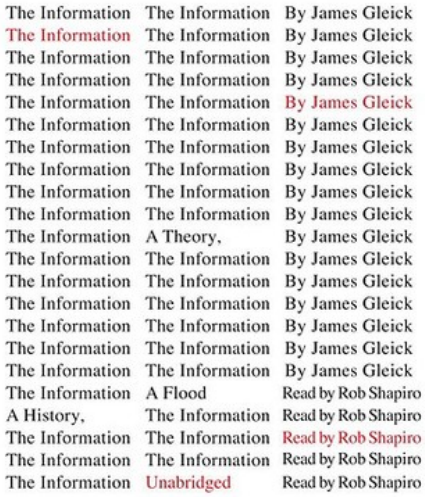

The Information: A History, a Theory, a Flood

James Gleick , Rob Shapiro (Narrator)

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James Gleick, the author of the best sellers *Chaos* and *Genius,* now brings us a work just as astonishing and masterly: a revelatory chronicle and meditation that shows how information has become the modern era's defining quality—the blood, the fuel, the vital principle of our world.

The story of information begins in a time profoundly unlike our own, when every thought and utterance vanishes as soon as it is born. From the invention of scripts and alphabets to the long-misunderstood talking drums of Africa, Gleick tells the story of information technologies that changed the very nature of human consciousness. He provides portraits of the key figures contributing to the inexorable development of our modern understanding of information: Charles Babbage, the idiosyncratic inventor of the first great mechanical computer; Ada Byron, the brilliant and doomed daughter of the poet, who became the first true programmer; pivotal figures like Samuel Morse and Alan Turing; and Claude Shannon, the creator of information theory itself.

And then the information age arrives. Citizens of this world become experts willy-nilly: aficionados of bits and bytes. And we sometimes feel we are drowning, swept by a deluge of signs and signals, news and images, blogs and tweets. *The Information* is the story of how we got here and where we are heading.

From the Hardcover edition.

The Information: A History, a Theory, a Flood Details

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From Reader Review The Information: A History, a Theory, a Flood for online ebook

Clif says

As a kid I loved to read the books on science by Issac Asimov.

I once had a job (1977) as a night janitor at a telephone switching office - back in the day when there were real live operators on duty for directory assistance, etc.

After finishing up my duties - cleaning ash trays, emptying wastebaskets, I would go to the basement, pull up a chair by the huge array of batteries that (still) provide backup power for the wired telephone system and read Asimov explaining the structure of the atom and how electricity works. I couldn't get enough of how things worked.

James Gleick follows in the Asimov tradition as a science writer for the masses but he gets in pretty deep.

The book is divided as the title describes into three sections - one about the history of information, one about the theory that developed to explain it, and finally a look at the flood of it that we are now experiencing. Throughout is that wonderful sense of excitement, discovery and adventurous thinking that Asimov was so good at relating.

There are many remarkable things in this book, one of which is an account of how writing changed the way we think from what it had been before. A different mental operation is at work when you relate things aurally, about things that you have seen, than when you write in symbols that bring up concepts that cannot be physically experienced. Also mentioned is the fact that writing is not evolutionary - in the sense that stone-age humans would have been able to write if they were instructed; The potential has been there all along. This kind of thing makes me eager to turn every page for more.

When Gleick gets into the theory of information even more fascination awaits. What is the information content of a printed character, of a dot or a dash of Morse code, of a photo? Much thinking went into analysis of communication before Claude Shannon came up with a formula for specifying the amount of information precisely - it has to do with novelty, unpredictability, and complexity but is completely independent of the meaning we place on communication. Now do I have your interest?

But things get deep. Here is an example from where I got completely lost...

" 'Feynman's insight,' says Bennett, 'was that a quantum system is, in a sense, computing its own future all the time. You may say it's an analog computer of its own dynamics.' Researchers quickly realized that if a quantum computer had special powers in cutting though problems in simulating physics, it might be able to solve other types of intractable problems as well."

Have you got that? Fortunately, the book doesn't often get this deep and right after the above quote the author leaves the theory for the flood section - much easier to swallow!

So step right up and challenge your mind to a roller coaster ride. There will be times when you will s-l-o-w d-o-w-n just as a coaster does when climbing the first height, but then you will find elation as you zoom into new ideas!

David Wiley says

Only half way through this book but it's one of the best I've read in a very long time. The chapter on Babbage and Lovelace filled me with rapture and awe, and a little bit of jealousy, peeking in on these great discoveries and the heady conversations and frequent advances and discoveries. What must it have been like to work at that level, to discover those things, to be so far ahead of your time? Incredible writing, so well researched, I just love this book... And as a bonus, highly applicable to my day job!

Radiantflux says

20th book for 2018.

In my doctorate I read and enjoyed many of the original 1950s papers applying information theory to psychology. I read Gleick's Chaos: Making a New Science many years ago and loved it, so his history of information was a natural second book for me to read.

Although his writing style is good, the book was quite disappointing. The book simply covers too many different topics with little to connect them (African drums; the telegraph; encyclopedias and dictionaries; codes; Babbage and Lady Lovelace; information theory; quantum computing; Wikipedia, encyclopedias again). While the chapters are interesting in their own way, nothing really adds up into something more coherent.

Not a terrible book, but it could have been so much better with a tighter focus.

3-stars.

Jen Padgett Bohle says

Here's an advertisement I want to place on craigslist because of this book:

Desperately Seeking:
Scintillating conversation partner who is preferably a math, physics, or logic major with strong knowledge of Quantum Physics and Information theory (of today and yesterday)and concepts including, but not limited to, the Babbage/Lovelace Difference Machine, Claude Shannon's math and entropy and cryptology, Turing's machine, logcal paradoxes, Maxwell's demon,The Heisenberg Uncertainty Principle, Schrodinger's cat, Richard Dawkins' memes, Goding's proofs, Douglas Hofstadter's EVERYTHING. Lack of arrogance and condescension toward someone who almost failed high school math a must. Must be willing to meet in heavily populated public place.

* * * *

Aside from that, delving into mathematics as James Gleick tells it (algebra, calculus and Boolean logic,

mostly ---A watered down version for us math scarred) makes me want to write a letter to every godawful mediocre monotone high school math teacher I ever had (so, all of them) and give them some major shit for not even bothering. Really? Overhead transparencies of meaningless equations and word problems involving trains and lots of bland white kids was all they had? Worksheets and odd numbered problems in a textbook? If I had only known that math is just another way of describing the world, just, ya know, symbolism like Dostoevsky used, but with numbers, and that all that misery and embarrassment and boredom working equations at the blackboard could actually get me closer to the secrets and meaning(s) of life...So, thanks to James Gleick for that too- late realization and doing what the uninspired mathbots should have done years ago. (Are you available for tutoring?)

The Information is by no means an easy read, but if you have some previous knowledge of physics(mine came from having read Brian Greene's Fabric of the Cosmos: Space, Time and the Texture of something or other and a biography of e = mc2 but I suspect a bit of patience and wikipedia would also be just fine), you should be able to get through this without any major confusion.

Anybody wanna talk physics and Information theory?

Wm says

The History chapters are the best -- the African drum system, Babbage, and the development of the telegraph were all fascinating. Once you get into the 20th century things become more mathematical and abstruse. I didn't understand all the equations. But what the structure of the book does is really show you how the technologies we have now relate to what happened in the past. Gleick weaves theory and storytelling together well. I would have like a bit more of the sociology and less of the theory.

David says

While nothing in this book is really new, Gleick has managed to pull together a fascinating, comprehensive review of the subject of information. The book does an excellent job unifying a vast subject area. I appreciate the book's emphasis on the contributions of Claude Shannon to the field of information theory. Also, it is eye-opening to be reminded, that an animal's body is simply the vehicle that a gene--i.e., information--uses to self-replicate. And it was fun to learn about earlier methods of long-distance communications, like jungle drums and the semaphore system used in France. I would recommend this book to anybody who uses his brain to store information.

Trevor says

I think this is perhaps as good an introduction to information theory as you are likely to read. Lucid, clear and quite nicely paced, it covers a wealth of material and it does so with beautiful ease. This guy really is a wonderful science writer. His Chaos and Newton were both stunning books. I got about half of the way through Genius, but then got distracted and never quite made it back – but I’ve always meant to. All the same, this one shines and shines.

Perhaps the best chapter was the one on randomness. Randomness is such a tricky concept, but oddly, not

something we generally really think about. Just how do you go about proving that a series of numbers is, in fact, random? The problem is that we humans are hopeless at spotting randomness. This is partly because we are such excellent pattern picking machines that we even spot patterns when there are none. And then we also tend to think there must be a pattern if there is repetition, but random sequences have odd repetitions too. All this means we tend to think things that aren't random are in fact random and vice versa.

The definition of randomness is that there is, in a string of numbers, a one in ten chance that you will be able to pick the next number in the sequence – in a random series you will have a one in ten chance – if you can do better than this chance at picking the number then you must have an algorithm to help you pick the next number and that means the next number can't be random.

His discussion of Turing, not just his test but also his machine and incalculable numbers, is highly readable and clear. His discussion of Gödel is somewhat less clear, but than I'm yet to have read a perfectly clear description of the incompleteness theorem – which might say more about me than it does about the descriptions I have read, who knows. This one is still good, even if it remains over my head. However, there is a wonderful discussion of the relationship between information and entropy and why entropy is an important concept for people to understand, as good an explanation as any I have ever read.

The early parts of the book are a joy. The stuff about the barbed wire telegraphs is particularly fascinating. As was his explanation of why multistorey buildings needed the telephone to be invented as much as they needed lifts.

I was less impressed by the discussion of memes, but mostly because I don't find this nearly as useful a metaphor as others do and worry when ideas that are clearly meant to be provocative end up being taken much more seriously than they warrant. Selfish genes and selfish memes, with their characteristic inversion of common sense, tend to become Blackmore's 'self-plex' and the end of human freewill and identity and therefore take a joke all a little too far.

The discussion at the very start of this book about African talking drums is virtually worth the cover price alone. I had never realised that these communicate 'tonally' and that to make them work the drummer must add lots of redundancy to the message, almost like a convention of sub-phrases. This was a wonderful description of why redundancy is necessary to messages and said interesting things about Western racism. Westerners simply could not believe these drums actually could send messages or that they were not being sent by a kind of Morse Code.

This book really is a pleasure and on a fascinating topic that is deftly handled by one of the best science writers alive.

Gary Schroeder says

This book could have alternately been titled "A History of the Bit: How the bit made modern communication, computing, logic, an understanding of biology and a whole bunch of other stuff possible." It's James Gleick's extremely ambitious attempt to wrap his arms around the entirety of the expansive concept of "information." To the uninitiated, "information" might seem like a rather straightforward concept, unworthy of a 400+ page book. After all, what is there to say about a concept that we all commonly refer to, understand, and take for granted? Quite a bit, as it turns out.

The good news is that this is not another book about the history of computing, from the Gutenberg press to the Macintosh. There are more than enough books on that topic. So, exactly what is it about? It's hard to be succinct about that. It might be better to offer a listing of broad topics covered.

He starts with the most basic of communication systems: the African drum -- a method of communication over distances that surprised early european colonizers with its apparent accuracy and specificity. From here, he moves to Babbage's mechanical difference engine and the first organized thoughts about the nature of information itself. When one has to carry out mechanical computation, it seems to be universal that an analysis of what comprises information quickly ensues. A new branch of philosophy is born.

Succeeding chapters cover technologies we typically associate with the transmission of information: telegraphy and telephony. Telegraphy introduces the idea of creating one set of symbols that can represent another set. In this case, dots and dashes for an alphabet. Twenty six characters are reduced to two. Telegraphy also introduced the need to reduce even further the number of characters by which a message could be clearly received, as in representing common phrases by a series of three digit numbers. Such a reduction costs the transmitter less money to send and enables the owner of the system to send more messages in the same time, earning them more money. This is information compression in its simplest form. Sending a message through an intermediary (a telegrapher) also means that you might want to hide the meaning of the message from them. This leads to ciphers and other methods of encoding. The sender and the receiver share a common key for decoding.

Telephony reduced the barriers to telecommunication by reducing the middle man, saved money for businesses by reducing the need for messengers and increasing the speed of messages. Telephony also drove further information technology innovations. Phone companies (or THE phone company at the time) devoted considerable resources to dealing with problems of long distance transmission of voice information over inherently "lossy" copper wires. Sifting meaningful signal from distance-induced static and noise became of focus of some particularly talented engineers. Analysis of this problem lead to mathematical abstractions as they tried to reduce "information" to the lowest possible common denominator. How small of a signal can carry a message? How can "message" be defined mathematically? The idea of the "bit" became common and the field of information theory began to take off. It had existed before, but it had never flowered in the way that modern communications forced it to. Claude Shannon is a central figure in the development of modern information theory and his revolutionary ideas are quoted extensively throughout the book. Parallel developments in information theory occurred with Alan Turing who developed the theoretical basis for computing before any of the hardware existed.

Some familiar computing history themes are then covered in which Gleick reviews projects undertaken during World War II to create mechanical systems capable of shooting down fast moving aircraft from the ground. These projects produced mathematical methods for estimating random motion and predicting probabilities, problems very similar to the efforts of phone engineers to separate signal from noise.

What Gleick tries to get across is the idea that the developments in information theory, some of which are concepts that we take for granted today, are in fact not intuitive at all. The idea that all information could be conveyed by nothing more than two states, on and off, yes or no, was revolutionary. For people of the era, these ideas would be like suggesting the existence of a new color that no one had ever imagined before. Shocking, like an intuitive leap that seemed to come from nowhere.

Information theory has implications for...well, just about everything in existence. It has implications for biology. The basic units of heredity, the genes, carry a certain number of bits of information needed to describe traits. DNA molecules can be thought of as biological memory storage devices, mere transmitters of

information. It also has things to say about memes, self-replicating packets of information. Gleick quotes Dawkins and wonders if they're like genes, existing to propagate themselves.

Towards the end of the book, he advances to modern developments of the past 30 years or so such as information compression and quantum information science. As part of this journey, Gleick tries to cover some very challenging mathematical topics like randomness, incompleteness theorems, the absolute computability of numbers and chaos. These sections are less successful. I got the feeling that he felt the need to include them, but felt that he could not adequately reduce them to a level that even an industrious layman could handle. Many terms are introduced which are never thoroughly explained, or which are explained tautologically, using poorly explained concepts to label new ones.

Finally, he ends with a light analysis of the cultural implications of the info-clogged modern world: information fatigue, information glut, and the devaluation of information that is ubiquitously available for the first time in history.

This is a big topic...indeed, a massive one. While "The Information" rambles on in places and seems disjointed in others, it's an important book. It brings the philosophy and science of information itself to a lay audience. Mathematicians and philosophers will be familiar with many of the concepts it contains, but this may be the first book that attempts to bring these rigorously technical fields to the masses in an easily digestible form.

Yothgoboufnir says

The Information has a lot going for it. And it has a lot going against it.

For starters, Gleick keeps the read enjoyable with his strong prose style. The author controls the pace and tone of his writing to carry readers along almost cinematically. Indeed, many passages read like the voice-over of a History Channel program, while simultaneously conjuring for readers the images that would play under the voice-over. It is a strong effect, engrossing and enjoyable.

The other big strong point of *The Information* is how wide-ranging -- yet unified -- its topic is. Gleick has, rather conspicuously, rounded up a huge catalog of sources and influences and subjects. I believe if a person is really going to like this book, it will be as an exuberant, unregimented romp through the jungle that is information. The book is ambitious, and looks at the world with the wide eyes of delight ... not the furrowed brow of calculation.

And given this combination of the book's ambition and approach, from *The Information* emerge some weaknesses. The book's treatment of its various subjects is very uneven. Gleick does a good job of impressing on readers how big a shift in mindset literacy generates. He gives an engrossing treatment of talking drums, and he gives an equally engrossing treatment of Charles Babbage and Ada Byron. These subjects together form an informal "first half" of the book, and succeed in prompting readers to think through the genesis of information as something (first) represented and (eventually) manipulated in tangible forms like scripts, tones, and gears.

Since we today generally take for granted a certain relationship between information, our minds, and our instruments, it is a major accomplishment that Gleick gets us to note that we haven't always lived this way and to think through how we got this way.

But after Gleick accomplishes this in the first portion of the book, he falters. His treatment of most subsequent topics is often not cogent. For example, in his treatment of thermodynamic information, he equivocates on what Maxwell's Demon is or isn't, and whether it exists or doesn't. Gleick ends up noting that the demon could not operate, but then he keeps referring to it as if it really does operate, a (presumably) rhetorical move that is pointless and incoherent.

Later on, Gleick gives a treatment of both genes and memes that is strangely uninspired. The fact that the book's wide scope requires the treatment of any particular topic to be fairly shallow does not combine well with the fact that almost everyone these days has a passing familiarity with both genes and memes: Gleick says no more than "the educated layperson" already knows. In a book on The Information, it seems genes and memes must be discussed as a matter of course -- but these sections don't add value to the book.

Moreover, the section on genes was even more deeply flawed. Gleick attributes to Watson and Crick the elucidation of the information content of DNA. He thereby conflates the chemical structure of the DNA molecule with the information structure of the DNA code. This is analogous to saying that the first person who figured out that a charred stick could be used to make marks on slate was the person who figured out writing. Or, it is analogous to saying that the information content of enigma-encrypted Wehrmacht transmissions was retrieved not by the codebreakers at Bletchly Park but by the radio operators who determined what radio frequency the messages were broadcast on. This is a rather profound mistake, considering the subject of *The Information*.

And this major mistake cropped up again and again, in different contexts. Despite his attentiveness to the father of information theory, Shannon, Gleick never got around to explicitly saying what makes something information, nor did Gleick implicitly follow any solid definition of information. This becomes problematic toward the end, where Gleick wants to unify everything under quantum information -- "it from bit" -- with the entire universe as a collection of physical-informational states. That is an interesting concept, but it actually has little to do with "information" as treated in the rest of the book: alphabets, calculators, cyphers, telegraphs, genes, Wikipedia articles. In all these contexts, something is *informational* when one physical object stands in for something else -- say, AAG for lysine, or dot-dot-dot for *s*. Gleick seems aware of this special relationship that defines information (per Shannon), but never pursues it and eventually abandons it. The sense of "information" he ends with is simply the notion that at certain levels, such as the level of quarks, the objects of study are indistinguishable from the formalisms by which we know them. That's a deep topic, but it isn't really pursued for its own sake; it is deployed as a rhetorical way to make "everything" informational ... even though it's only nominally related to the informational topics discussed in the rest of the book.

I found it intriguing that, in the final chapter, Gleick mentions in passing a perfect 1:1 map of everything as suggested by Lewis Carroll. Carroll was quite witty and this map is, of course, absurd. Its absurdity is precisely the problem that arises when Gleick conflates his two kinds of information. A perfect 1:1 map of everything A) would not be a map and B) would not be the thing itself.

So there were some deep conceptual problems plaguing *The Information*. Relatedly, the book lacked form. It was sprawling, and attempts at unification (aside from leading Gleick to embrace absurdities and forget what information even is) fell flat. As Gleick reminds us at the end in his excellent prose, there is a lot of information on the internet, and a lot of particles in the universe -- not exactly a parting thought that leaves readers pondering.

Finally, the references are in such bad shape that they warrant comment. None of the main body text has citations of any kind. Multiple times, I looked up authors who were quoted and found no entries in the

bibliography! There is a section of "notes", which appears to be a collection of endnotes containing citations and comments, presumably for the many unsourced quotations in the book. This section is puzzling, because the text does not actually refer to any notes. I infer that the numerals which signal there is an endnote pertaining to some point in the text have all been removed from the book, but the notes themselves retained. Presumably the in-text designation of notes was removed to make the text appear readable rather than intimidating. A rigorously sourced book suggests to readers it is meant to be taken seriously; apparently it was decided that that would send the wrong impression for this book.

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Bottom line:
The Information was fun and interesting. The first half was especially strong, even illuminating. But there were also serious conceptual and formal problems that prevented the book's content from matching the potential of such an ambitious topic. The book is much more likely to reward casual reading than serious or repeated reading.

Gayle says

I begin by saying to my middle school algebra teacher, “Damn, why didn’t you just say so?” At the risk of revealing my age, I can tell you that mathematics as taught in my elementary school era certainly lacked certain clarity in the fact that rote memorization played a totally unnecessary role as far as I was concerned. Luckily for me, I knew how to manipulate money long before I went to school, so the patterns in math were already obvious. Then suddenly there were these little *x*s and *y*s and I was completely thrown for a loop! “Why are these letters slinking around with my beloved numbers?” I thought. Gee, I wish my teacher had just given me Charles Babbage to read. After the initial shock, the patterns that I knew so well did return and I moved on, loving algebra, but the process would have been so much smoother had someone simply told me to think of the “x” as an empty box waiting for the right number to complete the pattern!

I am not a math and science whiz by any stretch of the imagination; I am, however, in awe of both and always have been. As far as I’m concerned, it takes a bazillion times more creativity to discover and *prove* a math or science concept than it does to write a story or poem. Literature is limited by the human experience and needs no proof. Math and science have no limits—think universe and ∞—and if you are unable to *prove* your theory, you will not become a part of the conversation unless, of course, someone else can prove your theory.

The Information, as I see it, is about just that, extraordinary people seeing the patterns first, forming a theory, beginning their proofs, and others building on those proofs until new understandings emerge. It’s an exciting and wonderful journey!

If you are the type of person that *must* understand and see clearly every concept mentioned in the book you are reading, don’t pick this one up. (Although, I’ve never understood why people who can read Oscar Wilde or T. S. Eliot comfortably can become so uncomfortable reading a book like Mr. Gleick’s that they would put it down and consider it too difficult to understand.) I have a high tolerance for the vague; it doesn’t bother me. There is a lot in this book that is vague to me, but I was constantly rewarded with so many “Ah ha!” moments that it did not interfere with my total enjoyment.

For example, how do you write about a theory before there are clear and concise words to describe it? Words

that everyone can agree upon must first be written about. “...where Newton wanted words for nature’s laws, Wittgenstein wanted words for words...” The limitation of words is that you must use words to describe them! Did you know that your teenager wasn’t the first to use expressions such as “lol” and “bff” to communicate? I did not, but when telegrams were charged by the word, people adapted by doing exactly the same thing—see page 154. Then there is the redundancy in language factor demonstrated nicely by one of my favorites, the James Merrill poem and 1970s subway sign “If U Cn Rd Ths, u cn gt a gd jb w hi pa.” “Bit” is a combination of binary and digit. Duh, but I truly did not know this!

Near the end of the story, we go from bits to bytes, to megabytes, gigabytes, terabytes and I found myself reading faster and *faster* and... as if experiencing the John Lanier quote, “It’s as if you kneel to plant the seed of a tree and it grows so fast that it swallows your whole town before you can even rise to your feet,” up close and personal. (Reminds me of *The Blob* and *Invasion of the Body Snatchers*.) We’ve moved from an oral culture where words/impressions were dissipated/forgotten or changed down the line—like kids sitting in a circle playing the game Telephone—to terabytes+ of the same set in code and then disseminated exponentially through our technology. Personally I like that idea; it doesn’t scare me at all. Can you tell? I *loved* this book!

Laura Jean says

I now LOATHE this book.

I had started reading it last spring before I left Nashville. I was trying to be a good library minion and keep up to date with reading in my field. I got through chapter 7 (1/3 of the book) and decided it was a bit heavy and that I would have enough reading of that sort soon enough in graduate school.

So guess what I had to read for my Perspectives in Information class?

If I thought this book was difficult before....I HAD NO IDEA.

The difficulty lies not in the actual content of the book -- quantum mechanics aside. I found that it truly lies in its narrative style. It is seductively easy to just accept what Gleick states as true. And from some of my other readings, I have learned that this is part of the problem with his premise and conclusion.

He believes that throughout time, humanity has slowly made technological advances through the advent of abstract thought and that at each threshold a new framework has been created to help define that technology to society. He discusses everything from the written word to quantum computers. He suggests that these innovations were possible due to an increase in the abstraction of thought which in turn allowed a quantification of information that was not possible before.

He introduces the advent of Information Theory, created by Claude Shannon, specifically for an electrical engineering issue concerning noise reduction in telephones. Shannon explained that in his theory, the meaning of the message was not necessary. Later he added that his theory should not be applied to other disciplines because it was meant specifically for an engineering application where meaning did not matter.

People did it anyway. However, they did try to apply it to their own specific discipline. And it produced amazing results. Many new subsets of traditional disciplines like physics and biology were born. And many

technological advances occurred.

The problem is that while James Gleick extols the virtues of abstract thinking and the part it has played in the evolution of technology in our society, he neglects to notice that the greater the abstraction of thought the further we are removed from the reality that the words are supposed to represent. And when you remove the meaning as well, as he blames Claude Shannon for doing, how do you value what remains? Sure it lets us quantify information. But how is that applicable to anything that is based in a subjective reality?

In addition, in his attempts to praise the technological innovations of a society grounded in a literal framework, he dismisses any value of societies with an oral foundation. This is too simplistic.

In the end, he suggests that the tools we have for organizing information in this new digital world are insufficient. He suggests that the meaning should be reintroduced. I believe that there are purposes for which abstract thought are made. That there are things that can and should be quantified. But that just because we can apply this to some things does not mean that we need to apply it to EVERYTHING. And it is better to leave the meaning intact in some areas as Claude Shannon intended.

Though I do agree that we are heading toward a new framework of thought with new definitions to help us understand and describe the new digital world we live in. I just believe that it is a long transition between conceptual frameworks and the evolution takes centuries. Until then I firmly believe that we will continue to use the print framework that we have been using. We will simply adapt it as we have always done.

Ian Scuffling says

The glut, the flood, the deluge, the overwhelming wash of information that has been a characteristic of 21st century life has only gotten worse in a world with a president who tweets from the shitter and corporatized media that has to play to the baser parts of our psychology to maintain ratings to make money. It's also been a characteristic of life since the advent of written language. And probably before that, but we can never know.

I've been interested in information theory as it pertains to general systems theory in my undergraduate studies on the systems novel, and my quest of reading what Tom LeClair has dubbed the "systext" (a macro-novel made up of seven meganovels). However, to this point, I didn't have much reading in it beyond literary criticism, and the mastery of fictioneers like Pynchon whose forms and themes and concepts embody the core theory of information and communication. Gleick's book is an encyclopaedia of information's history, its theory and where we're at right now. In these senses it is an utter success. He maps the history of mass communication from beating drums in Africa to the most basic and indivisible form: the bit.

The closing 3 chapters focus on where we are right now in our information-laden culture, with particular emphasis on Wikipedia as the real-life equivalent of Borges's library. These chapters are good, but feel a bit less "significant" than the rest of the book. In the closing, Gleick makes a compelling shift back toward the message and meaning and how we are the meaning-makers and information, essentially, lacks meaning until we interact with it, organize it.

Also of great interest to me, and deeply affecting, was the scientific evolution of understanding information

theory to finally understand our most basic atoms of information: genetics. It re-configures understanding about life and humanity to understand ourselves as computers. Processors of information. Information in the form of genetic code.

If you're interested in information and communication theory, want to understand entropy better, get a compelling history of how humans have been creating devices of mass communication and computing for centuries, read this book. It will change how you understand information, how humans are information that also processes information, and what it means to be in the information.

Jenny (Reading Envy) says

I have a soft spot for mathematics. The more complicated and obtuse it gets, the more I like it. It is probably best I didn't figure this out earlier in life, because I might have pursued it and gone crazy. So I enjoy reading about it from time to time.

In The Information, Gleick speaks to the interplay between mathematical progress with science, culture, information theory, and really the development of society. It is an incredible overview of topics ranging from logic to communication to memes. It is DENSE. I spread my reading over a few weeks, a chapter here, a chapter there. When the information started going over my head, I gleefully skimmed it until I could sink back in. The formulas meant very little but then he put musical fragments into it with no explanation, and at least I understood those.

The chapter that first captured me detailed the history of the OED. I loved the logic chapter, talking about Boole and his contributions, someone very important to library theory and I never really knew anything about where all of that came from. It was the last chapter, as well as the epilogue, where Gleick steps beyond his thorough research to offer a few opinions on the direction of information and information overload, that I think the book really shines, or at least, where it was most interesting/useful to me.

I don't know enough to speak to the accuracy of this book, but I feel like I learned a lot, as well as adding a bunch of other books to read to my list that he cites. I will also be ordering it for the academic library where I work, and using it in a presentation I'm giving in February! Win/win/win.

"It sometimes seems as if curbing entropy is our quixotic purpose in this universe."

"We make our own storehouses. The persistence of information, the difficulty of forgetting, so characteristic of our time, accretes confusion."

"When information is cheap, attention becomes expensive. For the same reason, mechanisms of search - *engines*, in cyberspace - find needles in haystacks. By now we've learned that it is not enough for information to *exist*."

"Too much information, and so much of it lost. An unindexed Internet site is in the same limbo as a misshelved library book. This is why the successful and powerful business enterprises of the information economy are built on filtering and searching."

"Infinite possibility is good, not bad. Meaningless disorder is to be challenged, not feared. Language maps a boundless world of objects and sensations and combinations onto a finite space. The world changes, always

mixing the static with the ephemeral.... Everyone's language is different. We can be overwhelmed or we can be emboldened."

"We want the Demon, you see,' wrote Stanislaw Lem, 'to extract from the dance of atoms only information that is genuine, like mathematical theorems, fashion magazines, blueprints, historical chronicles, or a recipe for ion crumpets, or how to clean and iron a suit of asbestos, and poetry too, and scientific advice, and almanacs, and calendars, and secret documents, and everything that ever appeared in any newspaper in the Universe, and telephone books of the future.'"

"As ever, it is the choice that *informs* us... Selecting the genuine takes work; then forgetting takes even more work."

"The library will endure; it is the universe... We walk the corridors, searching the shelves and rearranging them, looking for lines of meaning amid leagues of cacophony and incoherence, reading the history of the past and of the future, collecting our thoughts and collecting the thoughts of others, and every so often glimpsing mirrors, in which we may recognize creatures of the information."

Hadrian says

Very interesting and complex history of information theory, from drumbeats and cuneiform to the Internet. Not afraid to venture into the more technical and detailed aspects of history, which I admire.

Jimmy says

The history of information theory is a history of increasing abstraction. To the point where the meaning of information becomes irrelevant. To the point where the universe itself can be seen as a giant computer, and each of our choices, thoughts, movements become like states in the machine. I loved reading about the African drummers who communicated over long

distances via a tonal drum language with built in redundancy. I loved reading about Babbage and his calculating machine, and to think about it as a kind of steam-punk calculator fantasy world of the future. I loved reading about people decrying the telegraph and the telephone as technologies that will ruin humanity. And to read about the shortening of telegraph messages to save time and money, with phrases like wyegfef which stands for 'will you exchange gold for eastern funds?' which is interesting because here we are in 2012

coming full circle, a form of regression maybe, by using codes like ROFLOL and BRB in our chatboxes and cellphones. And also that the telegraph reminds me a bit of twitter in its shortness. I didn't love reading about Godel and Turing and Shannon, but only because I've read so much about them already in other books just like this one, but it was still interesting enough. I liked reading about genes and the gene code ok, but I really loved reading about quantum computers because I knew next to nothing about them. Something I never thought about before is how a message sent using a quantum computer cannot be intercepted or wiretapped because of Heisenberg's principle

which says that you can't look at a quantum particle without effecting it, so in effect the intercepter cannot go undetected! This blew my mind. I loved reading the more philosophical chapters about how we have too

much information for us to ever process, and how we must now deal with it. I loved reading about the library of babel and borges of course, how could I not? I loved thinking about how we have too much information and how everything is documented. "It did not occur to Sophocle's audiences that it would be sad for his plays to be lost; they enjoyed the show". I thought about that and I thought

about how every performance, ceremony, or event that I've been to in the last year or so has been recorded on video (and probably up on YouTube already) and how or whether that took away from the experience, whether knowing something will be archived later makes you pay attention less now, or is it a form of insurance, a kind of just-in-case, which then made me wonder how many times I (or anyone) will ever go and watch those videos again. I thought about the last chapters and how Google and other search engines are our only means of not being completely lost in meaningless data and then I thought about how much power the role of a search engine is, to make sense of the information is also to hold all the power, to control the information, to control what information people see or don't see. I'm looking forward to the sequel.

Melissa says

If you like the idea of relating information to thermodynamics - more specifically, the second law of entropy, you will whiz through this book in one sitting despite its length. In any transformation, a dissipation occurs. Loss in one form of energy is inevitable; in our futile attempts to avoid this loss, we inadvertently gain energy in other forms. Information can be viewed similarly. As it travels through books, mouths, films, etc., it loses something each time. This loss creates room for the unintended lessons.

I probably slaughtered the description with my futile attempts at explaining this – suppose that conveniently serves as further proof of the validity of his message.

Loring Wirbel says

Since I was absolutely astonished by such Gleick works as "Chaos" and "What Just Happened", and since his subject matter (Claude Shannon, Godel, info theory) is right up my alley, I was prepared to give this book five stars, particularly given raves in NY Times Book Review and elsewhere. Quite honestly, I'm tending toward the Goodreads consensus of four stars, leaning to a high three. And the reasons for that are quite specific.

Gleick pulls all the right ingredients together - Charles Babbage, Lady Ada Lovelace, Claude Shannon, Alan Turing, Kurt Godel, Norbert Wiener. He gives us unique quotes from Lady Lovelace's letters, odd anecdotes of Shannon and Godel meeting at Princeton. The book is lively and readable for the most part, though the odd algebraic algorithm might scare some people. And yet, and yet.... Something feels like a perfectly prepared pudding or souffle that wasn't cooked at the right temperature, leading to a failure to set properly.

Perhaps the problem is that Gleick set a high bar for himself with "Chaos", and a high bar was set for incompleteness theorem and information with Douglas Hofstadter's "Godel Escher Bach: An Eternal Golden Braid." Gleick quotes at length from Hofstadter, to be sure, but he doesn't achieve quite the sense of astonishment and whimsy that Hofstadter did when GEB first came out in the early 1980s. Maybe I was expecting Gleick to provide a new theory of what happens when incompleteness meets infinite recursiveness meets the compressed-code condition where a single symbol stands for a universe of meaning. Maybe that

was a ridiculous expectation.

This book makes a wonderful companion to Hofstadter's GEB, William Gibson's "The Difference Engine", and similar works. It makes Shannon and Turing seem like real people, though it does not delve into the heartache of Turing's persecution as a homosexual, which several biographies of Turing have done. Gleick ends the book with a marvelous treatise on Wikipedia's reason for being in this world, and a suggestion that we are running into a new recursiveness when an ever-expanding Wikipedia begins to stand for all sentient knowledge in the universe - have we gained anything in library management or data compression? Still, Gleick manages to end the book on an optimistic note, not wringing his hands too anxiously over information overload, etc.

Remember, a pudding or souffle that comes out of the oven a little too runny still can make for good eating, and Gleick's book is often yummy. Just don't expect "The Information" to reach new frontiers of information theory. It's just a dime map of the reef, and that's OK.

Joshua says

I enjoyed reading this book thoroughly. However, I do not think it will satisfy everyone who is considering reading it. I know many of my librarian colleagues and my classmates from the School of Information probably have this on their to-read lists. Many of them are probably more interested in contemporary issues of information management, such as information retrieval, social network analysis and human-computer interaction. This book touches some of those issues, and indeed many others, but this book is primarily about the history of information theory. The subtitle of the book is "A History, A Theory, A Flood," but the Flood part is only discussed in the final chapters. The rest of it is devoted to the theory and history.

You can tell that Gleick has spent his career writing biographies and histories of physicists and mathematicians, because those subjects are covered in greater detail in this book. The two most prominent individuals that Gleick focuses upon are Charles Babbage and Claude Shannon. If you're interested in the history of science, math and philosophy, or if you would like a good explanation of information theory (which I think most people do not understand correctly) then I would recommend this book. Otherwise, this book may not be what you are hoping it to be.

If you are into that sort of thing, then this book will be a fun read for you. I found it extremely fascinating.

A couple passages that made me pause:

An amusing quip on entropy: "Living things manage to remain unstable." Indeed. Increased entropy is the natural progression of the universe. But living things maintain an organized state, which is highly anti-entropic. Hence, we are all unstable people!

On memes: "...rhyme and rhythm help bits of text get remembered. Rhyme and rhythm are qualities that aid a meme's survival, just as strength and speed aid an animal's. Patterned language has an evolutionary advantage. Rhyme, rhythm, reason--for reason, too, is a form of pattern." This is an interesting thought. Reason as simply a pattern--a memory aid.

Katie says

A wonderful and eclectic book that gave me a new perspective. I'm not sure how this book reads for those already versed in information theory - I think it's largely designed for those who are not - but it's a great introduction to the subject.

Gleick is especially got at illustrating how wide-ranging this subject is, and how innovations from people like Claude Shannon or Alan Turing rippled out into fields as diverse as linguistics, genetics, and psychology. It's rare that an introductory book can legitimately offer a slightly different way of viewing the world while still remaining grounded and accurate, but this work pulls it off beautifully. I'd love to read more on information theory if anyone has any recommendations for me.

Mara says

The amount of information (pun acknowledged, but not intended) that ***James Gleick*** was able to contain in the book is mind-boggling (***Claude Shannon*** could probably tell you what the physical cost of the logical work my mind did while reading it was, but I, alas, cannot).

I'm sure that for those who are well-versed in information theory, some of his omissions were glaring and seemingly arbitrary, but there is nothing wrong with a book that leaves you wanting more and feeling sufficiently motivated to go out and find it.

The Information , with all that it contains, is a likely candidate for the list of non-fiction books I loved, took copious notes on while reading, and would recommend, but fail to review because there is just so much to be said. However, it's ***Ada Lovelace Day*** , and without Gleick I would have no clue as to who she was (and she was awesome).

My lack of time and in-depth knowledge of Lovelace suggest that my attempt to describe her right now would be inadequate, so I'll just recommend a nice New Yorker article ***"Ada Lovelace, The First Tech Visionary"*** (and/or any of the ALD features that are bound to grace the interwebs today).
