Chapter 2: A Consensual hallucination: Imagining cyberspace

The idea that visiting a webpage or communicating with someone at a distance using digital methods might seem strange, exciting, or even exotic may now seem extraordinary. It is too easy to assume, because computers, and even the internet, existed in the 1990s, that the experience of their use has remained similar. However, it is important to consider just how different the experience of using a computer was in the cyberspace era from what we currently take for granted. We have forgotten what the cyberspace of the late 20th century was like, due both to familiarity and contempt. Familiarity, because cyberspace has become conflated in our minds and our memories with applications such as email and the World Wide Web, which have now become so commonplace that most of us barely ever think about them. Contempt, because we are all too aware of the negative affordances of social media – the trolling, the racism, the abuse, the sexism or even the potential for misuse by massive communications businesses who seem to have abandoned their once-stated wishes to do no evil.

But cyberspace was not always like this. As I have argued in the introduction, in the 1990s, cyberspace seemed to offer a new kind of existence: a different community that appeared to be freer and friendlier than the life we had known. The people we encountered there were not always the kind of people we would have met in the course of our normal lives. It was an exciting place to be.

But what exactly was cyberspace? Was it a real phenomenon, consisting of computational hardware, software and networking infrastructure, or did it rely as much for its legitimacy on the use of imagination? There were many different instantiations of cyberspace which I shall go on to examine in detail in the following chapters, however it is important first to examine how cyberspace was initially conceived.

In their introduction to a 1995 collection of essays entitled *cyberspace/cyberbodies/cyberpunk*, Featherstone and Burrows draw a distinction between what they term Barlovian and Gibsonian cyberspace. Barlovian cyberspace, named after John Perry Barlow, the internet pioneer of whom we will hear much more in the course of the book, is a technically-focused description of the computational infrastructure which existed in the 1990s. Gibsonian cyberspace, on the other hand, takes its name from the fictional world created by William Gibson, who coined the term cyberspace, in his book *Neuromancer,* first published in 1984.[1]

As Featherstone and Burrow's collection demonstrates, Gibson was far from alone in creating fictional dystopian worlds dominated by technology. The cyberpunk genre, of which he was part, also included many other science fiction writers such as Michael Moorcock, Isaac Asimov and Philip K Dick.[2] However, *Neuromancer* was extraordinarily influential on discussions of online culture in the 1990s and even on the design of Barlovian cyberspace itself. It is therefore important to consider Gibson's imagined world at length, which he introduces as follows:

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[1] Gibson, *Neuromancer*.
[2] Featherstone and Burrows, *Cyberspace/Cyberbodies/Cyberpunk*, 1–20.

> Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts …. A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding . . .[3]

Gibson later admitted that when he wrote *Neuromancer* he had very seldom used a computer and was familiar with neither virtual communities nor other online platforms. Yet this passage was quoted numerous times in discussions of cyberspace in the 1990s.

Neuromancer takes place in a post-apocalyptic world that has survived a catastrophic nuclear war but is enormously changed by it. As a result, civilisation is both degraded and technologically advanced. The characters, living on the edge of society, are the stereotypical macho men, criminals, corrupt businessmen and women with doubtful pasts familiar from the pulp fiction and B movies of the 1950s, with which those of Gibson's generation grew up. The action takes place in the shady bars, brothels and down at heal dives familiar from such genres, except that in this case they are in a space station and the global megacities of a hybrid world that also includes the digital spaces of the matrix- or cyberspace. Unsurprisingly, given the grim nature of their environment, many characters take mind altering drugs to block out unpleasantness of reality.

Only a very few talented individuals, all of them male, can enter the matrix. The hero, Henry Case, is one such. Cowboys use a deck to connect to cyberspace, or to jack into the matrix as the *Neuromancer* jargon has it:

> He settled the black terry sweat-band across his forehead, careful not to disturb the flat Sendai dermatrodes. He stared at the deck on his lap, not really seeing it, […]
>
> > He closed his eyes.
> >
> > Found the ridged face of the power stud.
> >
> > And in the bloodlit dark behind his eyes, silver phosphenes boiling in from the edge of space, hypnagogic images jerking past like film compiled from random frames. Symbols, figures, faces, a blurred, fragmented mandala of visual information.
> >
> > Please, he prayed, *now —*
> >
> > A gray disk, the color of Chiba sky.
> >
> > *Now —*

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[3] Gibson, *Neuromancer*, 57.

Disk beginning to rotate, faster, becoming a sphere of paler gray. Expanding —

And flowed, flowered for him, fluid neon origami trick, the unfolding of his distanceless home, his country, transparent 3D chessboard extending to infinity. Inner eye opening to the stepped scarlet pyramid of the Eastern Seaboard Fission Authority burning beyond the green cubes of Mitsubishi Bank of America, and high and very far away he saw the spiral arms of military systems, forever beyond his reach.

And somewhere he was laughing, in a white-painted loft, distant fingers caressing the deck, tears of release streaking his face.

Molly was gone when he took the trodes off, and the loft was dark. He checked the time. He'd been in cyberspace for five hours. He carried the Ono-Sendai to one of the new work-tables and collapsed across the bedslab, pulling Molly's black silk sleeping bag over his head.[4]

As this extract shows, although the matrix is digital, the process of jacking in is via physical connection, using a band of electrodes that fit onto, or perhaps even into, the head. Such a union of human and machine appears to be an almost sexual experience judging by the language Gibson chooses to describe it. This kind of hybridisation of human bodies and machines is relatively common in *Neuromancer*. We meet a character, for example, who has digital memory chips implanted behind his ear. Human bodies can be rebuilt using digital parts, perhaps because real body parts such as livers and pancreases can only be obtained on the black market for very high prices. But the term for human bodies- 'meat' is often used in derogatory fashion: digital, it appears, is far superior. Molly, our heroine, is a cyborg who has been fitted with retractable steel claws and digital replacements for eyes. She uses the matrix, while in physical reality, to communicate with Case via a kind of telepathic video link, called a Simstim. This can be attached to his deck, allowing him full access to her sensorium. But it's a one-way system: she can't get into his consciousness or into cyberspace, whereas Case, as a cowboy, hacks into both.

It is far from clear how the Simstim or the deck might work, but there are hints. The Simstim seems, at least initially to have been designed for some kind of digital sex: Case dismisses it as 'a meat toy' of lesser complexity than the deck, about which we know very little except that it seems relatively easily portable. We also don't know why the individuals who jack in are called cowboys or why there don't seem to be cowgirls. Gibson's readers have to work out what's going on because the viewpoint is entirely that of the hero, with almost no independent narration. So if something is commonplace to him but exotic to the reader, it is not explained further. This gives the book a sense of uncanny, documentary-like apparent verisimilitude, but means that the reader is never able fully to comprehend what is on the edge of their perception.

Even the nature of Gibsonian cyberspace is unclear. The matrix is, apparently, a vast computational space, within which information has arranged itself into matter and apparently vast buildings. But we area also informed that Case knows "...that the cyberspace

[4] Gibson, 57–58.

matrix was actually a drastic simplification of the human sensorium."[5] Thus it appears in some way to be a huge digital brain simulation- a metaphor that was often used of real computers in their earliest days of development. It is often very difficult to determine where the action of the book is taking place – in the matrix, in cyberspace, in outer space, or on Earth. Cyberspace seems to be controlled by large corporate entities and inhabited by digital beings known as AIs, who have something important to protect, which we assume is commercially valuable data. The Cowboys have to fight their way through defences, known as ice, to steal the data assets, the exact nature of which remain unclear. This activity is extremely physically demanding and emotionally draining, as we can see from this description of Case attacking Wintermute, one of the AIs:

Wintermute was a simple cube of white light, that very simplicity suggesting extreme complexity.

"Don't look much, does it?" the Flatline said. "But just you try and touch it."

"I'm going in for a pass, Dixie."

"Be my guest."

Case punched to within four grid points of the cube. Its blank face, towering above him now, began to seethe with faint internal shadows, as though a thousand dancers whirled behind a vast sheet of frosted glass.

"Knows we're here," the Flatline observed.

Case punched again, once; they jumped forward by a single grid point.

A stippled gray circle formed on the face of the cube.

"Dixie . . ."

"Back off, fast."

The gray area bulged smoothly, became a sphere, and detached itself from the cube.

Case felt the edge of the deck sting his palm as he slapped MAX REVERSE. The matrix blurred backward; they plunged down a twilit shaft of Swiss banks. He looked up. The sphere was darker now, gaining on him. Falling.

"Jack out," the Flatline said.

The dark came down like a hammer. [6]

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[5] Gibson, 60.
[6] Gibson, 123–24.

The mixture of terror and excitement that permeates this scene recalls the attack on the Death Star in *Star Wars*, a movie that had been a huge hit in 1977, only a few years before *Neuromancer* appeared. But it also references the conventions of older war movies which Gibson doubtless grew up watching. As in those movies, the hero's life is often on the line. Dixie in the extract above is known as The Flatline because he is the postmortem presence, or construct, of Case's mentor, a cowboy who died in the matrix. On more than one occasion Case's heart also stops and he must be dragged clear of his connection. Gibsonian cyberspace may be a different world, but it's a rough and dangerous one.

Barlovian cyberspace, by contrast, was a far more pragmatic prospect: a group of technologies that made possible networked or hypertextual communication – usually via the internet, but also by connecting directly to the telephone network. Now that the web and social media are so dominant as online platforms, we tend to forget how important the telephone network was as the vehicle for early forays into cyberspace. For Featherstone and Burrows the simplest form of cyberspace was "… little more than an extension of existing telephone systems, simply substituting text and some icons for voice."[7] This was also a helpful metaphor, since at the time the only kind of international communication network with which most people were familiar was that of the telephone.

Whittle initially objects that the term cyberspace "… either defies definition or is one of those intuitive words that is understood without a definition." Instead, he provides an extensive list of technologies which make connection between individuals possible, including email and the web, the telephone and even television. Intriguingly he does not insist that they must be connected to a computational network.[8]

Kitchen follows a similarly pragmatic path of describing, at considerable length, the technologies that make up cyberspace, complete with screenshots of web pages, cybercafes and email clients.[9] The fact that Kitchen and Whittle, in books published in 1997 and 1998 respectively, felt compelled to describe technologies such as email and the web in such detail demonstrates just how unfamiliar they expected them still to be to their readers.[10]

However, it is instructive to pause, at this point to consider how different the actual technology which underlay Barlovian cyberspace was from the fictional world of Neuromancer. Gibson portrays a world where technology is so advanced that it can be difficult to tell where physical existence begins and ends: cowboys become part of their decks and it can be difficult to distinguish the physical embodiments of AIs from humans. The technical infrastructure on which 1990s Barlovian infrastructure ran was very different.

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[7] Featherstone and Burrows, *Cyberspace/Cyberbodies/Cyberpunk*, 5.

[8] Whittle, *Cyberspace*, 8.

[9] Kitchin, *Cyberspace*, 3.

[10] My second-hand copy of Kitchen is marked with the stamp of the UK Ministry of Defence library, suggesting that even civil servants whose job it was to advise government on complex matters of national defence felt the need for such information at the time. The condition of the book is pristine, however. I can't quite decide whether that's a reassuring indication that they already possessed such knowledge, or a worrying hint that they didn't see the need for it.

In the year that Gibson's *Neuromancer* first appeared, the most powerful personal computer available, the Mac 512K, had only 512 kilobytes of memory and used a Graphical User Interface, the first of which had been launched only six years before, in 1984, with the Mac 128K.[11] But the Mac 512K had no hard disc, meaning that data had to be stored on external floppy discs with a maximum capacity of 400K, which also included the operating system and all programs. This left only a few tens of kilobytes for any files a user wished to store. To put this into perspective, by 2010 the iPhone 4 had 512K of RAM and in 2020 the smallest amount of RAM available for Apple iPhone 12 was 4GB, which would have been considered a huge amount for a 1990s desktop computer.[12] In 1990, at the start of the cyberspace decade, the MAC IIfx was launched. It was the fastest computer available, with a 40 MHz processor and a 4GB internal hard disc. Again, for comparison, in 2021 the lowest specification of Mac- the Macbook Air had a 32GB hard disc and the processor for the Mac Pro ran at 4.4GHz- over a hundred times faster than the Mac IIfx.

In 1985 Microsoft launched its first graphical user interface, Windows 1, but did not fully commit to GUI until the launch of Windows 3.0 in 1990.[13] Even then, desktop computers with command-line based DOS operating systems were still common in many homes, workplaces and universities until the mid 1990s. A variety of manufacturers produced what were then known as IBM compatible PCs, so it is more difficult to make comparisons as to specifications. But a typical desktop machine, such as the IBM PS/1, in 1990 would probably have had a 16-25Mhz processor speed and a hard disc of around 16-32 Mb with 2-4 MB of RAM.[14]

Computers were also more expensive, in relative terms, than they currently are. In 1990 the Mac IIfx cost US $9,000 to US $12,000, the equivalent of $17-23,000 in 2020, whereas a Mac Pro cost $5,999 and Macbook Air less than $1,000. In 1990 the IBM PS/1 cost between $999 to $1,999, depending on its specification, which was significantly less expensive than a Mac, but would, nevertheless, be equivalent to $1,950-$3,900 today.[15] It is not surprising, therefore, that home computer use was limited to those on a higher than average income in the 1990s.

By the end of the cyberspace era in 2001 much had changed. Computers had hard discs, colour monitors and much larger storage capacity and processors. In 2001 Microsoft introduced the XP operating system[16], Mac launched OS 10, and perhaps just as significantly, iTunes.[17] PC magazine's choice as best PC of 2001, the Compaq Presario, had 1.53-GHz AMD Athlon XP 1800 processor, 128MB of DDR memory, and an 80GB hard drive.[18] The PowerMac G4 shipped with USB 2.0 ports and writable DVD drive. The most

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[11] 'Macintosh 128k'.
[12] Peters, 'IPhone 12 Pro Models Have 6GB of RAM, IPhone 12 & IPhone 12 Mini Sport 4GB'; 'IPhone - Compare Models'; 'IPhone 4 - Technical Specifications'.
[13] 'Operating System Interface Design Between 1981-2009'.
[14] 'IBM PS/1 Machine 2133 Model 114 - Computer - Computing History'.
[15] Lynch, 'The Pros and Cons of Buying an IBM PS/1'.
[16] Gibbs, 'From Windows 1 to Windows 10'.
[17] Painter, 'Complete List of Mac OS X & MacOS Versions'; McElhearn, 'ITunes'.
[18] 'PCs & Mobile'.

powerful 800 MHz model had 256 MB of RAM, an 80 GB hard drive and a DVD-R drive and cost $3,499.[19]

Given the cost of such a machine, it is not surprising that most computer users during the period under discussion stored their data on floppy discs or external hard discs with what we would now see as very limited capacity. The metaphor of the cloud for data storage can be traced back to 1996, but widespread commercial cloud computing was not accessible until the mid 2000s.[20] The first USB drives were sold in 2000, with a limited 8Mb capacity.[21] Writable CD-ROM drives had begun to appear on personal computers in the late 1990s, but the process of burning CDs was time consuming and not always successful. Organisations such as universities and IT businesses that required large scale storage ran and maintained their own servers, to which users could connect using communication protocols such as Telnet, Gopher or File Transfer Protocol (FTP) to move files from their computer to the server, or vice versa. But anyone who wanted to use such protocols to move a file first needed to know where it was located on the network. This was a relatively difficult task, requiring a knowledge of the Unix operating system, used on most servers to navigate a complex directory structure via the correct command line. Even when visual FTP clients appeared, users required an understanding of the file structure of a server and the operation of access permissions. Thus the use of FTP was limited to proficient computer users. By contrast, every time a Mac user saved a file on their machine in 2020, it was automatically backed up to the cloud.

As we have seen, Featherstone and Burrows emphasised the importance of the telephone network as cyberspace infrastructure. This was for good reason: during the 1990s most users could only access the internet using a modem connected both to the computer and the telephone line. In 1990 only about a third of computers were fitted with modems, which otherwise had to be bought separately. Installation was not a simple task and thus only tended to be attempted by the very determined or technically expert users.[22] The cost and difficulty of establishing a network connection therefore meant that relatively few people accessed the internet at home even if they owned a home computer. Even in 1995, although 43% of the American population regularly used a computer, only 14% of Americans had any access to the internet at home.[23]

This was partly due to the difficulty of connecting, but also to the fact that public access to the internet had only been available since the Reaganite privatisation of ARPANET in 1990. [24] Although this book is not a comprehensive history of the internet, it is important to discuss ARPANET's development as one of the origin stories for cyberspace. ARPANET was a network which preceded the internet and was used exclusively by the US military and those academic researchers in computer science or engineering who were funded by the

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[19] 'Power Macintosh G4 (Quicksilver)'.

[20] Regalado, 'Who Coined "Cloud Computing"?'

[21] Buchanan, 'Object of Interest'.

[22] Markoff, 'All About/Computers Talking to Computers; Fast Modems'; Edwards, 'The Lost Civilization of Dial-Up Bulletin Board Systems'.

[23] Pew Research Center, 'Americans Going Online...Explosive Growth, Uncertain Destinations'.

[24] Those interested in further detail of how ARPANET was founded and its transition to the public internet might wish to consult the following, excellent, histories. Hafner and Lyon, *Where Wizards Stay up Late*; Naughton, *A Brief History of the Future.*; Castells, *The Internet Galaxy*.

Department of Defence. The Advanced Research Projects Agency (ARPA) itself was founded in the wake of the political crisis caused when the USSR successfully tested the first intercontinental ballistic missile and launched Sputnik- the first manned space vehicle to orbit the earth, in August and October 1957 respectively. This became known as the missile gap, a phenomenon which provoked alarm among the public and policy makers alike and led to a large increase in military spending. As a result of this, ARPA was founded in February 1958 by the Department of Defence (DoD). Its role was to support high risk basic research which might eventually give rise to technological and scientific advances which would contribute positively to US military and nuclear capacity, especially in the areas of computing and communications.[25]

ARPANET itself was a by-product of the ARPA funding programme. It quickly became apparent that every recipient of ARPA funding idemanded a new computer, which proved a severe drain on the budget. Effort was also duplicated when different labs addressed similar problems in different ways, using different protocols and languages. Even if different teams wanted to collaborate and use another lab's machine, the only way to do so was to travel, sometimes thousands of miles. A network of computers was therefore proposed as a way to save time, money and avoid duplication of intellectual energy. ARPANET was therefore launched in 1969 with four initial nodes at Stanford, UCLA, University of California Santa Barbara, and the University of Utah; there were 15 nodes by 1971, and their number continued to increase during the 1970s and 80s. But, by the 1990s, it had grown so large that it required more funding that even the Department of Defence could provide. Thus the decision was taken to privatise it, and allow commercial companies to fund the network, in return for internet access for their customers. [26]

Suddenly ordinary people who were not scientists or IT professionals had access to a network which, at the time was unprecedently large. It is not surprising, therefore that those writing about the internet, or cyberspace as it was often called, described it as operating at a scale and speed of technological development that many would find hard to comprehend. A beginner's introduction to cyberspace describes it as: "the network of computer networks and all the information held on it about everything, everywhere..." [27] Dery insists that: "We are moving, at dizzying speed, from a reassuringly solid age of hardware into a disconcertingly wraithlike age of software, in which circuitry too small to see and code too complex to fully comprehend controls more and more of the world around us."[28]

That 'dizzying speed' now seems almost inconceivably sluggish by today's standards: for those using a modem, the maximum connection speed was only 56 kilobits per second making it impossible to download movies or to play games that involved graphics. But there was little alternative for home users. In 2000 there were just under 150 million dial-up subscriptions in the 34 OECD countries but fewer than 20 million broadband subscriptions to Broadband, which was first launched in the UK in 2000.[29] By 2001 only 7% of internet

[25] Mercille, 'Mind the Gap'; Baucom, 'Eisenhower and Ballistic Missile Defense'.
[26] Hafner and Lyon, *Where Wizards Stay up Late*, 38–41.
[27] Buick, Appignanesi, and Jevtic, *Introducing Cyberspace*, 7.
[28] Dery, *Escape Velocity*, 4.
[29] OECD, 'The Future of the Internet Economy: A Statistical Profile'.

users, globally, had a broadband connection. Wifi access was still extremely rare especially for home users and speeds very limited.[30] Internet access from mobile devices was even more limited. The Nokia 2000 Communicator was the first mobile phone to feature internet access in 1996, and NTT DoCoMo launched i-Mode, the first mobile internet service, in Japan, in 1999.[31] Nevertheless, with small screens and very low resolution, mobile web access remained difficult throughout the cyberspace era. Internet access was far easier for those using university networks. Although the UK's Joint academic Network (JANET) began in 1984 with speeds of only 9.5K, by 2001, the newly-launched SuperJANET4 could deliver 10Gb per second.[32] In 2020 the fastest widely-available home broadband connection operates at 512Mb per second and JANET now operates at speeds of at least 2Tbps.[33] We now take for granted the ability to download movies and songs to our mobile devices via 4G and 5G networks: in 2001 that would have been inconceivable.

Just as, by the mid-1990s most discussions of cyberspace tended to see it as synonymous with the internet, so the internet itself was often conflated with another technology invented in the 1990s, the World Wide Web. In order to appreciate the magnitude of the transformation it made possible and understand the profound nature of its effect on cyberspace and its users, it is therefore important to discuss its functionality.

The first web site and browser were created by Berners Lee in 1990 as a hypertext system to provide information about research at CERN, where he was then a research fellow. It was designed to run on the internet, but be separate from it, rather as a train requires tracks. Berners Lee was inspired by Vannevar Bush's pioneering article, 'As We May Think', published in The Atlantic in 1945. Bush argued that standard library classification techniques were no longer adequate for the organisation of large amounts of information, proposing instead an automated information system, the Memex, which would operate using associative linkages.[34] The Memex was not a functioning system, but the digital hypertext systems it inspired, including the web, made it possible to create associative linkages between pages, rather than organising them within a linear narrative. Thus, rather than having a beginning, middle and end, a hypertext consists of a collection of documents (or lexias) connected by thematic linkages (hyperlinks).

Hypertext systems had existed before the web. In the late 1960s Douglas Englebart, better known as the inventor of the computer mouse, created a system called NLS (oN-Line System) which was used on ARPANET.[35] During the same period Ted Nelson was working on his own hypertext, Xanadu, which although not a commercial success, proved an important influence on the design of later hypertext systems such Storyspace, HyperCard and Microcosm.[36] These systems, launched in 1980, 1987 and 1988 respectively, were designed to run on standalone machines and in some ways their functionality was superior to that of

[30] Youde, 'Broadband'; Thomas, 'The History of WiFi'.
[31] '15 Fantastic Firsts on the Internet'.
[32] JISC, '1984-2014- 30 Years of the Janet Network'.
[33] Choose, 'Who Is the UK's Fastest Broadband Provider?'; Jackson, 'COVID-19 - A Quick Look at Data Traffic on the UK Janet Network'.
[34] Bush, 'As We May Think'.
[35] 'Douglas Engelbart - Biography, History and Inventions'.
[36] Wolf, 'The Curse of Xanadu'.

the later web.[37] For example, on the web, hyperlinks are strictly unidirectional - from page A to page B but not back again. Whereas Microcosm allowed both multi-directional linking not only back from page B to page A, but onwards from page A to pages B, C, D, E and so-on.[38] Some systems also allowed the nature of the link to be indicated, for example that of a child or subdivision as opposed to an associative concept such as allusion or citation.[39]

But what made the web so successful was its relative simplicity, which made it very easy for new users to learn how to create content, and the fact that the Hypertext Markup Language (HTML) in which web pages were written, was compatible with any hardware then in existence. This was a huge step forward since, in the 1990s, software was often written specifically for certain platforms, such as MS-DOS and Windows, Mac OS or Unix, and code was proprietary to its operating system. As a result, not only could software written for a Mac not run on Windows, but a file created on one platform could not be used on another. HTML files, by contrast, did not contain any proprietary code, consisting only of plain text into which simple markup was inserted, denoted by angle brackets, which contained instructions about how the page should be rendered. So, for example <p> denoted a paragraph (with </p> at the end of each one) and <h1> denoted a top-level heading. Links could also be created to other HTML files or to images using the jpeg or gif formats, which also were platform agnostic. This meant that basic web pages could be created using a simple text editor- no specialist software, nor any experience as a programmer, was necessary.

Web pages were uploaded to a server where files were stored, and communication between the server and client browsers was managed using the hypertext transfer protocol (http), which also worked on all platforms. Anyone wishing to create content on the internet had to have access to a web server, which was likely only to be available to those working in academia or the IT profession. Yet even in this case, the creation of personal pages was relatively rare. To put this in perspective, in March 1997, only 400 webpages can be located for the whole users.ox.ac.uk top level domain, most of them created by students at Oxford University, and only 27 of these were created by individuals who can reasonably be identified as female.[40] That year there were 15,641 students in residence at Oxford.[41]

Home users lacking in such expertise might subscribe to an Internet Service Provider such as CompuServe, Prodigy or America Online, which offered internet, and, once available, web access and a small amount of storage accessed by more user-friendly tools.[42] However the user friendliness was relative; to make successful use of such tools, especially in the early days of cyberspace required persistence and confidence in computer use and at least a basic knowledge of HTML markup.

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[37] Kahney, 'HyperCard'; Bolter and Joyce, 'Hypertext and Creative Writing'.
[38] Fountain et al., 'MICROCOSM'.
[39] Landow, *Hypertext 2.0*, 1–28.
[40] I have determined this by looking at the names of the owners of the page, and, if present, their photographs. Since not everyone posted a picture of themselves, or made clear their gender, it is possible I have misidentified some individuals with names such as Alex or Lynn.
[41] Oxford University Gazette, 'Statistical Information on the University of Oxford'.
[42] Before the internet itself had been opened up for commercial traffic, these providers began offering simple dialup networking services to private individuals, starting in 1979, 1984 and 1985 respectively, benefitting from cheaper access to telephony which followed the breakup of AT&T, which I have discussed in chapter 3.

Not only were web pages were relatively easy to create and store, they could be read from anywhere, using any hardware, as long as the machine was connected to the internet and running a simple piece of software called a web browser. The first web browsers, including the Nexus application that Tim Berners Lee developed to access the newly created web in 1990 and the Lynx browser which appeared in 1992, were text-only command line-based applications, and tended, as a result, to be difficult to use. [43] Mosaic, the first widely usable graphical browser which appeared in 1993, transformed the experience of web use. Mosiac was commercialised as Netscape, and graphical browsing quickly became the accepted standard, allowing website creators to use colour and images. Lynx is still available from lynx.browser.org and anyone who wants to understand why graphical web browsing was so transformative might wish to experiment with using it without reference to a tutorial.[44] When I was working at Oxford University Computing Services from 1996-98, we had to build websites that could be used with a text only browser. Subsequent research on accessibility would prove that this is a good discipline, ensuing that the resulting site is usable to those using audio screen readers.[45] But at the time it seemed an annoyance, and a limitation on creativity. I could not understand why we should be building such new and exciting resources to suit those who insisted on using such an outdated application as Lynx. I had no idea that it was almost as new as Netscape; they seemed to reference such different eras.

To access web pages from any browser, users simply typed the relevant address (the universal resource locator or URL) and the page appeared. Or at least that was the theory. In practice, pages often took some time to load- sometimes several minutes if they contained media files or large images which might load themselves pixel by pixel. Links that should have led to other pages often resulted instead in the dreaded '404 page not found' error message. Nevertheless, most of the time it worked, and the web quickly prove a remarkably attractive and successful medium. This is shown by the remarkably rapid growth in web use over the period addressed in this volume. In 1990 fewer than 1% of the population of any region of the globe had used the internet in the previous three months. Initially this grew relatively slowly: by 1995 8.73% of North Americans were using it, but usage was still below 1% of the population in all other world regions. But by 2000 this had grown significantly to 43.88% of North Americans, 13.16% of the population of Europe and Centra Asia, 5.61% of the population of East Asia and the Pacific and 1.71% of the Middle East and North Africa: only in Sub-Saharan Africa and South Asia were less than 1% of the population using the web.[46]

However, until the invention of web search engines in 1994, a user's ability to find information on the web was severely limited.[47] Before the advent of graphical browsers, users could only search for material stored on computers connected to the newly-accessible internet using command line, textual interfaces. Archie, a search protocol which appeared in 1990s was complex and frustrating to use, and major improvements such as Veronica and

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[43] Berners-Lee, 'Frequently Asked Questions by the Press'.

[44] But if you really must cheat, take a look at this helpful guide: https://cects.com/using-the-lynx-web-browser/?cn-reloaded=1 or watch this video https://www.youtube.com/watch?v=HduFZm5JEmM

[45] Pernice and Nielsen, *Usability Guidelines for Accessible Web Design*.

[46] Roser, Ritchie, and Ortiz-Ospina, 'Internet'.

[47] 'Search Engine History.Com'.

Gopher only appeared shortly before the web was invented.[48] Other search engines, which used automatic agents or robots to crawl the nascent web soon began to appear, including Lycos, Alta Vista and the curiously named Dogpile. Yahoo and AOL's own search engine also made it possible for users to browse categories organised and collated at least partly by human agency. However, search engine queries often resulted in a large, undifferentiated set of links whose relevance the user then had to determine.

In such an environment, it was often easier simply to browse, starting from a page whose URL the user knew. That meant knowing the precise URL of the resource, and its whole directory structure, not just the top level domain, since browsers did not automatically correct poor spelling or infer the URL from something that had been incorrectly typed. In the absence of such knowledge, we simply surfed the web, discovering information almost accidentally as we went along. The verb 'to surf', coined by a University of Minnesota librarian in 1992, implies an enjoyable, if perhaps slightly risky, adrenaline-filled activity, and that was how using the web felt in its early days.[49] You started from a familiar location, then moved outwards, following links, and keeping records of where you had been by bookmarking pages to find your way to resources of interest. This was often a relatively slow process. But we tended to look on such activities as a pleasant voyage of discovery rather than a time crunched dash to grab results and then leave.

This, then, was the technical reality of Barlovian cyberspace, literally worlds away from that imagined by William Gibson. However, the difference between them was not quite as absolute as it may initially seem. This is due not only to technology itself but also the way that it relates to human imagination and interpersonal interaction.

In his discussion of cyberspace, for example, Loader introduces the idea that it is not only technologically driven, but dependent on the interaction of millions of its users, over whom there is no official control.

> "… cyberspace : a computer- generated public domain which has no territorial boundaries or physical attributes and is in perpetual use. To date its most potent manifestation is that matrix of electronic telecommunications and computer networks, usually referred to as the Internet, which links millions of people globally, is growing at a rapid rate daily, is taking shape and direction as a consequence of the voluntary actions of its participants and, it is claimed, is not controlled by any single authority."[50]

As this quotation demonstrates, as well as being synonymous with the digital networking technologies of the internet, Cyberspace was essentially linked to the idea of a virtual community– a networked online space where users could congregate, communicate, and interact with others. On fact many of the technologies that formed the backbone of early cyberspace, such as UseNet, The Well, MUDs, MOOs, and email lists, had existed well before

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[48] 'History of Search Engines'.
[49] Surfing, 'The Women Who Coined the Expression "Surfing the Internet"'.
[50] Loader, *The Governance of Cyberspace: Politics, Technology and Global Restructuring.*, 1.

the internet was opened to public use.[51] Although, as we shall see in chapter three, one of the most debated issues of the time was the question of whether genuine emotional bonds could be created online, and whether such groups constituted real communities.

Nevertheless, in virtual communities, whatever technical platform they might run on, the boundary between Gibsonian fictions and Barlovian reality became somewhat blurred. As discussed above, Gibson provides very few details about how any of the technologies in his world work, or how his environments function. This forces the reader's imagination to work unusually hard. In a similar way, the experience of early Barlovian cyberspace required huge acts of the imagination and of linguistic facility. In MUDS and MOOs- early online roll-playing environments- players could only use text to describe what their character looked like and had to script interactions with other characters, while also negotiating the challenges that the game environment threw at them. They could not create images, or see other players. Even in environments such as UseNet or email lists, members could only express their personality and get to know others in writing. Relationship building therefore depended, to a significant extent, on imagination: the ability to create and interpret text, and a willingness to suspend disbelief.

Early users of cyberspace therefore had to become accustomed to a phenomenon to which we are now so used that it has become unremarkable: the fact that, when online, our bodies exist in physical reality, while our mind is engaged in imaginative communication with others online to the extent that consciousness of outside reality may become muted. This experience of flow, brought about by a world of digital text might be compared to that a reader losing themselves in a printed book, or as Barlow argued, to be "….where you are when you're talking on the telephone."[52] By this he means the state of being so mentally abstracted from reality that remote communication, whether online or on a telephone, may seem more compelling.[53] Interacting within cyberspace thus meant both developing a sensitivity to the power and complexity of text and the act of reading it and an appreciation of how such activities differed from communication in a physical world. Barlovian cyberspace could therefore be regarded not only as a technological phenomenon but also, as Whittle argues, a state of mind, in which the sense of absorption in communication with others became a central part of the experience.[54]

The use of arcane language is another instance of a collision between the two, apparently distinct, types of cyberspace. As we have seen, in *Neuromancer,* Gibson employs a closed discourse: the implication is that we as readers are insiders, able to comprehend the abstruse terms which are never explained. Or if we aren't, we don't merit being given an explanation. Early virtual communities were also notable for their use of complex language which insiders were expected to know. As chapter three demonstrates, it was often necessary for users to learn some computer code, such as Unix, to get access to virtual

[51] Multi User Dungeons and Multi-user Dungeons, object orientated were early online communities, the nature of which will be discussed in detail in chapter 3.
[52] Rucker, Sirius, and Mu, *Mondo 2000*, 78.
[53] Such a phenomenon has subsequently been identified as the reason why individuals may blurt out personal information while taking on a mobile phone in a public place- so absorbed are they in the interpersonal conversation they forget the public nature of their physical reality. Humphreys, 'Cellphones in Public'.
[54] Whittle, *Cyberspace*, 7.

communities. Online newbies were required to learn the repertoire of the commands necessary to populate and navigate the game worlds of MUDs, MOOs, or, when on UseNet or email lists, to apply the correct abbreviations such as 'btw', 'rotfl', or 'imho' to conserve bandwidth and ensure concision of expression.[55] They were also expected to read the often-extensive FAQs for individual groups, and to 'lurk' (i.e. read but not post), initially, to gain a sense of how things worked and how language was used. Those who failed to do so risked being flamed, or even censured by sysops or list owners.[56] The language of insiders was thus common to earthbound and imagined cyberspaces. Although it is very seldom alluded to in writing of the time, therefore, interactions in early virtual communities forced participants to confront questions of how language conveys meaning as well as how it is related to its writer and creates connections with readers.

It becomes even harder to insist on absolute distinctions between real and imaged online worlds when we look at the language used to describe, rather than define, cyberspace. Despite his technology-led, pragmatic approach to definition, Whittle begins his book with the following paragraphs:

> Cyberspace! A word born from the dark visions of a science- fictional genius, now often used to describe a world brilliant with promise and fraught with peril. Uncharted; yet as familiar as the phone in your ear, the radio in your car, or the television that hypnotises young children and weary adults. Unparalleled potential. Dark and foreboding to some; Yet sparkling in the bright hopes of a new generation. Like stars in the vastness of the universe, rising...
>
> Close your eyes and say the word aloud. Cyberspace! What do you see? A black hole sucking you into a vortex of the unknown, or a galaxy of sparkling stars that beckons you to explore? The utopia of goodwill, or a wasteland of corruption? To me, cyberspace is a state of possibilities- a place where space and time lose meaning as barriers, where the timeless, timely, and obsolete unite."[57]

Here Whittle uses the typically breathless linguistic register that was repeatedly evoked by a number of authors when introducing this new phenomenon. The rhythms and vocabulary of the language are immediately reminiscent of Gibson, to the extent that Whittle ends the first paragraph with the present participle of a verb of movement, and the use of ellipsis, in this case 'rising...' as opposed to Gibson's 'receding...'

The language of Benedikt's description is even more lyrical:

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[55] Short for 'by the way', 'rolls on the floor laughing' and 'in my humble opinion' respectively.
[56] Flaming was an activity which we might now describe as trolling, and which will be discussed further in chapter three. A sysop was a 'system operator'- essentially the referee of a UseNet group.
[57] Whittle, *Cyberspace*, 3.

Cyberspace: a common mental geography, built, in turn, by consensus and revolution, canon and experiment; a territory swarming with data and lies, with mind stuff and memories of nature, with a million voices and two million eyes in a silent, invisible concert of inquiry, deal- making, dream sharing, and simple beholding.

Cyberspace: its corridors form wherever electricity runs with intelligence. Its chambers bloom wherever data gatherers and is stored. Its depths increase with every image or word or number, with every addition, every contribution, of fact or thoughtful. Its horizons recede in every direction; it breathes larger, it complexifies, it embraces and involves. Billowing, glittering, humming, coursing, a Borgesian library, a city; Intimate, immense, firm, liquid, recognisable and unrecognisable at once."[58]

These are just two of the ten paragraphs of similarly heightened language with which he introduces a collection of articles about cyberspace. Essentially, we see the same themes emerging as those of the more pragmatic descriptions discussed above- that cyberspace is technologically driven but also a state of mind (a consensual hallucination, perhaps?); that it is vast, consisting of connections between millions of people and huge quantities of data, which once again recalls Gibson's depiction; that it is unprecedented in complexity- again recalling the matrix. Benedikt's introductory paragraphs are an extended riff on Gibson's descriptions, adapting his tropes to a real-life digital phenomenon.

Lévy also adopts similar language when describing cyberspace, but in this case stresses the idea of a world elsewhere, which offers an alternative to, or even surpasses, life in a physical world.

"Cyberspace designates the universe of digital networks as a world of interaction and adventure, the site of global conflicts, a new economic and cultural frontier. There currently exists in the world a wide array of literary, musical, artistic, even political cultures, all claiming the title of "cyberculture." But cyberspace refers less to the new media of information transmission than to original modes of creation and navigation within knowledge, and the social relations they bring about. […]

…..In the silence of thought, we will travel the digital avenues of cyberspace, inhabit weightless mansions that will now constitute our subjectivity. Cyberspace: urban nomad, software engineering, the liquid architecture of the knowledge space. It brings with it methods of collective perception, feeling, remembrance, working, playing, and being. It is an interior architecture, an unfinished system of intelligence hardware, a gyrating city with its rooftops of signs. The development of cyberspace, the quintessential medium of communication and thought, is one of the principal aesthetic and political challenges of the coming century ."[59]

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[58] Benedikt, *Cyberspace*, 3.
[59] Lévy, *Collective Intelligence*, 118–19.

Not everyone thought that the use of such heightened registers was justified, however: Robins was scathing in his objections to the depiction of cyberspace as an idealised, alternative digital existence:

> "All this rhetoric of 'age-old' dreams and desires – which is quite common among the cyber-visionaries – is unspeakably vacuous and devoid of inspiration. It is a familiar old appeal to an imaginative space in which we can occupy new identities and create new experiences to transcend the limitations of our mundane lives. It is the aesthetic of fantasy-gaming; the fag-end of a Romantic sensibility."[60]

Whether it was romantic to do so or not, Lévy employs the language of the frontier in the context of cyberspace. This was doubtless inspired by Barlow's 'Declaration of the Independence of Cyberspace' and Rheingold's book *Virtual Communities*, the subtitle of which was 'homesteading on the Electronic Frontier'. As we shall see in chapter eight, the frontier was to become a powerful and pervasive metaphor of cyberspace, driven by those who wanted to see themselves as latter-day pioneers fleeing the tyranny of government regulation and control, or the reach or the kind of corporate capitalism that Henry Case is so intent on attacking. It is also intriguing that Gibson chose to call those who enter the matrix 'cowboys', recalling, in similar fashion, the anarchic freedoms of the old west. Here again we see Gibsonian and Barlovian notions of cyberspace converging.

In literal terms, of course, Gibson's cyberspace was very different from the real digital spaces of the 1990s, which remained relatively primitive by today's standards. As we have seen, computers were much less powerful, especially at the beginning of the period, when features that we now take for granted, such as integrated internet access, a large hard disc and fast processor were absent. The web was not invented until 1990, and even in the mid 1990s graphical web browsers and search engines were in their infancy. Google did not exist until 1998, and Wikipedia until 2001.

Those who wanted to enter cyberspace did not have to be preternaturally gifted; they were not in physical danger when online, although they might have been chasing sexual thrills; nor were they usually doing anything especially heroic. Much of the activity in Barlovian cyberspace was very mundane – people chatting about sport, weddings, motorbikes or football teams. But we can see Gibson's influence even here. As we have seen from the quotations above, there was a sense that to enter even Barlovian cyberspace was to engage with a place apart from everyday reality. Its inhabitants were, at least in economic terms, an elite, because they could afford the cost of the computers, modems and phone calls necessary to get online, and had the technical ability necessary to do so. They were also predominantly male, given the demographics of computational expertise and occupations at that time. It is tempting, therefore, to speculate that some users might have identified, when online, with Case the heroic cowboy, badass and babe-magnet, on the basis of shared technical expertise and arcane knowledge.

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[60] Robins, 'Cyberspace and the World We Live In', 139.

It may be that those of us who had such high hopes for Barlovian cyberspace participated in something that was as much a consensual hallucination as the world that Gibson had created. We imagined we were part of a digital world that never really existed. Indeed, as I have shown above, the more we examine the nature of such worlds, the more difficult it becomes to draw a distinction between factual and fictional cyberspace, and the more profound the influence of Gibson's depiction appears. One of the most essential elements of Gibsonian cyberspace is its sense of being outside the law and beyond control. Case is the hero precisely because he is able to do as he wishes, defying both the authorities and multinational corporations. In similar fashion, the idea of freedom to act as one wished, free from authoritarian interference, became one of the uniting ideas of Barlovian cyberspace, a concept named after one of the foremost libertarians of the digital realm. The question of what it means to be free to lead a digital existence is one which unites considerations of both Barlovian and Gibsonian cyberspace, and one to which I shall repeatedly return throughout the following discussion. To do so, it is now necessary to revisit cyberspace and examine the nature of its virtual communities which are the topic of the next chapter.

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