Disaggregating the Sexual Division of Labour: A Transatlantic Case Study

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Abstract

This paper explores the adequacy of several theories advanced to account for the sexual division of labour -- neoclassical, dual labour market, marxist feminist, and technologically determined- by comparing the historical processes by which the gender segregation developed in the hosiery and knit goods industry in Canada and Britain in the period 1890 to 1950. It argues that the sexual division of labor is formed within the shifting mutuality and antipathy of gender relations and the relations of production so that theories of sexual segregation must integrate rather than isolate class and gender based processes.

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Introduction

Sexual division has been an obvious and enduring characteristic of wage work, much studied on both sides of the Atlantic. Gender roles, household forms and community welfare have been made and remade by changing access to paid work. The theoretical literature on gender segregation in the labour force is rich, but economists and feminist theorists have been interested in sexual divisions as general features of the economic or sex/gender system rather than as boundaries between tasks forged in defined contexts by particular clashes of interest. Whether in specifying the social groups which benefited by gender division, the systematic relationships which generated the boundaries, or the traits upon which lines of partition were drawn, most analysts have dealt with gender division as a characteristic of the workforce as a whole.¹

While sexual segregation is a longstanding pattern in aggregate labour force statistics, at the disaggregated level, the level at which women and men have looked for and tried to hold onto jobs, the picture is rather different. Sexual division in the labour force is the sum of the sex-labelling of specific tasks. These labels on close inspection have shown so little continuity as to seem arbitrary. The same jobs have been assigned to different genders at different times in the same place and in different places at the same time.

For the historian working at the level of the firm, industry, family or community, economy-wide characterizations of gender segmentation do not suffice. In the analysis of domestic, workplace and town politics, it is the particular local array of entitlement by gender to specific jobs with known rewards and detriments, and the changes in these entitlements which are germane. Yet in contrast with sexual segmentation as a characteristic of the economy as a whole, the processes by which jobs have been assigned by gender have not been much studied.²

It is, however, in contests over the sex-labels of jobs that the interactions between economic and gender hierarchies more clearly emerge. An approach which acknowledges the heterogeneous interests and influence of women, men, capital, and labour will better explain why “a job that is clearly and exclusively women's work in one factory, town or region may be just as exclusively men's work in another factory, town or region”.³ In studies of entitlement to particular jobs the processes which human capital, dual labour market and feminist theorists have isolated are forced to keep the same awkward company they do in real life. This paper attempts to explore the relationships among economic and gender hierarchies by a transatlantic comparison of the assignment of technically similar knitting tasks in the hosiery industry of the English east midlands and southern Ontario in central Canada, to show both the diversity and the commonalities in the processes by which gender divisions are drawn and to suggest the contending elements which have contributed in these cases to substantially different definitions of what was appropriately women's and men's work.

At the turn of the century in the English east midlands and in south western Ontario, knitting was both women's and men's work and exceptional in the hosiery industry as a mixed gender occupation. Seamers, the most numerous employees in the industry, were all female by tradition from the domestic stage. The fixers who set up and restarted machines and the mechanics who repaired them were uniformly male by convention which gendered mechanical aptitude masculine. Two key changes had occurred simultaneously in the industry on both sides of the Atlantic only thirty to fifty years previously, the shift
from human to steam power and from workshop to factory production. In the technological and organizational changes which followed, knitting rooms became contested terrain. As the sexual division of labour in the hosiery was reformulated with increasing automation, the knitter was the worker whose appropriate gender was most in dispute, most frequently seen to require explanation and defense. In the midlands and in Ontario specific traditions from both the domestic and early factory stages, societal prescriptions of entitlement to wage work, features in the local labour market and labour organization and technological transformations came to bear, but the ways in which these elements arrayed managers against workers and men against women to remake gender divisions in knitting differed markedly.

The East Midlands

The east midlands was the centre of the English hosiery industry. Traditions from the workshops that were being replaced remained strong in the hosiery factories of Nottinghamshire and Leicestershire in 1900 and customary gender divisions in knitting persisted, as theorists have suggested, 'regardless of the reason women or men were initially used' in certain jobs. The most common workshop knitting machines were the fully-fashioned frames said to have been invented by William Lee in the sixteenth century. From the establishment of the industry in England, there were women knitters, as the membership lists of the Worshipful Company of Framework Knitters for the early eighteenth century clearly show. In a small number of cases, for example Unwin of Sutton-in-Ashfield in the eighteenth century and Wolsey in Leicester in the nineteenth, women are known to have run important merchant hosier enterprises. In domestic production gender divisions needed to be relatively flexible, because at any given time the number of males and females available for work in a family was fixed. Women knitters were not oddities in the framework villages. Still, men more often knit while women seamed and the struggling stockinger portrayed in poems and royal commission testimony was usually male.

From the mid-nineteenth century, however, another kind of knitting machine was used by some domestic knitters. The circular machine, attributed to the engineer Marc Isambert Brunel, was manufactured for women, 'small and compact enough to be screwed to a lady's worktable.' The rotary motion of the circulars was adapted to steam power sooner and more successfully than was the alternating clatter of the stockinger's frame, and the circular machines, inconspicuous in domestic industry, achieved early and continuing dominance in the factory stage. The circulars, small, physically undemanding, and well-adapted for domestic use, were thought of as 'ladies machines' and run by women 'from the first years of factory production'.

Both male capitalists and male knitters had reviled circular knit goods, what Felkin called 'stockings in the form of bags', from their inception as threats to traditional craftsmanship and wages in the industry, but by the 1890's, with the numerical dominance of more productive circular knitting technology firmly established, male knitters began to reconstrue tradition. When A.J. Mundella, a Nottingham manufacturer with long experience in the industry, reminded a hosiery union official appearing before the 1892 Labour Commission that 'Women always did the circular trade very largely', Samuel Bower, secretary of the midlands federation of hosiery workers, disagreed and answered by talking instead about men's traditional work on full-fashioned frames. A workman wrote to the journal of the trade decrying the 'supplanting' of male by female labour in the circular branch and both hosiery manufacturers and technical experts fretted that with women knitters 'a divided interest entered the trade' challenging the
honoured male stockinger tradition of the industry. By 1900 men with diverse and often conflicting interests in the industry shared a sense that the status of knitting had been devalued, not by the factory transition but by the greater dependence in the factory stage upon women's circular machines. Using the tradition of male knitters on the flat bed frames, (the most numerous steam powered version of which was the Cotton's Patent), they were arguing that all knitters were historically and preferably male. Making the claim stick was another matter.

Among east midland communities, gender divisions in knitting varied depending upon the relative numbers of men and women available to work. Jobs were not reassigned between men and women in seaming or fixing where customary female and male ascriptions had not been challenged. But once the gender of knitters was contested these tasks became the rudders through which imbalances in the local labour market could be adjusted and turned to advantage. In colliery and agricultural districts where work for men was plentiful and well paid, hosiery firms employed surplus local female labourers as knitters as well as seamers and menders. Only overseeing and fixing were unambiguously male occupations in the hosiery industry in the early twentieth century. Expert observers, for example William Davis of University College, Nottingham, suggested therefore that 'the one-sided nature of the labour conditions which arise when the knitting industry develops on a large scale' made it 'an essential condition of success ... that engineering or mining industries exist side by side so as to stabilise the labour position'. Alternatively when jobs for men were not available locally, for example in Hinckley, Leicestershire, manufacturers found it in their interest to name all knitting jobs men's work, fearing 'the loss of female labour if families were not retained in the district'. In the process male capitalists seemed to be conceding male unionists' claim that men should be knitters locally because 'there was a great many more chances for a woman getting a job than a man'. By contrast in Leicester, the rising boot and shoe industry which employed many men allowed for the smooth and steady feminisation of hosiery production. The advantages of complementarity with other local employers and the need to secure a stable labour force made the traditional gender divisions in knitting contingent sometimes reducing, sometimes reinforcing customary practices.

As local labour availability and reinterpretations of tradition in the industry made the appropriate gender of circular knitters increasingly ambiguous in the years 1890-1910, the technology itself changed rapidly. Circular frames became increasingly automatic. Through a programmable reciprocating action, hosiery machines completed a stocking from top through heel to toe and round underwear frames made changes in dimension and splices without operator intervention. Both American and English machine builders sold these innovations in trade journals as 'light to handle', 'easy running' and 'comparatively easy to operate' and following contemporary engineering conventions emphasized that such equipment lent 'itself to female and unskilled labour'.

Plate 1. A Canadian stockinger knitting on a hand frame, Port Hope Ontario, c. 1870. Note the two women working finishing stockings behind the frame in this domestic or workshop setting. Source: Public Archives of Canada, PA 74600.
Plate 2. A modern Canadian-made hand powered circular knitting machine similar to that patented by Brunel, for use in domestic production. Such machines were about 14 inches high and 10 inches in diameter driven by an egg-beater-like crank affixed to the side. Source: Fraser's Canadian Textile, Apparel and Fur Trade Directory, 1950-51, p.21.

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Engineers’ deskillling strategies have been much emphasized in the literature on the degradation of work and labour segmentation. But it is misleading to assume that machine-builders' design goals were determining on the factory floor. Certainly midlands knitting experts were unwilling to concede authority in determining knitting gender divisions to engineering firms. Why automated circular machinery should 'increase the demand for female labour' was' a question in the minds of many that [had] not yet been satisfactorily answered' according to James Quilter, editor of the Hosiery Trade Journal. Neither Quilter nor John Chamberlain, his frequent collaborator in technical manuals on knitting, and successor as editor of the Journal, welcomed the feminization in knitting which the growing pre-eminence of circular machines seemed to portend. Quilter argued that if the stockingers of the future were 'to be more of the female class ... the ever remembered and respected old type of stockinger (would) be only known in history', the standing of the industry inevitably compromised. Lecturers at midlands technical colleges did not associate de-skilling technological change with the decline of the hosiery; they admired the 'near perfection' of the new machines. Their apprehensions were not about the changes in stockingers' jobs, but about the change in the gender of the stockingers. For this transformation they blamed not the machine designers but male knitters who had 'not taken to' the new equipment at its introduction or 'before giving it a good trial, made conditions which were not acceptable by employers'. That the new circulars were 'not under the control of men', was 'the fault of the men themselves' the technical experts charged.xii

The men Chamberlain and Quilter meant were male unionists. Unions were not an implacable force in the hosiery industry. They were segregated by locality and craft, organizing distinct firms in an industry which showed little vertical integration. In the largest knitting centres, Nottingham, Leicester, Loughborough and Hinckley, union influence was strong but the country districts remained difficult to organize even after the several branches of the union movement consolidated their forces. Nonetheless the hosiery unions tried to take an 'active role' in the subsequent reformulation of gender divisions in knitting, forwarding men's interests to the detriment of female members.xiii

Women did not join the unions in as great numbers as did men, either in the country districts or in the towns in the late nineteenth or the twentieth century. Wells estimated that about 20% of women employees by comparison with 40% of men were unionists: women in all industries, he complained, were 'notoriously difficult to organize'. But union leaders did not serve their female members well. Neither their benefit plans nor their interventions on behalf of employees provided much incentive for women workers to join. The unions, male institutions from the pre-factory stage, were still in the 1930's 'run by the men for the men'.xiv
Plate 4. Female knitters working circular rib machines in the Nottinghamshire village of Daybrook, 1924. Two male fixers and a white-shirted foreman are also visible. Source: Nottingham Local Studies Library.
Fewer benefits were paid to women and in lesser amounts. In 1915 in Nottingham women victimised for organising were voted half the compensation offered men. Many hosiery unions opted out of the early state unemployment insurance plans which offered equal benefits to men and women. The Leicester trades' alternative plan took equal subscriptions from men and women, while providing unemployed women with two shillings less per week than unemployed men. When Nottingham hosiery finishers suggested that the sick benefit be paid in maternity cases, the request was denied. Only in payment for dues collection did the unions craft a gender gap which favoured women, acknowledging that women collectors had a more meagre benefit package to sell to female members who had other grounds to be sceptical as well.\textsuperscript{xv}

Union officials intervened more frequently and firmly to defend men's jobs than women's and, in disputes over entitlement by gender to jobs, consistently favoured males. The terms of settlement of a 1919 strike in Nottingham made the lines of defense clear: 'no restrictions in the use or output on any machine by either male or female, but it shall not be permitted to put female labour on machines ordinarily worked by men.' Women who had worked on Cotton's Patent's, the "men's" flat bed machines derived from the stockinger's frame, were treated as blacklegs.\textsuperscript{xxvi} But men's claims to circular machines were treated with some delicacy. When a group of unemployed male knitters in Hinckley demanded the right to replace women then running a certain type of circular, officials did refuse their request for a men-only meeting to decide the question. But they agreed that men should be given every 'chance to learn this kind of machine' and priority when vacancies occurred. Employers were regularly advised that 'it would remove unrest in the trade if they could see their way clear to replace the women with men' in the circulars and employers frequently obliged.\textsuperscript{xvii}

Although class interests regularly arrayed male unionists and male manufacturers against one another, their common gender formed the basis for a consensus on some matters. Both manufacturers and men believed that gender specific restrictions on women's night work were appropriate. Both capitalists and union leaders saw mechanical facility as a valuable trait possessed exclusively by men. Through the inter-war years these shared beliefs about the essential differences between men and women over-ruled any countervening considerations of profitability or technical feasibility, and became key to reforming gender divisions in the knit goods industry.

The convergence of male interests around shift work formed slowly. In the 1890's when the circular technology was changing rapidly manufacturers argued for double shifts 'anxious to get what they could out of new machine' before it was 'superceded by something better'. Male workers pressed rather for overtime in rush seasons, a strategy which maximised their earnings and emphasised their preferability over women knitters -- whose home responsibilities conflicted with extended hours. Equipment shortages in the wake of WWI created pressures to institutionalise shift work, extending the two war-time shifts to three. At the level of policy, unions' opposition to shift work remained firm, but a technological change in seaming, which seemed likely to favour women's circular knitting machines over the flat-beds forced the men to a pre-emptive concession. The newly perfected flat-lock seamers made so comfortable and durable a join in cut-up circular fabric that the shaped selvedges of garment parts knit on the flat-bed cotton's patent's lost a crucial advantage. In the spring of 1921 'to compete better against the circular', and the women knitters who ran them, the cotton's patent men agreed to run double shifts, allowing their
employers to more quickly recoup the heavier capital costs of flat-bed equipment.¹⁸ⅸ In the same months, the unions of Nottingham, Leicester and Ilkeston protested vehemently against the new Employment of Women, Young Persons and Children Act under which the Home Secretary was authorising women to work an extra shift on the circulars, undermining the advantage greater access to shift work gave men.¹⁹

A combination of cyclical and technological change in the 1930's consolidated night work and a three shift system in the midlands hosiery. Union officials continued to condemn shift work, 'from an idealistic viewpoint' as a 'trespass on the social rights of the people', a damning example of how the hosiery trade was 'failing in its duty toward mankind.' But the new non-unionised knit-goods plants in London and Lancashire were gaining cost advantages by running shifts, and the new finer guage interlock machines ran poorly or not at all unless, to maintain constant temperatures and relative humidity, they were worked the continuous twenty-four hours. The crisis, competition and a more capital-intensive technology forged a consensus between masters and men. Manufacturers' costs were minimised and production workers' earnings maximised by the shift system. By law, the night shift alone was exclusively male, but men were unwilling to work permanent nights. Peter Armstrong has argued for the footwear industry that "the firm's drive to maximise the return on capital investment combined with the constraints presented by 'protective legislation' on the one hand and the unwillingness of the men to work permanent nights shifts on the other" resulted in the exclusion of women from capital intensive processes.²² In practice, most knitting soon became a male preserve. But how men were able to make their disinclination to work permanent nights into an accepted claim to control over all knitting, night and day, requires further explanation.

Here job composition, the tasks grouped and labelled one person's work, becomes crucial. Job composition is as dependent upon social relations in a particular setting as upon the engineering properties of a given technology. In the inter-war period in the midlands, management and union agreed that the job of male circular knitter consisted of tending a third more machines than the job of female circular knitter. In time men became acknowledged as more productive and then more efficient knitters, a confusion of output with entitlements which technical experts in the industry, long averse to female knitters, readily endorsed.²² More important in the long run, however, in establishing knitting as men's work, was the inter-war renegotiation of the appropriate balance, within the job, between minders' and mechanics' functions.

Hand frame knitters had been mechanics, but with the advent of the factory and power machinery the knitter's and the mechanic's functions had become separated in the midlands. Industry commentators linked this change to the precedence of the female circular knitter 'who could not be expected to be a mechanic.' As Millicent Fawcett noted, concerning the contemporary woven textile trade, 'It was looked upon as a law of nature that a man could set a machine and that a woman could not', when the central distinction was rather between what men were allowed to know and women were not. ²²But manufacturers, technical advisors and union leaders in the hosiery industry shared the social consensus that mechanical aptitude was gendered male, and with it the implication that men appropriately controlled machines, and only 'lent' them to women.²²

The line between the knitter's 'minding' and the mechanic's 'maintaining' varied with the context (and starkly across the Atlantic). Once 'a thorough knowledge of all the mechanisms involved' was required of
all knitters, the women to whom the circular frames had been 'lent' began to find the loans recalled. After World War II machines for making both seamless hose and tubular fabric became so productive that it was no longer worth the trouble for employers to contest the union's claims that these few jobs should be men's. Amid the radical changes in the technology, labour process and relations between owners and workers, the gender balance of the stockinger's workshop had been re-established by the 1940's in midlands factory knitting rooms.

**South-Western Ontario**

The knitting technology used in Ontario and the midlands was essentially the same. Machines were purchased from common English and United States engineering firms and innovations were installed at roughly similar rates. Yet transatlantic differences between the two contexts in the structure of firms, the pattern of labour recruitment and the strength of workers' organisations which meant that by 1950 Ontario conventions concerning the preferred gender of knitters and the appropriate rewards due those with the mechanical knowledge to set up machines were not those current in the east midlands.

Whereas the English hosiery was characterised by many small independent firms specialising in one phase of the production process, the Canadian industry was oligopolistic and vertically integrated. Penman's, the leading Canadian knit-goods manufacturer, controlled the making of outerwear, underwear, hosiery and socks from the opening of bales of raw cotton and the scouring of wool fleeces to the boxing and shipping of finished garments. Their largest and most long-established facilities in Paris, Ontario included a yarn mill, dye house, three knitting mills and a box factory.

Like the midlands hosiery, the Ontario knit goods industry employed a preponderance of female labour, and for the same reason. The most labour intensive part of the production process, seaming, was, by unquestioned convention, women's work. Canadian managers, like English owners, saw a good community mix of men's and women's jobs as the best way to secure a stable female labour force, but the more diversified structure of Canadian firms meant that they had more flexibility in pursuing this goal.

Penman's-clad construction workers built two new railways across Canada in the first decade of this century and opened many new mines in the north. Demand in the knit goods industry was booming at the same time that new 'automatic' circulars were being put in place in Canada. Rather than designate men's jobs from among mixed gender occupations such as knitting in order to anchor more families of female mill workers in town, Paris managers expanded their local production to include spinning, dyeing, pressing and box-making, all processes which included many tasks conventionally assigned to men alone. By creating these separate new departments in which men predominated, the company assured the labour segmentation which kept its large seaming and finishing departments safely separate, female and low waged. And the expansion of the spinning mill complemented the continued employment of female circular knitters. By insuring more closely monitored, higher quality yarn supplies, Penman's reduced the incidence of break-downs in knittingrooms and thus the disadvantages of using women, assumed less able to deal with mechanical failures, on the circular machines.

The oligopolistic structure of the Canadian knitting industry also made active labour recruitment strategies more cost effective in small town Ontario than they would have been among small competing firms in the countryside,
when by the 1890's John Penman's demands for women mill workers had exceeded the supply of nearby farmers' daughters, he began to recruit overseas. The new Montreal corporate owners routinised this policy. Between 1906 and 1928 Penman's brought large numbers of young women from the midlands to Paris on contract labour schemes. There were some male family members in these parties who took 'men's jobs' in the mills but the majority of the assisted immigrants were women, among them a number of women knitters. Confident of their command over all jobs in the small Canadian knit-goods industry, Penman's used gender specific recruitment overseas to secure the extra women employees it needed in boom times, obviating the need to reassign jobs which formerly might have been held by either men or women to male workers alone. xxviii

With the exception of a small hand-powered circular used by female outworkers to manufacture argyle socks, all Penman's knitting technology was imported, before 1950 in approximately equal portions from England and the United States. The machinery brought with it certain scripted gender divisions. The accompanying engineering manuals described the characteristics of the operators for whom the machines had been designed. The factory technicians dispatched to set up the equipment reiterated these specifications. The lead knitting foremen until World War II were immigrants from either the midlands or the United States. These men were hired for their experience with the knitting room personnel practices, as well as the machines, used in their homelands. They arrived with clear preconceptions about who knitters ought to be. Together imported engineering targets and management conventions influenced gender divisions in Canadian interwar knitting perceptibly toward those current whence the machines came. All flat-bed machines, whether the American bursons or the English full-fashioned frames, were run by men. In 1936, 60% of knitters on American circulars were women; only 36% ran British circulars. These echoes of distant conventions about gender lingered after World War II. xxix

Penman's workers themselves did not have strong preferences between English and American machines. Knitters tended fewer of the English Komets and Spiers because the completed socks came from these machines attached to one another by threads of waste, which the operator had to clip, rather than dropping singly into a waiting bin. But knitters' earnings on the two technologies were indistinguishable and knitters maneuvered to secure the best running set to work. Mechanics noted complex and simple equipment in both the midlands and American lines and remembered the work of set-up and repair as of similar difficulty. The firm owned both technologies because each was best suited to different products, the English excelling in ribs, the American in cables and patterns. xxx

Plant managers found one feature of American equipment especially useful in the small Canadian market. American machines were designed on the "Universal" principle; each model could be accessorised to produce a wide range of goods. These elements made the equipment more complicated, but in the Canadian context, more efficient because better adapted to shift from one short production run to another. Their implications for job composition and gender divisions in knitting were, however, ambiguous. xxxi The advice foremen received on these questions was conflicting. American correspondents to the Canadian Textile Journal argued for a strict separation of machine operation from maintenance,

> A simple and effective means of promoting efficiency is to insist that the knitter attends to the very minimum of tasks related to the actual processes of knitting and leave such
jobs as adjusting yarn tensions, correct fittings, changing pattern chains, putting in needles and sliders, to the knitting machine fixer.

While reserving all active intervention, albeit to make only minor machine adjustments, to male fixers, they provided a minder's job description which emphasised affinities with women's domestic work, 'The greatest single factor in maintaining knitting machine efficiency and at the same time preserving machine parts' being 'cleanliness it is the operator's duty to see that the machine is wiped off carefully many times a day'.xxxii English contributors advocated merging the minding and mechanical parts of the labour process into a single job under male control,

Other conditions being equal, male operatives can be relied upon ... to maintain a higher standard of work as regards both quality and output. Where freedom of choice exists the modern tendency seems to be to prefer men … A competent male knitter should be capable of making fine adjustments and effecting minor repairs when necessary, thus leaving the mechanic free to devote his whole attention to serious troubles.xxxiii

This was the compromise midlands manufacturers and unionists had reached by the mid-1930's after their disputes over shift work.

Penman's managers and foremen were unconstrained by union influence as they weighed this contradictory English and American advice. In Paris in the mid-thirties a textile union representative worked briefly among the male spinners and boarders at Penman's, but before 1946 when the United Textile Workers of America-AFL began a concerted card-signing drive, the knit-goods industry in small town Ontario was entirely unorganised.xxxiv The province had legislation prohibiting female factory night work and Canadian managers shared the belief that mechanical aptitude was gendered male. But the absence of a union, when the firm had few competitors either for its products or its labour supply and a small market to serve, meant that Penman's managers had different priorities as they framed job composition. Among these, the preferences of male employees, whose labour locally was in excess supply, did not rank high.

Whereas in the midlands male unionists successfully claimed all equipment run on shifts as 'men's machines' around the clock, in the inter-war period Penman's managers unilaterally drew the line between men's and women's work in knitting rooms between night and day. Girl and boy knitters started on the day shift, 7AM to 6PM, learning from experienced female knitters, married women with work histories of fifteen years or more in the room. After six or eight months the young knitters graduated onto their own sets of machines, and the boys moved onto the men's shift, 6PM to 7AM with an hour lunch break at mid-night. Their piece rates were the same as day knitters; they worked the same number of machines; there was no shift differential. The best male knitters earned 20% more than the best women in 1934, but they worked longer hours. Men hated permanent nights. After ten or twelve years they felt the physical toll of perpetually interrupted sleep and resented the social confinement: 'You couldn't go anywhere. You were like a slave to your work'. Wives understood that management had little reason 'to be bothered' about these stresses among their male workers. Penman's controlled the local mill sites and the town council. There were few other jobs for men in town. Despite the irritations, in the inter-war years turnover among men in the knitting rooms was not high. Burdened with longer hours and all the anti-social hours, limited to the same number of machines and rates as women were assigned by day,
male night knitters were left with a fickle fantasy as compensation, the illusion that they, more than day knitters, commanded the machines.

For as the gender of knitters varied between night and day, so did the composition of the knitter's job. Until after World War II Penman's used American knitting room conventions on the day shift and midlands practices at night. The social meaning applied to the difference between day and night knitters' duties was that male knitters controlled the machines while female knitters only cared for them. In the thirties, the fathers and sons of Paris had to be content with whatever psychic satisfactions they could derive from this distinction. Its economic advantages accrued entirely to the firm.

During the day the labour process in knitting was divided among three different workers. A 1923 Penman's recruiting booklet illustrating a latch needle knitting cylinder promised that girls are simply required to keep these machines running and have to feed the yarn into the guides and splice any broken ends. Repair work is provided by men especially employed for that purpose.

Female machine minders kept the equipment cleaned and oiled, and the yarn cones filled, inspecting each sock or stocking as it came off the machine for flaws caused by developing machine faults. Day foremen said they preferred women minders because they were 'more fussy', and day knitters claimed this trait with pride. Because management agreed that mechanical skill was gendered male, a floor fixer supported each pair of knitter-minders, intervening when the minder had shut down the machine, changing needles, setting up new patterns, retiming the cylinder before the restart. A practiced and observant female knitter-minder could do much of the fixer's work on her own set, and did when her fixer was preoccupied elsewhere. But having a fixer to do these tasks allowed the minder more time for the other parts of her job so that she produced higher quality work. A mechanic supported the fixers. He worked out the sequences in the jacks and chains for new patterns, and conducted or guided fixers through major repairs.

At night both American and British machines were run according to midlands practice. The job was divided into two rather than three parts. Male knitter-fixers did fine adjustments, restarts and minor repairs on the machines they were tending, the mechanics assuming responsibility for more complex diagnostics and time-consuming rebuilding of the equipment. But because Ontario knitter-fixers on the night shift worked the same number of machines as day knitter-minders, men at night were not able to produce more socks per hour than women did by day. Rather than appropriating productivity gains for themselves by demanding more equipment to work, as midlands knitters had, unorganised Ontario male knitter-fixers worked for the same rates as women while contributing more labour to the production of each sock. Male management and male knitters divided the proceeds from this arrangement unequally; Penman's took the material gain and encouraged gender pride based on mechanical proficiency among their knitter-fixers.

After World War II an engineering change combined with a change in the power relationships between management and men to alter job composition and narrow these gender inequities. The American practice which divided knitting into three jobs, distinguishing a fixer's role between the minder and the mechanic, always had a particular technical advantage on the Canadian shop-floor. In a smaller market, all production lines were shorter. It was necessary to stop more frequently to change yarn colours and
patterns. Whether the English or the more amply accessorised American 'universal' machines were being used, someone was spending proportionately more time doing set-ups and re-starts in an Ontario knitting room than would have been the case in Britain or the United States.

In hard times in a tight job market, male knitter-fixers might, within limits, be obliged to do these tasks in addition to their other work. But technical changes in the forties increased the complexity of set-ups in both American and English machines. On the day shift it was necessary to decrease the ratio of machines to fixers. At night, knitter-fixers were spending enough time away from minding on these other tasks that the quality differential between the production of 'fussy' women and 'careless' men long suspected became marked. xxxviii

Coincidentally, the men's predicament had changed. Ex-service men returned with more experience in the outside world and more confidence. There were jobs available in heavy industry in nearby towns, at wages which would support commuting by car. A union with a formidable record harrying Penman's Quebec parent was organising in town. When individual men balked at working steady nights, challenging the pre-war gender division in knitting by shift, and began to demand rotations through the day work, Penman's complied, hoping to stem the union drive. Both night and day knitters were given fixers to help them, and premiums were paid when men took the night shift. xxxix

For a time boys were given hiring priority among learners in the knitting rooms. Because fixers needed to know how to knit, the new knitting room protocols required more fixers, and the belief that fixers must be male remained firm. xl After the union was defeated in 1949, the three part knitting room task division remained in place but the distinction between floor-fixer and mechanic was sternly drawn. Floor-fixers were described as sloggers. Their mechanical knowledge of the machines was limited to set-ups and restarts. As daily rated workers they frequently earned less than knitters and other women piece workers, but young male knitters could not refuse transfers to fixing. In the absence of strong worker organisation, when a small number of firms dominated a small market, male managers conceded only that male workers possessed greater mechanical skill than women, not that they were entitled to higher wages. Knitting remained a mixed-gender occupation. xli

When immigrant families compared their experiences on two sides of the Atlantic, women said they preferred Ontario; men thought the midlands a better place to work. Indeed several households divided after a few years in Canada, the men returning to the Old Country, the women remaining with their children overseas. By 1950, sexual divisions and gender hierarchies in knitting favoured women in Paris, Ontario and men in the organised workplaces of Nottingham and Leicestershire.

Conclusion

Until the 1970s the most commonly applied theories of divisions within the labour market, those developed by neo-classical economists, distinguished among workers in terms of the continuity of their waged labour and their possession of hierarchically ranked traits labelled skill. Interruptions in job histories, for example women's time away from wage work for child-bearing, were assumed to be causes of differential efficiency. Occupations were sorted by skill but the processes by which certain qualities in the work force came to be called skill were not commonly questioned. It was rather assumed that wage levels were reliable indicators of productivity differences attributable to differential skills. These
productivity ratios, if infrequently measurable, were assumed to be, like skill, susceptible to specification in an engineering sense. These analyses did not acknowledge that female wage rates were nominal, attributed by gender rather than task; in a confusion of outcomes with processes, women's systematically lower earnings became a validation of their lower skill and productivity. The heterogeneity of the jobs women did for homogeneously low wages was disguised in the aggregation.\textsuperscript{xlii}

Dual labour market theorists in the early seventies changed the focus of attention to the 'functions and consequences of occupational segregation' emphasising associations between labour force divisions and changes in technology and industrial structure. Radical theorists amplified these studies by attempting to specify both the forms of capital and traits of technology which distinguished pre-industrial craftsmen from day labourers, or skilled from semi-skilled industrial workers, as products of particular ideologies in discrete historical stages. Race, ethnicity, age and gender were recognised as traits upon which socially and politically significant divisions among workers might be drawn, but the class characteristic of dividedness, rather than the gender, age or race specific process by which division was secured remained of paramount interest. Gender was noted as a feature upon which the system of demarcation among workers could be mapped, but these boundaries were not seen as the product of a set of relations analytically distinct from those drawn upon differences in colour or age.\textsuperscript{xliii}

In 1978, Jill Rubery, alert to the inadequacies of dual and radical theories in explaining labour market segmentation outside the United States, directed attention toward the processes by which divisions might be drawn and their historical range. Her revisions, based on the British case, broke the 'collective eye of all capitalists' into distinctive and often conflicting employers' views conditioned by their particular circumstances. And most importantly, she argued that in order to account for variations in time and place, "workers and worker organisation must be assigned an active role in the development of labour market structure". Her aim was to acknowledge the contingency in labour divisions, and to insist upon the boundaries between workers by sex, age or skill, as contested outcomes determined from among a 'range of development paths' possible.\textsuperscript{xliv}

Clearly, if sex segregation was to be understood as an historical process distinct from the general system of labour force segmentation, it was important, as Mary Stephenson had urged in 1975, to locate 'the specific mechanisms that channel women into a limited number of occupations and industries.'\textsuperscript{xlv} In this regard, Marxist feminists have pointed to the domestic precedents for sex segregation and emphasised the ways in which a hierarchical sex-gender system has been transferred through these divisions to wage work. But a wide variety of tasks have been called feminine in the domestic sphere and the reasoning by which paid occupations have been justified as emerging from household work has been diverse and often contradictory.\textsuperscript{xlvii} Feminist historians while noting the persistence of gender segregation and the 'consistency of this articulation of the capitalist mode of production through a patriarchal family structure'\textsuperscript{xlviii} have in their analysis revealed a considerable diversity of experience.\textsuperscript{xlviii} Dual labour market theory clarifies the functions of labour market segmentation; Marxist feminist contributions suggest the power relationships at play in the delineation of sexual divisions in the work force generally. But neither accounts well for the diverse and changing gender attributions of particular jobs.

Neither can technology explain gender divisions. Plainly technology informs the production process; it, however, does not determine the elements in a labour process grouped to form a job or the social relationships which at any time will define and structure a cluster of tasks. Just as the 'external' historians
of technology have noted the interdependence of technological change and class relations, feminist historians are now discovering that the gender associations of given technologies have been contingent and biddable, the products of 'conflicts between men and women as well as between management and the workforce over machines'. In particular, the twentieth century process of 'deskilling', assumed to displace craftsmen in favour of the female and the young, has not had predictable or uniform effects upon gender division. xix

There were common features in the two cases considered here. The technology used was similar as was engineers' advice about who ought to best to use the equipment they designed. A shared gender ideology distilled to the common propositions that women ought not to work at night and men only possessed mechanical skill. But across these commonalities class and gender interests arrayed themselves in different ways. The structure of the industry and of the labour market, and the state of labour organisation tipped the balance toward male managers in Ontario and male unionists in the midlands. On both sides of the Atlantic there was ground for common cause between managers and men, but alliances across class through gender were approached warily. In Ontario men's gains from this alliance were formal, not substantive; in the midlands, the men's gains were residual, but real.

The cases considered here suggest:

1. that it is important to study sexual segregation at the level of the workplace where both the full extent and the fluidity of sexual division at work are most apparent,
2. that it is more useful to explore the processes which forge occupational segregation than to merely track the outcomes of these processes, the gender divisions themselves,
3. that the sexual division of labour is formed within the shifting mutuality and antipathy of gender relations and the relations of production so that theories of sexual segregation must integrate rather than isolate the class and gender based processes at work, and
4. that even when owners and managers enjoyed a relatively free hand, as they did in south-western Ontario for the period considered, powerful deeply seated cultural assumptions about masculine and feminine domains -- here apparent in unquestioned conventions about mechanical aptitude and night work -- set limits on the use of female labour and thus constrained and contradicted the pursuit of profitability.


ii An exception to this pattern is Valerie Oppenheimer, 'The sex-labelling of jobs' Industrial Relations 7 (May 1968) 214-34. Community and industry variations in access to skilled occupations are clear in Mark Aldrich and Randy Albelda, 'Determinants of women's wages during the Progressive era' Explorations in Economic History 17 (1980) 332-5. Alison M. Scott makes this same point about the ways in which aggregation disguises the 'full extent and function of gender segregation' in her 'Industrialisation, gender segregation and stratification theory,' in Rosemary Crompton and Michael Mann, eds., Gender and Stratification Cambridge, 1986 157.


iv David M. Smith, The Industrial Archaeology of the East Midlands London 1966 27; Roy A. Church, Economic and Social Change in a Midland Town: Nottingham 1815-1900 London 1966 259, 262; Charlotte Erickson, British Industrialists: Steel and Hosiery 1850-1950 Cambridge 1959 94, 176-8; The Canadian factory hosiery industry began, as did the English, in the 1850's; Penman's, the leading Canadian firm, dates from 1868.

v Valerie Kincade Oppenheimer, 'Sex Labelling' 228; Sally Alexander, Women's work in nineteenth century London London 1983 22; F.A. Wells, the modern authority on the hosiery trade, notes the power of pre-factory custom in factories in the 1890's, F.A. Wells, The British Hosiery Trade London 1935 190.

vi I am grateful to Dr. Stanley Chapman of the University of Nottingham for pointing out these early examples to me and sending me evidence for one active knitting centre. In the framework village of Ruddington there were 12 female framework knitters in 1841, 29 in 1851 and 14 in 1861. Roughly 5% of all frameworkers were female in this village in these years. Census Enumerators Returns, 1841-1861.

vii Nancy Grey Osterud, 'Gender divisions and the organisation of work in the Leicester hosiery industry' in Angela V. John, Unequal Opportunity Oxford 1986 45-70 and Sonia Rose, 'Gender segregation in the transition to the factory: the English hosiery industry 1850-1910,' Feminist Studies 13, 1 (Spring 1987) chart these patterns.

viii William Felkin, the best source on nineteenth century knitting technology, describes the circular, known also as the griswold, as a ladies' machine. William Felkin, History of Machine Wrought Hosiery and Lace Manufactures 1867 (London 1967) 496; Wells described the differentials in adaptation to steam power, F.A. Wells, The British Hosiery and Knitwear Industry London 1972 174; on the dominance of women-run circulars in the early factory stage see Richard Gurnham A history of the trade union movement in the hosiery and knitwear industry 1776-1976 Leicester 1976 34; Charlotte Erickson British Industrialists 181; Felkin History 507, 543-4 and Wells (1972) 156.
\textsuperscript{ix} Felkin 498; Wells (1972) 156; Labour Commission 1892 c 6795- VI XXXVI 549; Knitters Circular and Monthly Record May 1895 'Workmen's Grievances' 2; Hosiery Trade Journal June 1900 'Stockingers Past-Present-Future' 7; July 1905 'Hosiery Manufacture -- Past and Present' 243; Sandra Taylor, 'The effect of marriage on job possibilities for women and the ideology of the home: Nottingham 1890-1930' Oral History 5 Autumn 1977 50.


\textsuperscript{xi} See for example HTJ June 1905 199; 'Development of the seamless hosiery machine' Sept 1918 434-6; advertisements noting the affinity of the new circulars to unskilled female labour appeared in almost every issue.

\textsuperscript{xii} HTJ Jan 1900 'Stockingers past and present' 7; June 1902 'Knitters and knitting, new and old' 167; Jan 1907 7; April 1910 'Editorial' 138; Jan 1919 John Chamberlain 'The future of the knitting industry' 80.

\textsuperscript{xiii} Gurnham History is the best study of the hosiery unions; see especially chapters 3,4 and 5; Wells (1935) 239-40; The active role of unions shaping gender divisions in the workplace is discussed in Milkman 'Organising' 101 and in Jill Rubery 'Structured labour markets, worker organisation and low pay' in Alice Amusden, The Economics of Women and Work Harmondsworth 1980 244.

\textsuperscript{xiv} Labour Commission 1892 c 6795-IX group c schedules 49-50; Wells, 1935 239; Gurnham 105-6; John Benson has written recently about this pattern. Benson, 'Work' in The Working-Class in England London 1985 78-9.

\textsuperscript{xv} LRO NUHKW DE 1655 4/1 Nottingham 5 Jun 1915; Leicester trades 2/7 22 Feb 1918, 1 Mar 1919, Nottingham hosiery finishers 5/1 27 Sept 1921, 28 July 1927; Leicester 2/7 17 Aug 1920.

\textsuperscript{xvi} HTJ Sept 1919 'Terms of the recent strike' 524; LRO NUHKW DE 1655 Leicester trades 2/7 24 Jun 1919; Nottingham 4/1 28 Aug 1915, 5 Feb 1916, 4 Mar 1916. A contemporary analysis of the use of this 'unsymmetrical pressure' by male unionists is F.Y. Edgeworth, 'Equal pay to men and women for equal work' Economic Journal no 128 v 32 Dec 1922. The quote is from p. 438.

\textsuperscript{xvii} LRO NUHKW DE 1655 Hinckley 3/3 10 Nov 1920; Loughborough 7/1 15 May 1925, 20 Jun 1925, 17 Oct 1925.

\textsuperscript{xviii} Labour Commission 1892 c 6795-111 XXXVI pt 3 577; LRO NUHKW DE 1655 Leicester trades 2/7 30 Jan 1918, 22 Feb 1919, 2 Mar 1921, 14 Mar 1922; Nottingham 4/2 26 Oct 1919.
xix HTJ June 1921 498; LRO NUHKW DE 1655 Ilkeston 6/2 23 Aug 1920; Nottingham 4/2 27 Nov 1920; Leicester 2/7 24 Nov 1926; HTJ Aug 1927 104.

xx HTJ Dec 1937 'Union official's attack on the shift system' and editorial response; on 'Changing methods in the hosiery trade' see the article by Wm Davis of the University College, Nottingham in the Hawick Express 1939 in Nottingham Local Studies Library (NLSL) hosiery clipping files 1919-39. See similarly Peter Armstrong, 'If it's only women it doesn't matter so much' in Jackie West, Work, women and the labour market London 1982 32.

xxi In 1919 John Chamberlain argued that this aspect of job composition 'cannot be settled in the offhand manner which is sometimes used by machine builders. The number of machines workable by one operator often depends more upon the operator than the machines, and due allowance must be made for the type, sex and efficiency of the operator.' HTJ Jan 1919 'Production of standard knit goods'. On agreements under the Joint Industrial Council see Wells 1935 241; the Hinckley discussion of men's and women's entitlements to American Scott and Williams Model K machines is interesting, LRO NUHKW DE 1655 Hinckley 3/2 19 May 1920, as the discussants were clearly aware that US gender divisions in knitting differed from those they were establishing; HTJ Mar 1927 F. Willis 'Modern seamless automatics' 64; July 1927 'Modern seamless automatics' 54; Working Party - Hosiery 1946 33; the most odd intervention on this question is John Chamberlain, 'The future of the knitting industry' May 1926 which argues that British knitters were less efficient than American knitters on seamless hose machines because more British operators were women. Seamless hose machines were run by both men and women in the US as well. They were more productive because American operators ran more heads than either men or women did under the midlands collective agreements. Elizabeth Faulkner Baker, Technology and Women's Work New York 1964 137-9; Working Party 1946 34.

xxii HTJ Nov 1906 'Our mechanics, past and present' 409; Jan 1907 7; Millicent Fawcett, 'Equal pay for equal work' Economic Journal Mar 1918 no 109 v 28 p.4.

xxiii Armstrong in West, 30; the lending analogy is from Cynthia Cockburn Brothers London 1983 160.

xxiv HTJ Mar 1939 W.E. Boswell, Lecturer, University College, Nottingham, 'Training operatives in the hosiery industry' 56; NLSL Oral History Collection, transcript A15 p. 11.


xxvii On the effects of yarn quality on knitting see HTJ May 1937, H.B. Hopewell, 'The importance of efficient spinning and winding', 44; the same arguments are made for the Canadian case by Roscoe Hill 'Problems of production and quality', Canadian Textile Journal (CTJ) 4 Dec 1942 29; on the interdependence between the yarn and knitting rooms see Paris Industrial History Project - Interviews (cited hereafter as PIHP followed by the pseudonym assigned the respondent) Irene Cobbett 13, Henry Kelly 7.

Penman's Archives, 1930 Appraisal, Penman's Ltd. by Canadian Appraisal Company; reconstruction of Penman's labour force from personnel and plant records. Numbers of circular knitters (1936) male 37, female 25; (1948) male 45, female 21; in 1948 48% of knitters on American circulars and 28% of knitters on British circulars were women. On burson knitting see PIHP - Frank Boyle 5-7,22; on knitting foremen see PIHP - Charles Harrison, Sam Howell, Clarence Cobbett.

PIHP - Irene Cobbett 7,8,10,13; Alice Russell 7; Charles Harrison 30; Horace Timpson 8,11.

CTJ Jan 1916 12; 30 April 1918 'Philadelphia Hosiery and Knit-goods Exhibition' 161; 3 Mar 1939 Roscoe Hill 'Canada's knitting industries' 20; The British Working Party (Hosiery) 1946 noted this feature of the Canadian industry, 199.

CTJ 'Circular knitting machine maintenance' 24 April 1942 36,38.


Royal Commission on Price Spreads 1938 Paris Hearings, testimony of James Granton.

Penman's Payrolls, Feb 1934 found in Public Archives of Canada (PAC) Royal Commission on Price Spreads RG 33/18 vol 111, earnings by sex by task, earnings/hours worked by sex by task; PIHP - Henry Kelly 6, Irene Cobbett 9, 16, Alice Russell 18-20, Horace Timpson 23, Sam Howell 29. There is a compelling description of the gendered construction of workers' relationship to machines, based on the Australian appliance industry in Ann Game and Rosemary Pringle Gender at Work London 1984 36.


PIHP Annie Hedley 11, Irene Cobbett 5,6,12-15, Alice Russell 5,8,10-12,16, Horace Timpson 13, Sam Howell 27, Paul Nelles 11.


PAC Parent-Rowley Papers. The 1946-48 organising campaign and the 1949 strike will be the topic of another paper.

The recruitment of young male knitters is evident in the declining relative age and length of work histories of men between these two years. In 1936 women knitters had worked an average of 14.9 years (n=30), men 23.4 years (n=43). In 1948 women knitters had worked an average of 16.7 years (n=36), men 18.1 (n=56). 41% of knitters were women in 1936 (n=73), 36% were women in 1948 (n=88).

PIHP Charles Harrison 7, Paul Nelles 5,6,11,13, Horace Timpson 9, 10, 17, Clarence Cobbett 22.

The classic rendering of dual labour market theory is Peter Doeringer and Michael Piore's Internal labor markets and manpower analysis, Lexington Mass. 1971. The most recent synthesis of radical theory is David M. Gordon, Richard Edwards and Michael Reich, Segmented work, divided workers Cambridge 1982. See also R.D. Barron and G.M. Norris, 'Sexual divisions and the dual labour market' in Diana Leonard and Sheila Allen, Dependence and Exploitation in Work and Marriage London 1976. The quote is from Milkman 'Organising' 101. Both Milkman and Rubery 'Structured labour markets' are critical of dual and radical labour market theorists' inattention to variations among actors and institutions shaping gender divisions, particularly to the role of unions and male unionists.

Rubery 'Structured labour markets' 250, 244, 243.

Stephenson, 'Women's wages' 251-53.

Milkman, 'Organising' 102-3; Alexander, 'Women's work' 65; Heidi Hartmann, 'Capitalism, patriarchy and job segregation by sex' in Martha Blaxall and Barbara Reagan Women and the Workplace Chicago 1976 137-70.

Alexander, 'Women's work' 65.

