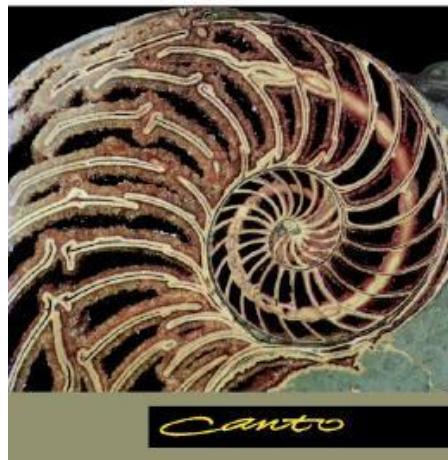


On Growth and Form

D'ARCY THOMPSON



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D'Arcy Wentworth Thompson, John Tyler Bonner (Editor)

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Why do living things and physical phenomena take the forms they do? Analyzing the mathematical and physical aspects of biological processes, this historic work, first published in 1917, has become renowned as well for the poetry of its descriptions.

On Growth and Form Details

Date : Published July 31st 1992 by Cambridge University Press (first published 1917)

ISBN : 9780521437769

Author : D'Arcy Wentworth Thompson , John Tyler Bonner (Editor)

Format : Paperback 368 pages

Genre : Science, Biology, Nonfiction, Evolution, Mathematics, Philosophy

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Akshit Seth says

Really nice work on mathematical biology, must-read for everyone who wants to learn about patterns that emerge in Nature. On the whole, the book focuses on empirical and analytical studies of emergent biological phenomena.

Lorne Rothman says

"On Growth and Form" is a brilliant piece of scientific literature written by a true renaissance man. This remarkably varied book describes the wondrous diversity of patterns we see in nature, yet helps us to see the unity in their origins, through detailed explanations of the simple, common rules that govern the development and structure of all living organisms.

Written in 1917, "On Growth and Form" was ahead of its time, and was surely a seminal piece in the development of complexity theory and the understanding of self-organizing systems.

I highly recommend this book for those who wish to better understand the unity that lies beneath the bewildering diversity in our natural world.

Fred says

I read the modern reprint by Dover. I highly recommend this classic book, but I also recommend anyone avoid the Canto abridged edition pictured here.

Elliott Bignell says

This is one of the most beautifully written works of science that I have had the luxury of reading, the prose style comparable to Gould at his best but with some of the clarity of Dawkins. It is also lavishly illustrated. Unfortunately, the author seems to have been a bit of an evolution-sceptic, and while he does not come out and say so, it is indicated in the introduction that he intended his principles to stand as an alternative explanation for structures in nature.

Thompson's drive, however, is entirely in the spirit of legitimate scientific enquiry, in that he seeks to place the study of structures on a numeric basis. Just as equations can be written to plot the movements of the planets, so he hopes that the understanding of natural forms can be understood as an engineering discipline. He probably doesn't get everything right, but it is surprising how much ground he covers and just how many insights he delivers. From what I understand, much of his thinking has been absorbed into evo-devo and remains very relevant and useful. He never created a successful challenge to natural selection, in my opinion, but he certainly provides a basis for understanding some of its constraints.

One niggle: Thompson was of an age where classical learning could still be taken for granted, and a stylistic tripwire for the modern reader is that he speaks Latin, Greek, French, Italian, German and probably Martian, and liberally sprinkles the text with untranslated fragments of nearly all the above.

A must.

Nigel_s says

A beautiful and bountiful book, I have spent many hours since reading it the first time just looking at the pictures.

Peter says

A science classic. The meaning of form. Invention of chaos: A science masterpiece. Written during WWI, revised during WW2. An amazing amount of knowledge, viewed through the eyes of an incredibly perceptive scholar and scientist. Early 20th century writing style. Greek, Latin, French and German citations. From the prefatory note: "an easy introduction to the study of organic Form, by methods which are the common places of physical science, which are by no means novel in their application to natural history, but which nevertheless naturalists are little accustomed to employ." Thompson's theory of transformations is covered in the last chapter.

Edward says

Foreword: This Was a Man, by Stephen Jay Gould

The Editor's Introduction, by John Tyler Bonner

--On Growth and Form [Abridged]

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Stephanie Kesler says

This may be the most monumental read of my adult life. This book is not for the faint of heart. But, oh, the miracle that is this book. The work is considered by many to be the greatest work of scientific literature of the 20th century.

One note: I read the abridged version which is a mere 321 pages in comparison to the 1100+ page full version. But as Stephen Jay Gould wrote in his jewel of an introduction:

"Much as it must pain any scholar and publisher of integrity to abridge such a work (for such an act does resemble the dissection of a body), one must not as Jesus told us, 'light a candle and then place it invisibly under a bush.' 'On Growth and Human Form' is one of the great lights of science (and of English prose); it must be available at an affordable price and a totable heft: 'Let your light so shine before men, that they may

see your good works."

The overall coordinating theory: that form and growth follow physical forces is presented all the way from single celled protozoa through the largest mammals and man.

The last chapter, which is considered the most influential, is a joy and masterpiece.

The first edition of the book was published in 1914 and then update in the early 40's. So, the genetic revolution is not really what this book is about. Instead, it's about physics and engineering in the development of living organisms.

I will never again look at quadruped without thinking of bridges, cantilevers, and the bridge over the Firth of Forth. I will never again look at the skull of a mouse and then a human without thinking of warping systems of coordinates.

This book will be with me for the rest of my life.

Christopher says

This book is a meticulous work that's both thought provoking and inspiring in its scope. There are plenty of profound, even poetic, insights scattered throughout a density of seemingly sterile precision. An especially interesting holism can be found in the chapter titled 'On the Theory of Transformations, or the Comparison of Related Forms' : "With the 'characters' of Mendelian genetics there is no fault to be found; tall and short, rough and smooth, plain or coloured are opposite tendencies or contrasting qualities, in plain logical contradistinction. But when the morphologist compares one animal with another, point by point or character by character, these are too often the mere outcome of artificial dissection and analysis. Rather is the living body one integral and indivisible whole, in which we cannot find, when we come to look for it, any strict dividing line between the head and the body, the muscle and the tendon, the sinew and the bone. Characters which we have differentiated insist on integrating themselves again; and aspects of the organism are seen to be conjoined which only our mental analysis had put asunder." Thompson was the enlightened type of scientist, able to see both a whole for its parts and parts on the whole- I have yet to find a better work of scientific literature.

Feliks says

I tend to despise hard science and life science, I hold it in much less favor than social sciences. I'm rarely a reader of scientific tracts. The ones I have read, have usually proved edifying and informative but never electrifying or entralling. Welcome to one of the rare exceptions to that rule. This book is one such; and you will find it so, as well. It more than lives up to its glowing reputation; in just the first chapter --and barely thirty pages in--I find my eyes wide as saucers and gooseflesh raising the hackles on my forearms.

In the current day we live in, we are so glutted with frenetic popular-science babble ...and all the chatter is always about the puniest latest toy-tech, the trifling, the superficial. It dulls our sense of true wonder. We hear about the latest gadgets and updates but none of this is ever transformative. What's the difference

between a DVD and a CD? Nothing. It's just marketing. It's not pioneering at all. Yet our gaze is always fixed on all such man-made trinkets. *But Men do not make the world we actually live in. Nature always does and always will.*

This is one of those few books which reminds you about the extraordinary mechanics which underpin the reality which actually governs our lives. Everyone's lives. How do we walk? How do we lift a weight? Why are things sized and scaled and shaped the way they are? Why do pumpkins and melons grow only on ground; why are trees never any taller than three hundred feet; why are mice the smallest mammals? How can a dog carry three times its weight but a horse can hardly bear half?

All these observations and hundreds more fill these --sharpening your senses as you flip each page --and it makes you read slowly and with delight and savor. Afterward, you will learn why a pachyderm femur must assume the same profile as a cargo crane, and why both of which must curve like a feather from a hummingbird's wing. You will grasp why things look the way they do and cease merely noting that they do oddly, look the same. It doesn't happen by chance or whim. This book doesn't merely dwell on facts; it imparts long-lasting *meaning* and *reason*.

And, it's all written in beautiful, extraordinary turn-of-the-19th century elocution. Very fun (in-and-of-itself) to listen to with your 'inner ear'. The kind of technical verbiage is poetry; and the commentary a swell--not just cold, matter-of-fact recitation but a fierce and passionate history of intellectual men of the 1800s and their individual ambitions for knowledge and mastery. The book is a dramatic history of one man's arguments defeating another man's arguments and the resulting progress.

This work is amazing in its power to reawaken curiosity. It clobbers the tyranny of the image and the snapshot. Too many answers has made us fat and complacent. We're content to look at pictures all day long; and skim lamebrain lowbrow encyclopedias, rather than question anything ourselves anymore. It's our duty to be curious about the world but lately we let ourselves be spoon-fed.

Forget the internet. Forget jpgs. Forget txts. Forget all this picayune, glam, insipid, man-made prestidigitation.

Keep THIS BOOK on your shelf as a remind on how to THINK.

Barry Behrstock says

This is the classic on the subject

Bill Daniels says

One of my double armful of totally mind blowing books on my shelves!

Carol Collins says

1961 version, abridged

James F says

This is an abridged version; the 1942 edition is over a thousand pages. The editor has taken advantage of the abridgement to cut out passages he considers outdated. The book is apparently considered a classic of sorts; it deals with the growth and forms of living organisms, from microbial life to the bones and skeletons of larger animals in terms of mathematical and physical patterns. It was actually quite interesting; although the author occasionally engages in polemics against "natural selection" which he considers to be a catchphrase for ignoring the specific development of various organisms, the patterns he suggests actually can be explained in terms of modern genetics as differential rates of growth in the course of development and so on. Undoubtedly purely mechanical causes do explain much of morphology -- how else could the genome regulate so many different features? He deals mainly with math and physics, with much less chemistry than one would expect -- of course DNA was not yet identified as the genetic material, much less analyzed.
