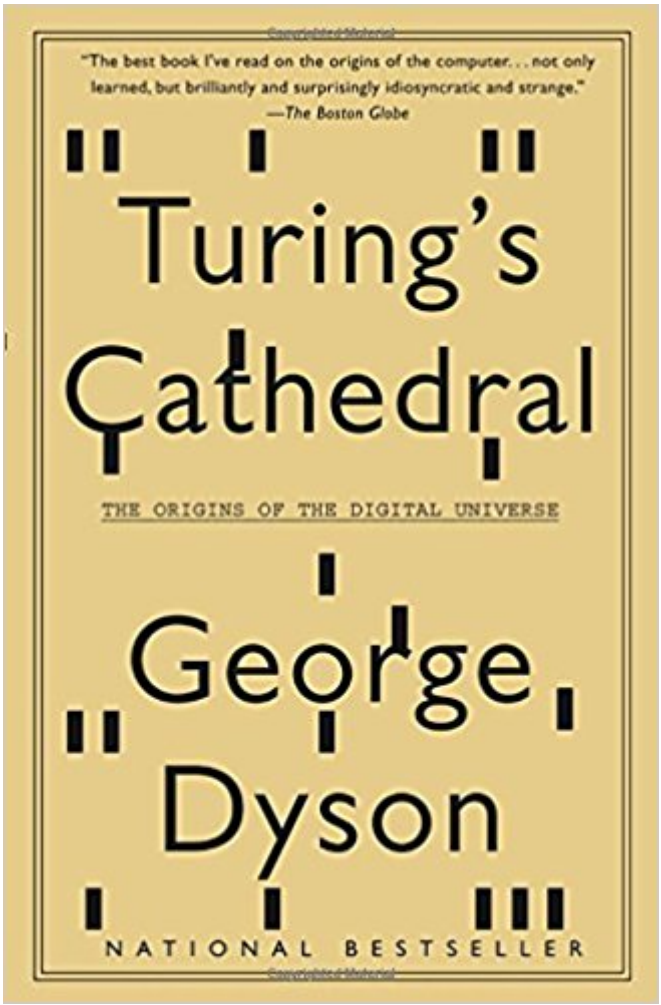
Turing's Cathedral: The Origins Of The Digital Universe



Synopsis

A Wall Street Journal Best Business Book of 2012A Kirkus Reviews Best Book of 2012In this revealing account of how the digital universe exploded in the aftermath of World War II, George Dyson illuminates the nature of digital computers, the lives of those who brought them into existence, and how code took over the world. Ã Â In the 1940s and Ã¢â ¬Ëœ50s, a small group of men and womenÃ¢â ¬â •led by John von NeumannÃ¢â ¬â •gathered in Princeton, New Jersey, to begin building one of the first computers to realize Alan TuringÃ¢â ¬â„¢s vision of a Universal Machine. The codes unleashed within this embryonic, 5-kilobyte universeÃ¢â ¬â •less memory than is allocated to displaying a single icon on a computer screen todayÃ¢â ¬â •broke the distinction between numbers that mean things and numbers that do things, and our universe would never be the same. TuringÃ¢â ¬â„¢s Cathedral is the story of how the most constructive and most destructive of twentieth-century inventionsÃ¢â ¬â •the digital computer and the hydrogen bombÃ¢â ¬â •emerged at the same time.

Book Information

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Customer Reviews

Ã¢â ¬Å“The best book IÃ¢â ¬â„¢ve read on the origins of the computer. . . not only learned, but brilliantly and surprisingly idiosyncratic and strange.Ã¢â ¬Â• Ã¢â ¬â •The Boston GlobeÃ Â Ã¢â ¬Å“A groundbreaking history . . . the book brims with unexpected detail.Ã¢â ¬Â• Ã¢â ¬â •The New York Times Book ReviewÃ Â Ã¢â ¬Å“A technical, philosophical and sometimes personal account . . . wide-ranging and lyrical.Ã¢â ¬Â• Ã¢â ¬â •The EconomistÃ Â Ã¢â ¬Å“The

story of the [von Neumann] computer project and how it begat todayÃ¢â ¬â„¢s digital universe has been told before, but no one has told it with such precision and narrative sweep.Ã¢â ¬Â• Ã¢â ¬â •The New York Review of BooksÃ¢â ¬Å“A fascinating combination of the technical and human stories behind the computing breakthroughs of the 1940s and Ã¢â ¬Ëœ50s. . . . An important work.Ã¢â ¬Â• Ã¢â ¬â •The Philadelphia InquirerÃ Â Ã¢â ¬Å“Vivid. . . . [A] detailed yet readable chronicle of the birth of modern computing. . . . DysonÃ¢â ¬â„¢s book is one small step toward reminding us that behind all the touch screens, artificial intelligences and cerebellum implants lies not sorcery but a machine from the middle of New Jersey.Ã¢â ¬Â• Ã¢â ¬â •The Oregonian Ã Â Ã¢â ¬Å“Well-told. . . . Dyson tells his story as a sort of intellectual caper film. He gathers his cast of characters . . . and tracks their journey to Princeton. When they converge, itÃ¢â ¬â„¢s great fun, despite postwar food rationing and housing shortages. . . . Dyson is rightly as concerned with the machineÃ¢â ¬â„¢s inventors as with the technology itself." Ã¢â ¬â •The Wall Street Journal Ã Â Ã¢â ¬Å“Charming. . . . Creation stories are always worth telling, especially when they center on the birth of world-changing powers. . . . Dyson creatively recounts the curious Faustian bargain that permitted mathematicians to experiment with building more powerful computers, which in turn helped others build more destructive bombs.Ã¢â ¬Â• Ã¢â ¬â •San Francisco Chronicle Ã Â Ã¢â ¬Å“The story of the invention of computers has been told many times, from many different points of view, but seldom as authoritatively and with as much detail as George Dyson has done. . . . TuringÃ¢â ¬â„¢s Cathedral will enthrall computer enthusiasts. . . . Employing letters, memoirs, oral histories and personal interviews, Dyson organizes his book around the personalities of the men (and occasional woman) behind the computer, and does a splendid job in bringing them to life.Ã¢â ¬Â• Ã¢â ¬â •The Seattle TimesÃ Â Ã Â Ã¢â ¬Å“A powerful story of the ethical dimension of scientific research, a story whose lessons apply as much today in an era of expanded military R&D as they did in the ENIAC and MANIAC era . . . Dyson closes the book with three absolutely, hair-on-neck-standing-up inspiring chapters on the present and future, a bracing reminder of the distance we have come on some of the paths envisioned by von Neumann, Turing, et al.Ã¢â ¬Â• Ã¢â ¬â •Cory Doctorow, Boing BoingÃ Â Ã¢â ¬Å“No other book about the beginnings of the digital age . . . makes the connections this one does between the lessons of the computerÃ¢â ¬â„¢s origin and the possible paths of its future.Ã¢â ¬Â• Ã¢â ¬â •The Guardian Ã Â Ã¢â ¬Å“If you want to be mentally prepared for the next revolution in computing, DysonÃ¢â ¬â„¢s book is a must read. But it is also a must read if you just want a ripping yarn about the way real scientists (at least, some real scientists) work and think.Ã¢â ¬Â• Ã¢â ¬â •Literary ReviewÃ Â Ã¢â ¬Å“More than just a great book about science. ItÃ¢â ¬â„¢s a great book,

period.Ã¢â ¬Â• Ã¢â ¬â •The Globe and Mail

George Dyson is a science historian as well as a boat designer and builder. He is also the author of Baidarka, Project Orion, and Darwin Among the Machines.

The early history of computing is usually presented in a simple linear fashion: Atonsoff, Mauchley and Eckert, Turing and the Enigma project, Von Neumann, and the post war explosion. That's the way I learned it in college in the 70s, and the way just about every book presents it. It's correct, insofar as it goes, but it leaves out a tremendous amount of richness and detail that George Dyson relates in this book. His narrative consists of over a dozen parallel, interrelated, stories, each concentrating on one person or project, along with how they or it relates to the overall narrative. The story begins with the history of Princeton, New Jersey, and the two men most responsible for the creation of the Institute for Advanced Study: Abraham Flexner, and Oswald Veblen, son of economist Thorsten Veblen. Flexner and the younger Veblen shared a vision of creating a place in which the world's greatest thinkers, able to interact freely and freed from the mundane obligations of teaching and practical applications, would advance the world's knowledge on a heretofore unprecedented scale. In so doing they inadvertently created one of the era's greatest centers for applied research into computing.Turing and von Neumann make their appearances here, of course, along with Mauchley, Eckert, Oppenheimer, Ulam, Freeman Dyson (the authors' father), and other notables of the era. But Dyson also tells the story of a number of pioneers and contributors to the design, construction, and most of all the theory of computation, who have been overlooked by history. Most remarkable, perhaps, is Nils Barricelli, who could justifiably be called the founder of computational biology. Working in the early 1950s with a computer having less computational power and memory than a modern day sewing machine, he created a one-dimensional, artificial,universe in order to explore the relative power of mutation and symbiosis is the evolution of organisms. His work led to a number of original discoveries and conclusions that would only be rediscovered or proposed decades later, such as the notion that genes originated as independent organism, like viruses, that combined to create more complex organisms.There's an entire chapter on a vacuum tube, the lowly 6J6, a dual triode created during the war that combined several elements necessary for the creation of a large scale computer: Simplicity, ruggedness, and economy. It fulfilled one of von Neumann's guiding principals for ENIAC: Don't invent anything. That is, don't waste time inventing where solutions already exist. By the nature of its relative unreliability and wide production tolerances relative to project goals, it also helped stimulate a critical line of research, that of how to

created reliable systems from unreliable components- something more important now than ever in this era of microprocessors and memory chips with millions and even billions of components on a chip.The chapter on Alan Turing is particularly good, covering as it does much of his work that has been neglected in biographies and presenting a much more accurate description of his work and his contributions to computational science. The great importance of his conceptual computer- the "Turing Machine"- is not, as is commonly stated in popular works, that it can perform the work of any other computer. It is that it demonstrated how any possible computing machine can be represented as a number, and vice versa. This allowed him to construct a proof that there exist uncomputable strings, I.e., programs for which it could not be determined a priori whether they will eventually halt. This was strongly related to Godel's work on the completeness of formal systems, and part of a larger project to disprove Godel's incompleteness theorem.What makes this a particularly exceptional book is the manner in which Dyson connects the stories of individuals involved in the birth of electronic computing with the science itself. He does an exceptional job of explaining difficult topics like Godel incompleteness, the problems of separating noise from data, and the notion of computability in a way that the intelligent read who may not have advanced math skills will understand. More importantly, he understands the material well enough to know what are the critical concepts and accomplishments of these pioneers of computing, and doesn't fall into the trap of repeating the errors of far too many popular science writers. The result is a thoroughly original, accurate, and tremendously enjoyable history. Strongly recommended to anyone curious about the origins of computers and more importantly, the science of computing itself.

This is an excellent introduction to the early years of computers as seen from the vantage point of the Institute of Advanced Studies at Princeton and the fascinating people who worked there during the thirties and WWII. The participation of these figures, and others, in the development of the atom bomb is examined with more than a hint of the crucial issue of the conflict between secrecy and open sharing, between the commercial (e.g., patents) and computers as vehicles for pure research or free public usage. George Dyson is a clear and gifted writer, commands the fields he treats, and has a leg up on the Institute, given that he grew up there with his celebrated father Freeman Dyson. By the way, though, Turing is a background figure in the book, though of course a vital one.

I read this book several years ago, but I feel it didn't get all of the attention it deserved. Dyson manages to weave together the stories of the birth of the computer, the beginning of the Institute for Advanced Study and the personalities of some of the leading scientists of the 20th century all in one

compelling narrative.The prose is engaging but written for fellow scientists or, at least, the scientifically literate. Because of the fact that Dyson chose to write the book above the level of popular science his book didn't go viral in the way of, say, Blink by Malcolm Gladwell.However, even though I read this book several years ago, I can say I've rarely had the pleasure of reading a finer work since. Highly recommended for a select kind of reader.

I am fascinated by this period in the history of technology, and the book's major premise -- that the IAS computer and its creators represented the first true fully realized digital computer -- has long been one of the core lessons in the technology history classes I teach. The book filled in a lot of details in my somewhat fuzzy appreciation of von Neumann and his role in many areas of 20th-century mathematics and technology. I was fascinated from beginning to end and couldn't put this book down while reading. However, some readers will be put off by the extremely non-linear storytelling style -- it jumps frequently between decades, continents and personalities with no clear defining plan -- and I find Dyson's attempt to link today's apps and search engines to von Neumann's and Turing's work in cellular automata and artificial intelligence a bit of an intellectual stretch. He does better when recounting pure history and not speculating about its links to the future.

Excellent writing on the technical aspects of the birth of the computer and the people behind it. I worked on early NTDS systems and this book heldclues for me to the origins of those machines and the design details in them. If you are a technical reader you will enjoy this, this book is not a Hollywood romp of intrigue, but a factual account over time. Highly detailed only wish there were more pictures of early machines.

Computer Alan Turing: Unlocking the Enigma (Kindle Single) Alan Turing: The Enigma: The Book That Inspired the Film "The Imitation Game" Alan Turing: The Enigma The Imitation Game: Alan Turing Decoded The Universal Computer: The Road from Leibniz to Turing Alan Turing (Profiles in Mathematics) Turing's Vision: The Birth of Computer Science (MIT Press) Turing: Pioneer of the Information Age Bitcoin Basics: Cryptocurrency, Blockchain And The New Digital Economy (Digital currency, Cryptocurrency, Blockchain, Digital Economy) Photography: Complete Guide to Taking Stunning,Beautiful Digital Pictures (photography, stunning digital, great pictures, digital photography, portrait ... landscape photography, good pictures) Photography: DSLR Photography Secrets and Tips to Taking Beautiful Digital Pictures (Photography, DSLR, cameras, digital photography, digital pictures, portrait photography, landscape photography) The New Testament and the People of God/ Christian Origins and the Question of God, Vol.1 (Christian Origins and the Question of God (Paperback))