

Ideology and Technology. Reactions to Modern Technology in the Netherlands 1850–1920

Introduction

During the second half of the nineteenth century the Netherlands, like many other European countries, underwent the impact of rapid technological change. Between 1860 and 1880 a railway system was built which spanned the whole country. The larger cities were provided with sewerage systems and networks for the distribution of gas and water. As a result of the repeal of the taxes on newspapers in 1869 and the introduction of cheap types of paper and steam-driven printing presses, inexpensive newspapers appeared achieving an unprecedented circulation. Reading became more common, as can be inferred from the great increase in the use of public libraries. In agriculture, new tools and machinery such as iron ploughs and threshing machines were introduced from the 1850s on.¹ During the European agricultural crisis, which started to affect Dutch farmers at the end of the 1870s, the production of butter and cheese, traditionally important export products, was moved from farms to new dairy factories. All these innovations — and I have only mentioned some important examples — were introduced before large-scale industrialization occurred. Although there were some factories around 1850 (sugar refineries, textile and paper mills), industrial 'take-off' (to borrow Rostow's phrase) only took place after the Great Depression, that is, after about 1890. The larger engineering and shipbuilding firms date from this period, as well as the electrical and margarine-producing companies, which grew into multinational concerns.

During the same period important social and political changes took place, involving large segments of the population.² The agrarian crisis drove many farmers and craftsmen to the cities, which consequently started to grow rapidly. In 1849, 386,333 people

(13.02 per cent of the total population) were living in the three largest cities: Amsterdam, Rotterdam and The Hague. In 1920, this number had increased fourfold to 1,420,493 (21.73 per cent of the population).³ The cities offered employment in small factories and especially in construction, and many migrants set up small shops. But during the 1880s, the international economic crisis started to affect the Dutch economy too, causing widespread unemployment, misery (especially during the very cold winters at the beginning and during the second half of the 1880s) and unrest among the poor. The 'social question', which had been placed upon the public agenda by progressive liberals during the 1870s, now became urgent. A parliamentary inquiry into the conditions of the working classes produced shocking results and the first effective social laws were enacted in 1889. The franchise was extended in 1887 and 1897, so that at the turn of the century small shopkeepers and craftsmen, and part of the skilled workforce, had the vote. At the same time a fierce struggle was taking place between the liberal governments on the one hand and the Roman Catholic and orthodox Protestant churches on the other, over government subsidies for denominational elementary schools.

It was in response to these problems that the social and political organizations emerged that were to dominate Dutch society and politics during the twentieth century. These organizations were part of four ideological movements, each of which presented its own analysis of the situation and offered its own ideas as to which direction Dutch society should take. The question this article tries to answer is: how did these movements assess the impact of technological change upon Dutch society and what role did technology play in their visions of the future? Did they consider technological development inevitable and self-propelling or was it controllable; was it beneficial or harmful? In the remaining part of this introduction I will sketch the four ideological movements briefly. Then I will look at the way each reacted to technological changes taking place in the Netherlands.

After the adoption of a new constitution in 1848, liberalism became predominant in Dutch political and cultural life. Liberal politicians dominated Dutch government, sometimes with the co-operation of conservatives, who as a group were not very powerful. The same liberal elite in fact ruled the Dutch Reformed

Church. This officially Calvinist denomination had been a kind of established church from 1648, after the successful revolt against Spain, until 1796, when the new republic set up with French support granted equal rights to all denominations. Liberalism also put its stamp on the Dutch universities. The ideological movements which emerged after 1860 all contested this liberal rule.

The first to do this were orthodox Calvinists who resented the latitudinarian attitudes of the Dutch Reformed Church and the appointment of 'modernist' ministers in their congregations. They also claimed the right to government subsidies for their own elementary schools, the founding and maintaining of which became increasingly expensive as a consequence of laws the liberals passed in order to improve the quality of these schools. In 1834 and 1886 thousands of these orthodox Protestants left the Dutch Reformed Church and formed their own congregations. The most powerful of these was the 'Gereformeerde Kerken' led by the Amsterdam minister Abraham Kuyper. Kuyper's aims were much more ambitious than church and school reform. He argued that those problems were only part of a general social crisis that could only be resolved by re-Christianizing society. He regarded his own constituency (only about 8 to 10 per cent of the population, mainly from the lower middle classes) as the nucleus from which such a society could grow and he therefore started his own university (the Free University in Amsterdam, which exists to this day), his own newspaper and the first modern political party in the Netherlands, the Antirevolutionaire Partij (founded in 1879). In other words, he led an emancipation movement of orthodox Christians which, thanks to his vision and organizational genius, went far beyond its initial purpose of church reform and became one of the main political forces in Dutch society.

A similar development took place in the Catholic Church, which as we have seen only received equal rights with the other denominations in 1796. During the nineteenth century Catholic leaders started their own emancipation movement, trying to reverse the results of centuries of discrimination. The issue of government subsidies for their schools brought them together with the orthodox Calvinists, otherwise an unlikely ally, and in 1888 the first coalition government of Catholics and the Antirevolutionaire Partij was formed. More heavily represented among the working classes than the orthodox Calvinists, Catholic leaders were greatly concerned about the growth of socialism, especially among Cath-

olic workers, during the 1880s. They therefore started their own trade unions and other working-class associations. Especially after 1900, a whole subculture of Catholic organizations (schools, labour unions, newspapers, a broadcasting organization, sports-clubs, and so on) grew up, all led by priests and intended to protect the faithful from the dangers and temptations of the modern world. Catholic leaders also developed their own diagnosis of and therapy for the problems of Dutch society. This ideology was much less 'home grown' than Kuyper's. It was more dependent on papal encyclicals and leaned heavily on German Catholic social thinkers.

Socialism started to develop and spread in the Netherlands during the crisis of the 1880s. After an initial radical phase, a more moderate, reformist brand of socialism emerged that became the basis of the most prominent working-class party, the SDAP (founded in 1894). Socialists too developed their own subculture, including all sorts of clubs and newspapers, and of course had their own distinctive ideology.

Within liberalism, a 'radical' faction presented itself from the 1870s on, which demanded extension of the franchise and an active social and educational policy from the government. Liberalism, both in its traditional and in its radical form, had no real subculture. It was the ideology of the elite and liberals were reluctant to join in the struggle for popular support the other parties engaged in. With the extension of the franchise, liberalism therefore lost influence, especially to the Christian Democratic parties, but also to democratic socialism. Liberals of several shades, however, dominated a large part of the periodical press, in which they discussed the problems of the day; and they remained an important force in politics at least until the First World War.

Thus at the end of the nineteenth century four ideological currents had emerged, each with its own views of society propounded in its own newspapers and periodicals, and each strongly attacking the views of the others. Around the turn of the century, public discourse was much more overtly ideological than it is now, both in the Netherlands and elsewhere. Ideas about the problems and future of Dutch society that played a role in public decision-making in the Netherlands — whether by the government or by large organizations such as labour unions — were produced and debated within and between these four currents. Since technical

development played an important part in the social changes taking place during this period, it is important to find out how these groups assessed these developments.

Liberalism

As early as 1820 a lively discussion was going on about the social implications of the mechanization of industry (at that time Belgium, which contained some rapidly industrializing areas, still belonged to the Dutch kingdom; it became independent in 1830). Some writers feared mass unemployment, economic stagnation as a result of overproduction, and depletion of natural resources through excessive consumption of mass produced goods.⁴ Influential economists like H.W. Tydeman and B.W.A. Sloet tot Oldhuis, however, argued that these problems were only temporary in nature, that eventually the whole nation would profit from technical innovation and that refusal to foster technical progress would condemn the country to stagnation and poverty.⁵

By the middle of the nineteenth century practically all Dutch economists, who generally subscribed to the theories of famous authors like Mill, McCulloch, Bastiat and Say, shared the optimistic standpoint. Influential periodicals such as *De Economist* and the *Tijdschrift voor Staatshuishoudkunde en Statistiek* and the largest nationwide organization of businessmen and industrialists, the Society for the Promotion of Industry and Trade, conducted a veritable campaign for the introduction of modern machinery. They published extensive reports of visits to highly mechanized enterprises and short notices about all kinds of new machinery, always with the aim of stimulating Dutch entrepreneurs to introduce new technology.⁶ Social problems were also discussed, especially by the younger generation of left-wing liberals, who joined the public debate after 1870. Although these men had a keen eye for the detrimental effects of modern industry — child labour, accidents with machinery, the degradation of work — they never doubted the eventual benevolence of technical innovations. H. Goeman Borgesius, one of the young liberal leaders, for instance, argued that those problems 'are mostly not inherent in industrial progress but are the consequences of human ignorance and immorality, of obsolete institutions and laws'.⁷ Since labour was an essential part of the self-realization of a free person, he

wrote, the state could not remain aloof when work was degraded in industry. Against 'doctrinaire liberals' (as he called them) he argued for the introduction of social legislation. 'Almost everything in our society is the product of art', he wrote; and society itself was not a natural fact but a historically contingent human construction, which could and should be changed when human needs required it.⁸ 'Every replacement of human labour by natural power is a step in the right direction', wrote Borgesius,

. . . a victory over the demon which has always pursued mankind with its sharp scourge and has driven it on the road of progress by means of poverty and misery. It compels the civilized nations to co-operate and to share the blessings of this progress with the less advanced nations. It is as if the sound of the steam whistle is enough to chase away coarseness and barbarism.⁹

This optimism concerning technological change is typical of liberal writers during the whole period under discussion.

Socialism and the labour unions

The first Dutch working-men's associations and the first socialist movement (the Social Democratic League) had their origins in the 1860s and 1880s respectively, that is, well before the advent of large-scale industrialization in the Netherlands. Consequently, before 1900 these movements were not very large (although the demonstrations of radical socialists during the 1880s greatly impressed many people) and their programmes drew heavily from foreign examples, especially that of the German SPD.

Socialist leaders were every bit as sanguine about technological development as the liberals. Of course, they recognized that the mechanization of industry resulted in longer working hours, the exploitation of women and children, and the degradation of labour. But these problems, they thought, should not be blamed upon the machines, but on capitalist society, which turned those potential blessings into a curse.¹⁰ Only socialism would eventually see to a just distribution of the wealth created with the aid of modern technology. In fact, technical innovation was a basic condition for the realization of socialism:

For our expectations of the future society are high indeed: it will leave, it is said, all unpleasant and unhealthy work to machines; there will be work for all

who can and want to work and there will be plenty of food for all. . . . Therefore, the more technology advances today, the sooner we approach a society in which production is socialized.¹¹ Therefore we do not say: Away with machinery, but: Up with capital and away with the capitalists.¹²

This general position was taken by all socialist and labour union leaders, from the anarchist Domela Nieuwenhuis, who led the big demonstrations in the 1880s, to typical reformist socialists and unionists such as Wibaut, Vliegen and Schaper.¹³

It is of course much harder to discover what the workers themselves thought about the technical innovations affecting their everyday lives. The urgency with which socialist and union leaders often pleaded with workers not to resist 'technical progress' and to join their organizations instead of using violence against machines suggests, however, that more radical opinions existed among the workers, and that although differences of opinion hardly appeared in socialist and union periodicals, they did occur between those organizations and many of the workers themselves. The clearest example of this was the bitter struggle of the dock-workers of Rotterdam against the introduction of floating grain-unloaders in 1905 and 1907.¹⁴

After the opening of the new canal which gave Rotterdam a better connection with the sea (1872), its harbour became the funnel through which grain from overseas flowed to the almost insatiable German industrial area, the *Ruhrgebiet*. Traditionally, importers had hired ships to haul the grain from the exporting country. But by the end of the nineteenth century, with the growth of international trade, it became customary for exporters to hire big steamships in order to deliver loads of grain for several customers to seaports like Antwerp, Bremen, Hamburg and Rotterdam. There the grain was moved to lighters that had been chartered by the importers. Ports like Rotterdam therefore became the place where the grain changed hands from exporter to importer. This involved weighing the loads, which was done by licensed weighers under the supervision of controllers and factors, representing exporters and importers respectively. Until the advent of the grain-unloaders the trans-shipment itself was done by hand. With the growth of steamships carrying loads for several importers at a time, a grainship being unloaded came to look like a 'seething anthill', as one observer noted.¹⁵ The confusion and haste of the procedure, the involvement of stevedores, factors,

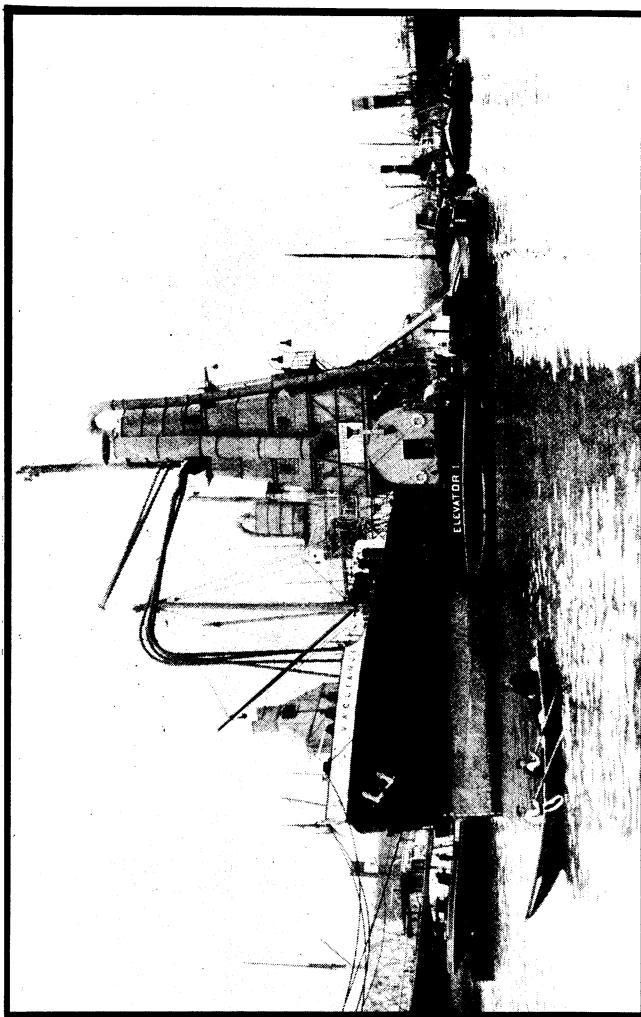


Figure 1
Floating grain-unloader ('elevator') in the Rotterdam harbour. The grainship is on the left, the lighter on the right. A small police vessel to the right of the lighter protects the workers against strikers.

Source: International Instituut voor Sociale Geschiedenis, Amsterdam

weighers, controllers and dock-workers, each with his own interests, and especially the hand weighing, created plenty of opportunities for fraud and bribery. In particular the exporters were duped (up to 20 per cent of the value of the cargo, according to some),¹⁶ and they blamed the shipbrokers, who were responsible for the delivery of the grain.

It was therefore not surprising that a group of shipbrokers and shipowners became interested in the floating grain-unloader. This machine, a pneumatic device that pumped the grain from the hold of the grain-ship into the lighters, would solve many problems in one stroke: both the trans-shipment and the weighing would be done automatically so that most of the workers, weighers, factors and controllers could be done away with and transactions would become 'objective' (Fig. 1). Around 1900 unloaders had been introduced successfully in the harbours of London, Hamburg and Bremen, and in view of the fierce competition between those harbours,¹⁷ the Rotterdam entrepreneurs felt they had to follow suit. In 1904 they started the 'Company for the exploitation of floating grain-unloaders' and in the fall of 1905 two grain-unloaders were introduced in the harbour.

The Rotterdam dock-workers had some experience of resisting technical innovations. Beginning in 1883, there had been strikes against, among others, mechanical grain elevators, electrical cranes and coal-unloaders. The pattern of these actions was always the same: they were sudden, bitter and short. Because the workers were hardly organized, they did not have the means to sustain a long strike and they had no representatives who could negotiate with the employers. There were a few labour unions, however, and these were the first to react to the founding of the grain-unloader company. In April 1904 one of their journals published a ditty against the 'bread stealers', as they were henceforth called.¹⁸ The journal reviewed the new machines introduced during the previous ten years, and concluded: 'This today and that tomorrow. All progress brings hunger to the workers.'¹⁹ However, echoing socialist leaders, they urged the workers: 'Don't bash them, but join the organization'²⁰ — without explaining what exactly the organization could do for them.

The appeal to join the unions was little heeded until the unloaders were put to work in August 1905. Unfortunately for the grain-unloader company, the weighing apparatus did not work, and the weighing had to be done by hand. The weighers now suddenly

realized what a deadly enemy had appeared in the harbour and that they had an unexpected opportunity to block its introduction. Therefore these men, who had always felt superior to the common workers and who had never joined labour unions, started their own organization and called a strike, which soon paralysed the whole harbour. The leaders of the strongest dock-workers' union reluctantly supported the weighers: in principle, they condemned striking against technical progress, but they could not resist the call to action by the dock-workers themselves, who warmly supported the strike.²¹ The local social democratic leader Spiekman said that if the workers had a real chance to stop the machine they should do so²² — an utterance for which he was severely censured by his socialist colleagues. Only the Catholic and the Protestant dockworkers' unions tried to negotiate with the employers.

To everyone's surprise, the weighers quickly won the struggle. The German importers, who were (unlike the shipping companies that owned the unloaders) less interested in quick dispatch than in an even and secure flow of grain, negotiated with the weighers, and promised not to accept any grain that had been transshipped by machine.²³ The elevator company was therefore forced to idle the machines, while preparing for a new round in the struggle. They managed to contract a few importers who would allow transhipment by machine, created their own corps of dock-hands and weighers, and in April 1907 the grain-unloaders were in operation again. The weighers called for a boycott against those firms that had signed the contract with the grain-unloader company. They received unanimous support from the dock-workers and their organizations, including this time the Christian ones. Soon there were violent confrontations between strikers and scabs. In June the mayor proclaimed martial law, a battleship appeared in the harbour and troops put an end to the fighting. For the workers, badly organized and without strike funds, the strike became a war of attrition they could only lose. In November 1907 they had to accept defeat. Two years later, eight floating grain-unloaders trans-shipped more than half of the grain arriving in Rotterdam and more than two-thirds of the grain-workers had lost their jobs.²⁴ The introduction of new machinery never again met with resistance from the workers.

The story of the grain-unloaders shows clearly that occasional outbursts of resentment against modern machinery enjoyed no

support from the leaders of the working-class organizations, whose ideology excluded such action. Only at the local level did some leaders vainly attempt to control the action by assuming command of it; but it was clear that the workers followed their own inclinations, and did not heed the pleas for restraint from union leaders. Among political and intellectual leaders there were hardly any supporters of a consistent critique of modern technology. Actions like the one against the floating grain-unloaders, therefore, violent as they were, remained isolated and totally ineffective.²⁵

Socialist and liberal enthusiasm for technological progress was fairly common in industrializing countries in Europe.²⁶ More characteristic of Dutch society were the ideas of the Catholic and orthodox-Calvinist movements. From them we might expect a more critical attitude toward modern technology since, as many Christian leaders noted, industrialism and the revolution in transportation and communication tended to undermine the authority of the churches. Also, modern science, which was generally associated with modern technology, was thought materialistic and was often openly anti-religious. We will first consider the orthodox Protestants.

Orthodox Protestantism

The only groups in the Netherlands that have consistently and stubbornly resisted (if not actively opposed) modern technology, some of them to the present day, are to be found among the orthodox Protestants. At the end of the nineteenth century many orthodox farmers first rejected, then reluctantly adopted, artificial fertilizers; in more recent times some orthodox people have eschewed the cinema and television because these media are held to propagate the sinful ways of the modern world. A much larger group of orthodox Protestants, however, displays the exact opposite attitude and pattern of behaviour regarding modern technology. The farmers in this group were among the first to introduce modern fertilizers and machinery, and were prominent among the colonizers of the large areas of reclaimed land (*polders*) created in the nineteenth and twentieth centuries. Their participation in the advanced levels of secondary education and their social mobility are significantly above the average for their social

class.²⁷ After 1870 this last group was led by Abraham Kuyper, one of the most impressive figures in this period of Dutch history. Of the solutions put forward by Dutch politicians and intellectuals to the problems surrounding modern technology, his were the most original.

Kuyper (1837-1920) began his career as a brilliant student of theology at the University of Leyden. While writing his dissertation on Calvin and the Polish reformer A Lasco, he became disenchanted with modernist theology, which was dominant in the Dutch Reformed Church and at the university. After becoming a minister in 1863, he slowly converted to a radical orthodox faith, and started to build a neo-Calvinist theology to support this position. In 1870, when he became minister in Amsterdam, he assumed the leadership of the orthodox faction in the church council, which opposed the dominance of modernism. After several conflicts with the synod, which persuaded him that his goal of reforming the national church could not be attained, Kuyper led his adherents in a secession (1886) and started a new denomination (the 'Gereformeerde Kerken in Nederland'). Some earlier secessionists also joined this church. Kuyper became the leader of about half of the orthodox Protestants, who amounted to between 8 and 10 per cent of the population.

In the meantime, Kuyper became increasingly involved in political issues. In 1874 he was elected to parliament, where he became one of the main proponents of state-subsidized denominational schools. In 1878 he published a programme for a neo-Calvinist political party, which was founded during the following year (the Antirevolutionaire Partij). It was the first modern political party in the Netherlands. His following consisted mainly of small farmers, craftsmen, skilled workers and shopkeepers ('kleine luyden' or 'little people' as they were sometimes called), although he also had some adherents in prominent bourgeois circles. In 1888 Kuyper's party broke for the first time the rule of the liberals and formed a coalition with the Roman Catholics. He was at the height of his power in 1901 when he became prime minister. Thereafter his personal influence declined, although his party remained an important force in Dutch politics. As mentioned earlier in the introduction, Kuyper created a neo-Calvinist subculture, with its own church, newspapers, schools, university and social organizations. He wanted to use this platform to launch a campaign for re-Christianizing Dutch society.

When during the 1860s Kuyper started to discuss in public his ideas about society, his position was strongly anti-modernist — not only on theology, but on social and political questions as well. In a speech given in 1869, with the emblematic title 'Uniformity, the curse of modern life',²⁸ he described the modern world as dominated by artificial networks, both social and physical, which destroyed diversity and created a deadly, monotonous uniformity: street grids in modern cities and state-organized primary education were examples, as well as modern machinery.²⁹ Steam engines, said Kuyper, destroyed the diversity of craft industry; railroads and the telegraph not only promoted lively cultural exchange but also tended to annihilate the cultural diversity of countries and regions. And here is how this flamboyant preacher assessed modern naval warfare:

Not personal courage, making the sailor jump into the rigging of the enemy, is what one now calls a sea battle, but the jerking and jolting and smashing against one another of iron sea-monsters, in which people are hidden. What you see there is not people moving, but machines, clutching each other with their cog-wheels — machines all put together in the same way, working according to the same plan, and moved by the compelling, regulating, equalizing power of society.³⁰

In the programme of the Antirevolutionaire Partij, Kuyper reckoned the steam engine and modern machinery among the most important causes of the social question, since these had reduced the dependence of employers on the strength and skill of their workers. 'The witchcraft with iron machinery induces the capitalist to regard his day labourer, quite materialistically, as nothing but a machine of flesh which, when worn or broken down, is discarded, thrown away'.³¹ The machine-breaking which had occurred in other countries was therefore entirely understandable, he wrote, and the onward march of mechanization made him sceptical about restoring peaceful relations between employers and workers. Only the restoration of the right religious principles could be a basis for building a better social order, he believed. The only alternative to this would be class war.³²

During the 1870s and 1880s Kuyper slowly changed his mind about modernity, and especially about the role of technology therein. In his writings after 1890, it is hard to find any critical references to modern technology, while optimistic, even lyrical, statements abound. While visiting the United States in 1898, for

example, he wrote enthusiastic reports to his newspaper about the skyscrapers, the electric trams, and the telephone and typewriter in his hotel room.³³ When in 1897 Kuyper gave a speech about the modern newspaper at the twenty-fifth anniversary of his own *De Standaard*, even the idea of a network assumed a positive meaning:

Thanks to the daily newspaper you need not remain isolated with your opinions. Someone in the north comes imperceptibly as if in telephonic contact with kindred spirits in the south. Opinions find one another, souls find souls and in this way connections come into being. These connections and associations generate power, which is used to vindicate your sacred principles in society.³⁴

The mechanization of industry now also received Kuyper's warm support. He condemned the strike of the Rotterdam ore-workers against the introduction of electric cranes in 1896 as useless and harmful. Mechanization would eventually also benefit the labourers, he argued.³⁵

These opinions were based upon a neo-Calvinist philosophy which Kuyper had been developing ever since his thesis about Calvin and A Lasco, and which he explained to his adherents in a long series of newspaper articles published between 1890 and 1910.³⁶ Although technology was not his central concern in these writings, a fairly consistent philosophy concerning technology can be gleaned from them.

The dominion of man over nature, says Kuyper, is a divine command, as recorded in the creation story in Genesis ('... fill the earth and subdue it; and have dominion over the fish of the sea and the birds of the air and over every living thing that moves upon the earth'). Since man is obviously inferior in physical power to lions and elephants, this dominion must be spiritual in nature: mind rules over matter. This was symbolized in the story of Adam naming the animals. After the Fall, man's easy dominion over nature was lost and nature became his deadly enemy. Man found himself surrounded by a hostile world, and he would have perished then and there had not God intervened by granting him the power to protect himself and eventually to subdue nature again and to create culture. Man's capacity for social life and the creation of beauty is thus attributed to grace from God. Kuyper termed this 'general grace' (to be sharply distinguished from 'special grace', which according to Calvinist doctrine is extended only to the elect).³⁷ The first scriptural example of this occurs

immediately after the Fall, when God teaches man to clothe himself with animal skins in order to protect himself against the cold which, according to Kuyper's rather free interpretation of the Genesis story, had then set in. Another example is the building of Noah's ark, to save mankind from complete extermination by the flood. Even though the hostility of nature is man's well-deserved curse, he is called upon to fight back and by arduous work to reassert his superiority. This is the basis of the process of scientific and technological development. This process is portrayed as a battle between man and nature which nature is bound to lose. It proves the ultimate superiority of mind over matter.

According to Kuyper, Catholicism had obscured this human mission by focusing man's attention upon the spiritual and the hereafter. Calvinism, on the other hand, stressed the importance of activity in this world. Many orthodox believers had not recognized this, and had shunned 'the world', including modern technology. Again and again Kuyper fulminated against this attitude among the faithful. It was a shameful thing, he said, that while many beerhalls were illuminated electrically and heated by steam, people were suffering from cold in the churches, and darkness enveloped the congregation during late afternoon services.³⁸ He castigated those Christians who were opposed to vaccination, lightning conductors, dike-building, and so on.

Kuyper distinguished sharply between technological and social progress. Technological development did not by itself lead to a better world. On the contrary, modern society was experiencing a spiritual crisis, which could to a large extent be explained by the fact that sinful men had at their disposal ever more perfect devices that they put to evil purposes. Modern travel, the press and the city created an overwhelming flow of information and impressions which many people could not digest. Hence the spread of restlessness, insanity and suicide. The sense of power over nature diminished man's humility and sense of dependence, and deceived him into thinking he could change the world all by himself. This accounted for the popularity of ideologies such as liberalism and socialism and the decline of the churches. Kuyper foresaw a deepening of this crisis, that eventually would reach apocalyptic proportions. All of this, however, did not, he said, discredit technological development, which remained a sacred duty. In itself, technology was a neutral instrument that could and should be used to further the sacred cause.

Kuyper's development from a very critical attitude toward modern technology to a wholehearted endorsement of it can be explained as a consequence of his career as a churchman and a politician. During the 1860s and 1870s he was the leader of a rebellion within the Dutch Reformed Church that articulated the aversion and fear of the orthodox-Protestant part of the petite bourgeoisie regarding religious modernism and the modern world in general, including technology. Later on he realized that he needed modern techniques of political mobilization — a party with a programme and local branches, a cheap newspaper — in order to achieve his goal of restructuring Dutch society. He also needed a Calvinist university, teaching the modern sciences, to penetrate the elites. All this suited his temperament. Kuyper was a man of titanic working power. He was party leader, professor and newspaper editor all at the same time, and he travelled extensively, to the United States and to the countries all around the Mediterranean, among other places. He combined a deep pessimism about the cultural crisis of the modern world with a great admiration for its — in his eyes — foremost manifestation: modern technology. His speeches are full of technical metaphors. He did not want to become the leader of a religious minority if this meant isolation from society. A Dutch theologian has aptly written: 'the neo-Calvinist wants to feel at home in the modern world. More than that: he wants to master it.'³⁹

This explains why Kuyper often took the side of 'technological progress' even at the expense of his own following. He was, for example, strongly in favour of plans to reclaim land in the Zuiderzee, although he realized this would cost fishermen and bargemen, with many of whom he was very popular, their jobs.⁴⁰ It also explains why about half of the orthodox Protestants refused to follow him and severely criticized his unholy compromises with the modern world. For his adherents, however, he was the charismatic leader who spoke to them in person or by means of his newspaper every day and explained to them how the faithful should live in this world. Thanks to his leadership, many of the grandchildren of the 'little people' assumed prominent places in Dutch society in the twentieth century.⁴¹

Roman Catholicism

Roman Catholic attitudes developed in a way remarkably similar to those of the neo-Calvinists. Before the 1890s, Catholic periodicals did not pay much attention to social problems. The Catholic elite was preoccupied with defending the faith against Protestantism and liberalism, and the school question overshadowed all other concerns. In those few articles which discussed the social question, however, technology played a very sinister role. Factories were called 'modern prisons' and 'murderers' dens', where human labour was degraded through being deprived of its human, rational part (which was the essence of human labour, according to the Catholic view): men became slaves, beasts of burden, machines.⁴² Young workers were a special object of concern. Following a German example, Catholic leaders from the late 1860s on founded so-called St Joseph's Journeymen's Associations in the larger towns, each owning its own 'home'. Here young working-men who did not live with their parents and had not yet married were to find a kind of family circle, with a priest in the role of father. The associations recruited their members from among workers in the craft industries, which were predominant at the time; factory workers were excluded.⁴³ St Joseph, patron saint of many Catholic working-men's associations, served as a role model. In devotional pictures (widely distributed among the faithful, especially as presents to children, and therefore potentially a very influential medium for the propagation of the Church's values and norms) and in sermons, he was often depicted as the perfect working man: always at his humble but noble craft and often in the midst of the Holy Family (Fig. 2).

These were the values the Church wanted young workers to imbibe: the dignity of handiwork (represented by a typically pre-industrial example, the carpenter in his own shop), implying the acceptance of a lowly position in society, and the family as a model of social relations, based upon inequality, love and harmony.⁴⁴ The typical 'home' of a local association was large and lavishly decorated and included a dormitory, a recreation room, a chapel and classrooms for craft courses. Members were expected to spend all their leisure time in this building.

This approach to social problems is typical of the Catholic Church at that time, not only in the Netherlands but also elsewhere. Church historian McSweeney has called it the strategy of



Figure 2

The Holy Family. Devotional picture, probably around 1900.

Source: Stichting Katholiek Leven in Beeld, Katholiek Documentatiecentrum, Nijmegen

the 'cultural ghetto'.⁴⁵ It was an attempt to surround the faithful with a world of symbols and ritual of such splendour that the secular institutions which governed their everyday lives would appear unimportant in comparison. In this case, young workers were to be protected from the harmful influence of industry and the city. However, the St Joseph's Journeymen's Associations also had a more aggressive goal. They organized courses in the theory and practice of several crafts, such as smithing and carpentry, in order to 'strengthen the craftsmen in the face of the enormous power and dominance of the machine and of the factory'. Catholic leaders believed that the creation of a strong middle class was the best answer to the social question.⁴⁶

Another illustration of this 'ghetto strategy' is the fact that

priests constantly discouraged parents from sending their sons to 'modern' secondary schools, such as the HBS (comparable to the German *Oberrealschule*), where subjects like physics and biology, held to undermine Catholic doctrine, were taught. In fact, seminaries were considered the only acceptable type of secondary education for Catholic boys. This meant that for a long time the Catholic intelligentsia consisted mostly of priests, reinforcing the 'ghetto' situation.⁴⁷

Not all Catholic intellectuals exhibited this defensive attitude toward modern science and technology. The Jesuit journal *Studiën* regularly published articles about subjects like balloon flights, telephones and all kinds of scientific discoveries, apparently to help priests catch up with these aspects of modern culture, about which they had learned so little in their seminaries. But these articles did not address the social implications of modern technology, and only appeared infrequently.⁴⁸

After 1890, Catholics started to pay more attention to the relation between technology and society and, like Kuyper, they now started to take a much more optimistic view. After about 1880, the 'cultural ghetto' approach was dropped in favour of a more aggressive strategy. For instance, in the industrial area of Twente (in the eastern part of the country) a modern trade union was set up for Christian factory workers in 1891. This union (and similar organizations founded after 1900) was supervised by a priest, but some workers played a prominent role in it. Catholic periodicals and handbooks used at the seminaries now discussed social problems extensively, including the role of machinery. These discussions followed a rather monotonous pattern. It was recognized that modern industry gave rise to child and female factory labour, excessive working hours, deadening routines and class antagonism. Not modern machinery, but the liberal-capitalist order in which it was used was held responsible for this. The division of labour and the invention of new machines are inherent in human nature, it was argued: they are the expression of the social and rational character of man. These were divine gifts and were therefore intrinsically beneficial. If a just social order could be created, machines would work only for the common good.⁴⁹

As time went by, many Catholic leaders became quite enthusiastic about technical progress. Like Kuyper, they celebrated modern technology as the triumph of human reason over matter. Many of them became convinced that new techniques could help

solve urgent social problems. Two examples illustrate this attitude. The first is the debate about the future of the crafts that engaged many politicians and intellectuals in western Europe at the end of the nineteenth century.⁵⁰ Especially after the electoral law of 1897 enfranchised the petite bourgeoisie, the 'middle-class problem' became urgent for Catholic and neo-Calvinist political leaders; many of their voters came from these strata. Echoing Catholic politicians in other countries such as Von Hertling, they argued that the growth of big industry on the one hand and the working-class movement on the other threatened to destroy the middle classes, which would make Marxist predictions about the coming of the great class war come true. The process of industrial concentration should therefore be halted by creating a strong class of farmers, craftsmen and shopkeepers. Against liberal and socialist writers who accepted the disappearance of the crafts as inevitable, they argued that this development was not necessary. If craftsmen improved their administration and introduced modern machinery, they could create a permanent place for themselves in modern society. After 1900, therefore, priests started to found trade associations and credit banks for small entrepreneurs, and urged the government to help by providing tax facilities and creating information agencies.⁵¹

Not surprisingly, therefore, the introduction after 1900 of electrical machinery inspired great enthusiasm among Catholic leaders.

Steam power has driven the people to the factories, electric current will drive them out again, to their own shops. Such a decentralization of industry will prove to be the best way to end the social abuses which attend industrial production in our times.⁵²

Technical modernization as a means of countering the dangers of modern society: this attitude is typical of Catholic leaders after about 1900. However, they carefully avoided complete identification with the petite bourgeoisie, since they also wanted to appeal to the workers and the higher social strata.

This becomes clear in our next example: the debate about F.W. Taylor's scientific management, starting after 1909 when Taylor's *Shop Management* appeared in a Dutch translation. At first, Catholic writers responded very critically, repeating the old arguments about the degradation of labour in industry. But soon, when longer articles and pamphlets started to appear, it turned out that

Catholic leaders did not really oppose the system. Taylorism, they argued, was a form of rationalization which was a natural and therefore an inevitable and eventually beneficial process. The real problem was how this development could be influenced in such a way that the workers would also profit from it. As in the case of the handicrafts, the answer was technological. It was called 'psychotechnics.'

The Jesuit priest who developed this idea, Jac. van Ginneken, criticized Taylor for his primitive ideas about human psychology which largely ignored individual differences in capabilities and the psychological pressures generated by industrial labour. He proposed setting up 'psychotechnical bureaux' in which people would be tested by means of various experiments in order to put 'the right man in the right place'.⁵³ The bureaux could also offer 'scientific' advice about wage levels and the design of the production process. Thus, the overburdening of the workers which the Taylor system implied could be avoided, and human talents could be used most efficiently to the benefit of both employers and workers. Van Ginneken compared his testing of people to the testing of machines.

Just as a manufacturer does not buy a machine before having an engineer check its entire structure, he should not hire workers without having a psychologist test empirically whether or not they are really fit for their jobs. Of course, a man is not constructed by an engineer in a factory, but created by God's goodness; but God does not create every man the same, and not every man is equal to every task.⁵⁴

Van Ginneken proposed regulating the labour market by means of psychotechnical bureaux which should have at their disposal personal records of persons applying for jobs. Schools should keep such records for every pupil. In this way everyone would find the 'right place' in society, wages would be determined in a scientific manner, and class conflicts would come to an end.⁵⁵ Such a technocratic attitude toward the human problems of modern industry was the ultimate consequence of Catholic enthusiasm for technological development.

This ideology of technical progress did not go completely uncontested in Catholic circles. Some lay trade union leaders in industrial areas, for example, pointed out that the harm done by modern industry was not caused by a wrong use of intrinsically beneficial machinery but was inherent in technical progress. Thus

the weaver A.H.J. Engels, one of the leaders of the first Catholic trade union, wrote in 1915 in his yearly review of the reports of the factory inspectors: 'Every new invention of science goads industry to seek ways and means to apply it. The goal is always to produce more cheaply or more, push others aside and make a lot of money.' Innovations that seemed profitable were always introduced, no matter what the effects on the workers were. Thus, welding apparatus and the production of light bulbs appeared to harm the eyes of the workers, workers in the paint industry developed skin diseases, and expensive machinery forced employers to lengthen the working day. 'Thus grows, slowly and inexorably, the army of invalids, casualties of the industrial war of competition.'⁵⁶ Occasionally, a man like Engels might give a polite nod to the official optimism of his superiors, acknowledging that eventually, in a well-ordered society, machinery would work for the common good and admitting that technical development is progress.⁵⁷ But he made it clear enough that for the time being industrialization was disastrous for the workers.

Another influential lay union leader, the compositor Henri Hermans, wrote that there would always be 'innumerable workers who are dependent upon machine work, and technology is developing so fast that the number of these workers will even increase'. Unlike church leaders, Hermans did not comfort the workers with the hope of material progress as a consequence of technology, but with a much more traditional message: the worker, he wrote, is a cog in the machinery of the factory. But he is also a small wheel in the great design of the Creator.⁵⁸ Men like Engels and Hermans never openly challenged the optimism of the clerical leaders. They acknowledged the 'progress' argument in theory, even though they did not find any evidence for it in practice. The authority of priests was still unquestioned in Catholic circles; and besides, fatalism is a bad basis for political argument.

This combination of fatalism and deference to official optimism kept Catholic union leaders from wholeheartedly supporting the dock-workers' strike against the grain-unloaders in 1907. Although the Catholic dock-workers' union briefly felt compelled to support the strike, Engels, who wrote the leading articles about it in the national Catholic paper on social problems, said that 'the struggle against "progress" is doomed to fail.'⁵⁹ Therefore, although Catholic union leaders were more sympathetic to the

workers' hatred of modern machinery than the socialists, they shared the socialists' reluctance to take the workers' side, and did not produce ideas about how to influence the introduction of new machinery in order to protect the workers or improve their situation. In their eyes, massive mechanization was simply inevitable and its consequences dreadful.

It is the attitude of the elite, which had changed so much since the end of the nineteenth century, that needs to be accounted for. As in the case of Kuyper, the explanation is both sociopolitical and theological. Since the Catholic Church is an international organization, we have to start with the changing strategies of the Vatican during the nineteenth century. The most important of these changes occurred when Leo XIII assumed the pontificate in 1878.⁶⁰ The new pope realized that by simply declaring liberalism, socialism and modern science anathema for Catholics as his predecessor had done, the Church would gradually lose its meaning for intellectuals and workers alike. From the 1870s on, the process of industrialization accelerated, and began to affect Roman Catholic areas for the first time. The socialist movement grew, attracting Catholic workers as well.⁶¹ In the face of these threats, Leo XIII opted for an offensive strategy.

In the first place, he reinstated the philosophy of the thirteenth-century Dominican friar Thomas Aquinas (1225–74) as the basis of Roman Catholic thinking. This implied a much more favourable attitude towards modern science. Aquinas had argued, among other things, that there could be no real contradictions between faith and science, since science consisted in discovering the laws of nature, which revealed the greatness of the Creator. Both scientific research and faith led man to God. Therefore, wrote Leo XIII in his encyclical *Aeterni Patris* (1879),⁶² science should be allowed to proceed by its own methods, principles and argumentation. But since the human intellect had been dimmed by sin, all men needed the guidance of faith in order to reach a true understanding of the world.⁶³ Nevertheless, the Church now started to encourage the faithful to pursue modern science. For example, Dutch Catholic periodicals now published articles about important contributions of Catholic scholars to astronomy and physics.⁶⁴ In the same journals, Catholic scientists explained the latest scientific and technological discoveries, such as the telephone, radio, neon tubes, submarines and X-rays.⁶⁵ Neo-Thomism saw technological development as the gradual triumph of the

human intellect, God's greatest gift to man, over nature. 'Technology is the intellectual power of man objectified', wrote a Catholic professor at the engineering school in Delft. 'The history of technology reveals the nobility of human nature.'⁶⁶

In another encyclical, *Rerum Novarum* (1891), the Vatican for the first time analysed the problems of the workers, acknowledging their right to reasonable pay and decent working conditions, and urged them to start their own associations (preferably Catholic, as pointed out in a later encyclical). The pope realized that the Church had to create its own brand of modernism if it wanted to avoid marginalization in the modern world.

Leo XIII's encyclicals met with a warm response from young Catholic leaders in the Netherlands, especially from priests who were working in the new industrial areas and from young intellectuals. The encyclicals were cited time and again to legitimate their new trade unions and scientific efforts. To them, the new doctrine implied the acceptance of modern methods to strengthen Catholicism. It was an encouragement to abandon their backward position and participate fully in modern society. Van Ginneken expressed this attitude well when he wrote about his psycho-technical bureaux, 'We must use the most recent, reliable and promising scientific results. Here, too, we must from the beginning make use of the very latest [methods].'⁶⁷ This pronouncement could have been the motto for all social activities undertaken by progressive Catholics after 1890.

Conclusion

In 1894, the curate Alphons Ariëns, founder of the first Christian labour union in the Netherlands, gave a speech to an association of Christian railway-workers. Talking about the wonders of modern technology, he said:

If God's mild hand puts sparks of His infinite wisdom into the heads of some individuals, if he raises up among us men who like Saul rise head and shoulders above the crowd, then this is for the benefit of humanity, so that a warmer sun may rise over Adam's toiling posterity.⁶⁸

It was clear, he went on, that at present the workers did not profit from the blessings of this progress. But they had a right to their share and they should claim it in an orderly fashion. He was

convinced that technology could create wealth and comfort for all, if only society could be organized more justly. Although very Catholic in its formulation, this statement would not have met with much opposition from orthodox Protestants, socialists and even progressive liberals at the time. Around 1900, there was a remarkable convergence of opinion about the social role of modern technology among political and intellectual leaders in the Netherlands. While liberals and socialists had been firm believers in technical progress all along, for the churches this meant a rather dramatic reversal of their earlier, much more pessimistic positions. In this final section I will offer four explanations for this convergence: political, theological, cultural and economic.

Sociopolitical considerations were the main reason why the Roman Catholic Church abandoned its 'cultural ghetto' strategy for a more aggressive course of action. In the Netherlands, Ariëns was one of the first priests who, working in an industrial area, realized that only a real Christian labour union could prevent Christian workers from adopting socialism. He therefore hailed *Rerum Novarum* as a legitimization of his social activities, which he had to defend against conservative bishops. The new strategy of the Church included an endorsement of modern technology, one which Ariëns repeated eloquently but which was not self-evident to the workers and their representatives in the Catholic unions, as we have seen. Church leaders estimated, however, that resistance to modern technology would be useless and would estrange them from the entrepreneurial elites with whom they wanted to remain on as friendly terms as possible.⁶⁹ They pointed to all kinds of beneficial social effects of the introduction of modern technology, such as, for instance, the strengthening of the crafts by the use of light machinery and the 'scientific' management of labour relations. As a trans-class movement, political Catholicism avoided identification with any one class, and incorporated many elements of both liberalism and socialism in its ideology. Taylorism, albeit in modified form, appealed to them precisely because it promised to put an end to class conflict by promoting the interests of both employers and workers.⁷⁰

Kuyper's position was quite similar. Like the Catholics, he was not satisfied with representing the interests of one group, in his case the 'little people' who were the majority of his constituency; he wanted to change society along Christian lines. Therefore he

could not afford to oppose such a powerful force as technical modernization.

Both the Catholic Church and Kuyper had a rich theological tradition to draw upon in fashioning a legitimating ideology for their positions. While Kuyper created a highly personal form of Calvinism, the Vatican launched a very effective new version of Thomism. Both systems exalted the human intellect as God's greatest gift to man and as the means by which mankind would accomplish its divine mission of subduing nature. As in most nineteenth-century discourse, technology was represented as applied science, the triumph of the intellect over matter. Man's sinfulness was strictly separated from his intellectual and technical capabilities. Social problems could therefore not be attributed to technology as such, only to the social structures in which technology developed. The idea that 'artefacts have politics' — so eloquently formulated by Langdon Winner⁷¹ — was completely foreign to them, as it was to all Dutch politicians and intellectuals. Artefacts were neutral instruments, and ethical and political considerations applied only to their uses. The same lack of criticism of modern technology is evident in the work of Dutch poets and novelists, as well as in that of painters. Technology and industry do not appear very often in Dutch works of art, but where they do, the tone is usually one of romantic admiration.⁷² This paucity of fundamental criticism of modern technology has, in my opinion, cultural and economic as well as political and theological explanations.

As to the cultural aspect, in countries like England and Germany the most serious critical assessments of modern technology came from conservative politicians (such as Oastler and Disraeli) and romantic writers (such as Southey, Carlyle and Ruskin in England and Adam Müller and Franz von Baader in Germany).⁷³ In the Netherlands, however, both the conservative and the romantic movement were very weak. The weakness of conservatism can be explained by the lack of a strong feudal tradition in the Netherlands. The Dutch Republic was ruled by the urban, merchant elite of the western provinces, while the aristocratic families in other parts of the country played an insignificant role.⁷⁴

To a large extent, both conservatism and romanticism were reactions to the ideas of the Enlightenment and to the French and Industrial Revolutions. In the Netherlands, the Enlightenment

took a very moderate form, and was strongly influenced by the latitudinarian Protestantism of the Dutch Reformed Church.⁷⁵ Political change was also less dramatic, lacking the violence and passion characteristic of developments in surrounding countries in the years after 1789, in 1830 and in 1848. And finally, the comparatively late arrival and slow pace of industrialization meant that the 'shock of the new' was not as violent as it was in other countries. Between 1850 and 1890 Dutch industry switched over from wind and water mills to steam engines. In 1850, only about 10 per cent of industrial power was generated by steam, in 1890 about 80 per cent.⁷⁶ But most of these steam engines were small (less than 20 horsepower),⁷⁷ and they probably strengthened small-scale production. Most large industrial firms appeared only after 1890. At the same time, however, new machinery such as electrical engines appeared, making small-scale production a viable alternative. The use of light machines spread very rapidly after 1900.⁷⁸ Simplifying a little, we might say that what Lewis Mumford called paleotechnics and neotechnics arrived at about the same time in the Netherlands.⁷⁹ While large-scale industry was causing social problems in some parts of the country, political leaders and intellectuals could point to electric lighting and machinery, the telegraph and the printing press as evidence of the essentially beneficial nature of technical development.

All this does not mean that there was no resentment of and resistance to modern technology. The strikes against the floating grain-unloaders and other innovations in the harbour of Rotterdam and the pessimistic pronouncements of Catholic labour union leaders are examples of this, to which others could be added.⁸⁰ This resentment remained ineffectual, however, because it was not organized. And the reason for this was that in the Netherlands, unlike countries such as England and Germany, there was no sustained criticism of technology among the educated elites. Popular resentment can only become a political force if it is channelled into a movement, an organization with a programme. Such articulation and organization is usually the business of intellectuals. Therefore the uncritical attitude of politicians and intellectuals in the Netherlands goes a long way toward explaining the lack of open conflict surrounding technical innovations that so drastically changed society. On a more general level, this argument seems to me to demonstrate the importance of the history of ideas about

technology for understanding the role technology plays in modern societies.⁸¹

Notes

This article summarizes part of my doctoral dissertation, *Techniek en ideologie. Opvattingen over de maatschappelijke betekenis van technische vernieuwingen in Nederland 1850-1920* (Groningen 1988). I would like to thank Floris Cohen, Eda Kranakis and Roy MacLeod for their comments on earlier versions of this article.

1. J.M.G. van der Poel, *Honderd Jaar Landbouwmechanisatie in Nederland* (Wageningen 1967), ch. 4; W.P.H.M. van Hooff, *In het Rijk van de Nederlandse Vulcanus* (Amsterdam 1990), 227-33.

2. An excellent overview is E.H. Kossmann, *The Low Countries* (Oxford 1978).

3. J. Postmus, *Een Onderzoek naar Omvang en Aard van de Bevolkingsconcentratie in Nederland sedert 1830* (Amsterdam 1928), 79-88.

4. E.g. F. van Sorge, *Over den Invloed van Machines op de Welvaart der Volken* (Middelburg 1842).

5. E.g. H.W. Tydeman, *Verhandeling ter Beantwoording der Vrage: Welke zijn de Grenzen van het Nut en van de Schade, welke door het Gebruik van Werktuigen in de Fabrieken . . . (etc.)* n.p.n.d. [1820].

6. See e.g. *De Economist* (1852), 202-13, 229-49; (1854), 57-60, 343-5; (1860), 448-9; *Tijdschrift voor Staatshuishoudkunde en Statistiek* (1843), 18-25; (1848), 59-73; (1857/58), 437-53; (1864), 65-80; *Tijdschrift van de Maatschappij ter Bevordering van Nijverheid*, passim.

7. *Vragen des Tijds* (1876) I, 24-5.

8. *Ibid.*, 28-9.

9. *Ibid.*, 10, 12.

10. F. Domela Nieuwenhuis, 'Zijn Machines een Zegen voor de Arbeiders?', *Jaarboekje van het ANVV* (1881), 57.

11. *De Nieuwe Tijd* (1896/97), 302-3.

12. *Recht voor Allen*, 19 August 1894.

13. See F. Domela Nieuwenhuis in *Recht voor Allen*, 19 August 1894; J.H. Schaper, *In den Strijd. Handboekje ten Dienste van de SDAP* (Amsterdam 1909), 165; W.H. Vliegen in *De Nieuwe Tijd* (1908), 870; F.M. Wibaut, 'De Machine', *De Kroniek* (2 December 1905), 377-8.

14. The following is based mainly on Ch.A. Cocheret, *Het Elevatorbedrijf in de Rotterdamse Haven* (Rotterdam 1933), and H. Mol, *Memoires van een Havenarbeider* [1932] (Nijmegen 1980).

15. D.L. Uyttenbogaart, 'Het Graantransportbedrijf', in E.O.H.M. Ruempol, ed., *Gedenkboek 600 jaar Rotterdam* (Rotterdam 1928), 284.

16. Cocheret, *op. cit.*, 65.

17. J.Ph. Backx, *De Haven van Rotterdam* (Rotterdam 1929), 14.

18. Cocheret, *op. cit.*, 23.

19. *Ibid.*, 32.

20. *Ibid.*, 33.
21. Mol, *op. cit.*, 176.
22. Cocheret, *op. cit.*, 44.
23. The importers were in a hurry to secure their orders of grain because in a few months the import tariff was to be raised. And, as we have seen, weighing by hand was often to their advantage.
24. P. Serton, *Rotterdam als Haven van Massale Goederen* (Utrecht 1919), 42.
25. There are not very many examples of anti-machinery actions by workers in the Netherlands. I.J. Brugmans (*De Arbeidende Klasse in Nederland in de Negentiende Eeuw 1813–1870* [Utrecht 1975], 183–4) attributes this to the fact that there were not as many skilled workers — as, for example, the handloom weavers in England and Germany — being displaced by machinery (the grain-weighers are clearly an exception). The Dutch working class consisted mostly of unskilled workers, and labour unions only became strong during the twentieth century. Also, most labour-saving machinery was introduced during periods of economic expansion, unlike what happened in England around 1800 and Germany in the 1840s.
26. R.P. Sieferle, *Fortschrittsfeinde? Opposition gegen Technik und Industrie von der Romantik bis zur Gegenwart* (Munich 1984), chs 9 and 10.
27. J.P. Kruyt, *De onkerkelijkheid in Nederland* (Groningen 1933), 217–18; J. van Putten, *Zoveel kerken zoveel zinnen* (Kampen 1968), 130, 168–9, 211, 229–32; J. Hendriks, *De emancipatie van de gereformeerden* (Alphen aan de Rijn 1971), ch. 5.
28. A. Kuyper, *Eenvormigheid, de vloek van het moderne leven* (Amsterdam 1869).
29. The speech resembles in many respects Carlyle's famous essay 'Signs of the times' (1829) and reminds one also of Jacques Ellul, both thinkers strongly influenced by Calvinism, like Kuyper.
30. Kuyper, *op. cit.*, 21.
31. A. Kuyper, *Ons Program* (Amsterdam 1880, 2nd edn), 359.
32. A. Kuyper, *Handenarbeid* (Amsterdam 1889), 19.
33. A. Kuyper, *Varia Americana* (Amsterdam 1899), 33–8.
34. A. Kuyper, speech given on the twenty-fifth anniversary of the *Standaard*, in J.C. Boogman and C.A. Tamse, eds, *Emancipatie in Nederland* (Den Haag 1978), 181.
35. *De Standaard*, 25 March 1896.
36. These articles were later published as books. The following is based on them: A. Kuyper, *De Gemeene Gratie* (Leyden 1902–4; I used the second edition, Kampen n.d.); A. Kuyper, *De Gemeene Gratie in Wetenschap en Kunst* (Amsterdam 1905); A. Kuyper, *Pro Rege of het Koningschap van Christus*, 3 vols. (Kampen 1911–12).
37. The use of the concept of 'general grace', which Kuyper had found in Calvin, where it plays a minor role, was a brilliant idea: it allowed him to condemn the whole world as sinful, while at the same time attributing to God's grace the things he admired and wanted to use. It was his bridge between the society of the elect and the modern world.
38. A. Kuyper, *De Gemeene Gratie*, Vol. II, 517.
39. Th.L. Haitjema, cited in S.J. Ridderbos, *De theologische cultuurbeschouwing van Abraham Kuyper* (Kampen 1947), 270–1.

40. *De Standaard*, 14 September 1892; *De Standaard*, 23 October 1917.
41. Hendriks, op. cit., ch. 5.
42. *De Katholiek* (1879), 223–50, 315–42, 355–88.
43. J. Dankers, 'Van Adolf Kolpings Trouwe Zonen', *Jaarboek van het Katholiek Documentatiecentrum* (1986), 22, 29, 30.
44. H.J.C.M. van Nispen tot Sevenaer, *Handboek voor de Nederlandsche Presidenten der Katholieke Gezellenvereeniging* (Amsterdam 1872); cf. G. Korff, 'Heiligenverehrung und Soziale Frage', in G. Wiegmann, ed., *Kultureller Wandel im 19. Jahrhundert* (Göttingen 1973), 102–11.
45. B. McSweeney, *Roman Catholicism. The Search for Relevance* (Oxford 1980), 59.
46. Van Nispen tot Sevenaer, op. cit., 24, 35; idem, *De Symboliek en het Doel van het St Josephs-Gezellenhuis te Amsterdam* (Amsterdam 1878), 39.
47. M.A.J.M. Matthijsen, *Katholiek Middelbaar Onderwijs en Intellectuele Emancipatie* (Assen 1958), 112–13.
48. E.g. *Studien* 18/II (1886), 164–73.
49. See, for example, the seminary books by P.B. Bruin, *Sociologische Beginselen* (Nijmegen 1904), and J.D.J. Aengenent, *Leerboek der Sociologie* (1909).
50. G. Crossick, 'The Petite Bourgeoisie in Nineteenth-century Europe: Problems and Research', in *Historische Zeitschrift* 1986, Sonderheft 15, 227–77; Ph. Nord, 'Les Mouvements des Petits Propriétaires et la Politique (des Années 1880 à la Première Guerre Mondiale)', *Revue Historique* 275/2 (1986), 407–33; D. van Lente, 'The Crafts in Industrial Society; Ideals and Policy in the Netherlands 1890–1930', *Economic and Social History in the Netherlands*, II (1990), 99–119.
51. See *Katholiek Sociaal Weekblad* (1902), 77–9, 377–9; (1903), 408; (1905), 289–91; (1908), 666.
52. *De Hanzebode*, 15 October 1909.
53. This was the title of one of his pamphlets: *De Rechte Man op de Rechte Plaats* (Amsterdam 1918). See also his *Zielkunde en Taylorsysteem* (Amsterdam 1918) and *Arbeid Vermoeit* (Amsterdam 1918).
54. Van Ginneken, *Zielkunde*, 58–9.
55. Van Ginneken, *De Rechte Man*, 85–6. These grandiose plans were not realized. Van Ginneken's bureau was started in September 1918 but was not very successful.
56. *Katholiek Sociaal Weekblad* (1915), 422–3.
57. *Katholiek Sociaal Weekblad* (1910), 319.
58. H. Hermans, *Handboekje voor de RK Werkliedenvereenigingen* (Amsterdam 1919), 26–7.
59. *Katholiek Sociaal Weekblad* (1907), 492.
60. The following is based mainly on P. Thibault, *Savoir et Pouvoir* (Quebec 1972), and McSweeney, op. cit., ch. 3.
61. R.L. Camp, *The Papal Ideology of Social Reform* (Leiden 1969), 9.
62. Reprinted in E. Gilson, *The Church Speaks to the Modern World. The Social Teachings of Leo XIII* (Garden City 1954).
63. The Pope's stress on original sin was based not so much upon Aquinas as upon older authorities, especially Augustine. See, for example, the encyclical *Humanum Genus* in Gilson, op. cit., 117–18, 123–6.
64. E.g. *Studien* 19/I (1887), 58 f.; 20/I (1887), 150 f.
65. E.g. *De Katholiek* (1901), 391 f.; (1902), 364 f., 405 f.; (1903), 272 f.;

(1915), 286 f.; *Studien* 52 (1899), 355 f.; 72 (1909), 550 f.; 86 (1916), 308 f.; 87 (1917), 451 f., 571 f.

66. P.J.M. Aalberse, *Economie en Techniek* (Leiden 1916), 16.
67. Van Ginneken, *De Rechte Man*, 25.
68. Speech given before the Roman Catholic union of railway employees, entitled 'Recht en Plicht' (Right and Duty), 29 July 1894, in J. Roes, ed., *Alphons Ariëns. Bronnen van de Katholieke Arbeidersbeweging* (Baarn 1982), 259.
69. See, for example, the letter Ariëns wrote to the prominent textile manufacturer Van Heek on the occasion of the founding of his Christian working-men's union. He claimed the union would be 'a dam against the onslaught of socialism', and asked (and obtained) its official recognition by the association of textile manufacturers. See Roes, *op. cit.*, 70–1.
70. This aspect of Taylorism has been stressed by J.A. Merkle, *Management and Ideology* (Berkeley 1980), esp. 15–16.
71. L. Winner, 'Do Artefacts have Politics?', in his *The Whale and the Reactor* (Chicago 1986), 19–39.
72. D. van Lente and J. Schot, 'Heyenbroek en de Nederlandse Industrialisatie', in W. Buitelaar et al., eds, *In het Spoor van Heyenbroek* (Amsterdam 1988), 25–9.
73. M. Berg, *The Machinery Question and the Making of Political Economy, 1815–1848* (Cambridge 1982), ch. 11; Sieferle, *op. cit.*, chs 11–15; W. König, 'Die Rezeption von Technik und Industrie in der Katholischen Romantik', in T. Pirker et al., eds, *Technik und Industrielle Revolution* (Opladen 1987), 246–65.
74. H.W. von der Dunk, 'Conservatisme in Vooroorlogs Nederland', in C.B. Wels et al., eds, *Vaderlands Verleden in Veelvoud* (Den Haag 1980), 253–76.
75. H.H. Zwager, *Nederland en de Verlichting* (Haarlem 1980, 2nd edn), 11.
76. H. Lintsen, 'Stoom als Symbool van de Industriële Revolutie', *Jaarboek voor de Geschiedenis van Bedrijf en Techniek* 5 (1988), 339.
77. *Ibid.*, 346.
78. H. Knippenberg et al., 'Modernisering van de Nederlandse Nijverheid in Regionaal Perspectief, 1900–1903', *Jaarboek voor de Geschiedenis van Bedrijf en Techniek* 5 (1988), 394.
79. However, I would not agree with Lewis Mumford that the Netherlands 'slipped directly from an eotechnic into the neotechnic economy, without feeling more than the cold of the paleotechnic cloud'. See his *Technics and Civilization* (New York 1963), 111, 155.
80. E.g. I.J. Brugmans, *De Arbeidende Klasse*, 183; *idem*, *Paardenkracht en Mensenmacht* (Den Haag 1961), 194; J. van Meeuwen, *Zo Rood als de Roodste Socialisten* (Amsterdam 1981), 60.
81. I therefore disagree with W. König and R. Vahrenkamp, who argue that most debates about technology are not really about technology at all, but about larger (and vaguer) social issues for which technology is only a useful metaphor, while opinions about technology itself change rapidly and are easily manipulated. The discussion about the 'middle class problem', for example, led to real efforts to help the crafts by means of technical modernization; and the wholehearted support of the churches, firmly grounded in theology, for technical innovation as natural and inevitable impeded thinking about the way technology could be shaped in order to incorporate the interests of the workers. Technology is often not so much a metaphor as a metonym: it is seen as part of larger social issues. See W. König, 'Ideology and Practice of Technology in History', *History and Technology* 2

(1985), 12–13; R. Vahrenkamp, 'Botschaften der Industriekultur: Technikdebatten und Ihre Wirkungen', *Technikgeschichte* 55/2 (1988), 111–23.

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