Chapter 58
Ethics Is Not Enough:
From Professionalism to the Political Philosophy of Engineering

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ABSTRACT

This chapter argues for understanding engineering ethics in terms of three principles—but then going beyond ethics to political theory. A simplified prefatory comparison between engineering and science points to the importance of ethics in engineering. Section 1 provides a historico-philosophical overview of engineering ethics in the United States, on the premise that American experience can be generally illuminating. The narrative traces a trajectory of commitments from company loyalty to public responsibility, with the public responsibility promoting public engagement. Section 2 considers three influential American cases that together suggest a duty to public disclosure. Section 3 broadens the analysis through selective reviews of engineering ethics profiles in Germany, The Netherlands, Japan, Chile, and in transnational professional engineering organizations, on the basis of which is articulated a duty not only to avoid harm but also to do good. Section 4, a critical reflection on engineering in the intensive form of research and design, posits a synthesis of the principles of participation, disclosure, and beneficence into a duty plus respicare, to take more into account. A concluding section nevertheless suggests the inadequacy of limiting engineering ethics to ethics. Ethics in engineering like ethics generally implicates political theory. Ethics in the absence of politics demands unrealistic personal heroism; political theory without any foundation in ethics promotes tyranny.

INTRODUCTION

Humans have since antiquity undertaken projects that are now often interpreted as works of engineering, but the first engineers as such did not appear before the Renaissance. In the centuries since there has been increasing recognition that the powers possessed by modern engineers as a result of their expertise call forth special moral obligations or responsibilities. Critical reflection on such responsibilities is known as engineering ethics, and the associated efforts to articulate and apply engineering responsibilities are topics of ongoing discussion. Insofar as people in

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the contemporary world have become users of engineered artifacts and live out their lives in engineered worlds, there is a sense in which they too have new responsibilities, so that engineering ethics is for everyone. What follows is an effort to review the historico-philosophical development of engineering ethics as this discourse emerged from the United States in a way that can inform not only professional engineers but also all reflective consumers, users, and citizens in a technoscientific world. In the end, however, ethics is not enough. What is called for is a political philosophy of engineering.

PROLOGUE: IN PLACE OF DEFINITION

To focus on engineering as such requires a preliminary definition. Yet clear and distinct definitions are not only difficult to come by, they may also precipitously narrow reflection. Mindful of this danger, but cognizant that understanding advances by comparison and contrast, it is useful to begin with some provisional reflections on relationships between engineering and its near neighbor science.

"Scientists discover the world that exists; engineers create the world that never was." This statement, commonly attributed to aeronautical engineer Theodore von Kármán,[1] offers a soft definition of engineering as creative of new things. Although obviously true to some extent, the statement is too general; craft, the arts, and revolutionary politics all create things that did not previously exist. But taking off from von Kármán's analysis of relationships between mathematics (as a science) and engineering,[2] science can be described as a disinterested pursuit of knowledge or truth especially manifested in research that leads to publication. Unlike engineering research, there is no explicit commitment to practical value—although science is often thought to have indirect or spin-off value for engineering, economic development, and other practical activities. By contrast, engineering is explicitly oriented toward the design and creation of physical artifacts, which, in capitalist society, are often patented or protected by trade secrecy laws. In popular thought, the scientist is imagined as university based, whereas the typical engineer owns or works for a business firm or the government. Compare, for example, the image of Albert Einstein with those of Nikola Tesla and Werner von Braun (James, 2010). Explicit codes of conduct are neither as old nor as diversely articulated in science as in engineering,[3] with the most widely discussed ethical conduct issues in science being fabrication, falsification, and plagiarism in the reporting of research, whereas with engineering they are the sign and production of dangerous (unsafe) structures, processes, or consumer goods and whistle blowing. Such contrasts are summarized in the following table:

However simplified or incomplete, such comparisons provide a preliminary orientation for reflecting on engineering ethics. Following

Table 1. Science vs. egineering

Ethics *Related to:*	**In Science**	**In Engineering**
Goals	Knowledge or truth and- publication	Practical effectiveness and patents
Ethics Codes	More implicit	More explicit
Institutional Base	University or government-corporate research centers	Development or manufacturing divisions of business firms
Public Issues	Research fraud or misconduct	Unsafe designs and whistle blowing