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The Local Group is a small cluster of galaxies of which 35 members are currently known, including the Milky Way. It is believed that at least half of all galaxies in the Universe belong to similar groups. Galaxies of the Local Group can be used as “stepping stones” to determine the distance to more remote galaxies, and thus they help to measure the size and age of the Universe. Studying stars of differing ages in different members of the Local Group allows us to see how galaxies evolve over timescales in excess of 10 billion years. The oldest stars in the Local Group galaxies also provide critical information on the physical conditions of the early Universe. The Local Group thus provides many valuable clues to understanding the rest of the Universe.

This authoritative volume provides a comprehensive and up-to-date synthesis of what is currently known about the Local Group of galaxies. It includes a summary of our knowledge of each of the individual member galaxies, as well as those galaxies previously regarded as possible members. After examining each galaxy in detail, the book goes on to examine the mass, stability, and evolution of the Local Group as a whole. The book includes many important previously unpublished results and conclusions.

With characteristic clarity, Professor van den Bergh provides in this book a masterful summary of all that is known about the galaxies of the Local Group and their evolution, and he expertly places this knowledge in the wider context of ongoing studies of galaxy formation and evolution, the cosmic distance scale, and the conditions in the early Universe.

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SIDNEY VAN DEN BERGH

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Preface

In April of 1968 I gave a series of lectures on the structure, evolution, and stellar content of nearby galaxies at the University of California in Berkeley. An outline of these talks was printed as a slender volume entitled “The Galaxies of the Local Group” (van den Bergh 1968a). Since the publication of this booklet the number of known members of the Local Group has doubled. Furthermore both the quantity, and the quality, of the data that are available on the previously known Local Group members have increased enormously.

Particularly exciting developments since 1968 have been (1) the discovery of the Sagittarius dwarf, which is the nearest external galaxy, (2) the discovery of six dwarf spheroidal companions to the Andromeda nebula, (3) the application of CCD detectors to studies of stellar populations in various Local Group systems, and (4) deep high-resolution observations of various objects in the Local Group with the *Hubble Space Telescope*. With the presently available enlarged sample, and the improved quality of data on individual objects, we are now in a much better position to start exploring the evolutionary history of the Local Group and its constituent galaxies. Finally (5) it has become clear during the past quarter century that the masses of dark matter halos are typically an order of magnitude greater than the masses of the baryonic galaxies that are embedded within them.

The distance scale within the Local Group remains somewhat controversial, even though the adopted distances to most individual galaxies have not changed by more than $\sim 10\%$ over the past three decades. In the present volume the highest weight has been given to distance determinations based on observations of Cepheids and RR Lyrae variables. However, recent observations with the *HIPPARCOS* satellite have cast some doubt on the most widely accepted luminosity calibrations of classical Cepheids and RR Lyrae stars.

Literature citations in this book are complete for papers that arrived at the Dominion Astrophysical Observatory before February 1, 1999. All coordinates in this volume refer to equinox J2000.

The astronomical literature on the galaxies of the Local Group is so vast that it is quite impossible to do justice to all of it. The present volume has therefore been written in the spirit of Winston Churchill’s *History of the English-Speaking Peoples*, of which Clement Attlee said that it should have been called “things in history that interested me.”

It is a particular pleasure to acknowledge the help and encouragement by friends and colleagues too numerous to be thanked individually. I should also like to express

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