CHAPTER ONE

TRANSFERRING TECHNICAL KNOWLEDGE AND INNOVATING IN EUROPE, C.1200-C.1800

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Introduction

The role of technology in the transition from premodern, ‘Malthusian’ to modern economies in late eighteenth- and nineteenth-century Europe is among the major questions in economic history, but it is still poorly understood.¹ In particular, the view that technological change before c.1800 was close to zero due to poorly specified property rights to knowledge and pervasive rent seeking by guilds is hard to square with the fact that the surge of technological innovation in the eighteenth century occurred within institutional frameworks not too dissimilar to those of 1300.²

A plausible explanation of premodern European technological development and industrialisation must account for three established facts. First,

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¹ [This paper was found on the author’s personal website at the London School of Economics at the time of his death. As a matter of fact, another version of the same text was available on that same website as well, in the Working Papers Series from the project, led by prof. Mary Morgan, ‘The Nature of Evidence: How well do “facts” travel?’. The version printed here, with the permission of Mary Morgan and the author’s partner dr. Rita Astuti, is the more extended of the two, and therefore presumably the latest edition produced by Larry Epstein. It is also the last of his works to appear in print. In some places obvious mistakes have been rectified. Information that was later added is between square brackets. The editors]

in the early thirteenth century Europe was still a technological backwater by comparison with the great Asian civilisations. Only a process of small-scale incremental innovation in metallurgy and instrument making, mining, building and shipbuilding, chemical process and cloth production, can explain the technological and industrial success of steam power—the most salient European contribution to premodern technical knowledge—six centuries later. The most striking feature by comparison with other coeval societies, however, is not so much that technological progress in premodern Europe occurred at a faster rate than elsewhere, but that progress was persistent and uninterrupted. By contrast, technological development in the great Asian civilizations of India and China experienced comparatively short periods of efflorescence, lasting a few centuries at a time, which were regularly followed by long phases of near-stagnation.

Second, the geographical location of technological leadership in premodern Europe moved over time. Between the eleventh and the nineteenth centuries, Europe’s technological frontier shifted increasingly north-west: from the east-central Mediterranean to northern Italy during the thirteenth and fourteenth centuries, to southern Germany and Bohemia in the late fifteenth, to the southern Low Countries in the sixteenth, to the Dutch Republic and finally to Britain during the seventeenth and eighteenth. Each new regional leader added the innovations of its predecessors to its local technical stock and recombed them for further technological advances. Although leadership was temporary, falling prey over time to technological sclerosis, declining marginal returns, and rent seeking by producers and elites, loss of leadership did not lead to a technological dead end. The existence of an increasingly integrated European market for skilled labour with a great deal of ‘ecological’ variation in demand, and of many polities whose rulers’ peaceful and military competition created spatial and temporal variation in demand for skills, generated the market and institutional conditions for new technological growth poles to take over.

4 One might speculate that similar processes of slow, incremental technological diffusion and recombination under changing social, economic and institutional conditions are less apparent in premodern Asia. Instead, technological leadership seems to have persisted in the same regions (south-eastern China, western India) over very long stretches of time—significantly raising the likelihood of long-run equilibrium (or in a more pessimistic scenario, technical sclerosis due to ‘Cardwell’s Law’).