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E-Books:

The First Two Generations

A thesis presented to
the faculty of the Department of English
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Master of Arts in English

by
Todd Doman
December 2001

Dr. Jeff Powers-Beck, Chair
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ABSTRACT

Electronic Books: An Overview of the First Two Generations

by

Todd Doman

The electronic text reading device, or e-book, is an idea that has reached the implementation stage. Technology has only recently made possible the production of a device to challenge the printed book's dominance as the media for information transmission. These microprocessor-based devices are attempts to exceed the limitations of printed texts while retaining their strengths. Two generations of these devices, and the companies that created them, have reached the marketplace.

This thesis provides a short history of electronic text readers and gives an overview of the first and second generations. The issues that will affect the adoption of the e-book as the dominant media for the transmission of texts are discussed. The primary objections to the e-book's replacement of the book are durability, ease of use and clarity. With these concerns addressed by improvement of the underlying technology, the e-book will replace the majority of the printed books in the marketplace.

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CHAPTER 1

INTRODUCTION

The electronic book, or *e-book*, has been around for a long time as a concept. The original idea was clearly defined for the first time in 1945 and has been addressed many times since then. The advent of personal computers led to the realization that the electronic reading device was a real possibility. Until the late 1990s, however, there were only isolated instances of the electronic book in physical form. It took this long for the available technology to catch up to the idea. Along the way, the concept of the electronic book, or e-book, led to significant advancements in personal computer development. When display, battery, and micro-processing technologies advanced to the necessary level, the mixture of the computer chip and the printing press that resulted led to several new devices. These devices, in turn, led to the first major challenge to the world of the text since the paperback book: the e-book.

The hardware e-books, or *readers* as they are sometimes called, are symbolic of the challenge that the printed books are facing. These devices are designed to replicate and, if possible, improve upon the reading experience afforded by a paper edition of a book. They do this by using aspects of hypertext, a term coined by Ted Nelson, widely regarded as a computer visionary, to describe non-linear writing in which you follow associative paths through textual documents. By taking the text and removing it from the printed page, what will this mean? Much of the answer to this question will depend on the device that is chosen to replace the printed book. Each of text readers in the first and second generations of the e-book

has its own interpretation of the reading experience. How this affects the reader and their interaction with the text is a large question that must be addressed if we are to understand what this means for literature and reading, in general.

Bush's Memex

Before we discuss what I have termed the “first generation” of e-book devices, let us look back to the electronic book's beginnings. Vannevar Bush's Memex and his proposal to link microfiche texts together to allow knowledge to be structured more efficiently in what he termed “associative indexing” (Bush) can be seen as the clearest visualization of the concept. Bush's Memex was a response to what he considered to be a previously unknown problem; too much information.

After World War Two, Bush said that:

The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships. (Bush)

Essentially, the rate of the information that had to be absorbed had increased by a significant factor, but the tools that we used had not changed. This is still the case, but the possibility exists for new tools to expand our capabilities.

What Bush proposed was a machine that would combine a “mechanized private file and library” into a device that would serve as “an enlarged intimate supplement to his [the user's] memory” (Bush). By doing this, Bush proposed that the massive amount of information that was being published, due to the impetus of the war effort, would be more accessible to readers.

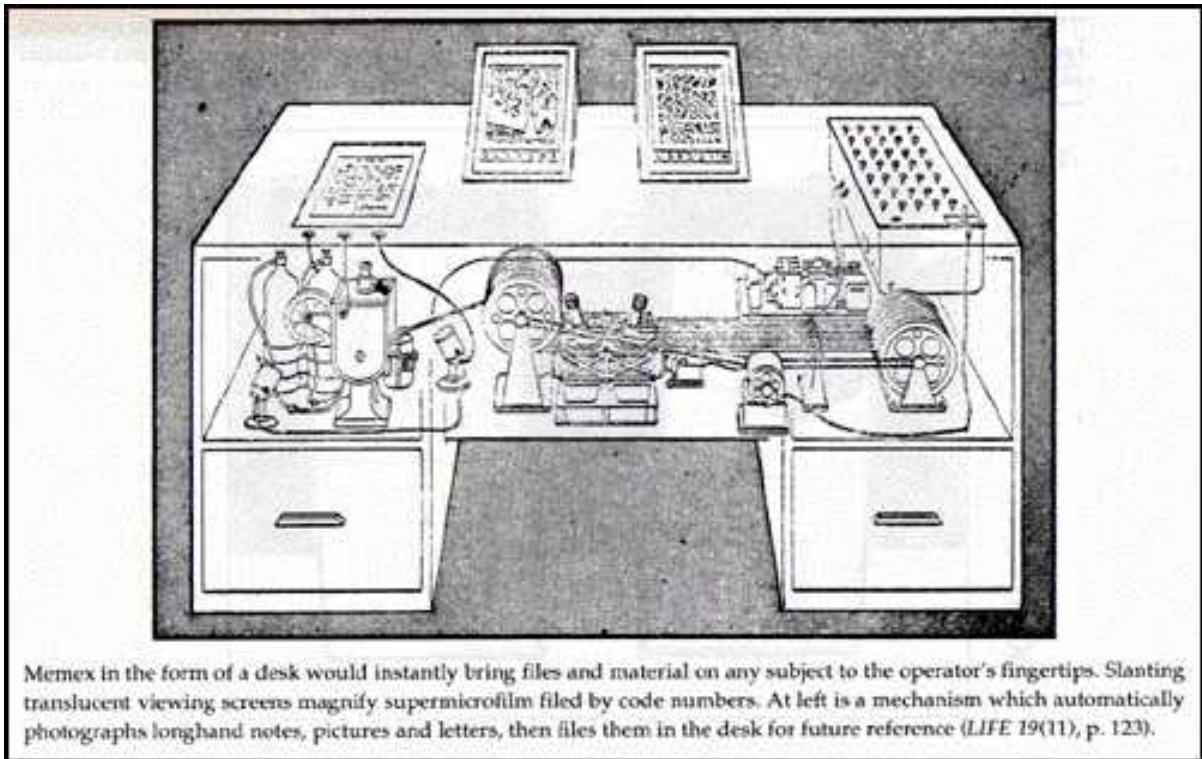


Figure 1 - Vannevar Bush's Memex

The true value of the Memex would come in associative indexing, the tying together of two items in the texts. The user would be able to build a trail through the microfiche books contained in the device, following threads of associations through books and articles. The user could interject their own thoughts into the trail in the form of longhand passages of their own. It would also have been possible to record the trail that one had blazed and to reproduce it, to allow others to follow it by placing it into their own Memex (Bush). For this idea, Vannevar Bush is frequently honored as the originator of the idea of hypertext. Arguably, he should also be recognized as the originator of the electronic book. The text may not have existed in digital form, but that was due only to the limitations of the then-current technology. Now the technology is approaching the point at which the original idea of the Memex can be made a reality.

Kay's Dynabook

The person most often viewed as the originator of the electronic book was Alan Kay. The idea came to him in 1968, while on an airplane. Kay was returning from visiting Seymour Papert, who had been teaching children to program a computer. He remembered Aldus Manutius, a Venetian printer and the first to print book in a modern format. Manutius had set the size of the book by measuring saddlebags, the transport medium of the time. Kay had an idea for a “book-sized computer that the user, especially children, could use in place of paper” (Gasch), what he termed a “personal dynamic medium” (Johnstone). It was a “light, intimate, keyboardless device” (Levy, 2001, 67), which was “as accessible as a book” (Wilson). He called it the “Dynabook.” The cardboard mock-up of the device that he constructed resembled a modern laptop, except it was flat, like a tablet (Johnstone).

In 1972, Kay became a member of the Xerox Palo Alto Research Center (PARC). This research lab was the staging center for the PC revolution. Many of the aspects of the PC that we take for granted were first thought of here. Kay presented a slide presentation and outlined a technology that he termed the B.O.O.K. (Basic Organization of Knowledge). It was a device that was:

solid state; held several megabytes; cost only a few dollars per megabyte; weighed only a few pounds; had low power drain; had a high resolution, high contrast readable display that was highly legible in daylight; and had the capacity to represent the most important segments of the world's knowledge (Kay).

This device would use the strengths of the computer and the strengths of the book to change the way that discourse and argument are conducted. Kay also stated that he hoped to avoid the hundred years that it took from the introduction of the printing press to change the way that scholarly arguments were conducted. Arguments stopped appealing to authority and precedent and began using “observation, models and logic” (Kay). Kay stated that the media should be purposely designed to avoid the useless imitation of previous forms that took place during the decades after the printing press was introduced.

Shortly after this presentation, in 1971, Two PARC engineers, Chuck Thacker and Butler Lampson, asked Kay if they could try to build his Dynabook. What they produced was called the Alto, a desktop computer that provided the inspiration for the Apple (Levy, 69). Another attempt, by a company called Grid, led to the laptop computer, as we know it. The “clamshell” design was intended to protect the display, a problem with the original conception of the Dynabook (Johnstone).

Project Gutenberg

In 1971, Project Gutenberg began. While not an attempt at building a device, Project Gutenberg was an attempt to place public-domain textual works into a digital format, thereby making them available for people throughout the world and, incidentally, providing resources for electronic book devices.

The project was begun by Michael Hart, who received a user account with \$100,000,000 in spare computing time in it by the operator's of the Xerox Sigma V mainframe at the Materials Research Lab at the University of Illinois (“History and Philosophy of Project Gutenberg”). Hart reportedly felt that there was nothing that he

could do in the way of a normal computing project to repay that value, so he announced that “the greatest value created by computers would not be computing, but would be the storage, retrieval, and searching of what was stored in our libraries “ (History of...). He began by typing in the “Declaration of Independence.” His theory was that anything that could be entered into a computer could be reproduced indefinitely, creating what he termed a “replicator culture” (“History of...”).

To provide these texts for the future, Project Gutenberg, which aims for simplicity, has since its inception held to one specific standard for the texts that it holds. This format is ASCII (American Standard Code for Information Interchange) text, the simplest form of text file. While not capable of advanced formatting, ASCII text is capable of being read in a tremendous variety of computer systems. It is a file system that assigns a number to each character, which includes letters, both upper- and lower-case, and basic punctuation. Formatting is by means of spaces, carriage returns, and line feeds. Over 99% of all computer systems ever made will be capable of displaying the ASCII text files (“History and ...”), regardless of what make, model, or operating system they use. Rather than tying the preservation of a truly historic mass of texts to the survival of a single company, they took the least common denominator of the computer world and made that their standard.

The current total of the texts that have been converted to digital files number 2500 as of March 11, 2001, representing 850 authors. More texts will be added to the library as volunteers create the files, and as more texts reach the public domain. The recent extension of the length of copyright has limited the number of modern

texts that will be reaching the public domain. These texts provide a vast pool of information that is accessible for inclusion in the modern e-book.

The use of Project Gutenberg would have to wait 14 years from the beginning of the project, because the first electronic book could not access those files. In 1984, Franklin Electronic Publishers released an electronic dictionary, capable of displaying a single line of text on a pocket calculator-sized device (Wilson). This was followed by other devices: electronic foreign language translators/dictionaries, Bibles, and specialty dictionaries, among others. They were sold in consumer electronics stores, department stores, and many other retail venues. Each of these devices is a hard-wired book, incapable of being upgraded or changed.

Sony Discman

Another electronic book device was produced by Sony, the Japanese electronics company. The Data Discman was introduced to the American marketplace in 1991. The Discman played both audio CD's and data CD's in Sony's proprietary electronic book format. There were two separate models released in North America, with the only difference being the number of electronic book titles that came bundled with the device. Both weighed 1.5 pounds, measured 4.25x2x5.35 inches. They had a LCD screen that measured 3.4" diagonally, and displayed 10 lines of 30 characters each. The battery provided three hours of use (Keep, McLaughlin, and Parmar). The DD-1EXB had a retail price of \$550 and came with three texts: Compton's Concise Encyclopedia, Wellness Encyclopedia, and Passport's World Travel Translator. The DD-1EXE came with only the Compton's concise Encyclopedia and sold for \$450. At the time of their introduction, only 20

titles were available in the Sony electronic book format. The limitations of the device form a list that mirror many of the failings of later devices. Nancy Herther gave them as:

[U]sing a battery as power source limits multimedia capabilities; the screen is small and resolution limited; the closed, proprietary architecture limits creativity; the search engine is not very robust; and the lack of DOS capability or a note field limits its current value to many vertical markets (qtd. in Keep et al.).

This did not prevent it from selling a reported 90,000 units in Japan, mainly to “professional men in their forties who feel a need for quick access to reference information”(Herther qtd. in Keep et al.).

Sony/Franklin Bookman

Sony’s second device, the Bookman was built to answer the critics of the first device. It weighed two pounds, had a 4.5” (diagonal) screen, and used cartridges to store texts. In 1995, Franklin purchased and began marketing the Bookman line of hardware based electronic books. These devices changed greatly from their original form at Sony.

The current Franklin Bookman, still available for purchase from Franklin, uses matchbox-sized memory cards to store texts and some small programs. Readers can download information from a computer to one of the proprietary cards with the purchase of a Bookman Writer, a \$50 accessory. The texts that are available for the Bookman consist of primarily reference works, including multiple versions of the Bible, a wine guide, multiple dictionaries, and some card and trivia games. The

pricing of the texts averages \$20 for the purchase of a unit on a card or \$14 for a downloaded file that is loaded to a card through the Bookman Writer.

The early developments of the electronic text reader were as capable as they could be with the technology of the time. With the advent of more powerful processors, more efficient batteries, and less expensive memory, the e-book came into being in more than one form for the first time in the late 1990s.

CHAPTER 2

FIRST GENERATION DEVICES

The first generation of the hardware e-book was an eventful one. Much like the close of the century it took place in, the generation saw many ups and downs, with many people unable to agree upon which event was positive or negative. Observers also witnessed many casualties among the developing companies. Numerous companies were founded, such as GemBook and Nuvomedia, all of them dedicated to bringing the e-book reader to the masses. Some of these companies vanished. Some of them transformed themselves and others merged. None of them entered the 21st century in quite the same form as they approached it.

Gembook

GemBook, a company whose name oddly resembles the only surviving e-book company, was founded by a Florida entrepreneur, Gemma S. Beaulieu. The company scheduled its rollout for the fall of 1999 but disappeared without ever

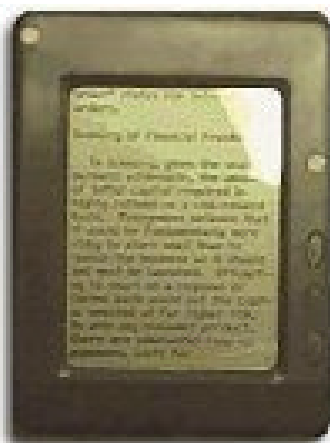


Figure 1 - GemBook

demonstrating a working model of their book. The device they were promoting used replaceable memory cards, approximately the size of a credit card, for storing text, rather than transferring it from a computer. Each “GemCard” would hold a book of between 400 to 600 pages. These cards would be purchased in either retail stores or from a website (Beaulieu).

The GemBook reader was designed for people who were not “computer literate...just literate,” in the words of their press release. The

device, said to be about the size and weight of a paperback book, was designed to be both “beach proof” and “ketchup proof” (Beaulieu). A flat panel, black-on-white display screen displayed a complete page of text, which was supposed to “turn,” rather than scroll as in some of the other designs. A page-forward/page-backward button controlled the movement. An on/off switch, self-adjusting backlight, and a two-stage font size control were the only other buttons. It had multiple options for power supplies. AA batteries, said to supply up to 30 hours of function, a power adapter for 110v/220v wall outlets, and optional rechargeable batteries were the possibilities (Beaulieu).

The GemBook, unlike most of the other first generation e-books, required no connection to another electronic device, telephone line, or network. The possibility was mentioned for later developments, but the original design used a removable storage device, the GemBook Card, as the only interface. The cards were encrypted and copyrighted, which allowed full control over the texts and prevented any possibility of piracy. The card format allowed more “fair use” flexibility than the copy protection schemes of the other e-books. Rather than locking a text to a particular reader, the GemBook allowed the “loaning” of texts. Simply by giving a GemBook Card to another Gembook owner, you could transfer a text to someone else for an indefinite period of time. Used-book stores would also be able to resell the cards.

In hindsight, this may not have been the best plan as it relied on either retailers to sell the cards directly to the customers or shipping the memory cards after they were purchased from a web site.

The reasons for this infrastructure design may have been concerns for security and profitability. Because the texts would not be able to be copied or transmitted digitally, the chance of copyright violation would be nonexistent. In addition, the purchaser of the device would be locked into buying only from GemBook or one of their licensees due to the card's proprietary format. This model did not attract enough interest or funding to reach beyond the development stage.

Glassbook

Glassbook, another first generation e-book company, initially planned to build



Figure 2 - Glassbook

a dedicated reading device to complement its Digital Rights Management (DRM) software. This would be used for delivering encrypted, copy-protected content (“Hand-Held Reader Devices & Other information,” 2).

The Glassbook Reader used the Adobe Acrobat format, the .pdf file. This format had the advantage of allowing access to a large pool of pre-existing documents, in that the Acrobat program is most often used to create static digital forms of existing paper documents, such as newspaper or magazine articles, forms, or other documents, typed, printed, or handwritten.

One of the most interesting capabilities of the Glassbook device was the ability to “loan” a text to a friend. Although the mechanics of the loan were not made clear, the process was described as relatively simple. The file could be transferred to the Glassbook reader of a friend for a specific period of time, during which it would

be inactivated on the original machine. At the end of that time, the loaned copy would expire, and the original would once again be activated.

Even though the business plan seemed to take at least one of the concerns of the possible users of the device into account, it was not to be. The production of a hardware device was dropped as the company became part of Adobe's e-book efforts. Because the Glassbook Reader used the .pdf file format of Adobe's popular Acrobat program, this was an easy merger. Since Glassbook had both the Glassbook Reader software and the Glassbook Content Server, Adobe purchased a complete system, saving them a great deal of research and development. The Glassbook reader name was retained for a short period of time, then Adobe changed the name to the "Adobe Acrobat eBook Reader" (McHale and Lesinski)

Librius Millenium Reader

Other companies changed their business plans. Librius had been developing an e-book reader. At least three prototypes had been developed, but none had been released. Their reader, the Millennium Reader, was viewed as an ancillary product to their books and software. The target market for their device was "people who read romance novels and best sellers" (Sanders 2). The Chief Executive Officer, Don Bottoms, said, "We're going to give women a high-tech way to read romance novels" (qtd. in Sanders 2). By forming partnerships with bookstores and supermarkets, the company hoped to make it easy for the "computer-wary" (Sanders 2) to use the Millennium. By keeping the design of the device simple, using only five buttons, Librius claimed that a user manual was unnecessary.

This business plan was based on a forecast of the e-book market reaching \$2.5 billion by 2002, according to Bottoms. This forecast, like a weather forecast, was subject to change. Librius decided to abandon the development of the Millennium. Don Ledford, a company spokesman, announced in September of 1999 that Librius believed that “the niche for eReader devices like the Millenium, the RocketBook [sic], the SoftBook, etc., will evaporate within one year” (Zeitchik, “Ebook Manufacturer...”). The company felt that the future lay in the multi-purpose Personal Digital Assistants (PDA’s) like the Palm, Handspring, and others. This forecast led to Librius changing their focus toward producing a software program for use in those hand-held computers. The ability to use the device for scheduling, calculating, games, and many other uses, limited only by the processor power and the user’s imagination, makes the device a wiser investment than a single-purpose e-book that costs the same amount (or even more).

Everybook Dedicated Reader

Another company, Everybook, was promoting an extremely attractive reading device. The Everybook “Dedicated Reader” made an addition to the seemingly standard e-book layout of a handheld tablet.

This addition was a second, opposing screen. A hinge between the two screens allowed a reading experience very similar to that of a printed book. This similarity was only skin-deep, as both leaves of the e-book were to be able to display different texts, which



Figure 3 – Everybook Dedicated Reader

allowed the reader to open and read two separate and distinct texts at a single time.

The resemblance to a printed book was further enhanced by the file format used by the reader. The file format that the Everybook device used was the Adobe PDF (.pdf) file. This format enabled the e-book to display the text exactly as the author wished, rather than the page reformatting to fit whichever size screen it was displayed on. It also allowed for encryption. An added benefit, touted by Everybook, is that almost 90% of all publishers either format or archive their titles in PDF (Everybook media kit letter). Thus, PDF is as close to an industry standard as currently exists.

The physical dimensions of the Everybook Dedicated Reader were large, larger than any of the other first generation e-books. The screens were supposed to be a full 8.5" by 11". Everybook said that this was necessary because research "show[ed] conclusively that reference and education textbooks must be full 8.5"x11" pages to maximize reading speed and comprehension." (Munyan, qtd. in Roush, "Everybook facing screens..."). The weight of a prototype unit was 3.65 pounds, making it by far the heaviest e-book. It outweighed the SoftBook, the next heaviest, by three quarters of a pound. Most of this weight comes from the screens.

The screens had a projected resolution of 300 dpi, far in excess of any other e-book. The Nuvomedia Rocket eBook had the closest published resolution at 110 dpi. This resolution would have enabled the Everybook to display the .pdf files needed to reproduce the pages of a book exactly as they had been printed.

The target market for the Dedicated Reader was primarily industry. The manufacturer's suggested retail price was \$1600, leaving it out of the reach of most

households at approximately the price of 80 hardback books. This cost was not prohibitive to a corporation, because the manuals required by a technician could be placed on the device. By preparing service manuals in e-book form, the corporation would eliminate printing costs, as well as such hidden costs as the amount of time wasted traveling from shelf to machine and back again, the storage space required by the manuals, the shipping costs to get them to the technicians, etc.

In June of 2000, the company changed the focus of its device from an e-book reader to a laptop replacement (Roush, "Everybook Repositions..."). Everybook made this change because, as Everybook president Daniel Munyan says, "We were hearing things like, 'I already have a Palm or Jornada, a cell phone and a laptop. I don't want another device, especially one that's only a little smaller than my laptop'" (Roush, "Everybook Repositions..."). Munyan described an incident at a Pennsylvania librarians' conference to illustrate this. A woman attending the conference came up to Everybook's table to examine the device. Munyan told her that it was an e-book reader. "She said, 'Oh my goodness, it looks so nice, but it's too heavy, too expensive, it would never work for me'," recounted Munyan. "Another woman came up five minutes later. To her, I said, 'it's a two-screen laptop with e-book capability.' She said, 'Oh, it 's so light! I just paid an enormous amount of money for my laptop, and with this I could have gotten two screens!'" (Roush, "Everybook Repositions..."). Incidents such as this confirmed the company's decision to change its focus.

Shortly after making this decision, the company switched its focus again. This time, they changed from marketing a physical device to offering document

management services for .pdf and .doc files to the same corporations that it had considered its market for the e-book reader and laptop replacement devices. So another company left the not-so-crowded field of e-book competition before it placed its device in the hands of the public. It did this by selling its developed hardware to another company, N-Vision Technologies, Inc. This company will be discussed in the next chapter.

Softbook

The two hardware devices that did enter the market, Nuvomedia's Rocket eBook and the SoftBook, by Softbook Press of Menlo Park, California, were modestly successful. The two companies were purchased by Gemstar, a company specializing until then in intellectual property (licensing patents, most recognized for simplifying the programming of VCR's), in January of 2000. Before this happened, the two companies set the standard for e-books.



Figure 4 – Softbook Reader

The Softbook is widely recognized as one of the most well-designed of the first generation of e-books. In fact, the Chicago Athenaeum Museum of Architecture and Design named the Softbook one of the 100 best-designed products of 1999 (Roush, “Sophisticated Interface...”). In many reviews of the SoftBook, the interface received favorable comments.

One of the first features that is noticed about the device is the leather cover that folds over the screen. This served multiple functions: to protect the screen when not in use, serve as a power switch, and increase the “book-like” feeling of the

device. The user interface designer for the Nuvomedia Rocket eBook responded to the “feeling” by saying, “having grown up in the late 20th century, I don’t own a single leather-bound book in my library” (McCusker 6). In our time, leather has come to symbolize many things. In some instances it is used to create a feeling of luxury or value. By using a leather cover, the designers of the Softbook made an effort to create a feeling of connection to the printed book.

Physically, the SoftBook has approximately the same dimensions as a one-inch thick three-ring binder, 11” by 8.5” by 1”. The touch sensitive, flat panel screen is 7.75 inches by 5.75 inches and is covered by the previously mentioned leather flap. The resolution of the screen is 85 dots per inch (dpi), which is slightly lower than the Rocket eBook at 110 dpi (Roush). The SoftBook’s screen, however, is a gray-scale display, meaning that it can create 16 varying shades of gray. The intermediate shades that the Softbook’s screen can display provide the ability to show more attractive graphics than the Rocket, which uses a monochrome screen, meaning that it can display only white or black. The intermediate shades allow for smoother graphics, with multiple shadings. The screen does have a drawback, however. Some users of the SoftBook reported that the screen is difficult to see from any angle other than straight ahead, a common complaint with LCD screens. The poor contrast and lack of anti-aliasing for the text, resulting in “staircased” letters, were also concerns for Alan Kay, the developer of the modern idea of the e-book.

For the SoftBook Reader, a lithium-ion battery, one of the most efficient forms of rechargeable batteries available, will provide power for up to 5 hours. This battery

and the screen, relatively large when compared to other first generation e-books, contribute to a total weight of 2.9 lbs.

The controls of the Softbook Reader were minimal and well laid out. A tilting handle let the reader turn the pages forward or backwards, while a menu button provided access to an on-screen menu. The on-screen functions include controls to alter the text size, search documents, make notes, or to purchase titles (Roush, “Sophisticated Interface...”).

It is in the ability to purchase new titles that the SoftBook demonstrated a commitment to bridging the “Digital Divide” while being an issue of concern in the . Unlike the Rocket eBook or the GemBook, the SoftBook included a 33.6 kbps modem. This modem, when connected to a phone line, allows the user to connect directly to the SoftBook Press online bookstore. When connected to this bookstore, touching the book’s title on the device’s screen will automatically download the text into the SoftBook and bill the user’s credit card. This was the only way to load texts into the device, leaving the user locked to the Softbook databae for their titles. If Softbook Press had gone out of business, a significant investment would have been rendered useless.

The onboard memory of 8MB held approximately 5,000 pages and was upgradeable. By adding flash memory cards, up to 50,000 pages could be stored (Roush, “Sophisticated Interface...”). This stands in direct contrast to the Rocket eBook which was upgradeable only to 32MB, and only by returning the device to the manufacturer.

The Softbook's features were not cheap. There were two pricing options for the device. Users could either purchase the SoftBook outright for \$599.95 or enter into a purchasing agreement, buying the SoftBook for \$299.95 and agreeing to purchase \$19.95 worth of texts and periodicals each month for 24 months. This cost seems to have limited the SoftBook's appeal.

Nuvomedia Rocket eBook

The most successful of the first generation of dedicated reading devices was the Rocket eBook. The Rocket eBook had a larger number of units in the market than any other, in large part due to effective marketing and a lower price. Part of this marketing was a partnership between Nuvomedia and Franklin Electronic Publishers.

Franklin was the manufacturer and distributor of Nuvomedia's Rocket. In 1999, as the Rocket eBook was first introduced, Nuvomedia and Franklin teamed up



Figure 5 – Nuvomedia Rocket eBook

to market the device. Martin F. Eberhard, the CEO and co-founder of Nuvomedia, said that "Franklin has been a pioneer in the development of handheld electronic reference books and has been very successful in selling these products" ("Franklin to Distribute

NuvoMedia's Rocket eBook™ To Consumer Electronics Retailers"). The

reason that Nuvomedia did this is very clear. As a newly founded company with a product that had no pre-existing market, they needed Franklin to "get the Rocket

eBook into the hands of readers through Franklin's well established consumer electronics channels" ("Franklin to Distribute..."). Franklin is the company that helped to develop the market for electronic text devices, introducing an electronic Bible and numerous electronic dictionaries in English and other languages.

Another reason for the success of the Rocket was the price. The retail price for the base Rocket eBook unit fell from \$500 in the Summer of 1999 to \$199 by the Spring of 2000, when the company was purchased by Gemstar. This compared very favorably to the only other commercially available device of the first generation of e-book readers, the Softbook, with a price of \$599.95 for the least-expensive model,

What the Rocket eBook purchaser received was a well-designed reading device. It measured 5 inches in width by 7 ½ inches in height, in its default reading orientation, shown in Figure 5. The thickness, at an inch and a half, completes the resemblance to a trade paperback. The unit weighed 22 ounces, about the weight of a decently sized hardback book. The weight was concentrated in an ergonomically shaped bulge on the left hand side of the device, which reminded me of the shape of a paperback when it is folded over. Some purchasers have complained that this shape and weight distribution makes it difficult for them to hold the book for any length of time. One respondent to www.epinions.com, a consumer review site, said, "My left arm and hand start to cramp after about fifteen minutes of use, and I know my grandmother certainly couldn't use it at all (which is a shame because it does such a great job of displaying large print)" (Wendt). I found this to be contrary to my experience with the device. The center of balance was placed far to the left of the device, again, in its standard orientation, enabling me to hold it easily with my left

hand, freeing my right to take notes, hold a baby bottle or whatever else I needed to do, without having to worry about turning pages.

The balance of the weight is a well-considered feature of the device, allowing for easy single-handed reading without precluding a two-handed hold.

By placing the majority of the weight in the “bulge,” the designers of the Rocket eBook shifted the center of gravity towards the palm of the hand holding it. This keeps the fingers of that hand from having to remain tensed to support the weight. The placement of the page buttons allows the reader to use the thumb of a single hand to scroll through a text. I could even shift hands, rotating the text as I did so, in order to allow me to continue reading with my opposite hand. Alan Kay, the originator of the Dynabook, found the weight to be a factor, with the page button being placed too low, so that the weight of the device extending from the hand causes fatigue (Kay).

The ability to “shift” the book is an improvement over the print book. The aforementioned “bulge” was purposely designed to replicate the folded over binding of a paperback book by Ralf Gröne, of Palo Alto Design Group (McCusker 6). The paperback is the most popular book format, according to Deanna McCusker, the user interface designer of the Rocket eBook, particularly for portability. Because of this, Nuvomedia focused their attention on keeping the physical dimensions of the Rocket similar to those of a paperback. They ended up relatively close.

The reading experience that the Rocket eBook provided took a little getting used to, but once the initial learning period was over, was quite pleasant. The way that I read had to change somewhat. Normally, I hold the right-hand page slightly up

with the index finger of my right hand, separated from the remainder of the pages. This method allows me to skim the last few lines of the page, then flip to the next page rapidly, with no interruption to the flow of the text. In turning the page on the Rocket, this was not possible. I had to wait for the short period of time, less than a second, that it took to load the next page. The next page redraws from the top down, letting the reader begin to read while the rest of the page is being drawn onto the screen. Changing this habit was more difficult than learning to use the software and was the source of much annoyance until I examined how the experience was different on the reading device and the printed page. After the initial “breaking-in” period, the experience became transparent.

Other capabilities extended the reading experience, among these the backlight of the LCD panel. The backlight is an under-appreciated advantage. The backlight answers the critics of early electronic texts, who would ask, “Can you read it in bed?” When electronic texts were bound to a monitor, the answer was, “No.” With the backlight of the Rocket, you can read in bed more easily than with a printed text. The backlight also makes reading in dim places other than the bedroom much easier and more enjoyable. The light level is adjustable, allowing the reader to find a level that is comfortable for his or her eyes and which does not distract those around them. Classrooms and lecture halls are also not a problem. If you need to see your book, turn the backlight on. The light is not bright enough to distract the people around you but easily bright enough to see.

The backlight also contributes to producing a “white” background for the LCD text. This contributes to a better degree of contrast and much better performance in

bright light situations than comparable LCD panels, such as those on PDA's or the Softbook (Kay). The backlight does drain the batteries, so using it to overcome ambient light significantly reduces the amount of usable time before recharging is required.

A Nickel-Cadmium rechargeable battery, which can be recharged either in the interface cradle or separately, provides up to 30 hours of use. When not in use, the reader draws only minimal power, allowing it to be packed away for an extended period of time. The interface cradle is required to send titles to the book through a cable attached to a serial port of the computer, using the RocketLibrarian software.

The software that the Rocket eBook comes with, the RocketLibrarian, is a necessity. The software is required to interface your computer with the Rocket. Without it, you are limited to only the texts that come pre-loaded on the device. While these include *Alice's Adventures in Wonderland*, the *Random House eDictionary* (ver. 2.0), and the *User's Guide for the Rocket eBook.*, it would be a significant reduction in the possibilities of the e-book. The first thing that you have to do after installing the software is to register the e-book. This is before you can load any additional titles into the device. Once that is done, you can convert web pages (.html files) as well as text (.txt) files into the .rb format for reading on the Rocket eBook.

In addition to providing the interface for converting files to the .rb format and adding titles to the Rocket eBook, the RocketLibrarian software provides other functions. The software lived up to its name, serving as a librarian and keeping track of the files that I had loaded into it, no matter where on my hard drive they resided. It

also served as a browser for the purchase of titles from Nuvomedia's online bookstore. This led to one of the most useful aspects of the Rocket, access.

The greatest benefit to reading texts on the Rocket E-book was the speed at which I could access them. Using the Internet, I could purchase, download, and be reading texts in less time than it would have taken me to drive to the bookstore, much less have parked and walked in. Using the Baen publishing company's Webscriptions service, I could purchase and download a set of texts, already formatted for the Rocket. After downloading, clicking on the file would launch the RocketLibrarian, ready to place it into the e-book device's onboard memory.

One of the biggest drawbacks to the Rocket eBook comes in the method of loading texts into it. In order to do so, one must have the RocketLibrarian software loaded onto a computer. Without this software, there is no method of uploading new texts to the device. In modern American society, there is a concern over a growing lack of career opportunities available to those Americans who do not have access to a computer. This has been described as the "Digital divide." Censorship based on the tools of access is another possible description.

If texts become a digital medium, no longer available to any literate person, but only those with a computer, what will this removal of available information mean to those who can no longer access it? The Rocket does not address this issue, in part because its target market was the "early adopters," those intrepid souls who simply have to have the newest thing, whatever it may be. It is a safe assumption that most, if not all, of the people who have bought any of the first generation of the e-book have a computer, or at the very least, have ready access to one.

The production of this first generation of devices was a wake-up call for the publishing industry and, indeed, any business, organization, or person who dealt with texts. The way that readers read was facing its first real challenge since the paperback book was introduced in the early Twentieth century. The way that readers interact with the text and how this would change when the interface changed was now a hot topic of study. The innovations of the Internet were reaching past the screens of the computers and into the hands of readers.

Alan Kay reviewed both the Softbook and Rocket eBook and was “underwhelmed” by what he saw. Instead of being a synthesis of the best of both, “little of what is good about books and good about computers was in evidence” (Kay). He holds hope for the future of digital text, saying that:

Looking to the future, it is pretty clear that most books will be offered in digital form over the Internet and be read on high quality, low cost personal computers for children of all ages (Kay).

Reduced prices for the components, especially the display, will lead to this state of affairs. The first generation of devices provide only a sampling of the possibilities. The e-book is still being developed by a variety of companies.

While the first generation of e-books was marked by the failure of many of the companies that took part in it, the innovators paved the way for those who followed them. The second generation of the e-book was both more and less capable than the first, as the companies who brought them forth made decisions based on what they felt were the mistakes made by their predecessors. In the next chapter, we will examine the results of these decisions.

CHAPTER 3

SECOND GENERATION DEVICES

Beginning in the fall of 2000, the second generation of e-books began to appear. These devices were The only hardware e-books that had reached the American marketplace by the time of this writing were the Franklin EBookMan and the Gemstar/RCA Ebooks. These devices are available for purchase through retail stores (such as Office Max) and on-line stores (Amazon.com, Barnesandnoble.com).

Franklin eBookMan

One of the first of the second generation devices to come to market was the Franklin eBookMan. This device is from a company with a long involvement in



Figure 6 – Franklin eBookMan 900

electronic publishing. Franklin developed the first electronic dictionaries and purchased the Bookman from Sony. The company also partnered with Nuvomedia to provide the marketing and manufacturing assistance that was needed to bring the Rocket eBook to market. Franklin evidently listened to what the users of the

Nuvomedia device were asking for and added these features to the device that they built.

One of the more useful features included in the eBookMan is the ability to easily add memory to the reader by using a Multimedia card (MMC) of up to 64 megabytes (MB) of Random Access Memory (RAM). These cards contain interchangeable, non-volatile random access memory. What this means is that the user of the device can load his or her favorite titles or songs onto these cards and,

by taking extras along with the device, extend the memory beyond what they load into the machine's on-board memory. This easy upgradability is a far cry from the procedure required to upgrade the memory of the Rocket eBook, which involved sending the device back to the manufacturer to update the memory from 8MB to 32MB.

Another feature that appeared frequently on the wish-lists of the users of the Rocket eBook was the ability to play audio files. The eBookMan adds this capability, although at a price. This price is a loss of compression. When transferring MP3 files to the eBookMan, the file size doubles. A file that would take 2MB of space in MP3 format takes 4 in the format that the eBookMan must use. Reportedly, this is due to the limitations of the processor that is built into the device (Hanuise). Because it is not as powerful as a full-size computer, or even a laptop, the compression ratio and the sampling rate must be lowered. Another limitation due to the processor is the limitation on multi-tasking. The eBookMan is capable of decoding and playing back an audio file and displaying a book at the same time (Hanuise).

The program that one uses to read titles on the eBookMan is, unlike any other e-book device that I am aware of, a choice of the owner. The eBookMan uses the Franklin Reader, a proprietary program to display electronic texts on the device, a program which requires a specially formatted file. It is possible however, for the user to install other text display and management programs on the eBookMan.

Mobipocket, a company who originally developed their software for the Palm PDA devices, has a version of its software available for the eBookMan. In addition, a

version of the Microsoft Reader program is being developed for the Franklin device (“eBookMan What’s New”).

Gemstar/RCA REB 1100 and 1200

After purchasing the two most successful of the first generation e-book companies, Gemstar, brought out two new models of e-book. This was a surprising purchase, since Gemstar is most well-known for licensing the patents to VCR+, a technology for simplifying the programmed recording of VCR’s.

The two models appeared under the RCA brand name, from Gemstar’s partner, Thomson Consumer Electronics. These models, the REB 1100 and 1200, closely resemble their first-generation predecessors. In the case of the REB 1100, that is the Rocket eBook, by Nuvomedia. For the REB 1200, it is the Softbook, from Softbook press.

The REB 1100 is 5 inches in width, 7 inches long, and 1.5 inches high. This is almost identical to the original Rocket eBook. The Rocket was half an inch longer.



Figure 7 – REB 1100

The REB 1100 weighs four ounces less than the Rocket, 18 oz. compared to 22. Most of this weight comes from the shift to a Lithium-Ion(Li-on) battery from a Nickel-Cadmium (Ni-Cad) rechargeable battery. Li-on batteries store energy more efficiently than the Ni-Cad’s. The battery life is reported to remain the same as the Rocket eBook, with a maximum of 40 hours. The real life range

is between 15-35, depending on the brightness of the backlight and how often it is used.

The change in the battery technology represents an evolutionary change in the design and manufacture of the REB 1100. Another example of this kind of evolutionary change can be found in the buttons used to turn the pages of the electronic text. The buttons for this purpose on the REB 1100 are larger than those on the Rocket, and placed farther apart. This should make it easier to reach the buttons and aid in the use of the device. While I have not heard other reviewers discuss the effects of this change in position, it affected the reading experience that I had with the book. In order to hold the book in one hand and turn pages with it, I had to shift the book away from my palm, out onto my fingers so that my thumb could reach the lower (page forward) button [see Figure 8]. It was easy to reach the page-back button, but that feature is of somewhat limited usefulness. This position was much less comfortable and led to increased hand fatigue. Another example of the evolution of the design is the rubberized coating on the slightly more angular gripping surface of the REB 1100. This makes the device easier to hold and gives a more secure grip.

One of these evolutionary additions made in the new models is expanded memory. The original Nuvomedia device came with only 4MB of RAM. The REB 1100 adds another 4MB, bringing the total to 8MB, enough for about 20 books (5000 pages). It also allows for additional expansion in the form of removable Smartmedia cards. These cards are available in sizes from 8MB to 128 MB of RAM

and are fairly affordable. The REB 1100 will allow a maximum memory size of 64 MB to be added to the device, bringing the total to 72MB (“Thomson Unveils...”).

Another evolutionary change that was made to the REB 1100 is the capability to purchase books without the use of a computer. They did this by using a 33.6 kbps modem, which they built into the device. This capability helps to eliminate the need to own a PC before being able to download a text into the device. For PC owners, it also has a USB port to allow connection to the computer. This is an improvement over the Nuvomedia model in that it does not tie up a serial port, which may be required for use by a PDA or may not even be present on the computer, as some manufacturers are currently building them.

In the case of the REB 1200, the modem is supplemented by a 10Mbps Ethernet connector. This enables the device to connect to a TCP/IP based network of computers. The USB and infrared connections are not found on the 1200. What this means is that the computer cannot download texts directly from a computer. With Gemstar’s removal of the RocketWriter program from the REB 1100’s supported software, this doesn’t seem to be a fact of major import, but the concerns that it raises are worth discussing. At present, the only electronic retailer that the REB 1200 (or the REB 1100, through its modem) can access is Gemstar’s bookstore. This limitation of purchasing options, while it reduces the likelihood of piracy, allows consumers little choice in the books that they purchase and no option at all to scan in books they already own to read on the device.

This difference in communication capability raises questions. Unlike the Franklin EBookMan, where the different devices all bear a more than passing

resemblance to each other, the RCA / Gemstar devices are very dissimilar. This dissimilarity serves to demonstrate the dual nature of their parent company, a nature resulting from the purchase of the two leading e-book manufacturers, Nuvomedia and Softbook. The second-generation devices are improvements on their predecessors, but the new capabilities that they offer are, again, only evolutionary extensions of what they had before.

An additional example of the extension, and an incomplete one, is the multimedia capability of the REB 1100. The new device adds a fifth icon to the four present on the Nuvomedia Rocket eBook. This icon is to allow audio playback, according to a press release by Cirrus-Logic, the manufacturer of the chip. This capability is not enabled in the current REB 1100, but is a possibility with "Internet audio hardware ready to be utilized at a future date" (qtd. in "Thomson Unveils..."). According to RCA spokesman Dave Arland, "The REB1100 is capable of audio playback when the audio file itself is part of the book. Other audio capabilities, such as MP3 playback, are being reviewed as possible future enhancements" (qtd. in "Thomson Unveils..."). A true multi-function device would be a powerful incentive for the reading public to purchase their first e-book.

One enhancement that would seem a logical extension of the new parent companies core business is the integration of the VCR Plus+ coding system built into the e-book unit. This has not been mentioned anywhere in my reading, but the possibility is truly enormous. Some background: VCR Plus+ is a coding system that lets users type a code into their VCR remote control units that will automatically program their VCR to turn on at a certain time, record a certain channel for a certain

period of time, and then turn off. All the user has to do is punch the code, which appears in their newspaper listings or TVGuide magazine, into their remote control and place a tape in the VCR.

Gemstar, which owns TVGuide magazine and the two leading e-book companies, can now make this even simpler. The possibility exists for users to subscribe to TVGuide electronically and read it on their e-book. Then, all that would have to be done is to select the show to be recorded on the reader's screen and select a menu button, "record." The e-book, using its built in infrared transmitter, would then beam the proper commands to the VCR. By doing it this way, Gemstar would build its own niche market. People who currently subscribe to TVGuide would provide the core of a market that would serve to demonstrate the feasibility of electronic text readers. Rather than being a "one-trick" pony, the e-book reader would fulfill two functions, a remote control unit and an e-book reader.

The e-book reader may begin by displaying only television channel listings, but the same mode of communication that provides the information about television shows could also display ads for books available from the same source. Using targeted marketing, based on the channels and shows that the viewer selects, would allow ads for texts most likely to appeal to the device user. These could be romances for the soap viewer, political analyses for the "Meet the Press" viewer, and "how-to" manuals for the watchers of do-it-yourself shows.

This would make it an indispensable viewing aid and provider of reading material all in one unit, using marketing focused by input from the user (target) to increase the sales of electronic texts. This is an idea that may seem far-fetched now

but is a possibility in a period where texts gain freedom from the confines of the paper page and begin to affect other components of our lives directly, rather than through the thoughts and feelings that they engender.

Other opportunities aside, the primary difference between the two new e-book reader models is the screen (and the statistics affected by it). In the REB 1100, the screen is 4.75" by 3", a 5.5" diagonal. This screen is said to be capable of slightly lower contrast than the original Nuvomedia Rocket eBook, making it harder to achieve the "black text on white paper" look, but this difference is reported to be hard to notice unless compared side to side ("Thomson Unveils..."). The LCD screen is, also as in the original, monochrome, touch-sensitive, and backlit.

The REB 1200's primary change is very visible, but, still, only evolutionary. The gray-scale screen has been replaced with a color LCD screen. The addition of a color LCD screen to replace the grayscale of the Softbook allows a much greater range of texts to be displayed. Magazines and full-color encyclopedias are much more readable with the addition of color. The leather cover is still present,



Figure 8 – REB 1200

and the physical dimensions are the same. The screen of the REB 1200 is a 7" by 5" TFT, touch-sensitive, color display. It provides a resolution of 97.3dpi and a screen size of 480 by 640 pixels, approximately the same as a VGA computer monitor ("REB 1200")

An evolutionary change to the REB 1200 is the addition of more RAM to allow for the inclusion of more text files. The

REB 1200 begins with 8MB of Ram and has the same expansion capabilities as the REB 1100. Its maximum memory is greater, as befits its higher price tag. Memory cards of up to 128 MB of RAM are usable. This should hold approximately 130,000 pages of text (“REB1200”).

The largest difference between the two devices is the price. The REB 1100 has a MSRP of \$299.99 and the REB 1200 has one of \$699.99. These mirror the relative price points of the original Softbook and Nuvomedia devices in the first generation.

One of the areas of greatest concern to the early adopters of the new devices is Gemstar’s stand on how content will be distributed for its device. The RocketLibrarian software that shipped with the Rocket eBook also comes with the REB 1100, with one major exception. The ability to create one’s own content has been removed. No longer may the owner of the e-book take a text or HTML file and convert it into a file to display on the e-book reader. This was, arguably, one of the greatest strengths of the Rocket eBook. Classic texts, available for free download at Project Gutenberg, could be translated into the .rb file format that the Rocket used. The owner’s personal files, such as business documents, texts, even favorite webpages, could be downloaded to the Rocket eBook and taken on trips without increasing the weight of one’s luggage. As the product ships now, it is useful only for maintaining a “local library” of files purchased from the Gemstar-ebook online store.

Gemstar’s stated plans are different from all of the other e-book manufacturers. Some of the partnerships begun under Nuvomedia will be continued under Gemstar’s ownership, but that is not the companies primary focus. This is,

according to Tom Morrow, a Gemstar spokesman, “the important thing is that we are tethered to everyone who has a device” (qtd. in Zeitchik, “Gemstar in the Rough”). The objective seems to be access to the customers’ data, but this focus may cause additional problems. By limiting the devices access to other text retailers, Gemstar is making itself responsible for the book selection, marketing, and distribution. They are also limiting the number of titles to approximately 5,000 mainly best-selling titles. While this number may grow, the focus will not. Morrow says, “Our goal is not to win a numbers game with someone like netLibrary that has 20,000 titles that nobody wants. We want to focus on quality and popular content” (qtd in Zeitchik, “Gemstar...”). This may be difficult, according to one publishing company executive. He said the company would not be handing over any titles to Gemstar, because the e-book company wanted pre-publication exclusives that, the un-named executive said, “we wouldn’t give to anyone” (qtd. in Zeitchik, “Gemstar...”) While Gemstar may be a big name in the television industry, they have yet to have an appreciable impact on the publishing industry.

Another issue that concerns some observers is paying for data that will reside only on someone else’s computer. By eliminating the capability to communicate with a PC, Gemstar has eliminated the ability to store archival copies of texts, make copies, or take advantage of any of the rights that are given to the purchasers of copyrights under the “Fair use” provisions of U.S. law.

Korea eBook hiebook

The hiebook H210 is a product of Korea eBook . It is already being produced

and sold in South Korea. In February of 2001, it was announced that it would be marketed to the American market in partnership with eBookAd.com, an ebook web portal. The device appears to be one of the most promising, with a clear display and multiple uses besides reading electronic texts, a factor which may have great impact on the possible market for the second generation devices.

The physical size of the hiebook is 115mm wide, 46mm long, and 18mm thick. It weighs 8.8 ounces, less than half the weight of the Rocket eBook. This is a tremendous weight reduction and should address one of the major concerns of those who view e-books with concern, the inherent weight of the electronics. This weight reduction comes at the expense of battery life, however. The lithium-ion battery of the hiebook is reported to allow over 10 hours of battery life, depending on usage (“hiebook Specs”). The battery is user-replaceable, so carrying an extra battery is an option.

The screen, a 16-shade grayscale, backlit LCD, allows the hiebook to achieve better image reproduction than the Rocket eBook and equal that of the original Softbook. The screen is 480 pixels by 320 pixels, measuring 5.6” diagonally. This



Figure 9 - hiebook

compares favorably to the screen size of the majority of the first-generation devices. The backlight of the hiebook is reminiscent of that on the Palm handheld computers, with green, glowing letters on a dark background (“hiebook FAQs”). This is not as easily seen from a wide viewing angle as the white background of the Rocket eBook.

The hiebook has an impressive amount of memory,

16 megabytes of Flash memory (non-volatile, meaning that its contents do not disappear when the power is turned off) and 8 megabytes of RAM (volatile, meaning that the contents do disappear when the power is removed). Additionally, smart media cards (SMC's) of up to 128 MB's are installable ("hiebook specs"). This use of a common removable storage standard is a boon to the user of the device, especially when the other uses of the device are considered.

The hiebook connects to the computer through a USB port, a much more accessible connection than the serial port used by some of the first-generation books, such as the Nuvomedia Rocket. The file types that the hiebook uses are .hi and .kml, created by a software program that ships with the device. These files are converted from text, HTML, and OEB files. This is a capability that addresses concerns with the proprietary nature of some of the devices. The same software that allows the conversion will provide for the administration and archival of the ebook files on the computer. Unlike the eBookMan, there are no plans to support the Microsoft Reader .lit files, or, indeed, any of the proprietary ebook formats ("hiebook FAQs"). It is a possibility that the hiebook will be capable of displaying Adobe Acrobat (.pdf) files. Hiebook (the company) has not said that it will, but did acknowledge that such a capability may be in place in the future, saying, "it is very likely that a third party will develop a PDF viewer for hiebook. The hardware is certainly capable of rendering PDF files ("hiebook FAQs"). This would be an addition to an already broad range of functions.

The features of the text reading program of the hiebook are the standard set. It allows book marking, hyperlinks, notes, underlining, search, page navigation, and

footnotes. It also allows a text interaction that only one other program, the Microsoft Reader, does: the ability to draw on the text. This allows one to circle a passage, draw arrows that link two sections, etc.

In addition to having the text reader, the hiebook adds a wide variety of other functions. The device functions as a fully featured, portable MP3 player. In addition, a built-in microphone allows the recording and playback of audio messages. If the user needs to record a drawn memo, a drawing program with shapes, an eraser and different pen sizes is included. A text input program is a standard feature to record text memos. In addition, a scheduler/calendar, calculator, address book, image viewer, and four games are included in the standard software package ("hiebook Features"). By adding these features to the reading device, Korea eBook has addressed many of the desires left unfulfilled by the first generation of electronic books. Consumers are no longer buying just a device to read electronic texts, they are purchasing a large-size PDA to help them organize their life, as well as replace their CD/MP3 player and hand-held game.

The device is scheduled to enter the American marketplace in September of 2001, at a manufacturer's suggested retail price of \$249 (Ford). At this price, with the capabilities that the device has, it may be a prime contender in the marketplace.

N-Vision Technologies Journal

This is the most recent development of the Everybook reading device. Everybook sold the technology that it had developed to N-Vision Technologies. At the present moment, the company has not announced any changes to the final

Journal (their new name) design. A spokesperson for the company stated that it is attempting to find investment capital that would allow the completion of device development and the beginning of its manufacture for the retail market (Meyer).

goReader

The “goReader” is an attempt to market an e-book directly to the market that has consistently been identified as the most likely to use e-books and adopt the technology, education. The founding of the company behind the product, goReader, Inc., is traced back to a conversation the founder had with his father about the high cost of his brothers’ college textbooks, followed by the founder’s reading of an article on the promise of e-books. After examining the products available (or publicized), he concluded that there were no products that were tailored to the specific needs of



students, the market most likely to use e-books.

An interesting point in the development of this device is the fact that it was subcontracted. Tachyon Semiconductor designed the device as a “turn-key solution” (“GoReader/Ureader”) for goReader, Inc.

Figure 10 - goReader

For texts, goReader has signed agreements with several textbook publishing companies, such as Addison-Wesley, Harcourt College Publishers, and others, to provide electronic adaptations of their textbooks. They have also entered into agreements with companies such as the Douglas Stewart Company, a distribution company that supplies over 3,000 college and university bookstores (“GoReader, Inc and West Group Announce ...”). This will give an incentive to the

schools who wish to experiment with digital textbooks in that they can measure the difference in achievement between a digital textbook using class and a control class using the standard printed textbook.

The goReader device could be described as a “missing link” between the Microsoft Tablet and other dedicated e-book readers. It provides more functionality than any of the first generation e-book readers and most of the second, including the hiebook. The multiple connection options and powerful processor are closer to the definition of the tablet computer than an e-book reader. It is also being marketed as a PC-replacement for the classroom as well as a textbook replacement.

The physical specifications of the goReader are also an indication of its dual nature. It weighs approximately 2.4 pounds in its standard configuration (“How it Works”) but may weigh more, depending on the specifications of the user. It is available with a 10.4” full color SVGA TFT screen, as found in many laptop computers. This type of screen enables the device to display high-resolution, multi-colored images; charts, graphs, photographs, etc. The device also supports a sub-pixel rendering technology similar to Microsoft’s ClearType for enhanced screen clarity.

A rechargeable Li-ion battery provides between five and ten hours of use and would be replaceable, so that multiple batteries could be carried to extend the usability for an indefinite period of time (“How...”). These batteries are available as optional accessories, for \$90 for the 4-cell (5 hour) battery, and \$160 for the 8-cell (10 hour) battery (“goReader Education Order Form”)

The goReader has multiple connection options – either USB or a PCMCIA card. The PCMCIA card allows an 802.11b wireless adapter, a modem card, and a 10/100base-T Ethernet card (“goReader Education...”). This is one of the most promising aspects of the device, in that the device can connect in a wide variety of ways. The wireless option is especially exciting, in that many colleges are looking at the possibility of implementing a wireless network on their campuses, to both save the cost of wiring and re-wiring their buildings and to provide a true “anytime-anywhere” connection to educational technology.

The technical specifications of the goReader are also impressive. The processor that drives the device is an Intel® StrongARM SA-1110 Microprocessor, running at 206Mhz. This is significantly more powerful than the CPU’s of any of the other devices so far listed. The memory to supply storage space for the e-textbooks is equally impressive. The options for memory range from 32MB to 128MB of RAM, with a one to two gigabyte (1-2GB) IBM Microdrive as an add-on. The amount of electronic text files that can fit on this device is more than ample. One figure that is mentioned, without giving the memory options that would be required, is 250 e-textbooks.

Part of this storage capacity may be due to the file format that the texts are stored in. The file type that the goReader uses is not a profligate memory user. The files can be based on either the XML or PDF ebook formats, because the device complies with the Open Electronic Book standards (“How it works”).

One facet of the file system that the goReader uses is of special interest in the discussion of e-books. In the wake of the Napster controversy, file-sharing is an

important concern of the textbook publishers. The goReader offers encryption to prevent the sharing of the electronic textbook files, but at the same time allowing the users to share notes and textbook annotations between devices (“How it works”). This allows students to share insights into the course material by sharing notes, as they have done for countless years.

This is important because of the note-taking capabilities that the goReader offers. Students (and others who use the device) can grab images and sections of text from their various textbooks to create a personalized study guide. The device also has an advanced search function that allows all of the textbooks to be searched for keywords, bookmarks, or chapters (“How it works”).

Another feature that is an addition to the standard form of the dedicated e-book reader is the PDA-like functions that the goReader has. A calculator, calendar, and electronic notebook come as standard features of the goReader. Additional programs can be purchased to increase the functionality of the device. Graphing calculator programs, day planners, e-mail, and Internet access are all planned to be available as accessories. Plug-in keyboards, extra styluses, wireless connectivity options and other add-ons will also be available.

Microsoft Reader (Tablet PC)

Microsoft entered the e-book marketplace in a big way. Their offering, the Microsoft Reader, differs from the e-book devices previously discussed in that it is a software program. By using a technology called “ClearType,” which enables a screen to display sharper text by individually controlling the red, green, and blue elements that make up the pixels on the cathode ray tube (CRT) or LCD screen. This

technology, which Microsoft has just received a patent for (Barker), is one of the best attempts so far to allow readers to experience the clarity of a printed page on an electronic screen.



Figure 11 - Tablet PC Prototype

The reason that Microsoft's software product is being discussed in this thesis, which has so far been focused on hardware devices, is the hardware device the Microsoft has developed that makes use of the Microsoft Reader. This device, the TabletPC, uses the Microsoft Reader software program to stake an early place in a developing market, apparently to increase its overall acceptance. This may be viewed as another attempt by Microsoft to dominate the marketplace. Regardless of its motivation, the move is a shrewd one, putting a powerful and influential company behind an entry into race to develop the future form of the book.

The primary difference between the Tablet and the other e-books that have been examined is the fact that it is a full-fledged computer. Unlike the other hardware devices, the Microsoft Tablet is an e-book with accessories. One of the most common complaints about the e-books that have led the way was that they were almost as expensive as a computer. The Tablet is as expensive as a computer with good reason. It is a computer.

It is also an attempt to create a change in the way that we interact with electronic text. Without being forced to sit at a desk or hold the computer on our lap, we will be able to access all of the functions that we have grown used to in our

dealings with computers, not just read texts. By using the handwriting recognition system, a person would be able to hold the Tablet and write, much as they would a clipboard. By using the voice recognition system, the operation of the Tablet could be completely hands-free.

The handwriting and voice recognition software would be the key to this device. Unlike the handheld computers that have proven popular in recent years, the price of the Tablet is not expected to be low enough to encourage people to purchase it as an accessory for their PC, to enable remote access to information otherwise inaccessible. When the Tablet debuts sometime in 2002, it is expected to have a price tag comparable to a fully featured laptop computer. At this price, the convenience factor would have to be balanced by features and components. It is far easier to justify spending a few hundred dollars on an electronic gadget to let you read electronic texts than it is a few thousand.

The physical dimensions of the Microsoft Tablet are not fixed. This is because the Tablet is a prototype. There are only about one hundred of them. This number will increase as time goes on and Microsoft signs agreements with different manufacturers to begin production of Tablet models. The current version weighs in at approximately three pounds. The physical size is reminiscent of a tablet of paper at 8 ½ by 11 inches, and an inch thick. The input is supposed to be as transparent as possible with handwriting and voice recognition, and an optional keyboard (just in case).

The Tablet is not an original idea of Microsoft's. There have been numerous pen-based computers. The idea's first proponent was Alan Kay, mentioned in

Chapter One. Beginning with Alan Kay's Dynabook, and its first incarnation as the Alto, the history of tablet computers reads less like pages in a history book than headstones in a graveyard. The format has endured in niche markets where portability and the ability to enter data without being tied to a keyboard have been important, such as warehousing, outside sales, and some maintenance operations. In the modern tablet computer, we see the ultimate expression of Vannevar Bush's Memex and Alan Kay's Dynabook: the power to hold a library of texts in a tablet form.

This is where the second generation exists: in the land between the reality and the promise. The technology, the interface, and the infrastructure are just barely at the point where electronic books are able to enter the marketplace and make a dent. The marketplace is adapting to the possibility, but the final form that the e-book will take is unknown. The most successful, in my opinion, would be a multi-function device, like a PDA, but with a larger and more readable screen. This device would be similar in form and capabilities to a tablet computer but significantly less expensive.

CHAPTER 4

CONCERNS AND POSSIBILITIES

Where do these products fit into the lives of the average reader? The student? The short answer is “Nowhere, yet...” By this I mean that the reading device is only one component of an extended system that will have to be in place before the e-books gain wide acceptance.

Not to make it a “chicken and egg” issue, but the problem is a simple one. Texts must be available so that readers can justify the purchase of the hardware devices. Conversely, hardware devices must be in the hands of readers to create a demand that will motivate publishers to produce electronic texts.

Before either one of these happens, other things must occur. Just as you cannot get eggs from a chicken without providing food and water, so the prospect of e-books must be tended. Some of the things that must be supplied for e-books to develop are: a non-proprietary file format, some form of copyright protection to protect the author and publisher’s interest while allowing “fair use” by the reader, a more durable and inexpensive reading device with a clearer and more easily read display, and a “critical mass” of devices and texts to be read on those devices.

File Format

The development of a standard format for the electronic text files, one that is used by all of the e-book reading devices and programs, is the goal of the Open eBook Forum (OEBF). It is an attempt to prevent the Beta/VHS type of branding conflict that has previously taken place in emerging markets. Members of the forum consist of “hardware and software companies, publishers, authors, users of

electronic books, and related organizations whose common goals are to establish specifications and standards for electronic publishing” (“About the Open eBook Forum”). These members, over 40 at present, include such industry leaders as Microsoft, Adobe, Gemstar, Harper-Collins, Palm Digital Media Group, the American Foundation for the Blind, and others. The groups that these organizations represent all have a stake in the future of the e-book.

The Open eBook Initiative was announced at the world’s first electronic book conference. In September of 1999, the Initiative released the first draft of the “Open eBook Publication Structure.” This is a specification for the file and format structure of electronic texts. It is based on HTML and XML, two of the languages used to create Web sites. By developing this specification, the OEBF hopes to create a “critical mass of compelling content” (“Activities of the Open eBook Forum”). By removing the onerous task of creating multiple file formats and making them available to customers, the OEBF is attempting to make an egg without a chicken by making the text creation process easier for the publishers. Regardless of the reading device that comes out on top of the pile, the publisher will only have to format a book into a single Open eBook compatible electronic file for it to be compatible with every OEB-compatible reading device.

While allowing more formatting controls than the basic ASCII text of Project Gutenberg, the OEB format remains a standard, not tied to the success or failure of a single company. This removes the stigma of the “lost tech” that has come to haunt so many technological innovations. Just as Beta VCR’s, 8-track tapes, satellite telephones, and more computer components than can be counted haunt basements

and closets, so their spectre haunts the e-book reading devices in the marketplace. The consumer is forced to wonder, "Will this still be around next year? Am I throwing my money away?" If the device supports the OEB specification, then texts will still be available, even if the manufacturer has disappeared.

A challenger to the OEB specification is Adobe's Acrobat (.pdf) file format. This is a file that preserves the exact image of a printed page, keeping the formatting, font, and design elements of a printed page. This avoids some of the issues of the hypertext (.html) based formats, because the layout choices of the author or editor are preserved in the e-book file. One downside to the technology is that it is owned by a single company, which would essentially be in control of the e-book market if its file became the standard.

Copyright

Another area that must be addressed is copyright. Copyright was not a matter of great concern throughout most of recorded history, because the act of copying a document was a time-consuming, manual labor process. The authors of ancient Greece and Rome were the first to be concerned that their name was attributed to their works, but they had no economic rights in the sale of their texts. When the printing press was introduced and books became an industry, copyright became an issue of much more concern. In 1706, Britain passed the first copyright law in the world that recognized the author's ownership of the work, as well as guaranteeing the author the right to authorize the publication of said work for a limited number of years (United Kingdom Patent Office).

In the United States, the idea of copyright is included in the article 1, Section 8 of the Constitution. The exact phrase is “To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries;” (United States - U.S. Constitution). The “limited times” of which the Constitution speaks was set at 14 years when the Copyright act of 1790 was enacted. This was the period of time that an author had exclusive control of his or her works.

By giving the author a period of time in which to profit from their creations, the incentive exists for the author to continue creating. Therefore society profits as well. Further, after the “limited period” is over, the creator’s control is lifted and the rest of society may then make use of the creation. Both the individual and the masses profit from the arrangement.

In 2001, the “limited period” has been stretched to the life of the creator plus 70 years for individuals or 95 years for corporations or companies. The law has changed from a protection for the author, to encourage creativity and productivity by protecting the right to profit from his or her work, to the establishment of dynasties founded on the work of the original creator (such as the Disney companies ownership of Walt Disney’s creations).

The most recent development in the evolution of copyright is the Digital Millennium Copyright Act (United States – U.S. Copyright Office), a legislation enacted in 1998 that contains many regulations specific to digital media. Many of the individual components of the legislation affect the delivery of electronic media, including not only the texts themselves, but also the software that is used to display

the texts. One of the most contentious aspects of the DMCA is the section making technologies designed to circumvent other technologies that protect copyrighted material illegal to produce or use. The entire argument is too long to enter into here, but the gist of it is that the DMCA makes it illegal to change the restrictions set on e-book reader software using any tool not authorized by the publisher, even if the restrictions are changed to enable uses of the text that are allowable under the fair use provisions of existing copyright law. The exact text of the law says:

No person shall manufacture, import, offer to the public provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that is primarily designed or produced for the purpose of circumventing a technological measure that effectively controls access to a work protected under this title;... (United States – U.S. Copyright Office).

By changing the settings on an e-book that has been encoded to restrict the ability to print a hard (paper) copy, so that they may avoid taking their expensive reading device to the pool with them, an e-book user would be in violation of the DMCA, even while remaining within the bounds of “fair use.” This places limits on the willingness of consumers to purchase e-books, because many of them would either be breaking the law or unable to do the things with texts that they have become used to, such as loaning it to a friend or photocopying their favorite passages.

Just as the development of the printing press spurred the first copyright protections for authors, the development of a viable electronic text market should spur the further refinement of copyright, to a more responsible and comprehensive

form than the DMCA. While the addressing of this issue may not spur the adoption of electronic texts by consumers, it must be addressed in order to guarantee the freedoms granted to readers while still protecting the rights of authors.

Durability

Copyright issues aside, there are other areas of concern that are preventing the adoption of e-books. The relative fragility of the current e-book readers coupled with their high cost do as much to prevent the wide spread adoption of electronic text readers. New technologies are emerging that will enable flat-panel devices to reach the pricing level and physical durability that will allow wide acceptance. Current LCD displays are based on light-switch transistors on a piece of silicon (Scanlon, 56). This technology forces the display to be flat, and expensive.

One solution to this difficulty is a project being developed by IBM. The objective is the development of a new semiconductor material to build transistors from; a combination of organic and in-organic compounds. The result of this project is a new material that performs as well as silicon but can be fabricated much more cheaply and at far lower temperatures (Scanlon, 56). Another benefit is that, by replacing the silicon in the chips, the door is opened to a wide variety of other substances for use as a substrate, or foundation, for the transistors. This development will allow the substrate of the displays to be made of plastics and, non-heat-resistant materials (Scanlon, 56). These materials, unlike silicon, could be formed into shapes other than a flat plane or be flexible. The production of an e-book reader that could be folded like a paperback or newspaper would help the e-book

gain much greater acceptance, especially if the materials lead to lower prices for the readers.

Another display alternative currently being developed is eink (short for electronic ink), a technology developed by a company of the same name. Eink holds great promise for flexible, high-contrast displays. The eink display is reported to be three to six times brighter than the reflective LCD displays used on the first and second-generation e-books. It also draws significantly less power, 1/100th the amount of power used by a laptop display. One of the ways that it does this is by shutting the power to the display down until the “page” is turned. It can do this because the display remains after the power is shut off until it is changed (Resnic and Barlow). This capability would allow portable devices to have significantly smaller batteries, reducing both the cost and the weight of the devices.

The eink displays are 30% thinner and lighter than LCD’s, allowing a further weight savings. This new display technology “brings us one step closer to paper-like electronic displays that preserve many of the same qualities we enjoy in books and newspapers today,” says Jim Iuliano, the President and CEO of eink (qtd. in Resnic and Barlow). The way that eink accomplishes this goal is by means of black and white “microcapsules,” suspended in a carrier medium. Depending on the polarity of the current applied, the pixel appears either white or black. These pixels are printed onto a flexible plastic substrate that is then bonded to a layer of circuitry. The substrate allows flexible, black on white displays that can be scaled to any size and placed on almost any surface (“What is Electronic Ink?”). Imagine your morning

paper appearing on the surface of your kitchen table when you sit down to eat breakfast.

The durability of the devices must be matched with an increase in clarity and contrast in a wide variety of lighting conditions. This is the most common complaint concerning LCD panels, which are the most commonly used portable digital display in both the first and second-generation e-books. A material like the e-ink display would allow a contrast ratio similar to that of paper, because it would rely on reflected light, not transmitted light. This would also decrease the amount of power used by the device for displaying text.

E-books in Education

If and when the concerns with durability and clarity are met, one market promises to be the gateway through which electronic texts will gain respect. This market is education. When children become comfortable with the e-book, its future will be assured. In the K-12 schools, there has been increasing interest in recent years over two issues concerning existing textbooks: their weight and their accuracy. The e-book reader may be a way in which both of these issues may be addressed.

The weight of the textbooks that children carry is a significant issue. An Italian study found that nearly 35% of Italian schoolchildren carry more than 30% of their body weight at least once a week. The average weight of the children's book bags was over 20 pounds, with the maximum load approaching 36 pounds. This is equivalent to a 180-pound man carrying a 40-pound load (Swint). The National Institute for Safety and Health recommends that adults lift no more than 51 pounds during the course of a day. That is lift, not carry for extended periods of time. This

weight can lead to back pain in the short term (Swint). E-books would enable the students to carry all of their books in a single package, weighing two pounds or less.

It is also possible that the e-books will allow the kind of associative indexing that Vannevar Bush outlined in his Memex. This kind of indexing would help children connect what they learn in one subject area to things that they learned in another. Making these kinds of connections is an important part of becoming an active learner and is one of the goals that the developer of the Dynabook was interested in achieving.

Another way in which e-books can affect the educational system is in their ability to be updated. The connections between subjects cannot be made if the facts are not correct. In one instance, Texas textbook reviewers found a total of approximately 15,000 errors in more than 200 products offered by 34 publishers (Cline). These totals were found after the publishers had already conducted one round of fact checking. A representative from Prentice-Hall publishers, Rick Culp, said, "In a book that comes out new, in a book of 3,000 to 5,000 pages, traditionally about 100-150 errors are found in the first edition" (qtd. In Cline). These errors will not be corrected until the second edition unless the state refuses to purchase the book.

California is another state that has had experience with the problem of errors in textbooks. The state has a systematic process for checking the accuracy of the textbooks it selected. Numerous errors were discovered in the textbook in use in the state. These ranged from simple typos, such as Columbus discovering the Americas in 1942, to more extreme errors, such as one reported by Cathy Barkett, the head of

California's instructional materials office. "The person who wrote one book did not have the understanding of mathematics necessary to write the book," she said (Cline). With e-books and electronic texts, these errors can be discovered and changed easily. Rather than the school systems being forced to buy new editions of their textbooks in order to have the latest (and most correct) versions, electronic texts would allow new texts to be downloaded and installed almost immediately.

One of the most problematic issues of the electronic text, its temporary nature, promises to offer a solution to the problem of textbook errors. The printed textbook (complete with errors, will stay in existence until the book is physically destroyed, either through an effort of the publisher or the careless use of the students. Electronic book readers, while not the most durable of items in their current form, offer the ability to change the edition with a minimum of financial outlay. This may be where the e-book finds its niche.

By their very nature, textbooks are transitory. Textbooks are the vehicle through which each generation imparts to its children the knowledge felt to be of import. Having textbooks that can be updated on a regular basis, with input from the end users and assessments being incorporated in those updates, would be a valuable tool to the modern educator.

The same ability to interact with the Internet that would allow e-textbooks to be updated makes the e-book a dramatic agent of change in the way that readers interact with the text. The Internet will change reading by allowing the reader to link to web sites, letting the reader leave the private world of the novel and join the electronic world. Reading may change in the same way that watching television did

with remote controls and an increased number of cable channels. We may become text-surfers, glossing through the texts, flipping onto the next one, or we may become deeper readers, following hints and clues through several texts, tracing the trail of an idea, making the associative leap that has so long been the goal of our instructors.

E-Books in Publishing

Just as education may help to build a critical mass of devices, authors and publishers must build a critical mass of texts. Project Gutenberg is only able to enter public-domain texts, which are fine for Literature classes, but will not draw the majority of readers to electronic texts. What is needed are modern, best selling authors to enter the electronic publishing arena. This is beginning to happen.

Electronic publishing has become a hot industry. Stephen King created a furor when he released his novella, "Riding the Bullet" as an electronic text. It was available for download at Adobe.com, Amazon.com, Barnesandnoble.com, and numerous other on-line booksellers. Over 500,000 people downloaded this text (Zeitchik, "The Revolution..."). This seems to be the event that put e-books on the map. King, one of the best-selling authors in history, threw his hat into the e-ring. Servers were overloaded as people rushed to download the \$2.50 story, available at some on-line bookstores for a limited time as a free download. It was available in the Adobe Glassbook format, with the print function disabled (Zeitchik, "The Revolution...").

King's entry into e-publishing made the field a topic that the media would cover. Developments in the technology and smaller-scale author's efforts went

unnoticed until King gave it the “mass-market” appeal that had been lacking. The broad appeal of King’s horror stories put e-books on the radar of the American consumer and led to a much greater interest in the electronic text publishing industry.

Another entrant, although in a more sustained manner, is Baen, publisher of popular fantasy and science fiction titles. This paper-based publishing company created an online bookstore and began selling its titles over the Internet. This service has been popular with readers, as well as the authors. The books average \$2.50 each, are primarily new releases, and the royalties to the author are double that of the print version (Baen). The total number of subscribers to the service is approximately 1200 (Cooper). Jim Baen, the owner and publisher, says:

as soon as we have a one-pound “book reader” that shows a thousand non-glowing dots per inch on a six-inch-wide by eight-inch-high screen that sells for under two hundred dollars – well paper publishing will then become the specialty item. But as of now, paper is just infinitely more pleasant, and we do read fiction for the fun of it, you know. (Cooper).

This statement defines what is needed for e-book readers to become accepted as a replacement, not just a supplement, for the printed book.

When the e-book devices become ready for the mass market, they will have come of age. Microsoft Vice President Dick Brass forecasts that in 2003, they will weigh less than a pound and cost between \$100 and \$900 depending on the features and display options. He further predicts that e-books will grow in capability and drop in price, until they are given away with magazine subscriptions (Levy, 98).

By 2020, he says, 90% of all books sold will be e-book titles. Newspapers will have gone entirely electronic. Books will still be around. Brass says that they will be “like horses after the automobile – not gone, but transformed into a recreational beast” (qtd in Levy, 98). The medium will have changed, he implies, but the message will stay the same.

Critical Questions

Will this be true? What does the development of the e-book mean for the relationship of the reader to the text? The shift from ink on paper to pixels on a screen will have to affect how the reader views the text. Exactly how is the question. Jay David Bolter, a noted scholar and explorer of the questions involving hypertext and reading, says that the electronic format makes dramatic changes in the authority of the text. The medium of electronic text, he says, “denies the fixity of the text,” and “questions the authority of the author” (Bolter, 153). This it does. The ability to transfer texts from the PC to the reader and then to delete the file when you are finished reading it, changes how you feel about the text. Another source of this change in feeling is being able to change the text size and seeing the pages disappear from the display screen. The net effect is that the text’s permanence is undermined. The fixed text implies a value, a permanence that texts displayed on e-book readers lacks. A book will sit on your shelf and wait, unchanging, for you to return to it. E-books will disappear from the screen when you turn the device off and be removed from the shelf when you delete them from the memory.

Another blow to the majesty of the book and the authority of the author springs from the device itself. A book, especially an older hardback, carries its own

sense of history with it, a feeling of connection with the past. Reading a four-hundred year old text on a six-month old e-book device is not the same thing as reading it in the original manuscript or even a 50-year-old edition. The authority of the text is reduced. The connection to the past is lost, much in the same way as looking at the “Mona Lisa” on a computer screen cannot compare to standing before the original. There is not the same feeling of connection to the past. The experience is not the same, because the medium has changed.

Marshall McLuhan said that the printing press took authority away from the sages. Speaking to an audience and placed it within the pages of a book. Scholars could become experts in a field without ever meeting those that they learned from. He saw television and radio moving the world from the dividing nature of the printed text of the Gutenberg Age back into the forms of the Tribal era, in the Electronic Age of Re-Tribalized Man (Bicket). The fluid nature of the electronic text may help to change the balance of the senses and lead to a new environment by taking text from the fixed format that we are used to and making it a vehicle for communal discussion.

With e-books and hypertext, we are moving into an electronic age where the printed word can change as rapidly and fluidly as a speech. Information is not transmitted through the authority of the text, but rather through a multitude of ways. Texts are no longer forced to be linear in nature, they can take a myriad of forms. For the near future, most electronic texts will follow the standard formats, but this may change.

In their current form e-book readers will not challenge the status quo. They may do so in the future. Myron Tuman, in his book *Word Perfect: Literacy in the Computer Age*, suggests that the non-linear nature of the electronic text will sacrifice the “integrative function” of the linear nature of the books (Lanham, 218). They will become, instead, collections of facts, unbound by a narrative structure. This will require students to learn how to do the organization on their own. Associative indexing may be the way to do it, but the children will have to be taught this skill, since they will probably not learn it from seeing it modeled in printed works. At what point in the future that this may take place is unclear, but the possibility is there.

The first and second generations of e-books do little more than show us that the possibility exists: any of the possibilities. For, just as books have done for hundreds of years, e-books are opening the door to a whole new world. The technology does not yet exist for them to do more.

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A Note: The Ebooknet site was shut down in the spring of 2001 by Gemstar, purchasers of Nuvomedia, the original sponsoring company.

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