

The Last Information Revolution:

What It Was and What Can We Learn from the Responses

Abstract

“Information Revolutions” are caused by dramatic reductions in the cost of information storage and sharing. In similar ways, the invention of the printing press in 1453 and the convergence of digital technologies (including personal computers and the internet) have paved the way for the sweeping scientific, ecclesiastical, and societal changes of the Reformation and the PostModern Era. Reflecting on the response of the Puritans and early Congregationalists to understanding and advancing the innovations of the Reformation will offer insights into navigating the current period of great change.

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“We should note the force, effect, and consequences of inventions...for these...have changed the appearance and state of the whole world...”
—Francis Bacon, *Novum Organum*

“A man born in 1453, the year of the fall of Constantinople, could look back from his fiftieth year on a lifetime in which about 8 million books had been printed, more perhaps than all the scribes of Europe had produced since Constantine founded his city in AD 330.”
—Michael Clapham, “Printing,” *A History of Technology, Volume 2, From the Renaissance to the Industrial Revolution*, ed. Charles Singer, E.J. Holmyard, A.R.Hall and Trevor Williams (4 volume, Oxford: 1957)

“History bears witness to the cataclysmic effect on society of inventions of new media for the transmission of information among persons...”
—N. St. John, Book review, *The American Journal of Sociology* 73 (1967);
(quoted in Eisenstein, see below)

“The fundamental reason that civilization is limited by information is quite simple: Civilization is information: its ethics, its literature and art are forms of information....civilizations are generally limited more by lack of information than by lack of physical resources.”
—Douglas S. Robertson, *The New Renaissance: Computers and the Next Level of Civilization*

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Introduction

Does any of this sound familiar?

- New technologies are re-shaping society.
- Wealth and education are increasing.
- The rate of change is accelerating.
- The amount of information available is skyrocketing.
- People’s understanding of family is changing.
- People are hungry for something beyond themselves.
- “We want something real!” is the desire of growing numbers of people.
- People seek more satisfying worship.
- Basic ideas of “nation” are changing.
- Basic ideas of “business” are changing.
- Corruption and bureaucracy seem to be everywhere.
- Old ways are being challenged.
- People feel humanity is on the edge of great good or nightmarish evil.

In the 21st century, many people feel that humanity is in uncharted territory as communities and individuals, and in some ways we are. Surprisingly, every one of the above descriptions could also be said of another time and place—the 1500s and 1600s in Europe, during the third and most recent “information revolution.” Through the tremendous upheavals of the 16th and 17th centuries, faithful people also navigated

uncharted territory remarkably similar to our own. Who were these faithful people and how did they approach their “unprecedented” times? What is an information revolution? What features do information revolutions generally share and what are some of the particular connections and divergences between our time (the PostModern Era) and the Reformation (typically thought of as 1517–1660)?

Culture and Caveats

One of the intriguing things about looking backward into history is that we are bound to the time from which we write. Gazing back from lives deeply steeped in the printed word and all that goes with that—what McLuhan and Eisenstein call the “print culture”¹—we can hardly conceive of a time when monastic scribes gathered in a scriptorium to copy by hand the manuscripts of the day and of the ancients. If the ways of scribal culture—the tablets, scrolls and codices—are difficult, the ways of truly oral culture are even more foreign. The odd, anachronistic sense of “writing a paper” on a laptop and presenting that “paper” with a video projector already hints at some of the changes in the way we think about something even as staid as academics. Even the fact that I approach these issues as *information* revolutions reveals the challenges of looking backward from our current age. As a child of the late 20th century, I am a “tweener”—born between the heights of print culture and the initial phases of electronic/digital culture. Because print culture is native to me, some aspects of the digital culture are challenging for me to perceive, appreciate and utilize.

Because this paper’s thesis touches on a horizon-stretching array of academic fields of study—history, anthropology, linguistics, sociology, science, politics, and religion just to name a few—a thoughtful person will realize that a full and rigorous treatment of the topic will be impossible within the bounds of the allotted space. Moreover, because we are “painting with a broad brush” in a confined space, some simplifications have been made to what are truly extremely complex phenomena. Take the Reformation for example. To say that the printing press *caused* the Reformation would be untrue. The invention of the printing press was one of *many* factors—including political, ecclesial, spiritual, societal and economic—that contributed energy that drove the Reformation, not the least of which would be choices of key people such as Luther, Calvin, Zwingli, the Popes, Henry VIII, and many others. Nevertheless, if the table was set for the Reformation before Martin Luther published his 95 Theses, the printing press had a vital supporting role in “starting the party.”² Moreover, though the printing press is widely

¹ Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change: Communications and cultural transformations in early-modern Europe*, (Cambridge: Cambridge University Press, 1979), p. xiv. Marshall McLuhan’s *The Gutenberg Galaxy: The making of typographic man* (Toronto: University of Toronto Press, 1962), seems to be organized in an impossible structure for quick navigation by usual methods in order to shake the reader loose of some of the assumptions that derive from the ubiquity of print in our lives.

² A number of authors, Eisenstein among them, point out that vernacular Bible translations and the lay movements they encouraged happened in a localized fashion on several occasions (e.g., Wycliffe & Lollards, Waldensians and Hussites) before vernacular translations became prevalent in the 15th & 16th centuries. The printing press is certainly one of the reasons vernacular Bible translations could not be contained and censored during the latter Renaissance and early Reformation. See Eisenstein, pp. 303, 311. She concludes, “Thus medieval heresies can be distinguished from the Protestant Revolt in much the same manner as medieval revivals from the Italian Renaissance. In both instances, localized

recognized for its supporting role in the Reformation, until Eisenstein's work examined the effects of the printing press, surprisingly little work had been done.

What were some of the most important consequences of the shift from script to print? Anticipating a strenuous effort to master a large and mushrooming literature, I began to investigate what had been written on this obviously important subject. As I say in my first chapter, there was not even a small literature available for consultation. Indeed I could not find a single book, or even a sizeable article which attempted to survey the consequences of the fifteenth-century communications shift.³

Eisenstein explores the possible reasons for this in detail,⁴ but at least part of the reason is that print is so much a part of how we think now, that we forget there was a time when it was new and world-shaking. Thus, despite the intellectual hazards of a paper of this type, the connections are compelling enough to warrant the attempt.

A Brief Survey of Information Revolutions

Concept

The idea of an "information revolution" could only be framed in this way after the 20th century "invention" of information science by Claude E. Shannon (1948) and the concept of measuring information.⁵ Douglas Robertson and others have connected significant increases in information with dramatic changes to human civilization.⁶ Robertson, in particular, connects the broad concept of civilization with information explosions or revolutions.

At least three inventions in the past—language, writing, and printing—had effects that were very similar to today's computer revolution. Each of these inventions decreased the effort and cost required to produce, store, and distribute information, thereby causing an information explosion very similar to the one being created today by computer technology... The most important dividing points in the history of civilization were each accompanied by an invention that caused an information explosion. This suggests a possible cause-and-effect relationship—that information explosions may have caused these transformations of civilization. If we can prove that such a relationship exists, the implications for civilization today would be profound: The computer could be the invention that will change civilization to a degree

transitory effects were superseded by widespread permanent ones...Partly because religious dissent was implemented by print, it could leave a much more indelible and far-reaching impression than dissent had ever left before," citing Robert Mandrou, "La Transmission de l'Hérésie à l'époque moderne," *Hérésies et Sociétés dans l'Europe pré-industrielle, 11e–18e Siècles* (Collque de Royaumont, 1962) ed. Jacques Le Goff (Civilisations et Sociétés 10) (The Hague, 1968), pp. 281–89.

³ Eisenstein, p. xi.

⁴ See Eisenstein's Preface and Chapter 1.

⁵ Telecommunication technology and the desire to improve telegraph and telephone signal drove these changes.

⁶ Douglas S. Robertson, *The New Renaissance: Computers and the next level of civilization* (NY: Oxford University Press, 1998) and Michael E. Hobart and Zachary S. Schiffman, *Information Ages: Literacy, numeracy, and the computer revolution* (Baltimore: Johns Hopkins University Press, 1998) are two of the best and most accessible of this enormous and growing field.

not seen since the Renaissance, the time of the last great revolution in information handling.⁷

What seems unique about Robertson's approach is that he defines, "an *information explosion* quantitatively as an increase of about two (or more) orders of magnitude in the production of information."⁸ Inherent in this concept is that information becomes less expensive. For example, Eisenstein observes that "By radically increasing the number of books and reducing their cost, printing had great social, economic and intellectual impact on European civilization at the time of the Reformation."⁹ From the definition of *information explosion*, Robertson moves to an information-based outline of the history of civilization, which I have adapted here.

- Level 0 — Pre-Language
- Level 1 — Spoken Language
- Level 2 — Written Language
- Level 3 — Printed Language
- Level 4 — Electronic/Digital Language

Pre-Language: Humans Before Language

The nature of human life independent of language is so far in the past that we must rely on archaeological evidence and some educated guesswork for insights. As early as 10,000 thousand years ago, some humans developed at least one of the proto-languages, Indo-European.¹⁰ Language almost certainly, then, predates even this point. How much information can a human mind store and retrieve? Robertson suggests that Homer's *Iliad* offers a way of getting at the limits of information in a Level 0 society: If every letter is 5 bits¹¹, then *The Iliad* is approximately 5 million bits. Can a person memorize more than one *Iliad*'s worth of information? Certainly and probably more than 9. More than 100 *Iliad*'s worth? Unlikely. So we might say that a person can memorize 10–99 *Iliads* or 10^7 bits.

First Revolution: Moving to Spoken Language

From the first, language has always set humans apart from all other creatures. With the advent of spoken language, culture could develop, ideas could flourish beyond one's own experience, and knowledge could be passed down from one generation to the next. Famous works of oral literature (another anachronistic combination!) from this time include *The Iliad*, *Beowulf*, and sections of the Old Testament. Before the advent of spoken language, the amount of knowledge to which a person had access was essentially what someone had in his/her own head. With the invention of language, people had access to the information in their own heads *and* the information in all the heads of their entire community. A person in a moderately large community from this

⁷ Robertson, p. 8.

⁸ *ibid.*, p. 20.

⁹ Paul Saenger, "Colard Mansion and the Evolution of the Printed Book," *The Library Quarterly* (Oct 1975), 45:416. Quoted in Eisenstein, p. 38.

¹⁰ John Whitfield, "Language tree rooted in Turkey," *Nature*, November 2003; online version, www.nature.com/news/2003/031124/full/031124-6.html

¹¹ "bit" is shorthand for "Binary digiT" that is 0 or 1. To differentiate each letter in the Roman alphabet, 5 bits is the minimum.

time period (in the range of 100–999 individuals), conservatively speaking, would have access to 10^9 bits.

Second Revolution: Moving to Written Language

The connection between the invention of writing and the dawn of civilization is even clearer. In the third millennium B.C., civilizations emerged almost simultaneously in four so-called “cradles of civilization”: Egypt, Mesopotamia, the Indus Valley, and China. The single factor that distinguished these four cultures from their neighbors was the invention of writing.¹²

The first writing samples from these civilizations are pictographic or hieroglyphic. The first attempts at phonetic alphabets, like Hebrew, were only consonants, leaving the vowels for the reader to fill in. The Greek alphabet was something new.

While the consonants had been used to record units of meaning that the scribe had picked from the flow of speech, the Greeks froze the flow of speech itself onto the page. The scroll had been sounded thus far through an act of interpretation of the letters; alphabetic recording that fixed sound on the page brings an utterance from the past into the present, to which the reader can listen, interpreting what he hears.¹³

Only after it had become possible to fix the flow of speech in phonetic transcription did the idea emerge that knowledge—information—could be held in the mind as in a store. Today, we take this idea so completely for granted that it is hard for us to reconstruct an age when recollection was not conceived as a trip into the cellar to pick up stores, or a look into a ledger to verify an entry.¹⁴

A human voice and presence was no longer required for the sharing of knowledge. Knowledge could now be gathered and stored, the “voice” of the writer speaking across time and space to communicate with the reader. With this second revolution, history becomes possible. Indeed, writing makes civilization itself possible.

[M]any other great men—among them Carlyle, Kant, Mirabeau, and Renan—...believed that the invention of writing formed the real beginning of civilization. These opinions are well supported by the statement so frequently quoted in anthropology: As language distinguishes man from animal, so writing distinguishes civilized man from barbarian....Writing exists only in a civilization, and a civilization cannot exist without writing.¹⁵

Now an individual not only had access to what was in their heads and in their community’s heads, but the collected knowledge of the library, again conservatively speaking, 10^{11} bits of information.

¹² Robertson, p. 12.

¹³ Ivan Illich and Barry Sanders, *ABC: The Alphabetization of the Popular Mind* (San Francisco: North Point Press, 1988), pp.12–13.

¹⁴ *ibid.*, p. 15.

¹⁵ I. Gelb, *A Study of Writing* (Chicago: Chicago University Press, 1963), p. 221–2. Cited in Robertson, pp. 12–3.

Third Revolution: Moving to Printed Language

When Johann Gutenberg created the first printing press in 1452,¹⁶ his Mainz workshop became one of the epicenters for what would come to be called the Renaissance. Just as writing froze the spoken word, so the printing press “froze” the text. Only with the printing press can the idea of an “original” or “correct” or “revised” text become possible. Now not only could an individual access the knowledge in his/her own head and the heads of their community, not only did an individual have access to the knowledge gathered into a library, but with printing, many individuals could afford to own their own library. Indeed, printing enabled media besides books to become popular. For the first time, pamphlets and periodicals, newspapers and manuals became possible and over the next few centuries, these media and others were more fully explored. Over time, printing made communicating across time and distances much, much cheaper. We will explore some of these effects in greater detail below, but conservatively speaking, Robertson estimates that individual knowledge access has risen to 10^{17} bits.

Fourth Revolution: Moving to Electronic to Digital Language

Before the Fourth Revolution, the electronic inventions of the telegraph, telephone, radio and television began the process of accelerating information and provided the “ramp up” from which the Digital Age would later explode. Samuel Morse’s telegraph could transfer information virtually instantaneously across great distances through the encoding and decoding of information. Alexander Graham Bell’s telephone could transfer a person’s voice just as quickly across the same distances. Marconi’s invention of the radio could not only transfer sound from one point to another, but from one point to many points and without wires! The television, when it was invented in 1923¹⁷, could transfer sound *and* image (a quantum leap in the amount of information transferred) from one point to many through the air. With radio and then with television, great numbers of people could instantaneously share experiences—baseball games, presidential assassinations, walks on the moon, the horrors of war—and cultural knowledge—the nightly news, Howdie-Doodie, Sesame Street. The first computer as we understand it was the ENIAC, built in 1946.¹⁸ For 50 years, computers were almost exclusively the purview of governments, universities and wealthy companies, and yet they captured the public’s attention, as witnessed by their prevalence in science fiction, television and movies. The idea of a “personal computer” (with a graphical user interface, keyboard and mouse) was first popularized by Apple Computing in 1984, revolutionizing many aspects of business and home life. The personal computer drew on lessons learned and infrastructure from a number of inventions, and made use of a number of others—typewriter keyboard invented in 1868,¹⁹ speakers invented in 1877,²⁰

¹⁶ Several dates (and even additional locations) have been suggested. For the purposes of this paper, we will stick with the generally accepted date and place. For more information, see S.H. Steinberg, *Five Hundred Years of Printing* (NY: Criterion Books, 1959), Chapter 1

¹⁷ Steven E. Schoenherr, Professor of History at University of San Diego.
<http://history.acusd.edu/gen/recording/television1.html>. © 1999-2004.

¹⁸ <http://www.library.upenn.edu/exhibits/rbm/mauchly/jwm8b.html>

¹⁹ Invented by Christopher Sholes. http://www.webopedia.com/TERM/Q/QWERTY_keyboard.html

²⁰ The first patent for a loudspeaker went to Ernst Siemens. The modern loudspeaker was developed by Chester W. Rice and Edward Washburn Kellogg in 1924.
(<http://inventors.about.com/library/inventors/blloudspeaker.htm>) Henry Kloss refined these loudspeakers in 1952 to create the first acoustic speakers. (<http://web.mit.edu/invent/iow/kloss.html>)

television, “mouse” in 1964.²¹ The personal computer not only proved to be ideally suited for communication, education and entertainment, but would eventually provide a better way to interact (“interface”) with other computers. In the 1970s, a cluster of US Department of Defense institutions formed the first network of computers (called ARPAnet) that would later come to be known as the “internet.”²² Tim Berners-Lee added a new wrinkle to networking when he invented the “world wide web” in 1990 at CERN to foster creativity among scientists.²³ In the last several years, all these technologies have “gone digital” or begun to do so, allowing every person with a computer to become their own publisher, photographer, movie director and more. The digital convergence has not only connected people, but made everyone’s information potentially accessible to everyone else. Robertson rates this information explosion as yielding access to $10^{25?}$ bits. The question mark in the exponent of $10^{25?}$ is important, because everyone with a networked computer is able to share their information (not just those with a printing or the money to pay a scribe). Thus far, Moore’s Law has held true: that computer processing capacity doubles every 18 months.²⁴ The revolution hinted at with the telegraph shows no signs of reaching an upper limit.

Summary of Information Revolution Similarities

<u>Civilization Level</u>	<u>Name</u>	<u>Start (app.)</u>	<u>Signature Invention</u>	<u>Info Available</u>
Level 0	Pre-Language	>10,000 BC	–	10^7 bits
Level 1	Spoken Language	10,000 BC	Language	10^9 bits
Level 2	Written Language	2500 BC	Writing	10^{11} bits
Level 3	Printed Language	1553 AD	Printing Press	10^{17} bits
Level 4	Electronic or Digital Language	1946 AD ²⁵	Computer	$10^{25?}$ bits

All these information revolutions have a number of features in common.

²¹ Invented by Douglas C. Engelbart. Story by Mary Bellis, posted at http://inventors.about.com/library/inventors/bl_computer_mouse_patent.htm

²² Walter P. Wilson, *The Internet Church: The local church can't be just local any more* (Nashville: Word Publishing, 2000), p. 17. “ARPAnet” stands for Advanced Research Projects Agency Network. “Its intent was to enable the military to communicate in the event of natural disaster or nuclear attack upon the United States.”

²³ Tim Berners-Lee, *Weaving the Web: The original design and ultimate destiny of the World Wide Web by its inventor* (San Francisco: Harper Collins, 1999), pp. 22–3. Berners-Lee notes on p.4: “The name CERN derives from the name of the international council (Conseil Européen pour la Recherche Nucléaire), which originally started the lab. The council no longer exists, and ‘Nuclear’ no longer describes the physics done there, so while the name CERN has stuck, it is not regarded as an acronym.”

²⁴ According to www.webopedia.com/TERM/M/Moores_Law.html, “Moore’s Law: The observation made in 1965 by Gordon Moore, co-founder of Intel, that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented. Moore predicted that this trend would continue for the foreseeable future. In subsequent years, the pace slowed down a bit, but data density has doubled approximately every 18 months, and this is the current definition of Moore’s Law, which Moore himself has blessed. Most experts, including Moore himself, expect Moore’s Law to hold for at least another two decades.”

²⁵ This date obviously depends on which invention you believe sparked the revolution. I have chosen the invention of the first computer, but other choices could be argued as well.

1. A *signature invention* opens the floodgates of information. Each information revolution has one invention that people of the time identify as the key that unlocks the new age, leaving its *signature* on the transition from one age to the next. This invention gathers and focuses a constellation of smaller inventions or discoveries, sparking an exponential increase in information. For the second revolution, the invention of writing (especially the alphabet) combined with inventions of writing utensils, surfaces and inks. For the third revolution, the printing press gathered movable type, ink, paper, block printing and others—all discovered earlier—in a revolutionary way.²⁶ Computers are the signature invention for the fourth information revolution, integrating several important inventions, including (among many) the transistor, television, xerography, film, movie, telecommunications, and electronics. The signature invention is not the explosion; it only makes the explosion possible.
2. Initially, the signature invention is used to do familiar things “better” or more efficiently.²⁷ For the last fifty years of the 15th century, the printing press was primarily used to augment scribal production, reproducing the Bible and classics for which previously only scribes had been used.²⁸

For at least fifty years after the shift there is no striking evidence of cultural change; one must wait until a full century after Gutenberg before the outlines of new world pictures begin to emerge into view.²⁹

In the first decades of computers, work previously done on typewriters shifted to the computer, which allowed for easier editing of text, insertion of footnotes, tables, graphs and eventually pictures.

3. An information explosion propels sweeping changes in virtually every aspect of human society. Writing of the Second Revolution,

The role played by letters in the birth of this new kind of society can be studied on two levels. On one level, new ways of doing business, nourishing prayer life, and administering justice all became feasible through the written preservation of words...The second way letters changed a society...has been much less studied and is much more difficult to talk about...By their very nature they serve to *describe*. They are directly suited to saying things about a society in which social

²⁶ Eisenstein, p. xv. “the first presses now appear merely as the end-products of many other innovations drawn from home and abroad. Changes affecting all manner of industries, arts, and crafts—ranging from wine-making, cheese-making, seal-cutting, oil-painting and card-playing, to metallurgy and textile production have to be taken into account.” p. 32

²⁷ Peter Drucker, (“Beyond the Information Revolution,” *Atlantic Monthly*, October 1999, www.theatlantic.com/issues/99oct/9910drucker.htm), draws useful comparisons between the Industrial Revolution (signature invention: the steam engine) and the Information Revolution.

²⁸ Eisenstein, p. 26. “the output of early presses drew on a backlog of scribal work...The more closely one observes the age of incunabula the less likely one is to be impressed by changes wrought by print. To see how a process of cultural transmission was transformed by the shift, one must take a more wide-angled, long-range view than is common among specialists in the Renaissance.” Traditionally, the “age of incunabula” runs from Gutenberg’s first use of the printing press to the year 1500, a completely arbitrary division, as Steinberg reminds, p. 19. Steinberg goes on to explain that the word, *incunabula*, comes from the Latin phrase, *prima typographiae incunabula* (meaning “when typography was in its swaddling clothes), and thus signifies the earliest printed material. The early editions were usually published in small runs of between 200 and 1000 copies (Eisenstein, p. 33).

²⁹ *ibid.*

relations are governed by a reliance on written language. Even as poets, we are men of letters. What we call science originates from description.³⁰

The Third Revolution led to an increasing focus on the nuclear family, gradually changed the role of women and men, contributed to the modern nation-state, affected laws, encouraged new kinds of government, encouraged standardization and on and on. The second part of this paper will explore some of these changes.

4. Truly revolutionary uses of the signature invention are extremely difficult to predict in the initial period of an information explosion. As noted above, the initial uses of a signature invention are relatively easy to predict, since they are merely extensions for current practices. Peter Drucker suggests that one of the truly revolutionary aspects of the Fourth Revolution is e-commerce, an entirely novel way of doing business that could not have been imagined even in the early days of the personal computer.³¹
5. An information explosion changes how humans think and process information. Notions of truth, self, worth, ownership and morality seem to be impacted by information revolutions. From the transition of the Second Revolution in Greece,

Prior to history, Plato says, there is a narrative that unfolds, not in accordance with the rules of art and knowledge, but out of divine enthusiasm and deep emotion. Corresponding to this prior time is a different truth—namely, myth. In this truly oral culture, before phonetic writing, there can be no words and therefore no text, no original, to which tradition can refer, no subject matter that can be passed on. A new rendering is never just a new version, but always a new song.³²

As we shall see, the Third Revolution also marked a watershed in the understanding of truth and history. Indeed, many of the elements of critical thinking we take for granted today (including rationalism and the scientific method) were developed to help people sift and process the huge volumes of information to which they were exposed.

...scientific methods are fundamentally a two-pronged attack on problems of information. One part of the scientific method involves verification of information by observation and experiment (such techniques are obviously responsible for much of the decline in misinformation following the invention of printing). The other part of the scientific method involves a search for patterns or underlying rules ("laws") that explain large bodies of observations...the scientific method is, in essence, a technique for dealing with a large quantity of information by reducing it to a comprehensible pattern.³³

6. Information explosions always encounter resistance and engender fear. Change is always scary and revolutionary change can be terrifying for some.
7. Information explosions are dependent on the presence of the signature invention and so the impact of the revolution spreads unevenly, as the use of the signature invention spreads. For example, even in the 21st century, Level 1 societies have

³⁰ Ilich & Sanders, p. 31.

³¹ Drucker, *op.cit.* Interestingly enough, Drucker identifies "aqua-culture" (agriculture/husbandry in marine environments) as another of the novel creations of the information age.

³² Ilich & Sanders, p. 4.

³³ Robertson, p. 17.

been found in extremely remote areas, untouched by writing, the printing press or computers.

8. “Information mini-revolutions” can occur with improvements in the supporting inventions to the signature invention. These improvements add to the efficiency or ease of use or decrease the cost of producing information. Examples of this include the inventions of the alphabet (improving writing), parchment (improving clay/stone tablets), the codex (improving on the scroll), photo lithography (improving printing), CDs (improving memory storage for computers), and broadband internet connection (improving on networking for computers). While these increase the amount of information available, the order of magnitude is within humanity’s ability to assimilate by means of adjustments rather than revolutions. The Gospel, for example, was one of the first kinds of literature recorded in codex form. The ease of passing these “books” from person to person contributed to the quick and reliable propagation of the early Church. Despite the improvement from scrolls, the codex did not generate civilization-wide change as great as that sparked by the printing press.

Again, information explosions or revolutions in themselves are not the change in civilization. Rather, the changes in civilization come as humans adapt society to make full use of the information and technologies available.

“Congregationalism” and the Third Revolution

The Reformation was a time of incredible spiritual, economic, and social change, not unlike our own. To illustrate some of these similarities, we will not only explore some of the general effects of the printing press, but also how the printing press affected four key areas of interest—Biblical, scientific, social, and liturgical.

General Effects of the Printing Press

The printing press had a number of far-reaching effects—some obvious and some subtle. These included:

- **The standardization of texts, methods and knowledge.** When multiple texts are available, comparison is made not only simple but almost natural. Differences can be noted, discrepancies explored. For the first time, errata were published to correct publishing errors. Methods for everything from child-rearing to preaching, from medicine to etiquette were published within the first 50 years, making it more likely that people separated by distances would approach any issue of published concern in the same way. Education also became more standardized with the use of primers, textbooks, and course-listings.³⁴
- **New ways of accessing the greater volume of information.** To navigate the increased volume of information, some practices occasional in the scribal era—tables of contents, catalogs and indices for example—would become much more common. Title pages, Arabic page numbers, and copyright dates are some of the more generic innovations dating from the first hundred years of the printing press.

³⁴ See Eisenstein’s extended and fascinating discussion, pp. 80–106.

For Biblical study, topical indices and concordances became possible. Libraries became increasingly organized as owner/librarians had to deal with more volumes. Subheadings, outlines and bullet-points are some of the current ways we make information more accessible more quickly.

- **New ways of testing information for trustworthiness.** In the first century of the printing press, publishers turned out “fluff” and misinformation as well as groundbreaking and edifying material.³⁵ One of the most famous of these cases is the “Wicked Bible of 1631” so called because it left a key word—*not*—out of the 7th commandment. “Thou shalt not commit adultery” became “Thou shalt commit adultery.” The church and horrified publisher tracked down as many of these versions as they could and burned them. (This illustration also underscores how important proofing became for the printer!)³⁶ One stream that helped establish the trustworthiness of information was the citation or reference. Even in this paper, an idea not coming from the author is substantiated by referencing other works. Plagiarism (claiming another person’s idea or words as one’s own) became so scandalous that in recent centuries, we have begun to take for granted that what a person signed their name to was their own. Another stream that helped establish the trustworthiness of information was the scientific method. This method encouraged a deliberate, focused approach, meticulous and transparent record-keeping, empirical measurement, reproducibility, and widely published works to convey ideas. In addition to leading to greater understanding, the scientific method helped test statements and beliefs and debunking myths. As these streams became more widespread and ingrained in popular culture, the quality of information also improved.
- **Increase in literacy and the importance of education.** Reading was the way to access this growing pool of knowledge. For Christians, the ability to read and understand the Bible drove increased emphasis on literacy, but rates increased for non-Christians as well. For everyone, education was seen as the path to success in the new society. For Christians, education became of the utmost importance—the path to an active and saving faith. (See below.)
- **Increased role of independence.** Increasingly, people wanted to know for themselves. Educated people begin to expect some time alone every day to read, and others are expected to respect that time in isolation while knowledge is gained. (The origins of being quiet in libraries stem from this growing need for time in quiet concentration.) In a more focused way, educated people expect to be able to make up their minds for themselves. More value is placed on the rational faculties. The printed book also became the dominant image for understanding one’s life, emphasizing in a new way the examination of the soul. With the decreasing cost of paper as well as printing, people not only can write to publish, but write journals—the “book” of their daily life.

³⁵ *ibid.*, pp. 76–77

³⁶ Eisenstein, p. 81, cites Black, p. 412. Eisenstein also directs the interested reader to Steinberg, p. 420, for other Bibles with celebrated errors, including the “Judas Bible of 1611,” “Printers Bible of 1702 and “Vinegar Bible of 1712.”

Biblical

The first major work of the first printing press in Mainz, Germany was a 42-line Bible in Latin, published circa 1455.³⁷ In 1460, Johann Mentelin was the first to print the Bible in any vernacular (German).³⁸ Up until that time, the only translation allowed by the Catholic church was the Latin Vulgate translated from Hebrew and Greek by Jerome in the 300s AD. Given the preciousness of each Bible copied and illuminated by hand, it comes as no surprise that we have stories of these valuable tomes chained to the lectern at the local church. Of course, some vernacular translations had been provided in some languages prior to the printing press (Wycliffe's English translation prominent among them), and these were unevenly censored depending on the locale and the individuals involved. Wherever people translated the Bible into the vernacular, lay renewal movements occurred. Why did none of these localized renewals spark the Reformation? The lack of a printing press seems to be part of the answer.³⁹ What was there about the combination of the Bible and the printing press that was so explosive?

The Bible is information about God. Christians believe God has chosen the Bible as one of the primary ways to reveal this information. For centuries prior to the Reformation, Christians had been known as the "people of the Book," rendering Christianity particularly sensitive to any dramatic improvements in the technology of the book.⁴⁰ Between the first printing press in 1453 and the 1490s, printing presses could be found in 28 cities in Europe, covering 14 countries.⁴¹ By 1600, the Bible had been published in at least 12 languages (in addition to the original manuscripts).⁴² By 1800, the Bible had been published no less than in 66 languages. As print run sizes increased, the cost of Bibles would drop. More and more people could own a copy of the Bible. Today (at the height of the Print Age) Bibles are given away!

Recognizing the transformational power of reading the Bible, all the major reformers advocated reading the Bible for oneself. Luther's dictum, *sola scriptura* ("scripture alone" or "only scripture"), defined the spirit of the Reformation. Indeed, as people read the Bible for themselves, they had an increasing number of questions about the text and about the church. Biblical scholarship, led by Erasmus around the turn of the 16th century, was able to return to the original texts—but which text was original? Great turbulence and ground-breaking approaches in Biblical studies followed as scholars tried to sort out the textual questions. More generally, people reading the Bible for the first time, had questions about meaning that have become staples for modern Bible study—why are there two accounts of Creation in Genesis? Who wrote the different books? When were they written? Is the Bible historically true, i.e. did it really happen?

³⁷ Steinberg, p. 23. This edition was 1,286 pages.

³⁸ Steinberg, p. 41. His edition was 850 pages, "saving almost a third of the paper."

³⁹ Eisenstein, p. 303. On p. 310, she writes, "According to Dickens, Lollardy 'could become no more than an abortive Reformation' partly because 'it lacked access to the printing press until after 1530,'" citing Arthur G. Dickens, *The Reformation and Society in Sixteenth Century Europe* (NY, 1968). This volume of Dickens seems to be one of the seminal works on the Reformation in the 20th century.

⁴⁰ Eisenstein, p. 327.

⁴¹ Steinberg, p. 39. This does not cover any of the itinerant printers who seem to have made a living seeking wealthy patronage.

⁴² Catholic Encyclopedia, <http://www.newadvent.org/cathen/15367a.htm>

To answer these questions, scholars looked deeper and developed even more questions. (Worth noting at this point is that modern ideas of authorship and historical dating are behind the questions of “who” and “when”.) Before this, occasionally people would turn their minds to them—Origen for example—but after the printing and spread of the Bible, these new approaches to scholarship and the differing willingness to live with uncertainty in the Biblical text increasingly drive a significant wedge between Christians and Biblical scholars. The more rational approach to faith simultaneously led to rejection of tolerance in some (the Puritans have a reputation for inflexibility) and embracing tolerance in others.⁴³

In the midst of these upheavals in the understanding of the Biblical text, informal groups of ordinary Christians began to gather. These small groups reading the Bible together became the real energy behind the Reformation. During this time period, lay and clergy alike began to use many of the tools for Bible study that we now take for granted—reading in context, examining the historical context to understand the author’s meaning better, cross-referencing (made easier), chapters and verses (rather than page numbers that change with each translation), topical indices, concordances, Biblical atlases, and many others.⁴⁴ Informal groups of lay people gathered to read and study the Bible together.

The printing press also intensified the disquiet felt about some of the Catholic church’s practices—corrupt, uneducated, even missing clergy; selling of indulgences⁴⁵; ecclesiastical courts—by increasing people’s awareness of the Biblical record. As more people read the Bible for themselves, they began to see the incongruities between the Bible’s messages (especially Jesus’ teachings and the practices of the early church) and the reality of the Catholic Church on the continent and of the Anglican Church. The established ecclesiastical structures seem to have been unprepared for how much faster things could change with the increased information and were slow to evolve. In sharp contrast, as the Reformation gets rolling (1517–1536), the Protestants were quick to adapt the new technology to their purposes.

One interesting paradox of the greater number of questions about the Bible is that they encouraged both greater reliance on one’s own interpretation of the Bible read for oneself, and simultaneously greater reliance on an educated clergy. This healthy tension exists even today in the Congregational Way—leading to encouraging private devotions for every Christian, and to the central role of preaching in worship (see below).⁴⁶

⁴³ Indeed, when the group of Separatists from Scrooby sought a haven for religious tolerance in Europe, they chose Leiden, one of the great publishing centers for Biblical studies at the time. Of course, the Pilgrims found that this tolerance was a double-edged blade—that it encouraged what they viewed as an unacceptable moral laxity.

⁴⁴ Eisenstein p. 97

⁴⁵ The first dated work printed was an indulgence. *ibid.*, p. 60.

⁴⁶ Daily (or even more frequent) devotions had previously been mostly the province of monastics or the old. See Eisenstein, p. 425.

Scientific

Without the printing press, science would not be what it is today. The printing press enabled scholars for the first time to put multiple sets of measurements (in the form of tables) side-by-side. Not only did the publishing of books (esp. tables and diagrams) significantly impact the pace and kinds of discovery, but the printing press enabled the publishing of journals for the first time, distributing information and uniting communities of scholars. Numbered among those scholars were Puritans and Congregationalists. Isaac Newton (the father of modern physics) counted himself a man of deep faith (influenced by the Puritans), as did Robert Boyle (the father of modern chemistry). Cotton Mather, arguably the greatest Congregational pastor of Boston in his day, was also a member of the Royal Society in London.⁴⁷ Within a few short years of its founding, 62% of the membership in the Royal Society was Puritan!

Three aspects of the Puritans' theology help explain this deep involvement in science.⁴⁸

- **Glorifying God in all we do.** The Puritans believed the chief aim and ultimate purpose of every person was to glorify God. Perhaps better than anyone in history, the Puritans laid bare every aspect of their lives and tried to bring their lives into congruence with what they read and knew about God. One aspect of Puritan spiritual genius is becoming open to God even in the workplace. What one does (for a living or a pastime) must reflect a person's foundational relationship with God.⁴⁹
- **The importance of calling.** For the Puritans and early Congregationalists, living out "the calling" from God that came to each person was part of how God was glorified. God called each person to serve where their gifts lay, so a person could glorify God in whatever work utilized their gifts. All work was sacralized and ennobled in this perspective, but the greatest calling one could have was to assist in building God's Kingdom by improving the lives of one's fellow man.⁵⁰
- **The book of nature.** When seeking to understand God, Puritans turned both to the Bible and to the "book of nature." Since all of Creation was the Lord's, if one could understand the created universe more clearly, then one could gain insights into how God worked. God's beauty and perfection, it was believed, could be seen in every aspect of existence, and by studying that Beauty one could grow in faith and understanding.

⁴⁷ Robert K. Merton, *Science, Technology & Society in Seventeenth Century England*, (NY: Harper Torchbooks, 1970), p. 122.

⁴⁸ Extended discussions of this subject are best pursued in Merton, *op.cit.* and Perry Miller's *The New England Mind: The Seventeenth Century* (Cambridge, MA: Harvard University Press, 1939). I am indebted to Merton for this outline (a short form of his) of important beliefs and their impact on science, chapters 5 and 6.

⁴⁹ Leland Ryken writes in *Worldly Saints: The Puritans as they really were* (Grand Rapids: Zondervan, 1986), p. 25, "For the Puritans, all of life was God's. Their goal was to integrate their daily work with their religious devotion to God."

⁵⁰ While Merton argues a simple utilitarianism lies at the root of this, clearly a power of belief moved these people of faith to good works.

In a sense, then, science became one of the desirable paths to salvation for the Puritans, and study of the “workings of the world” (physics) especially important. Moreover, Puritans exercised the same rigor and excellence in their scientific explorations with which they also pursued more “everyday” callings. The seeds to the so-called split between science and religion may have been planted in the Renaissance and Reformation, but throughout the 17th century, such a split had not begun to bear any of the bitterest fruit it would bear in the 19th and 20th centuries.⁵¹

Social

The Puritans revolutionized the importance and purpose of family. The family was seen as the basic unit of God’s Kingdom, a visible metaphor for the church, and the training ground for spiritual formation. Following Biblical precedent, a strict hierarchy was enforced—the husband/father was the spiritual head of the household with wife and children his subordinates. And yet the husband/father’s power and authority was also circumscribed by Biblical injunctions to “love as Christ loved.”⁵² Households were encouraged to do daily devotions by reading the Bible and praying together. On Sunday afternoons, families would go over the lessons from the morning’s preaching and teaching, preparing for attending worship again in the evening. This much time together would tend to tighten the family bonds.

Education became one of the great responsibilities and opportunities of the family. Learning to read was of course greatly encouraged, for the reader could encounter the power and promise of God’s Word more directly.

Surprisingly then, we discover that printing press led indirectly to promotion of both education and the nuclear family.

Worship

Worship was of utmost importance to the Puritans and early Congregationalists. In worship, the Reformation’s *sola scriptura* gained its fullest expression. The Puritans and early Congregationalists required scriptural warrants—and particularly New Testament reference—for every aspect of worship. Here, too, the printing press’ influence can be found in preaching and music.

Preaching. The tremendous desire of their congregations for better, more compelling explanation of the Bible pushed Protestant pastors to develop both deeper, more exacting understanding of the Word, and also better, more persuasive delivery. Preaching manuals became commonplace in the 16th century.⁵³ Printing did more than tend to standardize pastor’s approach to preaching—it provided additional material for Biblical interpretation, additional resources from church history, and transformed how pastors thought about what they did. Though most pastors’ sermons were not

⁵¹ Eisenstein, p. 327.

⁵² Ryken, p. 76, quotes John Robinson, “[A husband’s] love for his wife must be ‘like Christ’s to his church: holy for quality, and great for quantity.’”

⁵³ Eisenstein, pp. 315–6

published, simply knowing that some pastors did publish meant that pastors might adjust how they prepared for preaching.⁵⁴

Music. The Puritans and early Congregationalists had a great love of music, but because of the lack spiritual warrant, instrumental music was not permitted in worship and relegated to the home. Singing, however, was addressed by Paul in his letter to the Colossians (3:14). What “spiritual songs” could be worthy of the worship of the Almighty God? Only scripture. So the Puritans turned to metrical psalms for their worship, eschewing many other contemporary innovations in favor of this one. To bring these songs into worship and make them available to the entire congregation, the Puritans turned to the new technology and so were printed the first books for worship including metrical psalms. When the Puritans moved to the Americas, they brought metrical psalm books with them. In 1640, the first printing press established in America takes as its first project, the printing of the famous *Bay Book of Psalms*. The *Bay Book* was a collection of metrical psalms with music and lyrical translations by Puritan divines. In the 1681, the Plymouth Church began the innovation of “lining out” in which the song leader would sing a line of the hymn and the congregation would echo it.⁵⁵ The practice was tried to encourage the singing of the illiterate participants in worship. This practice grated on the nerves of many, notably Isaac, who caustically observed from England in 1707, the dreadful attitude “lining out” encouraged: “To see the dull indifference, the negligent and thoughtless air, that sits upon the faces of a whole assembly, when a psalm is on their lips, might tempt even a charitable observer to suspect the fervency of inward religion.”⁵⁶ By 1699, the practice of “lining out” was being abandoned in favor of hymnals.⁵⁷

The Puritans, then, approached worship with not only deep piety, but quick and careful innovation. Always the Puritans were mindful of the vital importance of glorifying God and remaining faithful to scripture.

Congregationalists and the Fourth Revolution: Integrate and Articulate

The PostModern Era is also a time of incredible spiritual, economic, and social change. To illustrate some of these similarities, we will define some of the general effects of the of the Information Revolution, and then briefly attempt to apply some of the lessons from the Puritans and early Congregationalists to our own time.

⁵⁴ *ibid.*

⁵⁵ Horton Davies, *The Worship of the American Puritans, 1629–1730* (NY: Peter Lang, 1990), p. 127, referencing Isaac Watts' Preface to *Hymns and Spiritual Songs in Three Books* (London, 1707).

⁵⁶ *ibid.*

⁵⁷ *ibid.* The first church to intentionally abandon this innovation was the liberal Independent, Brattle Square Church in Boston.

General Effects of the Digital Convergence

- **The standardization of texts, methods and knowledge.** As much as the printing press contributed to the increase of standardization, its contribution pales beside the affect of the Information Revolution. Tim Berners-Lee, inventor of the World Wide Web, illustrates the importance:

The art [to designing the foundations of the web] was to define the few basic, common rules of “protocol” that would allow one computer to talk to another, in such a way that when all computers everywhere did it, the system would thrive, not break down...[This allowed there to be] no central computer “controlling” the Web, no single network on which these protocols worked, not even an organization anywhere that “ran” the Web. The Web was not a physical “thing” that existed in a certain “place.” It was a “space” in which information could exist.⁵⁸

A computer has access only to what it can translate. Standardization broadens the reach of a computer. One of the attractions of digitizing information is that it makes that information available to a computer. If the digitized information uses one of the broad standards (e.g., MP3 for audio, JPEG for photos, QuickTime for movies), it can be read not on one computer, but by any computer (or other audio-visual equipment) designed to read such a standardized file.

Standardization enters the picture again as computerized forms require certain kinds of information (a zipcode for example) and refuse to accept non-numeric characters.

- **New ways of accessing the greater volume of information.** We have long passed the limits of the tools for accessing information developed during and after the Third Revolution. Even the noble card catalog has been replaced by the faster, computer database, less-space intensive. Even for some of the information in this paper, I experienced these limitations. Despite long explorations in seminal works, some simple, basic questions remained elusive (e.g., dating inventions, and quantifying print production). Some of this could be found by going to the library and poring over encyclopediae in the hunt for what should be a simple answer. With the use of a “search engine,” I tracked down the information from my home, chose a reputable source of the hundreds (even thousands!) available, drawing on knowledge from people in other parts of the US, and did so with a fraction of the effort in a fraction of the time. And the quantity of information available is still rising. More and better tools will undoubtedly be created that tap, organize and prioritize information.
- **New ways of testing information for trustworthiness.** During and after the Third Revolution, science, typographic conventions, and intellectual property laws helped give people confidence in the growing flow of information. The Digital Age has added an innovative tool to science—the computer simulation. Other tools for testing the trustworthiness of information are needed however, for in an ironic twist, computers (which give us amazing tools for testing hypotheses) also give us tools to create virtual realities, “realities” visually difficult to tell from the “real world.” Intellectual property rights—and the authorship they are designed to guard and encourage—are being stretched as never before. In recent days, National Public Radio advertised a show in which two musicians

⁵⁸ Berners-Lee, p. 36.

made equally valid arguments—one for not allowing their music to be accessible from the web (it makes it too easy to steal their work), and another ridiculing any musician who does not post their work for download on the web (the more music people download and share, the more people hear the music).⁵⁹ One of the great hopes for trustworthiness in the Digital Age is “transparency,” the fact that anything digital will eventually be revealed.⁶⁰ According to the reporter who broke the story about the abuses at Abu-Ghraib Prison in Iraq, a large part of the reason this story broke and captured the nations attention was the photos, photos taken on digital cameras by several soldiers. These soldiers could “burn” these photos onto CD, even e-mail copies to people in other parts of the world. Any efforts to contain the scandal by containing the photos proved as impossible as tracing and destroying every digital copy. Thus, the transparency of digital information—everyone can see everything you do—may provide a means for reinforcing people’s consciences.⁶¹

- **Increase in digital literacy and the importance of education.** Just as people in the throes of the Third Revolution saw literacy as a key to the new age, so, too did people even in the early years of personal computers. Computers found their ways into schools very quickly, at first as novelties, then as typewriters, and later as regular features in the educational curriculum. This preparation includes not only how to use different hardware and software, but programming and search strategies.
- **Increased role of independence and decentralization.** Like reading, computers tend to require a measure of isolated concentration. Unlike reading, networked computers allow for new kinds of social interaction—chat rooms, on-line gaming, and instant messaging to name a few. The human cost of physical isolation and virtual society are unclear. What is certain is that the amount of information available to any single person, combined with transparency, and a little money can give an *individual* unprecedented power. Osama bin Laden is but one example (and an extremely negative one) of the power an individual can wield in today’s world.⁶² The decentralized, horizontal structure of the World Wide Web reflects the increasing challenges to the sovereign nation-state. New understandings of relationships and community will need to be developed.⁶³

⁵⁹ Dated September 13, 2004.

⁶⁰ Thomas Friedman, *The Lexus and the Olive Tree: Understanding Globalization* (NY: Farrar Straus Giroux, 2000), Chapter 1. Friedman lays out clearly the sweeping economic and cultural issues of globalization.

⁶¹ One thoughtful (if somewhat difficult to navigate) examination of some of the drawbacks to the Fourth Information Revolution is by Clifford Stoll, *Silicon Snake Oil: Second Thoughts on the Information Highway* (NY: Doubleday, 1995).

⁶² Friedman, p. 13

⁶³ An extended, fascinating discussion can be found in Andrew L. Shapiro’s *The Control Revolution: How the internet is putting individuals in charge and changing the world we know* (NY: Century Foundation, 1999)

Applying Third Revolution Insights to 21st Century Challenges

As the above study suggests, the Puritans and early Congregationalists lived in times as challenging in their own way as we find our times. The 1500s and 1600s saw major societal changes associated with the development and spread of printing. What can we learn from the Puritans and early Congregationalists and the way they faced the challenge of innovation in their day? Our spiritual ancestors navigated the changes all around by integrating and articulating.

Changes to the Why or the How? From the Puritans and early Congregationalists, we learn that innovation is not to be feared or sought for its own sake. They are unyielding and passionate in their pursuit of their faith and fulfilling the purposes of their faith. The “why” of their faith is non-negotiable—worshiping and glorifying God in every facet of life. As long as the “why” is certain, the Puritans seemed to embrace innovation that does not contradict the foundations of their faithful approach (i.e., as long as they could find a Biblical warrant for it). The innovations that could reinforce the integration of God’s Presence into their lives they accept without question as good—printed Bibles, Biblical scholarship and metrical psalms in particular. Other innovations—instrumental music and the hedonistic literature of the day—they categorically rejected. Interestingly enough, the Puritan’s movement was a *radical* one in the sense that they sought to return to the *roots* of the Christian faith, to strip away what they saw as corrupt innovations of the Catholic Church. In another ironic twist, this backward-looking approach to renewal brought tremendous innovation to Christian faith.

The approach of the Puritans and early Congregationalists during and after the Third Revolution suggest a number of applications.

- **Know the Bible better.** I am convinced part of the reason our spiritual ancestors could navigate their turbulent times is that they had, as a group, a much greater and deeper knowledge of Scripture. How can we stand firm on the “non-negotiables” if we do not know what they are? The Puritans used the Bible as their sole guide for understanding how to faithfully limit and navigate their tumultuous times; it could do the same for us.
- **Integrate God into every aspect of our lives.** Using the Bible as their guide, the Puritans sought to bring every aspect of their lives under God’s control. In a society that tends to fragment, God can bring wholeness and purpose.
- **Be more passionate** about knowing, loving and following God. We serve a great and loving God, made manifest to us through the life, teachings, sacrifice and resurrection of Jesus Christ. Only passionate faith could lead someone to place themselves that completely on God’s potter’s wheel for shaping.
- **Embrace innovation that helps integrate God’s Presence into life.** The Puritans and early Congregationalists used the technology of the printing press to bring the Bible into every home. Congregationalists of the Fourth Revolution can encounter the Bible and Bible teaching even more deeply and intimately through electronic versions of the Bible. Even better, electronic Bibles are open to search engines, turning every version into an exhaustive concordance as well as a Bible. Christians with “personal digital assistants” (PDAs or handhelds) could carry their Bible with them, making God’s Word available any time

wherever they go. Online devotions could become part of a daily routine. E-mail opens up the possibility of being in close touch with family members, church members, missionaries in the field, prayer partners in other countries, and so on. Again, God's concerns have become more present in our lives. Some Christian scholars have discovered electronic versions of the Church Fathers or Calvin's Commentaries are searchable, not only saving time (which means more time to read), but making the teachings of the ages more accessible. Do you have a cellphone? Then you probably have an opportunity to put an encouraging message you can read every time you turn on your cellphone on.

Innovations to Greatly Bless or Merely Change? Though it must have been present in some measure, as I read the Puritan literature, I get very little sense of excitement over innovation for innovation's sake. Occasionally one of the Reformers (Luther for example) breaks into praise for what the printing press has made possible,⁶⁴ but all the Reformers (and the Puritans) recognize that the printing press is a tool which can only be as moral/spiritual as the uses to which it is put. All their innovations aim at being more faithful, to be sure, but more, to be a blessing to the common good,⁶⁵ and to draw others into Christ's embrace.⁶⁶ So science could be embraced both for how it helped people understand God better for how it improved people's lives. The innovation of "lining out" could be tried to improve worship, but when it proved to distract from worship, the practice was abandoned. Always the Puritans approached proposed change through the eyes of their integrated approach to faith—is it in the Bible? Did Jesus approve? Would Jesus approve?

Again, the approach of the Puritans and early Congregationalists during and after the Third Revolution suggest a number of applications.

- **Invest in technology with purpose.** Avoid the "gee whiz" approach to technology investment. This approach leads less to faithful following and more to materialism. Instead, be able to clearly articulate how a particular technology can benefit others. Thomas Bandy talks about using technology to leverage lasting change in congregations.⁶⁷
- **Embrace innovation that helps people find and know Christ better.** Paul writes,

Though I am free and belong to no man, I make myself a slave to everyone, to win as many as possible. To the Jews I became like a Jew, to win the Jews. To those under the law I became like one under the law (though I myself am not under the law), so as to win those under the law. To those not having the law I became like one not having the law (though

⁶⁴ "Luther, himself, described printing as 'God's highest and extremest act of grace, whereby the business of the Gospel is driven forward.' It was typical of the Protestant outlook that he also regarded it as 'the last flame before the extinction of the world.' Eisenstein, p. 304, citing Black, "The Printed Bible," *Cambridge History of the Bible, Volume 3: The West from the Reformation to the Present Day*, ed. by S.L. Greenslade (Cambridge, 1963), p. 432.

⁶⁵ Merton, pp. 60ff, and Ryken, pp. 26–28.

⁶⁶ See Luther's quote in footnote 41 above.

⁶⁷ Thomas Bandy, *Coaching Change: Breaking Down Resistance, Building Up Hope* (Nashville: Abingdon, 2000), p. 114ff.

I am not free from God's law but am under Christ's law), so as to win those not having the law. To the weak I became weak, to win the weak. I have become all things to all men so that by all possible means I might save some.⁶⁸

Electronic/digital technologies are one means among many for making it easier for God to draw people to Himself. Indeed, we must always remember that we are servants of the Most High God.

- **Abandon innovation that fails the tests of faith.** For the Puritans, faithful, meaningful worship and the Biblical witness were two of the most important guides to evaluating innovation. Congregationalists of the Fourth Revolution need to apply the same tests to current innovations, encouraging what improves loving faithfulness and rejecting what does not.

Unafraid of innovation, Christians can approach even failure with confidence. More important than success or failure is simply being faithful to the call. Every time a Christian uses technology to make God more real and more intimate in his/her life, or to help God become more real in the lives of others, God gains a stronger foothold not only in the Christian's life, but makes the technology itself subject to the Living God.

Maintain Balance. The impassioned hearts of the Reformation, once ignited by reading the Bible, hearing the sermons of Reformers, and experiencing the corrupted practices of a moribund Catholic Church, burned so hotly that often people went to destructive extremes.

Luther himself commented on the inconsistency of iconoclasts who tore pictures off walls while handling the illustrations in Bibles reverently. Pictures 'do no more harm on walls than in books,' he commented and then, somewhat sarcastically, stopped short of pursuing this line of thought: 'I must cease lest I give occasion to the image breakers never to read the Bible or to burn it.'⁶⁹

Later in the 16th century, the Puritans would also take their faith to extremes in banning organ and instrumental music, rejecting even the best religious music of their day in favor of metrical psalms. The Puritans, too, tended to remove all images from their worship spaces, even those which promoted faith and understanding. Taken to its extremes, the Puritan approach to faith could fill up with words and leave the soul joyless and anxiety-ridden. At their worst, the Puritans and early Congregationalists seem to have "thrown the baby out with the bathwater" in their desire to "clean up" Christianity and return to a pure faith. While their goals were admirable, sometimes the results were oppressive. At their best, these same faithful people sought to strip away all that was distracting or corrupting to faithful following of Jesus Christ. Almost miraculously, these faithful people harnessed the innovations of their day for God by tightly integrating and focusing their power in ways that built up and encouraged godly faith in their own lives and those of others.

⁶⁸ 1 Corinthians 9:19.

⁶⁹ Eisenstein, p. 68, citing "Against the Heavenly Prophets in the Matter of Images and Sacraments," (1525), *Luther's Works*, XL 99–100.

The more the Fourth Revolution penetrates people's lives, the more people's reactions may polarize. Christians must resist the impulse to either utterly reject or indiscriminately accept innovation. Perhaps Congregationalists of the Fourth Revolution can be just as passionately and more reasonably faithful.

Our society and our faith are transitioning to a new age. Our generation and the next have the great opportunity of shaping what that society and that faith will look like. Will our faithful lives inspire the generations to come? Will they look back on our passion for Christ to help light their way through uncertain times? We, like the Puritans and early Congregationalists, need to be more fully captivated by our love for Jesus Christ. We can learn from our spiritual ancestors the importance of a reasoned approach to passionate relationships. We, too, can turn from what hinders and distracts us, and embrace the changes that will open the doors to those who wish to know Christ better.

...the suggestion that we *need* the Puritans—we late twentieth-century Westerners, with all our sophistication and mastery of technique in both secular and sacred fields—may prompt some lifting of eyebrows....What could these zealots give us that we need?...

The answer, in one word, is maturity. Maturity is a compound of wisdom, goodwill, resilience, and creativity. The Puritans exemplified maturity; we don't...We are spiritual dwarfs. The Puritans, by contrast, as a body were giants. They were great souls serving a great God. In them, clear-headed passion and warm-hearted compassion combined. Visionary and practical, idealistic and realistic too, goal-oriented and methodical, they were great believers, great hoppers, great doers, and great sufferers.⁷⁰

⁷⁰ J.I. Packer, *Why We Need the Puritans*, foreword to Ryken, op.cit., p. x.

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