Palaeontologia Electronica
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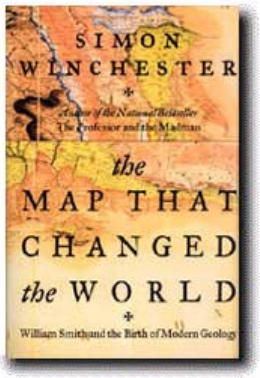
The Map That Changed the World: William Smith and the Birth of Modern Geology
by Ben Waggoner

Simon Winchester
HarperCollins, 2001, 352 pp.
ISBN: 0060193611, $26.00

Ever since the runaway success of Dava Sobel's 1995 book **Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time,** there has been a proliferation of popular books that focus on the history of a single invention or discovery, generally one so widespread that it never would occur to most people even to ask how it came to be. Most of these books center on a biography of a lone, forgotten genius who first made the great discovery that changed the world, sometimes in the teeth of huge obstacles. The titles say it all: Amir Acsel's **The Riddle of the Compass: the Invention that Changed the World;** Lucy Jago's **The Northern Lights: The True Story of the Man Who Unlocked the Secrets of the Aurora Borealis;** Cherry Lewis's **The Dating Game: One Man's Search for the Age of the Earth;** Simon Garfield's Mauve: **How One Man Invented a Color That Changed the World;** and so on. Think of them as the scientific equivalent of VH1's Behind the Music.

Simon Winchester's book **The Map that Changed the World: William Smith and the Birth of Modern Geology** is yet another example of what someone once called the "Small-Things-Mean-A-Lot" genre. It describes the origin of geologic maps and stratigraphy, and charts the life of William "Strata" Smith—the lone genius who invented them both and changed the world, as Winchester tells it. William Smith's name is hardly obscure; anyone who has been through a historical geology course has been introduced to Smith's "Law of Faunal Succession" and his geologic map. Yet little is generally known about his life and how he hit upon his ideas. Winchester tries to restore Smith to his rightful glory with this book.



Winchester tells Smith's life story, starting from his humble childhood in the village of Churchill in Oxfordshire. We see Smith as a child, raised by his uncle after his father died and his mother remarried, playing marbles with fossil brachiopods ("pundibs") and watching fossil sand dollars ("poundstones") being used to weigh butter. We see him as a young man, learning surveying as an apprentice, and working as a landscape architect and coal mining geologist before taking his most

famous job: canal surveyor. Smith's experiences at the coal mines of High Littleton receive a lot of attention, as Winchester explains how Smith hit upon what we would now call lithostratigraphy and biostratigraphy. After six years as a canal surveyor in Somerset, Smith lost his job and turned freelance geologist; we see him racing from one end of Britain to the other, taking jobs ranging from mine surveyor to quarry manager to drainage engineer, and constantly gathering data for his great map. Smith is sometimes portrayed as just a canal builder, and canal-building was certainly an important experience in the development of Smith's ideas, but Winchester shows that Smith had a wide range of experience in applied geoscience.

Midway through the book, Chapter 11 interrupts the narrative of Smith's life and traces Winchester's travels along the great Upper Jurassic outcrop that strikes from the Devonshire coast northeast to Yorkshire. This was my own favorite chapter; following in Smith's footsteps and drawing on childhood memories of his own, Winchester shows not only how stratigraphy is traced from outcrop to outcrop, but how the stratigraphy of England has affected its topography, architecture, industry, and even traditional village life. As the story resumes, we see Smith's looming financial troubles (largely of his own making), and his ill-advised marriage to a young woman prone to severe insanity—Smith allegedly destroyed most of the references to her in his own papers, but Winchester darkly whispers that she was a nymphomaniac. Winchester recounts Smith's struggles against class prejudice, as the villainous "armchair geologist" George Bellas Greenough and his fellow upper-class twits in the newly founded Geological Society of London shamelessly plagiarized Smith's map for their own. Forced to sell his fossil collection to the British Museum for a pittance, imprisoned for debt in King's Bench Prison in 1819, and then self-exiled to Yorkshire, Smith finally was rediscovered by the scientific establishment. A triumphant return to London culminated in his receiving the first Wollaston Medal from the Geological Society, in 1831. Like Job, William Smith's latter end was even more blessed than his beginning, and then he died, being old and full of days.

Winchester's book is essentially a tale of "just one man, doing it all by himself, imagining the unimaginable" (p. 193)—struggling against incredible odds to bring his creation to life. He depicts a monolithic Church Establishment, implacably hostile to the inexorable advance of Science and Reason, clinging tenaciously to an Earth less than 6000 years old. Winchester describes society as "still in the firm grip of purblind churchly certainty" (p. 41). He labels people who were so unenlightened as not to embrace modern historical geology as "dreamily unscientific" (p. 112) and trapped by "the kind of faith that is no more than the blind acceptance of absurdity" (p. 134), and their opponents as "a few bold and more radically inclined thinkers" (p. 24). He also vividly describes the crushing class prejudice that Smith had to face, and the snubs he received from his "betters" in the Geological Society (although he also tells of the great help Smith had from more than one upper-class nob). This viewpoint is one that many readers will enjoy. We seem to like mythic tales of one lone hero, battling tenaciously against every obstacle, in a never-ending quest to realize his grand dream and transform the lives of all humanity. It doesn't seem to matter whether the hero is William Smith, Galileo, Darwin, Pasteur, Howard Roark, or Luke Skywalker.

But serious historians of science no longer approve of this approach. The "Lone Genius" story of scientific progress is not an accurate one. Historians now recognize that social and religious forces interplay and intermingle with science in ways much more complex than the "black-and-white" model. Most now focus on questions such as how and why scientific knowledge is created and comes to be accepted, and how the content and practice of science are affected by its social context. This is something Winchester doesn't really grapple with. He does show how Smith's work was made possible by the Industrial Revolution, which spurred mining and canal construction; and he does depict the impact of Britain's class system on the reception of Smith's work. But he depicts Smith so much as a "Lone Genius" that he's not always clear on how Smith's contacts in the scientific community may have influenced his conclusions.

For example: probably the best-known geologist in the world during Smith's active lifetime was the German geologist Abraham Gottlob Werner. Werner's "Neptunism" has come in for quite a bit of ridicule from some historians, including Winchester, who briefly dismisses his ideas as "arrant nonsense" (p. 226). But Werner and his pupils—who modified his ideas in many ways, rather than forming a uniform bloc—were the first to define "formations" as historical entities, not just distinctive bodies of rock. They stressed the importance of mapping, using different colors to map the extent of different formations. Many of his pupils used fossils in their correlations and mapping—even Werner's predecessor J. C. Füchsel (1722-1773) relied on distinctive fossils to identify rock layers (Greene 1982, Laudan 1987). Was Smith influenced by Werner's "geognosy"? Laudan (1987) suggests that Smith developed most of his techniques independently from the Wernerians. But Wernerian ideas were circulating in England at the time Smith was active, thanks to the work of people like Robert Jameson, George Bellas Greenough, and Thomas Webster. And Smith was well-placed to hear about them; despite Smith's being shut out of the Geological Society, he read widely, and his friends and contacts included a number of prominent English scientists, most notably Sir Joseph Banks. Was Smith really so isolated as to be completely uninfluenced by the Wernerian school? Was his map really such a bolt from a clear sky? There's also no mention of Cuvier and Brogniart's geologic map of the Paris Basin, published in 1811, four years before Smith's map came out. Did they know of each other's work? (Yes, according to Rudwick (1997), who suggests that Brogniart saw one of Smith's maps during a visit to London in 1802.) How different were Cuvier and Brogniart's geological concepts from Smith's? Were the French stimulated to draw geologic maps for the same underlying reasons of industrialization that Smith was? Many questions like these are never even raised. I can't help but wonder if Winchester thought it would be unpatriotic to mention that German and French geologists were, at the very least, working along almost identical lines as Smith.

Also, despite mentioning that some of Smith's fellow pioneers in geology were churchmen, Winchester tends to portray the Church as the great enemy of enlightenment, wedded to absolute Biblical literalism. The problem is that this isn't historically accurate. Smith himself, "whose agnosticism was well known" according to Winchester (p. 135), believed in the Great Flood. Specifically, he believed that the English strata had been laid down in a series of deluges that swept England from southeast to northwest

(Gillispie 1951; Laudan 1987)—which makes him much more of a catastrophist than Winchester admits.

Finally, there are points where the prose gets just a little too cute—such as the description of a trilobite as "that most attractively lovable lobster-like Paleozoic arthropod" on p. 64, or "the magnificent twirling fantasy of a full-blown ammonite" on p. 118. Much as I like geology, I'm not sure that it's "a field of learning and endeavor that underpins all knowledge, all understanding" (p. xvi) — and as a Precambrian specialist, I was a little annoyed with "the merest smudges of discoloration that are said to be the first single-celled hints of ancient life" (p. 239). There are sections, such as Chapter 5, in which Winchester gets so caught up in announcing just how revolutionary are his hero's great deeds, that he takes a long time to get to the point. And there are a few minor errors of fact. Trilobites did not go extinct before the end of the Carboniferous (p. 64). And as far as I can tell from my own reading, Nicholas Steno did not "give up science in disgust" and retract his estimate of the Earth's vast age under pressure from the Church; he accepted the Biblical Flood as a real event in his geological writings (p. 38; see Gould 1983; Laudan 1987; Moe 1994).Perhaps a popular-level book like this can't go into all the details and controversies with which historians love to wrangle. If you can take the myth-making, the hero-worship, and the occasional bits of purple prose, Winchester's book isn't too bad. It does offer a corrective to several popular misconceptions, such as the notion that Charles Darwin singlehandedly invented evolution from scratch. Its dust-jacket folds out to show a large color reproduction of Smith's map, and its other illustrations are beautifully done. And it provides a generally good explanation of how stratigraphy and correlation work, with a liberal sprinkling of historical anecdotes and footnotes that I personally found fascinating—who knew that James Sowerby is probably the only scientist to have both a flower and a whale named in his honor?.I've often heard the tired old argument from the local creationists that "the rocks date the fossils and the fossils date the rocks, so evolution is based on circular reasoning!" This is why I just donated a copy to the local Baptist college's library; they could stand to read this book. But in the end, **The Map that Changed the World** propagates what I would call a widespread but misleading view of how science was and is done. At the end of his book, Winchester mentions that a more scholarly biography by Hugh Torrens is in the works. Historians of science will probably want to wait for that book to come out for a more detailed and less one-sided account of William Smith's life and work.

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30 August 2002
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Download Citation | THE MAP THAT CHANGED THE WORLD - WILLIAM SMITH AND THE BIRTH OF MODERN GEOLOGY: by Simon Winchester | The Map that Changed the World â€“ William Smith and the Birth of Modern Geology , by Simon Winchester. HarperCollins Publishers Inc., New York, | Find, read and cite all the research you need on ResearchGate.Â Winchesterâ€™s book sympathetically puts William Smith in the context of his time. Born to an Oxfordshire blacksmith in 1769, Smith was an intelligent, ambitious, upwardly-mobile and, it turned out, stubborn man. A generation after James Hutton, and a generation ahead of Lyell, Sedgwick and Murchison, he occupies a unique position in the history of geology. The Map That Changed the World: William Smith and the Birth of Modern Geology Paperback â€“ April 28, 2009. by. Simon Winchester (Author).Â The title of the book might lead you to believe that it's about The Map That Changed the World and how William Smith created it. However, the book is all over the place.Â William Smith and his map may have been the opening shot in the ongoing battle for reason to win out over superstition as creationists still insist on a 6000 year old earth and against evolution. It also shows how hierarchical British science was at the time and remained for many years. Smith, much like James Harrison, had to fight for recognition of his accomplishments. A challenging graded reader about geology and the world's first geological map, for adult English language students and young learners. Part of a free collection of advanced level reading texts designed to help students improve their English through free reading.Â The map shown above gave an unprecedented view of the UK by showing the distribution of rock types in vivid colour. Created solely by English surveyor William Smith, it is based on his discovery that sedimentary rock across southern Britain contains layers that are arranged in a set sequence, from oldest rocks to youngest. What's more, even if sheets of rock from different time periods are of a similar colour, each contains distinctive fossils that can be used to identify the layer. Smith used an innovative shading technique for his map. Rescuing Prometheus: Four Monumental Projects That Changed the Modern World. Read more. Fifty Chairs that changed the World.Â Geology of the Adventdalen map area. Read more. Cod: A Biography of the Fish That Changed the World. Read more. Cod: A Biography of the Fish That Changed the World. Read more. Cod- A Biography of the Fish That Changed the World. Read more.Â INGENIUM This page intentionally left blank MARK DENNY INGENIUM FIVE MACHINES THAT CHANGED THE WORLD t h e j o h n Ã—. Report "The Map That Changed The World, William Smith & The Birth Of Modern Geology". Your name. Email. Reason. -Select Reason- Pornographic Defamatory Illegal/Unlawful Spam Other Terms Of Service Violation File a copyright complaint. Then along came the map that changed the world. On display now. Created in 1815, the world's first geologic map measures 10 by 16 feet and illustrates the individual rock layers that underlie Great Britain. One of only two U.S. copies is now on public display for the first time at the Buffalo and Erie County Public Library in New York State. Only 43 copies of the map still exist. The only other U.S. copy is at the Library of Congress and it is not on public display.Â In addition to the map, canal surveyor William Smith created a series of sketches and descriptions of the fossils found within each specific layer of rock. There are only 11 surviving copies of these pamphlets in the world. "If geology were a religion, this map would be its bible," said University of Buffalo geologist Robert Jacobi.