INTRODUCTION

Ideas about the science-technology relationship have gone through an important evolution over the last decades. In the 1950s and 1960s the dominant model portrayed technology as applied science. This model assumed a hierarchical, almost parasitical relationship between science and technology. It assumed that technological development followed and was dependant upon paths of scientific change, whereas science followed its own, internal line of development, largely independent of technology. By the 1970s, the limitations and deficiencies of the applied science model had become increasingly apparent. Through the efforts of Edwin Layton and others, an alternative model was developed which has since gained wide acceptance. This model portrays science and technology as two distinct, but interacting communities, each with its own traditions, goals, and values, and its own body of knowledge and technique. The two communities borrow from one another, but on their own terms, generally transforming the borrowed knowledge to adapt it to different ends. In Layton’s words:

This model [of technology as applied science] ... assumes that science and technology represent different functions performed by the same community. But a fundamental fact is that they constitute different communities, each with its own goals and systems of values. They are, of course, similar in that both deal with matter and energy. But these similarities should not be overstated. Each community has its own social controls – such as its reward system – which tend to focus the work of each on its own needs. These needs determine not only the objects of concern, but the “language” in which they are discussed. These needs may overlap; but it would be surprising if this were a very frequent occurrence. One would expect that in the normal case science would beget more science, and technology would lead to further technology.¹

Delineating the boundaries and distinctions between science and technology in this way has had important historiographical benefits. It has had the benefit that technology is analyzed on its own terms rather than as a subordinate adjunct to science. It has also been instrumental in

P. Kroes and M. Bakker (eds.), Technological Development and Science in the Industrial Age, 177–204.
opening up a new domain of research that focuses on the nature and varieties of technological knowledge in relation both to scientific knowledge and to innovation. This research has shown that technology – even advanced technology – is not necessarily linked hierarchically to science, and further, that technology has a cognitive dimension and an intellectual history that are not merely subsets of those of science.²

Nevertheless, it remains true that the social and cognitive realms of science and technology have never been entirely distinct, and in fact seem to have become increasingly intermeshed and interdependent over the course of the last two centuries. And despite its other advantages, the “two communities” model, as it has generally been interpreted, does not fully allow for this phenomenon. I believe that to get new insight into the nature and evolution of the intermeshing of science and technology, it is helpful to adopt a model that views science and technology not as distinct communities that intermittently interact, but rather as overlapping realms of social activity.³ The model I propose assumes overlap in the communities of science and technology as well as in organizational structures, bodies of knowledge, traditions of practice, and value and reward systems. The two realms are distinguished in this model by the differences in their principal social activities: while the primary activities of science are the creation, screening, codification, and dissemination of official public knowledge about the natural world, technology is first of all oriented toward the production and maintenance of society’s material infrastructure.⁴

Modelling science and technology as overlapping worlds has several advantages.⁵ First, by calling attention to the areas of intermeshing of science and technology, this model encourages us to examine more carefully how these domains are linked. Second, the model assumes that the area of intersection between the worlds of science and technology is multi-dimensional. As suggested above, it may be defined in terms of intersecting organizational structures, bodies of knowledge, traditions of practice, communities of practitioners, etc.. Each dimension suggests a distinct line of inquiry or focus for research. A third advantage of the model is that it is consistent with a dynamic view of the relationship between science and technology. It assumes that the nature and extent of their intersection is fluid and changing, varying according to time, place, and discipline, and dependant upon historical and contextual circumstances. In other words, the nature and extent of this intersection is assumed to be socially constructed. Finally, this model allows for the