

CRITICAL THINKING, CRITICAL CHOICES:

BOOK 1

READING AND WRITING

JO ANN AEBERSOLD
JOHANNA KOWITZ
BARBARA SCHWARTE
EDWARD L. SMITH



4.687

A246

CRITICAL THINKING, CRITICAL CHOICES

Book 1: Reading and Writing

JOANN AEBERSOLD
Eastern Michigan University

JOHANNA KOWITZ
University of North Carolina, Chapel Hill

BARBARA SCHWARTE
Iowa State University

EDWARD L. SMITH, JR.
University of Texas at Austin

Library of Congress Cataloging in Publication Data

Main entry under title:

Critical thinking, critical choices.

Includes index.

Contents: bk. 1. Reading and writing.

1. English language—Textbooks for foreign speakers.
2. English language—Rhetoric. 3. Readers—Ecology.
4. Language arts (Higher) I. Aebersold, JoAnn.

PE1128.C775 1985 808'.042 84-11595
ISBN 0-13-194100-3

Editorial/production supervision and
interior design: Patricia V. Amoroso
Cover design: Wanda Lubelska
Manufacturing buyer: Harry P. Baisley

© 1985 by Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632

*All rights reserved. No part of this book may be
reproduced, in any form or by any means,
without permission in writing from the publisher.*

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

ISBN 0-13-194100-3 01

PRENTICE-HALL INTERNATIONAL, INC., *London*
PRENTICE-HALL OF AUSTRALIA PTY. LIMITED, *Sydney*
EDITORA PRENTICE-HALL DO BRASIL, LTDA., *Rio de Janeiro*
PRENTICE-HALL CANADA INC., *Toronto*
PRENTICE-HALL OF INDIA PRIVATE LIMITED, *New Delhi*
PRENTICE-HALL OF JAPAN, INC., *Tokyo*
PRENTICE-HALL OF SOUTHEAST ASIA PTE. LTD., *Singapore*
WHITEHALL BOOKS LIMITED, *Wellington, New Zealand*

Preface

Critical Thinking, Critical Choices is an advanced, integrated curriculum in English for Academic Purposes published in two books (Book 1: Reading and Writing; Book 2: Listening and Speaking) which may be used separately or together. The curriculum is directed at two audiences. Primarily, it is intended to help ESL students make the transition from intensive English study to regular academic and professional course work; as the title suggests, the curriculum aims to develop the critical thinking skills—analyzing, evaluating, synthesizing—needed to succeed in an American university. The secondary audience of the curriculum is those American students who may need help in improving these same critical skills.

The content of the curriculum revolves around a central theme: the “critical choices” facing humankind in dealing with its environmental crises—population, overpopulation, and dwindling food and fuel resources. The beginning units introduce basic concepts of natural ecology. Later units treat particular problems of human ecology: the relationship between environment and culture, and between environmental preservation and population and economic growth; the search for new, nonpolluting energy sources; and prospects for the future. The choice of ecology as a central theme has several advantages. First, it is general enough to appeal to students with diverse educational and occupational backgrounds. The problems dealt with draw information not only from the natural sciences, but also from politics, economics, anthropology, and engineering. At the same time, the subject matter is also technical to simulate the register of a university-level course. Second, the theme is relevant. It is an issue of concern to students from both industrialized countries and developing nations. Because the theme is a relevant one to many countries, students are able to bring their own outside experience into the classroom, particularly in class discussion. Finally, the use of a central theme provides both an integration point for the content of exercises in the various modes (reading and writing, listening and speaking) and a unifying thread running through the different content of each unit, thereby simulating the cumulative nature of an academic course.

As was mentioned, the curriculum is both *advanced* and *integrated*. It is advanced in that it aims at developing “critical skills” for academic and professional course work. Toward this end, the readings are selected from textbooks, academic journals, and periodicals that are directed toward an educated audience (e.g., *Natural History*) and are of moderate to significant length. The ex-

ercises in each unit develop such academic activities as notetaking, speaking in seminars, and summarizing and evaluating written material (though these are segmented into manageable sections so students can first learn the activity in discrete steps before practicing it).

The curriculum is integrated in two ways. First, the various skill exercises in each mode are integrated around the core content of each unit. In the *Reading and Writing* book this core content is furnished through the Reading; in the *Listening and Speaking* book it is furnished by the taped Lecture and by the Reading for Discussion. The core content for each unit provides material not only for comprehension practice, but also for production exercises in writing and speaking. Students find it easier to write or speak about content that they have already read about, listened to, and discussed. Second, the curriculum is integrated within modes. Exercises in a particular section (e.g., Reading) are often annotated for possible use in another section (e.g., Writing). (These cross-section notations, as well as cross-mode suggestions for certain exercises, e.g., Reading to Speaking, are to be found in the Instructor's Manual. Also included in the Instructor's Manual is a sample lesson plan for coordinating the first unit of both books.)

Thus, both through its content and its range of exercises, *Critical Thinking, Critical Choices* is designed to prepare students for academic work in an American university. The Instructor's Manual, containing teaching aids and answers to exercises, and audiotape cassettes of the lectures and lecture discussion groups in Book 2: *Listening and Speaking* are available from the publisher. Audiotape cassettes of the lecture excerpts used for the text exercises and video cassettes of the lectures and lecture discussion groups are available from CRITICAL THINKING, CRITICAL CHOICES, 219D New Alexander Building, Eastern Michigan University, Ypsilanti, Michigan 48197. Phone: (313) 487-0319. Please write for more information on the audiotape excerpts and video cassette recordings. Prices for the 6-tape video series vary according to the desired format, which can be VHS-SP, Beta-II, and U-Matic.

Acknowledgments

From the first fanciful idea which began the long process of writing *Critical Thinking, Critical Choices* to the last gruelling detail which completed the manuscript, many friends and colleagues have contributed generously. Without their time, energy, and talents, this book would not be in print. We therefore wish to take this opportunity to publicly thank:

- the many international students whose forbearance through multiple drafts of the curriculum enabled us to produce a better manuscript than the one we started with;
- our ESL colleagues at various institutions who taught these materials and provided valuable feedback. Thanks to Debbie Matthews, Bill Cline, Jean Bidwell, Brigitte Muller, Ann Lindell, Jia Frydenberg, Ellen Bober, Michelle McCullough, and Bob Pesek;
- Betsy Soden and Joan Morley, for their confidence in our professional abilities and their encouragement during the writing of this book;
- Ray Langsten, for his photographic excellence;
- Bill Webber, field representative extraordinaire, for his work as a liaison between us and the editorial staff at Prentice-Hall during our contract negotiations;

- Marianne Russell, Robin Baliszewski, and Pattie Amoroso, ESL Editors and Production Editor respectively at Prentice-Hall, for their patience and persistence in seeing the manuscript through to production.

The authors also wish to take this opportunity to thank each other for the frayed tolerance and sustaining camaraderie extended each one during the infinite series of Tuesday night meetings over gallons of tea and pounds of desserts. Finally, to our families and friends, who noted (but understood) our frequent absences from meals and friendly gatherings, we offer our thanks and this answer to their perennial question: "Yes, it's published."

Contents

PREFACE *vii*

ACKNOWLEDGMENTS *viii*

UNIT 1 Culture and Ecology 1

READING 2

READING STRATEGY: Previewing 2

READING: "When the Turtle Collapses, the World Ends" 3

VOCABULARY GROUPS BY TOPIC 11

SENTENCE RELATIONSHIPS: Between Sentences 12

PARAGRAPH COMPREHENSION: Controlling Ideas of Chunks 14

CRITICAL READING: Presentation Order 16

QUESTIONS FOR DISCUSSION 18

WRITING 19

PREWRITING 19

Definitions 19

Paraphrase 20

Summary 20

WRITING 21

Definitions 22

Paraphrase 23

Summary 23

WRITING STRATEGY: Controlling Ideas 24

TIMED WRITING AND ANALYSIS 25

GRAMMAR THROUGH WRITING: Complete Sentences, Fragments,

Run-Ons 26

Analyzing Sentences 26

Analyzing Your Own Sentences 30

LONGER COMPOSITIONS 31

Summary, Paraphrase 31

Definition, Explanation 32

Composition Layout Sheet 33

UNIT 2 Ecology of the Natural Environment 34

READING 35

READING STRATEGY: Previewing and Getting the Controlling Ideas of
Chunks 35

READING: "The Ecosphere" 35

VOCABULARY GROUPS BY TOPIC 53

SENTENCE RELATIONSHIPS: Within Sentences/Between Sentences 54

PARAGRAPH COMPREHENSION 55

CRITICAL READING: Strength of Belief 56

QUESTIONS FOR DISCUSSION 58

WRITING 60

PREWRITING 60

Classification 60

Paraphrase from Quotations 61

Explanation of Diagrams 63

Examples and Explanations 64

WRITING 66

Classification 66

Paraphrase from Quotations 66

Explanation of Diagrams 67

Examples and Explanations 69

WRITING STRATEGY: Introductions 69

TIMED WRITING AND ANALYSIS 71

GRAMMAR THROUGH WRITING: Agreement 71

Analyzing Sentences 71

Analyzing Your Own Sentences 74

LONGER COMPOSITIONS 75

Summary, Paraphrase 75

Classification 75

UNIT 3 Animal Ecology 77

READING 78

READING STRATEGY: Recognizing Transitions 78

READING: "Peaceful Coexistence" 79

VOCABULARY GROUPS BY TOPIC 87

SENTENCE RELATIONSHIPS: Between Sentences 88

PARAGRAPH COMPREHENSION 89

CRITICAL READING: Following the Argument 90

QUESTIONS FOR DISCUSSION 92

WRITING 93

PREWRITING 93

Explanations and Examples 93

Using Quotations 94

Using Visuals 96

WRITING 99

- Explanations and Examples 99
- Using Quotations 99
- Using Visuals 100

WRITING STRATEGY: Organization 100

TIMED WRITING AND ANALYSIS 102

GRAMMAR THROUGH WRITING: Passive 102

- Analyzing Sentences 102
- Analyzing Your Own Sentences 108

LONGER COMPOSITIONS 108

- Summary, Paraphrase, Quoting 108
- Classification, Graphs, Charts 108

UNIT 4 The Human Factor: Population 111

READING 112

READING STRATEGY: Skimming, or Getting the Topic of a Chunk 112

READING: "Shutting Off the Population Valve, or Who Does What to Whom?" 113

VOCABULARY GROUPS BY TOPIC 124

SENTENCE RELATIONSHIPS: Review 125

PARAGRAPH COMPREHENSION 126

CRITICAL READING: Chart Interpretation 127

QUESTIONS FOR DISCUSSION 129

WRITING 130

PREWRITING 130

- Comparison/Contrast 130

WRITING 133

- Comparison/Contrast 133

WRITING STRATEGY: Transitions 133

TIMED WRITING AND ANALYSIS 135

GRAMMAR THROUGH WRITING: Comparison/Contrast 135

- Analyzing Sentences 135
- Analyzing Your Own Sentences 136

LONGER COMPOSITIONS 137

- Summary, Paraphrase 137
- Comparison/Contrast, Point of View 139

UNIT 5 Energy Options 140

READING 141

READING STRATEGY: Marking the Text and Note Taking 141

READING: "Energy: The Coming Transition" 142

VOCABULARY GROUPS BY TOPIC 160

SENTENCE RELATIONSHIPS: Relationships Within/Between Paragraphs 161

PARAGRAPH COMPREHENSION 163

CRITICAL READING: Strength of Prediction 164
QUESTIONS FOR DISCUSSION 166

WRITING 167

PREWRITING 167

Larger Patterns of Organization (Part I) 167
Forming and Expanding Hypotheses 171

WRITING 172

Larger Patterns of Organization 172
Forming and Expanding Hypotheses 172

WRITING STRATEGY: Supporting Details 174

TIMED WRITING AND ANALYSIS 176

GRAMMAR THROUGH WRITING: Negativity 177

Analyzing Sentences 177

Analyzing Your Own Sentences 180

LONGER COMPOSITIONS 181

Summary, Paraphrase, Point of View 181

Summary, Paraphrase, Point of View from Outside Reading 181

UNIT 6 Prospects for the Future 183

READING 184

READING STRATEGY: Review and Focus on Conclusions 184

READING: "Epilogue: The Future of the Species" 185

VOCABULARY GROUPS BY TOPIC 200

SENTENCE RELATIONSHIPS: Review 201

PARAGRAPH COMPREHENSION 203

CRITICAL READING: Argument by Analogy 204

QUESTIONS FOR DISCUSSION 206

WRITING 208

PREWRITING 208

Larger Patterns of Organization (Part II) 208
Rhetorical Questions 209

WRITING 212

Larger Patterns of Organization/Rhetorical Questions 212

WRITING STRATEGY: Conclusions 212

TIMED WRITING AND ANALYSIS 214

GRAMMAR THROUGH WRITING: "If . . . then" Constructions 214

Analyzing Sentences 214

Analyzing Your Own Sentences 217

LONGER COMPOSITIONS 218

Summary, Paraphrase, Point of View 218

Synthesis, Point of View 218

APPENDIX 221

INDEX 223

UNIT 1

Culture and Ecology



Photograph courtesy of Jo Ann Aebersold

READING

READING STRATEGY: Previewing

Knowing what you are going to read makes reading easier. This knowledge is particularly useful in reading long articles. There are many ways you can increase your ability to anticipate information before you actually read it. One good way is to focus your attention on the beginning of the article. Discuss and answer the following questions dealing with the beginning of "When the Turtle Collapses, the World Ends."

1. Read the title. What information does it give about the topic of the reading? From your own knowledge and experience, what other information does it bring to mind?
2. Look through the pages of the reading. Does the main body of the article begin immediately after the title or is there any pre-article reading separated from the article by physical space?
3. Look through the article. Are there any other spaces between sections? Are there headings or subheadings? What about numbers or letters that appear to divide sections? How will recognizing these divisions aid reading comprehension?
4. With this visual scanning of the article completed, go back and read the pre-article reading material, if any. What is the relation between this section and the title of the article? If the relationship is not apparent, keep this question in mind as you continue.
5. Now turn your attention to the body of the article. The information gained from the prereading activities should provide a framework to help you organize what you read. As you turn your attention to the body of this or any long article, it is important to read the first several paragraphs carefully, as these paragraphs frequently introduce the information that will be developed throughout the rest of the article. In "When the Turtle Collapses, the World Ends," paragraphs 1 to 5 comprise the introduction to the article. Read these five paragraphs carefully and answer the following questions.
 - a. What did the Miskitos depend upon the turtles for in the past?
 - b. What change has taken place in the Miskitos' relation to the turtles?
 - c. What situation has come about as a result of this change?
 - d. On the basis of paragraphs 4 and 5 what topics do you think might be discussed in the rest of the article?
6. Now that you have read the introduction and know what the rest of the article is going to discuss, how does the information in the main body of the article relate to the anecdote in paragraph I and to the title? (You may not be able to answer this question until you have read the entire article.)

When the Turtle Collapses, the World Ends

BERNARD NIETSCHMANN

(1) After delivering a lecture on the solar system, philosopher-psychologist William James was approached by an elderly lady who claimed she had a theory superior to the one described by him.

"We don't live on a ball rotating around the sun," she said. "We live on a crust of earth on the back of a giant turtle."

Not wishing to demolish this absurd argument with the massive scientific evidence at his command, James decided to dissuade his opponent gently.

"If your theory is correct, madam, what does this turtle stand on?"

"You're a very clever man, Mr. James, and that's a good question, but I can answer that. The first turtle stands on the back of a second, far larger, turtle."

"But what does this second turtle stand on?" James asked patiently.

The old lady crowed triumphantly, "It's no use, Mr. James, it's turtles all the way down."

(1) In the half-light of dawn, a sailing canoe approaches a shoal where nets have been set the day before. A Miskito turtleman stands in the bow and points to a distant splash that breaks the gray sheen of the Caribbean water. Even from a hundred yards, he can tell that a green turtle has been caught in one of the nets. His two companions quickly bring the craft alongside the turtle, and as they pull it from the sea, its glistening shell reflects the first rays of the rising sun. As two men work to remove the heavy reptile from the net, the third keeps the canoe headed into the swells and beside the anchored net. After its fins have been pierced and lashed with bark fiber cord, the 250-pound turtle is placed on its back in the bottom of the canoe. The turtlemen are happy. Perhaps their luck will be good today and their other nets will also yield many turtles.

(2) These green turtles, caught by Miskito Indian turtlemen off the eastern coast of Nicaragua, are destined for distant markets. Their butchered bodies will pass through many hands, local and foreign, eventually ending up in tins, bottles, and freezers far away. Their meat, leather-shell, oil, and calipee, a gelatinous substance that is the base for turtle soup, will be used to produce goods consumed in more affluent parts of the world.

(3) The coastal Miskito Indians are very dependent on green turtles. Their culture has long been adapted to utilizing the once vast populations that inhabited the largest sea turtle feeding grounds in the Western Hemisphere. As the most important link between livelihood, social interaction, and environment, green turtles were the pivotal resource around which traditional Miskito Indian society revolved. These large reptiles also provided the major source of protein for Miskito subsistence. Now this priceless and limited resource has become a prized commodity that is being exploited almost entirely for economic reasons.

(4) In the past, turtles fulfilled the nutritional needs as well as the social responsibilities of Miskito society. Today, however, the Miskito depend mainly on the sale of turtles to provide them with the money they need to purchase household goods and other necessities. But turtles are a declining resource;

Reprinted with permission from *Natural History Magazine*, June-July 1974. Copyright © The American Museum of Natural History, 1974.

(1) to demolish: pull or tear down, destroy

(3) to adapt: change
link: connection

to exploit: use or develop natural resources

overdependence on them is leading the Miskito into an ecological blind alley. The cultural control mechanisms that once adapted the Miskito to their environment and faunal resources are now circumvented or inoperative, and they are caught up in a system of continued intensification of turtle fishing, which threatens to provide neither cash nor subsistence.

(5) I have been studying this situation for several years, unraveling its historical context and piecing together its past and future effect on Miskito society, economy and diet, and on the turtle population.

(6) The coastal Miskito Indians are among the world's most adept small-craft seamen and turtlemen. Their traditional subsistence system provided dependable yields from the judicious scheduling of resource procurement activities. Agriculture, hunting, fishing, and gathering were organized in accordance with seasonal fluctuations in weather and resource availability and provided adequate amounts of food and materials without overexploiting any one species or site. Women cultivated the crops while men hunted and fished. Turtle fishing was the backbone of subsistence, providing meat throughout the year.

(7) Miskito society and economy were interdependent. There was no economic activity without a social context and every social act had a reciprocal economic aspect. To the Miskito, meat, especially turtle meat, was the most esteemed and valuable resource, for it was not only a mainstay of subsistence, it was the item most commonly distributed to relatives and friends. Meat shared in this way satisfied mutual obligations and responsibilities and smoothed out daily and seasonal differences in the acquisition of animal protein. In this way, those too young, old, sick, or otherwise unable to secure meat received their share, and a certain balance in the village was achieved: minimal food requirements were met, meat surplus was disposed of to others, and social responsibilities were satisfied.

(8) Today, the older Miskito recall that when meat was scarce in the village, a few turtlemen would put out to sea in their dugout canoes for a day's harpooning on the turtle feeding grounds. In the afternoon, the men would return, sailing before the northeast trade wind, bringing meat for all. Gathered on the beach, the villagers helped drag the canoes into thatched storage sheds. After the turtles were butchered and the meat distributed, everyone returned home to the cooking fires.

(9) Historical circumstances and a series of boom-bust economic cycles disrupted the Miskito's society and environment. In the seventeenth and eighteenth centuries, intermittent trade with English and French buccaneers based on the exchange of forest and marine resources for metal tools and utensils, rum, and firearms prompted the Miskito to extend hunting, fishing, and gathering beyond subsistence needs to exploitative enterprises.

(10) During the nineteenth and early twentieth centuries foreign-owned companies operating in eastern Nicaragua exported rubber, lumber, and gold, and initiated commercial banana production. As alien economic and ecological

(4) mechanisms: social structures
to circumvent: pass by

(6) adept: expert, skillful
yield: amount produced
judicious: wise, careful
procurement: getting, acquisition

fluctuations: irregular movements
site: a place where something is, was, or will be

(7) acquisition: getting
(8) scarce: not available in sufficient quantity, rare
to drag: pull along

(9) to disrupt: throw into confusion
intermittent: stopping and starting at intervals
utensils: instruments or tools
(10) to initiate: set working, begin
alien: foreign, outside

influences were intensified, contract wage labor replaced seasonal, short-term economic relationships; company commissaries replaced limited trade goods; and large scale exploitation of natural resources replaced sporadic, selective extraction. During economic boom periods the relationship between resources, subsistence, and environment was drastically altered for the Miskito. Resources became a commodity with a price tag, market exploitation a livelihood, and foreign wages and goods a necessity.

(11) For more than 200 years, relations between the coastal Miskito and the English were based on sea turtles. It was from the Miskito that the English learned the art of turtling, which they then organized into intensive commercial exploitation of Caribbean turtle grounds and nesting beaches. Sea turtles were among the first resources involved in trade relations and foreign commerce in the Caribbean. Zoologist Archie Carr, an authority on sea turtles, has remarked that "more than any other dietary factor, the green turtle supported the opening up of the Caribbean." The once abundant turtle populations provided sustenance to ships' crews and to the new settlers and plantation laborers.

(12) The Cayman Islands, settled by the English, became in the seventeenth and eighteenth centuries the center of commercial turtle fishing in the Caribbean. By the early nineteenth century, pressure on the Cayman turtle grounds and nesting beaches to supply meat to Caribbean and European markets became so great that the turtle population was decimated. The Cayman Islanders were forced to shift to other turtle areas off Cuba, the Gulf of Honduras, and the coast of eastern Nicaragua. They made annual expeditions, lasting four to seven weeks, to the Miskito turtle grounds to net green turtles, occasionally purchasing live ones, dried calipee, and the shells of hawksbill turtles (*Eretmochelys imbricata*) from the Miskito Indians. Reported catches of green turtles by the Cayman turtlers generally ranged between 2,000 and 3,000 a year up to the early 1960's, when the Nicaraguan government failed to renew the islanders' fishing privileges (see Figure 1-1).

(13) Intensive resource extraction by foreign companies led to seriously depleted and altered environments. By the 1940's, many of the economic booms had turned to busts. As the resources ran out and operating costs mounted, companies shut down production and moved to other areas in Central America. Thus, the economic mainstays that had helped provide the Miskito with jobs, currency, markets, and foreign goods were gone. The company supply ships and commissaries disappeared, money became scarce, and store-bought items expensive.

(14) In the backwater of the passing golden boom period, the Miskito were left with an ethic of poverty, but they still had the subsistence skills that had maintained their culture for hundreds of years. Their land and water environment was still capable of providing reliable resources for local consumption. As it had been in the past, turtle fishing became a way of life, a provider of life itself. But traditional subsistence culture could no longer integrate Miskito society and environment in a state of equilibrium. Resources were now viewed as having a value and labor a price tag. All that was needed was a market.

(15) Recently, two foreign turtle companies began operations along the east coast of Nicaragua. One was built in Puerto Cabezas in late 1968, and another was completed in Bluefields in 1969. Both companies were capable of

- | | | |
|--|---|--|
| <p>sporadic: occurring only occasionally</p> <p>drastically: in a strong or violent way</p> <p>(11) abundant: more than enough, plentiful</p> | <p>sustenance: nourishment, food</p> <p>(12) to decimate: destroy</p> <p>privileges: rights or benefits</p> <p>(13) to deplete: use up, exhaust</p> | <p>(14) ethic: a system of moral principles, rules of conduct</p> <p>to integrate: combine into a whole</p> <p>equilibrium: balance</p> |
|--|---|--|

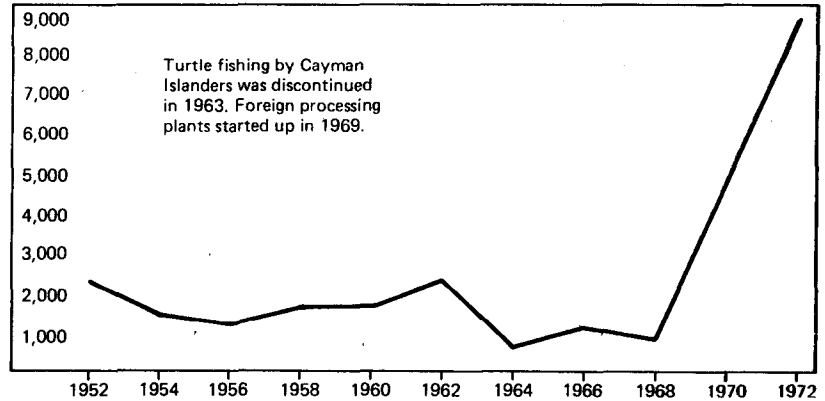


FIGURE 1-1 Number of green turtles exported annually from eastern Nicaragua

processing and shipping large amounts of green turtle meat and by-products to markets in North America and Europe. Turtles were acquired by purchase from the Miskito. Each week company boats visited coastal Miskito communities and offshore island turtle campus to buy green turtles. The "company" was back, money was again available, and the Miskito were expert in securing the desired commodity. Another economic boom period was at hand. But the significant difference between this boom and previous ones was that the Miskito were now selling a subsistence resource.

(16) As a result, the last large surviving green turtle population in the Caribbean was opened to intensive, almost year-round exploitation. Paradoxically, it would be the Miskito Indians, who once caught only what they needed for food, who would conduct the assault on the remaining turtle population.

(17) Another contradictory element in the Miskito-turtle story is that only some 200 miles to the south at Tortuguero, Costa Rica, Archie Carr had devoted fifteen years to the study of sea turtles and to the conservation and protection of the Caribbean's last major sea turtle nesting beach. Carr estimates that more than half the green turtles that nest at Tortuguero are from Nicaraguan waters. The sad and exasperating paradox is that a conservation program insured the survival of an endangered species for commercial exploitation in nearby waters.

(18) Green turtles, *Chelonia mydas*, are large, air-breathing, herbivorous marine reptiles. They congregate in large populations and graze on underwater beds of vegetation in relatively clear, shallow, tropical waters. A mature turtle can weigh 250 pounds or more and when caught, can live indefinitely in a saltwater enclosure or for a couple of weeks if kept in shade on land. Green turtles have at least six behavioral characteristics that are important in their exploitation: they occur in large numbers in localized areas; they are air breathing, so they have to surface; they are mass social nesters; they have an acute location-finding ability; when mature, they migrate seasonally on an

(15) **to process:** treat something in order to preserve it

(16) **paradoxically:** in a way that is opposite to what seems to be

true or to common sense

to conduct: control or manage

assault: an attack

(17) **exasperating:** irri-

tating, making angry

(18) **acute:** keen, sharp, or quick

to migrate: move from one place to another

overlapping two- or three-year cycle for mating and nesting; and they exhibit predictable local distributional patterns.

(19) The extensive shallow shelf off eastern Nicaragua is dotted with numerous small coral islands, thousands of reefs, and vast underwater pastures of marine vegetation called "turtle banks." During the day, a large group of turtles may be found feeding at one of the many turtle banks, while adjacent marine pastures may have only a few turtles. They graze on the vegetation, rising periodically to the surface for air and to float for a while before diving again. In the late afternoon, groups of turtles will leave the feeding areas and swim to shoals, some up to four or five miles away, to spend the night. By five the next morning, they gather to depart again for the banks. The turtles' precise, commuterlike behavior between sleeping and feeding areas is well-known to the Miskito and helps insure good turtling.

(20) Each coastal turtling village exploits an immense sea area, containing many turtle banks and shoals. For example, the Miskito of Tasbapauni utilize a marine area of approximately 600 square miles, with twenty major turtle banks and almost forty important shoals.

(21) Having rather predictable patterns of movement and habitat preference, green turtles are commonly caught by the Miskito in three ways: on the turtle banks with harpoons; along the shoal-to-feeding area route with harpoons; and on the shoals using nets, which entangle the turtles when they surface for air.

(22) The Miskito's traditional means of taking turtles was by harpoon—an eight- to ten-foot shaft fitted with a detachable short point tied to a strong line. The simple technology pitted two turtlemen in a small, seagoing canoe against the elusive turtles. Successful turtling with harpoons requires an extensive knowledge of turtle behavior and habits and tremendous skill and experience in handling a small canoe in what can be very rough seas. Turtlemen work in partnerships: a "strikerman" in the bow; the "captain" in the stern. Together, they make a single unit engaged in the delicate and almost silent pursuit of a wary prey, their movements coordinated by experience and rewarded by proficiency. Turtlemen have mental maps of all the banks and shoals in their area, each one named and located through a complex system of celestial navigation, distance reckoning, wind and current direction, and the individual surface-swell motion over each site. Traditionally, not all Miskito were sufficiently expert in seamanship and turtle lore to become respected "strikermen," capable of securing turtles even during hazardous sea conditions. Theirs was a very specialized calling. Harpooning restrained possible overexploitation since turtles were taken one at a time by two men directly involved in the chase, and there were only a limited number of really proficient "strikermen" in each village.

(23) Those who still use harpoons must leave early to take advantage of the land breeze and to have enough time to reach the distant offshore turtle grounds by first light. Turtlemen who are going for the day, or for several days, will meet on the beach by 2:00 A.M. They drag the canoes on bamboo rollers from beachfront sheds to the water's edge. There, in the swash of spent breakers, food, water, paddles, lines, harpoons, and sails are loaded and secured. Using a long pole, the standing bowman propels the canoe through the foaming surf while the captain in the stern keeps the craft running straight

(19) adjacent: near by
commuterlike: traveling at scheduled times

(22) to fit: put into place
elusive: having a tendency to escape, not easy to catch

to engage: occupy, make busy
to restrain: hold back