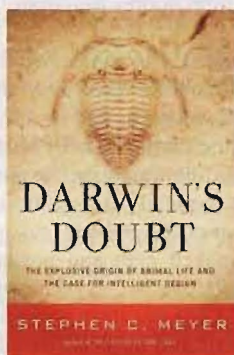


Books, Arts & Manners

How Nature Works

JOHN FARRELL



Darwin's Doubt: The Explosive Origin of Animal Life and the Case for Intelligent Design,
by Stephen C. Meyer
(HarperOne, 512 pp., \$28.99)

OUR contemporary debates about evolution are basically an extension of the argument Christians have been having with one another since the Middle Ages, about how much autonomy God granted to the natural world. Creationists claim that it was very little.

Stephen C. Meyer, a philosopher of science at the Discovery Institute in Seattle, is not a creationist in the standard definition of the term: He does not embrace the Genesis account of the world's origins literally, nor does he argue that God made the world in six days. What he does is reject two bedrock principles of modern evolutionary biology: the common ancestry of all living things, and natural selection as the driving force of the evolution of new species. If you reject these two notions of evolutionary biology, then by default you're left with only one alternative: the discrete interventions of an intelligent agent, a Designer, to explain the origin and diver-

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sification of life.

In his new book, Meyer argues that evolutionary theory, ever since Darwin's day, has been stymied by a puzzle: the "sudden" appearance of diverse animal phyla, or body plans, in the Cambrian period, which began roughly 540 million years ago. That's when all of the major body plans from which all currently existing classes of animals descend came into existence. According to most paleontologists today, the Cambrian explosion, or radiation, lasted at least 20 million years, but probably longer.

But Meyer contends that it was a much shorter time period: probably as little as 5 million years. And that's an explosion of diversity that is too sudden, too rapid to be adequately explained by Darwinian evolution. For this reason, Meyer argues, Intelligent Design is a more likely explanation. By Intelligent Design, Meyer means some kind of Mind or Intelligence that wrote the genetic code that allowed the explosion of new life forms.

Meyer sets the stage by recalling Darwin's own grappling with the Cambrian challenge: "Darwin . . . suggested that the fossil record may be significantly incomplete: Either the ancestral forms of the Cambrian animals were not fossilized or they hadn't been found yet. 'I look at the natural geological record, as a history of the world imperfectly kept, and written in a changing dialect,' Darwin wrote." This did not satisfy Darwin's contemporary, paleontologist Louis Agassiz—an early evolution skeptic who, Meyer points out, offered good reasons for expecting a better explanation. "Since the most exquisitely delicate structures, as well as embryonic phases of growth of the most perishable nature, have been preserved from very early deposits, we have no right to infer the disappearance of types because their absence disproves some favorite theory," Agassiz wrote in 1874.

This is a challenge that hasn't gone away, says Meyer, who names "several features of the Cambrian explosion that are unexpected from a Darwinian point of view" and need to be explained by defenders of Darwinian evolution, among them "the sudden appearance of Cambrian animal forms," "an absence of tran-

sitional intermediate fossils connecting the Cambrian animals to simpler Precambrian forms," and the fact that the "radical differences in form in the fossil record before more minor, small-scale diversification and variations" turn on its head "the Darwinian expectation of small incremental change only gradually resulting in larger and larger differences in form."

But Meyer's "sudden" is strikingly at odds with what today's paleontologists consider "sudden." And the event was more complex than Meyer allows: As geologists have improved their knowledge of the events of the late Precambrian-early Cambrian, they have realized that it included a particular series of steps.

The starting point was the large, soft-bodied, late Precambrian Ediacaran/Vendian fauna. Then came the first two stages of the Cambrian (Nemakit/Daldynian and Tommotian), where some of the Cambrian explosion began: We see brachiopods, archaeocyathids, early mollusks and echinoderms, and a large fauna of "little shellies" that show the beginnings of skeletonization. All of these stages have been part of the discussion of the Cambrian explosion over the last few decades. Meyer tries to claim that this is not the conventional understanding, but he does not make a very convincing case. He goes on to discuss the third stage of the Cambrian (Atdabanian) as if it were the complete Cambrian explosion—and finds it astonishing that most of the phyla were established by then.

In a 2006 article in the *Annual Review of Earth and Planetary Science*, Charles R. Marshall of the University of California, Berkeley, one of today's leading paleontologists, gives a fairly comprehensive overview of the topic. He diagrams a radiation of animal forms that shows a great deal of continuous evolution over a 50 million-year Cambrian period, from 542–43 million years ago to 490 million years ago. (Meyer doesn't discuss this interpretation, but he quotes Marshall on some other issues.)

Consider again the alleged absence of transitional intermediate fossils con-

necting the Cambrian animals to simpler Precambrian forms. Meyer argues that Darwinian scientists have no explanation for this; indeed, just as Darwin once did, they've tried to dismiss this challenge by falling back on the convenient hypothesis that the fossil record was poorly preserved and/or had been insufficiently sampled. Meyer:

Developmental biologist Eric Davidson, of California Institute of Technology, has suggested that the transitional forms leading to the Cambrian animals were "microscopic forms similar to modern marine larvae" and were thus too small to have been reliably fossilized. Other evolutionary scientists, such as Gregory Wray, Jeffrey Levinton, and Leo Shapiro, have suggested that the ancestors of

the Cambrian animals were not preserved, because they lacked hard parts such as shells and exoskeletons. They argue that since soft-bodied animals are difficult to fossilize, we shouldn't expect to find the remains of the supposedly soft-bodied ancestors of the Cambrian fauna in the Precambrian fossil records. University of California, Berkeley, paleontologist Charles R. Marshall summarizes these explanations . . .

Meyer then quotes Marshall:

It is important to remember that we see the Cambrian "explosion" through the windows permitted by the fossil and geological records. So when talking about the Cambrian "explosion," we are typically referring to the appearance of large-body (can be seen by the naked eye) and preservable (and therefore largely skeletonized) forms. . . . If the stem lineages were both small and unskeletonized, then we would not expect to see them in the fossil record.

I went to Marshall's paper and discovered that this passage had been lifted out of context, with the final statement—the part after Meyer's ellipsis—tacked on from *15 pages later in the article*, a section in which Marshall was commenting on a detailed diagram outlining the various factors scientists deem relevant to understanding the entire Cambrian explosion. The implication of the cut-and-paste quote in Meyer's account is that a leading paleontologist is, like his colleagues, trying to explain away a significant challenge to evolution: the lack of intermediate forms in the Precambrian period. But in fact, Marshall was not doing that. Here are the key missing words from Marshall's passage that would have appeared immediately before Meyer's ellipsis:

Finally, I place the word "explosion" in quotation marks because, while the Cambrian radiation occurred quickly compared with the time between the Cambrian and the present, it still extended over some 20 million years of the earliest Cambrian, or longer if you add in the last 30 million years of the Ediacaran and the entire 55 million year duration of the Cambrian.

The passage Meyer lifted has nothing to do with intermediate life forms—

SPRING

My enemy had hatched her young,
Made real the heady boasts she'd sung,

And when I saw the cherished thing,
I vowed it would not fly or sing.

My talons tightened in its fluff.
Their points were digging deep enough

That blood and dung and shrieks sprang out—
This wasn't what I'd thought about

All those weeks in my moldy hollow.
No, by all rights it didn't follow

That, blood to blood, its heart, my pulse
Battered each other. It convulsed

Against no claws or hard joints now
But two plain, helpless hands. Yet how—

When, quickly as a lamp is lit,
It grew, then slashed and gouged and bit

Up in the harrow of the air—
Was I to take my prey back there?

I struck, I buckled. He might know,
Who hung, millennia ago

From nails like mine but did not leave
Even the predator to grieve.

But where was He? Nothing below
Appeared but damp trees, ragged snow,

Dead reeds—a dead end like a cave;
Like smoke, for all the light it gave.

My wings were shriveling, but I
Must make my way through that cold sky

To somewhere that could hardly be,
With what I'd taken into me.

—SARAH RUDEN

missing or not—in the Precambrian.

Nor is this the only example of misleading quotation. Meyer makes the case that Darwinian evolution cannot explain how the underlying genetic circuitry of animal body plans, bursting forth at the time of the Cambrian, came about. Developmental gene regulatory networks (dGRNs), he writes, resist Darwinian mutational change because they are organized hierarchically: “This means that some [dGRNs] control other gene regulatory networks, while some influence only the individual genes and proteins under their control. At the center of this regulatory hierarchy are the regulatory networks that specify the axis and global form of the animal body plan during development. These dGRNs cannot vary without causing catastrophic effects to the organism.”

Meyer argues that a dGRN could not be altered by gradual mutational changes. He then cites a passage from a 2011 paper by Caltech cell biologist Eric H. Davidson to support his case that such dGRNs have minimal flexibility and cannot evolve the way Darwinian evolution would expect. The quote is from the end of a long passage in the paper “Evolutionary Bioscience as Regulatory Systems Biology,” where Davidson indeed outlines the challenge posed by the lack of flexibility of gene regulatory networks. *But Davidson doesn’t stop there.* To Meyer’s point, he argues: “The basic control features of the initial dGRNs of the Precambrian and early Cambrian must have differed in fundamental respects from those now being unraveled in our laboratories. The earliest ones were likely hierarchically shallow rather than deep, so that in the beginning adaptive selection could operate on a larger portion of their linkages.”

In other words, there’s no reason here to throw out the theoretical basis of evolutionary biology. There is a likely explanation: The gene regulatory networks that determine the basic body plan were not yet buried deep in the developmental process. So this issue is not regarded by paleontologists as an insurmountable problem for evolution.

At no point in the book does Meyer ever actually discuss these issues with Marshall, or Davidson, or any of the scientists working deeply in the field.

He simply lifts quotes from their papers as they seem convenient to his point.

This is the most disappointing aspect of Meyer’s book. It’s hard to read a book like *Darwin’s Doubt* in parallel with, for example, a book like *New Yorker* writer Jim Holt’s *Why Does the World Exist?* Holt spent months chasing down and interviewing a wide range of philosophers and scientists—simply to get their answer to the age-old question: Why is there something rather than nothing? It’s a delightful, thought-provoking read for all the reasons that Meyer’s is not. Holt lets none of his subjects off the hook—politely, but persistently, questioning their opinions and assertions.

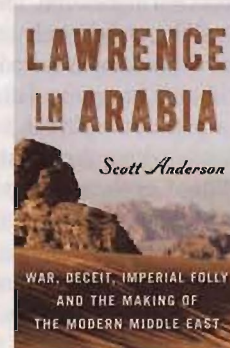
In the last part of the book, Meyer criticizes what he believes to be scientists’ bias against ID, the predisposition never to entertain it as an explanation for the Cambrian Explosion: “They have accepted a self-imposed limitation on the hypotheses they are willing to consider. . . . If researchers refuse as a matter of principle to consider the design hypothesis, they will obviously miss any evidence that happens to support it.” But the notion that scientists are not open to the possibility of agent action in the world is not accurate. In 1967, Jocelyn Bell Burnell, a graduate student in astrophysics at Cambridge, discovered a radio signal coming from the Crab Nebula. It was a fantastically rapid pulse—too rapid to be natural, it was first believed. That it might be the work of an intelligence was seriously considered—until the lack of variation in the beacon-like pulses, accompanied soon by the discovery of other sources sending similar beams toward earth, persuaded scientists that there was likely a natural explanation. Ultra-dense stars called “pulsars” are now considered the culprits.

In the end, *Darwin’s Doubt* boils down to a fundamentally weak argument—the argument from personal incredulity about the origin and evolution of life on earth. As John Henry Newman wrote in 1870: “I have not insisted on the argument from design. . . . To tell the truth, though I should not wish to preach on the subject, for 40 years I have been unable to see the logical force of the argument myself. I believe in design because I believe in God; not in a God because I see design.”

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The Myth Maker

DAVID PRYCE-JONES



Lawrence in Arabia: War, Deceit, Imperial Folly, and the Making of the Modern Middle East,
by Scott Anderson (Doubleday,
592 pp., \$28.95)

LAWARENCE OF ARABIA enjoys a prominent place in the mysterious and self-perpetuating realm of myth. This remarkable achievement has always depended on the impression he left of himself as both hero and victim. He was able to persuade influential friends and opinion-formers to take him at his word, and many still think it rather poor taste to ask awkward questions about whether he did more harm than good.

Realistically, Lawrence was a British intelligence agent of middling rank and demonic temperament operating in World War I in the Arab provinces of what was then the Ottoman Empire, Germany’s voluntary ally. Only a few experts knew anything about those provinces, and some of them, up to and including Lord Kitchener, secretary of state for war, devised a strategy of weakening the Turks by fomenting rebellion among their Arab subjects.

The principal Arab leader considered likely to fall in with the British strategy was the Sharif Hussein, a tribal chief in Mecca. His longstanding ambition had been to lay hands on enough of the Arab

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