

Contents

1	The Importance of Shape	I
	Form, Structure, Time, and Function	
	Properties Scales of Size and Time	
	The Mechanical Viewpoint	
2	The Mechanics of Shape	18
	One-, Two-, and Three-Dimensional Shapes	
	Cross-Sectional Shape and Mechanical	
	Properties	
3	Materials and Their Mechanical Properties	38
	Stress and Strain Deformability, Toughness,	
	and Brittleness Deformability and Water	
	Content Anisotropy in Biomaterials	
4	Structural Systems of Shaped Elements	59
	Branched Cylinders Hydrostats	
	Kinetic Frameworks	
5	The Origin of the Cylindrical Body Shape	81
	Feature 1: Extracellular Polymers	
	Feature 2: Cross-Linking of the Polymers	
	Feature 3: Parallel Orientation of Fibers	
	Feature 4: Cylindrical Body Form	
	Alternative Forms	

6 Plants and Animals Today	99
The Shapes of Organisms Increasing Size and Distribution of Materials Evolution of Whole-Animal Design	
Envoi	119
Bibliographic Note	123
References	125
Illustration Sources	129
Index	131

Structure without function is a corpse and
function without structure is a ghost.

Vogel and Wainwright, 1969

