



HISTORY & THE INTERNET

A GUIDE

A T R I C K D . R E A G A N

History and the Internet: A Guide

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HISTORY AND THE INTERNET: A GUIDE

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This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 QWF/QWF 0 9 8 7 6 5 4 3 2 1

ISBN 0-07-251456-6

Publisher: *Thalia Dorwick*

Sponsoring editor: *Lyn Uhl*

Editorial assistant: *Kate Mullin*

Marketing manager: *Janise Fry*

Project manager: *Christina Thornton-Villagomez*

Production supervisor: *Carol Bielski*

Freelance design coordinator: *Mary Kazak*

Media Producer: *Sean Crowley*

Cover designer: *Andrew Curtis*

Cover images: © *Photo Disc*/© *Image Book*

Interior design: *CRC*

Typeface: *12/13 Helvetica*

Compositor: *H&S Graphics Inc.*

Printer: *Quebecor World/Fairfield*

Library of Congress Control Number: 2001097385

www.mhhe.com

INTRODUCTION

Students and teachers need to take the Internet and new instructional technologies seriously as potentially valuable and exciting tools for the study and teaching of history. We know the adoption of new technologies in the past such as the camera, railroads, the telegraph, the telephone, the automobile, the radio, motion pictures, television, film strips, the transistor, the VCR, and the personal computer have not always lived up to their expected or promised potential. The only way we can play a role in how e-mail; Web sites; online library catalogs, archival inventories, and primary sources; and CD-ROM's will be used in our classrooms, college dormitories, homes, businesses, and apartments will be if we investigate and experiment with them.

From the time we are children, we all learn that the record of the human past is a complicated tale involving the tangled Web of interactions among individuals, groups, regions, generations, nations, races, classes, sexes, ethnicities, cultures, and religions. The only way to capture even a partial understanding of the complex warp and woof of the human social fabric is to integrate a wide diversity of source materials that reflect the metaphorical dance of life in all its contradictions. Traditionally, historians and most scholars in the humanities and the social sciences have tried to make sense of the past by focusing their attention on written records, knowing that oral traditions, sounds, images, and artifacts can often be difficult if not impossible to find, assess, and synthesize as part of the human record. With the emergence of computer technology, digitization, scanners, and the ability to communicate almost instantaneously across the globe in the last few decades, we now have the possibility of a truly multidimensional way of creating historical interpretations that brings the past alive.

The time has come for historians to join with other humanists, social scientists, and scientists in making the effort to bring this possibility to light and practice. Every term as we begin courses anew, we discover that students have leaped ahead of teachers in using computer technology, e-mail, and surfing the Net to thrive in our modern, fast-paced society. If historians as teachers do not make the effort to join students in using these new means to help them in understanding the significance of history as a way of

thinking, seeing, listening, and envisioning the past and present, we may wake up to a future that emerges as a dystopian nightmare rather than a utopian vision. Already, students perceive such new technologies as neither good nor bad, right or wrong, progressive or regressive—no Luddites here. Just as earlier generations learned to bring telephones, movies, radio shows, the television, the VCR, and the personal computer into their lives, we must learn to combine the best of the traditional ways of history with the best of the new ways of making history.

This guide is intended to provide both teachers and students with some of the knowledge about how we can make this transition to using a new set of tools to help us as craft workers laboring in the fields of human history. After providing an overview of the history of the Internet, the work centers on how to use an Internet browser and explore the World Wide Web as a form of hypertext and interactive historical learning. Web sites can function as online archives, while e-mail can promote multiple ways of communicating among students, between students and teachers, and among teachers and scholars. Search engines can help us to locate useful historical sources in the vast storehouse of the Internet, yet we must be thoughtful in evaluating the materials we find. People at all kinds of colleges and universities can now begin to access documents, texts, sights, and sounds that only a few years ago scholars at the best-funded research universities did not have available. Class assignments, research papers, presentations, and Web sites mean that control of publishing has in part been taken out of the hands of publishers and placed into the hands of individuals willing to take the initiative and use new means to collect, store, analyze, and distribute information that becomes knowledge through application of historical methods.

For the first time in human memory, we have the possibility of creating multimedia history that can spark a popular renaissance of historical thinking. Web sites, e-mail networks, and CD-ROMs, can bring together students, enthusiasts, teachers, scholars, and professional colleagues so that history need no longer be constrained by limited time, energy, and resources. As you explore the methods discussed here, please let the author know your thoughts, criticisms, and suggestions at preagan@tntech.edu.

ACKNOWLEDGMENTS

In the course of researching and writing this work, I have once again rediscovered the joy of working with talented, generous, and cooperative people. Don Mabry, Lynn Nelson, and Roy Rosenzweig engaged in thoughtful correspondence that gave me pause in thinking the project through. Peter Felten introduced me to the New Media Classroom project and acted as a solid sounding board for some ideas, while organizers and participants in the Blues, Bluegrass, and Blue Suede Shoes workshop at the Center for Teaching, Vanderbilt University kindly listened and offered many good ideas. Chad Berry and Alice Carls graciously gave time, comments, and suggestions. Thanks to Ballard Campbell, Bob Cherny, Kris Lindenmeyer, and Michael Pierce of H-SHGAPE for giving me the opportunity to learn what creating a community can be. All of my colleagues in the Department of History at Tennessee Technological University continue to listen attentively to my thoughts about computers, gophers, Webs, and the Net more than anyone could hope for while providing encouragement and sometimes healthy skepticism along the way. Editors Lyn Uhl and Kate Mullin at McGraw-Hill committed to expansion of the original proposal, listened to the author's ideas, and gave positive feedback. Each knew exactly when to recruit, cajole, beg, prod, push, and encourage a busy author and new father. Reilly West Reagan gave unsparingly of her time, energy, respect, and love even though it was our first year as new parents. In hope that the subject matter may one day inspire, I dedicate this work to our son Daniel Patrick Joseph whose entry into the world in time for the new millennium suggests that the next generation may truly go where "no one has gone before."

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1. A BRIEF HISTORY OF THE INTERNET

What Is the Internet: When and How Did It Emerge?

Immediately following the end of World War II in 1945, few people had access to computers. During the early years of the Cold War, the federal government purchased and used most computers made in the United States for defense-related functions. The **Electronic Numerical Integrator and Calculator (ENIAC)** developed at the University of Pennsylvania included eighteen thousand vacuum tubes that took up an entire room. These early computers lacked the power, memory, and storage room possible with modern-day desktop and laptop computers found in every walk of life including college campuses, business offices, and government agencies. No one had yet considered the possibility of linking computers together into small networks, let alone a national or global system such as the **Internet** we take for granted today. Only a very small number of huge machines were connected with other computers over a standard telephone line that could transfer data only at very slow rates. The costs of operating such links proved more expensive than any potential benefits.

Today the Internet joins tens of millions of laptops, personal computers (PCs), work stations, and older main frame computers in a world wide network with the ability to perform multiple tasks at once very rapidly and at low cost using not only text but also images and sounds. Soon millions of wireless and cellular telephones, **personal digital assistants (PDAs)**, and as yet undreamed of **multimedia** devices will bring the Internet into classrooms, libraries, laboratories, offices, businesses, and homes.

The Internet began as a major Cold War defense research project. In 1962 the U.S. Air Force (USAF) asked the **RAND [Research and Development] Corporation**, a new think tank, to study how the USAF's command system could survive a nuclear attack. By 1964, **RAND** developed a plan for a decentralized military communications network that eventually would evolve into the Internet. Linking government defense computers into a system in which each station could receive and transmit information over

many different routes would allow for continued communications in the event of nuclear war. If a nuclear attack destroyed one part of the system, the network could still transfer commands over the remaining circuits.

In 1969, the Department of Defense located in the Pentagon in Washington, D.C., inspired by the **RAND** proposal, created a modest, high-speed, four-computer network called **ARPANET (Advanced Research Projects Agency Network)**. By 1972, the network of computers for defense-related scientific research had grown more than nine-fold. Personal interactions of scientists changed the shape, history and purpose of the network. By 1974, scientists had transformed the system now called “the **Internet**” into an electronic mail service to exchange research, to speed up complex computations, and to provide a communication network to advance knowledge through what one historian of the Internet called “schmoozing” and “gossip.” Everyday human interaction changed the Internet from a strategic instrument of the Cold War to a network that eased the flow of professional knowledge, national security information, and daily chatter – but not necessarily in that order.

Gradually, as the National Science Foundation replaced **ARPANET** as the supervisor of the **Internet** (a role that it turned over to private businesses in the mid-1990s), what began as a military-inspired government network for scientific research became a civilian system for education and later privatized systems for commercial development, information sharing, and mass entertainment. Between the 1970s and the 1990s, interaction between users created languages, programs, and tools that tens of millions of people in government, the professions, commerce, education, non-profit organizations, and households use every day in the form of **e-mail**, Web sites, **newsgroups**, and **listservs**.

In 1983, the **Internet** became what its name implies, a network of networks. The language, or protocol, called **TCP/IP (Transmission Control Protocol/Internet Protocol)** first developed in the seventies made transfer of information in electronic form possible from one point in the system to another. As **TCP/IP** became the uniform standard for the Internet, it enabled computers using different operating systems (Macintosh,

Unix, DOS, and Windows, and others) to communicate with one another.

In the 1990s, the Internet emerged as a high-speed, global system transporting text, graphics, sounds and **multimedia** materials across oceans and continents. From four computers in 1969, the Internet evolved into the **World Wide Web**.

From Text to Graphics: The Internet Goes Multimedia

Boosters and critics bestow many names on the modern-day Internet, especially the **World Wide Web (WWW or the Web)**, its most familiar modern form. “A software system running on the Internet.” “A Web of knowledge.” “A set of protocols.” “A seamless world of information.” “A universal information database.” Or more dismissively, “just a bunch of links” and “trash.”

In truth, the **World Wide Web** includes all the above. In 1989 Tim Berners-Lee, an English scientist, developed a design and the necessary software and protocols for the high-speed transmission and retrieval of information by the international community of physicists. Berners-Lee and colleagues at the **Conseil Européenne pour la Recherche Nucléaire [European Organization for Nuclear Research](CERN)** outside Geneva, Switzerland created a global system of computer communications allowing physicists to exchange data and research quickly and seamlessly to promote scientific cooperation across national boundaries.

Several protocols (languages or sets of standards) encouraged the flow of knowledge. One created a common language that enabled computers to talk to one another: **Hypertext Markup Language (HTML)**. A second, **Hypertext Transfer Protocol (HTTP)**, directed the traffic of **multimedia** information (text, graphics, sound, and video) between computers and across networks. A third established a standard for creating addresses or **Uniform Resource Locators (URL)** for computers sending and receiving information. Since **CERN** sought to promote academic exchange rather than commercial profit, it made its protocols and software public, enabling linked computers around the world to decipher and translate **HTML** and **HTTP**. Anybody could use this **multimedia** Web, but few anticipated just how quickly it would

expand from a small community of scientists to today's vast numbers of government, education, commercial, and household users.

The Berners-Lee protocols transformed the **Internet**, allowing **CERN** scientists to export and import data as text, image, sound, and video files. Yet no one piece of integrated software existed with the capability of putting all this information in its different media forms onto a single computer screen. Text could be called up on one screen, images or graphics on another, sound on another, and video on still another. Before the Web would appeal to a larger, mass audience, software protocols and programs would have to become more user friendly.

By the early 1990s, scientists and programmers made significant advances in the software applications used to store and retrieve text information on the Web. Computer scientists at the University of Minnesota created the "**Gopher**" **system of text-based menus** named after the burrowing rodent which serves as the mascot of the University of Minnesota athletic teams. You could use a **Gopher** site to tunnel and dig for information using a series of hierarchically structured menus and submenus of data in text form. Every menu item was "hot," meaning that a click of the computer mouse over the menu link item took you to an information base or to a submenu with more choices for you to click. As a way of organizing and accessing large amounts of information, **Gopher** menus pioneered as a breakthrough making broad use of the **Internet** a real possibility. By today's standards, **Internet** surfers consider **Gopher** sites dinosaurs since they did not allow for accessing graphical images, sounds, or video. The hierarchical organization of the text-based **Gopher** menu system did not allow for the nonlinear linking of **hypertext**.

In 1993, development of the first practical **graphical user interface (GUI)**, soon known as a **Web browser**, called **Mosaic** at the National Center for Supercomputing Applications (NCSA) at the University of Illinois dramatically transformed the organization and potential uses of the **Internet**. Very quickly alternate browsers emerged as competitors to **Mosaic** including the most popular and widely used software. **Microsoft Internet Explorer**, **Netscape Navigator**, or the **Opera** Web browsers gave the **World Wide Web** the face we know today, making it possible to present

information in all its **multimedia** forms on a single screen. Web browser software translates **HTML**, the *lingua franca* or universal language of the WWW into text, images and sound, making it possible for you to access, read and make links between Web pages. A Web page is one or more screens of information which you see as text and/or images formatted in **Hypertext Markup Language or HTML**.

Internet Web browsers empower computer newcomers, called “newbies,” unable to tell the difference between Hypertext Markup Language, SGML, or Javascript coding to view a Web page just as an experienced computer programmer might -- with the click of a mouse. **Browser** software allows you to actively use **e-mail**, visit Web sites, download files, subscribe to **listservs**, participate in **newsgroups** and employ other **Internet** tools which we will define and discuss later.

Mosaic, Microsoft Internet Explorer, Netscape Navigator, and the **Opera** browsers transformed the Web, turning it into an everyday tool that invited participation by the sheer ease of navigation. The creators of these browsers imported **GUIs (Graphical User Interfaces)** to the Web. For years, **GUIs** had been a staple of Macintosh computers, soon followed by personal computers with the Microsoft Windows operating systems. We recognize **GUIs** as icons, scroll bars, pull-down menus and dialog boxes, all activated by moving the Mouse pointer (the cursor) and clicking on the computer mouse. With **browser** software, these clicks can take you on a Web trip to sites around the world.

What we click on a Web page, using a Web **browser**, are icons, images or text (typically underlined and in color, usually blue). We drag the cursor on the computer mouse to “hot” text or graphics, and then click onto another screen. “Hot” means “linked” in computer terminology. We know that a Web image or words are hot when the dragged mouse cursor turns into a hand.

Knowledge as Hypertext: Text, Images, and Sound

Hot text is **hypertext**. Hot links are **hyperlinks**. Simply defined, **hypertext** is non-sequential, linked knowledge. **Hypermedia** is **hypertext** and non-sequential links of text, images, and sound. **Hypertext** and **hypermedia** have major implications for how we

learn and organize knowledge. Typically, historians arrange knowledge into linear—that is, chronological—narratives.

Hypertext and **hypermedia** encourage the organization of related knowledge in many different directions, not linear but connected like a spider's web.

A BRIEF HISTORY OF THE INTERNET

1962 – U.S. Air Force commissions **RAND Corporation** to develop a decentralized computer communications network that could survive a nuclear attack.

1969 – Pentagon develops **ARPANET**, a RAND-inspired, four-computer network for defense-related research.

1974 – A much-expanded ARPANET is now called the **Internet**. Participating scientists transform the Internet, creating e-mail to "schmooze," "gossip," and exchange research.

1983 – The Internet becomes a network of networks, made possible by a protocol called **TCP/IP (Transmission Control Protocol/Internet Protocol)** enabling computers using different operating systems (Macintosh, Unix, DOS, Windows) to communicate with one another.

1989 – English scientist Tim Berners-Lee develops software and protocols for the **World Wide Web**, making possible the high-speed transmission and retrieval of information by an international community of physicists.

1993 – **Mosaic** develops a user-friendly, mouse-driven graphical user interface or browser. On a single computer screen, information can now be organized and accessed in all of its multimedia forms. As a result, the Internet expands from a small community of scientists to today's vast popular, commercial, educational, non-profit, and government use.

1993 – Volunteer editors in various academic disciplines begin creating a worldwide system of virtual library sites (WWW-VL) maintained by scholarly experts.

1995 – Java programming language allows for animation and interactivity between computers using different operating systems.

1995 – National Science Foundation gives up control of the Internet backbone leading to privatization and commercialization of the Internet.

A BRIEF HISTORY OF THE INTERNET, continued

1995 – The Internet delivers more e-mail than the post office does letters.

2001 – Web sites become so numerous that new domain names must be developed.

In the fast moving history of the **World Wide Web**, **Mosaic** quickly became another relic of computer history. Several programmers left **Mosaic**, creating the **Netscape Navigator** Communications Corporation which developed the powerful, multitask browser, **Netscape Navigator**, setting the standard for the industry in the mid-nineties. Later, **Netscape Navigator** became part of America On Line, a major **internet** service provider for millions of people. Today, most Web surfers use the **Microsoft Internet Explorer**, **Netscape Navigator**, or the **Opera** browser, although other companies continue to make competing browser software. The latest generation of browser software not only makes it easier to receive data, but also comes with editing programs to create Web pages complete with text, hot links, graphics, sounds, forms, and other interactive features without having to know anything about how to program HTML. Widespread distribution and use of these browsers, oftentimes downloaded for free off the **Internet**, creates a potential for democratizing the Web, bringing the power of a worldwide system of information exchange to anyone with access to a linked computer.

Connecting to the Net: Modems, T-1/T-3 lines, and ISDN, Cable Modem, and DSL

Not everyone has access to a computer, let alone one wired to the Web. Some people and institutions have better, faster access than others. Access to the **Internet** depends on such factors as speed, convenience, cost, and politics. This guide will mainly discuss speed and convenience, but money and power sometimes determine how well connected you are, including your wired connection to the **Internet**. Rapid changes in computer software and hardware and dramatic declines in costs lower the price of admission to the Web, making **Internet** access more affordable for masses of users.

Many Web surfers use a low-cost **modem** with a dial-up connection to transmit signals over telephone lines, operating at speeds of 2,400 to 56,600 bits per second. As fast as that sounds, it's slow compared to a **T-1 line** (1.5 million bits per second or bps) or a **T-3 line** (45 million bps). **Modems** are relatively inexpensive and can tap into an ordinary phone line coming into your home, apartment, or dorm room. High speed **T-1** and **T-3** lines establish direct point-to-point connections into the trunk of the telephone system, generally only affordable to big corporations, universities, some government agencies, and **Internet service providers**. Like most things in this world, you get what you pay for. You notice the speed difference between a **modem** on a home computer and a **T-1** or **T-3** line on a college or business network when linking to a Web page. Increasingly, access to **Integrated Services Digital Network (ISDL)** with speeds of 16-64,000 bps), **cable modem** (with speeds of about one million bps), and **Digital Subscriber Line (DSL)** with various speeds up to 1.5 million bps equivalent to a **T-1** line) connections through a local, urban, or national **Internet Service Provider (ISP)** provide affordable compromises with faster speeds than dial-up **modems** and significantly lower costs than **T-1** and **T-3** lines.

Other factors such as the power of your computer, the speed of the **server** computer that holds the Web page you want to access, the size of the Web information you want to import, the volume of traffic on the **Internet**, and the online service (e.g. America On Line) or college network that is your **Internet Service Provider**. Given the rapid turnover in computer technology in this age of immediate gratification, our definition of quick changes rapidly. A few years ago, two-day and overnight mail via FedEx, the U.S. post office, and other private delivery services was considered fast.

Today, **e-mail** users derisively call the U.S. Postal Service "**snail mail**." When a Web page does not appear on a screen within seconds of a mouse click, most computer users become impatient. People with different kinds of **Internet** access experiencing "traffic jams" refer to the "World Wide Wait." Development of the second and third generation **Internet** and expansion of broadband capabilities through fiber optic cables over time will allow faster surfing and more widespread use of

multimedia materials such as animated and full-color images, sounds, music, and audiovisual film recordings. With some historical perspective, we can appreciate just how far and fast we have moved from the origins of the **Internet** just three decades ago.

Summary of Internet History

In 1995, the **Internet** delivered more **e-mail** than the U.S. Postal Service did letters. That's a staggering statistic, testimony to the centrality and remarkable growth of the **Internet**. Researchers at the Pew Internet & American Life Project discovered that by the end of the year 2000, 104 million Americans had access to the **Internet**. Tens of millions more people across the globe were getting hooked up to this international computer system. One observer characterized the "**Internet** as a city struggling to be built," a social creation evolving into a system meeting user needs through **e-mail**, the **World Wide Web**, **listservs**, **newsgroups**, remote logins through **Telnet**, and movement of files through **FTP (File Transfer Protocol)**. With its phenomenal expansion, the **Internet** created a whole new vocabulary: **e-mail**, surfing the Net, **Telnet**, and **FTP** that will be explained in coming chapters and in a **Glossary** in the **Appendix**.

Computers and their linking via the **Internet** expand the power of texts—the printed word—as well as images and sounds by their ability to store and process information in the form of binary digits (bits). Filtered through users' brains, information can be transformed into research and knowledge. Floppy, **ZIP**, and **CD-ROM** disks make that knowledge portable. Typically a **CD-ROM** can hold 650 megabytes, or the equivalent of—perish the thought—500 history textbooks. While that's impressive, it pales before the power of the **Internet**, which can store and transmit over long distances infinitely more knowledge in **digital** form. Once received, a computer can take that **digital** information and transform it into a Shakespeare sonnet, a Monet still-life, a Billie Holiday blues song, any one of thousands of electronic books or absolute, utter trash. As pioneers of the computer revolution used to say, "Garbage In, Garbage Out" (**GIGO**). The **Internet** can become what we make it, a powerful tool for creating and sharing knowledge or promoting mediocrity through moving disconnected bytes and bits; for spreading rumor and false knowledge or