
Editorial technology upgrades at Queensland Newspapers Pty. Ltd., 1985-2002

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Abstract

This study reports on digital production facilities' installation and development at Queensland Newspapers Pty. Ltd. (QNPL), between 1996 and 2002. QNPL is Australia's fifth-largest capital city newspaper organisation and part of the News Limited group, controlled by Rupert Murdoch's transnational News Corporation. The study documents the architecture of the infrastructure, which was needed so that large-scale pagination and Internet communications could be implemented at the journalism workplace. This documentation parallels digital architecture within News Limited Australia-wide since 1995 and shows how News Limited was able to achieve national production efficiencies using digital networking between editorial sites, initially in capital cities. Of extra interest is the fact that central elements of these digital networks, pagination software, and practices – especially Microsoft Windows-driven pagination packages – were implemented and tested in Queensland before they were implemented at other News Limited enterprises and this makes the QNPL experience of special importance. Coincidentally, as this article is being published, QNPL has just announced that implementation of personal desktop email and Internet access for all its journalists is nearly complete, having commenced roll-out more than five years before.

Introduction

Quiet newsrooms and the humming of digital networks replaced clattering typewriters and the thump of linotype machines 20 years ago at the *Courier-Mail*, the *Sunday Mail* and the *Telegraph* in Brisbane. The last full-time compositors left the Campbell Street building in Bowen Hills in the mid-1990s, leaving sub-editors to do all the "design and construction" work on editorial pages, and clerks and non-trade computer operators to design and build advertising content.

A casual observer might comment that these changes have helped make newspaper publishing easier and faster. Among other things, there are no longer any typewriter ribbons for journalists to replace, no more carbon paper to interleaf between pieces of copy paper ... no more copy paper, in fact! On the input side, journalists and their publishing companies have made extensive use of software developments, email, direct-input, and FTP (file transfer protocol) software to receive information from sources, either for news or for advertising, as well as business-to-business (B2B) functions such as internal communications (by email and intranet) and the production of accounting and corporate stationery. By using email and World Wide Web avenues, journalists can now receive media releases direct to their computer terminals and interview sources anywhere in any time zone, provided those sources have similar email or even merely telephone access. They can conduct extensive database research tasks themselves without even having to leave their desks (cutting down on visits to clippings and book libraries) and can order more extensive searches by professional librarians or search agents almost anywhere in the world. Computers have even made it possible for members of the public (in the United States at least) to ring voice-activated computer dictation services and "write their own" sports or news story for publication in participating publications.

On the output side, journalists can now create articles, design pages, capture and manipulate images, and output whole publications to traditional printing presses or the World Wide Web on a single computer terminal if necessary. The desktop computer this author used at QNPL in Brisbane until 2002 was a prime example of this aggregated functionality. Using a small-business-level Pentium II processor with only 128MB of RAM ("random-access memory") residing on a Local Area Network (LAN), connected to a Wide Area Network (WAN), QNPL had installed more than 20 separate application programs on this single computer. The combined programs made it possible for this writer to interview sources interactively, communicate personally with company executives, research background material, create articles, create, capture, and electronically manipulate images and pages for publication (including advertisements), create printed or online output, and perform all the technical functions of any journalist in the company. (By way of explanation, this particular

machine and others in the Editorial Technology Department were set up as support and instructional design machines.) In practice, the only limitations in 2002 were that this one computer lacked the software required to create classified and display advertising (but it could access that software easily using network connections), and that one person acting alone could not physically perform all the necessary reporting, advertising, sales, and editorial functions to publish a large daily, or even a large weekly newspaper, in the time required.

Publishers make big savings by processing editorial and advertising material digitally rather than using expensive, labour-intensive paper or film output methods. Pages created in other cities using the Adobe Portable Document Format (PDF) can be easily reproduced, and new technology has even allowed newspaper printing press workers to make plates direct from electronic pagination systems, bypassing both proof and negative stages altogether. Emerging "rich media technology" (Bowen, 2001, n.p.) has also allowed online newspaper publishers to attract a new kind of advertisement which allows previously unheard-of interaction between reader and advertiser, using the newspaper website simply as a channel.

In a more scientific way than the casual observer, journalism researchers have also identified advantages. Ewart (1997, p.52) points out that desirable consequences of pagination technology include better photo handling ability, better control over the presentation of pages, and improved colour usage and quality. She also writes that pagination allows proprietors to pool resources over distributed sites. However, disadvantages found by Ewart and others include extra workload for sub-editors, unwelcome changes to the practice of sub-editing, and additional stress. Ewart mentions alterations in traditional recruitment practices and the fact that deadlines have become harder (to meet) and firmer (1997, p.54). Ewart argues that pagination "has irrevocably altered the nature of subbing" (1997, p.53).

Dombkins (1993) identifies organisational changes occurring within a large metropolitan newspaper when electronic pagination was introduced, while others (Beyrouti, 1990; Brill, 1994; Ezell, 1987; Henningham, 1995; Moulden, 2001; Pickett, 1959; Quinn, 1999; Randall, 1986; Schreiber, 1977; and Solomon, 1985) have investigated consequences such as improved access to information, more control, physical strain among journalists (especially sub-editors), variations in quality (measured by typographical errors or journalists' perception), and dissatisfaction with one's new role in the newsroom (again, especially prevalent among sub-editors). Lamble (2000) identified QNPL's own slow progress in introducing digital technology in its external bureaus.

However, hardly any contemporary journalism research refers to the fundamental ingredients behind these advances in news publishing: the 1947 development of digital coding, thanks to Bell Lab's Dr Claude Shannon's "Mathematical Theory of Communication" and his "bit" or binary digit

(Maddox, 1972, p.28), and, a year later, again at Bell Labs in the United States, the announcement of the transistor (Maddox, p.30). And yet it was just these developments which enabled newspaper proprietors to abandon traditional linotype and hot-metal production in the late 1970s and early 1980s, replacing them with initial transistorisation and digitisation of the editorial processes such as writing and copy editing, and in the mid-1990s to substitute their entire composing room operations (and dozens of trade-based compositors) with digital computer networks.

This article begins by tracing the rise of digital networking on a global scale, then examines the particular digital network in place at QNPL, and finally steps back to consider the national, Australian scale. The author worked from 1985 to 2002 as a reporter and feature writer / sub-editor (copy editor, layout, production, and design editor) / trainer / and website developer at QNPL, publisher of the *Courier-Mail* and *Sunday Mail* (and previously the *Telegraph*) in Brisbane. This period was, for this small and relatively "closed" (Cokley, 2002) community of journalists, one of continuously new experiences of digital newspaper pagination technology.

Pre-1995 at QNPL

The quintessential newspaper production chain of the 19th and 20th centuries began with reporters and editors in noisy, clattering, smoke-filled rooms, progressed through noisier, smelly, and more dangerous "hot metal" linotype "composing rooms," and concluded in the noisiest, darkened, ink-spray filled press halls. Journalists had for years relied on telegraph and telephones, pencils and ink pens, typing paper, carbon paper, typewriters, and trade-based labourers who were first employed to set racks of type in molten metal, etch pictures into metal blocks using dangerous acids, then assemble type and etchings into heavy "formes" of metal. These "formes" showed each complete page but in mirror-image. They were then covered by wet, paper-based mats known as "flongs" which, under pressure, dried into raised, positive image versions of each page. Each "flong" could be rolled into a cylinder and was used as a mould to form a metal "stereo" which in turn was mounted on to a large letterpress printing machine where it was brought into contact with sheet or web-fed paper.

That was typical around the world and was the situation at QNPL's Bowen Hills plant until 1982. During that year and into the next (in some departments of the company the change started in 1979), the hundreds of typewriters in the editorial departments and the banks of linotype machines in the composing room began to be replaced by a Digital Equipment Corporation (DEC) photo-composition system, which had been introduced and tested at the company's north Queensland masthead, the *Cairns Post*, in 1978 (Kerry Phillip Green, personal communication, June 2002). The DEC system allowed journalists to

write their reports into electronic format and have them edited and typeset into "galleys," or long strips of words exposed on to white photographic paper (pictures were treated in a similar manner). These "galleys" were waxed on one side by compositors and "cut and pasted" by them on to white card "boards." The boards were then mechanically photographed and the image exposed against a metal (later plastic) plate. It was this plate (replacing the former "stereo"), which was mounted on to the newer "offset" printing presses to produce the pages of each day's newspaper. In its heyday (around 1978) the DEC VT100 system running at QNPL was considered state-of-the-art (Smith, n.d.) but in 1995, everything about the news gathering and publishing process at QNPL began to change again.

Global events converge

In 1995, two converging event sequences – one global, the other in Brisbane – began to impact on QNPL. In August, a young United States company, the Netscape Communications Corporation, made its initial public offering of 500,000 shares to the American public (Netscape Communications Corporation, 2002). While this event in particular is recalled as a seminal event in the history of the Internet, there was another, more interesting stock release earlier the same year. In a private release in April, Netscape had sold 250,000 of its shares to some of the largest and most influential newspaper publishers in the United States. Also in 1995, Netscape formed strategic alliances with Adobe (to develop digital publishing systems) and Macromedia (to develop digital advertising systems) and just as the year was drawing to a close, announced – with Sun Microsystems – the release of a new open, cross-platform object scripting language called Java. Over at Microsoft, developers released Windows 95 the same year and, again as the year was closing, chairman Bill Gates publicly committed Microsoft to "supporting and enhancing the Internet" (Gates, 2002, n.p.).

In Brisbane, 1995 also was shaping as an important milestone in the local newspaper industry. Previously, QNPL's DEC computer system relied on a network of "dumb" terminals linked to a mainframe computer using what programmers called an "IAS" operating system, components of which were called EMS (editorial management system), TMS (text management system), and CMS (classified management system). This was to be replaced with a network of desktop computers that performed many of the storage and editing functions themselves without reference to the central "server" computers. The new "servers" – suitcase-sized computers instead of labyrinthine machines that filled a whole room – were generally able to interact with contemporary systems operating worldwide. The desktop-computer-based electronic pagination system chosen by QNPL had been developed by the Melbourne-based company CyberGraphics (most recently taken over, in June 2002, by the Atex corpo-

ration, until then a major competitor). This process would allow individual journalist/sub-editors to electronically design and construct pages on computer screens, then fill them with articles in electronic word processing format, illustrated by images in digital format. Consequently, the "cut and paste" functions of the composing room staff were eliminated and many of the PKIU (Printing and Kindred Industries Union) tradesmen were made redundant and left the company. Eventually almost all would resign, retire, or accept redundancy packages. By 2001 only a handful of former compositors worked at the Bowen Hills plant, and all were using desktop computers and Windows programs every day (mostly in the advertising or photographic enhancement departments).

In preparation for this change, the Bowen Hills presses were decommissioned in 1994 and a new \$280,000 press hall and distribution centre established in the Brisbane suburb of Murarrie, about 30 minutes drive across the city and on the other side of the river which bisects Brisbane. This move would make possible the move to a CyberGraphics digital pagination system which allowed data on completed electronic pages to be transmitted from Bowen Hills to Murarrie by an Integrated Services Digital Network (ISDN) telephone cable and arrive there as whole negative images, ready for conversion into plastic printing plates for the new web offset presses. Retraining of journalists to use the CyberGraphics system and the successive new versions which were purchased by QNPL continued from 1995 until 1998, after which the introduction of more versions continued "in the background," as the user interface remained generally the same.

In 1999 News Limited (based in Sydney) began publishing simplified online versions of its newspapers on the World Wide Web and the *Courier-Mail* and *Sunday Mail* took part in this new venture, using content-management software designed by the US-based Vignette Corporation. Small teams of journalists (including this writer for a short period) helped produce these online versions but only a handful was allocated solely to the online enterprise, most of the others devoting their principal efforts to the newspaper product. Plans were drawn during 2000 to distil both the newspaper content and the website content for different digital delivery methods, such as SMS, WAP, and other emerging technologies such as streaming media and rich text.

Reporters at QNPL had always used telephones and during the 1980s began using bulky portable computer terminals from which they could transmit their reports by telephone from remote locations. By 2001, however, reporters, artists, and editors working for QNPL were transmitting and receiving reports and artwork using (as well as conventional telephone connections) mobile phones, email, and FTP. The extensive coverage of the 2000 Olympic Games was largely made possible by these developments. But if the trend towards a completely electronic (and online) newsroom looked like continuing, the

vagaries of business took a hand. The last two months of 2000 and first two months of 2001 were marked by massive layoffs in online newsrooms around the world. Among others, the *New York Times*, the *Tribune*, Knight-Ridder, CNN, and News Corporation cumulatively sacked hundreds of journalists and support staff from their online divisions worldwide, including Australia, virtually overnight, citing "restructure plans" and lack of hoped-for profits. The stock market and boardroom crashes of 2001-2002, especially in high-technology equities, continued to reinforce this gloom and News Corporation declared a \$12 billion loss (mostly composed of technology asset write-downs) in August 2002.

All that was in the unseen future in 1995, however, and possibly the losses of the tech crashes would have been greater except for the production efficiencies delivered by digital networks. The installation of the QNPL Wide-Area Network (WAN) and the simultaneous installation and development of its Local Area Network (LAN) described in the next section of this article, as well as its front-end segment, the CyberGraphics system, directly superseded the composing room and all its employees and their functions. News Limited was actually able to achieve this changeover to digital on a nationwide scale, swapping human compositors for digital networks in major capitals around the same time or soon afterwards as it did in Brisbane (P. Cox, personal communication, August 2002).

For Brisbane, and for each of the remote sites (those away from Sydney), the single most important ingredient in the final architecture was the Optus Frame Relay described below, which connected (in the case of QNPL) the Bowen Hills editorial plant with the main News Limited WAN based at Mirror and Telegraph Newspapers at Holt Street, Surrey Hills, in Sydney. It allowed News Limited as a group to simultaneously achieve massive production efficiencies and staff reductions by laying off all composing room staff around the country. Text and digital images stored on News Limited servers in Sydney, Melbourne, and Adelaide and text stored on servers in Sydney and Melbourne became the basis for all archiving within the group. During the 2000 Olympic Games in Sydney, centralised production in Sydney and daily distribution around the News Limited group by FTP of a national Olympic supplement foreshadowed more routine but just as centralised productions afterwards, such as the weekly *Body+Soul* supplement in the group's Sunday newspapers, which had until 2001 been produced individually in the various capital city newsrooms.

The Queensland Newspapers WAN

The QNPL support and services manager, Mr Paul Darby, explained to the author the computer systems network in place on May 9, 2001. He said QNPL's principal business at that time was the production of printed newspapers: "The

Internet has almost no impact (on us)” (Darby, personal communication, May 9, 2001).

The systems Darby described covered the network within the QNPL building at 41 Campbell Street, Bowen Hills – home to the *Courier-Mail* and the *Sunday Mail* – and opposite, at 39 Mayne Road, where the weekly magazine *Brisbane News* was published. One system was called the WAN and the other was called the LAN. The WAN was the network of machines and connections that allowed all data to pass into and out of 41 Campbell Street and 39 Mayne Road. The LAN was the network of machines and connections that allowed all data within the buildings to circulate to and from relevant employees. Darby estimated the total capital investment in the WAN and LAN at \$1 million. His department, responsible for service, operation, and maintenance of the WAN and LAN, had a complement of 26 staff.

The core of the network was a Cabletron SSR8 “Gateway,” through which all parts of the WAN were connected to all parts of the LAN.

The WAN

Four main machines governed the input and output of data to QNPL in May 2001. A Cisco 3640 router connected the Bowen Hills editorial plant with the printing plant in the outer-eastern Brisbane suburb of Murarrie. The connection was an 8 megabyte (MB) Telstra LBMS (large bandwidth megalink service) via Telstra’s inground cable network. Since, as Darby pointed out, the “principal business at that time was the production of printed newspapers,” this connection had the status of a “spinal cord” between the “heart” of the business and editorial systems and the “muscle” of the printing presses. A back-up was available in the form of an ISDN dial-up connection into the Telstra standard telephone network. Once or twice during periods of extreme systems disruption between 1996 and 2001, this author witnessed a second kind of back-up procedure. If the link between Bowen Hills and Murarrie was severed, electronically produced pages were able to be “output to film” at Bowen Hills and shipped in taxis and trucks to Murarrie for conversion into printing plates for an evening’s edition. Given the emphasis journalists and printers still give to adhering to strict deadlines in the production of a newspaper (Cokley, 2002), the stress on staff involved was palpable.

A JTEC 7200 connected the Bowen Hills editorial plant with a room in Parliament House, Canberra, for the annual federal budget. Darby explained that even though a secure connection was required only once a year, maintenance of a permanent connection was still cheaper than setting up and removing the connection every year.

A Cisco 7200 connected the Bowen Hills editorial plant with:

- A computer server known as Roam, which the company had used for large projects such as the annual Gold Coast Indy car race and

other large-scale projects requiring a secure line for large amounts of data (pictures and text) transmission. This was the equivalent of what television commonly calls an "outside broadcast."

- A Telstra Frame Relay which in turn connected the Bowen Hills editorial plant with corresponding computer networks at the Townsville *Bulletin* newspaper in north Queensland, the Gold Coast *Bulletin* south of Brisbane (home also to a reporters' and photographers' bureau collecting reports for the *Sunday Mail* and the *Courier-Mail* in Brisbane), Quest suburban newspapers based in the north-Brisbane suburb of Stafford, and a reporter's bureau at Maroochydore on the Sunshine Coast north of Brisbane. A back-up was available in the form of an ISDN dial-up connection into the Telstra standard telephone network.

- An Optus Frame Relay, which in turn connected the Bowen Hills editorial plant with the main News Limited WAN based at Mirror and Telegraph Newspapers in Sydney. A back-up was available in the form of an ISDN dial-up connection into the Telstra standard telephone network. This Optus Frame Relay was the main in/out connection between QNPL and the "rest of the world," allowing staff at the Bowen Hills plant to reach digital images stored on News Limited servers in Sydney, Melbourne, and Adelaide and text stored on servers in Sydney and Melbourne. The Optus Frame Relay also allowed text and pictures from various national and worldwide wire service agencies such as Reuters and Associated Press to enter the QNPL network, having already entered the News Limited WAN in Sydney.

A Cisco 4500 connected the Bowen Hills editorial plant with three outside companies that had been allowed remote access to the QNPL network through a Telstra ISDN connection. The companies were two advertising agencies and a business stationery printing firm. The same Cisco 4500 connected the Bowen Hills editorial plant with a server known as Flame which was in development during 2001 as a remote-access dial-up point into the QNPL WAN for use by reporters and photographers. At the time, other dial-up servers were in use.

The LAN

Three main systems made up the QNPL LAN in 2001. These were called Cyber, Admin, and OUT and were connected by what was known as a "back plane."

- "Cyber" (the CyberGraphics Genesis system) was a server-side software package developed and installed on twin Alpha 2100 servers (one live, one duplicate back-up) by the CyberGraphics Systems company, then based in Melbourne. It acted as host to roughly 90 per cent of editorial users, on 110 desktop computers running a client-side pro-

program called CyberNews (used by reporters) and 220 desktop computers running another client-side program called CyberPage (used by sub-editors). It also hosted 110 machines in the QNPL telephone call room using a third client-side program (non-Windows based) called CGS-Win, as well as a further 14 Cyber machines used in advertising, credit control, and classified advertising.

- Admin was a system which hosted all other computer users in the company, such as clerical support (secretaries and clerks), and Editorial Technology, Training and Support (the author's home department at the time, comprising seven journalists with reporting and editing backgrounds who had been trained in network administration and support techniques). User load on "Admin" in 2001 was roughly 600 stations.

- OUT ("Output") was a system which hosted all output devices on the QNPL LAN. On this were hosted:

An array of Raster Image Processors (RIPs) described as "a hardware or combination hardware/software product that converts images described in the form of vector graphics statements into raster graphics images or bitmaps" (Whatis.com, 2002, n.p.). For example, laser printers use RIPs to convert images that arrive in vector form (for example, text in a specified font) into rasterised and therefore printable form. RIPs are also used to enlarge images for printing. They use special algorithms (such as error diffusion and stochastic) to provide large blow-ups without loss of clarity" (Whatis.com, undated web site),

"printers," and

"proofers" where a "printer" handled mainly text output and a "proofer" handled mainly EPS (Encapsulated PostScript) files, which appeared mainly as images. There was a total of approximately 50 printers and proofers on the QNPL LAN in 2001.

As well as run-of-press operations at the Murarrie print site, there were several other editorial and production systems in operation at QNPL in 2001, including:

- *TV Scene*, an irregular-sized liftout in the *Sunday Mail*, set up and paginated using CyberPage but then output to film and shipped to Progress Press in the western Brisbane suburb of Wacol;

- *Brisbane News*, another irregular sized publication, which stands alone and is also printed by Progress Press, then selectively distributed throughout Brisbane.

Environmental impacts

Institutionally, reporters and editors at QNPL felt the main impact of digi-

tal pagination when the composing room emptied of people and equipment, comparatively overnight. Compositors had been key members of the production team and, for a little while at least, sub-editors felt out on a limb without them. By 2002, however, the newsroom had filled with new reporters who had never known the previous system and who never missed it, and sub-editors had operated the pagination system – with varying degrees of ease and success – for up to five years. The remnant composing room began to be refurbished for other uses; the old “publishing room” where newspapers had been wrapped and loaded on to trucks was adapted into a telephone call centre; the press halls remained empty and silent. Staff had discovered other effects of the digital network earlier than pagination, of course. They had become totally dependent on the network for the performance of every single duty in their professional lives and that dependence would grow with the introduction of pagination. Typewriters disappeared in the mid-1980s, compelling journalists to use computer terminals to create articles for publication. Rotary telephones were taken away; still later, pins, copy “spikes,” and paper cutters were removed because they were identified as occupational health and safety hazards. I searched every editorial department at QNPL for some carbon paper in 2001 and finally managed to find some in a bottom drawer of the library, squirreled away by a nostalgic manager. When the DEC network malfunctioned between 1982 and 1996, journalists referred to this as a “crash” but some reporters could continue to interview people or search the clippings or books in the library for research; some layout sub-editors could continue to design pages using pencil and paper; some compositors could continue to paste up articles which had been typeset before the crash. However, after 1996, on any occasion – comparatively rare, it must be said – when the CyberGraphics network described in this article suffered a major collapse, all editorial and production work ceased.

Personally, QNPL journalists of all job descriptions encountered communications technology on several distinct levels between 1995 and 2002. Level 1 was at their normal work desk, where they often sat for shifts from 7 hours 36 minutes (the award norm) to 12-13 hours for senior, award-exempt journalists. Between 1982 and 1995, they used the comparatively simple editing and typesetting DEC system. After 1995, journalists were trained and switched to the CyberGraphics products described above. Many reporters continued to approach this technology from a functional point of view, asking questions during training such as “Where do I write my story?” and “How will this help me to get my story?” Many sub-editors and editors seemed uninterested in the nuances of software beyond what was absolutely necessary to achieve any allotted task. This reflects Sylvie’s concepts of “compatibility” and “relative advantage” (1988). Level 2 was in their private lives, or during business dealings away from QNPL. Home technology during that period ranged from mobile phones to cable TV and the World Wide Web. Computer games on

desktop computers and games consoles became very popular and between 1996 and 1999 the dream of global communications on a single phone number (embodied by the Iridium Corporation) became a reality and then crashed almost into oblivion (still operating in 2002 but dependent on funding from the US military and Australia's Western Mining Corporation).

Level 3 existed in a small office at QNPL known to journalists as "Ed Tech," the Editorial Technology Department. Established in 1982 as a liaison department between editorial and information technology, this section became a hub for training, support, and ultimately development and management of new technology resources at QNPL. Editorial Technology was the first place in the company where journalists could go to use email or web browsing; its staff supplied travelling reporters with the first portable computers known as "Telereams;" and its staff also tested all new software upgrades for journalist usability while training reporters and editors before all new rollouts up to and including 2000. In 2002, "Ed Tech" remained the first port of call for journalists with computer hardware or software problems, design requests, and for virtually all internet communications such as receiving digital text or images and database access outside the building. While almost all journalists at QNPL operated solely on the Cyber system, those in Editorial Technology, as well as artists in the Graphic Arts Department, some in the online news section and some in the pictorial department, were allowed a wider view of the LAN architecture. With their "higher permissions," Editorial Technology employees were able to see right across the network of computer servers in the LAN. In 2002, this network consisted of servers (known as "drives" but actually individual computer boxes mostly held in a single room upstairs at QNPL) arbitrarily named D, G, H, K, M, N, O, P, Q, R, S, T, W, and X. Of these, editorial users (including artists and photographers) had access only to Q, T, and O drives. Advertising, information technology, administration staff and other departments used the remaining "drives"; P and R serviced and were located in Townsville at the subsidiary North QNPL, publisher of the *Townsville Bulletin* and several nearby regional newspapers.

Conclusions

The short-term consequence of installing the Brisbane (QNPL) WAN and the simultaneous installation and development of the LAN and its front-end segment, the CyberGraphics system, was the replacement of the composing room and all its employees and their functions by a digital network. News Limited achieved this on a nationwide scale over several years, swapping human compositors for digital networks in most capital cities in the mid-1990s and on suburban mastheads in Sydney and Melbourne in 1998-99 (P. Cox, personal communication, August 2002). Journalists and clerical staff took up any slack, performing all existing and remaining functions which required human creative input.

Longer-term consequences remain mostly speculative but some have been demonstrated. First is the physical capacity to digitally produce newspaper and magazine products from one central location, such as Sydney. The News Limited WAN already allows this on a limited basis – such as for special events like the 2000 Olympics and the annual federal budget in Canberra, as well as training sessions between Brisbane and Townsville, for instance – but bandwidth has until now meant that the task of completing a whole daily newspaper with advertising would be beyond the system as it stood in 2002. Bandwidth is continually expanding, however, and it's easy to conceive of sufficient capacity existing around the national WAN for all production to be based in Sydney within five years.

The second possible long-term consequence is the aggravation of problems identified by the researchers above, such as sub-editors' further dissatisfaction with their screen-based production roles, an increase in newsroom stressors such as deadlines at remote presses over which journalists have no control, and more pronounced dissatisfaction among journalists with technology they can't see and know very little about.

In some small way this article hopes to address this last issue and demystify the digital processes and infrastructure within News Limited.

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