

Surprise surprise!

Joseph Ford

Complexification. By John L. Casti. HarperCollins: 1994. Pp. \$25.00. To be published in the United Kingdom by Abacus on 1 December at £7.99.

WHEN a scientist reviews a book in his area written for a general audience, he first scans the index for reference to his name and works. He then peruses the chapter closest to his heart, checking for coverage and technical accuracy. Finally, he browses through the rest of the book, paying special attention to any novel ways of presenting technical material and clever ways of aiding understanding for the novice, as these are items that might prove useful in his own teaching and writing. Whether or not these remarks are too jaundiced, readers of the following review are advised to bear in mind the biases a scientist wears as permanent equipment. Recall that the scientific reviews of James Gleick's *Chaos*, for example, were cool to hostile, whereas everyday readers kept it on the *New York Times* bestseller list for months, forcing it into innumerable re-printings. So, with the sides now clearly drawn, let the battle begin.

John Casti brings impressive credentials to the task of writing another book for a general audience on complexity. He is not only multi-degreed but also closely linked with the Sante Fe Institute, a recognized hotbed of complexity. Moreover, he has written several earlier books in this genre

that have been well received. The technical coverage in his latest book is extremely broad and he is highly ingenious in finding effective ways to lead the novice gently into technical areas. With all these factors going for it, what could possibly go wrong? In this regard, recall that the first edition of Herbert Goldstein's *Classical Dynamics* was 'lean and mean' and became the text of choice for several decades. But then popularity led to a revised edition all fat and bloated and "sicklied o'er with the pale cast of thought". *Complexification* is not fat and bloated but it does show the strain of Casti's inventing a new slant for reviewing much the same technical material as he covered earlier.

The subtitle, "Explaining a Paradoxical World Through the Science of Surprise", defines the theme of the book. Indeed, mention of the surprise generated by this or that scientific result is common and a section labelled "The Science of Surprise" appears near the end. Yet I can say without equivocation that I had no knowledge of a science of surprise before starting this book and I have none now. But this disappointment was only one of several that gave me the feeling that the book is imbued with too much and too little thought. For example, not only did I find the early chapter on catastrophe tough going, but as I turned the pages I found myself feeling an acute sense of *déjà vu*. Only later did I notice that it was caused by eight sequential, almost identical drawings of the cusp catastrophe.

On the brighter side, Casti introduces a useful section entitled "To Dig Deeper" to which the reader is referred when the text

discussion has reached the limits of popular presentation. This device is on the whole used sparingly, although in the last quarter of the book it becomes annoyingly frequent. The ploy has some of the character of a flash-card section at a sporting event. And I must draw attention to two technical matters. Casti reproduces all but the punch line of Turing's proof of the halting theorem from which he infers the existence of noncomputable numbers; following this questionable manoeuvre, he then offers the Turing theorem without proof. More seriously, Casti has a field day with the word 'random'. 'Random' itself is followed by 'truly random', 'deterministically random', 'pseudorandom' and 'everyday' or 'real-world random'. For the most part, readers are left to fend for themselves in distinguishing between these terms. Moreover, Casti uses his notions of randomness to prove that chaos is only 'apparently' random, with 'apparently' left undefined. His proof will probably generate a great deal of unintended surprise in the minds of many.

Despite my criticisms, this is not a bad book. A reader can learn much from it. But equally, it cannot be regarded as a good book when compared with the competition, including the author's own earlier works. Even the best of writers has a bad day, however; perhaps a future edition of this work will violate the usual rule and provide the surprise of being better than the original. □

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Tiger (c. 1830), one of several watercolour "portraits" of tigers and lions painted by Eugène Delacroix. The picture is taken from *Noble Beasts: Animals in Art*, a gathering of pictures from the National Gallery of Art in Washington, DC. Included are paintings

by Rubens, Boucher, Manet, Renoir, Gauguin, Bonnard, Vuillard and Hopper. Each work is accompanied by a literary excerpt, by authors such as Homer, Milton, Blake, Yeats and Lawrence. Contains 59 colour plates. Bullfinch/Little, Brown, \$24.95.