

**Galaxies**, by Harlow Shapley. (Cambridge, Mass.: Harvard University Press; and London: Oxford University Press.) Pp. 186. Price 40s.

This is an extensively revised edition of Shapley's earlier book *Galaxies* which first appeared in 1943. Since then, there have been rapid advances in extragalactic astronomy, mainly due to the existence of the 200-inch and the 48-inch Schmidt telescopes, the application of photoelectric measurements and the progress of radio astronomy. The present edition describes in some detail the new methods and the results of the recent surveys, without going into great technical details.

The first chapter begins with a historical account of galactic surveys from the days of Sir William Herschel to the present time. It is followed by a lucid explanation of the words and phrases in the astronomer's dictionary.

The explorations then begin with our nearest neighbours, the Clouds of Magellan to which the next two chapters are devoted. Important work was done on these clouds by the observatories at Harvard, Cordoba, Canberra, Bloemfontein and Pretoria. There is a detailed description of Cepheid variables and the period-luminosity relation—so important to the calibration of the distance scale in extragalactic space.

Chapter 4 is devoted to the Milky Way. The contents and structure of our Galaxy are treated rather briefly—the interest being concentrated on how the Galaxy looks as seen from outside. The attempts at measurement of the boundaries of our own system have been considered. Also, ways have been suggested of investigating problems concerning the galactic centre.

The next chapter deals with the neighbouring galaxies. It turns out that Andromeda is not as useful a neighbour as the Magellanic Clouds in supplying astronomical tools. Studies of the stellar systems in Messier 31, 32, 33 are described in detail. Two "irregular" neighbours NGC 6822 and IC 1613 as well as two "unusual" neighbours in Sculptor and Fornax also get their fair share.

The chapter on the Metagalaxy is a detailed but non-technical account of the various surveys of the metagalactic world carried out by Harvard Observatories. A more technical account may be found in Shapley's recent book, *The Inner Metagalaxy*.

The last chapter is on the expanding universe. The writer carefully avoids going into the basic "whys" and "hows" and just presents the observations, such as they are. Evidence is presented on the space distributions of galaxies. It is not yet possible to estimate accurately the space density of matter in the Universe. The writer estimates it roughly at  $10^{-30}$  gm/cm<sup>3</sup>. The radial velocity-distance relation is examined and a brief mention is also made of the alternative interpretations of red shift put forward by scientists from time to time. Data available on the "age" of the Universe are presented. There is only a brief mention of the current cosmological theories; the data at present are too limited to allow any decisive conclusions to be drawn.

The book is generously illustrated with diagrams and photographs. Because of its wealth of material and the style of presentation it should meet the requirements of the serious student as well as the layman.—  
J. V. NARLIKAR.