



# AN INTRODUCTION TO PHILOSOPHY OF TECHNOLOGY

Chen Changshu

Translated by Chen Fan  
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## Translators' Preface

Chen Changshu, the author of this book, was my supervisor when I studied for my master's and doctoral degrees, during which I was deeply impressed by his scholarship, effective research methodology and considerable erudition in his field. During our thirty-year cooperation in research after my graduation, I witnessed how he pioneered the study of philosophy of technology and thus established it as a separate discipline in China.

Philosophy of technology has a history of more than one hundred years in the west. By contrast, it is a young discipline in China, whose birth was symbolized by Chen's article "Unity and Divergences of Science and Technology" in 1982, in which he pointed out the essential differences between technology and science, advocated a clear demarcation between the two and opened up the path for philosophical studies of technology.

Chen's philosophical research lasted for nearly half a century. He began to consider writing a book on philosophy of technology in the 1980's. After more than ten years in the making, *An Introduction to Philosophy of Technology* was published in 1999 as the first monograph whose title contained the term "philosophy of technology" in China. In my view, this book can be viewed as the crystallization of Chen's long-time exploration and contemplation of technology from the philosophical perspective.

Based on a comprehensive summary of Chinese philosophical studies of technology in the 20th century, this book possesses

a logical structure that demonstrates the author's distinctive theoretical and methodological approaches, which are later adopted by the majority of Chinese researchers in the field. In view of the historical development of philosophy of technology in China, the book is undoubtedly a milestone in the research of the discipline.

The book is divided into three parts: The first part, composed of the first and the second chapters and focusing on the basic questions and the logical starting point of the discipline, offers an elaboration of the research object and a brief history of philosophy of technology. The author takes the relationship between man and nature as the central issue of philosophy of technology. To him, the task of the discipline is to investigate the workings of human reconfiguration of nature, which means that human reconfigured nature is the main object of the discipline. The history of technological philosophy indicates consensus can be reached only if technology is analyzed seriously as a whole. The German scholar Karp, founder of philosophy of technology, considered technological means as an extension of human capabilities, believing that tools and machines were projections of nature and improvements upon these capabilities. The relationship between man and nature in the process of human reconfiguration of nature holds the key to a correct understanding of the workings of technological means. Human reconfigured nature thus is the core concept in the study in philosophy of technology. Marx's philosophy of technology, which put more emphasis on the transformation of the world and the role of technological means in shaping the dynamic relationship between man and nature by elaborating the externalization and objectification of human capabilities with the help of technological means, serves as a justifiable starting point of Chen's exploration of philosophy of technology.

Part two, running from the third to the eighth chapter, starts with the differentiation of humans from nature and covers characteristics of various technological fields and systems. Humans are related to nature through two kinds of activities: one is scientific activity intended to unravel mysteries of nature and the other is technological activity intended to reconfigure nature. In this way, the abstract concept of human reconfigured nature is presented as various technological activities from the perspective of philosophy of technology.

The third part, from the ninth to the last chapter, situates technology in human-

social relations based on an analysis of the interactions between man and nature. Here, human society is viewed as reconfigured nature in its broad sense, or socialized nature as some scholars call it. In viewing human society in this manner, technology is considered as interacting with economy, politics, culture and human life, and thus it is logically revealed as part of the social system. On the one hand, technology exerts powerful effects on society; on the other hand, it is also restricted by various social factors. Beginning with an elaboration of the duality of technology, the book adopts a Marxist perspective to analyze the application and consequences of technology as a social phenomenon. Finally, it offers a philosophical reflection on the future of technology from the perspective of the coordinated development of nature and human society.

Just as the evolution of productive implements from simple stone tools to machines and complicated technological systems, human activities to reconfigure nature progress from simplicity to complexity, which is captured in the book as a process from the abstract to the concrete embedded in the interactions between man and nature. The author discusses technology in concrete applications in a critical and logical manner, and as such his elaboration is made clear and convincing. In addition, it enables him to philosophize on complicated matters and to present these as a whole.

The author is considered as a pioneer in technology studies and founder of philosophy of technology in China. *An Introduction to Philosophy of Technology* provides a paradigm for philosophical research of technology for Chinese scholars, representing Chinese characteristics of studies in the area. The distinctive features of this book, listed as follows, are of significant value and help for foreign readers to understand the historical course and current situation of research in philosophy of technology in China.

First, the book begins with ten significant issues of philosophy of technology, through which the author demonstrates that there indeed exist philosophical problems in technology worthy of study. Actually, failure to provide appropriate answers to these issues would undermine the foundation of philosophy of technology as a separate discipline. For example, without a clear understanding of the essential characteristics and requirements of technical activities, it would be difficult to account for differences between technological and scientific activities and the preconditions for the establishment of philosophy of technology as a

separate discipline would thus be destroyed; without an unambiguous definition of technology, it would be difficult to determine the relative importance of the material and the human factors; without serious inquiry into the social value of technology and engineers' social responsibilities, philosophy of technology would be deprived of its impetus to progress. These seemingly simple issues may be considered trivial by some. However, their exploration involves painstaking effort and can provide a solid foundation of a young discipline. As is always the case, the true, the beautiful and the good may lie in the seeming simplicity.

Second, comparison and differentiation is a powerful method for academic research. Thus, its systematic study in China by the author of the book is most effectively pursued through comparative analysis of science and technology. Chen always stressed clarification of the differences between technology and science, believing that applied research should receive as much attention as basic research. Northeastern University in Shenyang, where the author was based for much of his academic career, has a long history of engineering excellence, which benefited the author's understanding of modern technology and its application. Teaching and researching at a university with a strong commitment to the applied sciences as well as basic research, provided the author an advantage few other scholars had in revealing the essence of technological activities, laying the theoretical foundations of philosophy of technology and providing a scientific methodology for the discipline in China. In this book, the author makes a thorough comparison between technology and science by exploring ten key issues from the perspective of engineering philosophy of technology. As a philosopher, he asserts that we should not overemphasize the guiding role of science in the development of technology. Instead, modern science and technology interact with each other.

Third, *An Introduction to Philosophy of Technology* represents Chen's extensive understanding of his field both at home and abroad. In the 1980's, while he was pioneering the philosophical research of technology in China, he made efforts to learn about research in Japan, hoping to theorize his understanding of practical issues. However, finding Japanese studies at the time lacking in philosophical depth, he turned to Germany, the United States and other Western nations in the 1990's, introducing technology studies from these countries to China. The author then worked toward their assimilation into Chinese thinking,

finally innovating them so that resultant theories could be adapted to Chinese situations to meet the requirements of the opening and reform happening at the time as well as progress in the discipline. What he aimed at was to creatively adapt theories to deal with Chinese problems.

Fourth, *An Introduction to Philosophy of Technology* applies Marxist methodology to analyze technological practice, which helps to form the theoretical system of philosophy of technology with Chinese characteristics. Because of this, it has gained a large readership in science and technology-related Master's and doctoral programs all over China. In these programs, philosophy of technology is a required course, and Professor Chen is well known as founder of the study of philosophy of technology in China, and for his views and influence in the field.

Finally, *An Introduction to Philosophy of Technology* sets up principles that research in philosophy of technology can be guided by. At the Eighth National Annual Conference of Philosophy of Technology held in 1999 Chen reiterated three propositions concerning the development of philosophy of technology in China. The first is that if the discipline does not have its own distinctive features, it will not be able to claim a position among academic disciplines; second is that if the discipline does not emphasize research of concrete technologies, it will not be able to conduct research at a high level; third is that if the discipline does not have practical application, it will not be able to enjoy fruitful development. Now we may add that if the discipline does not communicate with outside academic communities, it will not make progress.

To sum up, *An Introduction to Philosophy of Technology* is profound in its thoughts, enabling it to guide Chinese philosophical research of technology in the 21st century. I am sure it will continue to exert great influence on the development of philosophy in China and will be valuable also for readers from other nations in understanding philosophy of technology and philosophy in China.

Chen Fan  
Shenyang, China  
January, 2015



## Preface to the Second Edition

“The long period from Descartes to Hegel and from Hobbes to Feuerbach, what has pushed philosophers forward is not the sheer power of thought, just as they imagined. On the contrary, it is natural science and industry which has become powerful and is making increasingly rapid progress that has pushed them forward.”

—Friedrich Engels

In the west, philosophy of technology as an independent discipline already has a history of more than one hundred years. By contrast, its history is less than thirty years in China. Temporally, it was in 1982 that philosophy of technology as a discipline was established in China when Chen Changshu published his “Unity and Divergences of Science and Technology”, in which he advocates to demarcate between science and technology, arguing that science and technology have essential differences, thereby helping establish philosophy of technology as a separate discipline in China. However, Chen’s contribution is not limited to this. He worked in this field for nearly half a century and had made indelible contribution to its development.

As his masterpiece, *An Introduction to Philosophy of Technology* was first published in 1999, which was not only a summary of the philosophical studies of technology in China in the twentieth century, but also a guidebook pointing out the direction of the development of this field in the 21st century. Publication of its second edition is both a memory of Chen and an effort to inherit his

learning and scholarship.

First, from the beginning of the 1980's when Chen began to think about writing a book on philosophy of technology until 1999 when *An Introduction to Philosophy* was published, twenty years passed. The book can be considered as crystallization of his exploration during these twenty years. Although he never showed off his achievements and modestly claimed this book to be "superficial" and "rustic", it is a fundamental and milestone masterpiece, especially when we take into consideration the role it has played in the development of philosophy of technology in China since its publication.

Second, beginning with ten basic issues of philosophy of technology, he offered a convincing and positive answer to the unavoidable question for the research of philosophy of technology "Are there any philosophical problems in technology?" These issues are critical to the establishment and fruitful progress of the discipline for the following reasons: failure to specify essential features and requirements of technological activities would make it difficult to elucidate differences between technological and scientific activities, which will erode the foundation of philosophy of technology as a discipline; without finding out what technology is, it will be impossible to determine between material and human factors, which are more important in technology; lacking in exploration of the social value of technology and engineers' social responsibilities, philosophy of technology will be detached from society, thus depriving the discipline of the fertile soil for its healthy growth... Just as the saying goes, great minds of philosophy tend to see significance harboring in minor events and truth, kindness and virtue in commonness. For anyone, searching for an appropriate answer to these seemingly simple but basic questions involves arduous labor. By proposing and answering these questions, the author paved the way for a theoretical framework for the discipline.

Third, *An Introduction to Philosophy of Technology* embodies the theoretical and etymological characteristics of Chen's philosophy of technology. As the author mentions in his preface, the book is divided into four parts, "the first four chapters are a general discussion of the object, history and basic issues of philosophy of technology; the fifth to the eighth chapters examine basic features of technology; the ninth to the eleventh chapters elucidate the interrelationship between technology and society; the twelfth chapter can be considered as the conclusion of the whole book." Based on his long term observation and reflection, Chen put forward significant issues

concerning the development of modern technology with philosophical properties, whose elaboration became clear and convincing thanks to a clever combination of his personal experience, other's views and a dialectical thinking and reasoning, which effectively revealed the hidden essence of modern technology. His long-term research at Northeastern University of China, which is known for its excellence in engineering technology, enabled him to have a profound grasp of modern technology which can be seen from the examples cited and analyzed in the book.

The establishment of philosophy of technology as a separate discipline requires it to be separated from philosophy of science, which can be best accomplished by means of comparison. That is what Chen did in the book. As early as the 1980's, Chen wrote to point out the need to pay attention to the differences between technology and science, believing that while emphasizing basic research, applied research should not be neglected. In this book, he investigated the differences between technology and science in 10 aspects from the perspective of philosophy, warning people against the tendency to see only the guiding role of science in technology and neglect the fact that science and technology are interacting or even integrating with each other.

Fourth, this book embodies Chen's extensive learning and innovative scholarship even though he modestly claimed that his grasp of foreign philosophy of technology was only superficial. In the early 1980's, while helping to lay the theoretical foundation for Chinese philosophy of technology, he began to introduce Japanese technological studies to China, attempting to work out a theoretical frame to understand practical problems in China with the help of the research results by Japanese. Unfortunately, because Japanese technological studies were found lacking in philosophical depth at the time and unable to benefit the development of Chinese philosophy of technology, he turned to the research in Germany, the United States of America and other western countries in the 1990's. Taking advantage of the visit to his relatives in the USA, he collected a large quantity of related literature and introduced some into China. With the theories of others, he had always adhered to the principle of introduction, assimilation and innovation, trying to explore their ideas critically and apply them to problems with Chinese characteristics to meet the theoretical demand of the development of philosophy of technology in China.

In 1999 at the Eighth National Annual Conference of Philosophy of Technology, Chen put forward three propositions concerning development of philosophy of

technology in China: “If this discipline does not have its own features, it will have no position among academic disciplines; if it is not rooted in technological studies, it will not progress and attain a high level; if it does not have practical value, it will not have fruitful development.” These beliefs have served as a principle in the writing of this book. He reiterated this idea more than once, believing that the vitality and realistic significance of philosophy of technology lie in the efforts to build on its distinctive features, strengthen its basic research and practical application, learn about the latest development overseas and take a rational attitude toward the engineering and humanistic traditions of the discipline. This guideline, pointing out the direction of the development of philosophy of technology in China in the 21st century, is insightful, prescient and far-reaching, which will be of immeasurable value for further development of the discipline in China.

Western philosophy of technology of the new century is experiencing “the empirical turn” and “the ethical turn”, which are in line with Chinese practical tradition of the discipline. Therefore, there is reason to believe that philosophy of technology, which is still young as a discipline, will enjoy a great prospect in China. Chen has passed away and left us a valuable intellectual wealth. The only best way to honor him is to push forward Chinese style philosophy of technology concerning Chinese situations and issues by obtaining more achievements in the field he opened up for us.

Chen Fan

November 6, 2011

## Foreword

Philosophy of technology, as its name indicates, can be understood as philosophy concerning technology or a view of technological issues from the philosophical perspective. Engineering and technological workers and philosophical researchers will inevitably meet with issues of philosophy of technology and need some knowledge of the subject.

It has been long since I wanted to write a book with such titles as *A General Course of Philosophy of Technology*, or *Philosophy for Engineers*. Beginning with "A Brief Exploration of Studies of Philosophy of Technology" written in 1983, up to 1996, I had published more than 30 articles on philosophy of technology. During the period, the idea of writing such a book had never been out of my mind. However, I was hesitant to start because of the feeling that I was not fully prepared. I was determined to start the writing at the beginning of last fall term mainly because I was approaching 65, which prompted me not to be satisfied with mere preparation any longer. Anyway, it was time for me to consider leaving my students with some material for reference. The title of the book *An Introduction to Philosophy of Technology* somehow can be seen as implying insufficient preparation for a more thorough and profound monograph.

Some people believe that being comprehensive but superficial is more undesirable than being incomplete but incisive, which

I totally approve of. Unfortunately, this book will no doubt appear superficial, not only because philosophy of technology is still in its infancy, but also because my experience, knowledge and ability bring about three disadvantages: the first is my lack of personal engineering experience and a thorough understanding of agricultural or medical technologies, especially high technology, even though I have studied and worked in an engineering oriented university for more than 40 years; the second is my long term work and life at a locality far from the national academic center of philosophy with few contacts with philosophical experts and literature, which results in my philosophy being rustic even though I once studied in a postgraduate program of philosophy and engaged in teaching philosophy in Renmin University of China; the third is my lack of in-depth study of theories of the discipline of foreign experts even though I have been trying to be less rustic and to keep in touch with the foreign academic trend in this area and I have even looked up foreign literature in philosophy of technology and made inquiries into several monographs and collected works during my half-year visit to my relatives in the United States.

This book is not supposed to be deep from the academic perspective. On the other hand, it should meet the standard of an academic monograph and may be consulted by researchers of philosophy of technology. At least no Chinese have ever written a book containing “philosophy of technology” in its title. It tries to arouse a stable interest of engineering and technical workers and management staff in philosophy of technology. In my view, this book can be regarded as “engineers’ philosophy of technology”.

Philosophy of technology puts forward more questions than it solves, which reflects both immaturity and vitality of the discipline. This book should be considered as statements of a school of thought because I desire to express my own opinions in it, which may make it appear one-sided. Maybe by doing so, it fits its name as an “introduction”.

As an introduction to philosophy of technology, the book should have taken the difficult task of constructing the theoretical system of the discipline. As can be seen from the arrangement of its chapters and sections, this book adopts a framework pervasive in studies of natural dialectics in China, which emphasizes adequate discussion and analysis of the basic elements of a system before work on their interrelationships. In addition, it is closer to “engineering philosophy of technology” than to “humanistic philosophy of technology”.

The first four chapters are general discussion of the object, history and basic issues of philosophy of technology; the fifth to the eighth chapters discuss basic characteristics of technology; the ninth to the eleventh chapters focus on the relationship between technology and society; the twelfth chapter can be considered as the conclusion.

As the preface, some remarks about writing and editing are suitable. References are listed at the end of each chapter, which are not many but in need of a few explanatory words. First, those which the texts actually quote are naturally part of references; second, references are not limited to the chapter at the end of which it is listed but should be viewed as references of the whole book. They are attached to individual chapters only because of the focuses of their content; third, some of my works are listed as references without being actually mentioned in the writing for two purposes: one is to show that ideas in the book are not whims from nowhere but have their roots and historical development; the other is to prove that these ideas are new instead of duplications of what have already been said.

Chen Changshu  
Northeastern University  
Shenyang, China  
September, 1997

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