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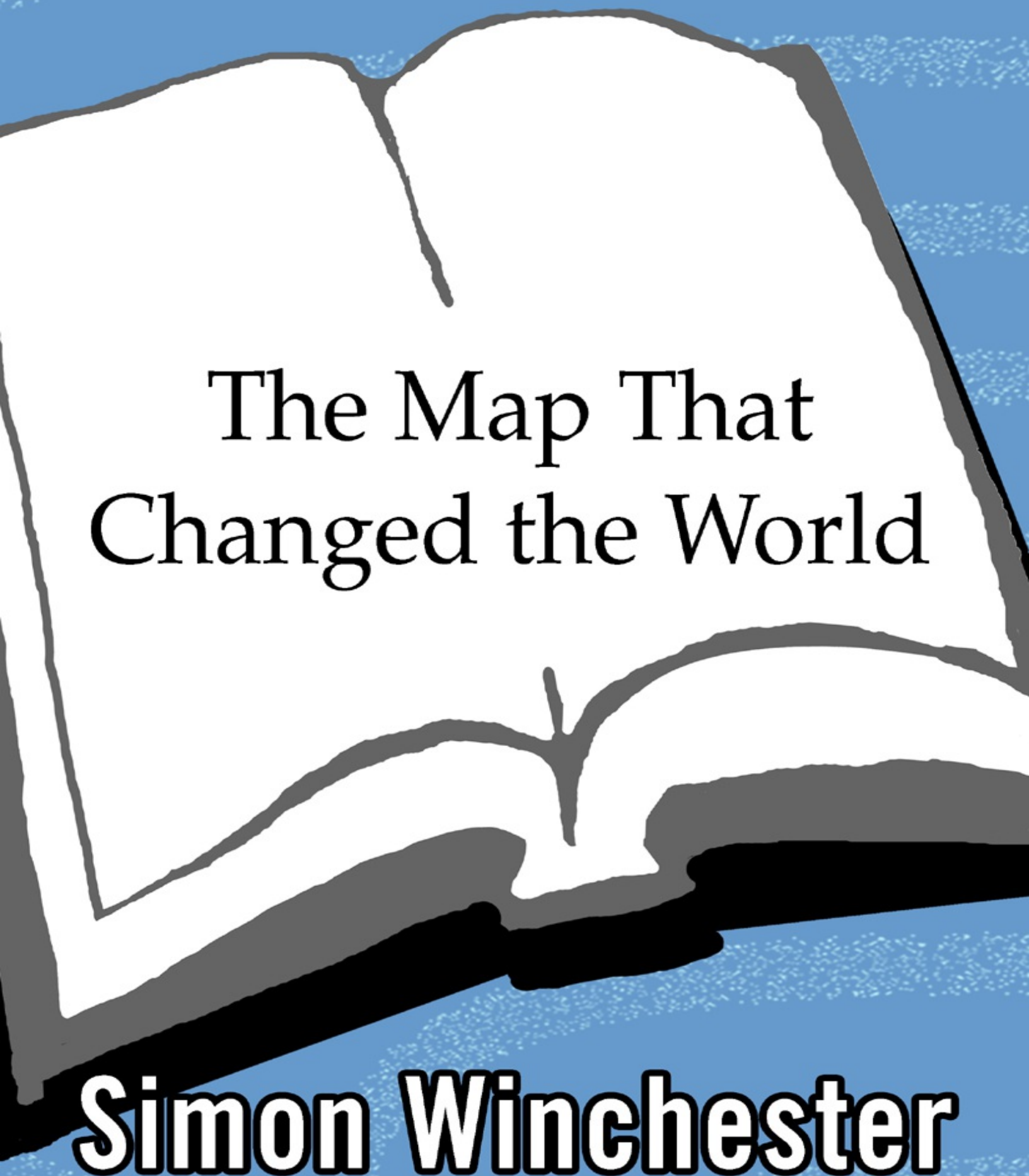

The Map That Changed the World

Simon Winchester

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The Map That Changed the World

William Smith and the Birth of Modern Geology

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FOR HAROLD READING

In days of old, old William Smith,
While making a canal, Sir,
Found out how the strata dipped to the east
With a very gentle fall, Sir.
First New Red Sand and marl a-top
With Lias on its border,
Then the Oolite and the Chalk so white
All stratified in order.
Sing, cockle-shells and oyster-banks,
Sing, thunder-bolts and screw-stones,
To Father Smith we owe our thanks
For the history of a few stones.

Source: Anniversary dinner, A. C. Ramsay, 1854

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Illustrations

CHAPTER-OPENING ILLUSTRATIONS

Incorporated in eighteen of the nineteen chapter openings (including those of the prologue and the epilogue) will be found small line drawings of Jurassic ammonites—long-extinct marine animals that were so named because their coiled and chambered shells resembled nothing so much as the horns of the ancient Egyptian ram-god, *Ammon*. Soun Vannithone's drawings of these eighteen specimens are placed in the book in what I believe to be the ammonites' exact chronological sequence. This means that the book's first fossil, *Psiloceras planorbis*, which illustrates the prologue, is the oldest ammonite, and is to be found deepest down in any sequence of Jurassic sediments; by the same token the final fossil, *Pavlovia pallasioides*, comes from a much higher horizon, and is very much younger. Much like the epilogue it illustrates, it was fashioned last. It must be said, though, that anyone who flips rapidly from chapter to chapter in the hope of seeing a speeded-up version of the evolutionary advancement of the ammonite will be disappointed: Ammonites—floating, pulsating, slow-swimming beasts that were hugely abundant in the warm blue Jurassic seas—do not display any conveniently obvious changes in their features—they neither become progressively smaller with time, nor do they become larger; their shells do not become more complex, or less. True, some ammonites with very ridged shells do indeed evolve into smoother-shelled species over the ages, but these same creatures then become rougher and more ridged again as time wears on, managing thereby to confuse and fascinate all who study them. Only studies of ammonites from successive levels will reveal sure evidence of evolutionary change, and such study is too time consuming for the chance observer. Ammonites are, however, uniformly lovely; and they inspired William Smith: two reasons good enough, perhaps, for including them as symbols both of Smith's remarkable prescience and geological time's amazing bounty. However: eighteen ammonites and nineteen chapter

openings? There is one additional illustration, of the microscopic cross-section of a typical oolitic limestone, which I have used to mark the heading for chapter 11. Since this chapter is very different in structure from all the others, and since much of its narrative takes place along the outcrop of those exquisitely lovely, honey-colored Jurassic rocks known in England as the Great Oolite and the Inferior Oolite, it seemed appropriate and reasonable to ask the legions of ammonites, on just this one occasion, to step—or swim very slowly—to one side.

Chapter Eleven: Oolitic Limestone

Text Illustrations

A Note on the Map Insert

The brilliance of William Smith's achievement can be amply demonstrated by comparing his great map of 1815 with the one produced today by the British Geological Survey. The similarity of so much of the detail—visible even at a scale where much cannot be seen—is proof absolute of the accuracy and prescience of Smith's work, yet does not admit of the one signal difference between the two productions: that while the survey map is the fruit of the labors of thousands, William Smith's map, drawn a century and a half before, is the result of the dedication and determination of one man who worked for almost twenty years, always entirely alone.