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Beyond the debate over “post-” vs. “neo-”Taylorism : the contrasting evolution of industrial work practices¹

This article aims at studying the evolution of the organisation of work, working practices and social and professional relationships in industry. It seeks to demonstrate that it is possible to transcend traditional analyses of factory work in terms of binary oppositions (Taylorism versus post-Taylorism or neo-Taylorism) by analysing the diversity of production models in conjunction with long-term fieldwork. In this study of the Belgian iron and steel industry, the various practices of plant actors are viewed in the light of the challenges defined by strategic choices of the company.

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For the last twenty years, debates on the evolution of factory work, have been dominated mainly by the problem of transcending Taylorism and Fordism (Cohendet et al. (eds.), 1988; Grootings et al. (eds.), 1989; Vallas, 1999). To simplify, there are two irreconcilable interpretations:

-The paradigm of a break from the past, upheld by those who support the “post-” Taylorism interpretation, claim that a break introduced in the early 1980s by the new management models changed the methods of organising work and mobilising industrial workers. These interpretations detect a new way of dominating workers in the widespread adoption of the "Japanese model" (e.g. just-in-time production, teamwork, reduced hierarchical echelons, worker participation, e.g.) and/or the "US model" (modular production, individualised career paths, e.g.) (Sewell, Wilkinson, 1992; Graham, 1995; Beaud, Pialoux, 1999). Others, on the contrary, although starting from the same paradigm of a break from the past, emphasise the positive effects observed in companies since these principles, or at least some of them, were introduced, particularly placing emphasis on individual worker skills, increasing worker autonomy and overcoming bureaucratic divisions within firms (Zarifian, 1993; Thuderoz, 1995; Kern, Schumann, 1992).

-The paradigm of continuity, upheld by those who support the “neo-“Taylorism” interpretation, claim that the predicted break has been no more than a superficial change, leaving the essential aspects of the traditional Taylorian division of labour intact². These researchers say that the changes, whether technical (automated production and electronic control on workers), organisational (the creation of flexible teamwork) or managerial

(individualised salary packages), actually increased the fragmentation of tasks and the control of workers by supervisors, and considerably reduced what was left of worker autonomy (Linhart, 1994; Durand, 1993; Barker, 1999).

Nevertheless, despite their differences, most of the studies in the social sciences agree on the fact that a group of companies has indeed set up a new system of work: continuous process industries (petrochemicals, electronuclear, steel, glass, e.g.). In the case of iron and steel, the reasons invoked to justify the convergence of work practices in these companies referred in some instances to internal company parameters (changes in production techniques and automated production processes (Suzuki, 1991; Yonekura, 1995)) and in others, to external parameters (the crisis of consumption in industrialised countries in 1975, the shift from demand for standard products to a demand for differentiated products, or to the exemplary success of Japanese firms that were posting profits after 1975 (Stora, 1979; Dertouzos et al., 1989)).

Without reproducing here the entire debate over work changes in these industries, we can distinguish three main ways of interpreting these changes. All three approaches include the idea that factory practices and modes of labour organisation have been transformed in the iron and steel industry, and that by analysing this segment, it is possible to bring out the broader changes in labour in the industrialised countries. The first approach, which has been called “flow theory”, noted an incomplete transformation of factory work in this segment, in which the role of operators is limited to monitoring completely automated processes and intervening only in a marginal way by making adjustments to offset technical failures (Vatin, 1987)³. According to this approach, factory work has been fragmented (divided between internal operators and outsourced unskilled workers) and emptied of its intellectual content (monitoring work for internal operators, physical labour for external workers). Another approach, close to the psychosociology of work, propounds the thesis of “a gap between real work and prescribed work”. This theory maintains that, while factory work is indeed considerably restricted by automation and required tasks, workers nevertheless continue to intervene in the regulating process to improve production, even though their superiors do not acknowledge that fact (De Keyser, 1988). Finally, sociologists who support the “task reorientation” thesis consider that, since the 1980s, management in these firms has become aware of the need to explicitly ask workers to become involved in determining how technical processes should be regulated. In this sense, factory work has changed in the direction of greater technicality and decompartmentalising the duties of production workers and maintenance workers helps increase the workers’ understanding of the work

itself. In addition, the detailed pre-codification of work, which falls within the scope of technical processes and the description of tasks, does not reduce operators' autonomy, but on the contrary, is the prerequisite for autonomy in complex technical systems (Zarifian, 1993). Despite their divergence, all of these viewpoints share the idea that the work performed by operators in these firms is basically the same, regardless of the production context. Moreover, according to this research, there is no real difference in the evolution of the firms, when they are seen within the same movement of history (the break away from mass production). Thus, the study of a single work situation is sufficient to express the general features common to the industry in Europe or worldwide.

I would like to take this debate, in the iron and steel industry which is viewed, by social science, as a locus for trying out new technical and management instruments. However, surveys carried out on the automotive industry cast doubt on the convergence of company trajectories. R. Boyer and M. Freyssenet (Boyer, Freyssenet, 2002), relying on a far-reaching research programme concerning all the companies in the automotive industry, proved that several different yet profitable company models existed side by side at the same time in the same country⁴. Starting from the study of the overall trajectory of an iron and steel company and three of its plants, we will show that these interpretations of varied company models allow us first to differentiate among the various processes of change within companies without falling back on binary oppositions such as Fordism *versus* post-Fordism, and secondly, to define work practices in the industry in terms other than merely opposition to change or domination, by relating them to the challenges defined by the company's trajectory (Lomba, 2001a). The point is to avoid universalising without going to the other extreme of "local" or "singular" cases.

1. A sociology of actors and practices

The methodological approach to the study of changes in work practices was chosen to meet the desire to view them in terms of the challenges defined by the company's strategic orientation. Hence, there are two distinct aspects of this research. The first part reconstructs the trajectory of the enterprise (here, the Belgian company Cockerill Sambre) from the end of the 1960s to the end of the 1990s, in order to define the company's strategic orientations and the means employed to implement it. The second aspect is concerned with the empirical study of three of the company's plants, to illustrate the way in which local actors embody and reset the strategic orientations pursued by the company.

For the trajectory of the enterprise and its strategic orientations, the various actors

(management; trade union organisations; local, regional, national and international authorities; competitors; customers; experts; e.g.) who take part in decision-making processes have been noted, without assuming any automatic involvement on their part. By identifying the actors who take part in these processes, we can consider both tacit and explicit agreements, understandings, conflicts, rivalries and transitory or lasting associations, and thereby determine the soundness of the means adopted by the company in its industrial organisation, sales policy and workforce management. This part of the study, based on written and oral sources⁵, will bring out the various strategic orientations pursued by the actors within the enterprise and the means mobilised to embody those orientations.

At the same time, we studied the application of these orientations in three large plants belonging to the company (a blast furnace, a hot-rolling mill, and a coating line), as well as social practices and relationships among the local actors (blue-collar workers, white-collar workers and managers). In this case, the study is based on ten months of fieldwork in the three plants where we joined teams working in shifts. Through these “analytical” observations (Chapoulie, 2001), we have been able to bring to the fore the day-to-day compromises worked out between the actors in the plants and detect variations in the phenomena under study by comparing the three plants and examining the phenomena over time. In this way, it becomes possible to grasp the dynamic construction of production by the actors involved.

This two-pronged study approach should not be understood as the comparison of two different areas, with one of them (the enterprise) determining the other (the plant), in which the latter is viewed as the place where strategic orientations are applied or resisted. Rather, in both cases, it is a question of considering the trajectory of practices as they developed in the context, without lapsing into a teleological history or functionalist sociology. Our research methods include the theoretical gains from previous historical (Lepetit, 1995) and sociological (Strauss, 1985) research into practices. They are therefore essentially guided by the desire to shed light on the interplay among the actors whose possibilities for action are limited by the challenges that define their scope.

2. An enterprise without a compass: actors in search of a strategic orientation

As we indicated in the introduction, most iron and steel industry studies postulate a break in the history of this sector, marking a shift towards post-Fordism, and attempt to determine the point at which this occurred in company trajectories. In contrast, the approach we are using here makes it possible to differentiate three main periods in the

trajectory of Cockerill Sambre starting at the end of the 1960s. These periods correspond to distinct compromises between the actors operating under the constraints of the political and economic context, and in that sense, are proper to the enterprise under study.

Cockerill Sambre S.A. is one of the pillars on which Belgium's industrial history is built. The iron and steel company Cockerill, founded in 1817 near Liège, was one of the engines of industrialisation in Belgium as well as in continental Europe (Pasleau, 1992). At the beginning of the 1970s, Cockerill S.A. was the leading steel producer in Belgium and ranked fifth in the European Union. At the time, the company employed 40,000 workers and posted net sales of €686 million. It was the country's largest industrial company.

By 1998, this Belgian bastion had become, from a European standpoint, merely a modest iron and steel company with a considerably reduced workforce (8,000 workers) that was about to be taken over by the French company Usinor, a large European iron and steel firm. In the meantime, Cockerill suffered considerably from the European steel industry downturn that followed upon the two oil crises. From 1975 to 1987, the company had posted recurring losses totalling €2.9 billion (at the 1999 exchange rate). The firm, which had come under the control of the public authorities and was subsidised to a great extent, had been the focus of numerous plans for strategic reorientation and rationalisation, including a merger with the other major Walloon iron and steel firm Hainaut-Sambre in 1981 to form the Cockerill Sambre Group. After a dozen years of uncertainty about the future of the company, and several close calls with bankruptcy, Cockerill Sambre turned around and became profitable, even during the crisis years in the first half of the 1990s. Following new rationalisation plans to improve profitability, Cockerill Sambre was privatised and sold to Arcelor. Arcelor continued the significant restructuring programme within the group and the Arcelor management scheduled the closing of most of the Cockerill Sambre plants in Liège (Fusulier, Vandewattyne, Lomba, 2003).

2.1. Caught between diversification and specialisation: the failure of a twofold strategic orientation (1970-1976)

The process of developing a strategic orientation and a production model is the combined result of actions performed by several collective actors. In the case of Cockerill, during the period under study, the firm comprised a financial holding company

that owned most of Belgium's industrial assets (Société Générale de Belgique) (Kurgan-van Hentenryk, 1996), the firm's management, Cockerill trade union organisations⁶, and the Iron and Steel Industry Consultation Committee (C.C.P.S.)⁷. Until 1975, a compromise was achieved among these actors concerning the firm's external growth (buying out the iron and steel companies of the Liège valley) that satisfied the aspirations of:

- the main shareholder in its search for dividends and in line with its competitive policy towards Belgium's other major financial holdings;
- the C.C.P.S., which intended to maintain its control over iron and steel through national firms and minimise competition among national producers;
- trade union organisations by maintaining regional employment and high wages within the company.

This compromise was not reached through consultation, as the number of conflicts among these actors demonstrates (lengthy strikes, wildcat strikes, conflicts within Cockerill's management, tensions among the various actors in the C.C.P.S), but rather resulted from a series of accommodations. From 1970 to 1974, Cockerill was not one of the top-earning companies in Europe, but its profits were not negligible (€60 million). On the other hand, in 1975, during the worldwide general recession in the segment, Cockerill became one of the least profitable iron and steel companies in Europe. How did it end up in such a situation?

From 1970 to 1974, Cockerill pursued a two-pronged strategy:

- **to diversify** its product range by proposing a full range of iron and steel products (wide rod, metal sections for building; flat steel⁸ for automobiles, building, packaging and industrial applications; special steels). Diversification was aimed at distributing economic risk across the board, through the entire range of steel production, and hence, among various customer-segments, each with its own separate cycle.

- **to specialise** in expanding products with high added value (thin flat products, coated steels and wide rod). Specialisation was sought-after in order to take advantage of increasing demand for certain high-end products.

To counter its fluctuating situation as a producer forced to export most of its production, the iron and steel company relied on a powerful distribution network in bordering countries, in a replacement market requiring good quality products. These strategies necessitated internal investment and a network of holdings in Belgian and French iron and steel plants. The configuration of Cockerill production was henceforth characterised by extremely compartmentalised plants that had recently merged, which were geographically isolated and self-sufficient for the production of the full range of

products from iron to finished products. In this case, industrial concentration did not lead to desired economies of scale. From the standpoint of the employment relationship, the management had to reach a compromise with extremely powerful trade union delegations that negotiated – often following conflict – a high level of employment and wages.

Starting in 1975, the internal contradiction between these two orientations became obvious. The compartmentalisation of the company's plants, together with its two-pronged strategic orientation towards diversification and specialisation, led Cockerill to adopt a scattered investment policy. As a result, certain processes required to make high quality, value-added products were not included, whereas some plants were too specialised to take advantage of the cycles of various types of customers. The solutions that were proposed had little impact on the results. Overall, Cockerill was left in a sort of limbo in which the measures adopted to remedy its problems (curbing investments, increasing indebtedness, attempting to introduce centralised services, downsizing the workforce and lowering wages) were, above all, an effort to cut their losses in the short run. We can see quite clearly here that the problems the company encountered at the time stemmed not so much from an inherently inefficient production model (the so-called "Fordist" model), as from the absence of a clear-cut strategic orientation.

2.2 The ongoing instability of the actors (1977-1986)

The 1977-1986 period was marked by a high degree of environmental instability: political instability in Belgium with a succession of coalition governments; instability of the steel market that suffered a new downturn in 1981; instability in the European directives intended to provide a framework for the European steel market. In addition to this unstable context, there was a high rate of turnover of decision-makers at Cockerill Sambre, which explains the uncertainty concerning the company's strategic orientations.

When we open up the black box of the decision-making process, we find that coalitions and alliances tended to be temporary rather than definitive, that they included actors who worked together on some projects and tore each other apart over others. In short, constant hesitation was the rule⁹. The public authorities gradually took hold of the firm when the private shareholders left after refusing to take responsibility for the destiny of a company in deficit. Top management came and went, and coalitions were short-lived. The involvement or withdrawal of most of the actors in decision-making processes (private shareholders; municipal, regional, national and European authorities; socialist and Christian trade union organisations; consultants; journalists; pressure groups; major customers; European competitors) seems to have been guided not only by their own

professional and financial interests or the fate of the company, but also by commitments in other social worlds (political, administrative, economic). When negotiations took place on building a galvanisation plant, for example, in the early 1980s, opposition arose between coalitions that were defending different geographical locations for the future plant. In particular, executives and engineers from the two Cockerill sites, armed with technical reports, fought over who should get the investment. But conflicts were also settled through broad coalitions that grouped together worker-union officials, local elected officials, parliamentary representatives, and even members of the European Commission, the Board of Directors, the top management and people from competing firms associated with the project. The conflict was to be settled by agreeing, in exchange for the project, to build an extension on another plant that would have the same workforce requirements. Later on, the actors would use the terms “compensation”¹⁰ and “counterpart” to describe the settlement.

Due to the absence of agreement on an orientation for the company, projects concerning manufacturing, sales and employees succeeded one another, promoted by different actors and lacking consistency and continuity. During this ten-year period, there were no less than eight restructuring plans involving changes in the organisation of manufacturing, sales policy and labour policy. This did not include partial restructuring plans, drawn up on a local scale. There were some consistent management decisions, however, though they did not amount to a clear strategic orientation for the enterprise. Rather, they involved short-term management of crisis-related problems including reducing production capacity at the request of the European Commission, closing old plants, concentrating production into automated units and widespread use of early retirement to trim the workforce¹¹. Lacking a genuine strategy, decision-makers therefore responded in the short term to steel market crises, but the company was running a large deficit during this period and only barely avoided bankruptcy.

2.3. A high-end grocery store in the European iron and steel industry (1987-1996)

After a period of turbulence, the decision-making process stabilised. The public shareholder withdrew from company management in favour of an internal management supervised by Jean Gandois, whose recognition by the French employers guaranteed his autonomy (Gandois, 1986)¹². The main actors involved in the decision-making process gave priority to focusing their actions on ensuring the company’s future, without necessarily sharing the same orientations.

Starting in 1987, taking advantage of a more favourable economic situation in

Western Europe, Cockerill Sambre manifested a more stable strategic orientation, similar to what R. Boyer and M. Freyssenet call a “diversity and flexibility” strategy, which consists in offering products to a wide customer base (building, automobiles, packaging, e.g.) while quickly adjusting costs and production to fluctuations in demand from each of these segments. The idea was thus to produce a highly diversified range of products to meet varied demand, without investing in small niche markets. From 1988 to 1995, Cockerill Sambre met this demand well by becoming a high-end grocery store in the steel industry. The company was then specialising in manufacturing products that other steel companies could not or did not want to produce, due to the size of the series or the complexity of the production process. Cockerill Sambre specialised in flat products, but maintained the entire range of these products while developing a “grocery store strategy” (selling short and middle series) of rather high-end products (coated steels), without investing in the top-of-range products. Its privileged client base was mainly made up of stable customers (in terms of volume and price) such as automobile makers and the packaging industry, who were demanding about product quality, willing to pay high prices and located in countries that enjoyed a high degree of monetary and political stability.

The “diversity and flexibility” strategy also required a flexible production organisation and workforce to handle diverse production while very quickly adjusting costs to variations in demand. The industrial organisation was therefore aimed at incorporating the entire iron and steelmaking production process (from blast furnaces to coating plants). In the upstream phase of the production process (converters, hot rolling mills, cold rolling mills), the plants were very flexible in terms of range, whereas the lines in the downstream phase (coating lines) were more specialised both in their range and market. As for the employment relationship, the challenge was to succeed in reconciling the high-level qualifications of the workforce required to manage the diversity of production with flexible working hours in the plants most subject to variations in the economic situation, i.e. the downstream phase plants. In production plants, Cockerill Sambre could rely on a stable labour force, given its policy of high wages, reduction of the labour force through early retirement and a low level of recruitment. This stability ensured the necessary familiarity with plant facilities to manage sudden jolts in the scheduling of small orders that in every instance called for a completely different production method. Production flexibility therefore relied on collective rather than individualised management of the labour force (e.g. through part-time employment). Cost adjustments were primarily obtained through partial unemployment in upstream plants¹³ and varying the length of the work week according to

the level of backlog for downstream plants, which were the most exposed to fluctuations in the economic situation (3-7 work days per week).

Cockerill Sambre therefore developed a production configuration that was consistent with the strategic orientation it pursued, and the results testify to that fact. Whereas a few years earlier, the company appeared to be on its last legs, during this period it posted significant profits and withstood the crisis at the beginning of the 1990s far better than most of its European competitors. However, this framework only lasted 7-8 years. The implementation of a drastic cost-reduction plan in 1996 (-20% with the same organisation) introduced choices that went against the “diversity and flexibility” strategy: small orders that bring in low profits during reflation periods but are essential in the event of a recession were refused; prices went down, and with them, the quality of supplies; workforce management was individualised according to the individual skills model; e.g. The promoters of this plan, supported by a well-known US consulting firm, sought to satisfy short-term financial criteria in view of a merger and to apply managerial fashions considered universally effective, such as refocusing on the *core business*, dividing the company into autonomous business units, and developing customer services. Once again, employment was severely affected (-20% of the company’s workforce), along with the quality of procurement, maintenance and supplies and, therefore, of the products themselves. Obviously, one cannot help seeing a connection between these decisions and the announcement that most of the Cockerill Sambre plants in Liège were to be closed.

Thus, decision-makers at Cockerill Sambre seldom pursued any long-term strategic orientation. The sole exception to this situation occurred in the early 1990s when the “diversity and flexibility” strategy proved effective in coping with the labour and product environment at the time. This should not suggest, however, that every steel company necessarily had to go through production diversification – a sign of “post-Fordism” – since the most profitable firms in Europe during the 1990s were supplied by two companies in northern Europe that had opted for standard production with limited product ranges (Ahlberg et al., 1999). At Cockerill Sambre, the principle of cost cutting, justified by the new management theories (Boltanski, Chiapello, 1999), prevailed, thereby jeopardising this strategy. To come back to the debate over transcending Fordism, long-term historical analysis shows that reducing the evolution of this segment to a break between Fordism and post-Fordism in no way accounts for the trajectory of Cockerill Sambre. Before 1975, the company’s orientation did not correspond to Fordism, which was too restrictive; after 1975, the period of constantly shifting orientations cannot be reduced to post-Fordism, which encompasses very different

strategies. It remains for us to see how these changes in strategic orientation took concrete form within the company and how the workers positioned themselves, in their practices and relationships, in the face of these orientations. As soon as we change the scale of analysis, the interpretation becomes more complex and calls these generalisations even further into question.

3. Workshop practices in the face of strategic uncertainty

How did the local actors at Cockerill Sambre embody and implement the successive strategic orientations associated with a drastic programme of cost reduction and constant trimming of the workforce? A synchronic survey, carried out in 1996-1997, allows us to grasp the relationship between the stakes defined by the company's strategic orientations and the development of work practices inside the plants. It was thus the company's strategic orientation, and not its chosen management models, that will serve as our point of departure for analysing work practices.

I will take as examples three company plants, all of which were subject to the cost-cutting programme, but with diverging orientations. The first case, probably the most widespread at the time at Cockerill Sambre, was the production of short and middle series of good quality products (e.g. the hot rolling mill). The second involved mass production of a standard product (e.g. a blast furnace), involving little technical mastery. The third involved the mass production of an average quality innovative product (e.g. the coating line). The point here is not to lapse into technical determinism (e.g. in other companies, hot rolling mills were used for mass production), but rather to consider that these plant orientations resulted from prior choices of company orientation ("diversity and flexibility" in the first case), or the absence of orientation ("innovation" in the third case), or yet again, from a choice of industrial organisation ("mass production" in the second case). This diversity makes it possible to understand the variety of types of factory work within each plant during the same period¹⁴.

3.1. "Clandestine" production of short and middle series

The Liège hot rolling mill is a plant situated upstream in the production process, which manufactures good quality products in short and middle series that require lamination parameters to be reset with every change of series. For the past twenty years, local managers thought that gradual plant automation was the best way to respond to manufacturing demands. The workers were believed to be incapable of meeting the

quality and productivity standards demanded by customers. Virtually all the installations in the plant are now controlled by automated processes, and consequently, the number of workers per team has dropped sharply (from 40 in 1980 to 21 in 1997). Most of the operators have been replaced by technical processes, whereas the more specialised maintenance work and ancillary production tasks have been outsourced.

The local management adopted a policy of lowering the status of operators (from “white-collar” to “blue-collar” workers¹⁵), which they claimed was justified by the reduced skills of the blue-collar workers, whose former role was now theoretically played by technical instruments. This change of status gave them the means to adjust costs to fluctuating demand through temporary lay-offs in the event of recession, instead of directly reducing workers’ wages, which would have led to trade union opposition. To continue the labour force reduction demanded in the company’s employment negotiations, once it had pursued this approach as far as it could go, starting in 1994 the management attempted to decompartmentalise worker trades (quality, maintenance and production departments) to fill up any slack time. Thus, during stoppages, production workers had to perform maintenance tasks requiring little technical skill (greasing, checking installations, changing standard modules), whereas maintenance and quality control workers could replace production workers at the simplest workstations.

These cost reduction measures interfered with the need to manufacture products in short and middle series. Indeed, automated techniques designed for mass production did not fulfil the need for production diversity on the one hand, and, on the other, the decrease in on-the-job training provided to blue-collar workers as well as of machine maintenance led to problems in managing production processes. For example, the engineer specialised in the furnace, situated at the beginning of the line, gradually created an automated pace for producing steel strips, whereas prior to the 1990s, the operators were in charge of that job. In order to achieve the productivity level demanded by the management, the pace was calculated on the basis of theoretical optimisation by type of product (according to size, composition and type of client) without including the time required to change the plating parameters according to the type of products. As a result, whenever there were repeated product changes, the pace was too fast, giving rise to breakage and breakdowns at the end of the line. To cope with the problem, the furnace operators, at least the older ones with permanent positions, complied with instructions for the simple products but not for the complex products or during transitions between different products (e.g. from very narrow to very wide), when they slowed down production. If the engineer put too much pressure on them, they would revert to automatic management until a breakdown occurred. This was followed by a game of

negotiations and pressures within the plant to lay blame (between engineers at different positions on the assembly line, as well as between operators). Can we conclude that the operators had more autonomy or less in this case? And does it make sense to take about transcending Taylorism in such a situation?

Another example clearly brings out the contradictions confronting the various categories of workers. In 1995, the number of discards and defects increased perceptibly on the assembly line. According to the workers, there were two main reasons for this deterioration: first, a change in the supplier of the cylinders used to flatten the steel, which were of poorer quality than before, and secondly, scaling down the number of people on the assembly line, which meant replacing experienced operators by young workers during meal breaks. The engineer supervisors were obviously aware of both of these problems, which did not prevent them from coming back to observe the operators directly for 15 days during all shift changes, even at night and on weekends when they were theoretically absent from the plant. Nevertheless, they took pains to avoid observing during meal periods, when the workers reverted to the old, more efficient cylinders. In the end, the results were considered to have improved, without anyone publicly questioning the procedure. The engineers abhorred the role of giving orders and their inability to justify, in the face of obvious needs, the lack of technical and human resources required to manage production diversity; as for the workers, they preferred to establish special exceptions to management rules in order to achieve production targets.

Consequently, special exceptions to the principles defined by official rules (automated processes and Total Quality standards) were more or less standard practice in the plant. Production operators were constantly intervening (e.g. to slow down the assembly line or alter the distribution of power among the engines), in spite of automated processes, to regulate the machines to deal with difficult laminating situations (large or thick formats or format changes). In these instances, production could be described as “clandestine”. Since versatility was not widely applied by older blue collar workers who were looking forward to early retirement in the short term (at 52), but was used by younger blue collar workers to increase their wages, the central assembly line workstations were occupied by stable blue collar workers. Workers used the technical processes and recommendations pertaining to work activity only for production requiring the lowest degree of know-how to make ordinary products. Since the ability to produce diversified series relies mainly on practical knowledge acquired on the job and the methods employed to coordinate teams, workers experienced changes introduced in the plant as calling into question their skills, their status and the conditions required to achieve production targets. As a result, the workers jointly developed methods to

coordinate exceptions to the rules to ensure production stability in the face of what they viewed as ongoing indecision on the part of their supervisors. This indecision referred particularly to the many management innovations adopted in the plant (Total Quality, quality circles, safety meetings, skills assessment interviews, e.g.), which the workers had trouble keeping straight and considered to be gimmicks. In addition, depending on the economic situation and the plant's financial results, the managers sometimes ordered the workers to emphasise production quantity, then changed to quality, and again to cost cutting, within the space of few weeks. As the action of each operator affects that of all the others, coordination methods are collective and require a long learning phase to determine work routines, which was shortened by the repeated change in the objectives assigned to the workers. In their uncertainty, they tried to encourage daily production volume by comparing team production scores. The rules that generally applied were those of an agreement based on conflicts or obligations: pressure from the older workers on their younger counterparts, conflicts between operators, separation between blue-collar trades, e.g.

The workers were thus required to reconcile the irreconcilable by producing good quality short and middle series without the technical means or the workforce to do so. The fieldwork revealed that these workers invented complex exceptional actions to ensure production targets, which supervisors knew about and which always remained open to sanctions in the event of poor production. The rules were tacit and clandestine, and led to numerous daily conflicts among the various actors in the plant.

3.2. Collective worker know-how for uniform production

The situation with regard to the blast furnace had a number of points in common with that of the rolling mill, but the phenomena observed often took on a different meaning. The blast furnace had to turn out uniform, even products in spite of varied supplies and little theoretical knowledge about the actual process of smelting minerals. In this case, the measures adopted to reduce costs mainly consisted in cutting supply costs, modifying technical processes (particularly carbon injection), trimming the unskilled workforce that performed smelting-related tasks under hard conditions, and outsourcing part of the labour requiring physical strength. At the same time, the local management set up micro-teams of highly qualified workers to manage production uncertainties. These workers were hired with a secondary school level background and agreed to pursue three years of higher education in metallurgical chemistry or electricity. By giving these workers an advantageous status (high wages, the possibility of easily achieving foreman

or “white-collar” status), the management guaranteed the stability of the personnel required to supervise a production process that required more than purely technical management. The workers or operators jointly developed extremely complex methods of intervention on a regular basis through discussion, without being able to rely on solutions that were inherently efficient. They were constantly arbitrating between partial solutions, because the blast furnace is slow to respond, and the parameters of intervention are interdependent (e.g. increasing the weight of the shot has the advantage of lowering the sulphur level, but also the disadvantage of increasing the silicon level which has to be eliminated by modifying other parameters).

At this stage of production, it was possible to improve the status of skilled workers because cost cutting affected other categories of personnel (less skilled or subcontractors), and because the machine was not faced with fluctuations in production period length. At the blast furnace, for example, the operators’ status (“white collar” status with monthly salaries) was in keeping with the stability of the length of the work, since the machine was almost never stopped and therefore never underwent partial unemployment. Along with this group, there was another worker group whose members were not as well trained (primary school level education or three years of secondary school) in charge of preparing and controlling the flow of molten iron. For these workers, the challenge was to withstand hard, dangerous and trying working conditions (intense heat, smoke emission, labour requiring physical strength). The division of labour was based on seniority, whereas in the face of these working conditions, a spirit of mutual cooperation determined the distribution of tasks.

A team of workers was divided into micro work-groups comprising one skilled worker and one unskilled worker, which were not connected to each other, with each one operating autonomously and performing different tasks. In this case, autonomy was not synonymous with clandestine production, because the standards were secondary. The supervisors rarely intervened in managing the workers, who organised themselves to divide up the hard work in the case of unskilled workers and to negotiate the most efficient blast furnace regulation for the operators.

3.3. Indirect surveillance of ordinary mass production

The coating line followed a trajectory in two stages. This line testified to the determination of Cockerill Sambre managers to invest in several strategic orientations during the 1980s, promoting product innovation through this line (coating thick products for building). In the first phase, the completed product did not sell, and there was some

discussing about dismantling the line. As soon as the product was adopted by certain customers, due in part to the efforts of the sales force, the line took advantage of its virtual monopoly in Europe to mass produce an average quality product, without trying to anticipate whether there might be a change in demand or to develop competing products. Unlike the phenomena observed at the other two plants, worker know-how did not rely in this instance on highly skilled personnel either by right, as in the case of the blast furnace or in fact, as in the case of the hot-rolling mill, but rather on the automatic regulation of a process that was carefully controlled within the company. The amount of R&D effort put into coating line processes at Cockerill Sambre and the fact that the line's production was not very diversified explains the high degree of technical control over plant processes by the engineers. The workers intervened very rarely in settings and the operators at central workstations did not spend a great deal of time monitoring the machines. In fact, when the bosses were absent, it was not unusual for us to spend the whole night talking in a small refectory without any monitoring of the automated machines on the part of the operators. In that sense, the stability of the workforce in the plant was not the prime topic of discussion. Rather, it was a question of having a workforce that would accept temporary technical jobs and work in shifts of varying length.

The workers offset these constraints by taking advantage of good working conditions (little pressure from supervisors, long breaks) and by looking upon their work in this plant as only one moment in their professional career (many left the plant to work in other factories within the firm). This did not mean that there were no conflicts, especially regarding improving salary conditions and flexible work time (which relied mainly on workers with fixed-term contracts), but they concerned issues that differed in part from those of the other two plants. Unlike the first case, automation was not seen as questioning workers' expertise. In the coating line, there were few clandestine practices aimed at taking charge of production beyond making technical adjustments. On the contrary, in the rare cases in which the adjustments did not work and the workers had to set the coating parameters themselves, they felt they were victims of intensified labour practices that called into question their everyday habits in the plant.

Summary chart of the three situations

	Hot-rolling mill	Blast furnace	Coating line
<i>Type of production</i>	Small and middle series of good quality products.	Uniform, standard production.	Mass production of average quality products.
<i>Amount of demand variation</i>	Average variation in demand.	No variation in demand.	Major variation over the long term and low variation in the short term.
<i>Degree of automation</i>	Partial process adjustment.	Assisted intervention.	Totally automated process.
<i>Operator intervention</i>	Regular, clandestine interventions for difficult products.	Regular, joint interventions.	Little intervention.
<i>Work organisation</i>	Attempt to integrate quality control -manufacturing- maintenance.	Professional division between technical work (operators) and manual work (foundry workers).	Division between trades little distinction within the trades.
<i>Status of assembly line personnel</i>	Change from “white collar” to “blue collar” status.	Two different employment statuses: “white collar” status for operators, “blue collar” status for foundry workers.	“Blue collar” status throughout the line.
<i>Relationships between peers and with supervisors</i>	Very conflict-ridden relationships (between generations, between teams, between bosses and workers, between operators).	Cooperative relationships among workers and limited cooperation with the management.	Sociability among workers and between teams, evasive relationships with supervisors.

These three examples of work practices and social relationships illustrate the need to get beyond interpretations formulated in “post” or “neo” terms to account for changes in companies and work. Indeed, these practices should not be analysed in the light of any

particular standard (teamworking, skills required, quality circles, e.g.), which is believed to mark a break from the past or continuity in the nature of the work. Analyses of social relationships and work organisation have everything to gain from paying serious attention to the diversity of these phenomena seen as a group of practices developed collectively in the face of stakes determined by strategic company orientations. The example used here presents three different work organisation situations, and even variations within each one. The chart does not pretend to exhaust the range of possibilities and it would be a mistake to view it as representing a generation overview of the degree of autonomy enjoyed by industrial workers.

This research programme ultimately required comparing the trajectories of the actors and organisations over a long period of time, while avoiding a teleological perspective. The use of written sources has allowed us to avoid rationalising after the fact and account for the intricate relationships among the actors and the paths they chose to follow or to abandon. This approach only makes sense if we look at each period, even previous ones, from a synchronic standpoint, and combine this angle with a detailed study of the practices of the various actors in the company. Long-term fieldwork provided us with the basic elements needed to understand daily practices without putting them into modal categories. Thus, diversity is no longer grasped as what is left over after analysis, but rather as the result of the firm's particular orientation and an integral part of the evolution of social phenomena.

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¹ Thanks to Susan Taponier for her translation.

² Some also emphasise that the application of new forms of work organisation has been limited to only a few famous companies (Vallas, 2003).

³ This current takes its inspiration directly from the intuitions of Pierre Naville (Naville, 1982).

⁴ The surveys were carried by the GERPISA (Permanent Group for the Study of the Automobile Industry and its Employees), an interdisciplinary network of several dozen researchers in various countries. For the period 1975-1990, for example, they showed that the strategies concerning “volume and diversity”, “ongoing cost-cutting”, and “innovation and flexibility” were profitably applied by Volkswagen, Toyota and Honda, respectively.

⁵ The written sources come from files registered by the enterprise, private archives, particularly those of a former Belgian Deputy Prime Minister who instigated the reorganisation of the Belgian iron and steel industry and my father (a worker, technician and later a trade union official within the firm). The main documents used were annual reports, the minutes of meetings of the board of directors, the management committee, trade union meetings, restructuring and reorganisation plans, audit reports, collective bargaining agreements, organisation charts, department reports, annual social reports, internal surveys, company newspapers, internal letters, public and international reports, reports from informal meetings, autobiographies and pay slips.

I have added to this material 67 recorded interviews with representatives of the main collective actors in the firm: management, trade unionists, public representatives, managers in various departments such as the research centre, logistics, sales, social affairs and quality.

⁶ Cockerill acts as a bastion of Belgian trade unionism, in which mass trade unions were built up, blue collar at first, then white collar, grouping together in the company nearly 99% of the two populations of workers.

⁷ The C.C.P.S. is made up of representatives of government, the Belgian Iron and Steel Committee and trade union organisations.

⁸ Flat steel or sheet metal is distinguished from long steel (rods, bars, sections) generally used in building. Flat products consist of steel which is much wider than it is thick.

⁹ For a more detailed presentation of the decision-making processes at Cockerill Sambre and the arrangement among actors starting with the example of investment decisions, cf. Lomba, 2001b.

¹⁰ Letter from R. Jehasse to G. Spitaels, 23/9/1982.

¹¹ In Belgium, early retirement allows companies to retire workers before the legal age (52-55 at Cockerill Sambre). The worker receives an unemployment benefit until he reaches retirement age, along with a bonus paid by the company.

¹² Jean Gandois was the Chairman and Chief Executive Officer of major French firms (Sollac, Rhône-Poulenc, Péchiney) and above all, present of the largest French business association (C.N.P.F.) from 1995 to 1997.

¹³ In Belgium, “partial unemployment” is used only for blue-collar workers who are paid wages (not salaries), when the company must stop production temporarily due to a lack of orders or a technical problem. In this instance, they receive unemployment benefits and a bonus paid by the company.

¹⁴ The factory is not only a place to apply outside measure and rules; it is also a partially autonomous area (Hatzfeld, 2002). For a more detailed presentation of the various organisations, relationships and practices in within the factory (between teams, between trades, between generations, e.g.), see Lomba, 2001a).

¹⁵ The distinction between “blue-collar” workers and “white-collar worker” (including clerks, technicians, foremen, e.g.) in Belgium refers legally to the “manual” or “intellectual” nature of the tasks performed by the worker. The main effect of status is on the method and amount of wage payment: blue collar workers are paid by the hour, and therefore subject to partial unemployment, whereas the others receive guaranteed monthly salaries regardless of whether or not plant machines are in operation.