BOOK REVIEWS


The 'channels' in the title refer not to the 'canali', introduced by Angelo Secchi more than 100 years ago, but to those arid valleys of apparently geological origin that form the most mysterious subject of Martian landforms (the valleys of tectonic origin, e.g. Valles Marineris, are called 'canyons').

Following two introductory chapters the author describes in detail different types of channels of Mars, often in comparison with selected terrestrial counterparts. The book contains about 130 fascinating photographs (mostly taken by the two Viking Orbiters; the orientation and the distance scale are indicated) and more than 50 elaborate maps and figures.

The comparative study has convinced the author that liquid water has played an essential role in the formation of most, if not all, of the channels of Mars. The extended 'outflow channels' leading to the Chryse Basin (Chapter 6) especially are ascribed to catastrophic flooding (Chapter 8) by analogy with the Channeled Scabland in the northwestern United States (Chapter 7). But how such vast water flows might have developed from the presumed planet-wide subsurface permafrost of water ice remains uncertain (Chapter 9).

The publication of book as this on such a specific subject typifies the enormous expansion of our knowledge of the planets in the last several years. This book will be an important stimulus for anyone interested in planetary geology as well as students of astro-geology.

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This book is a review of viable theories of gravitation other than the general theory of relativity. Their observational consequences for astrophysics and geophysics are discussed. Thereby the question of the variability of the gravitational constant forms an important part. Relations with elementary particle physics are extensively described. As a consequence much attention is paid to the importance of scale invariance and group theory for unified gravitational theories.

The book consists of two parts: Part I succeeds in giving a not too technical overview for the interested astrophysicist while Part II is intended for the professional research worker in this field. Part I contains a clear and thorough account of variable $G$ theories and the related observations (Chapter 2, Variable $G$ Gravitation, based on Chapter 9), the observational limits from astrophysics (Chapter 4), from geophysics (Chapter 5) and gravity experiments (Chapter 6, Discussion). The importance of gauge theories for gravitation is demonstrated in Chapter 3 (Particle Physics and Gravitation) and in the third section of Chapter 6. Part I is concluded by a brief summary of the entire book and a list of outstanding problems (based on Chapter 9). Part II reviews scale-invariant gravitation theories and their compatibility with observations (Chapter 8, Scale Invariance and Scalar-Tensor Theories, Chapter 9, Alternative Theories of Gravity), theories incorporating elementary particle physics, electromagnetism and gravity (Chapter 10, Group Theory and Gravity) and the (negative) status of non-Doppler redshifts in astrophysics (Chapter 11).

The book is an interesting review rather than a textbook; abundant use is made of references, which is not always attractive to read. The list of references (> 1000) and the material covered in this rapidly developing field end in 1979.

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