DESKTOP PUBLISHING: THE DOWNSIDE

T.F. Carney
University of Windsor

The workings of desktop publishing technology are reviewed, as are the consequences of the way the technology has been distributed, and of the organizational form required to develop and distribute it rapidly. The conclusion weighs the costs and benefits to society of this technology and reviews the desktop publishing "revolution".

On revoit les rouages de la technologie de l'éditique ainsi que les conséquences du mode de distribution de cette technologie et de la forme d'organisation requise pour une rapidité de développement et distribution. La conclusion évalue les coûts et avantages sociaux de cette technologie et examine la "révolution" entraînée par l'éditique.

The Development of the Technology

Desktop publishing emerged in 1985 as result of the coming together of three technologies: Apple's Macintosh Plus microcomputer and LaserWriter printer, and Aldus' page makeup program *PageMaker*. Desktop publishing is like utilizing a spreadsheet: virtually a new type of operation, one that couldn't be easily and quickly done until the technology for doing it was invented. This technology makes the skills of a publisher's team available to a micro computer's user (Carney, 1988: 23–36).

The Macintosh, the micro computer which made desktop publishing possible, was specifically designed to be easy to use. Its screen, set up as a desktop, is intuitively intelligible. Little pictures, 'icons', graphically represent the operations which can be activated by clicking on them with a 'mouse', a manual control device which you move to position the cursor. The mouse enables you to use your spatial skills: you don't have to program in any co-ordinates. There are 'menus' (unfolding lists of options) for each

type of operation (text file management, editing, typeface selection, and so on), or more icons (such as a 'ruler') for setting indents, leading measures, tabs and tables.

You can use a Mac without having to learn programming. All programs which run on the Mac must conform to its 'desktop'; so must all peripherals. So the software and peripherals for the Mac all work with one another. The 'desktop' is the Mac's equivalent of the IBM's MS DOS . Once you've learned to use the desktop (takes about 30 minutes) and one application program, you'll find that you're familiar with at least 40% of any program that you have subsequently to learn.

Moreover, the Mac has a WYSIWYG (what you see is what you get) screen. Changes to typefaces and text settings are evident as you enter them and your text contains no programming code. No more batch processing blind: you no longer have to print out your whole text file to see if all the commands embedded in your text were correctly entered. You can see what your text is going to look like as you put it on the screen.

The Mac was designed to present images rather letters or numbers on its screen. So it was able to run drafting and drawing programs when they were adapted from the mainframes to run on the micros (also in the mid-1980s). It can also accept pictures and photographs, scanned to disk by scanning devices, as bit-mapped 'paint' files. An avalanche of clip art was rapidly scanned to disk as click art for the Mac. Authors were thus further empowered, gaining the ability to produce their own pictures, graphs and diagrams.   `

It took the wood cut (which enabled drawings to be accurately reproduced for the first time in human history) as well as the printing press to make publishing possible. Computer graphics are as important, in their way: they have given back to ordinary people the ability to draw, which is normally arrested when children are instructed to read at five years old (Edwards, 1979: 61–79). With the advent of computer graphics, any adult can draw. He or she can adapt the click art-work of a master artist, learning in process; can move automatically from matrix analysis to all kinds of graphs and charts by using a spreadsheet program; and can automatically acquire the basic skills of a draftsperson when using a computer drawing program (which typically includes templates that can be adapted). As result of computers' facilitation of graphics, books have ceased to consist of page after page of undifferentiated paragraphs. Diagrams and graphics are appearing in genres of writing where they were previously almost absent, because of the costs of drafting them and positioning them when batch processors had to be employed.

The development of the LaserWriter printer enabled authors to print out type and graphics that look like print. Driven by an industry-standard 'language' (Adobe's *PostScript*), this printer produces precision drafting and reproductions of pictures, as well as all kinds and sizes of typefaces, at 300 (x 300) dots per inch (dpi). A vast improvement on the 72 (X 72) dpi of its predecessor, the dot matrix printer. As standard electronic typesetting equipment, such as the Linotronic (producing 2540 x 2540 dpi),

is also driven by *PostScript*, it is thus possible to produce camera-ready text and graphics via the micro on your desk.

To exploit this technology Paul Brainerd at Aldus adapted a publisher's typesetting program for the Mac, giving it the name *PageMaker*. With this program, the Mac's screen took on the appearance of a make-up person's work-table. Cutting and pasting of text and graphics can be done electronically, on the page spread in the middle of your 'work-table', with the pieces you're working on over at the sides—all WYSIWYG. The program accepts text from a variety of word processors (and typescript scanned to disk by optical character readers). No exacto knives, or special, under-lit make-up tables, or agonizing over aligning snippets of paper as you paste them on to a blue-lined sheet. The text flows automatically through pre-set up, gridded pages, fitting exactly to the grids. When you insert a graphic, the text flows around it, adding further gridded pages as it goes.

Thus was desktop publishing born. 70% of it is still done on the Mac.

Effective users of this technology have to be trained printers or persons prepared to train themselves as printers. This means learning the hard-won lore of the typesetter and that of the page layout designer, along with the expertise of the instructional message designer. It also means learning the skills and sensitivity of a graphic artist. As people normally have an aptitude either for typography or for graphics, most in-house desktop publishing is done by teams.

Purchasing the equivalent of a printer's team (copy and house style editor, page layout and paste-up specialist for the text; expert in colour separations registration, and for graphics, fountains, grey scales, rotation, cropping and scaling) in the micro results in big savings for corporations. In some cases they can cut expensive, unionized staff. This was why newspapers led in introducing this technology. Its hidden costs are paid by the computer operators. The technology is very labour intensive for the desktop publisher. He or she has to make tens of thousands of precise, repetitive and rapid motions while maintaining a constant state of high alertness (one miss-hit key can result in loss of hours of work), while bathed in radiation from the VDT, for 8–10 hours a day (instead of the two-hour stretches that safety requires). The costs, in crippling of the hands, arms and shoulders, from RSI (repetitive stress injury) and in the highest stress levels of any occupation, are only beginning to become evident (Taylor, 1989: 4–8; Hembree, 1990: 150–157). And it now appears that prolonged exposure to VLF and ELF radiation (very low frequency and extremely low frequency pulsed electronic and magnetic fields) from display monitors appears to be carcinogenic, in spite of industry and governmental declarations to the contrary (Brodeur, 1990: 136–45 and Borrell, 1990: 23–26).

How Database Programs Further Empowered Desktop Publishing

Microcomputer database programs have played a critical role in development of desktop-driven publishing (Stone,1988: 27–41). A small publisher with a book list of

a few titles, who is also publishing a newsletter or small journal or magazine, needs a database for record keeping, forms production, mass mailings and the like. But the mailing lists which his or her sales and circulation develop can become an important asset if they are 'enhanced'.

The database developed from book sales and subscriptions to the newsletter or magazine can be used to design 'bounce back' cards ("To help us serve you better, please provide answers to the following questions... "). A mass of lifestyle and other demographic information is generated by these cards. The database's multiple sorting capabilities can then be used to develop a profile of a typical customer from each of the publisher's publications. A gallery of portraits is thus produced, and, along with it, a 'segmented' list: one that is divided to match the buying preferences of the different types of readers. This gallery will suggest other categories of potential readers.

The services of mailing list vendors can now be used to run a database overlay program against lists catering to the categories of reader suggested by the publisher's gallery of portraits (Stone, 1988: 164–91; 414–40). The publisher can identify persons on the 'overlaid' lists with characteristics matching those in his or her own lists, a process known as list building. Each profile on these lists can also be matched against what is known of mail-order buyers' characteristics: in this regard, six 'consumer clusters' have been identified (Stone, 1988: 488–518).

The database thus enhanced can now be used to develop a package with an 'offer' for each type of customer, mail it, and track the closure rate and repeat/non-repeat subscribers for subsequent years, along with 'poor payers' and the like (Stone, 1988: 310–48). Further mailing of bounce back cards to new customers will reveal what type of products can be sold to the different categories of persons on the various lists resulting: products which their lifestyle, demographic, and proclivity-to-purchase-via-direct-mail characteristics indicate that they would be likely to purchase.

This type of information makes the publisher's list a marketable item in itself — a rentable list— as well as indicating directions in which the publisher can expand his or her publishing. Databases are the 'secret weapon' of direct marketing and of the direct mailing which is now at the leading edge of sales promotion. They are the reason why small presses can do so well at identifying and exploiting niche markets.

How the System for Producing and Distributing the Technology Affects the Way It Is Used

Microcomputer hardware and software has had to make a quantum leap in complexity to become able to deliver top quality (2540 dpi) camera-ready copy. The original, 'skinny' Mac was easy to use, but it was a toy. To become capable of its current feats in desktop publishing, the Mac has gone through seven more upgrades. The most recent version, the Mac IIfx, is a very powerful and sophisticated machine. The printer coupled with the Mac has likewise undergone a series of massive enhancements in power and sophistication; and a large, and very sophisticated, software library has built up.

As the technology has become increasingly complex, the Mac has grown increasingly less easy to use. The skinny Mac consisted of CPU, monitor and disk drive all in one; you attached a simple dot matrix printer to it. In the case of the micros of the Mac II line, you must put a 'system' together: you have a choice of cards to go inside the CPU, of monitors, keyboards, floppy and hard disk drives, and printers. The applications software has also grown more complex, as has the software that drives the Mac's operating system—the system software. A Mac's user will usually find it necessary to modify this software, adding memory-resident programs that can run while other software is running. The wrong combination of such programs (of which there are hundreds) can cause the system to 'bomb' (self-destruct). This can easily happen when a novice starts modifying the system operating software of a micro that's as powerful as a mainframe computer of 10 years ago.

The list of problems gets longer—in the days of the skinny Mac, there was only *one* file type for graphics; now there are several. As result, some of your graphics files may not be compatible with one another—or handle-able by your page make-up program. Also, where once there were only a few, simple, bit-mapped typefaces available for use, now there are thousands of typefaces, constructed in a variety of ways, fighting for the relatively few spaces allocated to them in the system's software register. Apple is about to move to generation *seven* of its system software, to end the spate of bombs resulting from such conflicting calls to the system.

The result is hardly a user-friendly microcomputing environment suitable for novices. When the computer industry made what had been an easy-to-use technology complex, it faced a serious problem in selling its products. Setting up a system for doing desktop publishing with the current Mac technology is no longer a simple matter. A variety of components of the desktop publishing system is by now available and while it is true that most combinations will work together, choosing the best combination for your particular needs requires considerable technical expertise. Nor are the current software programs easy to learn and get to work together.

Prior to the advent of the Mac, sales of hardware and software for sophisticated printing operations had been handled by turn-key operations. The manufacturer of such systems sent his sales force into the purchaser's firm, where they customized the hardware and software to the customer's satisfaction, remaining until the purchaser's printing team had mastered the intricacies of both (a process known as 'hand holding'). Hand holding is a lengthy and costly business, affordable only because the cost of the system package was so high (upwards of $200,000 in 1980 dollars). Purchasers were few at this time: maybe 30, nation-wide, in the United States).

Beginning in 1985, hardware and software production houses were operating independently, selling thousands of their products retail with slim profit margins. None of them could afford to employ a sales force for making sales and for after-sales hand holding. Nor could they rely on dealers and retailers, few of whom had expertise in any but a small number of the products which they sold. Nor was any one retailer responsible for putting a system together. So, if a purchaser's system didn't work, there

was no one to call (the only people who could help—the service centres which turn text and graphics files sent to them via modem into camera-ready copy from Linotronic printers—are far too busy to deal with such calls). The hot-line technical support from any *one* software house can't help, since the problem typically involves getting a complex set of components from several manufacturers to work together.

This inability to hand hold threatened ruin for the desktop publishing industry. Retailers were making ruinously slim profits, especially on the software, where they had to compete with giant mail-order supermarkets selling software in huge volume at cut rates (and employing a technical support staff for purchasers who experienced difficulties using this software). But, if the dealers and retailers were to go out of business, so would the producers, who relied on the dealers and retailers to move their products' upgrades, speedily and frequently.

The manufacturers' way out of this impasse relied on the following facts. 'After-sales' (sales of products ancillary to the initially-purchased 'package', or of upgrades of its components—which must be bought by the captive purchaser-users/'established user base') normally amount to at least 250% of the initial purchase price. Costs of training employees to use the hardware and software, and to retrain them on its upgrades, dwarf these expenses. So the computer industry decided that continuous, self-directed learning is the necessary accompaniment of computing. A sophisticated distance education system has accordingly been developed by the major manufacturers, who employ instructional design teams to produce its various components (see Table 1).

Table 1
Industry-related Distance Education System for
Continuing Education about Computers

Software related	Manuals & Books	Support & support groups
Instructional video cassette demonstrating the major functions of the program	Simple introductory guide-book for learning the pro-gram's major features	Manufacturer-provided support for hardware user groups and their electronic bulletin boards
Interactive tutorial on disk	'Sampler' booklet, setting out print-outs of the range of possible layouts or end products which the program is capable of producing	Manufacturer maintains a presence on-line on the major information utilities, providing consultation and information of pending product developments
Examples, provided on disk, of applications of the program to commonly occurring tasks	Very full detailed reference manual for users wishing to access advanced features of the program	800-number hot line, providing technical support for registered users who may experience problems with the product
Designer-produced templates for commonly needed presentational formats, also provided on disk	Handy, quick-reference fold-out 'card' listing power commands or macros for often-used mouse-plus-key-stroke sequences	Training workshops conducted by manufacturer in major centres, for dealers or lead users who wish to become accredited trainers in the program
Easy-to-use add-ons encouraged: third party or lead user developed additions (such as collections of macros, tips on undocumented features) of the program aimed at specific, work-related problems met by different types of user	Newsletter, for registered users, with news of uses to which the program has been put, tips on useful 'work arounds', and advance notice of advance developments which could enhance the program's capabilities	Support for third parties with services that help users: e.g., an instructional video or audio cassette combined with example files on disk and a quick reference card. (Examples of such third parties: MacAdemy, Personal Training Systems)
Purchase or licensing, for bundling with the program, of small ancillary programs that execute otherwise convoluted operations quickly or easily	Books on the product, by authors who are lead users, published by the manufacturer or developer	Support for nation-wide programs on the product run by third parties (an example of such a party is MacAdemy)

Most dealers and retailers, who are sophisticated enough to be rapidly trained in workshops provided by the hardware and software producers, now make most of their living from consulting about, and setting up, desktop publishing systems, and from training (and re-training) the purchasers' staffs. But a key element in the manufacturers' strategy is the 'lead user' (whose user groups are also given massive support, and special treatment when it comes to purchases, by the industry). Here's why:

When adoption of computers in the work place is given a mandate, a range of reactions normally occurs. Many employees merely accept the technology, making a minimal commitment to learning it and using only a fraction of its potential. A fair number of employees *adopt* the technology, learning to use it more fully. Yet others—a much smaller number, this time— *implement* the technology, applying the programs extensively in their work. A tiny number, the lead users, become experts in using their chosen hardware and software, and *'re-invent'* their chosen programs by finding new ways to use them in their work. The last two groups, some 10% of computer users, account for 50% of computer use (usually including the more sophisticated usages) in the work place.

There are considerable costs in becoming a lead user. You have to buy your own hardware and software, because many hours of continuous learning are involved, much if not most of which occurs at home outside office hours. You have to put in far more hours per day before the VDT than is good for your health. 'Economic transfer' thus occurs: the employer passes on to the employee the costs of equipping himself (lead users are mostly males) with and constantly upgrading the technology, knowledge and training to do his work. The time spent acquiring this expertise has to come from somewhere—usually from time that would be spent with the family, with whose members the lead user's relationships deteriorate markedly. A process not unconnected to the lead user's diverting large amounts of money from his family's needs to feed his computer addiction. Meanwhile he becomes something of a social isolate, interacting largely with his computer, and the relationships that he has become largely instrumental: they are mostly with other users at work and with the user group outside of work.

Any practice continued at the expense of your finances, your health and your network of close interpersonal relationships is addictive. Computer addiction is the normal cross-addiction to workaholism, and the addict exhibits the normal behaviours of a 'dry drunk': people pleasing at work combined with non-availability for family members' needs at home. Think of the lead user as an addict, and his potential, for pushers of what he's addicted to, makes the industry's strategies much more intelligible.

But there are big payoffs for lead users. A microcomputer is a user-definable tool. You can customize your hardware and software into a configuration that uniquely meets your needs. It becomes an extension of your interests and abilities: a virtual co-worker which enormously enhances your potential and productivity, and furthers your career, in the work place. Besides, as the lead user pushes an application program to

its limits, he becomes useful to its developer: he finds arcane 'bugs' and dreams up new features that will enhance the program's capabilities. Developers appreciate, and reward, such users. Meanwhile the lead user acquires a new power base within the work group, because his expertise is needed there. So he can often get his group to upgrade the technology that he is using at work. Meanwhile, the industry has discovered ways to reach into 'after (sales) markets' in organizations (Stone, 1988: 120–39).

Users who have less of an investment of ego, learning/training, money and time in this technology are markedly less enthusiastic about the demands it continually makes (Rogers, 1986: 116–149). They're daunted when confronted by a 12" high stack of computer manuals and cassettes, however well-designed and well-thought-out the latter may be. Those who merely accept the technology, prefer minimal involvement. They generally are prepared to accept a relationship of dependence upon their work group's lead user to achieve it.

Lead users can't respond to all the requests for assistance from fellow-workers struggling with product upgrades or the more arcane command routines of the feature-packed programs already in use. But they encourage the upgrading process, to feed their own addiction and to maintain the within-unit power and prestige that accrues to them as result of their up-to-the-minute expertise. They thus constitute a kind of in-house sales force for the product up-grades which other workers are much slower to demand. Lead users are empowered on the job and in the work place by the reliance which fellow workers must place in them when there's a major technological shift.

Microcomputers currently double in power annually. So up-grading of both hardware and software is continuous. Most users have an investment, of learning, money and materials on disk, in the current—functional—technology (and many of them have little desire to commit themselves further). So moving the new and, initially, buggy technology which this situation generates is no mean feat. The continuing education strategy helps make it possible, by providing business for dealers and retailers who aren't daunted by manuals and can provide in-house training, in their neighbourhoods, on the major word processing, spreadsheets, database, graphics and page makeup programs. Most after-sales retailers are surviving by providing such training. So the more complicated these programs become, the better the retailers like it. The software houses support their retailers by providing them with training which confers on them the title of accredited trainers in their software.

Apple also supports its dealers by having a publicized policy of only selling its micros and printers through accredited dealers with technicians trained by Apple in repairing their hardware. Tinkering with the hardware voids a user's warranty, and dealerships are not supposed to rectify matters if problems develop as result of such unauthorized repairs.

But this is no solution to the dealer's problems, as the technology doesn't break down very often. So Apple and the software houses support dealers and retailers by 'pull throughs' (as in 'pull through the door'). These are aimed at the 'hot market', the

lead users who have a major investment in/commitment to the technology. Usually highly educated and generally 'up-scale', lead users typically buy their technological fixes in clusters. And they typically sell eight or more other persons on hardware and software that they've bought and like. The 'roll-outs' to desktop presentations in 1988 and to colour printing in 1989 have provided the technological opportunities to encourage such cluster buying.

National advertising by major producers of hardware and software, in magazines targeted on heavy users, emphasizes complementary products and how they empower one another. Experienced users will only buy technology which has such complementarity. The pull throughs may cost as much as (if not, in combination, more than) the main item purchased. So they can add considerably to the sales of the dealer or retailer, and, in the dealer's case, there can be no competition from the software mailing superstores, which can't sell the basic hardware. An established user base, captives of a particular technology, doesn't have a lot of options. But it's doubtful that the average user benefits much from all this complexity.

Organizational Changes Resulting from Efforts to Dominate the Desktop Publishing Market

Desktop publishing opened up a market niche that promised to advance Apple into the ranks of the Fortune 500 companies, if it could exploit its initial technological lead and rapidly build a large base of established users. The following discussion explains how it was done.

Computer manufacturers labour under the following constraints: they have a high-cost product, with a short shelf life, which must be moved, in bulk and quickly. So the first set of interests with which the manufacturers must concern themselves are those of their developers: without the software and peripherals produced by the developers, micros won't sell. To sell, manufacturers must leverage existing hardware and software, adding value to it or augmenting the skills of established users. A manufacturer's aim is to increase market share, by 'rolling out' from one market niche to another adjacent one, so as to keep competing manufacturers at a disadvantage.

The second set of important interests are those of their distributors. The latter have to gain from the move to the new technology. So obsolete stock is deeply discounted by the manufacturer just prior to the launch of a new micro. This discounting enables dealers to make a profit on their stock, selling it while they still can; and it hooks purchasers into a bug-free technology which, once they've invested in it, they'll soon want to up-grade. Meanwhile, the new technology has to involve add-on sales: those buying a new micro or software program should, ideally, find that they have to buy utility software (programs that keep the operating system fine-tuned, or that enhance its capabilities) or peripherals (such as scanners or improved screens—and the 'boards' that go with them).

For instance, in 1988, Apple identified desktop presentations as the market niche to roll out into. Fifteen billion slides and overheads are used in making presentations every year in the United States. These graphics are either put together by the presenter (and are cheap—and look it) or by a graphics studio (and are very expensive—but look professional). Only 3% were then done by computer. Yet computer-produced slides and overheads have high impact, look professional, and cost relatively little—*if* you've got the technology to produce them. A huge market niche was available for development, a niche that was a natural extension of the desktop publishing technology that most organizations were already involved in.

Rolling out—moving into a contiguous area—enables users to build on their investments in desktop publishing expertise and technology. They can even use their old micros, making an evolutionary change. Some desktop presentations can be produced with only small and cumulative changes to the existing software and hardware base. But, as colour and grey scales are involved, a plethora of new software programs and peripherals will eventually be necessary, along with all kinds of enhancements of the 'old' micros, to get *advanced* results. In these circumstances it makes most sense to move immediately to the new technology for the few micros that are all that will be required—initially—for desktop presentations.

The roll out is initially focussed on the 'hot market'—the lead users. The manufacturer will provide deep discount sales to prominent early adopters—champions of his product line—in key businesses, major universities and leading user groups. He'll then 'hype the hots' by providing the user groups and major electronic bulletin boards with inside information on the new technology (software as well as hardware) and by 'event marketing' components of the technology.

The early adopters will typically buy a cluster of interrelated components of the new technology as well as switch to the new micros (which they've been coveting for some time). Each early adopter will sell, on average, seven or eight other people on this technology. This ripple effect generates the critical mass of users that foreshortens the otherwise lengthy early phase of the adoption process. In this way, the manufacturer has 'smashed the wall' of resistance to the new product. The early majority will soon to begin to purchase it.

The Organizational "Constellation"

The fast pace of technological development required to make this roll out possible needed a special organizational format to foster it. Apple adopted the format known as the "constellation" to do this fostering. As this structure makes the organizations which adopt it fearsomely effective competitors, it's likely to spread to other sectors of society in the wake of Apple's successes. Here's what's involved.

A constellation consists of an 'intelligence centre', plus a framework of co-ordinated modules—affiliates and members of the constellation. Functions which aren't of crucial importance are transferred from the centre to the modules Standard-

ized, industrial-type activities are likewise spun off. This leaves the centre with the jobs that are on the leading edge of the technology, while allowing it to piggy-back on other companies' technological capacities (Toffler, 1985: 99–146).

This type of organizational format keeps the centre lean by cutting back on bureaucratic overgrowth (and payroll); decreases capital expenditures; makes for greater flexibility in allocating resources, and strengthens the membership overall by the securing of strategic alliances. The centre concentrates on:

1. Research and development: Apple provides leadership in research and development to all other members of the constellation. New developments on the part of constellation members are encouraged by Apple's generating third party enterprises (by licensing out its technology or providing support for start-up efforts), by allocation of venture capital, and 'nondisclosure' agreements (which admit promising third parties to inside information on future developments, or patents, in Apple's technology).

2. Maintenance of standards: this ensures that all developmental work is in conformity with Apple's system, to which all developers must adhere; co-ordinates third parties' activities, when several related programs are under development simultaneously, and provides support services and resources.

The ethos of the constellation is that of 'bottom-up' management: everyone involved, in the modules as well as in the centre, is encouraged to come up with innovative ideas, and solicit them from lead users—developers at beta test sites (beta software is software at stage 0.9, or earlier, of development, where release occurs at stage 1.0), or heavy users who push the technology to its limits.

The staff of the centre focus on critical issues, at the cutting edge of the technology. Their role is to provide the entire constellation with leadership, and to initiate new developments constantly. Speedy, flexible and creative response to a wide range of developments is of paramount importance.

The centre gets out of capital-intensive activities, and decreases outgoings on manpower and payroll (there have been massive layoffs and financial streamlining at Apple). Projects which are at the bleeding edge of the technology (where sales depend on continuously cutting production costs rather than on adding, new, capability-enhancing features) are spun off to the modules—to new companies entering the constellation.

Cut-backs and transferring operations out, along with licensing out of patents, frees up money for supporting developers with projects of high potential, and for investment in joint ventures with other good prospects. This spreads the risks attendant on innovative ventures. When a risk-capital project succeeds, its developers can be encouraged to go public with their stock, increasing the financing and alliances available to the constellation (which becomes more attractive the larger its software library and range of peripherals grows). Dropping back to a minority stockholding

position, when such projects succeed and go public, frees the centre's capital for re-allocation.

A constellation is big enough to be monitored for its social and environmental impact on its host society. So the centre must watch its policies carefully. For instance, Apple is the only major producer of computers to have refused to sell into South Africa while the apartheid policy is in effect. Moreover, the centre can avoid activities which could be socially or politically controversial, while allowing modules involvement therein.

Another advantage of a constellation is that no *one* developer, whether of software or of hardware, can dominate the market into which the constellation is selling. Nor does the centre have to rely on any one company as a major supplier. The centre's role is to concentrate on basic research and development, and oversee and integrate the many related developmental endeavours among the modules. This makes it an intelligence centre; so it builds an informational base which makes its leadership unassailable.

The Effect of the Constellation on the Free Market

Leadership also entails the development of game plans. Highly successful ventures can be supported when their developers port them to other types of computers. These cross-overs enable the constellation to invade other markets, encroaching on the market share of leading developers who *aren't* constellation members.

The impact of the constellation on the computer industry is most clearly shown in software wars and software prices. It's increasingly difficult for a small company to make it on its own in an industry dominated by constellations. It won't have adequate capital, inside information, or technical support. The bigger companies will gobble the smaller ones up—and themselves be at risk from the big companies affiliated in giant constellations.

Mergers and alliances proliferate. Companies need a certain critical mass of programmers, persons to provide over-the-phone technical support, and sales and distribution staff, to provide quality services for major clients. Corporate buyers won't make a large investment in software, and an even larger one in training their staffs in that software, without assurance of on-going support and product development.

A software house which secures a number of corporate clients has a large captive market for up-grades and add-on products. But it will only retain this market by readily providing customer service and innovative product up-grades reflecting technological breakthroughs. Other software houses will push forward to provide service, if it fails to do so. Meanwhile software prices will rise. It's only competition between small, innovative companies, which don't have the overhead of the giants, that keeps prices down. But small companies can't mount the advertising campaigns that go with securing corporate customers. So, to survive and grow, they have to become affiliates of the constellation.

To spread its risks and expand its initiatives, the centre wants third parties to develop software. Insider trading in ideas and other conflicts of interest mean that the centre can't *itself* develop software, if it wants third parties to do so:

1. The centre is necessarily privy to the plans of all third parties developing software for its micros: it provides them with technical support. If it is simultaneously developing software that competes with theirs, it could exploit their ideas to its own advantage.

2. It takes several years to develop the next model of a micro. Likewise, it takes several years to develop the software for it. For the hardware and software to appear simultaneously, the software developers must have inside information at each stage of the micro's development. If any one software house has the inside track, it doesn't make sense for others to undertake to develop programs for the new model.

But third parties can be *too* independent. When Apple produced the first Macs, it had little option but to rely on Microsoft, the world's largest software house, which consequently enjoyed an insider position during their development. Microsoft, being closely associated with IBM, promptly put out a word processing program, *Word*, which was superior to Apple's *MacWrite*, and then a spreadsheet, *Excel*. Both products dominated their market niches, discouraging competition. With Microsoft dominating the Mac market, other developers were slow to enter it.

When introducing the SE, and later the Mac II, however, Apple *did* have options: there were 4,000 programs available by then for the Mac. So, when major developers objected to Apple's plans to put out a database management program of its own, Apple spun its software development activities off to two new companies: Claris (headed by Apple's former VP for sales and marketing in the United States, and *starting* as the world's fourth largest software house), and Acius (headed by Apple's former top 'evangelist').

These companies, backed by the resources of Apple's constellation, are likely to end Microsoft's reign as the largest independent supplier of software for the Mac. Then Apple will no longer be dependent on a company which has close connections with IBM. Apple wants its developers to be urgently writing their most exciting programs for the Mac, and porting from the Mac to the PC, not vice versa.

But it's in the public interest to have powerful software houses operating independently of the major vendors of micros. The current move, by Apple and Microsoft, to terminate Adobe's *PostScript* printer-driving language and library of typefaces as industry-wide standards—a move proceeded with despite widespread protests by end users, appalled at the prospect of the cluster buying which will necessarily result—demonstrates why this is so. The resulting plethora of printer-driving languages, differently designed typefaces, and specialized printer drivers will make the task of the service centres (which turn incoming text files into plates from linotronic printers, thus making quality printing from micros possible) increasingly

difficult. Smaller service centres will likely go out of business, not being able to afford all the new software and typefaces required.

A free market in ideas concerning this technology—the matrix which fosters such independents—is also in the public interest. The constellation is likely to *inhibit* the ferment of ideas that goes with an open marketplace, which has been the environment from which most of the creative initiatives in microcomputing have come. Since adopting the constellation, for instance, Apple's Macintosh technology appears to have become less innovative. The technological lead may well have passed to the NeXT technology, developed by Steve Jobs, developer of the Mac, ousted from Apple in the process of adopting Apple's new organizational structure and philosophy.

Potential Consequences if the Constellation Is Widely Adopted

The constellation is the organizational form which underlies the Japanese economic miracle. It goes with a social welfare system which is distinctly different from the one to which we are accustomed. In Japan, if you are fortunate enough to get hired into one of the centre's units within a constellation, you will live out your working life there. Your organization will provide company help with housing and medical care till you retire at age 55, with a bonus for your long years of service.

You'll need that bonus. There are no state pensions or unemployment insurance. If you have been employed in one of the centre's units, you'll very likely to be hired into one of the modular companies of the constellation. There, as VP, your inside knowledge of, and contacts within, the centre can be of inestimable value to the module out on the periphery. But you've lost your company-provided support for housing and medical services.

You'll need the equivalent of $1,000,000 on which to live when you retire. You may have been making $64,000 a year, and you'll have been saving hard. But the cost of living is so high in Japan that you probably won't have saved as much as you'll need. You'll have to live with a member of your family. And the above scenario holds only for those who make it to the centre. Most people don't—and life in the modules is a much tougher business. It's far better than life *outside* the constellation, however. These are the labour conditions that produce the driven work force that has created the Japanese economic miracle.

The constellation is fearsomely effective as an engine of economic growth. Western societies may have to adopt it to cope with international competition. This form of organization is anyway likely to spread from leading edge companies in our economy, if past experience is anything to go by. If the constellation becomes the organizational form in the West, our working conditions are likely to change drastically: the gains painfully made by the labour movement over the years will be lost; pensions will go; unions will become the production-conscious Japanese variety, and in-house promotion will be attenuated (ex-centre personnel will get most of the prize positions in the modules). A stable work environment will be a rarity: the centre passes

on most of the high risk endeavours to the modules, exploiting those at the bleeding edge of the technology. And creativity will become much rarer.

It's economic transfer again, on a gigantic scale. We'll be working in 'greedy groups'—groups which will require huge amounts of our time and energy. Competition will be endemic: we'll be members of competing groups/teams within our organizations, the groups themselves being situated within fiercely competing organizations. Large alliances of companies will be vying with one another for survival. Sculley's autobiographical account of his rise to CEO at Apple gives a vivid picture of this kind of work environment (Sculley with Byrne, 1987).

Conclusion: Overall Consequences of Desktop Publishing

The Desktop Publishing 'Revolution'

The computer industry hailed its desktop publishing technology as introducing a revolution. Authors would regain, for the first time since Gutenberg's days, control of the presentation of their ideas. They would *own* the means of production. Anyone could own a press, and, in so doing, would gain the freedom of the press.

But having a computer on your desk that can produce camera-ready copy (thus eliminating the expensive page-proofing-via-an-initial-print-run stage) copes only with the *pre-print* stages of publication. It cuts an enormous amount off publications costs (upwards of 60%). But you still have to hire a printer to print, collate and bind the results. Besides, to *publish* a book, you have to own, or put in place, a sales and distribution system, which is about as costly as a press. Moreover, desktop publishing technology is *very* expensive. It requires well educated and well trained persons to run it, and has to be run many hours a day every day (at serious risk to operatives' health, be it added) to justify its purchase costs. It hasn't occasioned a start up of underground presses. The reverse has occurred.

The main beneficiaries of desktop publishing have been the large corporations (who can purchase the equipment as a tax-deductible business expense). In North America, business and government together publish more pages annually than do book publishers. As they buy computers in bulk, they get cut rates. A centralized desktop publishing unit within an organization will cut that organization's publishing costs by over 60%. And the unit's computers can also be used for accounting, architectural and engineering drafting, and database management.

Desktop publishing saves corporations money on forms, manuals, flyers, newsletters (more people regularly read newsletters than read newspapers) and reports. This is not an inconsiderable sum: centralization of in-house publishing activities reveals it to be between 6 and 10% of company earnings. Moreover these documents can be produced and revised quickly and easily, with complete security over their contents. And the work is done on demand, as required (no waiting for printers' schedules), with minimal overtime costs. Thanks to this technology, most big corporations have effectively become publishing houses.

What appears to be happening is that the large, information-producing conglomerates (I've used this term because of the variety of types of communications that the latter produce, with proprietary electronic information services earning most money and trade books least) are growing in size and power. Insiders in the world of publishing are currently predicting that between 5 and 7 such conglomerates will dominate international publishing by the year 2,000 (Greco, 1988–9: 9–22).

Middle-level publishing houses are in something of a decline, as they have to maintain almost as large a sales force as the giants, yet have less products—and fewer product varieties—to market, so can't be as cost-effective. But *small* publishing houses have experienced a marked advance advance in vigour and profitability, for reasons already indicated.

The Impact of the Technology on Society

Rapid development of a communication technology produces an information-using elite of persons positioned by their higher economic and educational status to take advantage of such development. Only a well-educated, computer-literate person, with training on expensive microcomputing technology, can rapidly acquire the skills of a printer. The mass of the population drops, relatively, ever further behind, in information processing capabilities.

Besides this, computerization of the work place is altering the structure of the work force, cutting back on middle management positions. Most new jobs created are in low-paying service sectors. Only a privileged few in upper management have access, via corporate facilities, to the information utilities which make rapid retrieval of up-to-the-minute information on trends in business and industry possible. Thus as the gap between elite and mass in their respective abilities to produce publishable text is widening, the gap between them in their ability to access information is growing ever wider too.

Meanwhile, in our TV-oriented society, aliteracy (lessened use of reading skills) is on the increase. So is functional illiteracy, as the reading level required to make sense out of increasingly information-dense job-related reading matter (much of it produced via desktop publishing) goes up. Such readers will rarely access reading matter via a VDT, as they mostly don't have the minimal computer skills required to do so. Thus the spread of computer-enhanced communications among the elites is paralleled by decreasing rates of literacy among non-elite sectors of the community—hardly a desktop publishing revolution. But then, in the United States anyway, about a third of the population has such attenuated reading skills (illiteracy, too, is on the increase) that it can't read the desktop publisher's product (Henry, 1988–9: 4–8).

This, then, is the downside: though desktop publishing hasn't directly contributed to the spread of aliteracy, functional illiteracy and illiteracy, it doesn't seem in any way to have halted or decreased their growth. The development of the technology has led to microcomputer hardware and software that's harder, not easier, to use. And a new

organizational structure, adopted to rapidly develop the desktop publishing technology, could well lead to a markedly less humane and creative work environment for the rest of us, if it is widely adopted.

REFERENCES

Borrell, J. (July 1990). "Is Your Computer Killing You?" *Macworld*, 23–26.

Brodeur, P. (July 1990). "The Magnetic Field Menace," *Macworld*, 136–45.

Carney, Thomas F. (1988). *Publishing by Microcomputer: Its Potential and Its Problems*. Cambridgeshire, Soham: Peter Francis Publishers.

Edwards, Betty (1979). *Drawing on the Right Side of the Brain*. Los Angeles: Tarcher.

Embree, Diana (January 1990). "Warning: Computing Can Be Hazardous to Your Health", *Macworld*, 150–157.

Greco, Albert N. (1988–9). "Recent Trends in Mergers and Acquisitions in the Publishing Industry in the United States", *Gallatin Review*, Vol. 8, No. 1, 9–22.

Henry, Patrick (1988–9). "The Anti-Illiteracy Symposium", *Gallatin Review*, Vol. 8, No. 1, 1–8.

Rogers, Everett M. (1986). *Communication Technology: The New Media in Society*. New York: The Free Press.

Sculley, John, with John A. Byrne (1987). *Odyssey: Pepsi to Apple... a journey of adventure, ideas and the future*. Toronto: Fitzhenry and Whiteside.

Stone, Bob (1988). *Successful Direct Marketing Methods*. Lincolnwood, IL: NTC Business Books, 4th ed.

Taylor, John G. (May-June 1989). "Editors are scrambling to deal with the growing menace of VDT-related injuries", *American Society of Newspaper Editors Bulletin*, 4–8.

Toffler, A. (1985). *The Adaptive Corporation*. New York: Bantam Books.