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### DUTCH INDUSTRY IN THE GOLDEN AGE\*

by

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The only difficulty is that the industrial history of the Dutch Republic is still largely terra incognita. (*De moeilijkheid is alleen dat de industriële geschiedenis van de Republiek nog goeddeels terra incognita is.* ? P.W. Klein in: *de Volkskrant*, 15 February 1992).

#### 1. Introduction

The Dutch Republic, and the Holland region in particular, expanded after 1580 into one of the major industrial centres of Europe. Within a period of decades, a large number of companies whose impact often reached far beyond the local and regional markets settled into a relatively small area. In part that impact is reflected in the increasing differentiation and specialization within the sector into numerous branches and businesses. A variety of qualitative and quantitative changes indicate the importance and scope of industrial activities. These developments include the processes of diversification and concentration, technological advancement and rationalization, and increasing energy consumption and productivity.

This industrial growth must of course be viewed in the light of its economic consequences. Generally speaking, economic developments can be considered to have been positive until the second half of the seventeenth century. Production, sales and profits increased to new heights. Elsewhere in this collection of articles, J.L. Van Zanden analyses industrial performance in terms of (quantitative) growth. Here the institutional and organizational framework within which that growth took place is described. The social-economic relationships between the parties involved in the production process will, of course, also be discussed.<sup>1</sup> In order to better explain the scope and the speed of the process of growth, the medieval roots of the institutional and organizational relationships will be traced where possible. The basic assumption hidden herein is that if the effect of the medieval inheritance is discounted, the rise of the Dutch Republic and Holland's advantage in the seventeenth century lose some of their enigma. This article ends with the 1660s, when industrial activities probably - much is as yet uncertain - reached their highest pre-industrial level.

#### 2. Good times, bad times

Unlike the situation seen after 1580, the period prior to then can hardly be characterized as a period in which unambiguously positive developments in industrial activity took place. Even prior to 1580 the sector's profile was differentiated and its scope was large in comparison to numerous areas elsewhere in Europe, but starting in the early sixteenth century various sectors found themselves in a downward spiral. In particular, companies which were relatively more large-scale and which usually manufactured for export, such as textiles and beer brewing, were experiencing an economic recession. Disappointing sales as a result of foreign competition, rising costs for raw materials and protectionist policies in the export areas had a negative effect on profits.<sup>2</sup> Unemployment was rapidly spreading. On the other hand, differences on the local level were sometimes significant<sup>2</sup>, and other sectors managed to keep afloat or even experienced a period of modest growth, such as was probably the case in the shipbuilding sector. All in all, pre-1580 economic developments were varied.

After 1580 the situation changed drastically. As the Republic's economy flourished, the entire industrial sector shared in its growth, in sharp contrast to the preceding period.<sup>3</sup> The rapid growth in population resulting from both natural increase and immigration was reflected in a sharp increase in the demand for goods and services from this sector. Increasing sales of goods outside the Republic had an equally stimulating effect on industrial activity. Moreover, specialization, intensification and differentiation presented opportunities for further growth in agriculture,

fishing, trade and shipping. In terms of both services and management, the subsequent division of labour resulted in the development of a large-scale, independent and varied secondary sector.

### *3. The working population*

Sadly, no national or regional statistics are available concerning the development of the working population per sector and branch for the seventeenth century. However, data from the sporadically recorded censuses and professions, as listed in the registry of marriages and migration records in particular, on the local and regional level indicate that the increase in population was accompanied by a parallel absolute increase of the working population in the industrial sector.<sup>4</sup>

Relatively speaking, industrial activity in terms of job opportunities was so great that the division of the working population in the various sectors in some parts of the Republic, with the cities in Holland leading, strongly indicates relationships which can be considered characteristic of industrialized societies. In some inland towns industrial activity provided for the largest share of the available jobs. The first example in this respect which comes to mind is Leiden, where the presence of the dominant textiles industry clearly justifies the characterization 'industrial city'.<sup>5</sup> But in cities such as Haarlem, with its large-scale linen activities, and Delft, where the production of beer and porcelain were important industrial activities, the secondary sector also played a major role in the over-all economy. Even though the port cities with their extensive trade and transport sectors had relatively fewer producers, the share of industrial activities in the economy was significant there, too.

With the increase of international trade traffic involving the Dutch Republic and the central role which the Holland staple market played in the global economy, numerous raw materials which were not available in this country flowed in increasingly larger quantities into the port cities, where they were processed by industry before being passed on to destinations both inside and outside of the Netherlands. Numerous new branches - sugar refining, silk processing, glass blowing, gunpowder production, Delftware production, to name a few - kept many hands busy.

### *4. Geography and economy*

In the above, a certain indication of where the geographical emphasis in the Northern Netherlands industrial activities can be found has already been given: in the Holland region, which played an increasingly dominant role starting in the second half of the fifteenth century, and specifically in the cities. The character of towns in the hinterland was often determined by one or more branches of the industrial sector, and the distribution of relatively expensive raw materials was of importance in the ports. However, one would do well to apply such generalizations with the utmost of care, as illustrated in the following examples. In the city of Utrecht (in the region bearing the same name), some three-quarters of the working population in the seventeenth century were actively involved in industrial activities. Inland cities in Holland, such as Gouda and Alkmaar, were not characterized by the overwhelming importance of a single branch, such as textiles in Leiden. The production of luxury goods was not limited to Amsterdam, which was the most important port city. After 1580, Haarlem was also home to many companies which made high-quality, expensive goods.

Although a majority were situated in the cities, industrial activities were not foreign to rural parts of the Republic. This is particularly true for the coastal area, where, more so than in the sandy regions to the east, a highly productive and strongly commercialized agricultural sector - as a result of the division of labour as already mentioned - made it possible for the services industry to blossom and grow. The origins of this industry may perhaps be found as early as the fourteenth century.<sup>6</sup>

Besides the small enterprises working for the immediate environment, in the seventeenth century in particular industrial activities on a larger scale in rural areas evolved which catered to the needs of markets further away. In the area directly north of Amsterdam in particular - known as the Zaan area - companies whose products were sold outside the region flourished.<sup>7</sup>

A logical result of the availability of raw materials was that some of the industrial activities - to a greater or lesser extent - necessarily took place in rural areas. Examples in this respect are brickworks, lime kilns and peat cutting.<sup>8</sup> The availability of running water in the area known as the Veluwe in the Gelderland region was instrumental in the establishment of paper and copper mills there.<sup>9</sup> Some enterprises were shunned from towns due to pollution of the water or air: an illustrative example is the oil milling industry.<sup>10</sup> In other cases, city-based entrepreneurs elected to locate their enterprises in a rural area. A variety of factors played simultaneous roles: lower wages and taxes (and therefore cost of living), the absence of institutional obstacles (such as regulations laid down by guilds), and the

available wind for optimal application of industrial-purpose windmills, clear water and fields for bleaching, peat for fuel, or excellent shipping routes via waterways. The availability of part-time workers during seasons when the farms needed fewer hands was sometimes an important factor. Lack of space in urban areas also played a role in opting for a rural industrial location. A shortage of available workers in the cities may also have been a decisive factor. In the textiles industry in particular, the very nature of agricultural activities (irrespective of the relatively lower wages) made it possible to hire rural inhabitants, particularly for elementary processes such as spinning and combing.<sup>11</sup>

Typical for industrial activities, especially in the coastal regions, was the wide diversity of branches and businesses, characteristic of the seventeenth century in particular. After 1580, numerous new businesses flourished next to the small enterprises which traditionally sold their wares on the local market and the branches of industry which were traditionally export-oriented such as textiles and beer brewing. These new businesses made use of raw materials which had not been used prior to then and which were sometimes imported, and of newly-developed, advanced techniques and means of production, resulting in a highly-diversified new look for industrial activities.

The increasingly-wide diversity of industrial activities is not only evident in the broad range of branches and products. Striking differences in the size of the enterprise, the scope of the invested capital, the type of enterprise, organizational structure, productivity, degree of education and quality of entrepreneurship also indicate the presence of a widely-varied, highly-diversified secondary sector, for the period after 1580 in particular. Other indicators of diversification are the extent to which trade capital and capital for industrial activities were entwined, and market orientation and sales markets. The heterogeneous nature of the labour market also indicates a complicated industrial-activity structure. These indicators can be used not only to characterise the differences between the branches: when applied within one and the same branch of industrial activity, they bring a broad differentiation to light, as will be explained below.

### *5. Crafts and guilds*

The oldest type of enterprise known to develop was that of traditional crafts<sup>12</sup>: small enterprises in which a master craftsman and one or more journeymen and apprentices processed raw materials or carried out maintenance or repair activities. Only a modest initial investment was required. With just a few exceptions, such as grain mills<sup>13</sup>, only hand tools were used. Division of labour was only marginally seen. The owner usually worked alongside his helpers. Sales primarily took place on the local market or in the craftsman's own store and usually on order. In the latter case, the raw materials required were purchased at the expense of the principal, as a result of which (as is also the case for the means of production) almost no requirements were placed on the proprietor's financial strength. The fact that helpers were responsible for their own tools further reduced the need for capital.

Technology, which was virtually undeveloped, the marginal division of labour, and the limited scope of the enterprises soon restricted productivity. An institutional factor also played a role in this respect: the master craftsmen were forced to abide by regulations which were often laid down by a guild organization and tolerated by the civil authorities. The objective of this regulation was to limit competition within the profession, which resulted in limitations on the scope of the enterprises. Acquisition of raw materials, for example, was sometimes subject to maximums, and use of labour-saving devices was restricted. Only a modest number of apprentices and journeymen were allowed in order to ensure that economic and social status did not vary too much between the various producers. In short, small-scale enterprising was prescribed, and expansion, increasing productivity and creative business management according to one's own insights were all difficult to achieve. During the pre-industrial period, most businesses reflected this traditional craftsman structure, albeit that the extent to which regulations were laid down varied depending on the time and place, and proprietors were free to determine their own policies within certain limits. This traditional craftsman structure was even abandoned in a number of branches, and when industrial activities in the seventeenth century in particular started manufacturing new products, an entirely different type of operation developed.

### *6. Businesses on the move*

De-equalization tendencies can be seen as early as the middle ages and in the sixteenth century. In a variety of industrial sectors, such as shipbuilding and beer brewing, limitations on the number of helpers were eased or removed altogether. Thus not only did social-hierarchical relationships become more pronounced, but the way to large-scale industrial activity was opened. As a result, wider possibilities for the division of labour were made available to entrepreneurs. When, as a result of the broadening scope of a business, product specializations and

expansion of the product assortment and/or production processes became more extensive and complicated, the division of labour inherently represented a labour-organization structure which encompassed multiple levels. Division of tasks according to training, skills, age and gender also resulted in differentiated remuneration and accentuated social and economic differences.<sup>14</sup> This is, of course, a description of the culmination of a process which took place over a number of centuries, unmistakably originating in the middle ages. An illustrative example of the division of tasks in the highest echelon of an enterprise is a beer brewery in Delft in about 1550. In the largest breweries, the brewer-owner limited his activities to acquisition and sales while a journeyman took responsibility for actual production. Very early in its existence this branch of industrial activity was an excellent example of business expansion by means of diversification. In addition to brewing, the larger brewers had their workers make their own barrels (instead of purchasing them from coopers), and milled their own grain.<sup>15</sup>

Of course large-scale industrial activities developed from hand-crafting via transitional and intermediate forms. In areas where the scope of production per business was limited by guilds - beer brewing in Haarlem in the fifteenth century, for example - some brewers tried to get other small businesses to work for them by entering into certain contracts. In Delft, too, small brewers produced for colleagues with more financial strength: *op souldij*, which means producing for wages in one's own small enterprise with one's own means of production while the raw materials are purchased at the expense of a big brother.

Incidentally, these examples indicate that economic and social differentiation took place not only within a business, between the proprietor and the personnel. The differences between proprietors themselves became more pronounced as traditional restrictions were relaxed.

An example of disintegration of the traditional craftsman structure and the evolution of large-scale types of business and organizational structures can be seen in the textiles industry in general and in the production of *laken* (fine cloth) in particular. As early as the second half of the fourteenth century, a putting-out system is seen in which the draper had the various people involved in processing the wool (such as weavers, fullers, dyers and numerous others) working for him.<sup>16</sup>

The evolution of the putting-out system was facilitated by the special nature of textiles production. The large number of partial processes which the raw material had to pass through meant that extensive labour specialization was seen virtually from the beginning.

Initially, a variety of limitations were applicable, restricting unlimited growth of the enterprise and production, but this does not alter the fact that the putting-out system's organizational structure resulted in inequality between drapers and those working for them, who, as a result, were no longer independent producers. Incidentally, the maximum production limits were so high that differences in economic and social status were also seen between the drapers themselves.

In the seventeenth century these trends became increasingly evident. The scope of the businesses increased in many branches of industry. The traditional craftsman structure continued to fade away in many branches. Division of labour and hierarchization characterized an increasingly large part of industrial activities. Even though the traditional craftsman-based businesses continued to represent a numerical majority, the economic importance of these businesses declined, in part due to the rapid growth of new types of enterprises which were not based on the traditional craftsman structure.

Restrictions concerning the number of personnel, means of production and output were eased or removed, and often even never applied in new branches. Egalitarian equalization objectives dominated business operations less than ever before. To an increasing extent, entrepreneurs were free to allocate production factors as they saw fit. The attempt to ban all competition originating in the middle ages faded more and more into the background. The sometimes highly-detailed regulations concerning production methods, pricing, and quality laid down by the government, guilds or related commercial organizations did restrict commercial freedom, but the trend towards *liberteyt* (liberty) is unmistakably visible.<sup>17</sup>

One branch which soon reflected the factory system of the future was the shipbuilding industry. Wharfs with tens or hundreds of workers were commonplace. As the number of workers grew, division of labour and other types of rational, productivity-increasing organizational structures increased. At times, as many as 1,000 employees worked at the Dutch East India Company wharf in Amsterdam! More than 150 great ships for return shipping with Asia and 217 smaller ships were built there in the seventeenth century.<sup>18</sup> The size of the larger businesses is in part explained by the fact that the various suppliers, such as rope yards, anchor forges and pulley makers, were integrated into the shipbuilding enterprise.

In the textiles industry as well, the seeds of large-scale, centralized production were present. Starting in the 1630s, financially strong entrepreneurs - known as *reders* - departed from the putting-out organizational system. They wanted as many partial processes as possible carried out in their own workshops. Fine-cloth workers (*lakenarbeiders*) followed their example. Thus as a reaction to changes on the demand side - including changing fashions

and a demand for better quality - scattered, de-centralized, small-scale businesses made way for an organizational system in which the successive partial processes leading up to the finished product were concentrated: manufacturing. The putting-out system, however, continued to dominate industrial activities and was free to flourish in new branches.<sup>19</sup> But the tone for the future had been set.<sup>20</sup>

It was in the larger enterprises in particular that the "industrialists" attempted to evade and breach production limits and other detailed regulations, with varying degrees of success. As far as the organizational structure was concerned, the economic and social distance between the managing owner or the master craftsman hired by him as production manager and the helpers working in the workshops for wages was even greater than in the putting-out system, which in itself was differentiated.

A situation in which business expansion, hierarchization, differentiation and commercial freedom were increasingly determinant for the future was characteristic of many of the new branches and specialist fields already referred to. The lack of tradition undoubtedly contributed to the fact that the equalizing regulations which were inherent to the traditional craftsman structure were not seen in these new branches. Guidelines laid down by the government concerning labour conditions, number of personnel, organizational structure, apprenticeship system, wages and prices, or pertaining to the quality and size of production or to competition and sales played a far-less important role in these branches.

Certainly, proprietors - sometimes sanctioned by the government - reached agreements amongst themselves with the intention of monopolizing the market or controlling quality, but limitations on the number of personnel or production based on an egalitarian view of society which was characteristic of the traditional craftsman structure had long since disappeared in large-scale businesses and new types of enterprises. To an increasing degree, dynamics, expansion, technological creativity and commercial instincts were able to flourish. Naturally, traditional organizational structures sometimes remained intact (such as the shipbuilding guilds<sup>21</sup>), but their function and methods were attuned to the demands of large-scale enterprise and "modern" entrepreneurs. In short, it can certainly not be said that enterprisers in the seventeenth century enjoyed absolute freedom, but they were able to set their own course to a greater extent than ever before.

## 7. Tension and conflict

Attempts to increase commercial freedom and ease regulation often led to tension and a variety of conflicts. Master craftsmen who had no means of expanding their small businesses and level of production defended themselves against trends towards de-equalization and were far from pleased with relaxation of the traditional craftsman organizational structure and guild regime.<sup>22</sup>

At the end of the sixteenth century, an attempt was made to keep contractors from the construction industry in Amsterdam. Regulations were made more stringent; fines were increased. The concentration of carpenters, bricklayers and other construction workers, however, proved to be difficult to stop.<sup>23</sup> Similar reactions were seen in a wide variety of traditional crafts: limitations on commercial freedom, resistance to commercial expansion, concentration and diversification. The establishment of a number of new guilds can also be interpreted as an attempt to turn the tide.<sup>24</sup>

In cases where the authorities gave in to the resisting master craftsmen by tightening and expanding protective, restrictive guidelines, this could be considered making concessions, but these concessions were primarily concessions to the sectors working on order and/or solely for the local market, or for branches not yet infiltrated by trade capital to any significant degree.<sup>25</sup> But the repeated announcement of stipulations and violations of the rules indicate that even then, despite the emphasis placed on the profile of the small-scale business sector, the erosion of the traditional craftsman structure was a topic of continued concern and that sometimes successful measures were immediately undermined.

To an increasing degree, the scales were tipping in the other direction. It proved to be impossible to maintain production restrictions and extensive regulation in the beer-brewing industry in Delft around 1550.<sup>26</sup> Unsuccessful attempts were made to limit the growth of large-scale businesses. The dependency of the small-scale businesses working for wages was a fact of life. Despite the resistance of small-scale entrepreneurs, expansion of the number of helpers and shearers in fine cloth production in Leiden could not be stopped. Workshops came to exist where tens of dozens of helpers were employed. An attempt to limit the size of pressing houses was short-lived.<sup>27</sup>

Seen from a perspective in which growing commercial activities would prove to conquer the future, the tension between drapers and *reders* is particularly illustrative. Just as the putting-out system designed by the drapers succeeded in breaking through numerous traditional limitations despite continued regulation, the commercial policy of the financially-powerful *reders* can be viewed as an unambiguous attempt to continue along the path of deregulation and commercial freedom. The drapers felt threatened and resisted with all their might, and not without success.

Despite the trend towards disintegration, the putting-out system continued to set the tone in the textiles industry.<sup>28</sup>

But the erosion and undermining of restrictive types of businesses and labour organizational structures is not only indicated by conflicts among the entrepreneurs themselves. The tension between master craftsmen and their helpers also illustrates the attempts which were made to break loose from the traditional craftsman pattern. One example is the ungranted request submitted by delftware potters' helpers in Rotterdam around 1640, asking that the patrons take on no more than one apprentice every two years. This was a reaction to the guild's decision to allow master craftsmen to take on as many helpers as they wanted and to put five young apprentices to work painting.<sup>29</sup> With this example I am alluding to a type of conflict which will be discussed below, in which not only the results of deregulation were threatened, but also the job market situation, working conditions and wage levels; in short: a clash between "capital" and "labour".

It can be concluded that industrial activities underwent certain identifiable changes starting in the middle ages. Traditional crafts and guilds in a variety of sectors were crowded out by the putting-out system, workshops and large-scale businesses. The growing social distance between the producers, extensive division of labour and various forms of deregulation and de-equalization foreshadowed the future. Although businesses with traditional craftsman structures continued to be in the majority numerically, and defensive reactions from this sector resulted in tightened regulation and the expansion or establishment of new guilds, the face of industrial activities was being determined to an increasing degree by the changes. The fact that most of the new enterprises and specializations to see the light of day, after 1580 in particular as a result of spin-offs from international trade, did not have a traditional-craftsman structure can be said to have determined the image of industrial activity in the Golden Age. I will now discuss "capital" and "labour" in detail in an attempt to bring that image into sharper focus.

## 8. Capital

Parallel to the business typology described above, a distinction can be made between types of entrepreneurs: the master craftsman, the home industrial, the owner of middle-sized and large enterprises such as various workshops, wharfs and peat-cutting businesses.<sup>30</sup> The capital required for setting up and running these enterprises varied considerably. The master craftsman needed little or no capital. His helpers had their own tools. If work was done on order, the raw materials and semi-finished products were purchased at the principal's expense. Although the differences in income and wealth of the masters within a given craft were relatively small - in accordance with the effort to keep social-economic differences at a minimum - the need for capital varied considerably from one traditional craft to another. Investments in capital goods such as boilers, presses, barrels, and ropes required more funds than simple hand-held tools.

The capital needed for a drapery was in itself relatively modest, although some financial reserves were necessary, both for the acquisition of quality wool and because of the low turnover of capital inherent to the complicated, time-consuming production and distribution processes. But those who wanted to employ more than a few weavers and other partial-processors needed to invest more. Initially, an attempt was made to prevent large differences in capital strength by imposing production maximums. Despite this fact, differentiation increased. For many were unable to fill their quota. The large draperies succeeded in making almost all the partial-processors dependent on them, but their weaker colleagues often missed the financial stamina needed to have fabrics finished - which is what lent fabrics their value - at their own expense. Sometimes, drapers with the financial strength to do so agreed to finance the means of production for some partial-processors - weaving looms in particular. This made it possible for them to reduce production costs, thus accentuating the differences between the larger and smaller drapers.

The fact that the capital strength of the various drapers varied significantly is a warning that we should not blindly assume that this profession almost by nature played a more important economic and social role than the master craftsmen who were dependent on the drapers. Dyers, dry-shearers and *apprêteurs* (who finished the fabric) in particular who used their own capital goods and raw materials succeeded in holding their own among the "leaders" in the putting-out system.

In places where the traditional craftsman structure was eroded or the putting-out system was crowded out by centralized production of high-grade fabrics in workshops<sup>31</sup>, increased capital strength was required from business owners. Commercial expansion required higher and higher investments in raw materials, capital goods and workers' wages; naturally not always in the same ratio.

It is striking that the new businesses and specializations which typified industrial activities in the Dutch Republic after 1580 were more capital-oriented than wage-oriented. This is particularly true for the businesses concentrated in

port cities, where relatively expensive raw materials and ancillary materials were imported and primarily exported again after "refinement".<sup>32</sup>

But capital was sometimes also required for purposes other than wages in sectors where lower-grade goods were made. In the various types of windmills used for industrial purposes, wage expenses were relatively low. In the Zaan area - the rural district with the highest density of industrial windmills in the entire Republic - only five or six workers were needed to run an oil mill operating day and night.<sup>33</sup>

Energy consumption also claimed a relatively greater share of capital expenses. In addition to an absolute increase in part as a result of changes in production processes and application of new techniques, coal imported from Great Britain and Luik, which was relatively expensive, was being used more and more instead of inexpensive inland peat. This was not only true for new branches. Existing businesses such as beer breweries were switching to coal more and more often.<sup>34</sup>

Moreover, entrepreneurs profited from rapid technological development. Albeit slightly delayed, inventions were also put to use in industrial activity.<sup>35</sup> Although the application of tools and techniques increased expenses, it resulted in increased production, improved quality and reduction of labour. In order to limit costs, investments were sometimes collective. In 1617, for example, twelve brewers in Amsterdam collectively equipped a horse-driven mill for grinding malt.<sup>36</sup>

Technological innovations requiring capital were seen in almost all sectors irrespective of whether they required more working capital or increased wage expenses. The productivity in the shipbuilding sector, for example, was greatly stimulated by the use of chains, a variety of windlasses, pulleys and dry docks.<sup>37</sup> In the textiles industry, the use of the ribbon mill invented in 1604 resulted in an enormous increase in production. Until then, the weaver could make only one ribbon at a time on his loom; the mill made twelve at once while almost completely mechanising the process.<sup>38</sup> A new method for the production of gilt leather introduced in 1628 resulted in a considerable increase in quality. The material known as Dutch gilt leather was soon an extremely popular product.<sup>39</sup> How labour-saving innovations were to result in far-reaching technological unemployment is seen in the example of the sawmill invented in the 1590s. Increased use of this invention took the bread out of the mouths of manual sawyers everywhere.<sup>40</sup>

Expanded production and standardization resulting from innovations were translated into a reduction of the production costs per unit for the entrepreneur despite the required investment. Moreover, when this reduction was expressed in consumer prices, production became more competitive and sales increased. The shipbuilding industry shows salient examples in this respect. But the opposite effect was also seen. In the luxury-goods industry in particular, the improved quality resulting from new technological applications sometimes resulted in significant price increases, and even when production costs increased, profits soared. Passchier Lammertijn, a damask worker early in the seventeenth century, received much more than his colleagues for the tablecloths and napkins made on his patented looms. Patents prevented colleagues from using his inventions, and their products were of an inferior quality.<sup>41</sup>

In addition to technical improvements and newly-invented tools, production methods and the like, the entire scope of industrial activities saw numerous product innovations. I will mention two. Shipbuilders gave Dutch East India Company ships double hulls in the first decade of the seventeenth century in order to protect them from piddocks and to limit damages.<sup>42</sup> In the canon-casting industry in about 1630, canons were made from a combination of copper, iron and lead whose calibre equalled that of the heaviest bronze pieces but which weighed only half as much.<sup>43</sup>

Finally we have the required investments in commercial buildings and sites, which formed the largest fixed-capital expenditure in the pre-industrial era. Depending on the size of the business, these expenditures were sometimes considerable. For the craftsman, his home with adjoining workshop was usually sufficient, and the putting-out system required only limited space, certainly when production and the number of machines and producers was restricted by maximums. Enterprises with centralized production and many workers had entirely different requirements. For the dozens of looms and sometimes more than one hundred workers (including many women and children) working in the various workshops of the textiles industry after about 1630, a modest home-workshop was, of course, much too small.<sup>44</sup> A specially-constructed building in Leeuwarden for the production of wool fabrics was 90 feet long and 30 feet wide, and is said to have had six storeys.<sup>45</sup> In terms of surface area and buildings, the wharfs and related suppliers for the Dutch East India Company in Amsterdam resembled a modern-day factory complex.<sup>46</sup> Naturally, capital became less mobile once investments had been made in real estate. This may be one of the reasons why when - in an attempt to limit wage costs - the textiles industry started moving from the towns in Holland to sandy rural areas after 1640, the putting-out system was moved earlier than the manufacturing activities.

Insofar as investments were involved, one must wonder to what extent the combination of wage costs with potential expansion of production, standardization and/or quality improvement influenced the introduction of advanced technology. Technological unemployment (sawing has already been mentioned, but this phenomenon was

also seen in the textiles industry) would support the hypothesis that entrepreneurs took wage costs into consideration in their investment-related decisions. The fact that the wages in the Republic were high in comparison to elsewhere (resulting in a negative effect on the competitive position) and that interest rates in the Netherlands were low makes it an appealing hypothesis.

Little is known of actual investment behaviour. What was the relationship between internal and external capital in plans for starting or expanding commercial enterprises? Was there even a capital market open to industrial entrepreneurs? Did entrepreneurs want to be dependent upon that market?

In small-scale industry, and particularly when work was done on order and the raw materials were paid for by the principal, little capital was required. But in fields where the traditional-craftsman structure had been abandoned or which were traditionally characterized by a different type of business, things were different. In these fields, both fixed and current assets required considerable financial flexibility.

Internal financing by means of retaining profits was one possibility, but given the low profit margins, step-by-step expansion of this type (even when equalizing regulations had been reduced) could not have been easy. Whatever the case, weavers in Leiden in the fifteenth century were able - upon their own strength, I believe - to work themselves up to drapers and modest tradesmen-entrepreneurs.<sup>47</sup>

In professions such as beer brewer and maritime carpenter where craftsmen succeeded in permeating the highest economic and social echelons in the middle ages, capital generated in the craftsman's own business will not have played a major role; initially more important were legacies, family fortunes, private loans, and later also commercial loans and shares.

Striking is the fact that widely-varying businesses were combined, making it possible to concentrate profits and/or capital. The great drapers of Leiden received some of their income in the fifteenth century from operating brickworks and lime kilns, and from selling peat and wine.<sup>48</sup> Shipbuilders in Haarlem around 1550 were also active wine tappers and merchants.<sup>49</sup> In Hoorn, in addition to his activities for the government, Pieter Teding van Berkhout was involved in operating a beer brewery, a gunpowder mill, and an inn, and in trading shares in the Dutch West India Company.<sup>50</sup>

In addition to entering into widely-varying professional and commercial combinations, entrepreneurs turned to integration and diversification, both from the top of the production line down and from the bottom up. As many partial processes as possible were concentrated in the workshops of the large textiles enterprises. Shipbuilders integrated suppliers into their businesses. Brewery and coopers, as already mentioned, were united in one company.

But getting back to investment trends: more information is available about the manner in which funds for industrial activities and trade capital became entwined. As characteristic of merchants' behaviour in the early-modern era as the combination is, spreading risks and the urge to speculate undoubtedly resulted in dissimilar investments. Jan Jansz Kaerel, who gathered a sizeable fortune in the dairy trade, also owned a glass-blowing company when he died in 1616.<sup>51</sup> Integration of related activities was probably more common. The earliest drapers were retailers in finished fabrics.<sup>52</sup> Lumber merchants invested on a large scale, for example, in ownership of wharfs and mills for sawing lumber.<sup>53</sup> Fine cloth merchants (*lakenkopers*) were active in dry-shearing.<sup>54</sup> Thus merchants from a variety of sectors also turned into entrepreneurs, often leaving actual production - as was seen at soap works<sup>55</sup> - to a master craftsman or the former owner from whom the enterprise had been purchased. In the peat-cutting industry, investors usually hired a (business) manager to bear responsibility for organizing the work.<sup>56</sup>

The merchant's actual involvement was, of course, even more limited when he acted only as financier or shareholder. Using this construction, it was also possible to share risks with others. These shareholder's conglomerates evolved more or less as a matter of course when heirs refused to sell their shares, but sometimes these *partenrederijen* or shared enterprises came into being because other family members, friends, neighbours or fellow church members got involved. Industrial mills like the oil mills used in the Zaan area were often financed in this way.<sup>57</sup> The "shares" could be sold either in private or publicly, making it possible for outsiders to become involved in the business as well. Division into smaller "shares" often resulted in groups of dozens of owners.

Of course in cases where actual shares were involved, trade capital was not always the only capital invested. This is also true of loans and mortgages, for which funds originated with the same range of capitalists as was the case for shares.<sup>58</sup>

In addition to private capital, government funding also played a role in the financial support of industrial activities.<sup>59</sup> Various types of capital injections by government were seen. Towns offered the use of commercial buildings or contributed to housing-related expenditures. Costly capital goods such as cranes were also sometimes paid for by the authorities, and sometimes raw materials. But unregistered loans and mortgages were also extended. In the textiles industry in particular, commercial plans were often given the necessary financial backing in the interest of employment, in which cases not only interest-bearing but also interest-free loans were given. Supplying capital à

*fonds perdu* was also not uncommon. Inventories were sometimes mortgaged on extremely friendly conditions at the municipality's expense.<sup>60</sup> Initiatives for the establishment or expansion of businesses were often launched by council members. To counter premiums offered by other municipalities, however, towns robbed of a respectable share of their productive inhabitants often responded with equally active and even aggressive economic policies.

Combined with the availability of risk-bearing capital and low interest rates, these credit facilities contributed to the development of industrial activities in the Golden Age, albeit that the enthusiasm of capitalists for investing in industrial activities (and trade) was not as great as that for investing in land or bonds due to the risk factor in pre-industrial society.

Especially for the many aliens who immigrated to the Republic with insufficient means of support, for motives either religious or economic, in the hope of practising their original profession, government aid was important. Think in this respect of those from the Southern Netherlands whose "new draperies" influenced the textiles industry in particular after 1580 and whose fine cloth and other expensive fabrics represented an enormous boost for the industry after 1630. Their technical and commercial expertise was sizeable. Combinations of a variety of raw materials and the application of various weaving techniques resulted in a wide assortment of products. Throughout the years, more than 150 types and sub-types were introduced on the market in Leiden. The immigrants introduced less-expensive production methods, were willing to implement organizational improvements and other innovations, and were quick to respond to demand from other countries. This is true to an even greater extent for the financially-powerful large-scale fine cloth manufacturers - primarily originating from the Walloon provinces of Belgium - who set the tone of the industry after 1630.<sup>61</sup>

It was not only in the textiles sector that a leading role was played by foreign immigrants. Some examples: book printing and cartography also profited from a strong input from the Southern Netherlands; the glass industry from the Italians; pipe manufacturing from the English.<sup>62</sup> The last word has not been said concerning the scope and influence of this immigration, but it is certain that the introduction of new products, specializations in new or - to a lesser extent - existing business sectors, and a variety of technical, organizational and commercial innovations were given a powerful boost with the arrival of the immigrants. The newcomers had the best opportunities in locations or sectors where less-stringent residency requirements were applicable. In areas where they introduced specializations which were as yet unknown, even fewer obstacles hindered their industrial activities. Of course they, too, partook in a fair share of the conflicts with the crafts and guilds which wanted to maintain traditional organizational structures, but these rearguard actions usually signalled the end of the conflict.

When emphasis is placed on the achievements of the immigrants, I do not mean to imply that the foreigners were different from the Dutch entrepreneurs in terms of their desire to innovate and their progressive approach. Certainly, as was already stated, a traditionalist mentality was prevalent in certain sectors. But in numerous others - ship-building, for example - the "established" entrepreneurs certainly measured up to the "outsiders" in terms of technical innovation, commercial attitude and know-how in methods and markets.<sup>63</sup>

It will now be clear that starting in the second half of the fourteenth century, entrepreneurs began to play a significant role in industrial activities next to the master craftsmen. The fact that their role differed from the one traditionally seen in small-scale trade was in part a result of their investment behaviour, commercial organization, social origin and mobility in the relationship with their employees. This brings us to the question of the consequences of the disintegration of the traditional commercial organizational structures on the labour factor.

## 9. Labour

In the above, I mentioned the changing social relationships seen in sectors and businesses characterized by commercial expansion, increased production and division of labour. The disintegration of the traditional craftsman structure was accompanied by magnification of the social distance between masters and helpers. The opportunities for helpers to start for themselves diminished as they were required to pay more to be admitted to the guild and to complete a more difficult master's examination than the sons of established master craftsmen - who were sometimes not even required to produce a masterpiece.<sup>64</sup> When the organizational structure of production made division of labour possible, the training for all-round craftsmen was limited. All in all, even in sectors where businesses remained small-scale or the trend towards large-scale production stagnated, hierarchical relationships of a permanent nature evolved.

Increasing social inequality typifies to an even greater extent the putting-out system in the textiles industry, where the large-scale drapers ended up owning the means of production, thus undermining the independence of weavers and other partial processors, and basically forcing the status of wage labourer upon them.

The loss of independence and reduction to the status of labourer is perhaps best illustrated by the developments seen in the sawmills. Sawyers saw their income steadily increase in the course of the sixteenth century as the demand for sawed lumber grew. Originally earning less than carpenters and masons, sawyers climbed to the ranks of the best-paid craftsmen during the last decades of the century. The arrival of the sawmill - little is coincidental in economic history - marked the end of this development. Unemployment, decreasing wages and loss of independence were often the consequences of this labour-saving innovation. The future belonged to the mill - often financed by trade capital - where the owner or master craftsman oversaw the work of wage labourers, who could not even come close to achieving the same social and economic status of the sawyers of days gone by.<sup>65</sup>

These changes were also emphatically expressed in the changing remuneration structure. The difference in wages between master craftsmen and skilled helpers was initially minimal. Other helpers earned less, but age, experience and other qualities primarily determined the difference, which in itself was minor, rather than ownership of the business and any profit made. The wages of the supervisor and the helpers were usually fixed in detail.

However, in the putting-out system and in (large-scale) industry which was not characterized by the traditional craftsman structure, the inequality in remuneration grew proportionately with the growth of the enterprise. But these were not the only areas where this was seen: in small-scale industry - which retained a variety of traditional-craftsman characteristics - profits were not equally shared. While in the past the principal usually left the level of the helpers' wages to the master craftsmen, the proprietor now put aside a share for himself. If the enterprise employed five to ten helpers, the proprietor soon saw his daily wages double, enabling him to make a variety of investments.<sup>66</sup>

As far as we can tell, these wage deductions were not seen in the traditional craftsman structure until the end of the sixteenth century, but profitability and the accumulation of capital were probably accepted phenomena in other organizational structures many centuries earlier. As the number of helpers increased, the entrepreneur's profits increased, partly as a result of other profit-generating activities such as additional charges for expenses financed by the principal such as materials and tools.<sup>67</sup>

In large-scale industry in particular a growing demand for unskilled labourers was seen: a need which was fulfilled in a variety of sectors - brickworks and the textiles industry, for example - primarily by women and children. While the guild regime foresaw in training independent professionals, after the end of the sixteenth century the labour most needed by industry was cheap labour.

A distinction can be made between a variety of groups in the available labour force which were not freely interchangeable and which could not be considered employable irrespective of time, location and position. In the late middle ages and early modern era, we see differentiated labour potential. A variety of factors, such as educational level, experience, gender, age, possession of tools, geographic origin and institutional limitations, accentuated - of course to a given extent due to combinations of these factors - the heterogeneity of the labour force to an increasing degree, resulting in a highly segmented labour market. The dividing lines on that market were often determined by tension (between burgers and non-burgers, for example, or aliens and autochthons).<sup>68</sup>

## 10. Capital and labour

In order to sketch an accurate image of changes in the composition and function of the labour factor, let us return to the tensions caused by deregulation and de-equalization. The inequality caused by de-integration in small-scale industry resulted in conflicts which can be interpreted as clashes between "capital" and "labour", and which as such represent - forgive my use of a somewhat anachronistic term - class struggles of a sort.

As early as the second half of the fourteenth century, conflicts over wages between drapers and fullers in particular resulted in the most extreme cases in exoduses.<sup>69</sup> If tension could not be eased through discussions or other measures, the fullers left the municipality. Negotiations were then conducted from the new location. By leaving their home town, they removed themselves from the municipal judicial system, which considered the fullers to be in default and the demands of this troublesome group to be a threat to the social order and the existing political and economic structures. This type of conflict sometimes took a considerable amount of time to resolve. In 1478, negotiations involving fullers, helpers and master craftsmen from Leiden<sup>70</sup> who had moved to Gouda lasted no less than three months. Weavers also sometimes used the "exodus" strategy. More common, however, was the strike - and this is also true for other professions.

In city councils, where "capital" was always well-represented, either directly or indirectly, there was a strong desire to prohibit wage strikes, etc. Not only strikes in the literal sense, but even discussions and meetings concerning labour conditions were forbidden. The fact that "exoduses" and strikes started to take place indicates that, despite prohibitory and penal clauses, the labourers often found a way to organize properly. Professional solidarity was

sometimes even mandatory. During a strike in 1547, weavers in Leiden cried: "If anyone works they will be found and their work destroyed."<sup>71</sup>

The exodus appears to have been a typically medieval weapon. It was seen less and less after 1600. Municipal authorities clamped down on these actions and joined forces with the entrepreneurs.<sup>72</sup> As was already said, the strike gradually became the most effective weapon in the struggle for wages and other working conditions, such as drinking money, working hours and Sundays off. The dry-shearers were the most militant group, becoming the elite of the textiles manufacturers after 1580. The role played by the previously troublesome fullers ended with the introduction of the fulling mill. The fullers' ranks rapidly diminished after 1600 due to the technological unemployment resulting from this innovation. Confrontations between owners of the workshops which typified the dry-shearing industry (often fine cloth merchants who had succeeded in penetrating production with their trade capital) and their helpers resulted in harsh measures. The helpers regularly held meetings in which demands and tactics were discussed. Well-balanced cooperation which reached beyond municipal limits is seen in the strikes which broke out in various places simultaneously. Conflicts of interest were also regularly seen in other professional groups, where the strike was also used as a weapon.

As in earlier periods, professional solidarity was often mandatory and people willing to work were forced to join the campaigns. But cooperation among labourers never resulted in the establishment of permanent interest groups like today's labour unions. Repression from above was too extensive. Only collective health and funeral funds were tolerated.

While the organization of labour was being obstructed by any and all available means, entrepreneurs were given every freedom, often with extremely active support from the civil authorities. In addition to the guilds patronized by the officials, many sectors saw the birth of both local and regional employers' organizations with the explicit objective of preventing helpers from joining forces and campaigning for improved conditions.<sup>73</sup>

All in all, changes in the social-economic relationships between the various parties were the most visible in businesses and sectors where a relatively large number of labourers of varying quality were employed under a regime of extensive division of labour - for that time - with poor prospects for social improvement. Relationships in the putting-out system were more formal than in crafts, but the gap between the entrepreneur or master craftsman and the helpers in large workshops was even wider. Home workers were able to carry out their work in the manner they deemed suitable, retaining a certain degree of independence; in the workshops the helpers were constantly monitored, which also resulted in longer working hours. The absence of patriarchal relationships, the broadening social distance, the increasingly-strict monitoring and related stimuli for increased production therefore created a climate in which labour conflicts rapidly escalated.

From the perspective of the total sum of industrial activities, the number and scope of the "exoduses", strikes and other explicit confrontations can probably be considered modest in comparison to the industrialization period. In the traditional crafts, the patriarchal attitude was dominant. The structure of the putting-out system inherently represented an extremely low-profile relationship between capital and labour, while the isolation of partial processors which was inherent to the organizational structure of this system prevented these workers from joining forces. There was as yet no fertile soil for the radical class awareness seen in the nineteenth century within large-scale industry and production.

### *11. Institutions and economic growth*

In this essay, I have attempted to sketch the institutional and organizational framework within which industrial activities developed in the Dutch Republic in the period from about 1580 until the 1660s. In order to place this period in its proper perspective, the descriptions given are often based on the late middle ages. The background question was whether this vantage point can contribute to explaining the rapid, widespread economic growth in this sector during the Dutch Golden Age.

Using this perspective implicitly meant ignoring the demand side of development. Changes in the realm of demography, social stratification and mobility, income and wealth relationships, and consumer power were accepted as basic assumptions. In other words: fundamental factors which made expansion possible were consciously excluded from study (not in the last place due to a lack of sufficient detail studies).

At the same time, the relationships with other economic sectors which must have had an effect on the growth of industrial activity were not discussed. For example, intensification and specialization in inland farming not only stimulated the demand for industrial products, but also made it possible to produce crops such as flax, hemp and tobacco for industrial use. Equally obvious is the influence of trade on the supply of raw materials and shipment of industrial products.<sup>74</sup> The stimulating effect which the favourable economic development of trade had on the

shipbuilding industry is also self-explanatory.

However, while recognising the importance of demand and the influence of other sectors on the growth of industrial activities as described above, focus was placed on the supply side in general and its institutional framework in particular. For a thorough understanding of the processes described here, I would once again point out that it would have been difficult to steer clear of a variety of organizational obstacles had the institutional changes seen before 1580 not taken place, and the resulting rapid and widespread growth which typifies the increase in industrial activities in the Dutch Golden Age would have been much more difficult to achieve. After the fourteenth century - a bit earlier here, a bit later there - a variety of limitations pertaining to the scope of the enterprise, the number of personnel, the division of labour, output, etc. were lifted, as a result of which industrial activities were able to develop relatively freely after 1600, aided by the lucky stars of a favourable economic climate. By placing total emphasis on the undermining of the traditional craftsman structure as it began in the late middle ages, the deterioration of the guild regime, and the relevant changes which took place in the relationship between capital and labour, I have attempted to point out that an institutional and organizational foundation had been laid by the end of the sixteenth century which can be considered to have been one of the driving forces behind the growth which took place. The medieval legacy characterized by concepts such as de-equalization and deregulation was also one of the primary factors contributing to the disappearance of patriarchal relationships and the development of creative, innovative entrepreneurship. These are also factors which helped expand the limits of economic growth during the seventeenth century. Naturally it would be taking things too far to claim that this legacy represents the primary cause of the striking developments which took place after 1580, but it can certainly be considered one of the prerequisites.

When viewed from this premise, the changes and innovations which took place in the seventeenth century seem even more pronounced. Innovative views concerning profession and enterprise gained support and made it possible to integrate immigrants, to apply labour-saving innovations and to expand competitive practice with almost no difficulties.

In short, on the one hand I see the direct influence exerted by changes on the demand side on the increase in production capacity, the creation of more large-scale types of businesses, new types of labour organizational structures, modernized financial possibilities, innovations, expansion of product lines, and quality improvement, but on the other hand I recognise a relationship which is exactly the opposite. The institutional and organizational innovations were prerequisites for increasing productivity. They also contributed to the creation of an attractive product which had its effects on demand.

## 12. *Causa efficiens or conditio sine qua non?*

In order to refrain from forcing sixteenth-century industrial activity into the anachronistic mould of modern industrial capitalism, I would leave you with a few thoughts to place things in their proper perspective.

Part of the industrial sector resisted the institutional changes. Defensive reactions, sometimes supported by the government, were particularly successful in sectors oriented towards the local market. When traditional structures were departed from, the concept of commercial freedom cannot always be considered applicable in its literal definition. In many cases, authorities employed regulations, regulatory bodies or officials in their attempts to "direct" commerce.<sup>75</sup> Think in this respect of quality control in the textiles industry and wage regulations pertaining to a variety of secondary employment conditions in various sectors. It must also be remembered that "modern" entrepreneurs, as opportunistic as they were, also often collectively attempted to establish restrictive measures. This fact reminds us that the distinction between these entrepreneurs and the guild members is not as strict as it may seem.<sup>76</sup> But, in general, I might add that it is difficult to deny that the regulations laid down by the government or their own professional organizations binding non-traditional entrepreneurs were less stringent than those found in the traditional situation.

Moreover, in order to keep the situation in its proper perspective, I would remind readers that small-scale enterprise in the era of the Republic was dominant in terms of numbers. Based on available studies, it is difficult to determine what the relationship is between the influence of the traditional craftsman system and its contribution to economic growth and that of early capitalistic businesses. I may very well be overestimating the importance of the latter. However, considering the fact that even in sectors where the traditional craftsman structure and guilds continued to exist, "modern" influences were seen, the following conclusion remains valid: as early as in the late middle ages, industrial activity (in interaction with demand and the opportunities made available by other economic sectors) was in many ways able to develop freely, according to individual insights.<sup>77</sup> Thus at the end of the sixteenth century, an institutional and organizational foundation had already been laid for unprecedented economic growth, which developed rapidly and easily. In short, a foundation which I would not consider to be a *causa efficiens*, but

which I do view as a conditio sine qua non.<sup>78</sup>

## Notes

\*. Translation: L.S. Granger.

1.. Two revered traditions in Dutch economic historiography originating in the nineteenth century: the Historical School and historical materialism (see L. Noordegraaf, 'Anders maar ook eender; Economische geschiedschrijving in Nederland 1922-1992', M.M.G. Faxé & I. Van der Zijpp (eds), *Samenleving en economie in de twintigste eeuw* (Leiden 1992) 505-521.

2.. Unlike the situation in the Leiden fine-cloth industry, the textiles industry in and around Haarlem may have experienced extensive expansion (tentative results of a doctorate study being carried out by Herman Kaptein, Department of Economic and Social History, University of Amsterdam).

3.. L. Noordegraaf, 'Nijverheid in de Noordelijke Nederlanden 1490-1580' and L. Noordegraaf, 'Nijverheid in de Noordelijke Nederlanden 1580-1650', *Algemene geschiedenis der Nederlanden*, (Haarlem 1979) VI: 12-26; VII: 66-85; P.C. Jansen, 'Nijverheid in de Noordelijke Nederlanden 1650-1780', *Algemene geschiedenis der Nederlanden* (Haarlem 1979) VIII: 102-123. These articles include extensive bibliographies of literature published before 1979.

4.. See, for example, S. Hart, 'Geschrift en getal; Onderzoek naar de samenstelling van de bevolking van Amsterdam in de 17e en 18e eeuw, op grond van gegevens over migratie, huwelijk, beroep en alfabetisme', S. Hart, *Geschrift en getal; Een keuze uit de demografisch-, economisch- en sociaal-historische studiën op grond van Amsterdamse en Zaanse archivalia* (Dordrecht 1979) 128-129.

5.. N.W. Posthumus, *De geschiedenis van de Leidsche lakenindustrie* (Den Haag 1939) III: ch. 1 and 7.

6.. J.L. van Zanden, *Arbeid tijdens het handelskapitalisme; Opkomst en neergang van de Hollandse economie, 1350-1850* (Bergen 1991) ch. 2.

7.. A.M. van der Woude, *Het Noorderkwartier; Een regionaal historisch onderzoek in de demografische en economische geschiedenis van westelijk Nederland van de late middeleeuwen tot het begin van de negentiende eeuw* (AAG Bijdragen 16 (1972)/Utrecht 1972) II: ch. 5 and 6.

8.. Respective references for these branches are: J. Hollestelle, 'De Nederlandse steenbakkerij in de zeventiende en achttiende eeuw', *Economisch- en Sociaal-Historisch Jaarboek* 44 (1982) 11-21; K.A.H.W. Leenders, *Verdwenen Venen* (n.p. 1989).

9.. R. Hardonk, *Koormullenaers, pampiermaeckers en coperslaghers; Korte historie der waterradmolens van Apeldoorn, Beekbergen en Loenen* (Apeldoorn 1968).

10.. J.A. Faber, H.A. Diederiks & S. Hart, 'Urbanisering, industrialisering en milieuaantasting in Nederland in de periode van 1500 tot 1800', *AAG Bijdragen* 18 (1973) 251-271.

11.. K.P.J. Janse, 'De koptienden als bron voor de economische geschiedenis van het Gooi, 1500-1850', *Economisch- en Sociaal-Historisch Jaarboek* 55 (1992) 60-66.

12.. See note 3 and L. Noordegraaf, 'Betriebsformen und Arbeitsorganisation im Gewerbe der nördlichen Niederlande 1400-1800', K. Fritze *et al.* (eds), *Gewerbliche Produktion und Stadt-Land Beziehungen* (Weimar 1979; Hansische Studien IV) 54-64.

13.. J.P.A. Stroop, *Molenaarstermen en molengeschiedenis* (Arnhem 1979<sup>2</sup>).

14.. See note 64 et seq. below.

15.. J.J. Woltjer, 'Een Hollands stadsbestuur in het midden van de 16e eeuw; brouwers en bestuurders te Delft', D.E.H. de Boer & J.W. Marsilje (eds), *De Nederlanden in de late Middeleeuwen* (Utrecht 1987) 264-266.

16.. Recent studies on the old-style drapery and on the role played by female labour: A.J. Brandt, 'Crisis, beleid en differentiatie in de laat-middeleeuwse Leidse lakennijverheid', and E.M. Kloek, 'De arbeidsdeling naar sekse in de oude draperie', J.K.S. Moes & B.M.A. de Vries (eds), *Stof uit het Leidse verleden; Zeven eeuwen textielnijverheid* (Utrecht 1991) 53-56; 67-75; E.M. Kloek, *Wie hij zij, man of wijf; Vrouwengeschiedenis en de vroegmoderne tijd* (Hilversum 1990) 48-77; M.C. Howell, *Women, production and patriarchy in late medieval cities* (Chicago 1986).

17.. See also B.M.A. de Vries, 'De Leidse textielnijverheid in de zeventiende en achttiende eeuw', J.K.S. Moes & B.M.A. de Vries, *Stof uit het Leidse verleden; Zeven eeuwen textielnijverheid* (Utrecht 1991) 82.

18.. F.S. Gaastra, 'Arbeid op Oostenburg; Het personeel van de kamer Amsterdam van de Verenigde Oostindische Compagnie', *Van VOC tot Werkspoor; Het Amsterdamse industrieterrein Oostenburg* (Utrecht 1986) 67.

19.. D.J. Henstra, 'Kantnijverheid te Leeuwarden in de 17de en 18de eeuw', *De Vrije Fries* 72 (1992) 76.

20.. Th. van Tijn, 'Pieter de la Court. Zijn leven en zijn economische denkbeelden', *Tijdschrift voor Geschiedenis* 69 (1956) 312-315.

21.. R.W. Unger, *Dutch shipbuilding before 1800; Ships and guilds* (Assen/Amsterdam 1978) 78 ff.

22.. L. Noordegraaf, 'Tussen ambacht en manufactuur; Vroegkapitalistische productie- en klassenverhoudingen in de Alkmaarse textielnijverheid, 1500-1800', *Economisch en Sociaal-Historisch Jaarboek* 44 (1982) 127.

23.. H.P.H. Nusteling, *Welvaart en werkgelegenheid in Amsterdam 1540-1860; Een relaas over demografie, economie en sociale politiek van een wereldstad* (Amsterdam/Diemen 1985)

150.

24.. W. van Ravesteyn Jr., *Onderzoekingen over de economische en sociale ontwikkeling van Amsterdam gedurende de 16e en het eerste kwart der 17e eeuw* (Amsterdam 1906) 75-166.

Resistance to de-equalization was not the only important factor. Competing with small rural businesses in particular was an equally important objective. It was also one of the reasons why the protection which city councils, who recognized the economic and social importance of a powerful middle class, gave by granting their demands was rational.

25.. See M. Prak, 'Sociale geschiedschrijving van Nederlands Ancien Régime', L. Noordegraaf (ed.), *Ideeën en ideologieën; Studies over economische en sociale geschiedschrijving in Nederland 1894-1991* (Amsterdam 1991) II: 626-634.

26.. Woltjer, 'Een Hollands stadsbestuur', 267-268.

27.. W.S. Unger, 'Zeventiende-eeuwse ondernemersorganisaties', *De Socialistische Gids* 4 (1919).

28.. Van Tijn, 'Pieter de la Court', 321.

29.. A. Hoynk van Papendrecht, *De Rotterdamse plateel- en tegelbakkers en hun product 1590-1851* (Rotterdam 1920) 133.

30.. Cf. D.G. Carasso, 'Amsterdams nijverheid in de 17e en 18e eeuw', *Ons Amsterdam* 35 (1983) 198.

31.. For details of the various fabrics and raw materials: L. Noordegraaf, 'The New Draperies in the Northern Netherlands between the sixteenth and eighteenth centuries', N. Hart (ed.), *The New Draperies in the Low Countries and England* [1993].

- 32.. P.G. van Durenen, 'Gilden, trafieken en de rol van de overheid', *Jaarboek voor de geschiedenis van bedrijf en techniek* 5 (1988) 415-416.
- 33.. L.A. Ankum, 'Een bijdrage tot de geschiedenis van de Zaanse olieslagerij', *Tijdschrift voor Geschiedenis* 73 (1960) 246.
- 34.. For the underestimated importance of coal in comparison to peat, see: R.W. Unger, 'Energy sources for the Dutch Golden Age; Peat, wind and coal', *Research in Economic History* 9 (1984) 221-253.; G.J. Borger, 'Peatland exploitation in the Low Countries', M.G.C. Schouten & M.J. Nooren (eds.), *Peatlands, economy and conservation* (Den Haag 1990) 15-21.
- 35.. C.A. Davids, 'De technische ontwikkeling van Nederland in de vroeg-moderne tijd; Literatuur, problemen en hypothesen', *Jaarboek voor de Geschiedenis van Bedrijf en Techniek* 8 (1991) 9-37.
- 36.. J.G. van Dillen, *Van rijkdom en regenten; Handboek tot de economische en sociale geschiedenis van Nederland tijdens de Republiek* (Den Haag 1970) 202.
- 37.. R.W. Unger, 'Technology and industrial organization; Dutch shipbuilding to 1800', *Business History* 18 (1975) 64.
- 38.. J. Vogel, 'De zijdelintindustrie te Haarlem, 1663-1780', *Jaarboek voor de geschiedenis van bedrijf en techniek* 3 (1986) 77-78.
- 39.. E. Koldewij, 'Reliefs in goud; Goudleerbehang van de zestiende tot de achttiende eeuw', *Volkscultuur; Tijdschrift over tradities en tijderschijnselen* 9 (1992) 26.
- 40.. Davids, 'De technische ontwikkeling', 22.
- 41.. H. Kaptein, 'Passchier Lammertijn: uitvinder of bedrieger?', *Alkmaarse Historische Reeks* 9 (1993).
- 42.. R. Parthesius, 'De dubbele huid van Oostindiëvaarders aan het begin van de 17de eeuw', *Batavia-cahier* 3 (1991) 25-29.
- 43.. B. Westera, 'Gotelingen en mignons', *Cultuur Historisch Jaarboek voor Flevoland* (1992) 38-39.
- 44.. J. Klinkenberg, *Meesters, kooplieden, fabrikeurs; Vroegkapitalisme in de Utrechtse textielnijverheid in de late middeleeuwen en vroegmoderne tijd* (Amsterdam 1991; Master's thesis, Department of Economic and Social History) 29-32.
- 45.. P.G. Hoftijzer, 'Opkomst en ondergang van een Engelse wolfabriek te Leeuwarden in 1685', *De Vrije Fries* 71 (1991) 77-78.
- 46.. J.B. Kist, 'De VOC op Oostenburg. Gebouwen en terreinen', *Van VOC tot Werkspoor; Het Amsterdamse industrieterrein Oostenburg* (Utrecht 1986) 13-34.
- 47.. See notes 66-67 below. Cf. for a career from craftsman to merchant: C. Schmidt, *Om de eer van de familie. Het geslacht Teding van Berkhout 1500-1950; Een sociologische benadering* (Amsterdam 1986) 20. It is unknown to what extent entrepreneurs gave up their original activities after successfully entering into trade (unlike merchants who invested in industrial activities).
- 48.. Brandt, 'Crisis', 63.
- 49.. A.F.J. Niemeijer, *Van accijnsbrief tot Zuidam; Scheepsbouw te Haarlem van 1274 tot heden* (Haarlem 1990) 25.
- 50.. Schmidt, *Om de eer van de familie*, 41.
- 51.. J.A. Faber, 'De Noordelijke Nederlanden van 1480 tot 1780; Structuren in beweging', *Algemene geschiedenis der Nederlanden* (Haarlem/Bussum 1980) V: 224.
- 52.. F.J.W. van Kan, *Sleutels tot de macht; De ontwikkeling van het Leidse patriciaat tot 1420* (Hilversum 1988) 80-81, 232.
- 53.. A. van Braam, 'Over de omvang van de Zaanse scheepsbouw in de 17e en 18e eeuw', *Holland* 24 (1992) 35.
- 54.. Noordegraaf, 'Tussen ambacht en manufactuur', 130.
- 55.. Van Dillen, *Van rijkdom en regenten*, 207.
- 56.. T. Stol, *De veenkolonie Veenendaal; Turfwinning en waterstaat in het zuiden van de Gelderse Vallei, 1546-1653* (Zutphen 1992) 162.
- 57.. Ankum, 'Een bijdrage', 242-243.
- 58.. R.S. Duplessis, 'Capital and finance in the early modern Veluwe paper industry', *AAG Bijdragen* 28 (1986) 190-192. Supplier's credit facilities lent to entrepreneurs by merchants is also discussed.
- 59.. For other facilities, see the article by M.C. 't Hart in this volume.
- 60.. A. van Diepen & H. Fuhri Snethlage, *Haarlem en Hals* (Haarlem 1990) 57; Z.W. Sneller, 'De stapel der Westfaalsche linnen te Rotterdam 1669-1672', Z.W. Sneller, *Rotterdamse bedrijfsleven in het verleden* (Amsterdam 1940) 89-90.
- 61.. The same type of situation was seen shortly after the period discussed here with the arrival of the Huguenots.
- 62.. See J.G.C.A. Briels, *Zuidnederlandse boekdrukkers en boekverkopers in de Republiek der Verenigde Nederlanden omstreeks 1570-1630; Een bijdrage tot de geschiedenis van het boek* (Nieuwkoop 1974); P.W. Klein, 'Nederlandse glasmakerijen in de zeventiende en achttiende eeuw', *Economisch- en Sociaal-Historisch Jaarboek* 44 (1981) 34-38; C.A. Davids in this volume, ad note 65.
- 63.. In the discussion on the influence of immigrants (with the chauvinistic undertones inherent to such a discussion), too much emphasis is placed on the number of aliens and their immediate economic activities. The 'radiation' of their inventiveness resulting in new 'Dutch' ideas must also be taken into consideration. For a minor but surprising example of the commercial instinct of these foreigners, see: L. Noordegraaf, 'Van Manders Schilders-bouck in delen; Creativiteit en commercie verenigd', *Archivaria* 5 (1992) 26-33.
- 64.. P.H.M.G. Offermans, *Arbeid en levensstandaard in Nijmegen omstreeks de Reductie (1550-1600)* (Zutphen 1972) 77-106. For the apprenticeship system, see: R. de Jager, 'Meester, leerjongen, leertijd; Een analyse van zeventiende-eeuwse Noord-Nederlandse leerlingcontracten van kunstschilders, goud- en zilversmeden', *Oud-Holland* 104 (1990) 609-109; Nusteling, *Welvaart en werkgelegenheid*, 150-151.
- 65.. L. Noordegraaf, *Daglonen in Alkmaar 1500-1850* (Amsterdam 1980) 69-71; L. Noordegraaf & J.T. Schoenmakers, *Daglonen in Holland 1450-1600* (Amsterdam 1984) 40. See also the article in this volume by Jan de Vries.
- 66.. L. Noordegraaf, *Hollands welvaren?; Levensstandaard in Holland 1450-1650* (Bergen 1985) 61-66.
- 67.. Expressively described in: I. le Long, *De kunst om Geldt te winnen* (Amsterdam 1717).
- 68.. Studies of this topic have only just been initiated. In addition to the article in this volume by Jan de Vries, see the detailed case study: A. Knotter & J. Luiten van Zanden, 'Immigratie en arbeidsmarkt in Amsterdam in de 17e eeuw', *Tijdschrift voor Sociale Geschiedenis* 13 (1987) 403-431 (also in Van Zanden, *Arbeid*, ch. III). For a 'speech of the day' brief discussing various possible areas of study, see: L. Noordegraaf, 'Arbeid en arbeidsmarkt. Recent onderzoek in historiografisch perspectief', *Tijdschrift voor Sociale Geschiedenis* 13 (1987) 357-372.
- 69.. For the following, see: R. Dekker, 'Labour conflicts and working-class culture in early modern Holland', *International Review of Social History* 35 (1990) 377-420.
- 70.. The master craftsman in the putting-out system was the intermediary between 'capital' and 'labour' and was generally increasingly dependent on the entrepreneurs with capital, raw

materials and tools. See also: K. Spading, *Holland und die Hanse im 15. Jahrhundert. Zur problematik des Uebergangs vom Feudalismus zum Kapitalismus* (Weimar 1973) 105-117.

71.. Quoted in: Dekker, 'Labour conflicts', 388.

72.. How this relates to the new political relationships in the Republic after 1580 will not be discussed here.

73.. J. Lucassen, *Jan, Jan Salie en diens kinderen. Vergelijkend onderzoek naar continuïteit en discontinuïteit in de ontwikkeling van arbeidsverhoudingen* (Amsterdam 1991) 26, 34.

74.. See the articles in this volume by Bieleman and Lindblad. This does not mean that I, like J.I. Israel (*Dutch Primacy in World Trade, 1585-1740* (Oxford 1989)), consider the industrial activities which were dependent on rich trades to be more important than the industry which processed home-grown raw materials and/or that which was oriented towards the home market. See for detailed criticism of Israel's industrial view: L. Noordegraaf, 'De nijverheid van de Republiek ter discussie', in *Leidschrift* (1992) [forthcoming].

75.. P. Brusse & M. Windhorts, 'Tot welvaren van de stad ende verbetering van de neringhe?'. Arbeidsmarktregulering en economische ontwikkeling in de Amersfoortse textiel 1450-1800', *Textielhistorische Bijdragen* 30 (1990) 7-19.

76.. Cf. Th. van Tijn, *De menshelicke societeit. Beschouwingen over staat en maatschappij in het zeventiende-eeuwse Holland* (Utrecht 1992) 17-19. For a price and production trust see: J.H. de Vlieger & E. Homburg, 'Technische vernieuwing in een oude trafiek. De Nederlandse loodwitindustrie, 1600-1870', *Jaarboek voor de Geschiedenis van Bedrijf en Techniek* 9 (1992) 13.

77.. A debate between Lucassen and Prak who recently, albeit in a somewhat different context, emphasized the 'limitations' to which industrial activity was subjected, would seem to be a matter of course; (see J. Lucassen, 'Het welvaren van Leiden (1659-1662): de wording van een economische theorie over gilden en ondernemersschap' and M. Prak, 'Een verzekerd bestaan? Ambachtslieden, winkeliers en hun gilden in Den Bosch (ca. 1775)', B.M.A. de Vries *et. al* (eds), *De kracht der zwakken. Studies over arbeid en arbeidersbeweging in het verleden* (Amsterdam 1992) 13-48; 49-79).

78.. Striking is the fact that in areas where growth stagnated or changed to reduction in a later stage of the Republic's history, non-traditional-craftsman systems deteriorated or disappeared altogether while traditional relationships regained their former status.