

CONTENTS

	PAGE
PREFACE	vii
CHAPTER ONE. EARLY HISTORY—KEMPE'S "PROOF"	1
1. Statement of the problem	1
2. Early history	2
3. Kempe's "proof"	5
CHAPTER TWO. EULER'S EQUATION	20
1. Some inequalities	20
2. Maps and graphs	23
3. A proof of Euler's equation	27
4. Kempe's "proof" revisited	28
5. Polyhedra	31
6. Euler's equation on the torus	37
CHAPTER THREE. HAMILTONIAN CIRCUITS	52
1. Tait's conjecture	52
2. An application to chemistry	59
3. Non-Hamiltonian maps	63
CHAPTER FOUR. ISOMORPHISM AND DUALITY	78
1. Isomorphism	78
2. Properties of isomorphism	82
3. Duality	86
4. Duality and maps	92
5. The Five-Color Theorem	96
6. Duality for Polyhedra	98
CHAPTER FIVE. CONVEX POLYHEDRA	108
1. Polyhedral triples	109
2. Steinitz's Theorem	112
3. Eberhard's Theorem	117

X MAP COLORING, POLYHEDRA, AND THE FOUR-COLOR PROBLEM

CHAPTER SIX. EQUIVALENT FORMS AND SPECIAL CASES	126
1. Edge coloring	126
2. Vertex labeling	128
3. Polyhedra	134
4. Hadwiger's Conjecture	136
5. Arranged sums	137
CHAPTER SEVEN. REDUCTIONS	145
1. Reducible configurations	145
2. The proof of the Four-Color Theorem	152
CHAPTER EIGHT. MISCELLANEOUS	158
1. Countries with colonies	158
2. Infinite maps	160
3. Map coloring on other surfaces	161
4. What good is it?	164
INDEX	167