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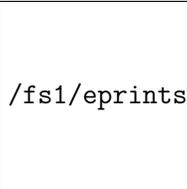
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Cyberneticists at war and peace: wrestling with ethical dilemmas of information

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Introduction

The study of information and its values has long been deeply tied up with the field of cybernetics, which studies informational processes of feedback occurring in a range of social, artificial and physical systems. Although sometimes derided as a mechanistic and anti-humanising discipline, cybernetics has always been an applied field, strongly tied to real-world phenomena. Many of its practitioners have been strongly aware of its power and potential for harm as well as good.

In particular, the origins of much of modern cybernetics during and shortly after the Second World War have forced a number of its practitioners actively to examine the military applications of their work. In this paper, we will consider four historical snapshots of cyberneticists wrestling with the ethical implications of their work, from the 1940s to the 1970s, in the United States and in Germany.

Cybernetics in general, and automatic control in particular, is a discipline that depends on the capture, transmission and processing of information. It is remarkable that after the Second World War so many engineers found the ethical and philosophical issues that had arisen so important. This paper will examine some of these.

Automatic control

The Second World War saw enormous advances in automatic control, in particular for anti-aircraft weapons. After the war, many publications appeared presenting the new technology both to engineers and the general public. A particularly fascinating book in the latter category is a Scientific American publication entitled, simply, *Automatic Control*. This featured chapters by some of the world experts of the time, and it is interesting to note that three out of the twelve chapters were devoted specifically to

the concept of information. A number of the authors queried explicitly the benefits of developments in automation, raising a number of important ethical questions. Ernest Nagel, for example, wrote:

> The crucial question is not whether control of social transactions will be further centralized. The crucial question is whether, despite such a movement, freedom of inquiry, freedom of communication and freedom to participate actively in decisions affecting our lives will be preserved and enlarged. It is good to be jealous of these rights, they are the substance of a liberal society. The probable expansion of automatic technology does raise serious problems concerning them (p.9).

Norbert Wiener, in his classic book published some years earlier [9], was even more concerned by what the future of automation might bring:

> the modern industrial revolution is [...] bound to devalue the human brain at least in its simpler and more routine decisions. Of course, just as the skilled carpenter, the skilled mechanic, the skilled dressmaker have in some degree survived the first industrial revolution, so the skilled scientist and the skilled administrator may survive the second. However, taking the second revolution as accomplished, the average human of mediocre attainments or less has nothing to sell that it is worth anyone's money to buy.

Wiener's anti-military stance

Norbert Wiener's work on automatic control in the Second World War formed one of the key foundations of his formulation of the concept of cybernetics. As he wrote late in his life, and was published posthumously, "in World War II several ideas came to my mind which I thought might be of military use, for we were all impressed by the catastrophe and were certain that we would be involved in it sooner or later" [10, p.31]. In particular, his work involved predicting the positions of combat aeroplanes to enable effective anti-aircraft weapons, although it is striking that his statistical method was "not used as such in any military apparatus actually adopted [although] it was taken over into the general volume of theories employed by people designing such apparatus" [10, p.32].

However, his stance changed significantly with the development of the atomic bomb and its potential for mass destruction. Just two years after the end of the war, he wrote a widely-read popular article which argued that "the experience of the scientists who have worked on the atomic bomb has indicated that in any investigation of this kind the scientist ends by putting unlimited powers in the hands of the people whom he is least inclined to trust with their use" [8]. He subsequently refused to take any military funding for his research work, despite the growing postwar importance of the US Department of Defense as a primary funding source even for pure research. This stance led to Wiener's investigation by the FBI during the political purges of Joseph McCarthy in the early 1950s.

Bynum has argued [1] that Wiener's stance was explicitly ethical, that he "considered flourishing as a person to be the overall purpose of life—flourishing in the sense of realizing one's full human potential in variety and possibility of choice and action" [1, p.427] and that in the process of doing so, he laid the foundations for later work on information ethics. Floridi [2], the most prominent contemporary analyst of information ethics, has also given credit for this ethical stance to Wiener.

A German cybernetics

Hermann Schmidt (1894-1968) was a physicist by training, gaining a first degree and a PhD from the University of Göttingen. He began to realise the generic nature of control engineering and its applicability to non-technical areas, and in 1939 he was asked to chair a new control engineering committee of the VDI *Verein Deutscher Ingenieure*. Under his leadership the committee took a broad approach, working with electrical engineers, physiologists and others, promulgating these ideas in lectures and publications. He was appointed to probably the first full chair in control engineering in Berlin towards the end of the war.

In this paper, however, we wish to discuss his post-war interests in philosophy and ethics. Schmidt saw control engineering as a major part of the way that technology would solve many of society's ills. Influenced by the philosopher Arnold Gehlen[1], who viewed human beings as having inherent flaws that could be overcome only by means of social and cultural developments and institutions, Schmidt viewed technology as playing a vital rôle in the perfection of human society. For Schmidt, the engineer must appreciate that:

> his technological world is no wall separating him from nature, but a bridge upon which nature and intellect [*Geist*] meet, a world in which nature and intellect have joined forces through the work of our hands – a world, like that of language, that we have set between us and nature through our own creative power, and a world that is thus much closer to us than unspoiled nature [5, p.88].

Heinz von Foerster and the funding of the Biological Computing Laboratory

Our last story relates to a slightly later historical period. Much of the core work around cybernetics in the 1960s and 1970s in the United States was carried out at the Biological Computing Laboratory (BCL) at the University of Illinois, under the leadership of Heinz von Foerster. It was at the BCL that the approach described by von Foerster as second-order cybernetics took shape; and a number of those still active in the American Society for Cybernetics had a close connection with the BCL.

Von Foerster's interests were in epistemology and neuropsychology (along with his early research in physics), and he conducted no military research. As an Austrian of part-Jewish heritage, he rather remarkably managed to survive the Second World War by working in Berlin "on obscure scientific projects considered too important to draft him into the German army yet carefully avoiding any usable result" [4, p.554]. He continued this approach when he moved to the United States after the war.

However, as Umpleby [7] relates, the funding of the BCL was closely tied to that of the US military. During the 1950s and 1960s, the US Department of Defense (DoD) unproblematically funded non-military basic research into a range of scientific topics, including the work of the BCL. Public protest around the Vietnam War, however, led to the passing in 1970 of legislation (the Mansfield Amendment) that the DoD could only fund specifically military work. This was created by a liberal Democrat who sought to reduce the influence of the military on American universities – but it had the side-effect of cutting funding for groups such as the BCL. As Von Foerster was unwilling to link his research to military work (unlike researchers in artificial intelligence), the main centre of US cybernetics research was forced to close in 1976.

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[1] For an introduction to Gehlen's philosophical thought see *Man: his Nature and Place in the World* (1940, thoroughly revised in 1950). Gehlen was following an earlier German tradition dating back at least to Kapp (1877) of viewing technologies as 'projections' of human organs, and his approach influenced later German philosophers including Habermas [3].

Conclusions

The accounts of cyberneticists wrestling with ethical dilemmas, especially around the military implications of their work, have been told here in a historical vein, rather than trying to draw conclusions for present ethical issues. We summarise here a few of the key conclusions:

1. Cybernetics has never been an ethically-neutral disciple. Ethical considerations have been present from the start in the work of cyberneticists, drawn from a number of source fields (including philosophy, mathematics, physics, engineering and neuroscience) and from several different countries. They are also independent of the political system involved – ethical issues in cybernetics are as relevant to a liberal democracy (such as the United States) as it is to a dictatorship (such as Nazi Germany).

2. Likewise, we would argue that there is no such thing as ethically neutral information. The cases above show that the gathering, analysis and distribution of information is inherently tied up with ethical issues. An attempt to ignore the ethical concerns all too often leads to the privileging of those in positions of power.

3. Although we have drawn our examples in this paper from concerns around military applications, the same concerns can readily be applied to information issues in a range of fields. A clear example of widespread current concern is that of surveillance by governments and corporations upon individuals, but many other areas apply.

It is important to acknowledge that there is now a considerable amount of work on information ethics, both in terms of theoretical frameworks and in application to specific issues. In its current form, Floridi [2] suggests information ethics dates back to the 1980s, although it has a number of antecedents, including the work of Wiener. We have shown in this paper that at least in the area of military application, cyberneticists have long been concerned with ethical issues.

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