Pre	Preface	
Ι	HISTORICAL SURVEY AND INTRODUCTION TO THE THEORY OF MINIMAL SURFACES	1
	§1. The Origins of Multidimensional Variational Calculus.	1
	§2. The Nineteenth Century, the Era of the Discovery of Basic Minimal Surface Properties.	7
	 Plateau's physical experiments and methods of forming soap films. 	7
	 Physical principles underlying the formation of soap films. The extremal properties of soap films and minimality of their area. The properties of the surface of separation between 	11
	two media. 4. The surface of separation between two media in	13
	equilibrium is a surface of constant mean curvature. 5. Soap films of constant positive curvature and constant zero	16
	curvature.	19
	§3. Topological and Physical Properties of Minimal	
	Surfaces.	20
	1. Stable and unstable surfaces.	20
	2. Plateau's experiments with stable columns of liquids.	22
	3. The physical realization of a helicoid.4. The physical realization of a catenoid and its restructuring	27
	as the boundary contour changes.	30
	The change of the topological type of minimal surface in	
	accordance with its stability or instability.	34
	§4. The Plateau Principles. Minimal Surfaces in Animate Nature.	49
	1. Two-dimensional minimal surfaces in three-dimensional space and the first Plateau principle.	49

	2. The area functional, Dirichlet functional, harmonic mappings and conformal coordinates.	. 51
	3. Singular points of minimal surfaces and three Plateau	
	principles. 4. The realization of minimal surfaces in animate nature.	55 60
II	SURVEY OF SOME IMPORTANT	
	PUBLICATIONS IN MINIMAL	
	SURFACE THEORY FROM THE	
	NINETEENTH TO THE EARLY	
	TWENTIETH CENTURY	65
	§1. Monge (1746–1818).	65
	§2. Poisson (1781–1840).	74
	§3. Plateau (1801–1883).	83
	§4. Some works of the Early Twentieth Century Radó, Douglas).	122
	§5. Minimal Surfaces in the Large.	123
Ш	SOME FACTS FROM ELEMENTARY TOPOLOGY	150
	of the state of the soft to do to the control of th	173
	§1. Singular and Cellular Homology Groups.	173
	1. Singular chains and homology groups.	173
	2. Cellular complexes, barycentric subdivisions.	176
	3. Cellular homology and computation of the singular	
	homology of the sphere. 4. Theorem on the coincidence of the singular and cellular	180
	homology of a finite complex.	184
	5. The geometric determination of cellular homology groups.	186
	6. The simplest examples of cellular homology group computations.	189
	§2. Cohomology Groups and Obstructions to the	
	Extensions of Mappings.	192
	1. Singular cochains and the coboundary operator.	192

	2. The problem of the extension of a continuous mapping	
	from a subspace to the whole space.	194
	3. Obstructions to the extension of mappings.	194
	4. The cases of the existence of the retraction of a space onto	
	a subspace which is homeomorphic to the sphere.	199
	References and Bibliography	204
	Index	219
	List of Contents of Part II	
IV	MODERN STATE OF MINIMAL	
	SURFACE THEORY	1
	SURFACE THEORY	
	§1. Minimal Surfaces and Homology.	1
	1. Two-dimensional minimal surfaces in Euclidean space and	
	in Riemannian manifolds.	1
	2. The multidimensional Riemannian volume functional and	
	second fundamental form on a submanifold.	9
	3. Multidimensional locally minimal surfaces.	16
	4. The global minimality of complex submanifolds.	18
	5. The complex Plateau problem.	20
	6. On various approaches to the concepts of surface and	
	boundary of a surface.	21
	7. The homology boundary of a surface and the role of the	
	coefficient group.	24
	8. Surprising examples of physical stable minimal surfaces,	
123	that nevertheless retract onto their boundaries.	28
	9. When does a soap film spanning a frame not contain closed	
	soap-bubbles?	41
	§2. Integral Currents.	48
	1. De Rham currents. Basic notions.	51
	2. Rectifiable currents and flat chains.	54
	3. Normal and integral currents.	55
	4. Various formulations of the minimal current existence	
	theorem.	57
	5. Varifolds and minimal surfaces	59
	6. The interior regularity for minimal surfaces and the	65
	structure of their singular points.	00