

From hot metal to cold type: new technology in the newspaper industry

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The paper examines the impact of radical changes in typesetting and composing techniques on 3 occupational groups employed in a major New Zealand newspaper: ex-lino-type operators, hot-metal compositors and teletypesetters. The paper stresses the importance of adopting a "relational" approach to analyse the transformation of the labour process. The approach proceeds from the historically defined interests produced by the tensions and contradictions within and between organisations or groups.

Introduction

Through his conceptualisation of deskilling, Braverman (1974) links control over the implementation of new technology to the motivations and actions of employers and to the individual worker on the shop-floor. For Braverman, therefore, the point of production is the key to the issue of control over the labour process. This paper demonstrates why it is necessary to go beyond this conception of control – and the notion of skill which it embodies – to understand the impact of new technology in the workplace. Drawing on research findings from a case study of the newspaper industry, the paper shows that an understanding of the job structures which emerge following technological transformation also requires consideration of external market factors and the dynamics of the internal labour market.

The empirical illustration is drawn from a study of the introduction of a computer-based system of production into New Zealand newspapers – in particular into Christchurch's afternoon "daily", *The Star*. The research involved an in-depth study of *The Star* between 1980 and 1983. The study documents the social process associated with changes in production techniques – through observations, interviews and extended conversations over a two-year period at *The Star*, and through field visits to other New Zealand and Australian newspapers. In addition, data were obtained from analysis of documents and newspaper articles, and from written and oral submissions to the New Zealand Arbitration Court during its hearing of a demarcation dispute between printing tradesmen and clerical workers in Christchurch and Wellington in November, 1981.

A "relational analysis" – which focuses not on the *elements* that make up the abstract classes of capital and labour but on *relations* between groups of employers and workers –

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is used to explain the job structures associated with the computerisation of typesetting and composition in the initial phase of the changeover from "hot metal" to "cold type" production techniques at *The Star*. Hot metal is the term used in the printing trade to refer to the method of setting type by linotype or linecasting machines, where type images or slugs are cast from molten metal. The cold type, or computer-based, method of typesetting creates type as artwork on photographic paper in a photo-electronic process referred to as photocomposition.

This paper concentrates on 3 occupational groups affected by the changes: ex-linotype operators and hot-metal compositors (both journeymen members of the Printing Union¹) and teletypesetter or TTS operators (who were non-journeymen members of the Union). Linotype operators converted advertising and editorial copy into lines of metal type using a linotype machine, and compositors "composed" the lines of type in columns to form a metal page. The TTS operators were trained typists who operated a teletypesetting machine — a specially adapted typewriter which punched a paper tape used to produce type from a linecasting (or automatic linotype) machine.

Theoretical perspective

Braverman's labour process theory and the early critiques which it generated (Nichols and Beynon, 1977; Burawoy, 1978; Beechey, 1979; and Elger, 1979) were useful in focusing research attention on the motivations of newspaper employers in introducing the new technology and on the nature and limits of worker resistance. However, it became apparent in the process of gathering field data that this theoretical framework was inadequate to explain the nature of the struggle over new technology and the outcome of this struggle in the transformed labour process at *The Star*. Criticism arising in the literature at the same time (Elbaum *et al.*, 1979 and Stark, 1980) also pointed to a need for an alternative framework.

Braverman shows that production technology reflects the choices managers have made as a consequence of deliberate policy. It is therefore a strong refutation of the technological determinism which underlies a number of writings on technology and the workplace (see Rose, 1978 and Hill, 1981), and much of the debate on the topic in New Zealand. Nevertheless, as critics (e.g. Nichols and Beynon, 1977; Burawoy, 1978; Beechey, 1979; and Elger, 1979) have argued, the theory presents a one-sided view of the labour process, and depicts capital imposing managerial policies on a "virtually inert working class" (Elger, 1979, p. 60) which submits to such domination seemingly without resistance. Hence, according to Braverman, the design and planning of machinery and organisation of work around the new technology are the inevitable consequence of the capitalist drive to achieve control over the labour process. But as Beechey (1979, p. 4) and others argue:

the organised sections of the working class, in particular, can limit capital's possibilities for reorganising the labour process on the basis of new technologies and for effecting the further subordination of labour to capital.

Stark (1980, p. 89) contends, however, that the limitations of Braverman's analysis cannot be overcome merely by examining the nature of labour resistance to capitalist domination. Whether one sees technology as the consequence of the motivations and actions of capitalists (Braverman's view) *or* arising from capitalist attempts to introduce the technology thereby provoking working class resistance (the critique of this view), the analysis is still limited by its adoption of the classic distinction between objective conditions and subjective factors (the marxist problematic of class-in-itself and class-for-itself). According to Stark,

1. The New Zealand Printing and Related Trades Industrial Union of Workers.

this type of class analysis proceeds by identifying the members who "make up" the class; this aggregate is then given the properties of a purposive actor (1980, p. 96).

In refuting this view, Stark argues polemically that:

a class is not "composed of" individuals; it is not a collection or aggregation of individuals. *Classes*, like the social relations from which they arise, exist in an antagonistic and dependent relation to each other. (1980, p. 97).

Therefore the object of study in class analysis should not be the *elements* that make up the respective classes, but the *relations* between them. Accordingly, Stark proposes that "a relational approach" be adopted as an alternative analytic strategy for studying transformation in the labour process — a strategy which places class struggle at the centre of analysis.

Stark argues that the shift from an aggregational approach to a relational one must also be accompanied by a shift in the level of abstraction at which the analysis is conducted, since analysis at the level of the mode of production has 2 important consequences. Firstly, it "sidestep[s] the problem that classes do not exist apart from their relation to the state," and secondly, this type of approach is "static [and] unhistorical" because it focuses on abstract classification schemes, rather than on the actual processes of struggle by which classes are continuously being formed and re-formed (1980, p. 98).

A relational analysis of transformation in the labour process proceeds from the historically defined interests produced by the tensions and contradictions within and between organisations or groups. These groups may be informal, arising for example from interaction at the workplace, or formal, such as craft organisations, trade unions, firms or state agencies.

But in both cases their interests, capacities, and resources are not posited *a priori* by the analyst but emerge historically, subject to changes in direction and magnitude based on the shifting patterns of relations (of conflict and alliance) within and between organisations. (Stark, 1980, p. 98).

For this reason

the activities of any participating group cannot be understood in isolation, but only *in their relation to the total field of competing and co-existing organizations* (Stark, 1980, p. 98, emphasis added).

Writing at the same period, Elbaum *et al.* (1979) also raise doubts about the extent to which Marxist analyses of the labour process have captured all of the fundamental characteristics of production. Accordingly, they argue that formal and informal struggles by strategic groups of workers and the competition between capitalists play a crucial role in determining the structure of the division of labour which emerges from technical change (pp. 228-229). Elbaum *et al.* also note that "the 'terrain of compromise' upon which capitalists and workers can find room to co-operate" has not been systematically explored by Marxists (p. 229). Like Stark, therefore, they suggest the need for a relational analysis and identify 3 basic sets of relationships which they consider influence the development of the labour process:

- (1) between capital and labour;
 - (2) among capitalists; and
 - (3) among groups of workers.
- (Elbaum *et al.* pp. 227-228).

They conclude that the scope of any analysis of the labour process must be enlarged to consider the details of these relationships and the interaction between them.

This theoretical framework is used to explore changes in the labour process in one key facet of newspaper production at *The Star*, the typesetting and composition of both advertising and editorial material. The section that follows provides the technical detail required as a background to the analysis of conflict and alliance in the industry.

The production of a newspaper

Newspaper copy prepared for typesetting and composition is divided into 2 main areas of production: advertising and editorial. Typically, advertising material printed in a newspaper falls into 2 main categories, "display" and "classified" copy. Display ads are those which, as the name suggests, provide a significant display of the advertising material and may occupy several columns, or indeed fill the entire page. In the late 1960s and early 1970s these advertisements were produced using the forerunner to fully computerised phototypesetting equipment.

For technical reasons, classified advertising continued to be produced entirely in hot metal in a highly labour-intensive process. Galleys or metal trays of the slugs or lines of type of classified ads, arranged in alphabetical order in the correct classification, would be systematically built up over the days and hours preceding publication. Thus, as new advertisements were received from customers, the copy was set in metal by the linotype operators and inserted by hand into the galleys by the compositors. Similarly, the lines of type of advertisements which required multiple insertions were extracted from the column after the day's "run", and held in store for subsequent use on the appropriate day.

Classified copy is divided into what are referred to as "spaced" or "space ads", and "run-ons". Spaced ads are those advertisements in which the headings and text are centred, tabulated and spaced according to typographical principles learned in trade training. The aim is to produce an eye-catching advertisement in the space purchased by the customer. Run-ons are just that. They are ads which have no horizontal spacing between headings and the text, nor vertical spacing within the body of the ad, but simply run-on in the columns.

Classified ads originate in several forms: hand or typewritten by customers and lodged at the "front counter" or sent by mail; telephoned to typists who record the ad on a printed form; and brought in by sales staff who solicit material from local businesses. Advertisements which originate in these different ways, on some form of paper, are referred to as "hard copy".

Editorial material originates as hard copy from the typewriters of newspaper journalists and from teleprinters which transmit news and feature articles from syndicated news sources. After the copy is edited by the sub-editors, a task known as "subbing", it is sent to the composing or "comp" room for typesetting and composing.

With hot-metal production, editorial and advertising copy undergoes 2 distinct stages of processing. First, the material is recorded in hard copy as previously described. In the second stage — typesetting and composition — the same material is re-typed or "re-keyboarded" by linotype or TTS (teletypesetter) operators, converted into hot metal and composed manually in columns in the metal page.

Computerised typesetting and photocomposition techniques enable classified advertising and editorial copy to be typeset at the *first* stage — a process referred to as "capturing the initial keystroke" or "direct-inputting". Classified advertising received from customers over the telephone can be keyed into a computer terminal, the text stored and subsequently manipulated, and "outputted" for printing. At the same time that the ad is received, typesetting instructions can be inserted into the text to enable the material to be set and composed in print without further handling. In a similar process, typesetting and composing instructions can be inserted into the text of editorial material as the journalist is writing the story.

Production changes at The Star

Typesetting at *The Star* was computerised in 2 phases. In the first phase leading up to the May 1980 changeover to cold-type production, 26 linotype operators were retrained to set type using visual display terminals (VDTs) and became known as VDT operators. In the following year, 19 hot-metal compositors — also printing tradesmen — began re-

training as VDT operators. Hard copy of both advertising and editorial material was entered into computer storage by these operators.

The second phase took place between March and June 1982, when 22 telephonist-typists were retrained to input *classified advertising* copy directly into the computer under the direct-inputting system. At the conclusion of the study in November 1983, the typesetting and composition of *editorial* material was still being carried out in the same manner as it had been at the May 1980 changeover, and this is still the case today (November, 1984).

After May 1980 the *composition* of type was carried out by a photocomposition process. This computer-controlled method of setting type involves exposing a photosensitised paper with images of type characters which have been arranged electronically in proper sequence and are exposed at the appropriate time and at the appropriate location to provide a typeset product on bromide or film paper.

In preparation for the new process, 5 ex-linotype operators and compositors were selected for extensive retraining to manage the computer room at *The Star* and to operate the computer system. In addition, 36 compositors or "comps" were retrained in "paste-up" techniques in which typeset material, processed on bromide paper, was waxed and stuck onto layout sheets for subsequent processing into printing plates. Compositors used small scalpels to cut stories and ads from bromide strips.

It is important to note that all those printing tradesmen who wished to retrain for jobs in the new production system did so. At the same time, no linotype operator or comp was made redundant despite the labour-saving facilitated by the technologies which were implemented during the first stage of computerisation. To understand why, one needs to recall the ways in which the new cold-type techniques reduced labour requirements and, in the light of this, to examine the collective strategies pursued by each of the groups involved in negotiations over the technology.

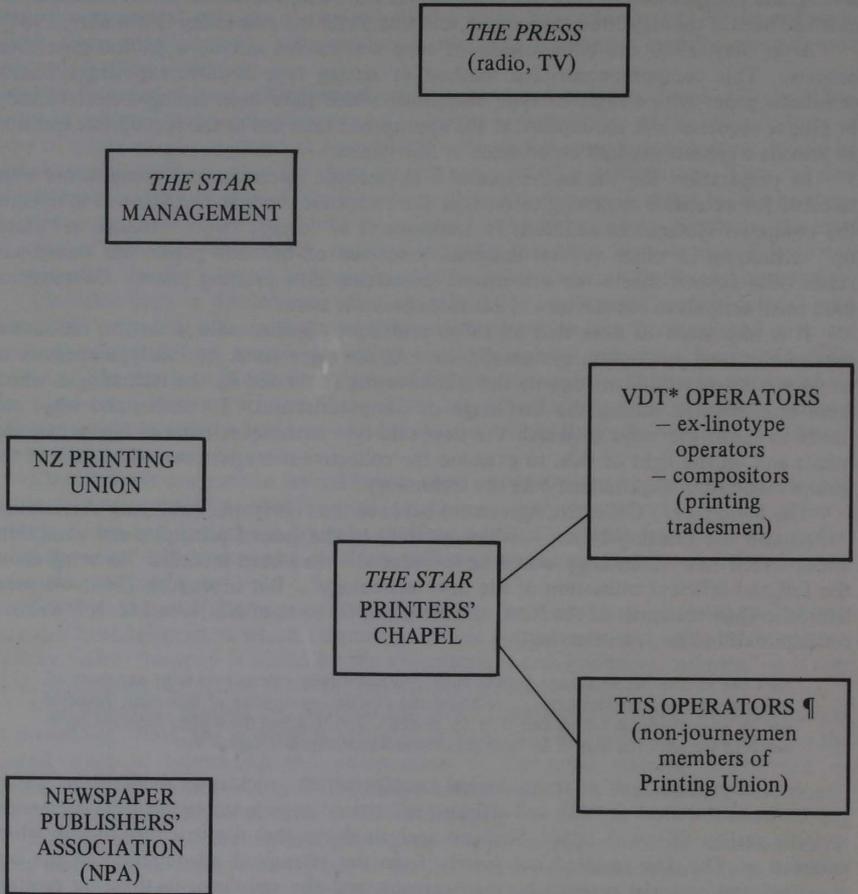
The March 1977 Collective Agreement between the Newspaper Publishers' Association (NPA) and the Printing Union — which established the general principles and conditions under which new technology would be introduced — had been intended "to bring about the full and efficient utilisation of the new technology". But in *August, 1981*, 4½ years later, the then chairman of the NPA, and Managing Director of NZ News Ltd, N P Webber, was reported in *The Star* as saying:

As I see it, the big challenge before New Zealand's daily newspapers is to use more efficiently the new technology . . . to avoid the double keystroking of incoming classified ads by advertisement takers and then by printers, and to avoid the double keystroking of much of the editorial matter by both printers and journalists. (August 4)

A relational analysis of technological transformation provides an explanation for the gap between the ideal of "full and efficient utilisation" mentioned in the 1977 Agreement and the reality 4½ years later. Such an analysis shows that the structure of jobs which emerged at *The Star* resulted not merely from the attempted introduction of the new classified and editorial systems by management, and the resistance to them by printers. Job structures were the outcome of patterns of conflict and co-operation among and between *The Star's* management and other employer groups, the NPA, the Printing Union at national and chapel (shop-floor) level and, within *The Star* Printers' Chapel, among tradesmen and non-tradesmen.² Figure 1 provides a summary of the key groups involved. Analysing the interaction among the groups helps to explain the changes that occurred — as a consequence of the *initial* introduction of computerisation (May 1980) — in the jobs of 3 categories of workers who were responsible for hot-metal typesetting and composition: linotype operators, hot-metal compositors, and TTS operators.

2. The Journalists' Union also played an indirect role in the struggle that occurred over the labour process of typesetters and composition. However, to simplify the analysis, the paper restricts its focus to the key groups involved.

Figure 1 Key groups involved in struggle over new technology of typesetting and composition



* Visual display terminal

¶ Teletypesetter operators

Conflict and co-operation between employers and printers

International experience with new technology had shown New Zealand employers and printers the cost of confrontation: a drop in profitability as editions were lost or papers closed, and a drastic reduction in printers' jobs. For example, in the United States where the new technology was first developed, industrial problems beset the *Washington Post*. Printers there smashed the presses at the start of their 1975 strike (*The Star* 14 May 1980). New technology was also partly responsible for the 1978 strike that put New York newspapers off the streets. In Australia, the impact of new technology on traditional job demarcation led to a 9 week strike at the Fairfax plant in Sydney in 1976 (Bennett, 1979, p. 13). A dispute over the terms on which the new technology should be introduced lay behind the disappearance of *The Times* from British streets for the period from November 1978 to November 1979. The suspension of its 5 newspapers cost The Times Newspapers \$60 million (*The Star* 14 May, 1980). In West Germany during March 1978, less than a third of the nation's newspapers appeared and more than 14 million copies (about 70 percent of total circulation) were lost, following selective strikes a week previously, as printers demanded a new agreement with employers to ensure that the new technology would not mean a loss of jobs. The publishers responded with lock-outs at 104 newspapers (*Christchurch Star* 11 March, 1978).

The official stance of the New Zealand Printing Union on the issue was that the technology was inevitable, and printers would not oppose its introduction as long as the Union's conditions were met (*Christchurch Star* 11 March 1978). In 1978, President W H Clement was quoted as saying:

To stand in its way would be the same as using a pick and shovel to build a road deviation . . . Our attitude is that we accept progress in any form, and everything that goes with it. But we'll try to secure for our members a fair share of the benefits arising from the introduction of the new technology. It'll mean a change from the messy, sweaty conditions of production to cleaner surroundings – and that, in combination with savings to the companies, should mean better wages, better conditions. (*Christchurch Star* 11 March 1978).

In the same article, *The Star's* Chapel Father, J Williams, commented on union response outside New Zealand:

We think the British situation is totally ridiculous. The new technology is inevitable; we can't stop it. But, by God, we're going to get a share of the action all the way through.

At the same time, though the Union had "firm assurances" from employers within the industry that there would be no redundancies, delegates to a new technology seminar in the same month took the view that:

. . . redundancy should be fought at every opportunity, as besides losing jobs it meant a reduction of union membership and a weakening of chapels. (*Imprint*³ March 1978, p. 4)

In addition, delegates concluded that job opportunity was already being reduced "and non-replacement of tradesmen [natural attrition] was a serious problem".

In exchange for the printers' compliance in principle with the new technology, newspaper publishers negotiated terms which would minimise the technology's effects on printing tradesmen's employment opportunities and skill. These terms were the outcome of what has been described as a "carefully orchestrated" approach to the changeover (*Christchurch Star* 11 March, 1978) which involved several years of negotiation – or "horse-trading", as one union official put it – over the key issues of control over the new equipment and techniques, and over job opportunity and skill. As a result, new computerised production equipment and techniques were introduced into New Zealand metropolitan

3. The official journal of the N Z Printing Union.

newspapers between 1979 and late 1981 without the loss of a single edition as a consequence of industrial action.⁴

The basis of the carefully orchestrated approach was the 1977 Newspaper Collective Agreement. Printing Union National President, W H Clement, explained that it:

represented the industry's agreement to face common problems logically. It was the result of considerable industry discussion over a long period. The employers needed an overall agreement to provide time for their consideration of many factors such as the type of equipment required (differing with each office), getting into the queue, planning finance, preparations for installation, practice runs, training and retraining staff, etc. The employers also needed assurances that the Union would honour the agreements made. (Christchurch Star 11 March, 1978).

Chairman of the NPA's Industrial Committee during 1980-81, R J Richardson, agreed with Clement's view that the means by which such an agreement had been reached had been by co-operation (NPA Conference Special, 1981, p. 23), although not all Printing Union officials shared this view. Richardson told the NPA's 1981 Conference that

both the employers and the printers' union, recognising that the change from the traditional hot-metal system to computerised phototypesetting was inevitable, actively worked together to ensure that the changeover was achieved in an orderly manner.

The mechanism by which this had been achieved was the Joint New Processes Committee set up about 3 years previously by both parties. In Richardson's view, since this Committee was free from the pressures and tensions associated with annual Award conciliations, it was able to discuss problems as they arose "in an informal atmosphere and arrive at solutions that normally reflect a give-and-take attitude from both sides". A Printing Union official referred to the Committee as a "buffer zone".

The Newspaper Collective Agreement between the NPA and the Printing Union was negotiated in the context of conflicting interests between the parties. Employers wanted to introduce single keyboarding (direct-inputting) to cut labour costs and to improve efficiency of production. The Printing Union wanted to avoid loss of job opportunity for its members and loss of union membership — an important source of the union's power. The resolution of these conflicting interests in the 1977 Agreement and in special technology provisions in subsequent Awards had consequences for the way in which work was organised on the shop-floor in individual newspaper offices around the country. At the same time, the process by which resolution was reached, both nationally and locally was also determined by the extent to which employers' and printers' interests coincided with, or diverged from those of other groups within the Printing Union itself and those outside the union.

It is important to recall that *hot-metal* typesetting and composition had been carried out by 3 key groups, the linotype and TTS operators and the compositors. To explain why linotype operators and hot-metal compositors (printing tradesmen) but *not* TTS operators (non-journeymen members of the Printing Union) were retrained as VDT operators at *The Star*, one must begin by examining the local conflict which existed within the Printers' Chapel between these 2 occupational groups.

Conflict within the printing union

Computerisation of newspaper production created the conditions under which a cheaper category of worker,⁵ the TTS operator, could be retrained for the new job of VDT operator. The extent to which a non-journeymen *vis a vis* a printing tradesman possessed the *typographical* skills required for VDT operation is explored elsewhere (Hill, 1983 a).

4. W H Clement, submission to Arbitration Court, Christchurch, November 1981.

5. The 1981 Award rate for printing tradesmen operating visual display terminals was \$215 per week compared with \$192.37 for non-journeymen keyboard operators.

Nonetheless, the TTS operator had typewriter keyboard skills which made her labour potentially more productive once she had acquired the necessary typographical skills. Moreover, this category of worker had 2 further advantages to management, it was potentially more manipulable and had a higher attrition rate.

The layout of the "qwerty" keyboard — which is used on the TTS machine, the conventional typewriter and, typically, on all computer keyboards — is quite different from a linotype keyboard with its 90 keys laid out in banks of 3. Moreover, unlike the linotype operators, compositors did not possess keyboard skills of any kind. In addition, although compositors had typographical knowledge and experience associated with their apprenticeship in hand-composing, they were not familiar with "house style" (the type-setting and editorial style used by a particular newspaper) and the "mark-up" used by sub-editors in editing copy. The TTS operators, however, had some limited understanding of both.

The TTS operators had the speed and skills of a fast typist. Typists had to have a minimum typing speed of 60 words per minute to qualify for the job. At *The Star*, management personnel, printing tradesmen and the women themselves all commented on the speed of TTS operators. Comments such as "one women [on the TTS machine] is worth 3 guys" (in terms of output); "the women handled 80 percent of the work before the changeover from hot metal"; and "the men were twice as fast on the VDTs as they used to be on the linos — but this is still slower than the women" typify this view. A TTS operator echoed the opinions of others in the TTS room when she said: "The men would hate it if they knew I said this, but we do a damn sight more work than they do".

Such comparisons need to be qualified however because the work done by each occupational group differed in significant ways: under cold-type production TTS operators handled straight run-on ads and editorial copy, while the men on the terminals set the more complex spaced ads and other tabulated material as well as straight editorial copy. In addition, the comparisons were influenced by assumptions based on sex-stereotyping of occupations, such as the view that typing is "essentially a female skill". Nevertheless, such statements suggest one reason why management might have preferred to retrain the TTS operators in preference to the compositors. The inference that women could be considered more suitable to work on VDTs was also drawn from comments volunteered by management personnel at other New Zealand newspapers. For example, in conversation at *The New Zealand Herald*, one executive spoke favourably of female printing apprentices compared with males and noted, "The girls are so far ahead in terms of their keyboard skills and speed it doesn't matter!"

Another possible reason for preferring to retrain the TTS operators was that a typist's skills were cheaper, as suggested in this comment by an ex-linotype operator:

I don't know whether I should say this, but management would prefer to bring girls from school in [to work on the terminals]. They type better than us, and management could get them at only a third of the pay.

Such an estimate presupposed that wage payment would be made under the Clerical Workers' Award and not the Printing Union Award.

A former compositor suggested another reason, that the "TTS girls" diluted chapel strength:

They have a tendency to "run to water". They won't stick by the union. Men are willing to give a few days' pay for the future of our jobs. Women won't. They only work for money. They don't care about the job. They only want it for a couple of years when the children are at school.

The extent to which this accurately reflects reality or is a male tradesman's view cannot be explored here. Evidence from the fieldwork suggests that although there may be some grounds for the statement, it also reflects gender-based assumptions about women's workforce participation.

Nevertheless, women typically have a higher "natural attrition" rate, since married

women may leave employment for reasons related to child-birth and child-rearing, and to accompany their husbands on transfer to other centres of work. Since a reduction in labour costs was possible with the technology, employing an occupational group with a higher natural attrition rate would facilitate the process of adjusting labour requirements to the work available — and this was in management's interest.

In addition, the TTS operators were keen to retrain on the terminals, whereas many compositors were reluctant to do so. Five or 6 of the 25 comps at *The Star* in 1981 had already trained for one trade, compositing, and did not want to train for another. As one comp in his late 20s put it: "There is a principle involved. I was trained as a *hand* typographer. I don't want to become an *operator*". Others disliked the idea of sitting all day, "typing away, staring at a TV screen". "That's not my idea of a job". "The lino-op's job [has] gone from being a man's job to a woman's, sitting behind a typewriter all day".

Notwithstanding this reluctance, however, the compositors were faced with the fact that (as explained earlier in the paper) the new technology of photocomposition automated significant parts of their former work, and fewer staff were required for the "paste-up" work that remained. Moreover, during 1981, the compositors were becoming aware of future developments in electronic composing known as "pagination" which could reduce the requirement for their trade even further.⁶ These current and imminent technological changes threatened their jobs, and in turn, the strength of the Printers' Chapel.

Despite the apparent suitability of the "TTS girls" for the work on VDTs, in the initial stage of the changeover in 1979-80, the women remained on the TTS machines which — as an obsolete technology — were to be phased out. During 1979 and 1980, while linotype operators were retraining on the terminals, TTS operators were called on to typeset some of the work normally done by the tradesmen. After the initial retraining period, the TTS operators reverted to their former work.

The last of the permanent TTS staff was taken on in May, 1979. Staff in the TTS room reached a maximum of 10 in early 1980. Five worked full-time, and 3 were "part-timers" who had previously worked full-time as TTS operators. Two more full-time operators were taken on temporarily at the beginning of 1979 to assist in the change-over.

The first group of compositors began typing lessons at the end of 1980 and training for the terminals continued during 1981 and 1982. By early 1983 only 2 TTS operators remained and they performed limited typesetting work on the TTS machines. One of the operators took up an adult apprenticeship as a typographer. The others left through "natural attrition" and were not replaced.

The Star's management also pursued a policy of non-replacement of other composing room staff who left. The men in the "comp room" suggested that this had been happening "for quite a while". In April, 1981, for example, one of the men noted that "the last tradesman came in about 3 years ago. Management used to take on about 4 new apprentices each year. Now it's 2 years since they did." In 1983, however, *The Star* took on 2 general hands to work in the composing room.

Deskilling and the introduction of TTS

The key to the question of why "TTS girls" at *The Star* were not retrained on the terminals can be found in the conflict and alliances between employers, and tradesmen and non-journeymen in the Printing Union, which stemmed from the introduction of TTS machines into New Zealand newspapers in 1954. Resistance by the printers to the deskilling entailed in the TTS operation was strong. For example, in presenting his submission

6. Pagination is a *fully* automated process of composing using a computer keyboard and screen to manipulate the position of typeset material. When fully implemented, the process by-passes the paste-up stage. Pagination equipment had been introduced into *The New Zealand Herald* at the time of the study.

to the Arbitration Court hearing in Christchurch in November 1981, Printing Union President, W H Clement, spoke of the installation of the TTS machines in 1954. He told the Court:

Female clerks . . . were recruited to operate the machines because the tradesmen wouldn't belittle themselves or condescend to operate the TTS.

Conversation with Printing Union officials following sittings of the Arbitration Court in Wellington a week later came round to the subject of TTS. One official remarked that when the TTS machines came into New Zealand, "the men weren't interested in working [them]. They felt it wasn't work for skilled tradesmen." He suggested that the men had "turned up their noses" at the idea of working on the TTS machines, but that this allowed the employers to bring in "the non-journeymen clause"⁷ in the Award. The Union official went on:

The girls thought *they* were putting out the paper – that's what management used to tell them. The men were happy to let the girls do the boring, repetitive work. *They* kept the cream.

Another official commented that "the 'TTS girls' did what management wanted – worked flat out under supervision". He compared the way their work was organised with an assembly line, and referred to the women as "battery hens". Similarly, at Wilson and Horton's, which publishes *The New Zealand Herald*, a printer remarked: "When the TTS machines first came in, the guys wouldn't touch them – *not* machines for girls". The relationship between the technical or objective deskilling of typesetting that occurred in 1954 and the subjective perception of the work as deskilled is complex and is explored elsewhere (Hill, 1984).

In summary, historical developments are crucial to an understanding of the new labour process associated with computerised typesetting at *The Star* in 1980. In the previous major technological change based on TTS machines and automatic linecasters, some aspects of typesetting were deskilled and the number of operators required for typesetting work on linotype machines was reduced. Since printing tradesmen refused to work on the new TTS machines, this allowed non-journeymen into the union. With the *current* change in typesetting techniques, the printers wanted to block any further erosion of their employment opportunities and resist dilution of the union by a group of workers who tradesmen considered weakened chapel strength. Therefore, in negotiating conditions governing the introduction of new computerised equipment and retraining of staff, printers ensured that the jobs of printing tradesmen – both operators *and* compositors – were protected.

The relevant clause in the Newspaper Award, Clause 25, first appearing in 1977, stipulates that:

Where the introduction of new equipment has taken place and retraining of staff becomes necessary *hand and machine typographers . . . will be given the opportunity to be re-trained progressively in ordinary company time in all aspects of typesetting and composition, hand and machine, . . . including . . . keyboarding.* [Emphasis added]

The clause stated that if individual employers found it necessary to use keyboard operators other than journeymen "then such operators shall be replaced by non-journeymen *ONLY after suitably skilled typographers employed by that employer have been given preference*" (Clause 25:3; emphasis added).

When a tradesman left and had to be replaced, the employer was required to "actively seek by public advertisement the engagement of additional tradesmen with the skills required" (Clause 25:4). Thus Clause 25 gave tradesmen priority in retraining for the new equipment. Only when an employer could prove that he was unable to obtain the services

7. The relevant clause (in the 1981 Award) is 17:9, which refers to "operators, other than journeymen of keyboards producing punched paper or magnetic tape . . ."

of printing tradesmen could non-journeymen keyboard operators be retrained.

As one would expect from a relational analysis, the details of how this issue was resolved in different newspaper offices varied according to the relative bargaining strength of each of the interested groups, and to the particular production system being implemented. *The Press*, for example, retrained TTS operators on VDTs when the company phased in a fully computerised classified system in the initial stages of its changeover. Wellington Newspapers Ltd also retrained TTS operators. In each case, however, the work performed by journeymen and non-journeymen differed in specific respects.

At *The Star*, the Printers' Chapel used Clause 25 to block any attempt by management to retrain TTS operators. Printing tradesmen were numerically dominant in the largely male Chapel and formed its elected executive. The female TTS operators, on the other hand, were a small and socially distinct group and their ability to influence the majority view was minimal. The Chapel won management agreement:

- (1) *not* to retrain the TTS operators on computer terminals;
- (2) *not* to replace with a trained typist any TTS operator who left; and
- (3) to retrain compositors on terminals.

It is important to note that the Chapel *had* backed non-journeymen members on other issues in which conflict was between employer and Chapel and not within the Chapel itself. For example, a TTS operator spoke on one occasion of a "qualified input allowance" which the Chapel fought to secure for the TTS operators.

Competition among employers

The printers' strength in negotiating Award provisions and in-house agreements at *The Star* was backed by several factors. Newspaper proprietors in the main metropolitan centres face competition with other newspapers for advertising and circulation revenues. Even when no other publisher produces a daily newspaper in the same centre, the company competes for advertising and readership with other forms of the media, importantly radio and television. Recently, "throw-away" newspapers delivered free to households have also been competing for available advertising.

Furthermore, the product market within the newspaper industry is of a particular kind. News is a highly perishable commodity which, unlike capital goods, cannot be stockpiled. As the Executive-Director of the NPA, D J Patten, explained it,

With a newspaper you're putting out a daily product. It's not like plastic bottles which come off an assembly line. If you miss an edition then you've had it.

Strikes and short-term interruptions to production result in the newspaper losing current advertising and circulation revenue and possibly its future share of the market. Speaking of the problems involved in the introduction of new technology, the Production Manager of Wellington Newspapers Ltd, J Forster, commented:

The greatest difficulty was the deadlines were critical. The most difficult thing was a work-to-rule because [for example] that prevented us getting *The New Zealand Times* to Invercargill at the right time. If you don't get it there before church you can forget it.

Industrial action also affects distribution costs as the following illustration shows. During discussion of a current technology issue in November 1981, Printing Union officials were speaking about different strategies the Union might adopt over the issue, and one commented:

There wouldn't need to be a strike. You just hold stop-work meetings just before deadlines. For every hour delayed there's the money which the newspapers have to pay out to get special transport if they miss the buses [on the scheduled runs].

In summary, the different occupational groups within the Printing Union — linotype operators, lino-mechanics, compositors, stereotypers and machinists (printing press) —

occupied strategic places under hot-metal production, since they controlled critical points in the work process. Without printers, no type could be set or composed nor printing plates produced, and the paper could not be printed. Since the nature of the product market made newspaper employers extremely vulnerable, printers could ensure that the new technologies would be introduced on terms favourable to them.

There were, of course, limits to the printers' power as overseas experience had shown. With rising costs and declining revenue, newspaper companies could not withstand sustained strike action indefinitely and were at risk of "folding" completely. The New Zealand Printing Union was well aware of the dilemma of which British journalist, R Winsbury (1976, p. 3) wrote:

If it is true that the sheer survival of some, or many, newspapers is at stake, certainly at anything like the circulations and resources they enjoy today, then resistance to new technology will simply hasten the elimination of just the jobs – and more – that [newspaper employees] are trying to defend.

Conclusion

As these research findings show, the job structure which emerged following the changeover to cold-type production at *The Star* was the outcome of a process of interaction among informal and formal groups and organisations. Moreover, the activities of any one group could only be understood in relation to those of other groups both within and outside the newspaper industry.

While Braverman's framework is useful in analysing the changeover, the theory's focus on the conflict between employer and employee tends to obscure the possibility that these groups may co-operate over the deployment of new technology when it is in their interest to do so. This paper has explored the degree to which the Newspaper Publishers Association and the Printing Union co-operated in order to minimise the relative costs of the introduction. On the one hand, employers sought to secure some of the labour-saving benefits and efficiency entailed in the new cold-type method while avoiding potentially costly disruptions to production. On the other hand, the printers, who regarded the technology as inevitable, wanted to avoid losing collective control over type-setting equipment, and the job-loss and deskilling which would occur if members of other unions and non-journeymen members of their own union performed aspects of the new work on the computer terminals. Hence this paper shows that an exclusive focus on the employer/employee relationship tends to obscure the role of labour-market segmentation in the struggle for control over the new technology. As Cockburn has pointed out, it is necessary to take into account the role which labour itself plays in the restructuring of the labour process (1983, p. 32).

At the same time, the particular nature of the product market – the perishable quality of the newspaper as a commodity and the competition between owners of various forms of the media – also emerged as a factor in newspaper employers' individual and collective response to resistance by the Printing Union to the labour-saving and deskilling potential of the technology.

For these reasons, the capital accumulation process set the context for but did not determine the struggle over the labour process which emerged at *The Star* in 1980, and the "contested terrain" (Edwards, 1979) of the workplace reflected more than merely the struggle for control between newspaper employer and printer. It also reflected external market factors and the dynamics of the internal labour market.

The interaction between all these factors shaped the structure of the jobs of the former linotype operators, hot-metal compositors, and TTS operators – the nature and level of skill which these jobs embodied, their stability or instability, and who was to be employed and who unemployed.

The linotype operators and the compositors avoided the full impact of the labour-

saving implications of the technology. No linotype operator nor comp was made redundant and each occupational group had the opportunity to retrain for the new jobs. This has protected those tradesmen *in employment* at the time of the changeover, a factor which highlights the need to distinguish between the effects of a new technology on the worker and on the job itself, as Lee (1981) has argued. At the same time, by retraining on the VDTs, the compositors also avoided the full impact of the deskilling and loss of control inherent in the new technology of photocomposition, an issue explored in detail elsewhere (Hill, 1983 b).

Natural attrition led to a decline in the numbers of TTS operators employed by *The Star*. Moreover, the struggle for control over the technology took place at the cost of potential job opportunity and reskilling for a particular category of worker, the female typist. These findings are consistent with those of Cockburn (1983) in her analysis (based on research in 4 London newspapers between 1979 and 1981) of class, gender and technological change.

Evidence from the New Zealand study shows that, more generally, opportunities for future employment in the industry have been significantly reduced. The Father of *The Star* Printer's Chapel calculated that, of the staff in departments affected by new technology and covered by the Printing Union (including the TTS operators), the number dropped from 126 in 1975 to 95 in 1980. This represented a drop of 25 percent. Between December 1980 and December 1982 there was a further 11 percent decrease.⁸ The reduction in the number of staff employed cannot be automatically attributed to new technology, since natural attrition would be relied on by management to reduce staff during any period when advertising sales were depressed as a consequence of national economic recession. Nevertheless, the figures are suggestive.

On the other hand, the research findings show that, compared with — and as a result of — international experience, the process of negotiation between employer and worker helped to avoid some of the worst consequences (both social and economic) of the technology's introduction (see the experience of the United States: Zimbalist, 1979; Australia: Bennett, 1979; and Britain: Cockburn, 1983).

This paper documents the first, albeit crucial, phase in the transition to computer-based typesetting and composition. The second phase, direct-inputting of classified advertising copy, has also been effected (see Hill, 1983a). Now that legislation permitting a return to some form of wage-bargaining is imminent, employers can be expected to press once again for the system of direct-inputting of editorial material to be implemented. Until now, the outcome of relations of conflict and alliance among employers, journalists and printers — the key groups involved in the struggle over this system — has precluded an agreement being reached, but this situation could change as interests shift and groups realign.

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8. These figures have been calculated using the number of staff listed in the Chapel's Christmas card printed for each of the respective years.

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