3 Apprenticeship, Flexibility, and Rigidity: A Long-Term Perspective

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Introduction

Our present-day views on craft and craftsmanship are very much informed by nineteenth- and twentieth-century visions in which craft was increasingly seen as the antithesis of technology-driven mass production and standardized production processes. Karl Marx's famous distinction between concrete labor and abstract labor was a distinction between artisanal labor and labor applied in the context of manufactories, with artisanal labor being likened to art. Marx (1973, 297) noted that "this economic relation—the character which capitalist and worker have as the extremes of a single relation of production—therefore develops more purely and adequately in proportion as labor loses all the characteristics of art; as its particular skill becomes something more and more abstract and irrelevant, and as it becomes more and more a purely abstract activity, a purely mechanical activity, hence indifferent to its particular form." In this regard, his views, which he voiced around 1857 to 1858, did not differ much from more conservative opinions, like those articulated in the context of the famous Arts and Crafts Movement, in which a return to the medieval crafts was advocated. The most famous representative of this movement, William Morris (1882, 9), wrote, "These arts, I have said, are part of a great system invented for the expression of a man's delight in beauty: all peoples and times have used them; they have been the joy of free nations, and the solace of oppressed nations; religion has used and elevated them, has abused and degraded them; they are connected with all history, and are clear teachers of it; and, best of all, they are the sweeteners of human labor, both to the handicraftsman, whose life is spent in working in them, and to people in general who are influenced by the sight of them at every turn of the day's work: they make our toil happy, our rest fruitful."

Notwithstanding all their ideological and scientific differences, both thinkers fell back on a dichotomous view in which arts and crafts were at once closely aligned with and in opposition to alienated factory labor. Craftsmanship is likened to a genuine and authentic type of labor, which was lost during modernity.

Such views inform our understandings up to the present day. In his bestseller *The Craftsman*, the famous sociologist Richard Sennett (2009, 9) considered craftsmanship the antithesis of modern types of alienated labor, defining craftsmanship as something intrinsic to human nature—that is, as "an enduring, basic human impulse, the desire to do a job well

for its own sake." In this definition, the autonomy and independency of the artisan takes center stage, although Sennett, not unlike Marx and Morris, also attributes a profoundly social dimension to craftmanship. While medieval workshops were considered to be characterized by a communal atmosphere, for Sennett, *craftsmanship* was "joined skill in community" (2009, 51). Medieval workshops would have provided a social structure for the development and transfer of skills, not with the help of codified instructions on paper but through the daily incorporation of the legitimate standards. In the words of Sennett (2009, 54), "the successful workshop will establish legitimate authority in the flesh, not in rights or duties set down on paper."

This clearly brings the question of rigidity versus flexibility to a head. While premodern crafts are likened to art—which invokes an autonomous and creative artisan—craftsmanship is also seen as a result of the incorporation of collective standards and procedures. As will be shown below, this ambivalence is actually the result of our modern, dichotomous view, which eclipses the complexity and hybridity of the artisan's manifold histories. What is particularly unclear is the range of technical knowledge an artisan masters and the level of individuality and specialization the artisan is able to deploy. Related to that, to what extent is an artisan to be distinguished from an artist? And last but not least, how did this all transform in the long run? What happened in between the medieval period and nineteenth-century industrialization?

Most approaches to apprenticeship postulate a field of tension between, on one hand, the need to pass on techniques in a structured and more or less standardized way and, on the other, the need for a certain flexibility when it comes to applying the techniques in variegated and ever-changing circumstances. In a way, the medieval and early modern apprenticeship system is considered to provide the mechanisms for balancing these somewhat contradictory requirements. The principle of learning on the shop floor by imitating a master amounts to passing on a certain technical tradition from generation to generation in a certain social context while at the same time enabling apprentices to adapt the techniques to the ever-changing economic and cultural contexts. However, the way in which rigidity and flexibility was balanced drastically transformed in the long run because of economic as well as cultural and political transformations.

My chapter traces these transformations through a focus on the way in which apprenticeship was organized and institutionalized. The current literature emphasizes that the medieval and early modern apprenticeship system allowed for a substantial amount of flexibility and adaptation to new contexts. Most evidence for that argument is circumstantial, but it includes the finding that books and recipes were hardly used on the shop floor, that imitating the master was not standardized, that test pieces were very broadly defined and simultaneously allowed for specialization, and that the learning content was defined in an open-ended way and customized in apprentice contracts (for overviews, see De Munck, Kaplan, and Soly 2007, and Prak and Wallis 2019). Rigidity increased in the long run, however. This has already been argued with a focus on the guild system, but other factors may have been important too, including the introduction of books, the growing importance of design and novelty in the appreciation of products, and last but not least, religious and epistemological transformations.

As I will argue, the long-term evolutions cannot be explained by looking at the economic context alone. While mass production and technological innovation are considered to be

accompanied by deskilling and increasing division of labor, I will show that the antithetical opposition of craft and technological innovation is in all likelihood a nineteenth-century fabrication. Our present-day views on medieval and early modern apprenticeship are very much informed by a nineteenth-century "invention of tradition," in which crafts were seen as the flipside of mass production in factories. A proper understanding of our current views on craftsmanship instead requires us to look at crucial transformations in the late medieval and early modern period. This is what I will present here, based on a review on the recent literature on craftsmanship and guilds in Northwest Europe and empirical data from my own work on the Southern Netherlands (roughly present-day Belgium).

Specialization and Division of Labor in the Late Middle Ages

Nineteenth- and twentieth-century views not only disregard evolutions that have taken place during the early modern period (roughly the fifteenth to the eighteenth century), they are even doing injustice to the complexity of medieval craftsmanship itself. On the one hand, many medieval crafts did already experience thorough division of labor and specialization, especially in the textile industries, the largest sector by far before the Renaissance. The production of woolen cloth required up to a dozen different types of workers, from wool combers, carders, spinners, warpers, overweavers, and fullers to dyers and shearers (Munro 2003a). All these professions could moreover have their own specialization, with dyers in blue, for instance, being distinguished from black dyers. Nor did specialization fail to increase. As soon as textile industries expanded from roughly the eleventh century on, competition forced entrepreneurs to specialize and focus on niche products, resulting in the use of different types of fabric (light woolens versus heavy woolens or a combination of wool and linen), different colors, and different patterns (van der Wee 1975, 1988; Thijs 1993; Munro 2003b, 2009). On the other hand, however, these types of specialization were not necessarily synonymous with deskilling—rather to the contrary. Innovation in terms of new types of products was mostly based on the development of new and additional technical knowledge. As economic historian Herman van der Wee (1975, 213) argued, "What was involved was more the deepening than the widening of human capital," and what was stressed was "the input of labor, as against capital and raw materials."

In this vein, the textile industry was not too different from the art sector. Our views on art and artists, too, are very much informed by nineteenth-century opinions in which artists are pictured as independent geniuses whose success is entirely the result of their natural talent and skill. According to ideas such as those of the nineteenth-century cultural historian Jacob Burckhardt (1860), artists would have emancipated themselves during the Renaissance, first in Italy and then in the rest of Europe. Yet contemporary views on the history of art show that sculpting, painting, and related arts could be viewed as an industry—a luxury industry targeting high-end markets (van der Wee 1975, 1988; Thijs 1993; Goldthwaite 1995). The huge importance of skills and technical knowledge in these industries does not prevent specialization; targeting niche markets was the order of the day. As art historians have shown, painters adapted their style and subject matter to the tastes and purchasing power of their target markets and customers (North and Ormrod 1998; De Marchi and van Miegroet 2006; Sluijter 2009). Moreover, a thorough division of labor has been revealed in

the workshops of artists as well. Many hands were involved in the finishing of one painting, with different workers often having different specializations, be it heads or human figures, or nature or specific types of decoration (Peeters 2007). Famous artists and workshops are even shown to have collaborated on specific paintings, with each artist attributing a specific specialization (Honig 1998).

In short, medieval and late medieval craftsmanship was not incompatible with division of labor, art was not antithetical to specialization, and art and craftsmanship were not situated in different realms; rather, both were luxury industries competing in high-end markets. This did not prevent, of course, that the entrepreneurs involved faced the challenge of dealing with the distinction between general and specific skills when it comes to investing in training. According to standard human capital theory, entrepreneurs only have an incentive to invest in specific skills (i.e., skills that can be applied only in their specific firm). With respect to general skills that are useful to a wide range of employers, it is up to either a public authority or the individual apprentice to make the investment. The latter can do so by simply paying the master or by accepting a below-market wage for some time (Becker 1964). However, this theory applies in a context of highly competitive markets, which of course did not exist in the early modern period (Acemoglu and Pischke 1999). Moreover, the problem of free riding—that is, employers benefiting from the investments made in training by other masters by hiring skilled workers instead of training them themselves—could, at least in theory, be solved by craft guilds.

In one of the most seminal papers in the field, Stephan R. Epstein (1998) has argued that craft guilds potentially solved the so-called hold-up problem faced by employers. While masters typically wanted to recoup their investment in training by committing their apprentices longer than strictly needed to learn the trade—so that the trainee paid the master with free or below-market-price skilled work—apprentices also had an incentive to abscond once they had mastered the trade sufficiently in order to earn a wage elsewhere. The guild could prevent this by simply describing a minimum term to serve (as a precondition to enter the labor market as either a journeyman or a master) or related measures such as imposing a ban on masters taking on other masters' apprentices or having the apprentice pay an upfront fee. Unfortunately, empirical research on whether guilds or other political authorities installed such regulations is still inconclusive (see Prak and Wallis 2019). Other research suggests that even the rigid English apprenticeship system, which prescribed a minimum term of seven years across trades and cities, allowed for a high degree of flexibility in practice—with the terms being adapted at the discretion of master and apprentice (Minns and Wallis 2012; Schalk et al. 2017).

The history of the guilds in particular reveals that they had to deal with tensions between rigidity and flexibility whenever they wanted to regulate the transmission of techniques. This is all the more the case as the passing of techniques is not only a matter of economic efficiency but also of building a community and defining the boundaries of that community (De Munck 2011). Apprenticeship rules were not only installed with an eye toward passing on knowledge and skills but also for deciding who had entry to the community of masters. The status of master was acquired if one could prove they had mastered the trade and were able to deliver high-quality products, which was often tested with a masterpiece. Becoming a master was actually akin to becoming a member of a political community, with a collective identity that was based on the ability to honestly perform high-quality work (for a case study,

see De Munck 2018). The way in which guilds navigated these different goals and contexts is very instructive of how the field of tension between rigidity and flexibility transformed in the long run.

Craft Guilds and Specialization

The field of tension between specialization and generality (and the transferability of skills) is detectable at the level of the juridical and institutional embedding of crafts. From the medieval period onward, most craftspeople were organized in craft guilds. Each guild was supposed to gather a specific group of artisans: the shoemaker's guild representing all shoemakers, the carpenter's guild all carpenters, the baker's guild all those involved in making bread, and so on (Farr 2000). However, this was far from straightforward. The shoemaking industry also encompassed old shoemakers or shoe repairers; the bakery industry gradually included pastry shops and sugar bakeries; and the wood industry was divided into sawyers, carpenters, and cabinetmakers, with the latter in turn encompassing such groups as wood inlayers, coffin makers, and panel makers. Product and process innovations within these groups, moreover, challenged the identity and boundaries of these groups constantly. The sixteenth-century wood industry in Antwerp was witness to a prolonged discussion between the carpenters and the cabinetmakers about who was allowed to produce exactly which products. In principle, the cabinetmakers were allowed to make loose furniture (with the use of glue) and the carpenters everything that was a fixed part of a house. But what to do with fixed banks once they are introduced? Among other things, the introduction of so-called panel work and the related shift from rough heavy boxes to light and attractive furniture assembled with mortise and tenon joints (in which panels could be fitted) jeopardized the existing boundaries between these two guilds (De Munck 2007a).

Within the guilds as well, specialization was a cause for concern, especially when it came to training and the assessment of skills. In most guilds, membership as a master artisan was conditional upon the finishing of an apprenticeship term and a masterpiece. The length of the term was, up to a degree at least, related to the difficulty of the trade. But what if different specializations are present within one and the same craft? That the guilds themselves struggled with this issue clearly emerges from an in-depth analysis of their masterpieces. The earliest descriptions of test pieces in the guilds' fifteenth- and sixteenth-century ordinances are mostly very vague, which suggests that a standardized range of skills needed to be demonstrated. In Antwerp, the tanners' guild in 1583 simply stipulated that prospective masters had to "skin, scrape, and sprinkle a hide" as a test. A journeyman who wanted to become a master shoemaker had to "cut and make a pair of thick leather shoes, a pair of boots, and a pair of slippers." And the cloth dressers' guild in 1696 simply prescribed that a new member first needed to shear nine ells of white cloth (De Munck 2007c, 68–74).

Yet other guilds clearly felt the need to specify exactly which product needed to be made as a trial piece or which types of skills needed to be demonstrated. The instruction of the Antwerp diamond guilds in their founding ordinance in 1582 mentions different types of stones as well as different operations, such as cutting, polishing, and finishing. At the end of the fifteenth century, the above-mentioned guild of cabinetmakers not only enacted that two cabinets and a table had to be made, but it also distinguished between two different

types of cupboard ("een spenne en een tritsoer") and specified that the table could be either round or square (De Munck 2007a; 2007c, 68–74). Moreover, guilds increasingly added that the deans of the guilds could decide ad hoc which piece was to be produced exactly. The Antwerp gold and silversmiths not only enacted a November 24, 1524, ordinance that the masterpiece must comprise either a major work (e.g., a platter) or a gold ring set with a diamond, it also stipulated that prospective masters could simply make "what they were used to making"—that is, what they had learned as an apprentice (De Munck 2007c, 72). Something similar was the case among the Paris goldsmiths (Bimbenet-Privat 1995, 29).

In the nineteenth and most of the twentieth centuries, liberal and progressive thinkers—building on Enlightenment ideas—mostly considered craft guilds as conservative hindrances to technical innovation and the emergence of efficient markets. Yet research has shown that they might have accommodated, if not stimulated, economic innovation (Epstein and Prak 2008). In response to specialization and the invention of niche products, they have at least tried to prevent that such entry barriers as apprenticeship terms and masterpieces would turn into thresholds for those who had only learned part of the craft or acquired a specific set of skills. Moreover, guilds may have had a stimulating impact on product as well as process innovation, too. Maarten Prak (2003) has, for instance, argued that the Dutch Saint Luke's guilds as a structure and network were a key factor in the success of the seventeenth-century Dutch art market, which was famous for its pioneering role in the shift toward more realistic and more standardized depictions of everyday life (the so-called genre paintings and still lives) fabricated with the help of new techniques such as the use of coarse brushstrokes and a reduction in the use of colors. It all indicates that there was at least a certain flexibility in adapting to changing market circumstances, even with regards to the institutions that were once renowned for their rigidity.

Specialization and Vertical Integration in the Long Run

Especially from the sixteenth century on, European guilds struggled to accommodate product innovation and vertical integration. Both dimensions can be illustrated by looking at discussions about the introduction of products such as leather belts with silver buckles or tin pots with earthenware lids. These products implied the input of manufacturers from different guilds, which was made possible by the activities of large merchants or entrepreneurs who simply bought the separate components of the article and employed artisans to assemble the final product. Guilds often protested this practice because they considered it a violation of their rules, which prescribed that guild-based masters were to be independent and the sole warrantors of the final product's quality and standards. The guilds' attitude even hampered vertical integration in one single sector. In the manufacture of leather products, tanning and shoemaking were typically considered two different crafts, with each guild defining separate quality standards (for the leather and the shoes, respectively) and entry requirements (apprenticeship terms and master trials). Juridical litigation could arise when tanners started to subcontract to shoemakers, who then manufactured shoes on the tanners' premises, and vice versa (De Munck 2007b, 127–128; 2007c, 233–236). The guilds involved mostly tried to confirm and monitor their rules, insisting that whoever manufactured shoes needed to have finished the shoemakers' term and trial and whoever tanned hides needed to have completed

the terms and trials of the tanners. In early modern Antwerp, such discussions emerged in a context in which the guilds of the tanners and the shoemakers were not sufficiently distinguished. Debate arose as shoemakers began to purchase hides themselves and hired tanners to tan for them. After decades of discussion, it was eventually decided to clearly separate the two guilds, which in practice meant that they each had their own apprenticeship term and masterpiece (De Munck 2007c, 235).

Within a single guild as well, product innovation could cause trouble. The guilds' products mostly had identifiable hallmarks that guaranteed certain quality standards. The tanners' hallmarks, for instance, guaranteed the proper origin of the hide used, distinguishing not only between different animals but also different parts of the animal. In the wood sector, the hallmark guaranteed the proper origin of the wood used, for instance, in order to distinguish genuine ebony wood from Spanish wood, which was used as a cheaper substitute. And in metal trades, a certain alloy was mostly guaranteed with a hallmark, with the tinsmiths' marks, for instance, ensuring that the tin did not contain more than 2 percent lead. What happened in the long term was that additional hallmarks were introduced to accommodate new products and quality levels. This was, for instance, the case with the Antwerp guild of pewterers who were forced to create new marks in order to accommodate new alloys introduced by the masters (De Munck 2008, 215–222; 2010a, 38–39; 2012). In addition, markets were increasingly flooded with products without quality marks or with shopkeepers' marks, which were not made according to the guild's standards. This was due to the increasing importance of wholesalers that provided shops with imported products and products made by "false masters" or outside the guild context. At the other end of the spectrum, the number of shops increased—called "faiseurs de rien vendeurs de toutes" in some of the literature. While guild-based masters had often combined manufacturing and selling, in the seventeenth and eighteenth centuries, these processes were increasingly separated (De Munck 2010a, 39–43; 2012, 10–13).

In all, textbook craftsmanship, which was based on autonomous masters who all made the same or similar products independently and with the help of a few journeymen and one or two apprentices, was very much a fiction by the end of the eighteenth century—at least in a range of trades. Vertical integration, subcontracting, wholesale, and retail all undermined the ideal of the master-housefather working on his own premises and selling products directly to customers (Lis and Soly 2006, 2008; De Munck 2010a). The guilds' efforts to accommodate product and process innovations moreover suggests that early modern craftspeople not only applied technological innovations but were on the very basis of innovations as well. This is clearly the case for product innovations, as can easily be illustrated by new "brands" such as Venetian glass, Cordoban leather, and Italian maiolica, to name only a few renowned types of products originating in early modern Europe. Nor was this simply a matter of designing a new product. These products typically implied adaption to the production process as well. One type of maiolica called "faience"—with which potters tried to imitate the renowned white Chinese porcelain—required a very sophisticated production process. First, the already-fired earthenware was covered with an opaque layer of white tin glaze. Subsequently, colored figures were typically painted on the white background with "underglaze" paint, after which the object was covered with a transparent glaze made of lead and tin oxides and fired again in order to fuse and burn the painting and the different layers. Clearly, in such innovations, new product designs were deeply entangled with new production

techniques and even new procedures—the latter, in this case, even involving new insights into chemical and thermochemical processes.

New insights were often the result of the combination of preexisting techniques, including from different sectors. Spillovers could occur between, for instance, the glass and the earthenware industries, on the condition that such industries clustered together in certain cities. Such conditions were very often met because highly skilled artisans were typically very mobile in the early modern period. While journeymen were sometimes obligated to "tramp" from place to place for one or two years after their initial training in order to acquire additional skills, established artisans were often forced to migrate as dynastic and religious warfare disrupted their access to suppliers and customers (Reith 2008). The history of the early modern guilds thus fits into the long-standing argument in economic geography and the history of technology that diversity fuels the recombination of ideas, techniques, and technologies, which in turn fuels innovation (e.g., Audretsch and Feldman 2004). Yet innovation is not a straightforward affair either, and the definition and nature of innovation has transformed throughout history. These transformations, moreover, had a profound effect on craftspeople, a history that is still largely to be written.

The Separation of Art and Craftsmanship

Guilds and craftsmanship deteriorated with the advent of industrialization and technological innovation. But contrary to what is thought, craftsmanship underwent major transformations even before the mid-eighteenth century too. Only they weren't transformations of scale or technology-driven change. The major transformation was the growing distinction between artisan and artist. Before the Renaissance period, artisans and artists were hardly distinguished at all. What we consider artists today were often joined in the same guild as artisans, as was the case with sculptors, who often shared a guild with other artisans working with stone, like masons. During the Renaissance, however, sculptors and painters started to distinguish themselves from what they then referred to as "mere artisans" or mere "mechanics." The artists built on the classical distinction between the mechanical arts and the liberal arts and aligned themselves to intellectuals and those who had learned Latin and were familiar with texts and images from Greek and Roman antiquity. In the process, artisans were increasingly denied what was then called *ingenium* (ingenuity). The Antwerp sculptors argued that talent was needed to become an artist but not to become a mason, claiming that while masons could support themselves from the very first day of their training, "apprentices in sculpture did not know for four or five years whether they would be able to continue in the profession" (De Munck 2010b, 346–347; Filipczak 1987, 16).

This evolution was part of a broader and more thorough transformation in which artisanal skills were increasingly instrumentalized. By the mid-eighteenth century, the famous Enlightenment philosopher Adam Smith (1776, 151–153) distinguished inventors and artisans with ingenuity from the rank-and-file artisans who only had to manufacture the products invented and designed by others: "The arts, which are much superior to common trades, such as those of making clocks and watches, contain no such mystery as to require a long course of instruction. The first invention of such beautiful machines, indeed, and even that of some of the instruments employed in making them, must, no doubt, have been the work of deep thought

and long time, and may justly be considered as among the happiest efforts of human ingenuity. But when both have been fairly invented and are well understood, to explain to any young man, in the compleatest manner, how to apply the instruments and how to construct the machines, cannot well require more than the lessons of a few weeks: perhaps those of a few days might be sufficient" (quoted in De Munck 2017, 819).

Paradoxically, artisans were actually valued highly in this period, but only as sophisticated robots of sorts. In the famous *Encyclopédie* of Diderot and D'Alembert, they were called "automatons," while entrepreneurs referred to them as "sets of hands" (Koepp 1986, 2009; Sewell 1986; Schaffer 1999; Lis and Soly 2012, 485–488, 422; De Munck 2014, 55–61). Artisans were no longer considered able to invent or design new products or to conceive and monitor a complex production process. Building on a distinction between mind and hand, this capacity was henceforth denied to most of them.

Interestingly, until at least the early sixteenth century, no distinction was made between mind and hand. Nor was embodied knowledge necessarily seen as inferior to intellectual knowledge before that time. As Michel Foucault first noted, the Renaissance epistemological context was such that access to the truth—which was at the time synonymous with God's wisdom—was possible through words as well as things. Just as finding the right words was considered getting closer to the truth in rhetoric, imitating God's creation by crafting could be seen as a way of getting nearer to God's wisdom. In order to understand this adequately, we have to free ourselves, again, from modern notions about invention and ingenuity. While imitation is seen as inferior to invention today, in the Renaissance context, it could actually be superior to manufacture imitations of, for instance, precious stones or diamonds, as you were then actually emulating God's *act* of creation (Bucklow 2009). This is in any case how the mystic humanist Nicolas Cusanus defended craftsmanship against the pretense of artists. In his famous dialogue *Idiota de mente*, Cusanus (1937, 51) features a wooden spoon maker who actually argues that craftsmanship is superior to art because artisans do not use models, just as God did not have a model when he created the world: "All finite art depends on infinite art. . . . As an example let me take the making of spoons. The spoon has no model other than the idea in our mind. The sculptor or painter takes his models from the things which he wishes to represent, but I do not do this when I produce spoons, saucers and pitchers from wood. . . . For this reason my art produces rather than reproduces natural forms and is, therefore, more like infinite art."

A proper understanding of this idea thus requires including an epistemological perspective and a reflection about the very notion of invention. Historians of science have shown that a more instrumental view on invention emerged in the beginning of the seventeenth century. The famous science theorist Francis Bacon praised practice and the mechanical arts because experience would have the capacity to reveal the secrets of nature, but theory was nevertheless superior. For Bacon, the invention of theories was the final aim of the natural sciences. This still involved practitioners, but it was based on a strict distinction between theory and practice. New insights were based on the data obtained from practical experiments and observations—for which practitioners were needed—but they were to be classified and interpreted by natural philosophers (Atkinson 2007, chap. 2). In areas such as navigation, cartography, surveying, and fortification, practical mathematics in the meantime grew more important and eventually became integrated as a source of knowledge—and even the very essence of nature—in natural philosophy (Cormack 2017a, 2, 4–5). This was all to the detriment of artisans, whose prestige

dwindled as processes of codification and abstraction grew more important in science and beyond (Vérin 1998, 2002; Dubourg Glatigny and Vérin 2008; Valleriani 2017).

All this had a profound impact on the social and political status of the artisans, which was subject to transformations, too. As will be further discussed below, craftsmanship was embedded in a religious atmosphere in which work and skills were inseparable from devotion and piety. As suggested by the above-mentioned views of Cusanus, the religious context was deeply entangled with the artisans' epistemology. The idea that artisans had access to fundamental truths was conditional on a specific religious worldview—that is, one in which God was immanent or at least had left his signature in everything (P. H. Smith 2000a, 2000b; De Munck 2014, 2019). Conversely, however, this specific religious and also political atmosphere presupposed a range of collective activities, the historical transformations of which could be seen as the flip side of the transformations related to technical knowledge and epistemologies.

The Sociopolitical Dimension of Learning

In the Middle Ages, learning was clearly not reducible to the acquisition of technical knowledge and skills. It was rather embedded in a political and religious culture in which acquiring skills went hand in glove with being socialized in a corporative milieu. Apprentices not only worked with their master but lived under his roof as well. A master was typically considered to act as a surrogate father of sorts. He was not only supposed to train the youth but also to educate and discipline him. Masters were held responsible for their apprentices' morals and were to guard that they fulfilled their religious duties (Prak 2004; De Munck 2010c). Moreover, the terminology used in contemporary documents—including in apprenticeship contracts—often included references to "serving." Apprenticeship was part of a life-cycle tradition in which living and being socialized in another household was a standard feature of the life of a large part of lower and middling groups (S. R. Smith 1973, 1981; Krausman Ben-Amos 1991; Rappaport 1989, 232–238). Boarding in another household mostly took place between age 12 and 24, roughly, with 14 or 15 often being the medium age at which an apprenticeship started. The term to serve as an apprentice often ranged between two and eight years, with four to five years being the mean or medium (De Munck 2007c, 177–185). During this period, apprentices were to "serve" their master to the best of their abilities, not unlike living-in female servants. Masters, in turn, were to teach, educate, and discipline the youth as a good housefather does.

The role of the guilds entirely chimed with this. Becoming part of the guild, too, was not only a matter of being able to demonstrate the mastering of a certain range of skills. It implied a range of rituals, like having meals and attending mass together with the other masters. A guild was not only an economic institution but a religious brotherhood as well. Members were not only confronted with product standards but were supposed to take part in collective activities such as masses, processions, feasts for a patron saint, and funerals of fellow members. The ubiquity of terms referring to family, like brother and brotherhood, suggests that guilds can be seen as artificial families of sorts. Finishing an apprenticeship was, in a way, like entering a new or a broader family, and becoming a master was equivalent to assuming a sociopolitical role in which public and private aspects were profoundly entangled

(Farr 2000). A proper understanding thereof requires appreciating the deeply feudal and corporative context in which this all took place. The body politic was in this period literally imagined as a "body," with a head and members. While the prince or, in some cities, a conglomerate of nobles was the head of the body, they did not represent a range of individuals on a territory as we would imagine today. Being part of the body as an individual rather implied being part of a member, which could be a noble family, the clergy, or indeed, a guild. And the guild itself was in turn conceived of as a body with a head (the board) and members (the masters), just as a household was (with the master as the head and the children, apprentices, servants, and the wife as members) (De Munck 2018, esp. chaps. 1 and 2).

To be sure, the corporative system and the collective "guild ethic" did not fail to be challenged by an economic reality to which the guilds' logic had difficulties to adapt. In the thirteenth and fourteenth centuries, masters and apprentices concluded individual apprenticeship contracts that not only differed from economic sector to economic sector but could also be customized to each individual case. In a sample of 11 weaver apprentices contracts, the terms agreed on ranged from two to five years; in a sample of six contracts for silversmith apprentices, the terms were three to six years (Des Marez 1911; Verriest 1911; also De Munck, De Kerf, and De Bie 2019, 223). Unfortunately, the current state of the art does not permit one to chart to what extent and in what sense this tension between a sociopolitical and an economic logic increased in the long run, but at least after the mid-seventeenth century, this tension would seem to have increased. In France, the term *alloué* appears, which refers to an apprentice who agrees to learn without aspiring to become a master himself. In the literature on England, reference is made to "clubbing-out apprenticeships," in which the apprentices no longer boarded with their masters, especially from the late eighteenth century on (Snell 1985, 257–263). On the Continent, the decline of boarding had been observed even sooner—in some instances, from the mid-seventeenth century on (De Munck 2010c, 9–14).

All this suggests that guilds gradually lost their brotherhood-like characteristics and gradually transformed into modern political and economic institutions that guarded the "mysteries of the trade" (as the technical knowledge was often called at the time) in a juridical way, with apprenticeship terms and masterpieces serving as entry barriers—just like Adam Smith and later modern thinkers envisioned them to be. This is arguably the origin of the view on the guilds as conservative institutions out of tune with what was then called "commercial society," but the historical shift was not one from regulation to deregulation. The enlightened philosophers were engaged in a broader reflection on the relationship between the individual, religion, and the state, and what eventually emerged was a one-to-one relationship between the individual and the state in which each individual was supposed to have "natural rights"—like the right to life, liberty, and property, as summarized by John Locke. Collectives such as the guilds were increasingly obsolete in this context, and they were eventually abolished altogether from the end of the eighteenth century on.

The Commodification of Skills

Some historians have attributed the decline of "das ganze haus" model to the emergence of precapitalistic labor relations, which would have turned the relationship between master and

apprentices into one resembling the relationship between employer and employee. In an article on apprenticeship, Reinhold Reith and Andreas Grieβinger distinguished sectors in which concentration trends took place, such as textiles and the building industry, from "traditional" sectors. In the former, concentration trends and increasing numbers of journeymen and apprentices per masters would have profoundly transformed the relationship between master and apprentice (Grießinger and Reith 1986; Reith 2007). However, research has shown that in so-called traditional sectors like gold and silversmithing as well, the ratio of apprentices who boarded declined. Moreover, in such sectors, too, the relationship between masters and apprentices seems to have grown more businesslike. A small sample of juridical litigations between masters and (the representatives of) apprentices shows that apprentices often refused to do household chores and that their parents or guardians stressed that they had paid for the acquisition of technical skills. They insisted that the apprentice would learn the tricks of the trade rather than being used as a servant or a cheap workforce (De Munck 2010c, 15–16; also De Munck 2018, chaps. 4 and 5).

Even so, this is not to say that the more businesslike relationship between master and apprentice was synonymous with deskilling. The point is rather that apprenticeship commodified skills, which could just as well mean that large amounts of money were paid for the acquisition of highly coveted skills. In the Antwerp gold and silversmiths sector, genuine learning ateliers emerged, where apprentices—including immigrant apprentices—came to learn very specific and specialized types of skills, or what was referred to in the apprenticeship contracts as "advanced skills." These apprentices were no longer life-cycle servants but were present in the master's workshop only to acquire the skills paid for—and, perhaps, to work for the master in return. Nor was this type of apprenticeship still related to a guild logic of finishing an apprenticeship term in order to become a master. The Antwerp gold and silversmith guild opposed the emergence of such learning ateliers, arguing that the masters in question hired more apprentices than was allowed. In a juridical dossier filed against him, the most important such master in the late seventeenth century, Guillaume De Rijck, simply responded that they were not apprentices but journeymen who attended his atelier to work and acquire additional skills (De Munck and De Kerf 2018, 48–56).

The guild system itself profoundly transformed in the meantime. Until the fifteenth century, master status was largely inheritable; a master's sons could become masters without a great deal of formal obligations. In contrast to outsiders, they often did not have to finish an apprenticeship term or make a trial piece. So, up to the late Middle Ages, you were either born in the guild or you had to become socialized in your new family by living with and serving a master for some years and then proving that you were able to do the job. This too changed in the long run, however. By the mid-eighteenth century, master's sons often had to meet requirements very much like those of outsiders, up to and including paying high entry fees. This suggests that the guild was no longer a corporation with the master's household as "members"; rather, it was an organization external to the private household of the master and more akin to either a modern civil society organization or an economic institution enacting rules to protect the interests and privileges of its members.

Unfortunately, current research does not tell us to what extent this had an impact on the innovativeness of guilds. Most economic historians and historians of technology would probably hypothesize that the innovative capacity increased because of increased flexibility

and mobility. Relatedly, guilds have often been seen as institutions that guarded the secrets of the trade (in a context in which a master's son often inherited the father's workshop), which could lead to the observation that knowledge has become more public. According to Joel Mokyr, this was a breeding ground for a more intense collaboration between practitioners and inventors, which in his view has served as a catalyst of the technological innovations driving the industrial revolution and is behind the kickoff of the so-called knowledge economy (Mokyr 2002; Hilaire-Pérez 2007). What is clear is that learning and acquiring skills were henceforth completely separate from acquiring a corporative status. It continued to be connected to a working ethos and embedded in a paternalistic culture, but skills were nevertheless instrumentalized and, to put it in Weberian terms, "disenchanted." This explains why a philosopher and economist like Adam Smith (1776, 151–153) could conceive of skills as only a factor in a larger production process: "the improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labor, and which, though it costs a certain expense, repays that expense with a profit."

Craft in the Nineteenth Century

Learning and acquiring social and cultural prestige continued to be important in the nineteenth century, of course. Under pressure of modern economic thinking based on the laissez-faire principle, guilds and other professional organizations were abolished around 1800 (often under French rule or influence) or later in the nineteenth century. In France, the D'Allarde and Le Chaplier Laws of 1791 abolished the guilds and outlawed collective organizations, and in England, the Combination Acts banned trade unions and collective bargaining in 1799 and 1800. Yet this did not prevent guildlike mechanisms like training apprentices on the shop floor from persisting. Even in large manufactories, senior workers could train apprentices as if they were masters of sorts, in a system called gang labor that allowed smaller social units to integrate into the larger whole. Nor did hands-on skills and craftsmanship disappear. In recent decades, several scholars have shown the continuing importance and persistence of artisanal skills as well as small-scale manufacturing (Samuel 1977, 1992; Berg 1980; Sabel and Zeitlin 1985).

Of course, this did not prevent mechanization and division of labor to become more important, resulting in both new types of hierarchies and new types of labor control. While more workers were reduced to their labor power, engineering and technical and technological know-how became more highly valued. Also, new managerial techniques replaced face-to-face contact and enabled the disciplining of workers with formal rules, protocols, differential wages, tables with working hours and targets, and so on. At least in large manufactories, workers were increasingly reduced to little cogs in a large productive machine (see Marglin 1974). In this context, craft experienced a return. The famous Arts and Crafts Movement was but the most famous expression of an atmosphere in which mechanized production and modernity in general were criticized in religious and conservative circles. In these circles, a revival of the Middle Ages was preached and practiced in myriad ways: the buying, selling, and imitation of old art; the invention of neo-styles like neo-Gothic and neo-Renaissance; the emergence of renovation and restoration as a

discipline, and so on (Caen, De Munck, and Langouche 2008). In it, medieval craftmanship was very much idealized, with the medieval craftsman rendered as a pious beacon of harmony as well as a proud and disinterested artist targeting high quality for its own sake.

In this context, a dichotomous view emerged in which craftmanship was seen as the antithesis of innovation and technology-driven production. Yet, as shown in this chapter, this is doing injustice to late medieval and early modern craftspeople and the small-scale production they stood for. While small commodity production has often been able to sustain economic growth and productivity, craftspeople were often at the center of innovation. Yet innovation and invention were, in this period, entirely different from our modern conceptions of it. The ideological and epistemological context were far more favorable to embodied and collective types of knowledge—up to the point that craftsmanship could be seen as conducive to scientific progress (Cormack 2017b). Art historians and historians of science have argued that the seventeenth-century scientific revolution—in which observation and experiment substituted for deductive philosophizing about the nature of nature—were very much indebted to the practices and experiences of craftspeople and other practitioners. While craftspeople observed how nature (raw materials) reacted to mechanical processing or such procedures as heating, the mathematical knowledge used for hydraulics and navigation was appropriated and built on by scientists such as René Descartes.

Unfortunately, this was also the period in which artisans themselves became discredited. Not unlike Bacon, Descartes eventually developed an instrumentalized view of artisanal skills. Reflecting on the rationality of artisanal work in the first decades of the seventeenth century, Descartes eventually abandoned the idea that artisanal work could give access to the mathesis of the world. While he first saw "orderly souls" (*âmes réglées*) at work when observing artisans, the dominant metaphor for the rational order gradually became the machine—which furthered the idea that the human body was devoid of talent and ingenuity and that talent and ingenuity should rather be looked for in the mind of learned philosophers. As art historian and historian of science Pamela Smith has observed, "artisanal bodily experience was absorbed into the work of the natural philosopher at the same time that the artisan himself was excised from it" (Smith 2004, 186).

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Rigidity and Flexibility in Use, Transmission, and Innovation

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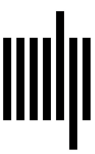

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