On The Origins Of Hypertext In The Disasters Of The Short 20th Century

Origins Of Hypertext

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The development of hypertext and the World Wide Web is most frequently explained by reference to changes in underlying technologies — Moore’s Law giving rise to faster computers, more ample memory, increased bandwidth, inexpensive color displays. That story is true, but it is not complete: hypertext and the Web are also built on a foundation of ideas. Specifically, I believe the Web we know arose from ideas rooted in the disasters of the short twentieth century, 1914–1989. The experience of these disasters differed in the Americas and in Eurasia, and this distinction helps explain many long-standing tensions in research and practice alike.

CCS CONCEPTS • History of computing • Arts and humanities • World Wide Web

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1. INTRODUCTION

We are accustomed to stories of the way new technologies transformed the physical and cultural landscape: the steam engine’s drive toward urbanization, the railroad’s domestication of the frontier. I would like here to explore the opposite direction: the way that the history of the 20th Century inspired a literary and technological revolution that sought to surpass the achievements of the codex book through the development of hypertext and the World Wide Web.

Technical advances rest upon other technical advances — Newton did stand on the shoulders of giants — but they also depend on ideas and events, and on the ways that specific ideas and events affected the lives and outlook of individual scientists and of the organizations and collegial networks they inhabited. When we are asked, “Why is the World Wide Web designed as it is, and why does it have the capabilities and shortcomings it possesses?”, our natural inclination has been to seek answers in changing technological constraints: the development of computer networks, the growth of personal computing, or the concentration of computational power circa 1990 in the hands of proudly independent academics.

If the social forces that shaped the Web we know had been different, the nature and experience of hypertext might well have departed radically from those familiar to us. H. G. Wells [Wells 1938] and Vannevar Bush [Bush 1945] each anticipated the utility of vast, encyclopedic hypertexts, but assumed that updates would be delivered in the mail rather than by network, and that everyone would therefore construct their own Web as a personal library. William F. Jenkins [Leinster 1946] anticipated that computers would require constant, expert maintenance in dedicated facilities, but that
home terminals might be installed and maintained by workers with working-class concerns, and that what really mattered was how a working stiff would see AI. John Brunner, on the other hand, anticipated that fast networks would enable a surveillance state, but that associative recall and trend identification would defy automation and conjure a new profession of trailblazing associative savants [Brunner 68]. Physical [Vinge 1992] or social [Herbert 1984] limitation on computational speed could easily lead to radically different visions of Web Engineering — limitations that were in fact experienced by early hypertext designers working, for example, with very slow storage [Akscyn 1987].

Yet all of these questions are subsidiary details to the overarching question: what is hypertext for? H. G. Wells assumed that the Web would be the comprehensive, affordable and up-to-date encyclopedia to which Diderot aspired, while Akscyn imagined a maintenance manual for an aircraft carrier. Asimov envisioned nothing less than a repair manual for civilization [Asimov 1953].

2. ROOTS OF HYPERTEXT

I would like to consider some specific intellectual developments that influenced the thousands of people who helped create the Web we know, and to relate those in turn to the arc of history. This is, of necessity, a speculative enterprise: we may know that an idea was in the air, but it is harder to show how a specific idea influenced specific individuals to design systems in specific ways. Nevertheless, I think one can trace the development of hypertext and the Web in the years after 1987 to a set of intellectual inquiries and developments — almost none of them scientific — that grew out of the disasters of the short 20th Century, 1914-1989.

I propose to begin with a short review of the historical context, and its differential impact in different places. I will then move to propose links between this context and specific ideas, approaches, and tensions that shaped the development of hypertext and the Web. This differential impact provides a useful check on our speculations; if an event had different effects in different places, we may expect those differences to be reflected in the ways people in those places adapted hypertext to their specific needs.

If these observations are not to be mere antiquarian curiosities or fish stories, they should offer explanatory or predictive insight that our conventional narratives do not. In this connection, the differential experience of the 20th century provides a more satisfactory explanation of some observed phenomena than does the happenstance of individual character. It is striking, for instance, that American hypertext research looked to Continental critical theory for its understanding of text and discourse, while Continental scholars often saw literary hypertext as a characteristically American phenomenon and even placed their study in departments of Amerikanistik. I suggest that this unlikely asymmetry might be explained with reference to the intellectual aftermath of World War II — particularly in France — and its contrast to the faith that G. I. Joe’s children would come to place in intense, mediatized experience as a path to personal liberation.

These conjectures cannot be proven in the compass of this paper, but I suggest that they are capable of proof (to the limited extent that any historical observation can be proven), and could form a useful basis for research.

3. THE SHORT TWENTIETH CENTURY

What historians call “the short 20th Century” spans the years from the start of the Great War to the collapse of the Soviet Union [Hobsbawm 1994]. It began with a war of unprecedented horror, a conflict that swept away an international economic order [Roberts 2013] and crystalized a dread, growing since the 18th Century, that people could destroy the world [Clute 2011]. The end of the war devastated the losers, but the winners were far from secure: as early as 1920, an incipient ecological disaster in the American West began to bankrupt farms, just as great swaths of
the Soviet Union were devastated by the Holodomor. By the end of the decade much of the world economy had
collapsed.

Bad times were succeeded by unspeakable disaster. Fascism captured Germany, while the economic crisis led Japan
deeper into paranoid imperial militarism. The Second World War began in 1931 with Japan’s invasion of Manchuria,
and its embers flared long after the Axis surrender — in mainland China until 1949, in Ukraine as late as 1956. Proxy
wars continued to devastate Korea, Vietnam and elsewhere.

Of particular note for the development of hypertext and the Web in the years immediately after the end of the short
20th Century is the differential experience of the Americas on one hand and of Eurasia on the other. Millions of North
Americans went to war and nearly everyone was directly affected, but in the Americas (as in New Zealand and
Australia) the war was almost always somewhere else — over there. For much of Eurasia, the wars were immediate,
ever-present, inescapable.

4. THE NORTH AMERICAN EXPERIENCE: PULLING TOGETHER
One distinctive aspect of the rhetoric surrounding the Web, especially prominent in the United States, has always been
its communitarian optimism — its confidence that people will work together to improve and cultivate a dynamic,
growing Web. The fundamental design of the Web, with its neat balance of GET and POST commands and its radical
statelessness, supposes that naturally people will write as well as read [Berners-Lee 1994]. This line of thought reaches
its pinnacle in Ward Cunningham’s immensely influential WikiWiki Web [Cunningham 2001] and in Wikipedia, “the
encyclopedia that anyone can edit.” Cunningham’s Wiki assumes that people, writing together, will incrementally
refine and improve the text through mutual effort and the wisdom of crowds [Surowiecki 2004]. That notional
collaborators might be ideological antagonists did not, initially, seem of concern, and that villains might use these open
platforms to pursue nefarious ends was not much discussed [Bernstein and Hooper 2018]. Security was often seen as a
defense of personal liberty against governmental overreach or against disorganized, casual vandalism; that well-
funded teams might subvert online discussions to spread lies for fun or for political advantage came as a shock
[Bernstein 2019]. Sensible people, it was assumed, would sift the universal Web and reject fraud and deception, and
would employ computational agents to evaluate sources and select only the best [Negroponte 1995].

In the United States, the memory of the disasters of the short 20th Century became, in large measure, a
communitarian fable, a story of Americans of all ethnicities coming together to resist Depression, tyranny and Fascism
and, through hard work and personal virtue, win through to peace and prosperity [Mailer 1948][Wouk 1951]
[Manchester 1980]. The ecological disaster of the Dust Bowl was refracted through The Wizard Of Oz (Best Picture
1939), and the Depression through My Man Godfrey (Best Picture 1937), melodramatic romances of triumph through
perseverance. The Second World War’s memory became a parable of ethnic and racial redemption, a myth that runs
from Stalag 17 (1953) and the Broadway redaction of South Pacific (1949), through MASH (1970), Star Wars (1977) and
Band Of Brothers (2001).

Elsewhere, the memory of disaster was quite different. For much of Europe and East Asia, the war wasn’t over
there. Even teenage girls who lived a thousand miles from the invading Germans saw that, if they did not find their
way to the fighting, the fighting would find its way to them [Aleksievich 1995]. A return to normalcy could not be
envisioned — least of all for those whose homes, families, communities, and cultures had been obliterated. Americans
asked whether it could happen here, but the rest of the world knew that it had happened. Concerns about surveillance,
trust, and responsibility, gained far more traction in Europe (and in Asia, albeit with different valence) as the new
media developed, and brash confidence in libertarian techno-utopian design has come to be seen as an American (or specifically Californian) attitude [Brooker 2019].

The conditions of the short 20th Century also contributed to characteristic blind spots and shortcomings of new media. There had been no privacy in the foxholes and precious little in the tenements [Mauldin 1945] [Riis 1898]. Familiarity with crowded conditions reduced the salience of privacy. In the old neighborhood or the old combat unit, everyone knew everyone and no one could shirk their responsibility [Fussell 1996]. Early hypertext systems were designed to shield against the casual intrusions of snooping siblings or busybody neighbors, not determined surveillance. Instead, much early Web rhetoric was eager to carve out opportunities for anonymity in order to advance freedom of expression for those who otherwise might be dismissed, (e.g. as geeks or juveniles [Card 1985]) and to promote contact for its own sake and for the advertisers’ benefit.

5. SOCIAL SPACES: ALL TOGETHER NOW

Reading has long been a personal practice, something we do by ourselves and for ourselves. Early anticipations of the Web often introduced social elements into scenarios that might, in principle, have been equally convincing considered as a strictly personal affordance. The hypothetical user of Vannevar Bush’s hypothetical Memex is not merely a scholar studying the bow and arrow; he draws on his trail to illustrate a point in a discussion with a colleague about “the queer ways in which a people resist innovations” [Bush 1945]. Engelbart’s augmentation program was, from the beginning, conceived as a group activity:

“At the workplace of each member of the subject group we aim to provide nearly full-time availability of a CRT work station, and then to work continuously to improve both the service available at the stations and the aggregate value derived therefrom by the group over the entire range of its roles and activities.” [Engelbart 1968]

Xanadu, envisioned as a sort of library, makes provisions for cheerfully-uniformed attendants and for the provision of snacks [Nelson 1982]. The sociable Web was prominent in the development of weblogs, many of which chiefly explored the boundaries between writer and audience, between private and shared space [Smith 2005][Rettberg 2008].

In the era immediately preceding the age of hypertext, the pivotal American question was not the centrality of community, but rather to which community one ought to belong. In the old country, one knew one’s place, but in the land of immigrants you could leave your name, your reputation, and your family behind. You could join your countrymen or shun them, or you could elect to join one or more of the synthetic fraternal orders that were so central to 19th century town life [Skopcol 2003]. Vonnegut had urged people to seek the ‘karass’ of people who matter to them, not the accidental ‘granfalloon’ into which circumstances dropped them [Vonnegut 1963]. Philip Roth, Saul Bellow, and Woody Allen pursued long, disparate inquiries into the American Jew’s alienation [Roth 1959]. A constant theme of the rock era was the pursuit of personal enlightenment through communal experience: trips, happenings, concerts and festivals [Echols 1999][Turner 2006]. The key question was neither personal salvation nor the redemption of a people, but rather to find the group in which you truly ought to be.

The influence of this quest for collective enlightenment pervades early hypertext. The visual aesthetic of Computer Lib derives directly from Stewart Brand’s Whole Earth Catalog and the homespun, do-it-yourself graphic design of the California rock scene [Turner 2006][Bernstein and Dolin, 2020]. Where the medieval and early modern ideal of scholarship often envisioned isolated personal study and meditation, the Web has always imagined collaboration and discussion.
The wars having been won and the Wall beginning to totter, it seemed that liberal democracy [Dunt 2020] had prevailed. “You are a child of the universe no less than the trees and the stars,” Max Ehrman had written. “You have a right to be here. And whether or not it is clear to you, no doubt the universe is unfolding as it should.” Early American visions of hypertext imagine its use by good people who are striving to become better — more productive, smarter, with better understanding [Engelbart 1963][Nelson 1974]. In Europe and Asia, the search for intentional community — indeed the idea that one might choose a community — was deeply contested. The terminus of our short 20th Century is defined by the resolution of this question for Eastern Europe with the end of East German border controls.

6. TRANS-ATLANTIC: ROLLING STONE

Approaching the end of history, many sought normalcy. They could not merely return to normalcy: no one would wish to go back to the Great Depression or to the labor strife and urban misery of the Gilded Age. The initial impulse led first to years of conformity and domesticity, a purportedly-conservative retreat to life centered on the nuclear family that was, in fact, historically novel. As time passed, young people rejected the stultifying conformity with which their parents had adopted to keep their heads down and their families safe [Menand 2021]. The young pursued experience and insight — raw, direct, forceful, and authentic [Echols 1999]. That experience might be a concert, a life on the road, a sojourn at a university, or an acid trip: the point was its power and impact.

This emphasis on personal experience set up a central artistic conflict: the tension between artistic mastery and authenticity. Virtuosity has inarguable virtues but it is seldom spontaneous or direct. Music, in particular, veered wildly between extremes of highly skilled and sophisticated performers and the unmediated power of punk and grunge. If you spent twenty years learning to speak the language of love, would you still remember what you once wanted to say? This tension repeated itself everywhere: in theater, in painting, in cinema. Was art the special province of talent and hard work, or did everybody have a song to sing? [Ward 2019]

Early hypertext, including the Web, consistently stands on the side of spontaneity. It declares that computing should be personal; that its key role is to enhance what we ourselves do, and that in any case the crucial thing is not that everybody should buy a computer but rather that everybody “can and must understand computers now!” [Nelson 1974] The Engelbart tradition is less polemic but no less individualist, promising to augment human intellect in order to enhance who we are [Engelbart 1963]. The Web takes care to give every server equal rights; you can write whatever you like on your own server and can link to anything on another server, and no power or authority can change what your server says.

The period preceding the emergence of hypertext was the pinnacle of a sustained aesthetic trend emphasizing rawness, directness, and immediacy, as a route to liberatory understanding. Artists from Stravinsky/Diaghilev and Scriabin had been fascinated by synaesthesia and the relationships among dance, light and music. In the mid-1960s, a short-lived but immensely influential Bay Area movement brought together like-minded friends to explore the potent combination of hallucinogenic drugs, extremely loud and dense music (The Grateful Dead and Jefferson Airplane started here), dances and light shows [Wolfe 1968]. This combined assault on the senses and on inhibition, it was hoped, would overcome convention and conformity, the discontents of civilization.

The arts had long wondered how they might be heard over the clamorous banality of the modern industrial city. Wagner envisioned an artwork of the future encompassing all the arts; the Bauhaus declared that “Das Endziel aller bildnerischen Tätigkeit ist der Bau!” — the ultimate goal of all artistic activity is the building. In England, followers of John Ruskin and William Morris had striven to integrate arts they believed to have been artificially separated while also elevating crafts like bookmaking, glassblowing and pottery [Cooper 2019]. The development of early hypertext
constantly emphasized the integration of text, image, sound and video, notably in Bob Stein’s Expanded Books, and the explosive growth of the Web was often attributed to Mosaic’s integration of imagery in web pages. The sudden development of Web design, and of disparate and conflicting approaches to visual aesthetics of hypertext, was conducted in language that deliberately echoed Morris’s Arts and Crafts movement [Cloninger 2002][Nielsen 1999].

7. EUROPE: TEXT AND TERROR

Postwar Europe faced a terrible aftermath of ruin, hunger, and doubt [Judt 2005]. Nowhere, perhaps, did the uncertainty seem more ominous than in France, which had been decimated in the Great War and then, in succession, had witnessed the failure of French liberal democracy, the collapse of the French Army, and the real possibility that the nation had come to an end [Bloch 1946]. Throughout Europe and throughout East Asia, survivors once again had to confront a terrible question: how had so many people been persuaded to support such terrible regimes and to carry out such atrocious plans?

Plato and Aristotle had expressed serious reservations about the utility of text. A book has no moral compass and no common sense, and it might instruct (or delude) readers whom any sensible professor would turn away. These concerns faded in antiquity because the Roman Empire floated on an ocean of paperwork and the Chinese Empire (and its construction of what it meant to be Chinese) was established through its civil service examinations as much as through conquest. The spread of Christianity and then of Islam through the propagation of written scripture (and the establishment of their own text-driven bureaucracies) lent texts still greater authority [Blair et al. 2021].

The repercussions of two world wars changed this understanding drastically. The horror of the concentration camps and the gulag demanded explanation: how could people have been led to do what they had done? How could they be prevented from doing it again? The aftermath of the Great War led to unprecedented research in linguistics, in formal languages, in structural patterns of argumentation, in abstract computation. In the wake of the Second War, Europe undertook a vast and radical reexamination of text in the light of the Nazi phenomenon — not just books and pamphlets, but also the posters, artworks, film, and radio broadcasts that had been used to such terrible effect. After Hiroshima, the need was urgent; if the disastrous impact of propaganda could not be blunted, the world was unlikely to survive [Menand 2021].

Anonymity, alienation and loneliness seemed inseparable from modernity, and anonymous, rootless and lonely people were the natural prey of totalitarians [Arendt 1951]. But where Americans and Canadians saw new media as a way to build new worlds in which people could meet, play, and matter [Goodman 2017], Europe was inclined to fear that new-media simulacra would leave its audience more vulnerable than ever to exploitation and manipulation. Where North American pioneers embraced the limitless opportunities for self-expression promised by virtual characters, European technologists often remained skeptical [Cadigan 1991][Cave 2020]. Much European new media research in these years focused on formal models, and on argumentative systems that could be validated and checked to ensure that their data had not been manipulated or distorted [Hall 1990] [Streitz 1992] [Garzotto 1997].

The development of advertising and propaganda inspired alarm from the outset. Shaw’s Major Barbara (1905) assumes not only that advertising corrupts viewers who cannot escape it, but also that an unreflective middle-class girl would take this for granted. Elites often expected that common people would be completely vulnerable to manipulation, and the experience of wartime only reinforced their fear [Orwell 1946]. Though it turned out that even uneducated workers were deeply skeptical of advertising, the dread of their vulnerability to advertisers and to demagogues, inspired drives for universal public education, workingmen’s colleges, scholarships and school diversity [Rose 2001], as well as renewed interest in the study of media and the nature of argument [McLuhan 1964][Kolb 1994].
This worry pervades the whole of early hypertext, which was deeply concerned with exposing the linkage between an argument and the evidence on which it was based. The architecture of Nelson’s Xanadu, for example, is dominated by the requirement for transclusion, ensuring that readers could always verify the accuracy of material on which an argument depends, and could independently assess it in its original context [Nelson 1982].

This concern for referential integrity pervades the early research literature. The first publication of the World Wide Web was rejected by the ACM Hypertext Conference on these very grounds: the proposed Web permitted broken links and made no provision to ensure that material you link to today would not change tomorrow. The early emphasis on encyclopedic hypertext in systems like Shneiderman’s Interactive Encyclopedia System HyperTIES [Shneiderman 1988] and Brown University’s Victorian Web [Landow 1992], similarly pursue a vision of a vast and constantly-updated encyclopedia that originated in H. G. Wells’s The World Brain [Wells 1938]. It is intriguing to note that many of those most deeply concerned with referential integrity and related concerns in these years were American Jews — Ben Shneiderman, George P. Landow, Andries van Dam, Norman Meyrowitz, Paul Kahn, Cathy Marshall, and myself among others — for many of whom the War was a breach that could never be healed.

It is also worth noting that, in the formative years of computer science, computational resources were scarce everywhere but remained especially scarce in Europe and Asia [Mounier-Kuhn 2010] [Trogemann et al. 2001]. The tradition of purely theoretical and formal research in computing remained stronger in environments in which implementation would, at best, prove difficult.

8. CRITICAL THEORY

Early hypertext conferences and workshops were infused by the anxieties of referential integrity, and much of the early work in formal models [Halasz 1994] and specification [Glushko 1989] [Garzotto 1997] explicitly reflects these concerns. Few researchers immediately recognized a distinct and less tractable problem that confronted the new field: just as hypertext was becoming technically possible, the foundations of our understanding of texts were collapsing.

A great enterprise of 20th century scholarship had been the search for the sort of structural patterns in history [Spengler 1923], stories [Propp 1968], and anthropology [Lévi-Strauss 1966] that had proven so useful to chemistry, physics and biology [Charle 2016]. This enterprise seemed promising at first and it still attracts attention, but actual phenomena turned out to be messier and less easily explained than proponents had hoped [Eagleton 1984] [Eagleton 2003]. In retrospect, almost the entire literature of hypertext and web research must be viewed against the background of this debate.

Between the wars, it seemed to many that both liberal Democracy and Communism were being sunk irrevocably in a sea of demagogic lies and wanton ignorance [Judt 2005]. One response was intense interest in language itself, spurred by the hope that, if language could be mastered, one might convince voters to respect their own interest or enable workers to tame the terrors that had come to control their state and fate. James Joyce, William Faulkner, Gertrude Stein, e.e. cummings, and Don Marquis were just a few workers in this laboratory of language. Simultaneously, novel mathematical inquiries into synthetic, abstract formal languages laid the foundation of computing. Alan Turing demonstrated the breadth of computation and Kurt Gödel demonstrated its limits, each by reasoning about abstract symbol manipulation. Where the nineteenth century posited that texts had meaning and tried to read even the most cryptic and fragmentary [Buchwald and Josefowicz 2020], the twentieth began to wonder where, precisely, meaning lay and whether that meaning had any real existence outside the interpreter.

Almost all early literary hypertext explicitly concerns itself with the construction of meaning [Landow 1992], and with understanding how the reader’s choice of links to follow (and perhaps the reader’s additions to the text) [Joyce...
1986]), were to be understood [Ensslin 2022]. Even more fundamentally, most early hypertext research was predicated on the intuition that information was structured, and that making that structure more evident, more explicit, or more tangible would improve our ability to communicate. The diagrammatic approach of British philosopher Stephen Toulmin mapped neatly into the node-link models of hypertext systems, and this convergence led to important work on link types [Trigg 1983], hypertext policy making [Conklin 1988], structured collaboration [Streitz 1992] and specification languages for hypertext [Garzotto 1997]. Here, too, disparate developments led to confusion and incomprehension; the disciples of Toulmin were building increasingly elaborate formal systems while the disciples of Barthes and Foucault were finding that the foundations of meaning and truth were, at best, unstable [Landow 1992] [Shipman and Marshall 1999].

A separate challenge to the use and meaning of texts arose in response to the need for educational institutions to address an increasingly-disparate and global audience. The American G.I. Bill and the increasing democratization of education in Europe and Asia created a torrent of scholarship. Universities expanded, new departments and new institutions blossomed, small teacher’s colleges became giant universities. Keeping track of the advances in knowledge was becoming an intractable challenge even before the wars [Buckland 2006] [Bush 1945]. After the war, more than ever, there was too much to know [Blair 2010]. Vannevar Bush’s Memex — an imagined personal hypertext library — was in effect a science-administrator’s response to this crisis. Computer Lib is suffused with contempt for the shortcomings of schools and confident that the key to addressing the schools’ failures lies in creating a form less rigid than the mass-produced codex book [Nelson 1974].

9. AUTHENTICITY IN DISNEYLAND

A generation of Americans (and Russians [Aleksievich 1995]) had gone to the war, and the war had come to everyone else. The survivors retained memories of expedient contrivances and improvised comforts [Mühener 1947] [Mailer 1948]. Nonetheless, reliance on technical solutions to seemingly-insoluble problems was problematic and problematized [Heller 1961][FitzGerald 1972][Bolter 1999].

At the same time, Europe (and North American academics who looked for European leadership) expressed growing distrust of (and revulsion for) mass-produced, sanitized and standardized modes of existence, especially in the service of corporate interests. Disneyland represented its dystopian culmination:

The only phantasmagoria in this imaginary world lies in the tenderness and warmth of the crowd, and in the sufficient and excessive number of gadgets necessary to create the multitudinous effect. The contrast with the absolute solitude of the parking lot - a veritable concentration camp - is total. [Baudrillard 1994]

One reaction against the Disneyfication of experience was resurgent interest in individual perception and creation. In Europe, corollaries of punk and grunge had their own valence, but were often theorized and valorized as rejection of Hollywood and of the shallowness and superficiality of late Capitalist America. European critics often regarded American writing, and some American cinema., as uniquely direct and unmannered, and therefore free from the encumbrance of old politics and ancient failure [Menand 2021].

The technical challenges of designing hypertext tools could be overcome, but researchers soon realized that we did not know how to write good hypertexts. This was, in a sense, an engineering challenge, but it was not only an engineering challenge; engineers naturally sought advice from those who had studied writing and meaning, but had the misfortune to raise the question at the moment when confidence in meaning and indeed in truth was at its nadir [Eagleton 2003] [Charle 2016]. The conflict is remembered as engaging "the engineers" and "the literati" [Leggett
1998]; it may be that the underlying tension was truly between those who hoped to remediate the plurality of meanings and those who sought to demolish hierarchies and authorities.

10. THE WAR AGAINST THE CREATIVES

These competing tensions were prominent in early hypertext research and the first decade of study of the World Wide Web. At the time, the tension seemed a natural outgrowth of competing personalities and institutional rivalries, perhaps exacerbated by political disagreement. In the Reagan-Thatcher era, for example, Ted Nelson’s rhetoric of personal liberation and his embrace of rock-festival graphic design posed difficulties for those seeking US military funding, where Doug Engelbart’s impeccable military-industrial credentials and courtly manner fit right in [Nelson 82] [Markoff 2005]. Yet behind the personalities and institutional rivalries lay significant ideas that merit closer examination.

Much early discussion of Web design was motivated by a desire to “rein in the creatives” by ensuring that Web sites met business needs and visitor expectations. Information Architects [Rosenfeld 1998] viewed hypertext design as an exercise in signage; get the hierarchy right and provide clear navigational signals and your reader would go where they wanted without inefficient detours [Young 1990][Glushko 1989]. Jakob Nielsen insisted that simplicity and conformance to expectation was the key to usability, and that usability was the key to profit [Nielsen 1999]. Hypertexts, in this view, should be engineered, preferably through formal models and specifications [Garzotto 1997], to provide efficient knowledge transfer by making those connections that were necessary and by avoiding anything that was not.

Though the connection was seldom (if ever) drawn at the time, I believe we can trace this approach to the early development of cybernetics and structural linguistics in the aftermath of the Great War. Of particular importance here is the université en exil organized in 1930s New York for francophone scholars fleeing France and Germany, where Roman Jakobson taught structural linguistics to Levi-Straus [Geohegan 2012]. (Levi-Straus lived in the same Manhattan apartment building as Richard Hamming [Menand 2021].) Structuralism bound together the understanding that communication can be viewed as a code (though we ourselves might understand that code incompletely) and the aspiration that the social or “human” sciences might be placed on a firmer empirical basis.

An alternative tradition held that writing is complex and multivalent: writers seldom say just one thing, and whatever enlightenment or revelation the reader seeks in a text, the goal is seldom a snippet of information or an isolated fact [Bernstein 1992]. Excessive concern with reader disorientation was unproductive: all readers are sometimes disoriented, and disorientation may be a necessary prelude to learning [Landow 1990]. To attempt to reduce the complexity of language, to avoid illustration and decoration, to insist that everything be clear, concise and sincere [Lanham 1993], was to deprive the message of meaning. The 1986 TINAC Manifesto called for a read-write revolution, proclaiming that “interactive narratives are what is written, whether by reader or writer.” One bundle of tips for aspiring Web creators urged them to “write passionately about things that matter” and posited little or no distinction between the writer and the work [Bernstein 2002]. Early Web rhetoric is replete with paeans to doing it yourself, and the Web of Jennicam was fascinated by authenticity and directness [Smith 2005]. Even professional graphic design discussions emphasized the utility of mastering a wide range of vernacular visual styles [Cloninger 2002].

One side sought analytic means to tame and refactor text, while the other saw new opportunities to embrace media complexity and ambiguity. Because a number of the academic participants on the latter side of the fracas were interested in literary hypertext and taught in departments of English, their approach was often viewed as “artistic” and sometimes dismissed as undisciplined. In retrospect, however, it also grows from a thoughtful consideration of texts.
Sartre’s existentialism, itself a response to the Occupation, insisted that free and thoughtful action is everything; this leads naturally to the repeated calls for passion in writing and design (see above) and for seriousness of purpose [Ensslin 2022], while interrogating the relationships between reader and writer, word and meaning, lexia and link [Moulthrop 1991][Joyce 94]. A constant subtext of this corner of the research literature is the avoidance of kitsch — art-like objects intended to flatter and please [Greenberg 1939].

11. NEW DIRECTIONS
We should resist the tendency of the business press to mythologize wealth and to present business success as a sign of personal virtue, heroic insight, or divine favor. Technological forces shape technology, as do the tastes and personalities of individual designers and writers. Yet things might have gone otherwise and — who knows? — they still may. Those who embarked on paths that we have not (yet) taken were not necessarily fools. It might repay some effort to consider the effects that would have followed successful mass-production of Memex machines [Buckland 2006], or to ask how a Memex would work if it used contemporary technology. What would the software world look like had Nelson’s vision of software as the work of an auteur caught on, as perhaps it might have done had it been attempted in a 19th century German seminar and not at Brown University in the 1960s?

This catalog of influences is, of course, both tentative and incomplete. It does suggest lines of investigation that may be fruitful. The differential effects of the historical background in Eurasia and in the Americas, in particular, provides a useful check on a number of speculative connections. Biographical inquiry could prove useful — not only into influences on Nelson and Engelbart, Bush and Berners-Lee, but even more into the hundreds of researchers, engineers and designers who developed and debated the evolution of hypertext and the Web, and who continue to shape our evolving understanding of hypertext and its discontents. The prominence of women at the forefront of hypertext research also deserves study.

I have here given more space to characteristically American ideas and less to the great European inquiry into Text, Discourse, and Critical Theory. In part, I have done so because the latter has been ably handled by Landow’s Hypertext [Landow 1992] and its numerous followers and critics, but also because the American story is more difficult to tease out. Critical Theory was developed in texts; American influences rest on music, poetry, film, performance, religion, and sometimes pharmaceuticals. There are profound and noble ideas here, not least the aspiration to augment human intellect and the insistence that we can (and must) understand computers now.

Above all, I think it important to understand that the Web (like the codex) is neither the inevitable technical expression of a prescribed ideal, nor the unique, predetermined product of technological forces [Nash 2016]. It might have been quite different. Indeed, the Web of 2022 is unlike (and for many, decidedly inferior to) the Web of 2002. It is not enough that we work to decrease the labor costs and increase the profit margins of Facebook and Twitter.

12. BIG IDEAS
The World Wide Web was built on big ideas inspired in response to the disasters of the short 20th Century.

In the aftermath of the Great War, the world undertook a great reexamination of the nature of text, argument, and of communication itself. Computer Science itself may be seen at one early growth of this pursuit, particularly its concern with abstract languages, information, encodings and protocols. A parallel exploration of new models of argumentation and novel roles for social sciences, universities, and museums led to new theories of History and reconceptualization of the role of publishing and intellectual property [Kurowski 2016]. The ambitions of the Web —
particularly its persistent desire to provide inexpensive or free access to information without regard for borders — arise from this very early work.

Hypertextuality was the central concern of the early Web, the foundation of its design, and the engine of its popularity. Any computer could participate, any participant could express whatever it chose, and any site could link as it pleased. The centrality of links as a discovery mechanism was indispensable to the vision, and their (partial, imperfect) replacement by search engines, recommendation algorithms, and advertisements has not always benefited either the individual reader nor society.

After the Depression and the Second World War and its sequelae, much of Europe and Asia lay in ruins. Survivors faced urgent questions, not least of which was: what is to be done? This was the existentialist question, and led in time to the postcolonial idea, to structuralism, and to a search for authenticity that often looked Westward toward what seemed to be a natural candor in American literature [Menand 2021]. The reconsiderations of truth, discourse, rhetoric, and representation that characterized Critical Theory, and an increasingly-conflicted view of the relation between Art and Money, remain central to our moment. These debates shaped every aspect of the Web, from server engineering to graphic design. The darker manifestations of this discourse include cynical exploitation of divisive rhetoric to enrich advertisers, and the use of the Web to misinform and imperil [Bernstein and Hooper 2018].

These anxieties of meaning reached North America late, despite the centrality of European refugees and émigrés to American intellectual life in the 1940s and 1950s. After an initial postwar outbreak of conformity, these ideas found an American audience that was ardent in the pursuit of personal liberation through direct sensual experience. This ambition is constantly evident in the rhetoric, the design, and in the artistic and engineering choices that underpin the Web, most evidently in the constant prominence the Web has accorded to multimedia, its longing for immersion and excess, and its insistence that everyone can (and should) participate.

The World Wide Web was built on big ideas, and understanding those ideas might let us rebuild it.

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