# COMPUTERIZATION IN THE NEWSPAPER INDUSTRY

by

BENJAMIN NITAY

B.S.A.D., Massachusetts Institute of Technology
(1974)
and

ZEEV ZURR

M.Sc., Tel Aviv University
(1972)

SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENT FOR THE

DEGREE OF MASTER OF

SCIENCE

at the

MASSACHUSETTS INSTITUTE OF

TECHNOLOGY

May, 1976

Signature of Authors ..... Signature redacted
Alfred P. Sloan School of Management, May 7, 1976

Certified by ..... Signature redacted
Thesis Supervisor

Accepted by ..... Signature redacted
Chairman, Departmental Committee on Graduate Students

# COMPUTERIZATION IN THE NEWSPAPER INDUSTRY

by

BENJAMIN NITAY and ZEEV ZURR

Submitted to the Alfred P. Sloan School of Management in May 1976, in partial fulfillment of the requirements of the degree of Master of Science.

## ABSTRACT

A major technological breakthrough in the newspaper industry during the last century has been the adoption of computerized technology in the last decade. The technology now available enables the partial or full computerization of nearly all pre-press stages.

Two related general trends are discernible in the current computerization process. First, increased sophistication of the separate computerized functions. Second, integration of the separate systems into a unified process. When such an integration will be achieved, it will radically alter the rigid sequence and character of the traditional production process newspaper. The integration process will be facilitated by advances in three areas: data compression, data base management and distributed processing.

Economically, computerization impacts both the costs and revenues of the newspaper industry. The revenues can potentially be increased by the extended ability to diversify the product thus appealing to a larger readership which attracts greater advertising revenues. Incorporation of plant to plant facsimile transmission reduces transportation-time barriers that previously hindered any substantial regional expansion. Personalized facsimile transmission to home printers, however, is unlikely for ecomonic reasons.

On the cost side, raw material expenses will remain relatively unaffected by computerization, but labor cost will be markedly reduced. Moreover, the skill requirements of the computerized newspaper's labor force will be dramatically different. Many traditional trades are already becoming obsolete; there is increased demand for computer related skills which unlike the old skills, are in abundant supply.

The financial and organizational impacts of computerization can be substantially mitigated by the adoption of a piecemeal absorption of the technology. A modular approach breaks down the investment requirements, facilitates the mastering of the new technology and, most important, allows a gradual transformation of the labor force.

The merging of communication technology has seriously put into question the prevailing doctrines regarding the dissemination of information. The newspaper industry which has been traditionally sheltered from government regulations is becoming, through computerization and other technological innovations, similar to the broadcast industry and hence potentially subject to similar regulations. Computerization may enhance the political power of newspapers by providing them with data banks and the ability to compile and disseminate pertinent information on issues or people at a very rapid rate.

ACKNOWLEDGEMENT

We wish to thank our adviser, Professor Lester C. Thurow for his assistance and advise. Professor Thurow was particularly considerate and helpful in allocating his time under our very hectic time schedule, and aided us greatly in structuring out study.

We wish to thank also Professor Arnoldo C. Hax, our reader, for giving us of his valuable time. We also thank Professor Stuart E. Madnick for his help.
Appreciation is also due to the generous help given by our friend, Joav Leventer.

We want also to thank the knowledgable people that spared their time for most helpful discussion. These are Professor Roger Kahle from the School of Journalism at Boston University, Professor Donald E. Troxel and Donald R. Knudson from MIT, Mr. Robert K. Haire from Digital and Mr. Robert J. Heyd from the Boston Globe.

Lastly, thanks to Nancy Emery for fast and responsible typing.

TABLE OF CONTENTS

# LIST OF FIGURES

# CHAPTER 1

# INTRODUCTION

## Objectives

The rapid advances in communication technology in recent years have revolutionized the communication industry. Unlike broadcasting and related areas of mass communication, however, the newspaper industry has been largely exempt from major technological breakthroughs, and this for close to a century. A perceptible change has been taking place in the past decade as newspapers have begun to adapt computerized technology at an accelerating pace. This paper will focus on this process with the following objective in mind:

1. Placing recent development in the historical context of the industry (Chapter 2).
2. Surveying the state of the art of newspaper computerization and identifying future technological trends. (Chapters 3 and 4).
3. Evaluating the impact of computerization.

on the economic position of the newspaper industry, its labor structure, and its political and legal status (Chapters 5, 6 and 7).

## Overview of the Newspaper Industry

Such an analysis requires an understanding of the three-dimensional nature of the newspaper industry.

Newspapers may be viewed as a communication industry which supplies information to the community. Indeed more so than any other communica-

tion system, newspapers are grounded at city-size scale (as the abundance of city names in their logos suggests) and serve information focal points for their respective communities.

As a manufacturing industry , newspapers convert heavy rolls of bland paper from pulp and paper mills into small, ink-coated sheets covered with symbolic patterns that change daily. These sheets are packaged into units which are then delivered to convenient spots for purchase by customers.

As a public institution, newspapers are protected by the constitution for the purpose of guaranteeing free speech and helping to preserve the democratic form of government.

Whatever the view taken of the industry, its economic foundation rests on a simple chain of operations. News and entertainment material are used to lure readers, which in turn lure advertising, which in turn lures additional readers.

While this chain is common to all the media, its last link is of particular importance in the case of newspapers. In newspapers alone, can the consumer "shop" for ads in their own individual sequence, whereas in radio and television (and to a lesser extent magazines) which send their message serially, the sequence is fixed. Consequently, the future of the newspaper industry heavily depends on their continuous cultivation of this advantage.

Traditionally a great deal of labor input was needed to successfully merge the two input streams of news and ads. The immediate impact of computers is th facilitate this process and reduce the labor

intensity. In the long run, however, computers impact on newspapers will be strongly felt along all three dimensions noted above.

# CHAPTER 2

## HISTORY 1700-1960

To see what are the effects of computerization on the industry it is first necessary to understand in greater depth the nature of the technological change process and to arrive at some conclusions about this process and its impacts. The introduction of computers into the newspaper industry in the last two decades is part of a continuous historical process by the industry of incorporating technological innovations. Some of these past innovations were specifically tailored for newspaper production, e.g. the rotary press, while others were implementations borrowed from prevailing technologies, e.g. the use of telegraph to transmit new stories.

An examination of the history of the newspaper industry in the United States provides a framework for an analysis of the impact of technological change on the industry. In addition to technological change, however, such an analysis must include the impact and interaction of the major demographic, political and economic developments over the past three centuries. During this period the U.S. emerged from an agrarian to an industrialized to a post-industrialized society. For the newspaper industry, this evolutionary development was punctuated by distinct periods of accelerated change; often these were followed by periods of consolidation and absorption.

Most of the technological change involved improvements in three areas: increased supply and improved quality of raw material, great typesetting speed and increased copy volume.

1670-1800

No major technological change took place during this period. Newspapers were essentially printed in letterpress - the same labor intensive process invented by Gutenberg some 300 years earlier. Individual metal letters were placed side by side on a flat plate to form sentences. Inked and pressed on paper they formed the printed page. The underdeveloped condition of the American press was such that even the type (and auxiliary equipment) had to be imported from England. In fact there was no American type foundry until the very end of the eighteenth century. The only significant technological change during this century was the development of a bleaching process which lowered the cost of paper and increased supply moderately.

Politically the chief characteristic of this period was the radical transformation in the political control of the press. This was the only period (up to 1776) in which the American press was subjected to what has become the staple diet of many newspapers elsewhere - government control, censorship, and outright suppression. Thus, the Publik Occurances of Boston never survived its first issue (1690); it was instantly suppressed by the British governor of Massachusetts. Many other such abortive attempts followed, until the successful publication of the weekly Boston Newsletter in 1704.

Most of the papers, however, were still perceived as "extensions of the bulletin board" and served primarily as an early kind of local advertising sheet. In fact, a great number of the colonial papers had the word "advertiser" in their title.

By the mid-18th centurn, however, the Pennsylvania Gazette published by Benjamin Franklin in Philadelphia had developed into a potent political power. The combination of an influential editor-publisher and a major urban center (Philadelphia was the largest city in North America at the time) was the first instance of a future pattern of strong political impact of newspapers. The lifting of all government controls after the American Revolution opened the way for additional papers and, along with the increasing population density, for a higher frequency of new dissemination. Thus, the first daily, The Daily Advertiser was published in Philadelphia in 1784; New York got a daily a year later.

## 1800-1880

This period was marked by a phenomenal expansion of the industry, a broadening of the geographic and political scope of operations and an improvement in the quality of the newspapers produced. The primary factors affecting these changes was the overlapping introduction of new technologies: paper production from wood, high speed presses, railroad (the last two powered by the steam engine) and the telegraph. As a result the number of newspapers increased from 235 in 1800 to 2300 in 1850, roughly a ten fold increase in less than 50 years (see Figure 2-1).

The mechanization of both printing and papermaking underlines the advances made during the ensuing decades. The modern revolution in the production of newspapers began around 1800 when the iron press re-

placed the wooden press. This change allowed both a larger sheet to be printed and a moderate savings in production time (the old wooden presses sometimes had to be used more than once to get a reliable impression of a single plate).

Previously, sheet size input was limited at the hand-made mills by the mass of moulded pulp (used to form an individual sheet) that the vatman was physically able to lift. However, the paper size which could be used by the iron press far exceeded the size available. Development of the paper making machine (first introduced in the U.S. in 1827) resolved this problem.

Another breakthrough was achieved in the 1870's when the sulfite pulping process paved the way to replace the scarce linen and cotten with wood as the major raw material for paper. This dramatically increased the availability of raw material.

With rising circulation and advertising pressure for more pages, the capacity of the flat press was soon outstripped. The revolutionary change that supplied the answer was to turn the printing surface from a flat reciprocating frame into a rotary cylinder (literally the "re-invention of the wheel"). This was the basic invention of the rotary press. It necessitated devising of methods to convert pages to set in movable type into segments of a circle secured to a cylinder. It is interesting to note that this mode of production rendered impossible any setting beyond single column; this had an obvious effect on the development of headline display, limiting then to column size. Not surprisingly the type revolving machines gave a new impetus to the

examination of stereotyping possibilities. Sterotyping is a method which provides the ability to duplicate cylindrical plates for multiple impressions of the same page.

Towards the end of this period (1870's onwards) a gradual absorption of web-fed rotary press technology took place in the larger daily papers. Essentially the process involved adopting the rotary press to accept web rolls of paper that were the standard output of paper mills. The successful marriage of the two technologies had a considerable labor saving impact.

All these innovations created a major increase in the production capacity of newspapers, but they were insufficient by themselves to keep pace with the westward expansion of the country, and the news needs created by the expansion. Here the telegraph and railroad entered, supplying the communication links necessary for transmitting news information from one coast to the other. Simultaneously the growth of large urban centers in the east, especially New York, stimulated the growth of major urban papers. Although, like all the other papers of the period, their distribution was limited to their immediate cities and communities, their scope of newsreporting was not. It extended not only to the West but to Europe and beyond as well. For example, Greely's "New York Tribune" became in the 1850's a major political news force which regularly maintained European corre pondents on its payroll (one of them was Karl Marx).

During this period newspapers became increasingly competitive. The growing advertising market provided lucrative opportunities and the technologicaland economic barriers to entry were not strong enough to

ensure monopoly. Consequently every major urban center had several competing papers which often resorted to rather unscrupulous tactics in the battle to win circulation (including the fabrication of hoaxes if necessary).

In short, the first three quarters of the 19th century brought the newspaper industry from an embryonic form to a vigorous industry which became an integral part of the American political and economic structure.

1880-1920

The innovations of the previous period greatly increased the printing capability beyond the stage of the finished printing plate, i.e. faster outputting of papers. Attention was now focused on reducing the time required to prepare the plate. This stage of the process had essentially remained unchanged since Gutenberg, and now became a major bottleneck. The breakthrough came with the invention of the Mergenthaler's hot metal line-caster (the Linotype) which produced type set lines in a single stage, eliminating the necessity of laboriously placing individual letters on the plate. As an operator pressed a letter on a keyboard, a mold for the letter fell into place, and when molds for the letters and spaces reached the end of the line, melted hot metal was shot through them to form a casting of the completed line. The cast metal lines, arranged in columns, were carried by hand to a table where they were arranged to form the total page.

Two problems had to be solved before the Linotype would displace the

individual type assemblage. First, it was necessary to control the spacing between words so as to justify (align) each line, and second, to automatically put each used mold back in its own channel in the magazine, ready for reuse. The introduction of the line caster increased the typesetting speed by nearly five-fold from an average of one line per minute to 4.9 lpm.

In addition to linecasting, another major change was the appearance of illustrations in the daily newspapers. This change was brought about by the use of an acid etched metal, usually zinc (hence zincography). The former mode of woodcutting was tedious and of marginal print quality.

The period from the end of the Civil War to the turn of the century was one of accelerated urbanization and industrialization. The growing cities of the U.S. became receptacles for large waves of immigrants which were organized in tight political machines. The technological breakthrough enables the newspaper industry to keep abreast of this rapid population expansion and for the first time to reach a mass audience on a daily basis. The political implication was not lost on any one. Control of the newspapers became a coveted, though often unrealizable goal of the big city bosses. Because they were supported by advertisement revenues which to a large extent were independent of political control, the newspapers could often afford to challenge the existing political structure. Thus the adversary relationship between the press and the political establishment in the U.S. was solidified during this period. Every political official had to take

into consideration the possibility of becoming a target of a critical press copy which could reach the home of nearly every citizen in his jurisdiction.

This was also the era of intense newspaper development, not so much in number of papers but in expanded circulation. It was the era of the sensational "Yellow Press" (named after the first appearance of colored supplements another innovation in 1893,)typified in the Hearst and Pulitzer newspapers. It also saw the growth of powerful dailies in the growing West like the Kansas City Star and the Denver Post. The late 1870's likewise witnessed the establishment of big city evenings, like the St. Louis Post Dispatch and the Boston Globe (which are still powerful and prosperous when most of their once mighty metropolitan contemporaries have vanished ).

1920-1945

The predominant technological change affecting the newspaper industry during this period was not an organic development within the industry. Rather it was the widespread proliferation of Radio during the 1920's. At first radio competed directly with the newspaper both as a source of news information and entertainment, and as a recipient of advertising revenues. This led to some speculation that newspapers would become obsolete and disappear.

Nothing of the sort happened. While it is true that the number of newspapers dropped between the two World Wars, newspapers maintained their circulation, but not without a shift in their orientation.

Radio, because of the speed and range of transmission took over the primary function of national coverage, while newspapers specialized more and more in local coverage where they could devote more space to community affairs, and analyze these in greater depth. The reason for this dichotomy is rooted both in the technological and commercial structure of the two media. Radio's broadcasting capability transcended local communities and reached a much larger undifferentiated mass market; newspapers with much more limited reach usually were rooted in and served the needs of local communities. Consequently national or regional business entities sought to advertise their product through radio, while local trade remained primarily focused around the newspapers.

Radio made the extra edition supplement of big city newspapers obsolete but newspapers responded by introducing the tabloids. The "tabs" (half sheet papers) heavily utilized graphic and pictorial material which radio of course could not supply. Their format was also eminently suitable for the millions of people commuting in the mass transportation systems that had by now become the hallmark of nearly every major American city(similarly, radio penetrated the private automobile ).

Since radio and newspapers between them encompassed all the news dissemination ("retailers") during this period, it is not surprising that the wire services emerged as major suppliers ("wholesalers") for both media. This trend has only been reinforced since then.

The single significant technological imporvement within the newspaper industry was the development of the teletypesetter in 1932.

This device produced a perforated paper tape which was in turn used to operate the traditional Linotype. It's chief advantage was a more efficient and uninterrupted use of the expensive Linotype machine, since all of the errors had been screened out and corrected on the tape by the less costly teletypesetter buffer.

The introduction of the teletypesetter signalled the obsolescense of highly specialized skills within the newspaper industry (the skilled pianist replaced by the "player piano"). However the real challenge of skill obsolencence and the related labor-management problems were to remain dormant for another thirty years.

1945-1960

From the end of World War II on, the newspaper industry experienced a steady decline. Although circulation increased roughly in proportion to population growth, many cities which had several competing newspapers in the 1940's became one-newspaper cities by the 1950's. (Boston and San Francisco are among the exceptions.) (See Figure 2-1)

The trend towards monopoly urban newspapers was encouraged by two factors. The first was that advertisers did not find it attractive to divide their print ads among paper with overlapping readership. Since competing newspapers had such an overlapping readership, the fierce competition for advertisers eventually drove the weaker establishment out of business. (Roughly 80% of newspapers revenues have been from advertising). For advertisers, the monopoly price was still lower than the cost of multiple ads in several papers.

The second factor was the barrier to entry caused by high investments required of new newspapers. To provide "fatter" ad-padded copies, newspapers had to invest in bigger plants, more presses, and additional staff.

The crucial development affecting the newspaper industry during this period was the advent of television. Television, much more so than radio, competed with newspapers as a source for news and entertainment. It combined and went beyond both the visual and audio capabilities of the two media. Its ability to reach a mass audience and retain attention was on a scale with which neither media could directly compete. Naturally, a large portion of the advertising revenue was diverted from both industries to this new media. What remained as advertising revenue sources for newspapers were primarily the local retailers (especially food and automobiles) which found the classified ads, the Sunday supplements and the coupon formats especially adequate for their marketing needs.

Through these means, newspapers provided and continue to provide advertising amenities that television or radio cannot provide: the ability to scan large and condensed bodies of print, and the ability to retain a physical record of the dispensed information.

The post-war period witnessed the process of massive suburbanization. This spawned some development of suburban papers, which were often little more than disguised shopping sheets. However, as noted, the predominant trend of this period was that fewer and fewer papers were serving larger and larger communities.

A corollary of this trend has been the rise of what may be termed quasi-national press. Although the U.S. is unique in lacking such an institution, several newspapers did emerge to a level of national importance. These are the New York Times, the Wall Street Journal, and the Washington Post (in the case of the New York Times the impact is international).

That these papers assumed greater national importance is partially reflected by the disproportionate rise of their circulation outside their immediate cities over a 20 year period.

The growing consciousness of world affairs fostered by television in this case contributed to this trend, especially since the respectable newspapers could offer a depth of analysis and a forum for serious debate which television with its extermely short message units could not.

The main technological change in the newspaper industry during this period was the adoption by some papers of the offset printing process that started in the 1950's. Offset eliminated the need for reliefs; impressions could now be produced by a chemical photographic process, resulting in sharper pictorial and print qualities.

Photographic chemical developments, moreover, enabled complete bypassing of "hot metal" (Linotype), even for litterpress printing. The new "cold" photocomposition paved the way for pre-press computerization.

The process greatly facilitated the rise of the national weekly magazines such as Time and Newsweek which can be seen as part of the

general trend towards a national press (565% combined circulation increase over a 20 year period).

The reason why many newspapers are slow to adopt this process is that such a move requires a general overhaul of capital, especially presses. (Many newspapers prefer to wait out the full depreciaion period of their old equipment, especially since there is practically no salvage value for it.)

Summary

The major technological innovations of the newspaper industry occurred during the 19th century. These developments produced the technological foundation for reaching a mass media audience, a capability which newspaper alone could provide for several decades.

The technological innovations of the 20th century brought forth competing mass media which broke this hegemony. Broadcasting, first through radio and then through television brought a reduction in the growth rate, and eventually a decline of, the newspaper industry. These developments closely traced the demographic and economic changes in American society. Television fitted well with the increasing emphasis on the national level in both economic and political spheres. While a modest national press has begun to emerge in the post World War II period, most of the newspaper industry tailored itself to the expanding suburbs and local communities. In the major urban centers a process of monopolization by single newspapers has gradually become the prevailing trend.

Essentially no substansive technological change in the newspaper industry was developed in the first half of the 20th century. The advent of computerization, however, may radically alter the role that newspapers have assumed in the past few decades among the mass media.

NEWSPAPER DISTRIBUTION

FIGURE 2-1

| Year | Daily Papers | Cities with Dailies | % of Daily Cities with Competing Papers | % of Urban Places with Own Dailies |
|---|---|---|---|---|
| 1880 | 850 | 389 | 61 | 90 |
| 1910 | 2202 | 1207 | 57 | 53 |
| 1920 | 2042 | 1295 | 43 | 48 |
| 1930 | 1942 | 1402 | 21 | 44 |
| 1940 | 1878 | 1426 | 13 | 41 |
| 1945 | 1744 | 1396 | 8 | — |
| 1961 | 1763 | 1461 | 4 | 29 |
| 1968 | 1749 | 1500 | 3 | — |

Source: Bagdikian, p. 80

# CHAPTER 3

## STATE OF THE ART

### Focus of technical innovation

Technological advances in any industry can provide changes of three kinds:[1]

1. New methods of producing existing products.
2. Design of entirely new products, or products with substantially new attributes.
3. New techniques of organization, marketing and management.

In the case examined here, the changes have been mostly of the first and third type. The product - the newspaper copy - remains unchanged. Yet, in almost all but the final product, the newspaper industry is undergoing a revolution. Nearly every stage of production and distribution is being radically transformed by the introduction of computers. In the late 50's the newspaper industry, like many other businesses first installed computers for payroll, billing and other accounting purposes. However, application of computer technology to specific newspaper needs was delayed until significant advances were made in the general computer field. These advances fall into three areas: processing (speed), capacity (memory), and real time capability (time sharing).

Most technological innovations change the relative share of either labor or capital in the total cost of production. In the case of the newspaper industry, the changes up to now have been clearly directed at reducing labor share. Most of the automated processes described in

this chapter have replaced less efficient labor-intensive processes. (The consequent labor displacement problems will be discussed in Chapter 6). In addition, computerization has brought improved production and product quality control.

## The Production Process

To follow the changes that have been made, it is first necessary to understand the various stages involved in the newspaper production. These can be summarized in the following table and flowchart:

| Stage | Description |
|---|---|
| Content Input | New stories and ads are gathered continuously into two separate inventories |
| Display Ad Layout | Allocation of Ad space |
| News selection | Condensation of news stories to copy's capacity |
| Editing | Editing of copy stories primarily for content and style |
| Typeset Composition | Redesign of edited stories for improved readability, primarily justification and hyphenation |
| Ad Composition and Make up | Graphic design of individual ads |
| Incorporation of non-textual material | Line drawings and photographs |
| Page composition | Reediting of whole page |
| Plate making | Production of plate prototype |
| Printing | Large Volume printing, primarily letterpress and offset |
| Packaging | Cutting, folding and binding single copies |

| Stage (cont.) | Description (cont.) |
|---|---|
| Delivery | Routing to newspaper outlets |

From the platemaking stage on (i.e. when the draft of the paper is finalized), the stages follow sequentially without sink nodes as indicated in Figure 3-1 . However all the activities prior to this point occur with different degrees of overlapping. In particular, intermittent proof reading (the equivalent of quality control) takes place whenever the processing is not solely electronic (i.e. during the interactive editing stages). Moreover, the input stream is closed only a few minutes before the final plate is made.

The Current Impact of computerization of the various stages

While in theory the technical expertise needed to computerize all the stages exists, the rate of diffusion of the technology has not been uniform. Some processes have been computerized rather quickly; others are still in the formative exploratory stage, and still others have not been computerized at all. In general, the bulk of computerization has been directed at pre-press activities. This section will describe the extent of computerization in the various stages.

Input Stage A variety of sources can supply information about external news events (in-house and syndicated reporters, wire services, and monitoring of other media). This information is mostly transmitted by phone, typed copy or telex. Before computerization this information had to be typed up and manually processed through the news file. As the file management is increasingly computerized, many

newspapers equip their reporters with portable terminals. This allows them to input their stories directly to the computerized file without any intermediate steps.

Another device that enables direct input to the computer is the Optical Character Recognition machine (OCR).[2] The OCR scans and recognizes typed text and electronically transmits this information to the computer.

The primary use of OCR currently is in the proofreading, correction and processing of classified ads. When the operator in the ad department receives a phone request for an ad, he/she types the information on a special form. This form is then edited by an ad editor and is passed to the OCR.

The OCR operator is alerted by a cursor on the OCR-display when the scanner encounters the proof-reader's notation. He then inputs the necessary corrections (marked on the form by the editor) and these are executed automatically. The entire proofreading process is greatly speeded up, and a hard copy is retained in addition to the electronic record.

These machines were on the market at least ten years before a newspaper version was introduced (by ECRM Company). During the lag time OCR's established a very large market, especially in credit card slip processing. As a result, the machine became competitive and hence attractive to newspapers.

The wire services, facing more stringent dissemination speed requirements, have computerized their end of the transmission channel

sooner than most newspapers at the receiving end. Increasingly, however, computerized newspapers receive wire service input directly to their computerized files, concurrently with the hard copy.

Display Ad layout The layout of a newspaper page first involves allocation of ad space in proportions which are prescribed by the newspaper policy. The remaining space (the "news hole") is then filled with the available news stories (with the possible exception of front page(s) where news takes precedence).

Computers enter the ad space allocation by speedily providing a variety of layout combinations which formerely had to be pasted up on a cardboard dummy. Obviously the number of possible combinations is staggering; the software must be sophisticated enough to offer only the reduced set of possibilities which conform to guidelines like the following:

1. Stylistic newspaper policy; prevalent are the half-pyramid or double-pyramid style.
2. Buried ad constraint; ads should touch the news, thus lowering the incremental eye movement that partition the ad from the reader's attention. (The eye contact notion reappears in (3)).
3. Side preference; advertisers may request right hand placement of their ads because they believe that these pages get more attention from readers.
4. Avoidance of ad type conflict; ads of competing business should not be placed on the same or facing pages.

5. Avoidance of back-to back overlap of coupons.

Programs are available that carry out the layout task.[3] In one experiment[4] successful 15 minutes computer assisted layout accomplished three man-hours that were required previously.

Even though the labor requirement is substantially reduced, it is unlikely that the present interactive process of display editor and computer will eventually give way to complete computerization. The reason for this is that page layout involves aesthetic and other intricate considerations of heuristic nature which are difficult to program. What is likely is that the page make-up will become a simultaneous rather than a sequential process, i.e. computers will eliminate the need to stick to rigid "ad-first" rules.

Selecting stage The cliche of the proverbial editor rummaging through reels of teletype reflects a simple reality: Roughly only 5% of the news input stream ends up on the paper. The decision as to which stories will be printed is largely the function of the managing editor. His decision process is guided primarily by two considerations: news worthiness and audience appeal. Here again, the criteria are so complex that it is difficult to create computer programs to do anything but assist the managing editor in sorting, filing, and calling forth information.

Some attempts have been made to apply the existing techniques, borrowed from the scientific community, of matching an editor's keywords with the news' stream.[5] With the present proportion of news selection, however, such measures are not mandatory: a competent

editor can manage the flow. In terms of news content screening, computers are more often used for back copies (morgue) retrieval from the archive, rather than daily inflow.

Old and established newspapers in particular, which have amassed large data banks are painfully aware of the inadequacy of manual filing, and are investigating automated approaches. The New York Times is a case in point; it has currently the most sophisticated computerized archival system[6] of any newspaper. The data bank in the 7th floor of the Times buildings contains indexing data, abstracts and full articles from the New York Times and other periodicals. Access to a desired article is achieved by moving hierarchically from the generalized subject matter to the specific article. This is done in the following manner: a user types from CRT terminal a Boolean combination of key-words which to his/her best judgement narrow the subject matter of the request. The computer responds by locating these key words in its index and presents on the user's display a list of articles that satisfy the Boolean request statement. Upon subsequent request, computer-disc-resident abstracts of selected articles from the list are displayed. Once the viewer decides to consult the full article, the system shifts to an external data-bank of micro-fische where the entire past issues are stored. A TV camera focuses on the pertinent article and transmits the image to the user's CRT. At the moment, because refreshed type CRT's are employed, the system's time-sharing capabilities are poor. Indeed remote users (who may rent time on NYT terminals located in several New York public libraries) cannot

consult the full article, only the abstracts. Obviously, the system's performance depends on the degree of faithful condensation captured by the abstracting and indexing. Fortunately, newspapers have the habit of condensing each story in its first paragraph. In addition, one is often concerned with names and places which happen to be capitalized and therefore are easily retrieved for indexing (discarding capitalized words that follow a period).

Editing stage Once the articles that are to be included in the newspaper have been selected it becomes necessary to edit them for grammar, style, and content (which in the case of newspapers often involves legal considerations). Anybody who has edited an article can appreciate the difficulty of trying to program this process. A computer, by its very nature, operates in an exact fashion leaving no room for fuzziness and indecision; human editing, on the other hand, works in precisely the opposite fashion. Usually the editor makes several passes starting from a general scan intending to locate the problem areas and gradually prescribing a set of changes to be made. As the editor moves from one pass to the next there is a great deal of indecision, and a constant shifting back and forth from the general to the concrete.

All of this at the present time cannot be duplicated by the computer. However the computer does have a great deal of application for the very final pass of editing. It can be fed mechanical instructions such as relocating entire blocks of text or changing spelling with far greater convenience and speed than the old scissors and glue system.

Typesetting One of the early uses of computers in newspapers was in the area of justification and hyphenation (J&H).[7] This is the operation that adjusts the type letters to fill up or full width of the column. It is carried out by the manipulation of interword spacing, and when necessary, the carrying forward of word-tails into the next line at proper break-points (usually syllables).

The programming of this task was by no means trivial, it involved composition of an elaborate rule system that had to take into account aesthetics and readability. For example, the amount of space following a period is affected by the specific capital letter that begins the next sentence. In addition, an inefficient program can be very costly because it is frequently revoked. Whenever stories which have already been justified are corrected for spelling mistakes, J&H is recalled because unlike typewriters, each letter in newspaper type has a different space buffer around it so that a whole line length is affected by one letter change.

In 1964, the first computerized typesetting capability for newspaper purposes, was installed at the Worcester Telegram and Gazette.[8] Produced by DEC, it was designed to drive a line casting machine. Early J&H performance was soon augmented by the incorporation of a word-exception dictionary to the system. Such a dictionary is expandable and can be custom tailored. For example, it could be extended to include hyphenation rules for names of local places and politicians.

Ads Composition During this stage, individual ads are designed by combining and arranging different print types with pictorial and graphic material. As in the editing stage, this process requires several

passes before a satisfactory final product is produced. It is a highly creative process which requires a great deal of feedback as intermediate design ideas are generated. Traditionally this function was carried out by ad designers manipulating graphic and printed paper strips on a cardboard base (usually, the advertiser gives some guidelines as to how the ad should be designed).

In the past few years, considerable development of computer-aided design has taken place. The heart of the system is a "giant" (about 25") CRT Video Display Tube (VDT)[9] of exceptional quality. The input device (or a combination of devices) allows the operator to build-up the design with speed and efficiency. The process is an interactive one; the operator chooses from a menu of different graphic and print elements and manipulates their location, scale and shape by evoking prearranged instructions.

The various models on the market vary in the features that they offer to users. In one model (CAMEX 135[10] Figure 3-2), a simultaneous left and right hand action is used - one hand operates a switch to constrain motion to a specific direction, while the other moves a stylus on a graphic tablet to indicate the extent of the motion. In another model (RAYCOMP -100[11] Figure 3-3) the machine "pours" typed text to fit (justified and hyphenated) into the operators' pre-designed outlandish boundaries.

The design of CRT displays involve a trade-off between responsiveness and detail. If the emphasis is on tracking a dynamic process (i.e. providing a continuous stream of image changes) one loses detail, and vice-versa. This parallels the trade-off between a slide and a

film show.[12]

Like the case of OCR machine, the VDT was originally developed for other markets, only later to be modified for the purposes of the newspaper industry. Its incorporation in a computerized newspaper system enables direct access to completed ads during the page make up stage.

Photographs and line drawings Newspapers (and the print industry in general) do not reproduce well continuous tone pictures. The reason for this is that printing plates are inherently binary devices; they either transfer ink from plate to paper or they do not. The grey-level appearance is achieved through the half-tone technique.

Currently, photographs transformed into half-tones at the newspaper's camera department are incorporated into the newspapers by pasting them up in the final stage of page making. Obviously, a fully computerized newspaper is not viable if photographs are excluded. The inclusion of photographs, however, presents serious problems. In terms of computer memory requirements, "one picture is worth (literally) a thousand words". Because of the obstacles of added hardware ("volume") and software ("traffic") expense, it has not been profitable as yet to develop a photograph-comprehensive computerized newspaper system.

Color pictures are even more burdensome. Essentially they require tripling the storage; each of the three basic colors carry as much information as a comparable sized B&W photograph.

Black/white line drawing pose similar problems to those of B&W photographs. Despite the fact that they are inherently binary and therefore do not require the special treatment for tone-gradation at

the newspaper's camera department, they nevertheless must be stored in the same memory-intensive fashion. Various information-compression techniques, have been developed for their digitilization.[13] The advances is these techniques clearly signal the transitory nature of the current situation of a separated pictorial sequence from a computerized newspaper system.

Summary

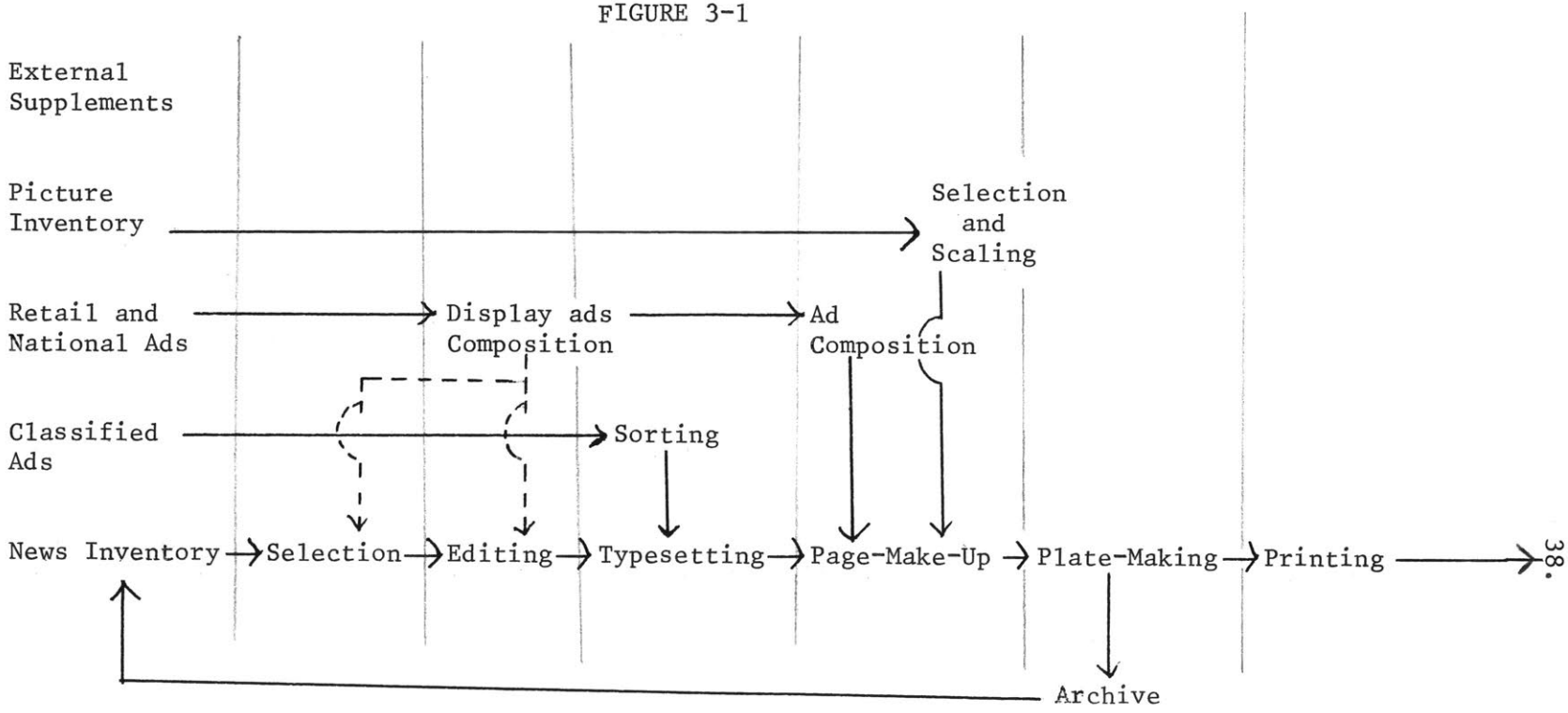
From the early 1960's on, computer systems have been increasingly adopted by the newspaper industry replacing older technology and providing new capabilities. The adoption process, however, was not an entire overhaul of the old process of newspaper production. Rather, it progressed by tailoring separate computer systems to replace limited functional areas in newspaper production on a step by step basis. This has allowed a rate of absorption compatible with each newspaper's particular environment and character.

The technology now available enables the partial or full computerization of nearly all pre-press stages. While in some areas it dramatically reduces labor requirements, much of this computerization (especially that related to the editing function) is still built around an interactive process requiring skilled personnel.

Computerization gives greater flexibility in the assembly of newspapers, allowing custom tailored editions for different regions, a practice already in use by several newspapers and national magazines (this zoning process is discussed in greater detail in Chapter 5).

Two realted general trends can be identified in the current state of the art. First, increased sophisitication of the separate computerized functions (minimizing the need for human intervention). Second, integration of the separate systems into a unified computerized process. When such an integration will be achieved, it may well alter the rigid sequence and character of newspaper production as we now know it.

FIGURE 3-1




NEWSPAPER PRODUCTION FLOW CHART

FIGURE 3-1 (cont.)

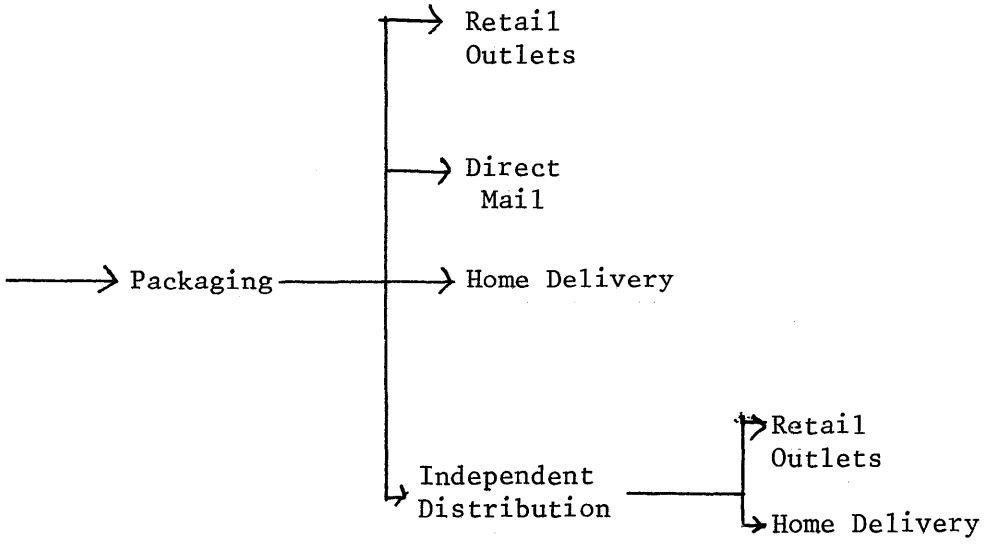
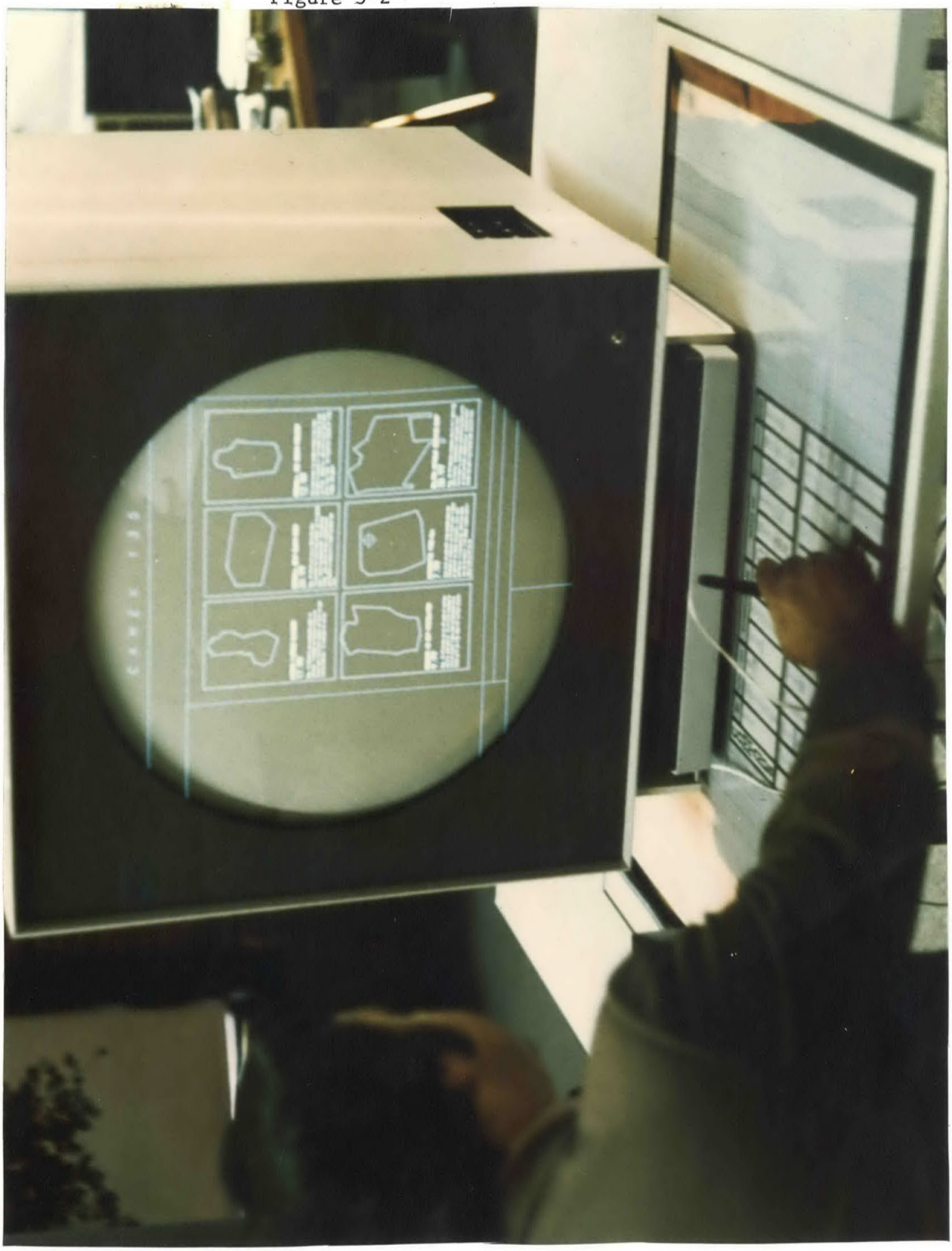


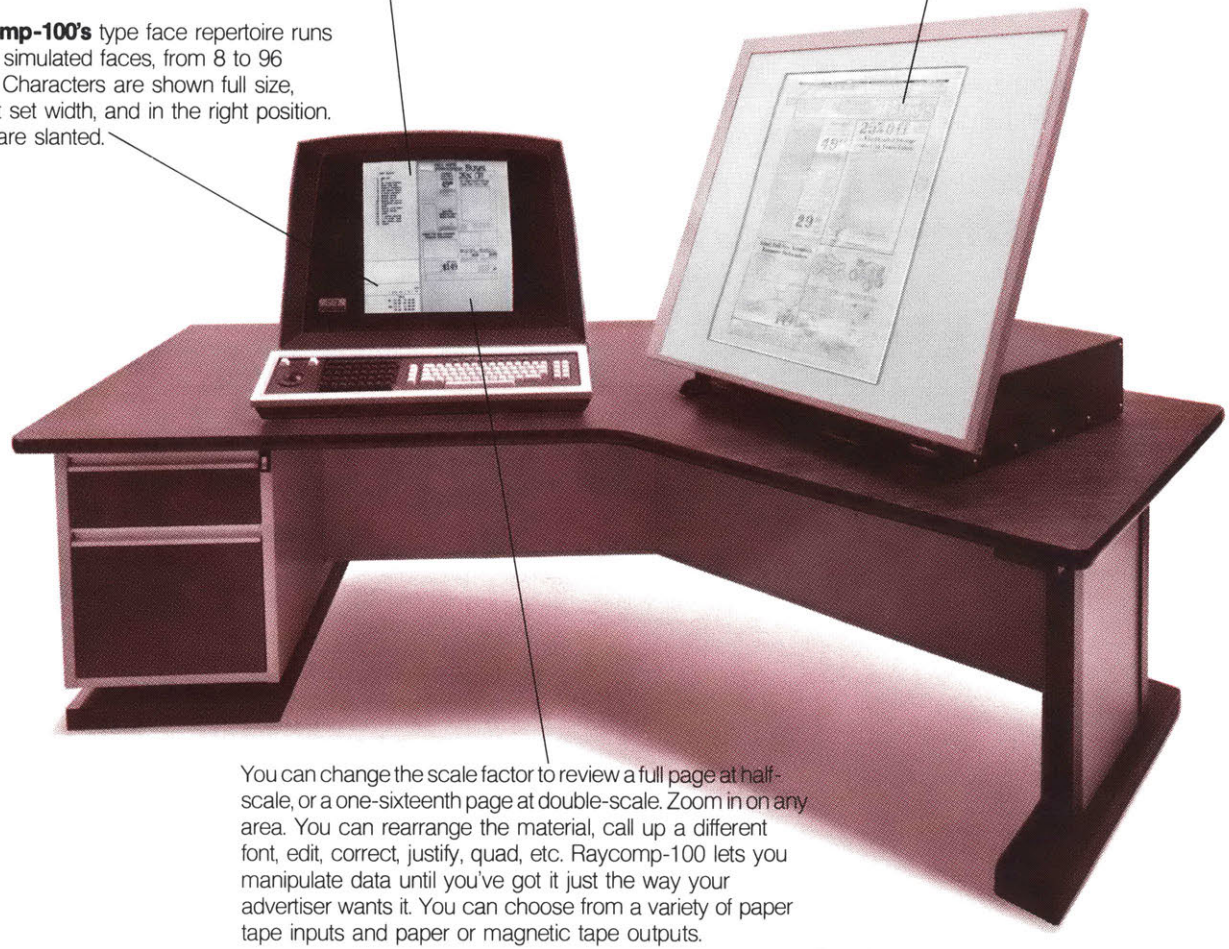
Figure 3-2



**Raycomp-100** handles more data — and handles it faster than any other system. The 200-square-inch screen is almost three times as big as other units. The display can handle up to 24,000 characters at a time, and you can't overload it. The built-in computer can recall more than 100 advertisements.

**Raycomp-100's** type face repertoire runs to 255 simulated faces, from 8 to 96 points. Characters are shown full size, correct set width, and in the right position. Italics are slanted.

**Raycomp-100** allows more creative layouts, too. You can create any shape needed — squares, rectangles, circles, lines, set copy inside, flow copy around outside, or use the digitizer to create unprogrammed original shapes.



You can change the scale factor to review a full page at half-scale, or a one-sixteenth page at double-scale. Zoom in on any area. You can rearrange the material, call up a different font, edit, correct, justify, quad, etc. Raycomp-100 lets you manipulate data until you've got it just the way your advertiser wants it. You can choose from a variety of paper tape inputs and paper or magnetic tape outputs.

Figure 3-3

# CHAPTER 4

## FUTURE TECHNOLOGY

### Personalized Newspaper

Will the newspaper in its present form disappear? Will home printers print personalized newspapers, thus achieving the ultimate in zoning and eliminating current forms of physical distribution? In forecasting any technological change it is necessary to consider both the economic and the social implications of expected innovations. On the economic side, the cost of private printers for personalized newspapers is currently prohibitive. It may be argued that technology could overcome this impediment; the time span of this speculated eventuality however, stretches beyond the future horizon of this chapter. The social acceptance of this new type of media, on the other hand, is a far more complex and doubtful matter and should be studied carefully. Take for example the recent attempt to introduce Point of Sale price sensing devides in supermarkets. This innovation is very viable economically but is having difficulty being accepted by consumers who expect to see the price printed on every item. Before speculating about radical change, then, it is necessary to study closely the phenomenon in question.

The acceptance of conventional newspapers by almost every household, despite the availability of competing news media (see competition in Chapter 5) may be traced to the following reasons: 1) Newspaper reading, similar to most other reading, is a personal "intimate" experience. It is particularly adaptable to a person's rate of sensory

absorption and to his/her time constraints. 2) Newspapers are laid out for both reading and browsing. Choosing a piece out of the cluttered newspaper size page is comparable to retrieving an item from a heavily-stocked department store. The columns arrangement (aisles?) helps the eye travel vertically faster. 3) Community affairs are covered extensively. The reader is thus assured (especially if there is only one community daily newspaper) of a common link with the whole community. The economic motivation for the establishment of a single newspaper per community may well be bolstered by this drive to expedite community communication. 4) Newspapers have become an integral part of most people's daily routine. A breakfast table in a commercial which strives to harmonize the new cereal or whatever with the familiar background, rarely fails to include a morning newspaper. This status of newspapers is very ironic considering their ever changing content, but explains their strength. By their familiar format, they help mitigate the fact that they are the daily herald of "future shock".

The gist of the above analysis is that although personalized newspapers may appear more and more in the future; they will hardly eliminate the needs served by regular newspapers today, acting as compliments rather than substitutes.

Distributed - Processing and Data-Bases

Computers were initially used, in the newspaper production process, as a tool for hyphenation and justification; material went in one end and immediately out the other end. There was no data base.

But as software became more sophisticated, stories took residence in a computer long enough for corrections to be made. This was the start of the data base. It now includes all news, classified, display and, for some, scheduling information, paid-in-advance customers, etc. In the future, these data will reside long after they outputed on a certain day's paper for immediate retrieval by an investigative reporter. Moreover, in the future, newspaper production techniques will transcend the current simplification of hierarchical step-wise approach whereby ads are laid out in advance and imposed as a constraint on the subsequent stages of Ad composition and News-hole filling. The future technique of "full page composition" will enable a global rather than a local optimization of the use of pages.

Concurrently, the input streams will benefit from computerization at their point of entry: the reporter will have a personal computer of his own. It will have memory adequate for all the story creation and editing facilities he will need, along with a terminal on which he can write his story and interact with the headquarters system.

All the improvements discussed above will be made possible by the use of the new technology of distributed processing. This technology is based on the advent of the highly cost-effective mini-computer, combined with the newest communication developments. Each relatively independent process could be managed rather effectively by a mini-computer. The capability of intercommunication between those mini-computers will support the integration of the various processes into a whole that is greater than the sum of the parts.

Distributed processing makes a modular, stepwise, development possible. Each of the various processes can be computerized independently as is done currently. The processes would then be integrated one by one into the distributed system forming, eventually, a pipe line with the news editor and ad editor sitting at their terminals at one end and the page plate coming out of the other end.

Sources of Future Technology

The technology for innovations can originate either in firms specifically established to serve newspaper needs (e.g. CAMEX, ECRM, HARRIS) or general high technology firms which spawn small division for that purpose (e.g. Graphic Arts of Digital, MGD of Rockwell International and Equipment Division of Raytheon).

So far the diffusion of the technology has been stimulated by both users and suppliers. On the supplier side, the rate of diffusion has been strongly affected by the particular marketing strategy employed by the various firms. The user side has also initiated programs to stimulate technological developments. For example, several leading newspapers have established the Newspaper Systems Development Group (NSDG) which attempts to develop, with IBM and other companies, a whole system approach to newspaper computerization. (It should be noted that this attempt at system integration from the onset has been suffering from serious difficulties.)

Because a distinct and lucrative market has been rapidly forming around computer tedhnology for newspapers, there is no reason to expect that the current trend of technological innovation will peter out.

Furthermore, any major breakthrough in the computer industry in general, could in the future, as in the past, be easily transferable to newspaper technology. Therefore, one can reasonably expect an acceleration in the rate of technological innovation and diffusion in the future.

# CHAPTER 5

# ECONOMIC EFFECTS

## Introduction

Newspaper publishing is the tenth largest industry in the economy in terms of sales. The total revenues of the industry amounted to $10.192 billion dollars in 1974. Furthermore, newspaper publishing is the fifth largest employer in the economy, with a labor force of 383,500 in 1974. Altogether, there are 1968 daily newspapers, with a total average circulation of 61.9 million copies, and 641 Sunday papers with a total circulation of 51.7 million copies (both 1974 figures). Advertising revenues comprise the larger share of a newspapers' income (about 80%). This income comes from national advertising (15%) local retail advertising (57%) and local classified ads (28%) (the above breakdown refers to 1974).[1]

The industry's operating costs is comprised of two major elements: raw materials and labor. The first, raw materials, includes newsprint and - much less significant - ink. Newsprint prices have increased sharply (40%) in the period 1973-1975, so that raw materials now account for up to 37% of a newspaper's costs. Note, however, that this cost is variable (11-37%), depending on the circulation of the paper and the number of pages. The two factors are highly correlated. Labor costs amount to 40% of total operating costs.

The impact of computers on the revenue side is the topic of this chapter. Computers' impact on the cost side is predominantly on labor's share and is discussed in Chapter 6. It should be noted parenthetically

that computerization can affect somewhat raw material cost by allowing a quick alteration of sheet size and format in response to changing raw material costs.[2] Despite trends in newspaper consolidation, both circulation and advertising have steadily increased over the years, thus increasing both revenues and employment of the newspaper industry. Figures 5-1 and 5-2 display this growth graphically.

Competition with other Newspapers

There is little competition between daily newspapers on local scale. This is because most newspapers (Boston and few other cities excluded) have monopolies in their respective areas. Recent demographic trends, however, have tended to unsettle this competitive advantage. The migration of population from the city to the suburbs has put major city newspapers in competition with smaller local suburban newspapers.[3] Some newspapers have dealt with this situation aggressively. The Los Angeles Times, for example, forestalled emergence of powerful suburban competitors through active promotion of local zoned edition since 1952. Other newspapers like the New York Times have been less enterprising in this area.

The key to the suburban migration problem lies in tailoring local satellite editions to each such district. It is in this area that the computer can enhance substantially the city newspapers' response to the challenge. If the deadline for incoming items is to be kept, a newspaper must resort to the use of computers.

Another problem related to the tight time frame is that of distri-

buting the newspaper to their points of sale. This time-consuming distribution process becomes prohibitive when considering a national or remote suburbs network. The technology of facsimile transmition combined with remote printers make such distribution possible. This technology is greatly enhanced by the use of computers.

There are, then, two major competitive strategies open to a newspaper facing the migration problem. The first is issuing multiple suburban editions. The second - and this is viable to only few large papers - is to go national. Both these strategies can be supported by the use of computers in organizing information and facsimile transmission.

Competition with other media

A newspaper can be seen to have two types of clients: readers and advertisers. It competes with other media for "readership" and for the advertiser's dollar. Although advertising is by far the larger source of income, it is clearly dependent on the size of "readership".

Comparative figures for media circulation are almost impossible to compile, because there is no common yardstick for comparison. The volume and share of advertising dollars by media are displayed in Figures 5-3 and 5-4. The division between national and local advertising is depicted in Figure 5-5. The remainder of this section presents the factors relating to the competition in circulation and each type of advertising.

Circulation The two major strategies mentioned above, tailoring local editions and going national, will also enhance the competitive ability

of the newspaper industry vis a vis other media. National newspapers will provide more detailed and written news and editorials thus competing better with television and national news magazines. (See Chapter 7 for limitation of TV editorials imposed by the equal time requirement). Radio has historically enhanced newspaper circulation (contrary to popular opinion).[4] It may be expected that it will enhance even more the more localized editions.

Computerization, then, is likely to increase newspaper circulation and as a result increase income from both newspaper sales and advertising. Note that price elasticity for newspapers is rather low as proven when recent price regulation was removed.[5] As a consequence, computerization can help newspapers increase their share of income coming from circulation.

National Advertising Clearly national newspaper would attract a larger share of national advertising through current regional and local newspaper ads. Since the newspapers would provide daily hard copy advertising, they may be expected to bite into TV and national magazine advertising share. (For breakdown of national advertising, 1970, refer to Figure 5-6).

Retail Advertising The locally tailored editions have the potential to attract local advertising beyond what is common today. It would then be a viable advertising outlet for local suburban stores, at reasonable price and effectiveness, hithento unavailable.

Inversely, the localized editions may enable a metropolitan retailer to identify the geographic distribution of his customers. This would be done by marking coupons according to local editions.

The computer can also aid in the design and editing of ads (see ad-composition in Chapter 3). This will raise the quality of newspaper ads and possibly their effectiveness and attractiveness to advertisers.

An added advantage of localized editions is that they compete more effectively with direct mail as an advertising medium, because they enable better focusing on taget groups.

Classified Advertising It is in the classified area that the computer can be most directly helpful to newpapers. The compilation, sorting, and editing of classified ads can be done almost exclusively by computer. Such computerized classified ads enable postponing the deadline for their submission to a few hours before publishing. Furthermore, the ads, as they appear in the newspaper, would be sorted by several keys (e.g. car make, year, color, etc.) and would be easier to use.

Timeliness is especially important in the real estate area, because of the influence of the weather on site inspection. Again, computers can help achieve this timeliness.

Investment

Clearly, the computerization of the newspaper industry, requires additional capital outlays for the new equipment, including computers and peripherals. This need not be a large one-shot effort. Rather, the computer could be phased-in slowly thus lightening the investment burden and facilitating the conversion to new methods of work. These new methods are required in order to reduce labor, increase output and improve quality, so that a competitive position of the newspaper would

not be hurt.

Examples of computer prices purchased by newspapers (circa 1973) are presented in Figure 5-7.[7] As the figure indicates, computer prices may run between several thousands and several hundreds of thousands of dollars, depending on the size of the newspaper and the number of applications for which the computer is used.

Investment trend during the 1960's indeed display sharp increases in capital expenditures: "Average expenditures for new plants and equipment per newspaper employee increased from $411 in 1963 to $742 in 1971. Total capital expenditures more than doubled while employment increased by 12 percent".[8]

The increase in investment obviously included investment in traditional equipment, such as printing press. There can be little doubt, however, that some of this investment is due to computerization of the newspaper industry. Figure 5-8 presents the computers used in the industry (1975).[9]

One of the major effects of the new capital outlay requirement is changes in business ownership within the newspaper industry.

It must be remembered that about 80% of the newspapers in the U.S. were singly privately owned. Two major trends occurred as the need for new capital arose in the 1960's: First, several newspaper companies went public. The sale of stock brought in the additional capital required for computerization. The second avenue for raising new capital has been the one of merger and acquisition. The latter phenomenon resulted in group ownership of newspapers, where one parent company

owns several newspapers in diverse areas. The largest groups are shown in Figure 5-9.[10]

The strategies of going public and of mergers are not unrelated. Public companies may swap stocks, a technique which renders mergers and acquisition less costly and thus more attractive to owners. The result then, has been one of larger goups of newspapers publicly owned.

Summary

Computerization impacts the three areas of costs, revenues and product quality. The revenue can potentially be increased by the extended ability to diversify the product, thus appealing to a larger readership which attracts greater advertising revenues. On the cost side, raw material expenses will remain relatively unaffected by computerization, but labor costs will be altered, (see Chapter 6).

In general, computerization in the short run will make newspapers more competitive for advertising revenues with the other media. It is possible,however, that such a competitive edge will be diminished in the long run by similar advances in other media (e.g. Cable TV) and by increased competition (new entries) within the newspaper industry itself.

On the investment side, computerization so far has required outlays ranging from under $50,000 to over $3,000,000 (New York Times), depending on size and technology absorption policy of the paper. In most papers, however, the payback period is relatively short (approximately two years) making the investment highly desireable. Aside from labor problems, the main economic factors impeding the absorption of computerized technology is the low salvage value and extended depreciation

period of existing capital equipment.

The size of the capital outlay can be reduced by adopting a step-by-step modular absorption of the technology (made increasingly feasible by distributed processing; see Chapter 4). However, since computerization requires a relatively large investment under any policy, many newspapers have sought new sources of capital by going public. This trend can be expected to continue in the next decade.

FIGURE 5-1

NUMBER OF NEWSPAPERS

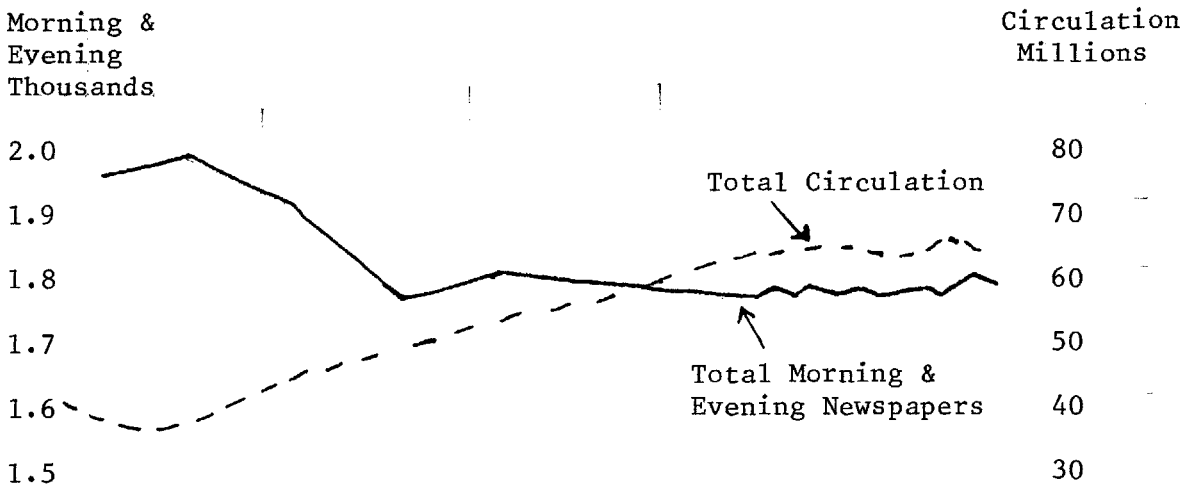



FIGURE 5-2

NUMBER OF NEWSPAPERS

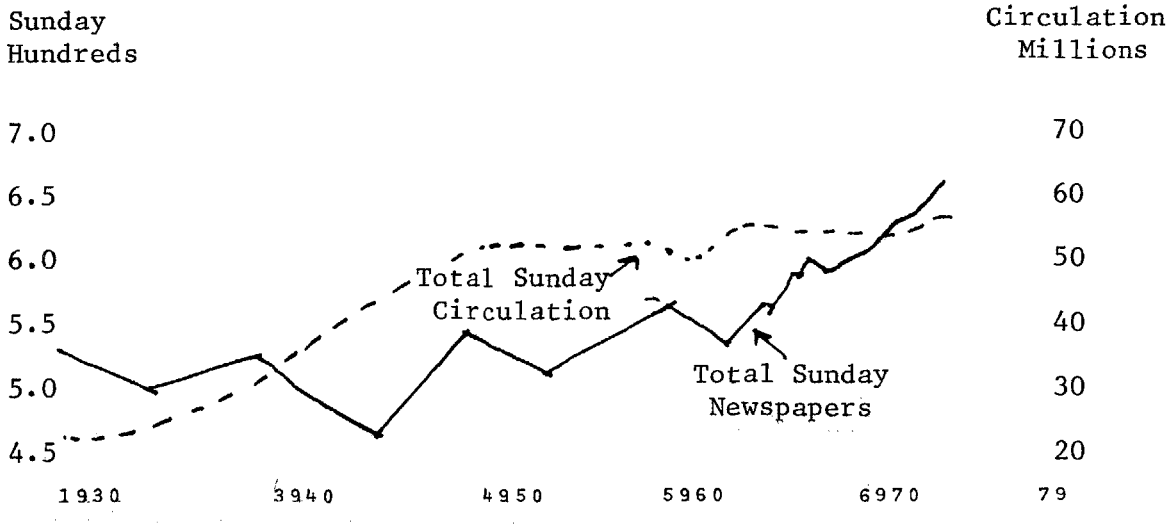


FIGURE 5-3

Advertising Volume by Media (in millions of dollars)

| Media | 1972 | 1973 | 1974 | % Change 1973-74 |
|---|---|---|---|---|
| Newspaper | 7,008 | 7,595 | 8,001 | +5.3 |
| National | 1,103 | 1,111 | 1,194 | +7.5 |
| Local | 5,905 | 6,484 | 6,807 | +5.0 |
| Television | 4,091 | 4,460 | 4,851 | +8.8 |
| Network | 1,804 | 1,968 | 2,145 | +9.0 |
| Spot | 1,318 | 1,377 | 1,495 | +8.6 |
| Local | 969 | 1,115 | 1,211 | +8.6 |
| Direct Mail | 3,420 | 3,698 | 3,986 | +7.8 |
| General & Farm Mag. | 1,499 | 1,513 | 1,576 | +4.2 |
| Radio | 1,612 | 1,723 | 1,835 | +6.5 |
| Business Papers | 781 | 865 | 900 | +4.0 |
| Outdoor | 292 | 308 | 345 | +12.0 |
| Miscellaneous | 4,597 | 4,958 | 5,286 | +6.6 |
| All Media | 23,300 | 25,120 | 26,780 | +6.6 |

Source S&P

FIGURE 5-4

Advertising media: Shares of Market(in percent)

| Media | 1945 | 1955 | 1965 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|---|---|
| Newspapers | 32.4 | 33.6 | 29.0 | 29.2 | 29.9 | 30.1 | 30.2 | 29.9 |
| Television | ... | 11.3 | 16.5 | 18.4 | 17.0 | 17.6 | 17.8 | 18.1 |
| Radio | 14.9 | 6.0 | 6.0 | 6.7 | 7.0 | 6.9 | 6.9 | 6.9 |
| Magazines | 12.1 | 7.6 | 7.6 | 6.6 | 6.6 | 6.2 | 5.8 | 5.6 |
| All Other | 40.6 | 41.5 | 40.9 | 39.1 | 39.5 | 39.2 | 39.3 | 39.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| National | 61.3 | 58.8 | 61.2 | 58.1 | 56.8 | 55.9 | 54.8 | 55.1 |
| Local | 38.7 | 41.2 | 38.8 | 41.9 | 43.2 | 44.1 | 45.2 | 44.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source S&P

FIGURE 5-5

SHARE OF NATIONAL & LOCAL ADVERTISING (in percent) BY MEDIA

| | % of total advertising | | | % of own advertising | |
|---|---|---|---|---|---|
| Media | Total | National | Local | National | Local |
| Newspapers | 29.9 | 13.5 | 25.5 | 15 | 85 |
| Television | 18.1 | 13.5 | 4.5 | 75 | 25 |
| Radio | 6.9 | 1.8 | 5.1 | 26 | 74 |
| Magazines | 5.6 | - | - | | |
| All other | 39.5 | - | - | | |

Source S&P

FIGURE 5-6

Costs of new equipment at selected survey plants

| Plant | Type of equipment | Cost |
|---|---|---|
| Large Metropolitan daily newspaper | 2 general-purpose computers | $5,000 rental per month each |
| | 2 second-generation phototypesetters | $39,000 each |
| Small local daily newspaper | Web-offset press | $191,000 |
| | Camera and Platemaking equipment for the press | $ 9,300 |
| | Automatic film processing system | $ 15,000 |
| Small local daily newspaper | Small special- purpose computer | $ 32,500 |
| | Small special-purpose computer (back-up unit) | $ 22,000 |
| | Mailroom counter-stacker and conveyor system | $ 65,000 |

Source "Outlook ..."

FIGURE 5-7

NATIONAL ADVERTISING INVESTMENT IN NEWSPAPERS

1970

| Classification | 1970 |
|---|---|
| Alcoholic Beverages | $65,412,000 |
| Amusements | 3,578,000 |
| Automotive | 278,774,000 |
| Educational | 5,825,000 |
| Farm & Garden | 13,146,000 |
| Foods | 111,688,000 |
| Hotel & Resorts | 33,765,000 |
| Household Furnishings | 6,668,000 |
| Household Supplies | 16,282,000 |
| Housing Equipment | 14,355,000 |
| Industrial | 16,013,000 |
| Insurance | 22,945,000 |
| Jewelry & Silverware | 3,255,000 |
| Medical | 16,183,000 |
| Miscellaneous | 65,810,000 |
| Professional & Service | 5,750,000 |
| Public Utilities | 25,343,000 |
| Publishing & Media | 64,901,000 |
| Radio, TV & Phonographs | 18,023,000 |
| Sporting Goods, Cameras & Pho. Supplies | 10,236,000 |
| Tobacco | 19,040,000 |
| Toilet Requisites | 19,592,000 |
| Transportation | 91,659,000 |
| Wearing Apparel | 22,161,000 |
| Grand Total | $948,404,000 |

FIGURE 5-8

Number of Computers (for pre-press and general purposes) in Plants

| Manufacturer | Letterpress Sterotype | | Letterpress Direct | | Offset | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units |
| Autologic | 1 | 2 | | | | | 1 | 2 |
| Burroughs | 1 | 2 | 1 | 3 | 1 | 1 | 3 | 6 |
| Compugraphic | 22 | 29 | 18 | 22 | 26 | 31 | 66 | 82 |
| Computer Automation | | | | | 1 | 1 | 1 | 1 |
| Computer Hardware | 1 | 2 | 5 | 11 | 1 | 2 | 7 | 15 |
| Computype | | | 1 | 1 | 1 | 1 | 2 | 2 |
| Control Data | | | | | 1 | 1 | 1 | 1 |
| 3300 | | | 5 | 6 | 1 | 2 | 6 | 8 |
| 8090 | 1 | 2 | | | | | 1 | 2 |
| Digital Equipment | 1 | 2 | | | 3 | 7 | 4 | 9 |
| PDP8 | 8 | 16 | 21 | 25 | 14 | 15 | 43 | 56 |
| PDP8E | 18 | 33 | 47 | 77 | 22 | 37 | 87 | 147 |
| PDP8I | 15 | 19 | 15 | 16 | 10 | 12 | 40 | 47 |
| PDP8L | 1 | 1 | 3 | 3 | 6 | 7 | 10 | 11 |
| PDP8M | | | 2 | 3 | 1 | 1 | 3 | 4 |
| PDP8S | | | | | 1 | 2 | 1 | 2 |
| PDP10-44 | | | 1 | 1 | 6 | 6 | 7 | 7 |
| PDP11 | 2 | 8 | 4 | 8 | | | 6 | 16 |
| PDP11-05 | 4 | 21 | 2 | 2 | 6 | 9 | 12 | 32 |
| PDP11-15 | | | 5 | 8 | 2 | 3 | 7 | 11 |
| PDP11-30 | 1 | 3 | | | | | 1 | 3 |
| PDP11-35 | 1 | 3 | 4 | 7 | 5 | 7 | 10 | 17 |

FIGURE 5-8 (cont.)

| Manufacturer | Letterpress Sterotype | | Letterpress Direct | | Offset | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units |
| PDP11-40 | | | 3 | 6 | 3 | 6 | 6 | 12 |
| PDP11-45 | 4 | 9 | 2 | 4 | 5 | 9 | 11 | 22 |
| 8000 | | | 5 | 7 | 2 | 2 | 7 | 9 |
| Digital Scientific Meta4 | | | 1 | 2 | | | 1 | 2 |
| Fairchild | | | | | 3 | 9 | 3 | 9 |
| 230 | 1 | 1 | | | | | 1 | 1 |
| 230B | | | | | | | | |
| General Automation | 3 | 6 | | | 1 | 1 | 4 | 7 |
| GA1830 | 16 | 31 | 15 | 27 | 3 | 4 | 34 | 62 |
| GRI Computer Corp. | 5 | 11 | 10 | 18 | 9 | 14 | 24 | 43 |
| Harris | 4 | 8 | 4 | 6 | 3 | 5 | 11 | 19 |
| Hewlitt Packard | 2 | 5 | | | 1 | 3 | 3 | 8 |
| Honeywell | 4 | 6 | 2 | 4 | | | 6 | 10 |
| Interdata | 1 | 7 | | | | | 1 | 7 |
| IBM | 1 | 1 | 2 | 3 | 3 | 7 | 6 | 11 |
| 360 | | | 1 | 1 | 2 | 2 | 3 | 3 |
| 360-20 | 2 | 2 | | | | | 2 | 2 |
| 360-30 | 1 | 1 | | | | | 1 | 1 |
| 360-40 | 1 | 3 | 1 | 1 | | | 2 | 4 |
| 370 | 2 | 3 | 2 | 2 | | | 4 | 5 |
| 370-30 | 1 | 1 | | | | | 1 | 1 |
| 370-45 | 1 | 1 | | | | | 1 | 1 |
| 370-115 | 1 | 1 | | | | | 1 | 1 |
| 370-125 | 2 | 3 | 1 | 1 | | | 3 | 4 |
| 370-135 | 2 | 2 | 1 | 1 | 1 | 3 | 4 | 6 |

FIGURE 5-8 (cont)

| Manufacturer | Letterpress Sterotype | | Letterpress Direct | | Offset | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units | No. of Plants | No. of Units |
| 370-145 | 4 | 6 | 1 | 1 | 1 | 2 | 6 | 9 |
| 1130 | 30 | 51 | 34 | 47 | 20 | 27 | 84 | 125 |
| 1131 | 2 | 4 | 2 | 3 | | | 4 | 7 |
| 1800 | | | 1 | 2 | 1 | 1 | 2 | 3 |
| Sys-3 | 3 | 3 | 6 | 6 | 1 | 1 | 10 | 10 |
| Sys-7 | 4 | 6 | 5 | 7 | 1 | 1 | 10 | 14 |
| Sys-3-10 | 1 | 1 | 1 | 1 | | | 2 | 2 |
| Mega Data | | | 1 | 2 | | | 1 | 2 |
| NCR | 1 | 2 | 2 | 2 | | | 3 | 4 |
| Prime Computer | 1 | 5 | 2 | 3 | 1 | 2 | 4 | 10 |
| RCA | 1 | 1 | | | | | 1 | 1 |
| 70-35 | | | | | 1 | 1 | 1 | 1 |
| 301 | | | | | 2 | 3 | 2 | 3 |
| Shaffstall | | | 1 | 1 | | | 1 | 1 |
| System Engineering Sel | | | 1 | 4 | | | 1 | 4 |
| Texas Instruments | | | 2 | 5 | 1 | 1 | 3 | 6 |
| Univac | 5 | 7 | 2 | 3 | 1 | 3 | 8 | 13 |
| Varian | 1 | 2 | 1 | 2 | 1 | 1 | 3 | 5 |
| Unidentified | 2 | 7 | 8 | 12 | 1 | 1 | 11 | 20 |
| Total Units | | 340 | | 377 | | 254 | | 971 |

Source "specification..."

FIGURE 5-9
NEWSPAPER GROUPS

| Group | No. of papers |
|---|---|
| Gannett Company, Inc. | 54 |
| Thomson Newspapers | 51 |
| Knight Ridder Newspapers | 37 |
| Scripps League | 35 |
| Donrey Media | 30 |
| Freedom Newspapers | 25 |
| Newhouse Newspapers | 25 |
| Harte-Hanks Newspapers, Inc. | 19 |
| Scripps Howard | 19 |
| Worrell Newspapers | 18 |

Source: Editor and Publisher Yearbook, 1975

# CHAPTER 6

## LABOR EFFECTS

Technical advances are challenging the basic structure of the labor force in the newspaper industry. The introduction of computerization, in particular, is affecting nearly all of the pre-press functions and will possibly alter delivery modes as well in the future. The areas impacted include total size of labor force, distribution of skills, union structure and jurisdiction, and labor management relations in general. The response to these changes involves policy issues such as labor displacement and restraining, rate of adoption of new technologies, and changing bargaining patterns. The revolutionary impact of the new technologies is increasingly being recognized as evidenced in the strikes and new contract provisions on this issue.

### Fragmentation

The dynamic nature of the newspaper industry, where a new product is delivered daily (and sometimes, at the metropolitan newspapers, even two to seven times a day) is handled by a highly organized labor force. This organization is extensively structured for several reasons.

First, it had ample time to evolve; the newspaper industry is selling the same product for over two centuries. In addition, Newspaper Production is a fairly complex process. A great many input and decision variables have to be managed simultaneously in a short span of time (e.g. decisions as to which storeis to print, choice of type, style, and size out of hundreds available fonts ). To cope with this complexity,

many trades and skills had to be brought together; consequently, an intricate hierarchical labor structure developed in the newspaper industry.

As in many other industries, the chief factors affecting unionization is location, ownership patterns, size and presence of related industries which are unionized. The degree of unionization is not uniformly distributed in the newspaper industry. Although few newspapers have no unions, most papers have some union representation. This may vary from as high as seventeen unions to a single union.[1]

Although the newspaper industry is not more heavily unionized than many other industries, its union structure and work force in general is peculiar in its excessive fragmentation. This fragmentation into smaller specialized unions and sub-unions is a product of both historical development and the traditional production mode of the printing industry.

The extent of fragmentation is illustrated in the following table which lists different unions and their jurisdiction in one metropolitan newspaper (during 1971):

| Union | Responsibility |
|---|---|
| American Newspaper Guild | News gathering, selecting and editing |
| International Typographical Union (ITU) | Textual material transformation to print image |
| Lithographers and Photo-engravers International Union (LPIU) | Pictorial material transformation to print image |
| Sterotypers Union | Duplicate plates (sterotypes) production |
| Paperhandler's Union | Web rolls feeding |
| Pressmen's Union | |
| Web Printing | Press running |
| Press Wipers | Press cleaning |

| Union (cont.) | Responsibility (cont.) |
|---|---|
| Mailers' Union | Newspaper bundling |
| Drivers' Union | Newspaper delivery |
| Mechanics' Union | Machinery maintenance |
| Electrical Union | Electrical maintenance |
| Painters' Union | Surface painting |
| Building Cleaning Union | Office cleaning |
| Operating Engineers Union | |
| Eleavator Operators | Manual elevators running |
| Carpenters | Carpentry |
| Janitors Union | Washroom cleaning |
| Building Cleaning Union | Building cleaning |

This complicated structure has obvious drawbacks for embodied technological advance; absorption of new technology is much more speedily accomplished when management can negotiate with a single union. Moreover, there are frequent inter-union disputes over jurisdiction which compound the difficulties. The break-up of the labor force along trade lines has been completely superseded by technological change. In a sudden burst of advance, technology has rendered the traditionsl labor divisions patently anachronistic and outmoded. Moreover, the lack of coordination among the unions prevented them until recently from recognizing the sweep of the trend. It is now however generally agreed upon by most union leaders and management that the character of the industry will undergo fundamental change in the near future, and that the share and mix of labor will be radically altered.

## Economic Rationale

The economic rationale for adopting new technology is partly based

on the desire of newspaper management and owners to reduce the share of labor cost in the production process (they run as high as 40% of total operating costs).[2] The newspaper industry in general has been plagued by inability to offset the rising labor costs with proportionate increase in revenues.

New technologies, some of it not directly related to computers, have helped curb this trend. From 1954 to 1972, production workers, as a percentage of total employment, had declined from 52.9 to 48.7% The bulk (over 50%) of production labor costs have been concentrated in the composing room.[3] Consequently, it is not surprising that this area has been one of the first to adopt computerization in an effort to streamline labor costs. Two examples will illustrate this point:

1. The Baltimore Sun experience with the Harris 2500 system: Baltimore has projected at attrition rate of 7% of the composing room work force (or approximately 30 people) per year. At present wage rates and fringe benefits, each employee costs the Sunpapers, approximately $20,000 per year. Even this modest attrition rate, therefore, would represent savings of $600 ,000 for the first year, $1,200,000 the second year, and $1,800,000 the third year, enough to pay off the $3 million investment about 2/3 of the way through the third year. Moreover, in the second and third quarters of 1974, Sunpapers was averaging between 2,100 and 2,400 hours per week in overtime (at $10 per hour) which have been eliminated.
2. The Boston Globe: Since the start of computerization of its composing room, the Globe has reduced its staff from 500 (three

shifts, six days a week) to under 410 with another 25 soon to be retired. Based on $20,000 a year per employee (including benefits, unemployment funds, etc.), the investment - $400,000 for the computer, $400,000 for typesetters - paid for itself after the first year.[5]

Despite the reduction in labor force, however, payroll costs for the newspaper industry had remained level due to annual wage hikes of 5 to 6 percent.[6]

It is clear that in the long run the economic incentive to computerize is sufficiently persuasive to overcome the many obstacles currently pitted against change.

Computer Impact on Employment and Skill

A statement by Elmer Brown, former president of the ITU - the oldest and most powerful newspaper union - most emphatically expressed the long term trend of technological change in the industry. "It is inevitable that there would be electronic transmission of all news, probably first into satellite plants, then into neighborhood centers and finally into the homes".[7]

The technological potential for such a development exists. It is possible to speculate that in the future, the dissemination of news (currently segmented into various media) will be an integrated computerized process requiring labor inputs mainly from reporters and editors. It is not clear however that total labor requirements will necessarily be reduced; automation under certain conditions can maintain or even increase the size of the labor force, e.g. if total demand is increased.[8]

The immediate effect of computerization has been mixed. On the one hand, as shown in the examples above, manpower requirements were reduced. On the other hand, in some newspapers this trend was more than offset by the creation of new jobs.

Figure 6-1 is taken from a Bureau of Labor Statistics Report.[9] Based on case studies, it provides an assessment of which jobs will be eliminated, modified and added. Essentially, the occupation skills most affected by displacement will be typesetters and sterotypers. The new jobs created will revolve around computer related skills such as programming and system analysis. Compositors and editors will have to undergo retraining in man-machine communication, but their basic function will be preserved.

In the long run, newspapers will probably divert the bulk of their manpower to more extensive reporting as more and more tasks are automated. This was the case in the AP Wire Service, where more emphasis was put into news gathering as distribution became automated.[10] (The possibility that only a computer will stand between the reporter and the printed copy has far reaching content and responsibility implications.)

## Labor-Management Balance of Power

Traditionally any potential conflict between labor and management in the newspaper industry was overshadowed by the union, especially by the ITU, that could bring the newspaper production to a halt. (One should hasten to add though, that smaller, family run newspapers generally operate in a congenial atmosphere and very rarely encounter

serious conflicts.) This threat put the union in a particularly advantageous bargaining position because of the convergence of three factors peculiar to the newspaper industry:

1) Management could not improve its stance by inventory build up - a most commonly hedging technique employed in manufacturing industries.

2) Management's threat to shift production to another geographical location - again a common management technique - would have been an empty threat because conventional distribution network virtually pinned down the plant to the community area.

3) Switch of advertisers and public to alternate media during a strike is potentially irreversible.

Pre-press computerization dramatically shifts the balance of power in favor of management in several ways.

The constraint of physical proximity of the composing room to the rest of the operation has been relaxed with the advent of electronic transmission of page image (the facsimile transmission is greatly benefited by computerization of the composing room).[11] This was demonstrated as early as 1963 when the Wall Street Journal transferred its New York composing room to Chicapee, Mass. The new degree of freedom regarding site independence of the various production stages is also exhibited in the recent announcement by the New York Times to move a satellite printing plant to New Jersey on grounds of labor and market considerations.[12] More recently during the Washington Post strike it is alleged that the Miami Herald secretly printed 70% of the electron-

ically transmitted paper and flew it overnight to Washington.[13] The current trend of newspaper mergers can only enhance the likelihood of future use of such techniques under strike conditions. To counteract such tactics, the unions are considering the installment of a common nation-wide expiration date[14] (a pattern found in other industries and most recently exercised by the rubber workers). A common contract expiration date for the various unions existing within a single newspaper - a first step in the same direction - was granted to the unions in the 1963 settlement that ended the famous 114 day newspaper strike in New York.[15]

Undoubtedly, computerization weakens the union position by eliminating many critical production steps that were previously union-controlled. The trend bodes ill for the present unions whose very survival is at stake.

In the longer run, however, it is probable that the critical links introduced by the computerization would be controlled by new white-collar unions which will be created, thus tilting back the balance of power. As a rule, the hazard of critical links in any network is mitigated by building in redundancy. A back up system, while generally an adequate technical solution will not guarantee management control because of the simple possibility that it too will be controlled by the same union or a coalition of unions. This trend towards one big union is in fact being seriously discussed in the industry as the only viable union response to technological change. The Newspaper Guild and the ITU are talking of merger at some time in the future. The ITU

has also had talks with the pressmen's union toward the same end .[16]

Current Settlement Trends

While the future realignment of the surviving and newly arrived trades remains to be seen, the pattern of current settlements reflects a simple reality: The unions are scrambling to salvage what they can while they can.

Basically, there is an agreement to a policy of phasing out. Jobs to be eliminated will disappear by attrition, which will be hastened by early retirement plans. This pattern was already laid down before the famous New York Times contract of 1974. (For example, the San Francisco Newspaper Printing Corporation which prints the San Francisco Chronical and the San Francisco Examiner, guaranteed in 1971 a life time job to 443 printers, or 94% of the working members).[17] However, the New York Times agreement crystalizes the pattern as a national standard. This agreement has been widely regarded as heralding the demise of the ITU in its present form. As H.A. Raskin commented in the New York Times after the signing: "...if the current contract marks a full turn toward nationality in bargaining, it also signals a slow slide into oblivion by the printers' union, now virtually doomed by its acceptance of the reality that automation is indispensable to newspaper survival".[18]

One obvious recourse to combat skill obsolescence is job retraining. The ITU has set up a retraining center in Colorado offering such courses as computer programming.[19] However, the industry's management and labor leadership in general has not responded with a retraining effort on a

massive scale. Such an effort is much more difficult in an industry as fragmented in both management and labor as the newspaper industry is.

## Summary

The labor structure of the newspaper industry is the area most strongly impacted by computerization. The economic incentive to computerize is clear. By introducing the computer into the composing room, roughly a fifth of labor force can be currently reduced in the larger newspapers. The labor displacement translates to a payback period which seldom exceeds two years.

The skill requirements of the computerized newspaper's labor force is dramatically altered. Since most of the old skills are rapidly becoming obsolete and since there is an abundant market for the new skills, newspapers have found it advantageous to adopt a policy of gradual attrition with the unions.

Fragmentation, which served well the newspaper unions' bargaining in the past (at least the few which could choke the production process in their respective domains), is now a serious handicap for the unions. The unions consequently are attempting to consolidate to meet the challenge of computerization.

FIGURE 6-1

TECHNOLOGICAL CHANGES IN THE COMPOSING ROOM AT SELECTED SURVEY PLANTS

| Firm | Innovation | Impact on employment | Impact on skills |
|---|---|---|---|
| Large metropolitan daily newspaper | Computers for justification and hyphenation, and photocomposition equipment used for setting advertising copy. | Production worker employment in 1962 (before installation of computers and presently used photocoposition machines) was 217. By 1968, it had increased to 268, a gain of 23.5%. Throughout the 6 year period, production workers accounted for 88-90% of total composing room employment<br><br>Jobs eliminated: By 1968, only four linecasting machine operators remained - men who were so close to retirement that they were not willing to be retrained. No new license machine operators were to be hired.<br><br>Jobs created: Computer programmer and console operator positions were filled by retraining company employees.<br><br>Systems analysts hired | There was a major skill shift from linecasting machine operators to keypunch operators. The keypunching staff consisted of production typists trained in computer codes and retrained linecasting machine operators.<br><br>Journeyman typesetters were retrained in photocomposition skills such as past makeup, monitoring tape-driven photocomposition, machines, and photographic film processing. |

FIGURE 6-1 (cont.)

| Firm | Innovation | Impact on Employment | Impact on Skills |
|---|---|---|---|
| | | from outside the company, as their skills are based on a considerable amount of computer experience. The company did not consider it practical to train its own people in these skills until the computers had been optional for some time. | |
| Small local daily newspaper (central newspaper in a chain of newspapers) | Computers for justification and hyphenation, leased telephone lines for data transmission between other newspapers in the chain photocomoposition equipment, optical scanning equipment. | The change to computerized photocomposition reduced employment by four people. At the time of the BLS visit, composing room employment (excluding computer personnel but including working supervisors) was 114.<br><br>Jobs created: Computer programer and console operator positions were filled by retraining employees from within the company. The programer staff was headed by a former linecasting machine operator.<br><br>Five systems analysts were hired at different times from outside the company. However, their lack of familiarity with the printing industry made them unsatisfactory for the newspaper's purposes. | Most of the teletypesetter (TTS) typists were retrained to type input copy for the optical scanner. Probably, little retraining was required, as the scanner has reduced skill and training requirements - copy that is typed for the scanner can be read by the typist. In contrast, the TTS machines produce punched paper tape, requiring the operators to learn TTS code then "read" the holes in the tape.<br><br>Typesetters were retrained for photocomposition machine monitoring, past makeup, and film processing operations. |

FIGURE 6-1 (cont.)

| Firm | Innovation | Impact on Employment | Impact on Skills |
|---|---|---|---|
| Large metropolitan daily newspaper | Computers for justification and hyphenation.<br><br>Second-generation tape-driven phototypesetter.<br><br>Third-generation CRT phototypsetter. | In 1958 there was approximately 280 full-time composing room employees (334, including part-time emplooyes). By 1968, full-time employees had increased to 312 (354, including part-time employees).<br><br>The number of makeup employees (both hot metal and photographic) increased for two reasons: more makeup work was necessary because of the increased amount of material being printed; and the newspaper was operating with shorter deadlines, allowing less time for correcting errors.<br><br>The number of composing room machinists increased due to an increase in the number of machines used, and to more intensive use of those machines. | Most of the composing room jobs have been modified by the introduction of the computerized phototypesetting system. Some had to be modified to make use of the new equipment; in addition, the newspaper's management decided to develop, among the composing room employees, a large resevoir of skills in handling various facets of the new technologies. A half-dozen training courses were set up and employees were given the opportunity to take an many of the courses as they wished. Out of 315 composing room employees, 275 received at least some training in new or modified job skills.<br><br>The phototypesetting machines, used for setting advertising copy, modified the jobs of "make-up" employees, who had previously set up advertisements and laid out newspaper page formats in three-dimensional metal type. Makeup employees (now classified as paste makeup)were retrained to use sheets of film and paper to produce the same result in two-dimensional form from which photographic negatives are made. Between 35 and 40 people were involved in past makeup work. |

FIGURE 6-1 (cont.)

| Firm | Innovation | Impact on Employment | Impact on Skills |
|---|---|---|---|
| | | Jobs created: Seventy people were hired or trained to punch tape for the computers (keypunch operators). Some were linecasting machine operators who were retrained in 1963-64, when the linecasting machines were converted to computer operation. By 1967 the phototypesetting machines had also been converted to computer operation, and about 80% of the phototypesetter operators decided to retrain for TTS operations, with the balance being retrained for makeup or paste makeup operations. Among the 70 keypunch operators, 40 were retrained printers (linecasting and phototypesetting machine operators) who had no previous experience with keyboards. Most of the remaining keypunch operators were hired for that specific ability, and needed no training. | Composing room machinists who maintained the phototypesetting machines received training in electronics. |

FIGURE 6-1 (cont.)

| Firm | Innovation | Impact on Employment | Impact on Skills |
|---|---|---|---|
| Large metropolitan daily newspaper - cont. | | The conversion to linecasting and phototypesetting machines that are operated entirely by computer-generated tape necessiated training a crew of machine monitors. While not a new occupation for the industry, it was new to this newspaper. Approximately 15 people were trained to monitor linecasting machines and five were trained to monitor phototypesetting machines.<br><br>Four programer positions and one systems analysts position were filled by retraining journeyman typesetters. The systems analyst was previously a composing room supervisor, and was trained first as a programer. | |
| Small local daily newspaper | Special purpose computer for justification | Work force increased from 61 men at the time the computers were installed to 66 at the time of the BLS visit. Five composing room employees were added because of the increased output of the computer: two for handling cor- | With the exception of employees who set type for advertising, all composing room employees are trained to punch tape (including learning to justify copy, although this skill is not often needed), operate the computers (which are relatively simple), and monitor automatic |

FIGURE 6-1 (cont.)

| Firm | Innovation | Impact on Employment | Impact on Skills |
|---|---|---|---|
| | | rections, one machine monitor, one on the collection bank, and one electrician. A retiring machinist was replaced by a machinist with training in electronics. | Computer justification has simplified keypunch work and has reduced typographical errors by 35% - the latter because keypunch operators, no longer required to do justifying, can pay more attention to keypunch accuracy. |



Source "Outlook..."

# CHAPTER 7

## LEGAL AND POLITICAL EFFECTS

### Regulatory Conflicts

"Congress shall make no law abridging the Freedom of Speech or of the Press." 1st Amendment.

The prevailing legal doctrines dealing with information dissemination in a democratic society have not kept pace with changing communication technology.

The fundamental approach was originally laid down in the first Amendment which defined "Freedom of the Press" as a corollary to"Free Speech". Formulated at an era when newspapers were the only available public media, and their production was a relatively simple affair, the 1st amendment addressed itself to two basic issues:

1. Ensuring freedom of the Press from government censorship or control.

2. Ensuring equal access to a public forum to all citizens.

Both of these points have by now entered the realm of sacred doctrine. A close examination of the realities of modern mass communications reveals inconsistencies in the application of this doctrine, and challenges its underlying assumption about the character and role of the press.

The first objective of the first amendment is clear enough. The American Press has been scrupulously shielded from government regulation for two centuries. In theory anyone can start his own newspaper; no license is required and no government regulation exists. Such has not been the fate of the electronic media, radio and television. There,

government regulation was seen as necessary nearly from the start precisely because of the desire to ensure equal access. The air waves were regarded as scarce public resources which had to be equitably appropriated among the citizenry and defended from monopolization. The federal regulatory commissions and the process of license renewal were set up to guarantee equal access. Thus the second objective of the first amendment superseded the first one. (In the case of radio, the legal implications were at first not fully appreciated because radio was initially thought as "entertainment" and not news; regulation was also deemed necessary to prevent cacophony on the air waves.)

Yet a curious paradox exists here. While the electronic media are on the verge of becoming more and more accessible to a greater and greater number of people, (with the advent of cable TV in particular) they are nevertheless subject to ceaseless regulation. Conversely, newspapers which are becoming less and less accessible, and which have been undergoing a steady process of monopolization, are free from such regulations. In 1973, there were 1,018 TV licenses, 7,284 radio lecenses, and approximately 1,800 daily newspapers. While most communities were served by one daily, 60% of the USA's TV homes (95% of the total) are served by 7 or more TV channels. As many analysts have noted, if the newspaper is less plentiful than the air waves, why should the printed page be excluded from the fairness doctrine?[1]

Part of the problem stems from a disregard for the changes in the character of the newspaper industry. The present day realities of newspaper publishing are far removed from the world of the simple "penny"

newspaper which anyone could publish in the "free marketplace of ideas" (a questionable assumption even in the early 19th century). Today anyone - anyone with a few million dollars to spare - can publish his own newspaper. As has been noted in Chapter 5, the start-up and operation of a modern newspaper involves vast investments in people, plants, machines, and increasingly sophisticated and expensive electronic system to tie all of these components together. Thus the free right of entry which is assumed in the First Amendment is contracted by an everpresent economic barrier to entry.

But this is only part of the picture. Today the information flow in a democratic society takes place through a complex system of merging technologies which in the case of newspapers has far outstripped the printing press.

Transmitters, telephones, computers, cables, teletypes, and facsimile copiers have created an awesome capability to communicate messages nearly instantaneously to vast numbers of people. Clearly, the first amendment needs a serious reevaluation if it continues to rely on an outdated printing press for its justification.[2]

For one thing, it is unclear today where one media ends and where another begins. Most newspapers, rely on the wire services, as does radio and TV. In addition, some newspapers are already using facsimile for transmission. If newspapers will eventually be transmitted electronically, should they not be regulated like other electronic media? Should they be thought of as another form of CATV or as newsprint media?

The crucial issue which will determine whether "newspaper trans-

mission" will be regulated in the future is an overall decision on which modes of delivery are scarce. Such a debate is now taking place between the major broadcast networks, the federal government, and the cablecasters. Its outcome will greatly influence the future of newspapers. For the moment, the FCC has disavowed any plans to regulate newspapers even if they are delivered to facsimile by satellite broadcast. This no doubt reflects the powerful sway of the sacrosanct tradition of "Freedom of the Press". But the technological advances may eventually force a reevaluation of the 1st amendment in the search for consistent application.

Cross Media Ownership

One of the current regulatory provisions is a barring of cross-media owners. Although this condition has been generally uphold, there have been several cases in which newspapers were permitted to purchase radio and TV stations outside their immediate districts, on the theory that in this way they are not posing a threat of local monopolization of the media. (The Boston Globe for example recently acquired a radio station in San Francisco.) But technological change challenges this assumption as well. As newsgatherings and dissemination is becoming increasingly a centralized and integrated operation, is it really safe to assume separation of influences by geographic separation? It is quite possible, for example, to envision a future cross-media network consisting of a newspaper in Boston, a radio station in San Francisco and a TV station in Dallas, all receiving "local" news from a central computerized data-

bank in Chicago.

Those arguing against multi-media ownership claim that a development such as the one outlined above would reduce the multiplicity of owners and hence hinder the free market place of ideas. Those arguing "for" would cite the same example and point out that the advantages of amalgamation would eventually flow to receivers (for example, computerized data banks and facsimiles would help bring more national news to the local level).

Political Power

The historical objective of regulation has been to ensure free access without content interference. In an unregulated newspaper industry such guarantees must be self-imposed. Although some newspapers have taken steps to ensure some diversity of viewpoints (e.g. Op-Ed pages), some serious critics of the press question whether such self restraint is possible.[3] They point to the fact that newspapers have emerged as potent political forces in their own right and that a new culture of journalism has emerged in the sixties calling for an active remolding of public opinion. Instead of informing, the public, the new journalists have become spokesmen for the public.

But, hand in hand with the growth in political powers, complain these critics, has come the decline in depth of coverage; flamboyant journalism has superseded deliberative journalism as the professional goal.

If both of these trends are true, they will probably be greatly

intensified by computerization. The political power of newspapers is based on the ownership structure of the media. The Editor Publisher has from the days of Benjamin Frnaklin been a powerful political force precisely because he was both the source and disseminator of news. It is not clear whether this pattern will be altered by computerization. If anything it may be reinforced, because fewer people will be involved in production and even fewer people will engage in editorial decisions. Political clout is also based on the capability to hold public official accountable for past promises. In this respect, computerized data retrieval allows a kind of "instant playback" to all reporters, not just the more enterprising and persistent ones. Thus it may be reasonable to expect a tighter control on factual discrepancies and a commensurate increase in caution in statements by political figures. This is also true of reporters who will not be able to pass the blame for errors in their stories onto the editors. *(Contined on page 88.)

Reporting Trends

Newspapers already are shifting to TV style spot reporting. For archive purposes, reporters in some newspapers are now instructed to write their stories in easily condensed abstracts. This goes counter to any attempt to capture depth and complexity and intensifies the tendency towards simplification. Indeed the prospect of televised newspaper editing (a possible development in the future where an editor would be electronically linked to a photographer on the scene) is an ominous one when viewed from this perspective. The camera

views things unselectively, not filtering the trivial from the important. It thus encourages an emotional reaction rather than reflective analysis which is more the domain of the printed word. The condensation of news stories and the adoption of televised technology may further push reporting towards adopting a TV style, thus substantially altering the character of the print media.

Finally, computerization may impact the local vs. national polarity that exists now in the US press. It has the potential to resolve the conflict between these two poles by facilitating both simultaneously. Thus it will enable New York Times to remain a paper of international stature but allow the printing of tailor made "local" "times" editions to the 5 boroughs of greater New York. Such an operation would have been unthinkable a few years ago, because the costs of producing separate editions would have been prohibitive. Computerized typesetting and editing and data storage may ensure the survival of the local press as more and more big city newspapers seek to expand into this market.

In similar fashion, and especially by the link up to facsimile copiers, coputerization could facilitate the growth in the U.S. of a truly national Press.

## Summary

The merging of communication technology has seriously put into question the prevailing doctrines regarding the dissemination of information. The newspaper industry which has been traditionally sheltered from government regulations is becoming, through computerization and

other technological innovations, similar to the broadcast industry and hence potentially subject to similar regulations. Computerization may enhance the political power of newspapers by providing them with data banks and the ability to compile and disseminate pertinent information on issues or people at a very rapid rate.

The style of newspaper reporting is already changing in response to the new technology, stressing abbreviated television style reporting which can be summarized and filed in convenient abstracts. This may imply a shift from the traditional emphasis of in-depth reporting in newspaper reporting. On the otherhand, such a trend is offset by the increased ability of reporters to conduct comprehensive research assited by the new data base.

---

(* Continued from page 86)

It is curious that in all of the current discussions of privacy and the political power of those organizations which compile huge data banks, the role of the newspaper (and the media in general) is seldom questioned. In fact the newspapers which are developing extensive data bases are as politically potent as any large organization, and probably more so by virtue of their ability to rapidly dispense, collected information.

# BIBLIOGRAPHY

## Chapter 2

1. Bagdikian, H. Ben, The Information Machines, Harper & Row, 1971.

2. Hutt Allen, The Changing Newspaper, 1971.

3. "Chemistry in the Economy", American Chemical Society, 1973.

## Chapter 3

1. Mansfield, Edwin, The economics of technological change, Norton, 1968.

2. Anderson, P.L., "ORC enters the practical stage", Datamation, December 1, 1971.

3. Kan, Hsin-Kuo, "Computer assisted display-ads layout for newspapers", MIT Report ESL-R-501, June 1973.

4. Elkin, Robert M., "An evaluation of computer assisted display-ads layout in an operating newspaper environment", Thesis, MIT, May 1974.

5. Polanski, Robert M. and Knudson, Donald K., "An experiment in computer selection of the news", MIT report ELS-R-460, September 1971.

6. Baker, F.T., "Chief programmer team management of production programming", IBM System Journal, Vol. 11, No. 1 1972.

7. Anderson, P.L., "Phototypesetting - a quiet revolution", Datamation, December 1, 1970.

8. Digital - Graphic Art, a company's brochure.

9. The Seybold Report, Vol. 5, No. 13 March 7, 1976.

10. The Seybold Report, Vol. 5, Vo. 15, April 6, 1976.

11. The Seybold Report, Vol. 4, No. 23, August 18, 1975.

12. White, George, "A presentation to the GCCA conference on interactive composition", January 21, 1976.

13. Knudson, Donald R., "Digital Enconding of newspaper graphic", MIT Report ESL-R-616, August 1975.

Chapter 4

1. R.I. Bulletin 1199 September 2, 1975, "Directions of Computer Applications". (ANPA Publication)

2. The Seybold Report, Vol. 5, No. 12, Feb. 23, 1976, "Area Composition".

3. The Seybold Report, Vol. 4, No. 18, May 26, 1975, "Preliminary Thoughts on Page Make-Up."

Chapter 5

1. Standard & Poor's Industry Surveys - Communications, October 9, 1975.

2. "The Shrinking Press", Newsweek, July 21, 1975.

3. New York Magazine, Vol. 9, No. 15, April 12, 1976.

4. Professor Ithiel Pool, MIT lecture.

5. Standard & Poor

6. Newspaper Advertising book, 1970.

7. "Outlook for Technology and Manpower in printing and publishing" U.S. Department of Labor BLS Bulletin, No. 1774, 1973.

8. "Outlook ..."

9. "Specification Data" - 1975, R.I. Bulletin of ANPA, 1976.

10. Editor and Publisher Yearbook, 1975.

Chapter 6

1. Bagdikian, Ben H. The Information Machines, Harper & Row, 1971.

2. Standard & Poor's Industry Surveys - Communication, October 9, 1975.

3. Editor & Publisher, April 12, 1975.

4. The Seybold Report, Vol. 5, No. 9, January 12, 1976.

5. Conversation with Mr. Robert J. Heyd - Systems Manager, The Boston Globe, April 1976.

6. "Union Wages and Hours: Printing Industry", U.S. Department of Labor, BLS Bulletin No. 1881, 1975.

7. Bagdikian

8. Mansfield, Edwin, The economics of technological change, Norton, 1968.

9. "Outlook for Technology and Manpower in Printing and Publishing", U.S. Department of Labor BLS, 1973 Bulletin No. 1774.

10. Conversation with Professor Donald E. Troxel, MIT, April 1976.

11. The Bulletin of Arthur D. Little, No. 504, 1973.

12. Editor & Publisher, January 25, 1975.

13. Conversation with ANPA/RI, April 1976.

14. Editor & Publisher, September 22, 1973.

15. Kebler, H. & C. Schlesinger, Union Printers and Controlled Automation, The Free Press, 1967.

16. Editor & Publisher, March 1, 1975.

17. Editor & Publisher, January 27, 1974.

18. The New York Times, July 29, 1974.

19. "Outlook ..."

Chapter 7

1. Press, Politics and Popular Government, George F. Will (ed.), Domestic Affairs Studies, Washington, D.C. 1968.

2. The First Amendment As a Shield on a Sword: An Integrated look at Regulation of Multi-Media Ownership, Anne W. Branscomb, Rand Paper Series, P-5418, April 1975.