LUNAR STRATIGRAPHY AND SEDIMENTOLOGY

Developments in Solar System- and Space Science, 3

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LUNAR STRATIGRAPHY AND SEDIMENTOLOGY

by

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TO

The Apollo Astronauts.

The moon is nothing
But a circumambulatory aphrodisiac
Divinely subsidized to provoke the world
Into a rising birthrate.

The Lady's Not For Burning
Christopher Fry, 1950

Preface

The dominant processes operative in shaping the lunar surface are very different from those acting on the earth's surface. The main differences between the two planets relate to the way in which available energy is used in the sedimentary environment. Sedimentary processes on the earth's surface are determined largely by solar energy interacting with the atmosphere and hydrosphere which act as intermediaries converting radiative solar energy to effective erosional and transportation energy by way of rivers, glaciers, ocean waves and so on. The moon is essentially free of both an atmosphere and hydrosphere and as a consequence solar energy is largely ineffective in the sedimentary environment. Instead lunar sedimentary processes are dominated by kinetic energy released by impacting meteoroids.

In the early stages of the Apollo program considerable attention was given to locating landing sites which would provide the best opportunity of sampling the primitive lunar crust. As the Apollo program progressed it became apparent that most of the rocks available at the lunar surface were in fact "breccias" or "clastic rocks" or in a more general sense "sedimentary rocks." The moon's crust was much more complex than anyone might have guessed. This book is an attempt to organize some of the information now available about the sedimentary rocks forming the lunar crust in a way that allows some comparison with the terrestrial sedimentary environment.

There are essentially three parts to the book. Chapter 1 presents a very brief view of the moon as a planetary body to establish a perspective for the following chapters. Chapters 2 and 3 evaluate the energy sources available in the lunar sedimentary environment. Because of their predominance in the lunar environment meteoritic processes are treated in considerable detail. Chapters 4, 5 and 6 bring together information on the general geology of the lunar crust and detailed information from some sedimentary units sampled during the Apollo missions.

A large number of people have contributed in various ways to make it possible for me to write this book and I am grateful for their assistance. In the early stages Dr. J. Head, then acting director of the Lunar Science Institute, Houston, Texas, encouraged me to begin the book and Prof. Alan

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January 12, 1976 John F. Lindsay

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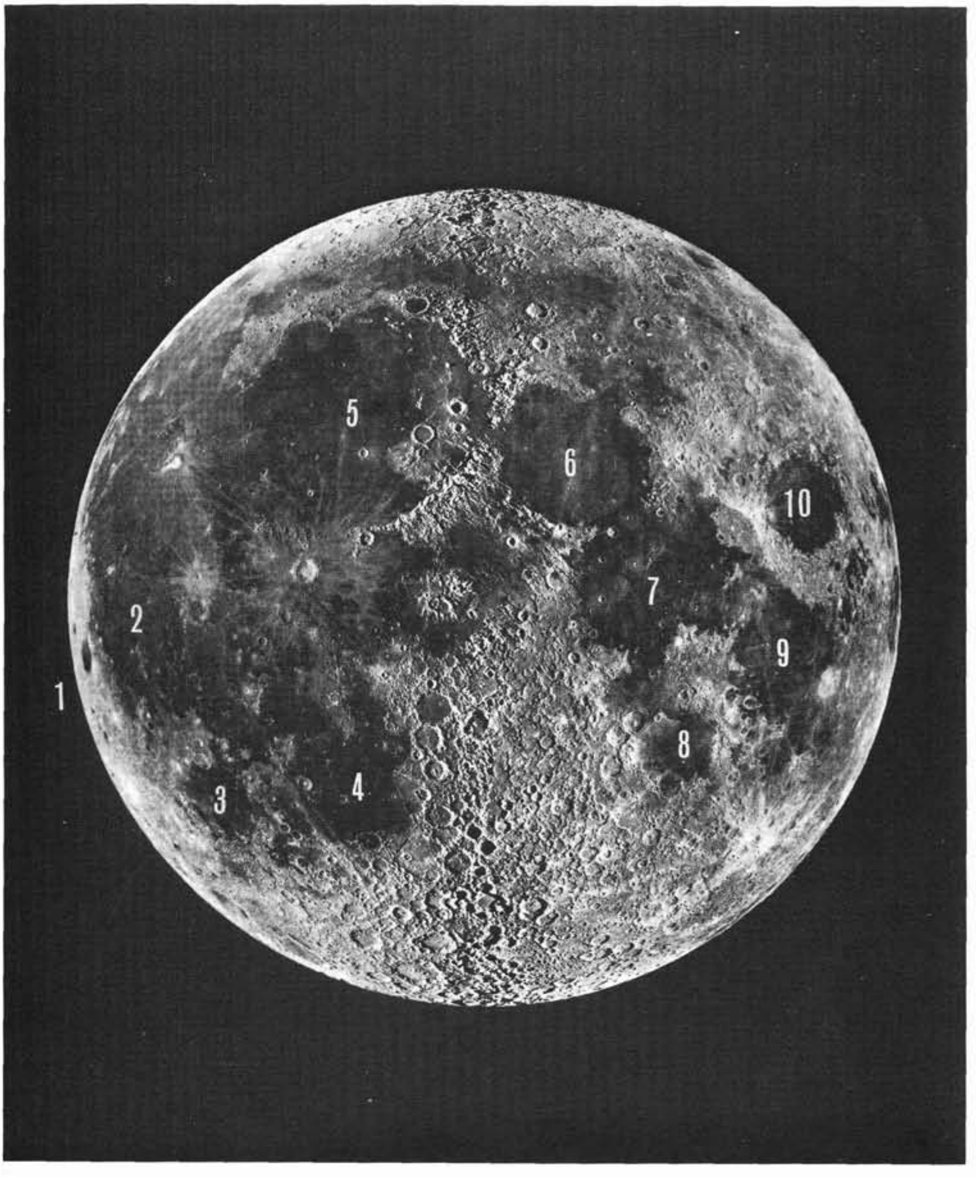

A composite view of the lunar nearside. The mare and highlands are clearly differentiated and the major circular basins are visible. (1) Mare Orientale on the edge of the disk. (2) Oceanus Procellarum. (3) Mare Humorum. (4) Mare Nubium. (5) Mare Imbrium. (6) Mare Serenitatis. (7) Mare Tranquillitatis. (8) Mare Nectaris. (9) Mare Fecunditatis. (10) Mare Crisium. (Lick Observatory Photograph).