"Revolution? What Revolution?"

Successes and limits of computing technologies in philosophy and religion*

"Who can foresee the consequences of such an invention?"

-- Lady Ada Lovelace

Introduction

Computing technologies—like other technological innovations in the modern West—are inevitably introduced with the rhetoric of "revolution." Especially during the 1980s (the PC revolution) and 1990s (the Internet and Web revolutions), enthusiasts insistently celebrated radical changes— changes ostensibly inevitable and certainly as radical as those brought about by the invention of the printing press, if not the discovery of fire.

These enthusiasms now seem very "1990s"—in part as the revolution stumbled with the dot.com failures and the devastating impacts of 9/11. Moreover, as I will sketch out below, the patterns of diffusion and impact in philosophy and religion show both tremendous success, as certain revolutionary promises are indeed kept—as well as (sometimes spectacular) failures. Perhaps we use revolutionary rhetoric less frequently—because the revolution has indeed succeeded: computing technologies, and many of the powers and potentials they bring us as scholars and religionists have become so ubiquitous and *normal* that they no longer seem "revolutionary" at all. At the same time, many of the early hopes and promises—instantiated in such specific projects as Artificial Intelligence and anticipations of virtual religious communities only—have been dashed against the apparently intractable limits of even these most remarkable technologies. While these failures are usually forgotten—they leave in their wake a clearer sense of what these new technologies can, and can<u>not</u> do.

To see this, I highlight historical and current examples of how computing technologies

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are used in philosophy and religion. We will see that philosophers have been engaged with computing from its beginnings in the dreams of Leibniz in the 17th century[1] and the earliest implementations of electronic computers in the 1940s, 1950s and 1960s. And, perhaps because of the clear connections between computing technologies and a range of classical philosophical practices (logic) and fields (epistemology, ontology, ethics, political philosophy, etc.), computation has enjoyed an increasingly central place in the philosophical literature of the past 50 years. Indeed, many philosophers speak of a "computational turn"—referring to ways in which computing technologies have given philosophers new kinds of laboratories for testing and refining classical debates and hypotheses.

Similarly, religious studies scholars learned early to exploit the new tools—beginning with Father Roberto Busa's pioneering use of computers in the 1940s to analyze complex texts. More sophisticated versions of these early innovations gradually developed and became commonplace on today's desktops and even palm-held computers. In addition, the impact of computation in religion seems still more powerful in the larger domain of religious practice. In ways consistent with earlier technological innovations—especially such mass media as the radio and television—it is especially the religiously marginalized and proselytizers who have benefited from computation as instantiated in computer networks, i.e., the Internet and the World Wide Web.

In both domains we will see the same general pattern: an early period of enthusiasm, one that rode high on revolutionary—even apocalyptic—promises of radical transformation, followed by a quieter period of diffusion and incorporation of computing technologies within philosophical and religious domains. Hegel would remind us that it is in this relative quiet, aided now by a rich history of examples, that we are able to evaluate more critically and carefully the strengths and limits of these remarkable technologies.

Philosophy ["love of wisdom" (   ) — s y s t ematic and rational inquiry into *what is* (metaphysics, ontology), how we may know (epistemology), how we may think cogently and avoid error (logic), and, especially given some account of who we are as human beings and our relation(s) to the larger world (possibly including divinity/ies), how we should behave individually and in community (ethics, politics)]

The computational turn: logic, AI, ethics

Arguably, computing is philosophy—specifically, the branch of philosophy concerned with logic. Our computing devices depend on the logical system developed by George Boole in the 1840s and 1850s and prior to Boole, a number of philosophers in the modern era—most notably, Leibniz—concerned themselves with the possibilities of machines that might automate reasoning as the manipulation of symbols (Dipert, 2002, 148). Hence, it is perhaps not surprising that some of the earliest applications of computing technology in philosophy were precisely in the area of logic—both in efforts to exploit the computer as a logical calculating device (e.g., for assessing argument validity and generating valid conclusions from specified premises, *ibid*) as well to automate the teaching of logic (perhaps most notably by Patrick Suppes, beginning in 1963: Suppes, Home page).

Moreover, as computers automate and expand our ability to undertake logical analyses, they not only offer new ways of accomplishing classical logical tasks (from truth table analysis through proofs to advanced logical applications—e.g., *Tarski's World*, etc.: see Barwise and Etchemendy, 1999): they further open up distinctively new ways of exploring classical philosophical questions. One of the earliest, and most obvious, examples of this "computational turn" in philosophy is the rise of Artificial Intelligence—the effort to replicate human consciousness and reasoning through computing devices, prominent especially in the 1950s through the early 1990s.Computers provided philosophers with a laboratory in which to empirically test and refine hypotheses about the nature of reason and consciousness. Initially, so-called "hard" AI proponents argued that machines would quickly outstrip human intelligence. It appears, however, that the hard AI agenda has largely moved to the margins—first of all, because of repeated failures to live up to early promises. As in the natural sciences, however, both successes and failures are instructive: the successful efforts to instantiate at least some components of human reasoning in machines has helped sharpen philosophers' sense of how far computation and consciousness overlap—while the failures help demarcate how computation and human reasoning remain irreducibly distinct from one another.   Indeed, there is a recent turn in philosophy—in fields as diverse as hermeneutics, phenomenology, and feminism—towards *embodiment* as a key theme of exploration: philosophers such as Albert Borgmann (1999) and Hubert Dreyfus (2001) use an understanding of *who we are as embodied creatures* to explore the strengths and limits of technology, including computing technologies, in contemporary life. So, while recognizing the achievements of AI and the pedagogical advantages of distance learning

via the Web and the Internet, Dreyfus argues that these technologies do <u>not</u> help us acquire our most distinctive and important human capacities—those of making commitments, taking risks, and exercising *phronesis* (Aristotle's term for practical judgment and wisdom) in our ethical and political lives.

Indeed, the creators of modern computing technology have been aware from the outset that these new devices raise precisely questions of *ethics* with regard to the use of these systems, *politics* with regard to their potential social and political impacts, and so forth. As Bynum points out (2001), Norbert Wiener in what amounts to the first book of computer ethics (1950), recognized that computing technologies will impact, for better and for worse, life and health, knowledge and science, work and wealth, creativity and happiness, democracy and freedom, and inter/national concerns with peace and security. In Bynum's view, moreover, Wiener sets the agenda for the field of computer ethics—a field that begins to emerge only slowly in the 1960s and 1970s, but now includes an extensive literature (including journals such as *Ethics and Information Technology*). More broadly, the computational turn is now well documented not only in AI and ethics, but also, for example, philosophy of mind, philosophy of science, epistemology, ontology, and so forth (Bynum and Moor, 1998, 2002). Indeed, the late 1990s and early 21st century saw the emergence of Philosophy of Information as one way to provide a systematic overview of the impact of computing in virtually every domain of philosophy (Floridi, 2003).

Hypertext.

In the 1980s, both philosophers and other humanities scholars were excited by a new form of "non-linear" text made possible by computing technologies—hypertext. While the theoretical reflections and software experiments of such hypertext pioneers such as Jay David Bolter (1991) and George Landow (1992) were most prominent—at least some philosophers explored the potential of hypertext to foster not only new forms of argument, but also to *recover* "traditional" argument forms (e.g., Hegel's dialectic) which are only awkwardly expressed in the (largely) linear frameworks of print (Kolb, 1996).

CD-ROM databases (ethics, history of philosophy)

First appearing in the 1980s, CD-ROMs seemed the perfect medium for realizing extensive hypermedia programs and databases – for example, for exploring and teaching ethics (e.g., Cavalier et al, 1998). As a second example: while originally defined as a Greek classics project

—i.e., focused on collecting primary and secondary literary and historical texts, as well as architectural, historical, and cultural resources (including extensive visual images of important sites, artifacts, etc.)—the second edition of *The Perseus Project* also included both the Greek and English texts of Plato and Aristotle. Like its counterparts in Biblical studies, the Perseus CD-ROM not only provides an electronic library of these primary texts, but also allows for extensive text searches and analyses. Such searches accomplish in minutes what might otherwise take weeks, months, or years of reading.

At the same time, however, these extraordinary resources and tools are also quite limited. While the primary and secondary texts made available on CD-ROM are extensive—and supplemented by a constantly growing electronic library on the Web—only a relatively small percentage of the literatures important to philosophers has been digitized. Moreover, word searches and morphological analyses are important components of scholarship—but they are only a very small component of our research, reflection, and writing. As with the specific history of AI, philosophers (and, it appears, religion scholars) are gaining a more realistic and nuanced appreciation of the strengths <u>and</u> limits of computing technologies in their disciplines, precisely as the successful resources and tools simultaneously mark out what the technologies can<u>not</u> do (at least so far).

Computer-mediated communication

The sorts of communication most familiar to us in terms of the Internet and the Web—also serve as a philosophical laboratory, one that allows philosophers to revisit classical questions in the domains of ontology, epistemology (including semiotics, hypertext, and logic), the meaning of identity and personhood (including issues of gender and embodiment), and ethical and political values (especially those clustering about the claim that these technologies will issue in a global democracy vs. the correlative dangers of commercialization and a "computer-mediated colonization": see Ess, 2003).

The Internet and the World Wide Web

Interestingly enough, major projects in both philosophy (*Perseus*) and religious studies (Diana Eck's *On Common Ground*, 2002) that began on CD-ROM have migrated to the Web—to join additional "electronic libraries" and online search engines. Two significant examples of online philosophical resources are the *Hippias* search engine and web site, and Lawrence Hinman's *Ethics Updates* site.

Finally, these computer networks have made possible what is now the presumed environment of philosophical scholarship—namely e-mail, listservs, extensive online databases and search engines, and countless web sites (of varying quality) that collect and "publish" often significant resources. It is commonly observed that, in contrast with the high-profile projects and experiments, in the end, it is the relatively low-tech tools that make the most difference—in this case, e-mail and listservs. Despite the explosion of scholarly resources and specialized tools available online and on CD-ROM—it remains debatable as to whether the computer revolution has markedly improved philosophical debate, scholarship, or insight (Dipert, 2002). Nonetheless, the ability for scholars, geographically remote from one another and positioned at institutions of varying resources and prestige, to communicate directly with one another through e-mail and listservs organized by interests and specialties is arguably "revolutionary" indeed. At the same time, however, this ability is now a commonplace.

Religion ["rebinding"—*religio*—between the human and the sacred, expressed both individually and in community in terms of beliefs, values, practices, rituals, etc.; *religious studies*—academic studies of multiple aspects of religion, including studies of scriptures and beliefs, as well as through a range of disciplines such as sociology, psychology, philosophy, philology, history, etc.]

While philosophers were closely involved with the development and early uses of computing technologies because of their disciplinary focus on logic—religious scholars were among the first to explore applications of computing in textual analysis. More recently, however —beyond the use of the Web and the Internet by believers and discussants—there appear to be comparatively fewer religiously-oriented computing projects (perhaps because religious studies are among the most marginalized and underfunded in the academy?). As a representative example: the Institute for Advanced Technology in the Humanities at the University of Virginia —arguably one of the most important centers for developing computing-based humanities applications — lists only two projects (out of some fifty or so) that focus on some aspect of religious studies. On the other hand: the open communicative environments of the Internet and the Web, while appropriated in much the same way among religious scholars as among philosophers, by contrast have been taken up with explosive energy by more or less every religious tradition whose representatives enjoy Internet access.

The use of computing technologies in religious scholarship

In the 1940s, Father Roberto Busa began developing techniques for encoding complex texts in ways that could be manipulated by computers – first of all, to develop a concordance for the corpus of Thomas Aquinas, followed by a more extensive project to develop a hypertextual edition of Aquinas that allows for multiple levels of linking and comparison (*Thomae Aquinatis Opera Omnia cum hypertextibus in CD-ROM*: see Busa, n.d.). At least one Bible concordance (for the then new *Revised Standard Version of the Bible*) was also generated in the 1950s using a computer. As computers became (somewhat) less expensive and more widespread through the 1960s and 1970s, religious scholars began to develop ways of exploiting the computer's storage and processing abilities to undertake complex text analyses (Harbin 1998). Just as philosophers hoped to make the machine take over foundational but repetitive tasks of logical calculation, so their colleagues in religious studies sought to use the machine to take on the tedium of word counts and comparisons.

As microcomputers and CD-ROMs made processing and storage increasingly inexpensive in the 1980s, descendents of these early text-base and concordance projects moved to the desktops and laptops of religious scholars. First of all, Bible database projects flourished– i.e., collections of Bible texts, translations, and commentaries, with basic computing features (indexing, word searches, note-taking) that support both elementary and more advanced sorts of grammatical and textual analysis. These range from the historically-oriented *History of the English Bible* (Beam and Gagos, 1997) and the Göttingen Gutenberg Bible (also available on the Web) to Bible study packages oriented primarily towards laity and clergy (e.g., *QuickVerse*) and remarkably extensive resources such as *BibleWorks*. These new technologies further allow other sorts of databases—for example, Diana Eck's *On Common Ground* CD-ROM (2002) and subsequent Web site that documents religious diversity in the U.S.

On the one hand, these resources fulfill some of the fondest dreams of scholars. *BibleWorks*, for example, allows for complex searches through multiple Bibles – translations as well as critical editions in Greek and Hebrew: a scholar can accomplish in minutes an inquiry that would otherwise take weeks or months. This is the analogue to the way computing technologies have indeed revolutionized mathematics , the sciences, and logic by turning over to the machine repetitive tasks that would otherwise take humans months, years, and lifetimes to perform (cf. Hardmeier, 2000). On the other hand, as in philosophy, the impact of these new

resources and abilities on the quality and quantity of scholarship remains a very open question. In particular, computer-adept scholars observe that these resources exploit only the most basic potentials of the computer, and—echoing the Socratic critique of the technology of writing as leading to the appearance, but not the substance, of wisdom—run the danger of giving the untutored amateur the appearance, if not conviction, that s/he now knows as much as any Bible scholar.

More fundamentally, the emergence of these new technologies themselves—again, especially as interpreted through the lenses of postmodernism—all but required scholars in religion to consider and respond to what many began to see as the emerging "secondary orality of electronic culture" (so one of the premier theologically-oriented theorists of new media, Walter Ong, 1988, 135-38, cited in O'Leary and Brasher 1996, 246). In response, the American Bible Society (after bringing out one of the first CD-ROM Bible databases) undertook an ambitious series of projects to "transmediate" important Christian narratives – i.e., to translate these, using scholarly approaches and principles of translation, into the multi-media environments made possible by computing technologies, so as to synthesize music, visual image, and scholarly resources as an environment for "telling the story" in a way intended to be attractive especially to younger people as oriented primarily to electronic visual media (ABS, 1995). Despite considerable investment and remarkable talent, however, these projects have met with only limited success in the religious marketplace.

Religious scholarship on the Web
As for philosophers, the Internet and the Web have diffused into the commonplace practices and environment of religious scholars. Beyond the explosive development of sites on the Web by diverse faith communities, there is also to be found a reasonably extensive but largely pedestrian use of the Internet and the Web to support

> listservs on scholarly topics of interest to religion scholars and lay persons;
> sites for religious studies professionals (e.g., the American Academy of Religion) that offer relatively little in terms of use or pointers towards use of computing technologies, but rather make use of the Web—sensibly—as an easily updateable archive for such things as their online syllabus project, etc.; and
> portal sites (e.g., Oxford University [Fraser, 2000], the Society of Biblical

Literature's *Electronic Publications and Technology Resources for Biblical Studies*) that list both institutionally-based resources and often very rich and helpful sites put up by individual scholars.

As with philosophers, these now relatively low-tech uses of the computing technology may have the most significance as they expand access to resources and the ability to communicate with geographically distant scholars who share similar interests.

The Internet, the Web, and Religious Communities

Whatever the potentials and impacts of computing technologies for religious scholars—religious communities have exploited the Internet and the Web with extraordinary energy. This religious colonization of cyberspace began first of all as the Internet and the Web afforded safe havens for those otherwise at the margins of North American religious life, e.g., Wiccans, Pagans, New Age seekers, etc., as well as (if more gradually) representatives of the world traditions such as Judaism (Hammerman, 2001), Islam, Buddhism, Hinduism, etc. (Brasher and O'Leary, 1996; Larsen, 2001)

This enthusiasm, was fueled (as elsewhere) by the rise of postmodernism, especially as postmodernism was theoretically conjoined with the technologies of hypertext and then the Web through such theorists as Jay David Bolter (1991) and George Landow (1992). As postmodernism made its way into religious scholarship and theology, it was embraced especially by Evangelicals and Pentecostals, as postmodernism promised to unseat modern rationalism - and thus shift epistemological legitimacy and authority to emotive experience (e.g., the *feeling* of being saved), and undermine rationalist approaches to Scripture such as the historical-critical method, thereby eliminating the chief nemesis of Fundamentalist interpretation. More broadly, this trajectory has led to a number of insightful analyses of the relationship between new media and religion – including texts that both celebrate the media's ostensibly liberatory/revolutionary potentials (e.g., Careaga, 2001) and those that directly challenge postmodernist communication theories by documenting how traditional religious beliefs and assumptions have shaped and constrained the development and use of the new technologies (e.g., Davis, 1998; see Ess, 2001, for an overview of this development and relevant literature).

Currently, the plethora of sites on the web devoted to religion staggers the imagination: a Google search on "religion," for example, will turn up some 13,800,000 hits. As yet, there is no authoritative study of this massive inventory. Two studies in progress suggest, however, an

interesting pattern:

> *Evangelical/Pentecostal/Fundamentalist* sites more fully exploit the interactive nature of online communication to proselytize; while
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> sites representing the online "face" of more *mainstream* and *conservative* traditions – including the Roman Catholic Church and the Greek Orthodox Church- largely provide extensive databases of authoritative texts and pronouncements, and relatively little interactive opportunity.

This pattern, moreover, is consistent with other studies that show, for example, that initial grassroots efforts to exploit the Internet and the Web for political activism are soon squeezed out as extant power centers learn, if somewhat more slowly, how to use the Web and the Net to re-establish their dominance and centrality online. Similarly, more ecumenical proponents of online religion hope that a global Internet may facilitate a global, dialogical culture that fosters the many voices of diverse religious traditions in a new pluralism. But the emerging patterns of use of the Internet, while giving a certain advantage to previously marginalized traditions, rather largely reflect and preserve the existing religious landscape, i.e., one marked far more often by allegiance to one's own tradition and proselytizing on its behalf.

Concluding remarks

Should this overview be even approximately correct, it is then notable for two reasons. First of all, through the larger perspectives of research (including cross-cultural research) on computer-mediated communication (CMC), this curve from initial enthusiasm to more pedestrian applications fits the larger pattern of development from the 1980s and 90s to the late 90s and early naughties (so the British say)—i.e., from the heyday of postmodernism to a "post-post-modern" period that represents more of a hybrid between postmodernism and whatever came before it. Secondly, this pattern suggests that, indeed, the revolution has succeeded in certain remarkable ways—so much so, that we no longer regard computer-based resources and tools as "revolutionary," but simply as "normal" elements of our lives—while at the same time, the multiple failures in philosophy and religion to exploit computing technologies have left a significant portion of our work and lives relatively untouched.

In my own case: I still marvel at having nearly instantaneous access to a remarkable library of important texts—both Biblical and philosophical—not only on my desktop computer,

but also my palm-held computer, and that I can undertake searches that help me locate a familiar quote, and perhaps uncover new patterns and insights. In these ways, these computer-based resources and tools certainly enhance my scholarship and teaching. At the same time, as a number of contemporary observers of technology caution, the affordances of these technologies—what they make easy for me to do—thereby encourage me to pursue the paths they facilitate, and perhaps thereby discourage other aspects of scholarship and teaching that, as yet unreduced to computational algorithms, remain comparatively more difficult. As well, the very ubiquity and commonplace character of these technologies may discourage us from attending more carefully to whatever more subtle and long-term consequences they may have for us as scholars and as human beings.

But even these critical reflections, finally, may be an indication of the success and maturity of the computing revolution in philosophy and religion: perhaps like other revolutions we now take granted, the computing revolution has proceeded far enough along to allow us to critically evaluate both its strengths and its limits.

[SEE CLASSICS, LITERARY STUDIES, NEW MEDIA]

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American Philosophical Association. Web Resources. 26 October 2002 <http://www.apa.udel.edu/apa/resources/>.

An extensive list of sites, online bibliographies and courses, electronic texts, and software (including online logic applications).

Barwise, Jon and John Etchemendy. (1999). *Language, Proof, and Logic*. (Text/software package). New York: Seven Bridges Press.

Includes "Tarski's World," one of the most significant and widely-used programs for teaching first-order logic, as well as other programs by Barwise and Etchemendy, widely regarded pioneers in exploiting computing technologies for the sake of teaching logic.

Beam, Kathryn, and Traianos Gagos (eds.). (1997). *The Evolution of the English Bible: >From Papyri to King James*. CD-ROM. Ann Arbor: University of Michigan Press.

An excellent example of exploiting hypermedia to bring together Biblical texts (including papyrus, parchment, and paper), images, timelines (from 119-1611 C.E.), and scholarly commentary on historical contexts, the evolution of writing styles, and book-making techniques.

BibleWorks. (2002).CD-ROM. 2 disks. Norfolk, VA: BibleWorks. <http://www.bibleworks.com>.

Includes 15 original language versions of the Bible, more than 70 translations, 10 reference works, and 14 lexical and analysis tools. While there are many other Bible programs available—some of which include, for example, more "Bible helps" and classical texts important within particular traditions—*BibleWorks* is notable for both the exceptional number of original language versions and translations it can put on the screen, and for its exceptionally sophisticated searching abilities.

Bolter, Jay David. (1991). *Writing Space: The Computer, Hypertext, and the History of Writing*. Hillsdale: Lawrence Erlbaum.

A seminal exploration of computation and the larger connections between communications technologies (orality, writing, print, and electronic) and our conceptions of "literacy" by a classics scholar and pioneering hypertext programmer and author.

[Revised edition: *Writing Space: Computers, Hypertext, and the Remediation of Print*. Mahwah, NJ: Lawrence Erlbaum, 2001.]

Borgmann, Albert. (1999). *Holding onto reality: the nature of information at the turn of the millennium*. Chicago: University of Chicago Press.

An extensive epistemological analysis of three kinds of "information"—natural, cultural, and technological—by one of the foremost philosophers of technology. Like Dreyfus, Borgmann emphasizes the experience—including the long evolutionary development—of human beings as *embodied* creatures, to develop a nuanced appreciation of both the capacities and limits of technological information.

Brasher, Brenda. (2001). *Give Me that Online Religion*. San Francisco: Jossey-Bass.

Brasher is a pioneering scholar of online religion, and one of its most articulate proponents. In addition to the value of her own analyses and insights, this volume (and its accompanying website < http://www.muc.edu/~brashebe/online%20religion.htm>) is perhaps the single best portal to the rapidly growing literature on online religion.

Busa, Roberto, S.J. (n.d.) Concluding a life's safari from punched cards to WWW. October 31, 2002 <http://users.ox.ac.uk/~drh97/Papers/Busa.html>.

Bynum, Terrell Ward. (2001). Computer ethics: its birth and its future. *Ethics and Information Technology* 3: 109-112.

Bynum T. W. and Moor J. H. (eds.) (1998). *The Digital Phoenix: How Computers are Changing Philosophy* (Oxford: Blackwell).

A landmark anthology documenting the "computational turn" in philosophy. Chapters take up the questions, impacts, and insights gained in the areas of epistemology, philosophy of science, logic and argument, metaphysics, philosophy of mind, artificial intelligence, ethics, and a series of reports on the impact of computing on professional philosophy.

_____. (2003). *Cyberphilosophy*. Oxford: Blackwell.

A follow-up volume to the 1998 anthology, including new chapters on Philosophy of Information, Philosophy and Computer-Mediated Communication, etc.

Careaga, Andrew. (2001). *eMinistry: Connecting with the Net Generation*. Grand Rapids, Michigan: Kregel Publications.

Careaga offers here both theoretical endorsement of postmodernism and its potentials for

Evangelical Christianity, and a correlatively enthusiastic handbook for exploring and proselytizing on the Web. His bibliography and discussion provide helpful orientation to the extensive landscape of authors and argumentation defining the postmodern-Evangelical conjunction.

Cavalier, Robert, Preston Covey, Elizabeth A. Style, and Andrew Thompson. (1998). *The Issue of Abortion in America.* CD-ROM. London and New York: Routledge.

One of the most sophisticated and well-designed examples of hypermedia in the service of philosophical (and, to some degree, religious) reflection—in this case, on the complex ethical issues surrounding abortion. In addition to a rich set of background resources (historical perspectives, legal issues, medical facts, philosophical arguments, and religious perspectives, the CD includes extensive video interviews with a great range of women (and sometimes their partners) who find themselves in somewhat similar situations, but often draw quite different conclusions. Exceptionally powerful as a teaching tool, as these videos make the issues concrete and part of real person's lives—not just abstract case studies and generalizations that otherwise characterize the abortion debate. (A project of the Center for the Advancement of Applied Ethics, Carnegie Mellon University.)

Davis, Erik. (1998). *Techgnosis: Myth, Magic + Mysticism in the Age of Information*. New York: Three Rivers Press.

A refreshingly critical, comprehensive, if occasionally uneven, inquiry into the multiple ways in which classical gnostic beliefs underlie and express themselves in contemporary technologies and the multiple discourses and behaviors surrounding them.

Dipert, Randall R. (2002). The substantive impact of computers on philosophy: prolegomena to a computational and information-theoretic metaphysics. *Metaphilosophy* Vol. 33, Nos. 1/2, January, 146-157.

Dreyfus, Hubert. (2001). *On the Internet*. London and New York: Routledge.

One of the most significant—and successful—critics of early Artificial Intelligence, Dreyfus elaborates here a nuanced account of the limitations of online experience. As *embodied* beings, if we are to learn how to take risks, make commitments, and acquire *phronesis*—Aristotle's term for the sort of practical wisdom that allows us to *judge* in ways that go beyond algorithms as we encounter new and distinctive contexts in our

ethical and political lives—such learning, Dreyfus argues, can only take place through a long apprenticeship among other embodied beings who "have a grip" on reality (a phrase he borrows from phenomenologist Merleau-Ponty).

Eck, Diana. (2002). *On Common Ground: World Religions in America*. CD-ROM, Second Edition. Affiliated web site: <http://www.fas.harvard.edu/~pluralsm/>
A remarkable resource—both in terms of its scope and highly successful hypertextual design—that explores the "changing religious landscape" of the United States over the past 30 years, especially as immigration changes have introduced and enhanced the presence of multiple global faiths in the U.S. In a way that nicely mirrors the plurality and diversity of religious traditions represented here, the CD-ROM exploits a sophisticated hypertextual design to conjoin text, still and video images, and sound to document in rich detail nothing short of a global range of religious traditions now "at home" in the United States.

Ess, Charles. (2001). The Word online? Text and image, authority and spirituality in the Age of the Internet. *Mots Pluriels* No 19. October.
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Floridi, Luciano (Ed.). 2003. *The Blackwell Guide to the Philosophy of Computing and Information*. Oxford: Blackwell.
The table of contents—organized by topics and subfields of philosophy—is available online: <http://www.wolfson.ox.ac.uk/~floridi/blackwell/toc.htm>. A definitive collection of essays documenting significant domains of philosophy affected by "the computational turn," to be consulted alongside the Bynum and Moor anthologies (1998, 2003).

Fraser, Michael and the Centre for Humanities Computing. (2000). *Computing Resources for Theology: An Introduction*. Humanities Computing Unit, Oxford University. 26 October 2002 <http://info.ox.ac.uk/ctitext/theology/theolit.html>.
Of the many excellent portals in religion and theology, this is among the most reliable and comprehensive.

Göttingen Gutenberg Bible. (n.d.) Niedersächsische Staats- und Universitätsbibliothek

Göttingen. CD-ROM and available online: <http://www.gutenbergdigital.de/index.html>.
A complete, freely accessible digitalization of a Gutenberg Bible (1282 pages),
complemented with sections on illuminations and other materials on copying
manuscripts, the development of printing, comparative translations, etc., drawn from the
exhibit "Gutenberg and his Impact" in Göttingen, 2000.

Hammerman, Joshua. 2001. From Shepherd to Weaver: Seeking God in Cyberspace. *Mots
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In these selected excerpts from his book *Thelordismyshepherd.com*, Rabbi Hammerman
reflects on religious life online from a standpoint extensively illumined by Jewish
tradition and literature.

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A concise overview of how the Bible has been studied and re-formed through computing
technologies, beginning with Father Busa's use of punch-cards and sorters.

Hardmeier, Christof. (2000). Was ist Computerphilologie? Theorie, Anwendungsfelder und
Methoden - eine Skizze [What is computer philology? A sketch of theories, fields of
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What is computer philology? Beginning points and methodologies - instruments and
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Easily the most extensive collective on the Web of materials related to almost every
approach and topic in philosophical ethics. Includes videos of lectures, audio files,
discussion fora, and a search engine.

Hippias Limited Area Search of Philosophy on the Internet. 26 October 2002
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Kolb, David. (1996). Discourse across links. In Charles Ess (Ed.). *Philosophical Perspectives on*

Computer-Mediated Communication (pp. 15-26). Albany, New York: SUNY Press.

Kolb—also prominent for his writings on postmodernism, architecture, etc.—approaches hypertext not only from theoretical perspectives, but also as a published author of hypertexts, using the "StorySpace" software of Eastgate Systems. *Contra* the postmodern claim that print allows only for linear modes of writing and argument, Kolb points out that philosophers such as Plato, Hegel, and Nietzsche have succeeded in introducing non-linear modes of argument within linear texts. In addition, central notions of hypertext are already embedded in the medieval Jewish Talmud.

Landow, George. (1992). *Hypertext: The Convergence of Contemporary Critical Theory and Technology.* Baltimore: Johns Hopkins University Press.

Perhaps the single most important exploration of the conjunction of hypermedia technology and postmodern theory by one of the foremost theorists and authors of hypermedia .

Lawrence, Bruce B. (2000). *The Complete Idiot's Guide to Religions Online*. Indianapolis: MacMillan.

Bruce Lawrence is Professor of Comparative Religions, Duke University, and he complies here an exceptionally complete overview of religious ways of interacting on the Web, along with a very complete list and description of websites and portals organized by tradition. Perhaps the best starting point for a systematic exploration of religion online.

Larsen, Elena. (2001). *Cyberfaith: How Americans Pursue Religion Online*. Pew Internet and American Life Project.

<http://www.pewinternet.org/reports/pdfs/PIP_CyberFaith_Report.pdf>

The more recent of two reports by the Pew Project, one of the most significant research centers within the U.S. context.

O'Leary, Stephen D. and Brenda E. Brasher. (1996). The Unknown God of the Internet. In Charles Ess (Ed.). *Philosophical Perspectives on Computer-Mediated Communication* (pp. 233-269). Albany, NY: State University of New York Press.

Ong, W. J. (1988). *Orality and Literacy: The Technologizing of the Word*. London: Routledge.

In this and his other works, Ong contributes to a schema for understanding various stages of communication (orality, literacy, print, and now the "secondary orality of electronic

culture") that, coupled with the work of other communication theorists (Harold Innis, Elizabeth Eisenstein, and Marshall McLuhan), became foundational for both secular and religiously-oriented analyses of the intersections between new computing technologies (especially hypertext) and postmodern emphases on decentering, fragmentation, bricolage ("play in cyberspace"), etc.

Perseus 2.0. (1996). CD-ROM. New York and London: Yale University Press.

An extraordinary collection—much of which has now migrated to the Web, <http://www.perseus.tufts.edu/>. The concise edition (one CD-ROM), in addition to an extensive library of primary and secondary texts, dictionaries, search and morphological analyses tools, etc., includes 5,200 full-screen images; the comprehensive edition (four CD-ROMs) includes 25,000.

QuickVerse. Parsons Church. 10 February 2003.

<http://www.parsonschurch.com/products/quickverse/>.

One of the earliest commercial products oriented towards use by clergy and interested laity, *QuickVerse* has continued to refine and expand the study resources it provides in very user-friendly, cross-linked form – so as to now include Bible translations and study materials for use on the Palm OS as well. Not surprisingly, however, the products are driven – and thus limited – by a particular theological orientation, one favoring the King James translation and more pietistic study helps. For a more robust set of resources – i.e., ones that more fully reflect and incorporate some of the best and most respected scholarly resources from a wide range of perspectives – the interested reader should turn to *BibleWorks* instead.

Society of Biblical Literature. *Electronic Publications and Technology Resources for Biblical Studies.* 26 October 2002 <http://www.sbl-site.org/e-resources.html>.

An excellent portal for a range of online resources, including other institutional sites, software resources, etc.

Suppes, Patrick. Home page. 26 October 2002. Philosophy Department. Stanford University <http://www.stanford.edu/~psuppes/>.

See his "Intellectual Autobiography," especially the web pages <http://www.stanford.edu/~psuppes/autobio20.html> through <http://www.stanford.edu/~psuppes/autobio22.html> for Suppes' account of his

developing computer-aided instruction in the early 1960s, including what we would now call distance learning, as supplied through teletype machines.

Wiener, Norbert. (1950). *The Human Use of Human Beings: Cybernetics and Society*. Boston: Houghton Mifflin.

One of the earliest explorations of the ethical and social issues evoked by the emergence of computing technologies, by one of the premier theorists and practitioners of information theory and design.

Endnotes

I must also note here an important caveat: both the rapid diffusion of computing technologies, and especially the (at least somewhat) global connectivity of the Internet and the Web mean that an ideal survey of the history and applications I undertake here would likewise be global. This essay, however, remains U.S.- and Eurocentric, not only because of my own limitations as a scholar—but (happily) because the diffusion of these technologies and the expansion of the Internet and the Web have encouraged application designs and scholarship throughout the world, and (more happily) in a range of national languages. But this means (unhappily) that many important resources—e.g., the Japanese Association for the Study of Religion and Society's "Religious Interaction in the Information Age" <http://wwwsoc.nii.ac.jp/jasrs/en/index.html>, which is largely in Japanese (of course)—will be inaccessible to the most likely readers of this essay.

1 In the Science Museum (London) exhibition, "Charles Babbage and his Calculating Engine," mounted on the occasion of the bicentennial of Babbage's birth and the Museum's realization of Babbage's "Difference Engine No. 2," the following is attributed to Leibniz, 1685: "It is unworthy for excellent men to lose hours like slaves in the labour of calculation which could safely be relegated to anyone else if machines were used."