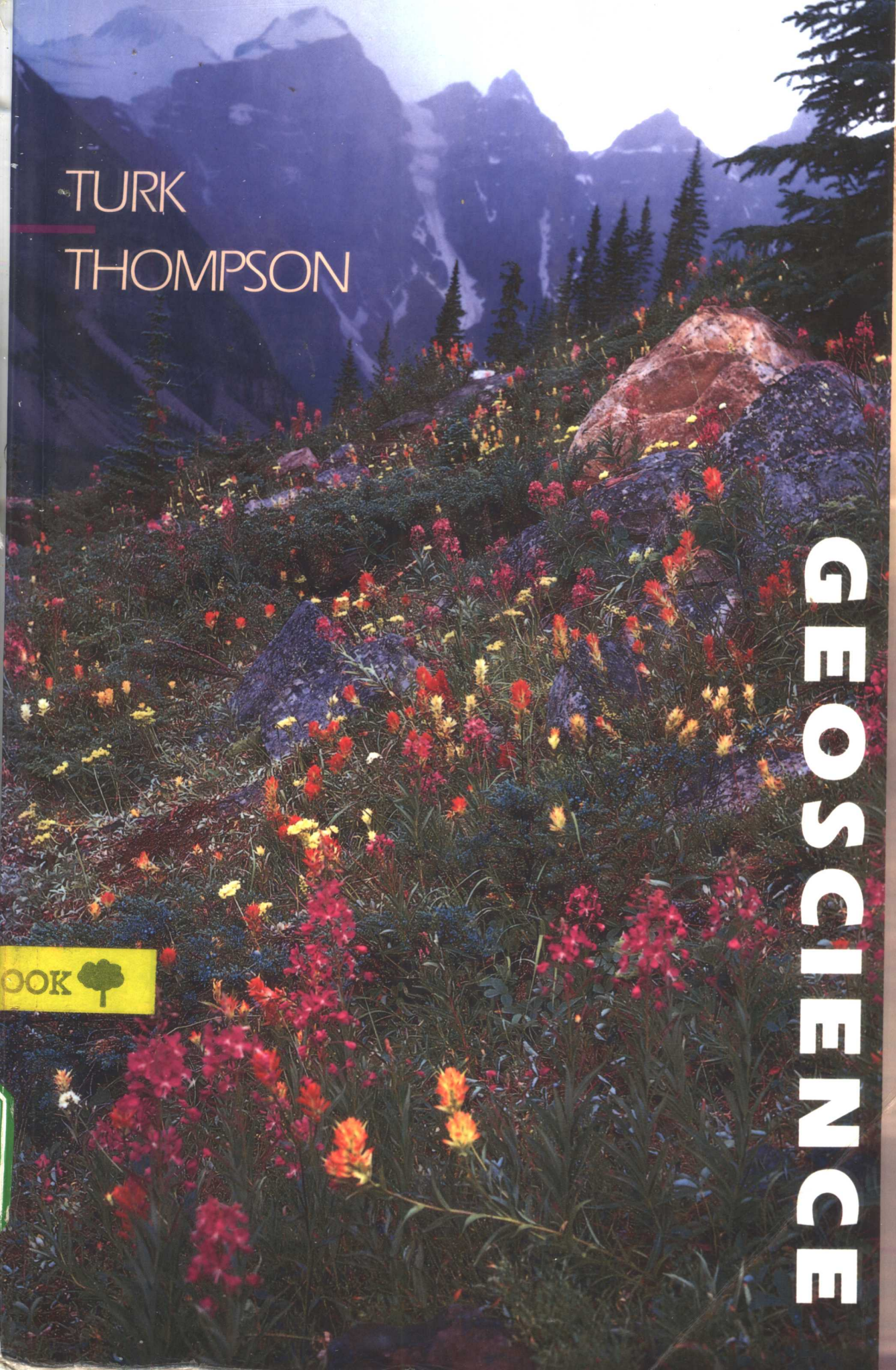

TURK
THOMPSON

ENVIRONMENTAL GEOSCIENCE

ENVIRONMENTAL Geoscience

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PREFACE

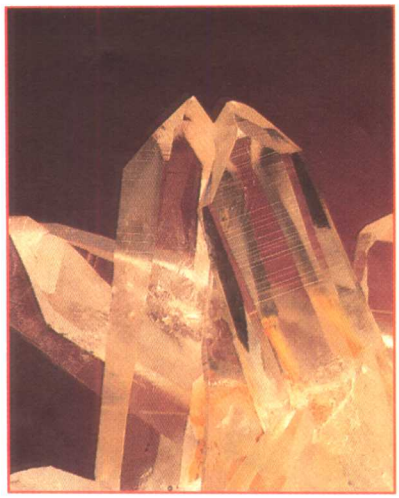
Ecological catastrophes contributed to the falls of several ancient civilizations. The Babylonians destroyed their farm soils by irrigating them year after year with slightly salty river water. Plato wrote about soil erosion and ground-water depletion after forests were cut from the Athenian hills. During the Industrial Revolution, governments frequently ignored the lessons of past civilizations and encouraged development regardless of environmental consequences. In many urban regions, skies turned black, rivers became polluted with chemicals and sewage, and rich soils were eroded. In 1775, Dr. Percival Pott showed that chimney soot caused cancer. In 1948, 20 people died and 6000 became ill from concentrated air pollution in Donora, Pennsylvania. In 1955, an oily film on the Cuyahoga River in Cleveland, Ohio, caught fire. These and similar incidents triggered a realization that pollution is unhealthful for humans and detrimental to the environment. People demanded action. In 1970, the United States Congress passed the National Environmental Policy Act (NEPA), committing the country to a clean environment. This act states that the United States Government must "use all practicable means, consistent with other essential considerations of national policy, to . . . fulfill the responsibilities of each generation as a trustee of the environment for succeeding generations."

Twenty-five years have passed since NEPA was signed into law. During that time, scientists of all disciplines have studied environmental degradation and searched for pollution-control strategies. Geologists contribute to this research by studying the rocks under our feet, the soil that supports plant growth, and the water that sustains us. They look backward in time to the evolution of our planet, its atmosphere, and its oceans.

Environmental Geoscience is an introductory text that explores the interaction of living organisms with the Earth. Over long expanses of geologic time, tectonic movement shapes ocean basins, raises mountains, and generates forces that cause earthquakes and volcanic eruptions. Over shorter time spans, surface processes erode mountain ranges, alter ground-water flow, and change the courses of rivers. Floods and landslides occur almost instantaneously. Both long- and short-term geologic change alters conditions for life on our planet.

Some geologic events such as earthquakes, volcanoes, and floods are beyond our control. However, if we understand these events, we can minimize their effects on human settlement. Other geologic changes, such as ground-water pollution and the impacts of mining and oil drilling, are caused by people. Since we create these disturbances, we must consider the costs and benefits of our actions.

Environmental Geoscience explains geologic processes as a background for understanding the environmental consequences of geologic change. The text highlights many environmental issues with Case Histories that relate geology to real situations. Examples include the 1993 Mississippi River flood, the California earthquake of 1994, and ground-water and nuclear waste disposal. Other topics that expand a student's understanding but are not necessary to a chapter's continuity are set off as *Focus On* boxes. Examples include "Conversion of Heat from Fuels to Work and Electricity" and "Earthquake Waves as a Tool for Investigating the Structure of the Earth."



Teaching Options

This book is divided into four parts:

Part 1: The Earth and Its Materials
Part 2: Internal Processes
Part 3: Surface Processes
Part 4: Mineral and Energy Resources

We have placed the topic of tectonics early in the book because tectonic activity creates the basic landforms that are shaped by surface processes. However, this order can be altered without much loss of continuity. Part 4, Mineral and Energy Resources, can be taught earlier in the course, or portions can be incorporated into other chapters.

We recognize that many students in an introductory geology course don't have backgrounds in chemistry and physics. Consequently, we introduce geologic processes and events in language that is readily understood by students with little or no college-level science or mathematics background.

Finally, we believe science is not a set of facts to be learned and memorized. Any study of geology would be lifeless unless students were introduced to some of the crucial experiments and thought processes that led to the development of important geological hypotheses and theories.

Special Features

As already explained, supplementary material is presented throughout the book in the form of *Focus On* boxes that are set aside and highlighted in color. These topics are not essential to the continuity of a chapter, and they can be included or omitted at the discretion of the instructor. *Case Histories* give contemporary examples that illustrate how geological events and processes affect people. The Case Histories are incorporated in the text but highlighted by color. These geological anecdotes are interesting in themselves and reinforce the main topics.

Chapter review material. Important words are highlighted in bold type within the text. Many of these key words are printed in a list at the end of each chapter for review purposes. In addition, a short summary is provided at the end of each chapter.

Questions. Two types of end-of-chapter questions are provided. The **Review Questions** can be answered in a straightforward manner from the material in the text. In contrast, **Discussion Questions** challenge students to apply what they have learned to the analysis of situations not directly presented in the text. Often there are no unique or absolute correct answers to these questions.

Appendices and Glossary. A glossary of terms is provided at the end of the book and appendices cover: A Periodic Table and International Table of Atomic Weights, Systems of Measurement, and Graphic Rock Symbols used throughout the book.

Ancillaries

This text is accompanied by extensive support materials.

Study Guide

The Study Guide, written by Vicki Harder of El Paso Community College, provides review and study aids to enhance the student's understanding of the text. The Study Guide includes an overview for each chapter, learning objectives, a detailed chapter outline, review questions, and answers.

Instructor's Manual and Test Bank

The Instructor's Manual, written by the authors, provides teaching goals, answers to discussion questions, and a short bibliography. Sample tests written by Christine Seashore are included in the manual. The test bank includes multiple-choice, true-or-false, and completion questions for each chapter.

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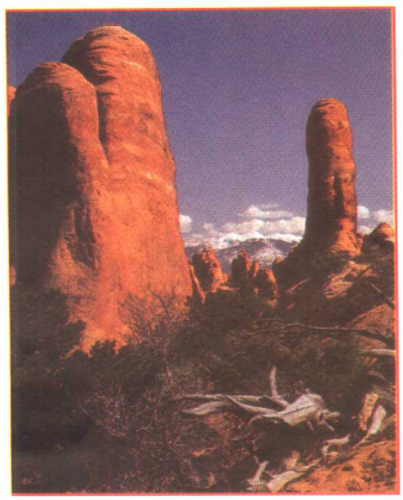
Geology is a visual science. We can readily observe many rocks and landforms on the Earth's surface. Although we cannot see many internal processes, these events can be visualized through the artist's eye. George Kelvin has painted most of the illustrations in this book. It has been a pleasure to work with him again.

We would never have been able to produce this book without professional support both here in Montana and from the offices of Saunders College Publishing. Thanks to Christine Seashore for finding photographs, contributing personal photographs, and for logistic collaboration. Special thanks to John Vondeling, our Associate Publisher. One of us,



Jonathan Turk, has worked with John for 25 years; we have developed a long-lasting friendship and a superb professional relationship. Christine Rickoff, our Developmental Editor, Anne Gibby, our Project Editor, Christine Schueler, Art Director, and Patricia Daly and Mary Patton, our Copy Editors, have all worked hard and efficiently to produce the finished project.

Jonathan Turk
Darby, Montana

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Missoula, Montana

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