humanity, 'post-humanity'<sup>35</sup>, or 'trans-humanity'<sup>36</sup> are all interpreting our present and future within the materialist mindset of control through technology. This perspective has to be complemented by a meta-perspective that allows the free expression of complementary and even contradictory ways of knowing and being. The creation of a culture of sustainment and the transformation towards a sustainable human civilisation will require decision making processes based on an understanding of both reductionism and holism – acknowledging the role of science *and* the sacred.

Whether we are conscious of the process or not, our thoughts, actions, designs and technologies are contributing to the creation of possible futures and excluding other possible futures – transforming our selves and our worlds. Rather than accepting climate chaos and a cyborg future as inevitable, we have the option to engage in widespread dialogue about design, technology, and ethics – about modes of appropriate participation. Such a dialogue could critically influence the future of humanity during the 21<sup>st</sup> century and beyond. In order to create a sustainable human civilisation we have to transcend *and* include the perspective offered by modernity's analytical, materialistic, and dualistic mode of consciousness.

A cyborg future of transhuman citizenship is not human destiny, nor is it inevitable. It is one of many possible ways in which conscious design and co-creative participation can create possible futures. However, if the mechanistic and materialistic epistemology becomes so culturally dominant, that our decision making processes ignore all other human ways of knowing and being, *then* we will create a future where robots are accepted as the next inevitable stage in evolution.

Many people already believe, without deeper questioning, that biological evolution will be, or has been, superseded by technological evolution. We have to open the dialogue about possible and alternative futures *now* before these technologies themselves gain ever more powerful creative agency and thereby restrict our freedom to choose alternative futures, and reduce the range of possible *biological* futures drastically and permanently.

Bill Joy, inventor (e.g. of the UNIX operating system) and co-founder of *Sun Microsystems* is certainly not a Luddite and he has spoken out publicly about the importance of consciously facing the ethical questions that the rapid developments in nanotechnology, robotics and genetic engineering are begging us to pay attention to. After his first confrontation with Ray Kurzweil and the enthusiastically suicidal visions of a rampant technophile's quest for immortality, Joy published an important article, entitled 'Why the future doesn't need us', in *Wired Magazine*.

Joy describes himself as an architect of complex systems and admits: "failing to see the consequences of our inventions while we are in the rapture of discovery and innovation seems to be a common fault of scientists and technologists."<sup>37</sup> He suggests that the rapid proliferation of the technologies celebrated by Kurzweil and others may actually be "threatening to make humans an endangered species."<sup>38</sup> Joy believes: "The human race might easily permit itself to drift into a position of ... dependence on the machines that it would have no practical choice but to accept all of the machines decisions."<sup>39</sup> Without the freedom to think and feel what we want, are we still human?

... if we are downloaded into our technology, what are the chances that we will thereafter be ourselves or even human? It seems to me far more likely that a robotic existence would not be like a human one in any sense that we understand, that the robots would in no sense be our children, that on this path our humanity may well be lost.<sup>40</sup>

Since consciousness emerges from the interactions and relationships of living beings, in the reciprocity *and* ultimate unity of self and world, no digital representation of reality will be able to emulate the richness of biological consciousness. To claim otherwise, and to design the technologies to prove it, is a misguided attempt to reduce the territory to the map. "Design is either ethics materialised or ethics negated."<sup>41</sup> "An immediate consequence of the Faustian bargain in obtaining the greater power of nanotechnology is that we run a grave risk – the risk that we might destroy the biosphere on which all life depends."<sup>42</sup>

The culturally dominant mode of consciousness, based on subject object separation, alienation and a resulting need to manipulate, predict and control, has driven the development of



technologies that have already started to alter the evolution of life forever. “The ability of advanced societies to survive is inseparable from the survival of the sacred.”<sup>43</sup> There is no place for meaning in a materialistic universe of dead matter, on a planet where accidental life is in constant competition for survival, all bound for the luke-warm indifference of maximum entropy. Such a story – scientific or not – has no survival value as cultural metadesign. The story of life – including all the life sciences – can easily be re-interpreted and re-written from a perspective of cooperation, symbiosis, reciprocity, interconnectedness, increasing complexity and diversity, as well as increasing resilience, synergy and health. From within a more participatory and holistic perspective, we are nodes of individual consciousness within the community of life.

The same John von Neumann who warned of the possibility of the approaching singularity, also developed ‘game theory’ and distinguished between zero-sum (win-lose) and non-zero sum (win-win) games. The sustainment and evolution of life and consciousness *is* a non-zero sum process. Dualistic metadesign separates the individual from its dynamic context (the living world) and establishes organism and environment (humanity – nature) as mutually exclusive categories. Such inappropriate metadesign predisposes us to tell life’s story as a zero-sum game, with its focus on competition rather than cooperation as the basis of life’s evolution.

According to Fry, most of the modes of meaning-making that are adopted today have lost their ability to bond community. “Modernity, as thought and action, has atomised us as individuated subjects by the ways we live, work and think.” He points out that “without life as given value, ethics, morality and belief all lose their ability to cement a collective body, which is normative of social action, in place.” Fry argues reason and objective knowledge alone cannot provide the “ability either to discover life as meaningful or to fuse an individual being to all being.” He proposes: “The sacred, as a (or perhaps the) bridge between the language of difference of nature and culture unites that which is, de facto, the same. It transforms mere existence into being within a domain of meaning.”<sup>44</sup>

The sacred provides the context within which individual being and the coming-into-being of all being (life) are recognised as facets of the same process of becoming through an intimate reciprocity of interactions and relationships. In this context, appropriate design decisions facilitate a meaningful existence and future. They aim to promote the health of the whole through promoting the health of all diverse participants. Appropriate design aims to maintain healthy (whole-making) relationships throughout the dynamic holarchy of health that connects individual, community, ecosystem, and bioregional health to the health of the biosphere and psychological health. Sustainable design has to be salutogenic (health generating) design, in order to be ethically appropriate, and ultimately sacred

and meaningful design.<sup>45</sup> Appropriate, ethical action and design require the context of the sacred that joins the individual organism, culture and species to the intrinsically meaningful whole of the community of life.

"Design cannot be agency for survival so long as it is locked into the productivist drive of domination that lacks any ability to create operative community."<sup>46</sup> Fry proposes: "Design has to be the materialisation of the sacred, as the processes, forms, appearances, and relationships that bring care (the means of survival) to differences (in particular, our cultural differences named in any way) as a valued being-in-the-world."<sup>47</sup> Tony Fry's description of sacred design is well worth revisiting: "Design thereafter becomes the bringing into being and taking into care of that which already cares and a destruction of that which destroys caring."<sup>48</sup>

What is needed is a cultural/civilisational change from design in a technological/materialistic context that may ultimately lead to von Neumann's 'singularity', to design in a salutogenic and sacred context that will bring about the age of sustainment. We need to shift from isolated zero-sum design to a fundamentally interconnected way of non zero-sum designing. The age of sustainment will be characterised by win-win-win design – design for life, health, and well-being. The author details elsewhere why sustainable design is therefore by necessity symbiotic, synergistic, scale-linking, salutogenic (health generating), and sacred design!<sup>49</sup>

Here a faith in technological solutions ends. What follows is recognition that the way in which we make things, and the way in which those things act, has a profound effect upon how we ourselves are made, and what we become. In this frame, work on or with the ecological systems will always be equally a reaching out, a touching, and a changing of the social ecology, the ecology of community that demands the myth of the value of life as given from elsewhere – the sacred.<sup>50</sup>

The ethical reframing of design and technology from *tools of control*, to participatory and co-creative *processes of care* goes hand in hand with the decision not to choose the meaningless future of a technological singularity and opt instead for the ultimately more meaningful sustainment of life, health, and wholeness as the sacred pattern that connects. The emergence of a culture of sustainment, whose material designs and conceptual metadesigns future rather than defuture, will require us to transcend *and* include reductionist, either/or thinking and the logic of subject object separation. The power of scientific knowledge and technological capability has to be tempered by the wisdom born from participatory, co-creative awareness and a holistic mode of consciousness that recognises all of life – the ecology of matter and mind – as the sacred ground

of *being*. Appropriate participation in social and ecological process, a responsible use of technology, and the creation of ethical and sustainable design ultimately depend on this transformation of consciousness.

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