Innovation in ethics follows innovation in technology

by Stefan Gruner

The following text is the transcript of a talk which Stefan Gruner gave in January 2008 at the annual PSSA Symposium of the Philosophical Society of South Africa, which was hosted by the University of Pretoria's Faculty of Humanities. Not only did this talk sketch some interesting developments in contemporary ethics of technology – it also demonstrated that the often demanded interdisciplinary relations between the different faculties are actually alive and working.

Motivation and overview

More often than not, our insights stem from small numbers of examples and comparison rather than exhaustive overviews or masses of data. So does this article. It sketches only a few of the central positions in the field of Ethics of Technology in Germany during the 1990s, a decade in which this topic was especially "hot" in many academic and industrial circles – in stark contrast to allegations brought forward by the Anglo-Saxon philosopher Peter Singer who, in [1], has questionably labelled Applied Ethics a "taboo topic" in modern Germany.

By understanding the key issues of the debates in Germany of the 1990s, the reader should be enabled to compare and judge the situation and state of the debate in South Africa of nowadays.

This comparison should be especially interesting if we take into account that Germany, widely regarded as one of the most developed countries in the world, has gone through noticeable phases of civilisation-tiredness (not at least due to the notorious side-effects of two fully mechanised total wars) – whereas South Africa, arguably still a member of the Third World (at least from my North-Western European perspective), is still maintaining an astonishing spirit of hope, optimism, perhaps even euphoria, as far as the idea of overcoming poverty and misery *by means of technology* is concerned.

My overview article is largely based on scriptures and lecture notes released in German language by academic philosophers of the University at Hagen [2]. Here I am trying to make these scriptures summarily accessible in an interpretative reflection in English language. Following those philosophers we shall see how *innovation* in technology – the theme of this magazine – is closely related to innovation in ethics which usually follows only one step behind technology in the trail of social progress in general. See also [3] for comparison.

Terminological preliminaries

To understand German Ethics and Philosophy of Technology it is necessary to appreciate that the German words "Ethik", "Philosophie", and "Technologie" have a considerably sharper focus than the seemingly equivalent English words "ethics", "philosophy" and "technology" which tend to be used rather sloppily and have a very wide semantic spectrum.

In English, "philosophy" can be almost anything that is somehow opinion-based, including the "philosophy" of a business corporation about how to make business, etc. In English, "ethics" is often not much more than a positive codex of rules to be obeyed for reasons of morality. In English, "technology" can be almost anything that has something to do with human crafts and engineering, be it a Xerox copy machine, be it the programming language Java, or anything like that. Even simple technicians who can fix a broken Xerox copy machine are often called "engineers" rather than simply: "mechanics" or "technicians".

The German sense of those words is considerably stricter and more precise. "Philosophie" means a critical rational enquiry, in which Reason itself is reasoning about its own possibilities and limitations. "Ethik" is not simply a positive codex of rules – such would in fact be a "moral system" – but a rational (thus: philosophical) enquiry about the possibilities, limitations and justifications of any such moral systems from a higher perspective – something which is sometimes called "Meta Ethics" by English writers. "Technologie" is not simply a set of techniques (as suggested by the English meaning of the word), but a complex social phenomenon in which key techniques are "lifted up" to the status of "Technologie" by means of an underlying affirmative ideology, which we could sum up in an "equation": technology = techniques + ideology. In other words: "Technologie" is

something which has deep ontological and existential impacts on the individual human nature (from the perspective of anthropology) as well as the structure of human societies (from the perspective of sociology). Such deeper notions and connotations of the German word "Technologie" – in contrast to the rather mundane English "Technology" – can be traced back to German philosophers such as of the School of Frankfurt (Herbert Marcuse et al.) in the 1960s, Martin Heidegger in the 1920s, and even Karl Marx in the 19th century.

Furthermore it is necessary in this context to distinguish between "theoretical" or "pure" ethics, which is reasoning about the concept of "Value" or the idea of "Good" in general, and "practical" or "applied" ethics, which is stronger related to particular domains of life such as: Ethics of Medicine, Ethics of Science, or Ethics of Technology. Due to their proximity to particular domains of application, those practical or applied ethics (in the German sense of the word) are coming somewhat closer to "ethics" in the English sense of the word; this also means that the philosophical reflections in applied ethics can indeed lead to the postulation of positive moral (and sometimes even: legal) systems in which certain sets of domain-specific "maxims" or guidelines (on a high level of generality, devoid of case-specific details) are proposed. Those maxims or guidelines are, of course, still subject to further philosophical criticism and rational enquiry by "academics" and "intellectuals" on the one hand, and still have to be "implemented" in detail (on a lower level of abstraction) on the other hand by "non-academic" practitioners: for example in form of positive legislation (parliament, government), or in form of corporate codices (e.g. association of electrical engineers, society of chemical engineers, and the like).

Finally it is worth mentioning that applied ethics in a particular domain (e.g. Ethics of Technology) is also called *material* ethics ("material"

= "having contents"), whereas theoretical (or pure) ethics is also called *formal* ethics (i.e. general reasoning without reference to a particular material domain).

Point of departure

The various, often divergent or even conflicting forms and positions of practical ethics in the German discourse of the 1990s have a common point of departure, due to which they are sometimes dubbed the "New Ethics" – in contrast to the "old" or "classical" forms of ethics which they are attempting to leave behind.

A deeper understanding of these "New Ethics" cannot be achieved without some basic understandings of those "old" or "classical" ethics, of which the one by Immanuel Kant is a prominent and often cited example. Those classical ethics – in spite of all their varieties – are found to have two common characteristics:
  a) they are mainly individual ethics, and
  b) they are mainly focused on their present time.

The dilemma of those classical ethics in our modern age is that it is well possible to be a "good person" in terms of classical ethics, whilst at the

→ 1. Nuclear bomb: problem of man-made apocalypse

→ 2. Oil-pest: problem of nature, resources and economy

→ *3. Apparatus-medicine: problem of death in dignity*

→ *4. Georg Agricola (1494-1555): early critic of mining-induced pollution and deforestation*

same time our natural environment is degrading to an un-habitable pitch of filth due to the devastating effects of modern technology – for which no individual person can be identified as particularly "guilty" or responsible. For this reason, various thinkers of the "New Ethics" attempt to reach beyond the limits of classical ethics by

a) emphasising the importance of the "environment" or "nature" as trans-individual ethical categories, and

b) by emphasising the importance of the future as a (previously neglected) parameter of contemporary ethical considerations.

In summary we may say that Innovation in Technology has triggered Innovation in Ethics, because the "old" ethics was not sufficient any more to cope with the moral problems of a "new" world created by the advent of new technology.

Historically, the "New Ethics" came to public recognition in several distinguished waves: The first wave came in the 1940s/1950s under the impression of nuclear warfare (Figure 1). Here it is interesting to note that scientists, especially physicists, have initiated the ethical discourse before it was picked up by their colleagues in the faculties of philosophy.

The second wave of "New Ethics" came in the 1970s/1980s under the impression of the "oil crisis" and the experience of large-scale deforestation and extinction of species in a variety of ecological habitats throughout the world (Figure 2). The notorious "Star-Wars" project (Strategic Defence Initiative, SDI) under USA-president Ronald Reagan could also be mentioned as an issue of debate in that decade. *Politically*, this wave of "New Ethics" resulted in the foundation of the "Green" parties: first in Germany, then also in almost all other Western-European democracies.

A third – and most recent – wave of "New Ethics" came in the 1990s under the impression of rapid progress in

Biotechnology (genetic engineering, cloning, etc.) and Informatics (Internet, data-mining, artificial intelligence, the new media, digital warfare, etc.), which triggered all sorts of anxiety and concern about the potential advent of a new totalitarian "big brother" state. Also the progress of the modern apparatus-medicine (Figure 3) lead to controversial ethical discourses, especially about the definition of "death" and the right of the medical expert to switch off the heart-lung-apparatus attached to a terminally unconscious patient in vegetative state. New legislation was the result of the intense and widespread ethical discourse especially in this domain.

After those rather historical remarks it is now time to look at some of the approaches and positions of the "New Ethics" from a more systematic point of view.

Elisabeth Ströker: Ethics of responsibility

Ströker starts her reflections with the observation that the notion of "responsibility" has become more and more visible in the public discourse, thereby gradually replacing the older idea of moral "duty" [2]. Originally the notion of responsibility had been a *legal* one, necessary to distinguish between "innocent" and "guilty" in criminal cases. Only then, gradually, the notion of responsibility came out of the legal into the political and philosophical sphere. The term "Verantwortungs-Ethik" (ethics of responsibility) itself, however, had already been coined by *Max Weber* in his famous essay on politics as a profession (1919).

Ströker continues her reflections by hinting at a general tendency towards *moralisation* of science and technology, starting in the 1970s, in which certain schools and individuals from the social sciences launched a general assault against any engineering and natural sciences and demanded that those sciences shall eventually stand up to their social

"responsibility". The publication of "Das Prinzip Verantwortung" (The principle of responsibility) by *Hans Jonas* in 1979 marked a climax of that heated debate – a climax that came about 400 years after the German *Georg Bauer* (a.k.a. *Georgius Agricola*, 1494-1555) had delivered the first known document of environmental awareness in his famous *De Re Metallica Libri XII* in the middle of the 16th century (Figure 4), in which he had criticised the vast deforestation and water-pollution caused by the mining and iron industry.

However, as Ströker points out in the subsequent parts of her essay, the notion of responsibility itself was only vaguely defined and much in need of further clarification. The novelty of Ethics of Responsibility, in contrast to classical ethics, is seen by Ströker especially in four particular points:

a) It is acknowledged that the most difficult moral problems of our time are the result of the complex structures of collective behaviour rather than the result of individual activities: Therefore, Ethics of Responsibility must be a *Social Ethics* rather than an Individual Ethics.

b) Moreover, as already noticed by Max Weber, it is acknowledged that modern Technology (in contrast to primitive craftsmanship) has temporally far-reaching consequences not only for today but also for the future generations of mankind: Therefore, Ethics of Responsibility must be a *Future Ethics* rather than a Present Ethics.

c) The power of modern technology does not affect only humans, but in a much larger scale also the natural resources on which human living and survival depends: Therefore, Ethics of Responsibility must also be an *Ethics of Nature*, rather than a human-centered ethics.

d) Because of the various ambivalences as far as political power and scientific expertise behind any such far-reaching technological decisions are concerned, Ethics of Responsibility must also be an *Ethics of Democracy.*

However, as the philosopher does not fail to point out, the word "responsibility" has meanwhile become such a ready-to-be-used buzzword in the phraseology of political correctness that not much genuine ethical progress can be expected if the notion of responsibility is not clarified in a deeper philosophical discourse. This means that in every situation where "responsibility" is demanded, it must also be clarified

- *who* is responsible,
- *for what*, and
- *to whom.*

If any of these three *relata* in the responsibility relation remains unspecified, then all the politically correct talk about "responsibility" remains as ineffective as the cheapest Sunday sermon. Thus the matter of power (juridical or political) re-arises in the question what means of sanctions are available against those who have broken their responsibility. This is a very difficult issue if an unspecified "future" is regarded as an ethical instance (or institution) at which the considerations of responsibility are aimed, because "the future" does not have any possibility of imposing effective sanctions against irresponsible decision-makers of yesterday or today.

The practical weakness of Ströker's responsibility-ethics can be illustrated, for example, by South Africa's notorious electricity shortage, which had been predicted by experts already a decade ago. A leading politician of this country has recently – eventually – publicly acknowledged his "responsibility" for not having followed the advice provided by the experts. However, such kind of political "responsibility"-talk is only cheap: due

→ *5. Cooling-tower at Soweto power station: problem of risk-distribution.*

to his eminent social position, this politician will certainly be spared the uncomfortable experience of sitting in darkness, and no further fines or sanctions whatsoever will be imposed against him for his admitted failure a decade ago.

Carl F. Gethmann: Justice of distribution in situations of risk

Gethmann, like Ströker, is also concerned about the far-reaching consequences of modern technology, in contrast to the rather limited consequences of pre-modern craftsmanship [2]. Because far-reaching consequences are, by definitions, those ones that can hardly be predicted or foreseen, the philosopher addresses the problem of how our potentially risky, far-reaching technological decisions and activities could be rationally justified. In this problematic context, the *purpose* of a new ethics must be specified.

In contrast to morals (which simply tell people what to do without providing any further rational justification) it is the purpose of ethics to reason about the suitability and justifiability of such morals – in other words: Ethics is the discipline that finds suitable rules and *criteria* according to which the moral quality of our decisions and activities can be reasonably judged.

In the new historical perspective of far-reaching consequences of technological decisions, a new ethics has thus the purpose of finding rules and criteria for judging our acting and decision-making under the perspective of risk and uncertainty. This, however, requires further philosophical reflections about the notion of "action", including the related concepts of "purpose", "goal", "means", "goods" and so on, which provide our actions with intentional direction or with the means to achieve the goals. In this context it is often observed that even if people agree on some purpose or goals (for example: "the oceans and the air shall not be so much polluted any more"), the

means and tools to achieve such goals are often the cause of disharmony, or *conflict*. Consequently, it must be another purpose of the New Ethics to elaborate the general rules by means of which such conflicts can be solved.

Moreover, the notion of "risk" itself requires further considerations, too: Gethmann points out that unless we are sufficiently clear about what to regard as "risk" we cannot agree on how such a risk can be "justly distributed" over a society which has to collectively bear that risk.

Thinking again, for example, about South Africa's notorious power black-outs, the question arises *where to build* a much-needed though potentially dangerous new power plant: near a crowded slum, near an upper-class mansion estate, or into a hitherto untouched nature reserve?

Once the notion of risk is sufficiently understood, the question of what part of the society shall bear what part of the risk is a question of *distribution-justice*. Immediately the question arises: *what* means "justice", and *how* shall it be implemented. Does it mean *equal* distribution, or does it mean *appropriate* distribution? At this point of the discourse Gethmann emphasises that this question is actually already a question of particular morals – not one of ethics in its genuine sense any more. Nevertheless ethics must provide a rational background on which such morals can be formulated. One of the related ethical (meta)-maxims, which the philosopher suggests in this context, reads: *"Always act in such a way, that the bearers of the potential risk also participate in its potential benefits!"*

In the example of above we can apply Gethmann's maxim: If a potentially dangerous new power plant is built near a slum, then the poor slum inhabitants, as bearers of the risk, must also enjoy the benefits of the new electricity being produced. The relevance of such ethics for South Africa is evident, as several – possibly nuclear – power stations must soon

be scheduled for construction in order to overcome the notorious electricity shortage (Figure 5).

Christoph Hubig: Value conflicts in technology assessment

Hubig starts with the observation that philosophy is currently "in demand" for providing "orientation" in a disoriented age, whereby this disorientation is largely due to the rapid, often technology-induced, changes to the fabric of a modern society [2].

Indeed we could say that *modernity* is a state of the social *mind* rather than a particular state of technology, a state of mind in which the previously unreflected, unproblematic, quasi "natural" relationship of the individual being with its own cultural traditions has become brittle and problematic, with deep impacts on the individual's concept of self-identity, a state of mind in which uncertainty and doubt have crept into every crevice of human existence, undermining everything that used to be "self-understanding" in a pre-modern context. For example, medieval man *had* the "technology" (of his age and time): medieval man had windmills, ships, catapults, etc., but he had – as far as we know – no doubts about his role and place in a universe which was believed to be meaningful and well-ordered by god himself.

Consequently a general "loss of values" is often perceived and bemoaned when a society is in a transition process to modernity or post-modernity – as it can also be observed in nowadays South Africa with its various parallel societies in various phases of development. In such problematic situations, as Hubig points out, ethics faces the theoretical and practical dilemma that
   a) *Formal ethics*, with its high level of abstraction and generality, usually fails to provide the demanded "orientation" for a disoriented society in transition, whereas
   b) *Material ethics*, with its proximity to concrete and

applicable morals, is always under the suspicion of particularity if not even bluntest dogmatism.

Like the word "philosophy" (especially in its English use – see Introduction), also the word "value" is currently in high-frequency-use wherever "politically correct" statements are uttered. Every larger business company and every governmental institution (including universities) nowadays publicly pride themselves of "having values" or "being value-driven"; however it is rarely explained *what* these "values" really are. It almost seems as if the sheer utterance of "being value-driven" has already become some sort of (ersatz) value in itself. Thus: Not only values themselves are needed in disoriented times (of which the above-mentioned inflationary "value"-gibberish is merely a symptom), but also a sober philosophical *analysis of what values really are*, and in which different categories they come along. This is especially true since modern man has more or less forgotten the classical ethical distinction of *virtues, duties, norms* and *goods* which are now all (somehow) subsumed under a fuzzy "value" idea.

Such a theory of values is the concern of Hubig. For this purpose he distinguishes object values, which tend to be regarded as more or less self-understanding "values by themselves" (especially in traditional, pre-modern interpretations) from *value objects*, which are entities that can possibly be of value, in case that any value gets attached to them somehow. This material notion of value is strongly related (though not identical) to another type of *method* values, which are actually criteria, or units of measure, according to which some good under consideration can be assessed.

As far as the often bemoaned "Wertewandel" (change of values) in a technological society is concerned, Hubig distinguishes an "*ethical*" from a "*technocratic*" value model. In a

technocratic value model, "values" are in fact either *purposes*, or the *means* with which such purposes could be achieved. For example, technocratic purpose-values could be stated as: to "become a space-faring nation by the year 2030", or to "be the largest engineering faculty in the country". Hubig points out that such kind of technocratic values are mostly defined *dogmatically* – regardless of whether the dogma is declared by a small elite, or whether it is democratically endorsed. In ethical value models, on the contrary, values are *not* to be found *within* such a hierarchy of means and purposes, but rather *beyond* or "next to" it, providing external guidelines for a critical judgement of our technocratic value system.

Last but not least, a philosophical theory of value must not ignore the *intrinsic conflicts* which usually occur in any non-trivial collection of values in which each individual value, beheld on its own, does not seem to be particularly problematic. To develop a more elaborate theory of values and value conflicts, the philosopher categorises values into different classes, such as: *Basis Values, Technical Option Values, Cultural Identity Values*, and so forth. Immediately the question arises how to decide in case of "clashes" between various values from such different categories. As we have already seen above, it cannot be the task of ethics to actually solve a value conflict in a concrete, particular situation of a society in transition. Again, ethics has to provide a *framework of rational guidelines* and general maxims, under which an actually chosen value preference can be reasonably justified.

Hubig's philosophy of values might also be interesting for nowadays South Africa, and, again, our notorious electricity crisis can motivate and illustrate such a discourse. "Values" at stake in our recent power shortage scenario are, for example: "economic growth", "employment", "safety and security", "urban comfort", etc., on the one hand (all depending on the

provision of electricity), as well as "clean air", "green forests", a "simple and natural way of life", etc., on the other hand.

Kurt Bayertz: Moral and ethical consequences of the brain-death definition

The philosopher Bayertz starts his considerations with the problematic fact that our latest medical technology is able to keep hospital patients, who are in an irreversible coma state, in a vegetative state for an almost arbitrary duration of time [2]. According to the traditional heart-definition of death, those patients would have to be regarded as "alive", such that the termination of the heart-lung-apparatus, to which those patients are attached, would be equivalent to homicide. With respect to the pointlessness of such medical "treatment" for irreversibly unconscious patients, it has been suggested to replace the traditional heart-death definition by a new brain-death definition, which is meanwhile globally accepted as a valid definition of the notion of "death".

Bayertz states that this re-definition of death, which only came about under the impression of technological progress, is not only a technical issue from the medical perspective, but also an issue of high philosophical relevance. By the way: the definition-of-death problem, related to the fading of a human life, has its analogue counterpart in the definition-of-life problem in the pro/contra abortion debate, related to the beginning of a human life. Hinting at considerations found in *Summa Technologiae* (by *Stanislaw Lem*, 1964) about the *dependency of morals on physics*, Bayertz analyses four ethical tendencies in our present age, to which the above-mentioned brain-death definition is only one example. These four tendencies, according to Bayertz, are:

   a) *Denaturalisation* of morals,
   b) *Functionalisation* of morals,
   c) *Homogenisation* of morals, and
   d) *Proceduralisation* of morals.

In the pre-modern age, death seemed to be a "natural event" like an earthquake or a volcano eruption. Thus, in pre-modern cultures there was no need for any explicit definition of death: the observation of the natural fact was entirely sufficient. Nowadays, however, the *discrepancy of fact and definition* poses a difficult ethical problem. Whereas death, considered as natural fact like an earthquake, does not impose any particular responsibilities on us (except of the traditional "thou shall not kill"), the new "death by definition" forces us into *new types of decisions* for which responsibility must explicitly be assumed. Thus, the naïve "natural basis" of morality is getting "thinner", and it is in this sense that Bayertz speaks about the "denaturalisation" of morals in our modern times.

Another development is relevant in this context. With the advent of "life"-prolonging medical machinery, a "not-yet-dead" (or, depending on the chosen definition: "dead") *person becomes an asset* as far as organ reuse and transplantation is concerned. Also, this is a fundamental difference to pre-modern cultures, in which dead persons had never been regarded as technically exploitable assets. In combination with this new development, the brain-death *definition looses its purely descriptive character* and becomes inevitably goal-driven and purposeful. Consequently, without a suitable brain-death definition we could never determine the moment from which onwards it would be allowed to cut the living heart out of the body of a brain-dead patient for the sake of the life of another person whose brain is alive but whose heart is dead. Thus, in contrast to the pre-modern age, our new ethics has to be consciously and deliberately "tailored" to "fit" our new purposes and new abilities such as heart transplantation. It is in this sense that the philosopher speaks about the above-mentioned "functionalisation" of morals in the modern age. Again, we can clearly see in this example how ethical innovation follows in the trail of technical innovation.

Once this new kind of functionalisation of morals has started (e.g. in ethics of medicine) it is likely to spread out from one application domain to another one. This is usually justified by analogy: If we have modified our ethics in this domain in such and such a way, then, for the sake of *consistency*, we should also modify our ethics in a similar way in other domains. The abortion-debate has already been mentioned above as such an example of analogy. Thus, for the sake of being logical and consistent – a philosophical requirement typically imposed in and by rationalist Western societies – we cannot "contain" any ethical innovation, which we have started, within a limited domain of application. It is in this sense that Bayertz speaks about "homogenisation" of morals in our times.

Moreover, we can also observe a tendency towards *procedural concepts*, in contrast to classical "essential" concepts, in contemporary ethics. Especially in the example of the brain-death definition it is interesting to note that this definition did not (and could not) grow "organically" through many centuries – it was the outcome of well-regulated and tightly managed committee meetings which were purposefully organised towards the explicit formulation of an acceptable brain-death definition. In Germany, the now legally acknowledged "criteria of brain-death" are the result of a purposefully managed *norm generation process* which took place for about one decade before the norms were eventually enshrined in positive law. It is equally worth mentioning that the need for "future versions" of this norm was already explicitly stated in a preamble when the "first version" of the according norm was released. Such a deliberate delimitation and *explicit* temporal "versioning" of ethical norms, already with hindsight to future evolution, would have been unthinkable in the pre-modern age in which valid norms were considered as timeless and eternal; (recall that especially *Platon* did not attribute

any "truth" to anything subject to the change of time). Thus, Bayertz states: *Progress in science and technology induces a permanent pressure towards permanent re-definitions of valid moral norms and ethical criteria.* Once the first brain-death definition was released, we cannot reasonably expect any end in the chain of re- and re-re-definitions in the future.

Further it is important to note how not only the genealogy (generation process) of the brain-death definition, but also its very *contents* is strongly characterised by procedural elements: the definition states *what* brain-death *is* by *stipulating* the *procedure* of its *diagnosis* in minute detail – who has to do what and when before the diagnosis "brain-death" may be validly declared and underwritten. Herein we find another fundamental difference to classical moral norms (e.g.: "help the poor!") which tell us *what* to do *but not how* to do it. Thus, in modern "procedural" ethics, as Bayertz puts it, the previously separate *applicability conditions* of (or to) a norm become an intrinsic (respectively inherent) *part of the norm itself*, such that the classical separation between ethical *justification* and practical *application* of a moral norm gets increasingly blurred.

Therefore, the philosopher concludes, we do not only need object ethics to reflect upon the consequences of innovation in technology: we also need *meta-ethics* to reflect upon the implications of our purposefully innovative "designer-ethics" that follow the trail of technological innovation.

Jan P. Beckmann: Benefits and limitations of engineer's codices

According to Kant, there are basically two philosophical questions: "*what can we know?*" and: "*what shall/may we do?*". For us engineers, the latter question can (and should) be refined to the question: "*what shall/may the engineer do?*" (in his or her capacity as engineer – apart from being a citizen of the society or a member

of humankind). To this question, two types of wrong answers in the form of professional codices can be given:

a) answers, respectively engineer's codices, that remain "sub-standard" by demanding little more than what the engineer is anyway supposed to do in his capacity as a member of the society or humankind in the wider sense, and

b) answers, respectively engineer's codices, that demand too much by being overly general and not providing sufficiently concrete guidelines with sufficient practical relevance.

In this context, Beckmann analyses examples for both types of engineer's codices [2]. For example, the 1914 ethic codex of the American Society of Civil Engineers (ASCE) mentions little more than that the engineer should be honest, should not be disloyal towards his clients or superiors, should not engage in unfair competition, and should not bring the dignity of his profession into disrepute. It is easy to see that this old engineering codex is not particularly engineering-specific: it would equally apply to merchants, to hairdressers or to any other professional guild. It is thus an example of a "sub-standard" ethical codex.

On the other hand, the philosopher analyses the highly idealistic German VDI (*Verein Deutscher Ingenieure*) codex of 1950, declared with hindsight to the experiences of WW2 and the Holocaust: This VDI codex "correctly" mentions idealistic values such as "human dignity", "human rights", "service to the community", "humbleness with hindsight to God" (etc.) throughout the paragraphs of its document, but it remains insufficient in several aspects:

a) It remains mute about the concrete *dangers* which can arise from technology.

b) It does not provide any concrete (i.e. procedural) hints about what to do and what

not to do in order to "serve the community" (etc.) – especially as far as the (not mentioned) dangers of engineering and technology are concerned.

c) Moreover, the VDI codex of 1950 remains purely *individualistic* and does not mention any corporate responsibilities as far as the institutions (companies and universities) are concerned into which the individual engineer is embedded.

In other words: The prima facie idealistic and "valuable" VDI codex of 1950, despite of its post-WW2 origin, was by and large entrapped in the philosophical leftovers of the pre-industrial age. It was thus as naïve – though in another way – as the previously mentioned, purely pragmatist ASCE codex of 1914.

Since those two extreme examples of engineer's codices, as Beckmann explains further, the ethical awareness of corporate engineering has left that state of naivety and has become much more professional. Consequently, more recent examples of engineering codices are considerably *stricter* and more "responsible" than the simple American engineering-business codex of 1914, but on the other hand also considerably *more critical and practical* than overly abstract and highly idealistic German codex of 1950.

Since not only the profession of engineering but also the profession of philosophical ethics has made considerable progress since then, modern engineering codices are no longer "home-made" by philosophically naïve engineers, but mostly in cooperation with professional ethicists. The result is usually a much better balance – or, in the terminology of above: a much better *applied ethics* – in the middle ground between a simplistic collection of guild-rules on the one hand, and non-specific theoretical ethics on the other hand.

Beckmann concludes that the notorious problems of humankind will *neither* be solved purely technically (respectively materialistically) *nor* purely ethically (respectively idealistically), but only in a combined approach in which technology *and* ethics are mutually aware of each other's strengths and weaknesses. ❸

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