Nossa Galáxia: Perspectiva Histórica

Como a imagem que temos da Via Láctea evoluiu ao longo do tempo

Referências

- "MINDING THE HEAVENS: THE STORY OF OUR DISCOVERY OF THE MILKY WAY", Leila Belkora, 2003, Institute of Physics Publishing

- http://atropos.as.arizona.edu/aiz/teaching/a204/shapley_curtis.html

- http://galaxymap.org/drupal/node/171

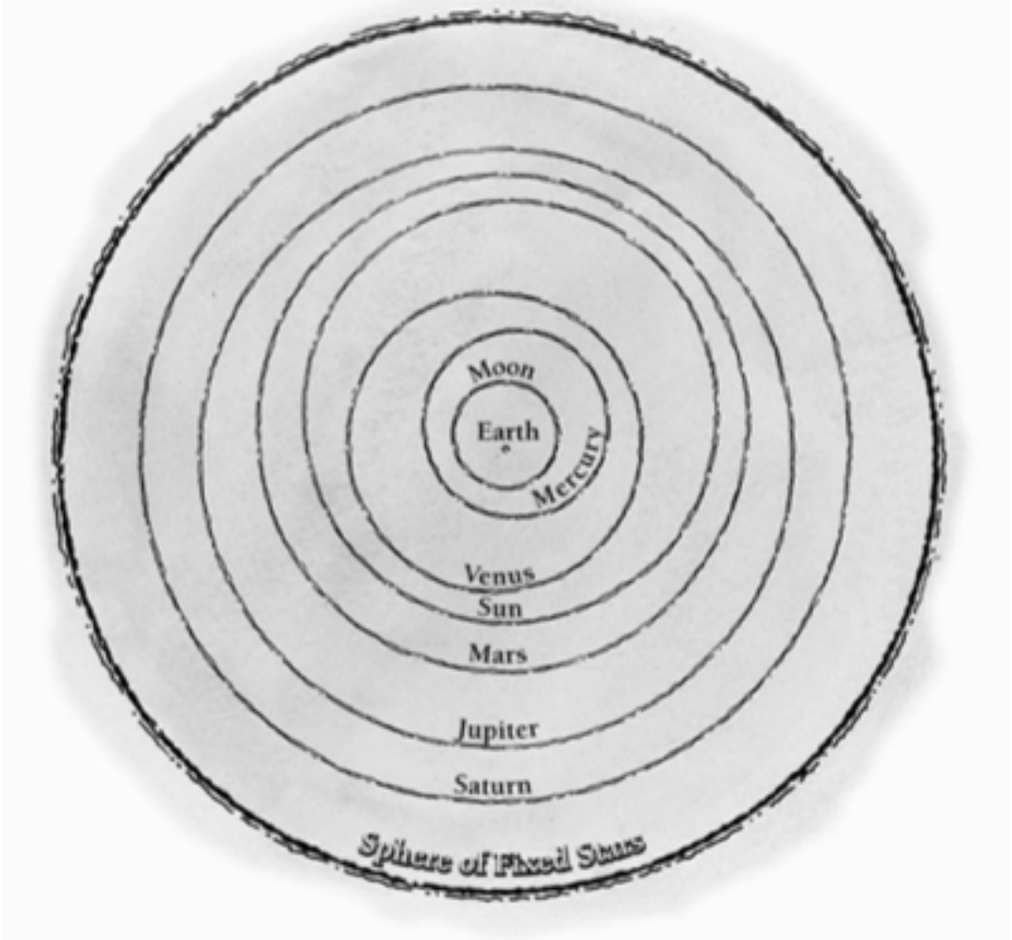


Figure 1.3 An Earth-centered system with the order of the planets as given by Ptolemy. The system ends with the sphere of fixed stars. (Credit: Layne Lundström.)

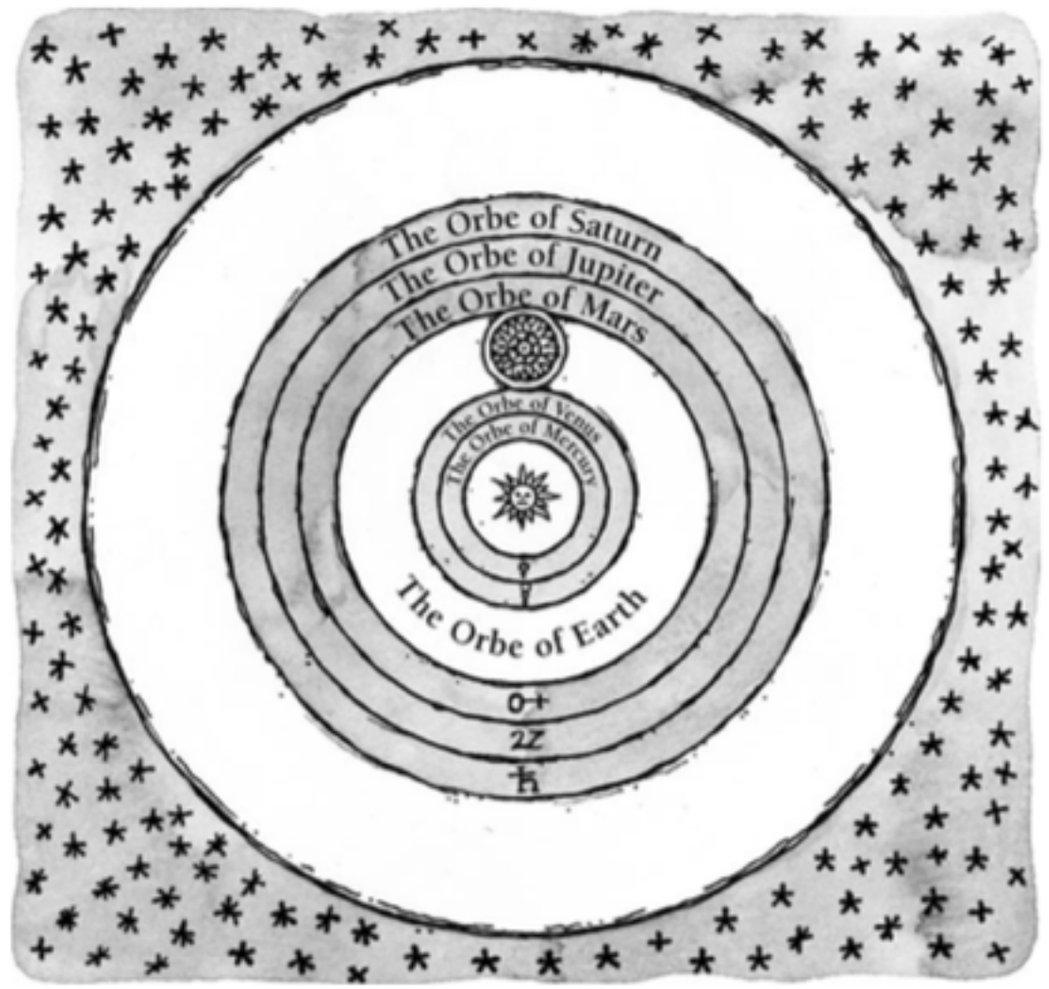


Figure 1.4 System imagined by Thomas Digges (c. 1546–95) and drawn to accompany his *Perfit Description of the Celestiall Orbes*. The label for his outermost sphere says that "the orbe of starres fixed infinitely up extendeth hit self in altitude spherically." This space is also the court of celestial angels and a site of endless joy. (Adapted by Layne Lundström.)

Antes do Conceito de Galáxia

Figuras de L. Belkora, 2003

Filosofando sobre a Via Láctea

- Thomas Wright, 1750
- Immanuel Kant, 1755
- Figura em L. Belkora, 2003

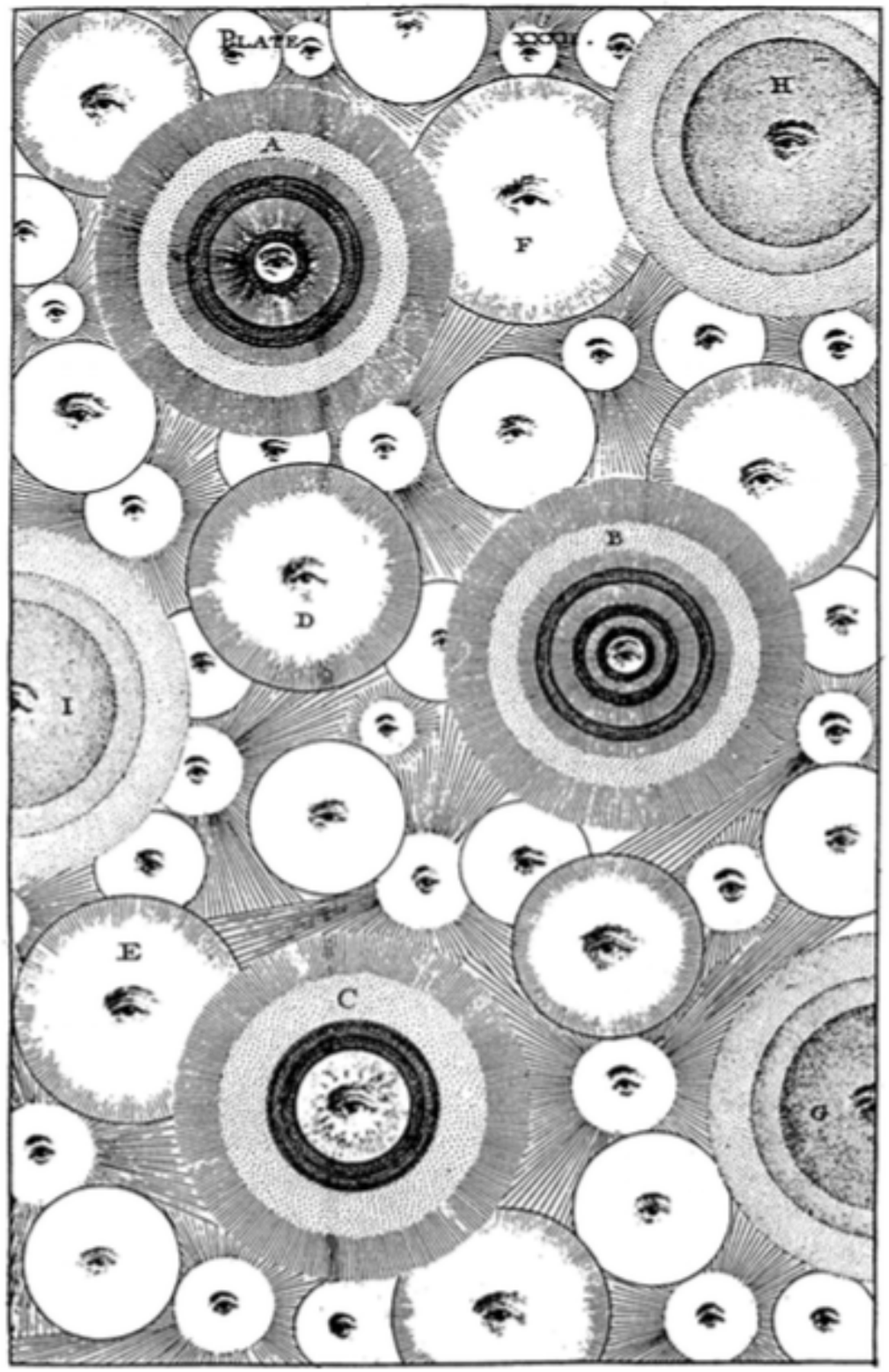


Figure 1.5 Wright's "Plenum of Creations." Wright attempted to show, in cross-section view, a number of "creations" filling the immensity of space. The eye symbols at the centers of the spheres represent the "divine Presence." In some cases, the stars are grouped in nested spheres or shells around their respective centers. (Adapted, with permission, from Hoskin (1971).)

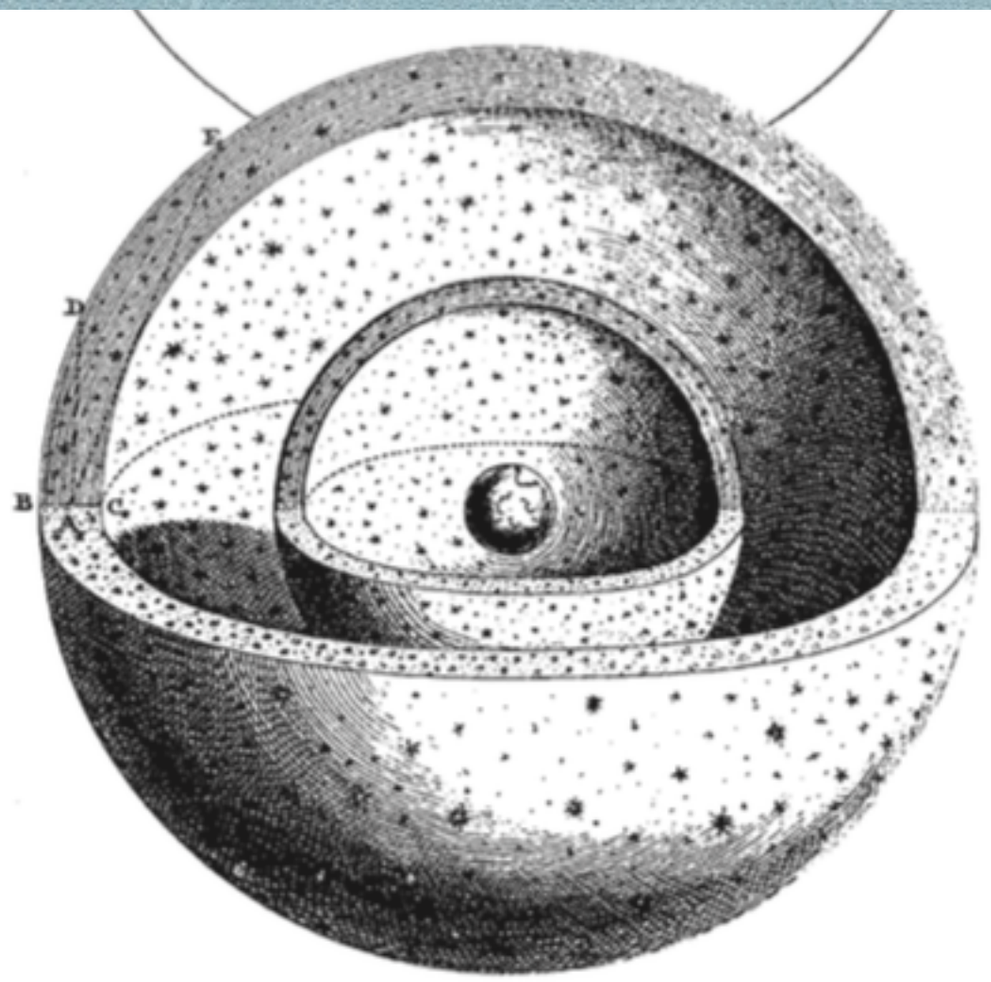


Figure 3.6 Two views of spherical "creation." (Reproduced with permission from Hoskin (1971).)

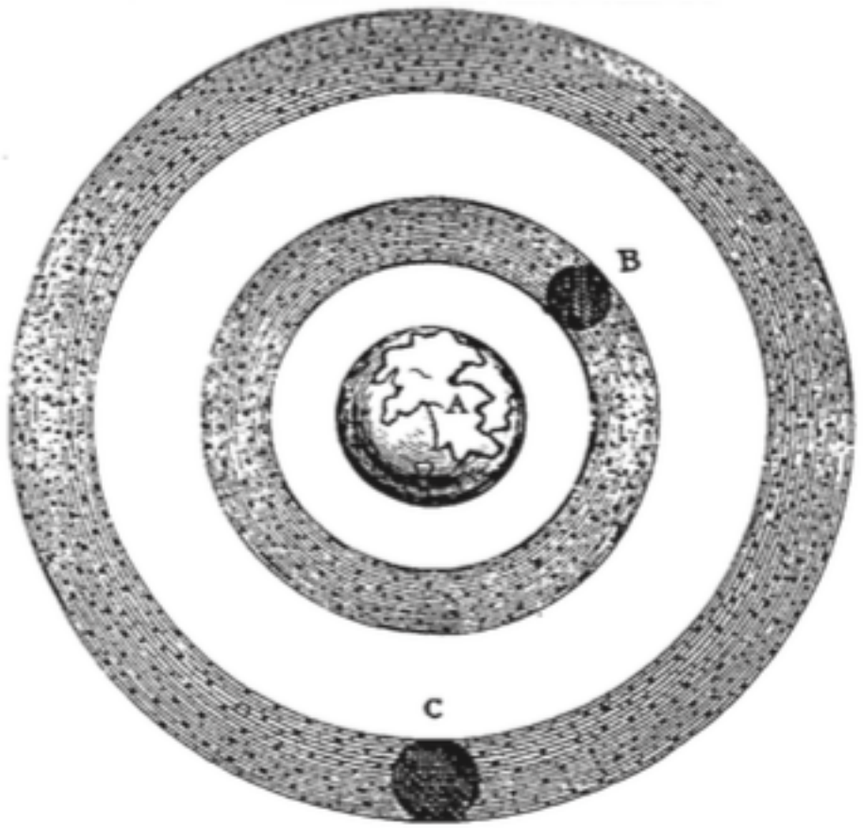


Figure 3.7 An alternative "creation" imagined by Wright; the stars lie not in a spherical shell, but in one or more rings around the divine center. (Reproduced with permission from Hoskin (1971).)

"Universos Ilhas" de Wright

Immanuel Kant

Figura em L. Belkora, 2003

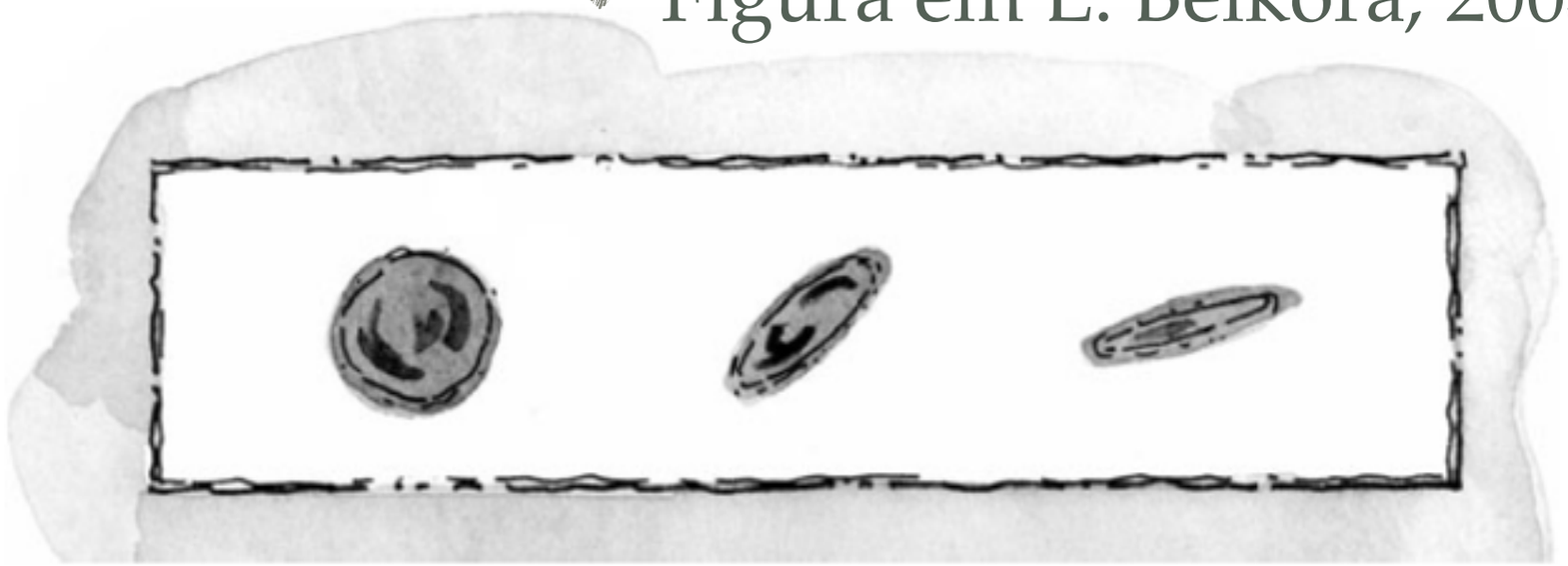


Figure 3.8 A disk of stars, or galaxy, viewed face-on (left view) and edge-on (right view). The middle view is for an intermediate viewing angle. (Credit: Layne Lundström.)

- "I easily persuaded myself that these ["nebulous"] stars can be nothing else than a mass of many fixed stars,"
- if "a system of fixed stars which are related in their positions to a common plane, as we have delineated the Milky Way to be, be so far removed from us that the individual stars of which it consists are no longer sensibly distinguishable even by the telescope […] if such a world of fixed stars is beheld at such an immense distance from the eye […], then this world will appear […] circular if its plane is presented directly to the eye, and elliptical if it is seen from the side or obliquely. The feebleness of its light, […] will clearly distinguish such a phenomenon when it is presented, from all the stars that are seen single."

Mapeando a Galáxia

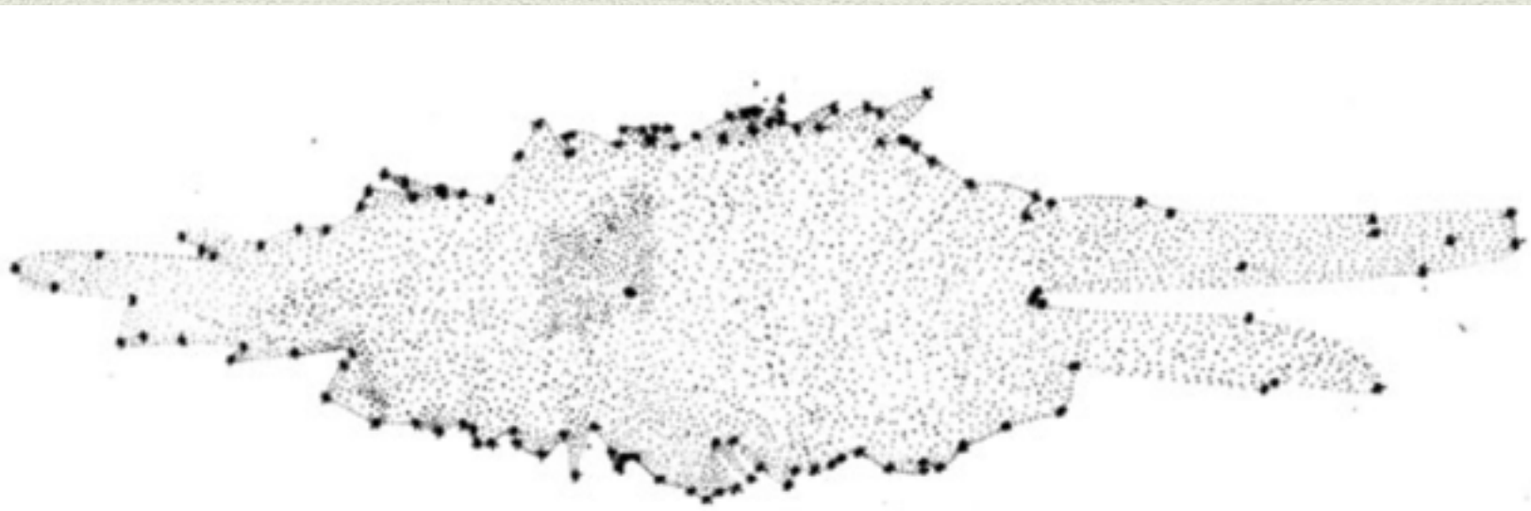


Figure 4.8 Milky Way from "star-gages." (Credit: Royal Astronomical Society.)

William Herschel, 1785

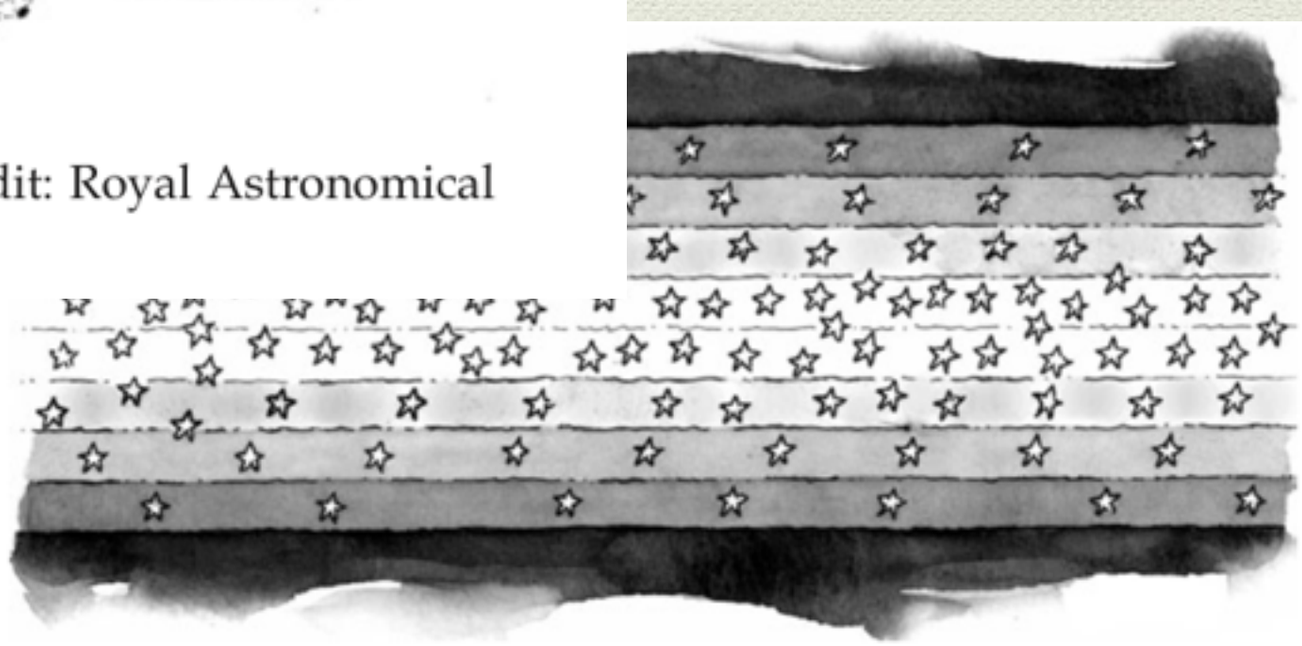
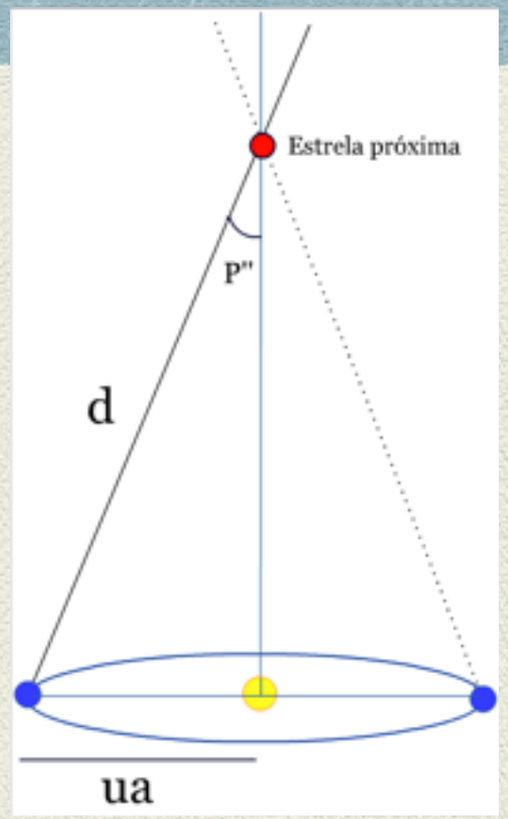


Figure 5.8 Struve's model of the Milky Way, as described verbally in his *Etudes d'Astronomie Stellaire* (1847). The Milky Way system of stars, in his conception, is thin in one direction but extends to unknown reaches in the other direction. Struve described the distribution of stars mathematically, envisioning them as very densely packed in a thin central layer, surrounded by layers of decreasing density. (Credit: Layne Lundström.)

Wilhelm Struve, 1847



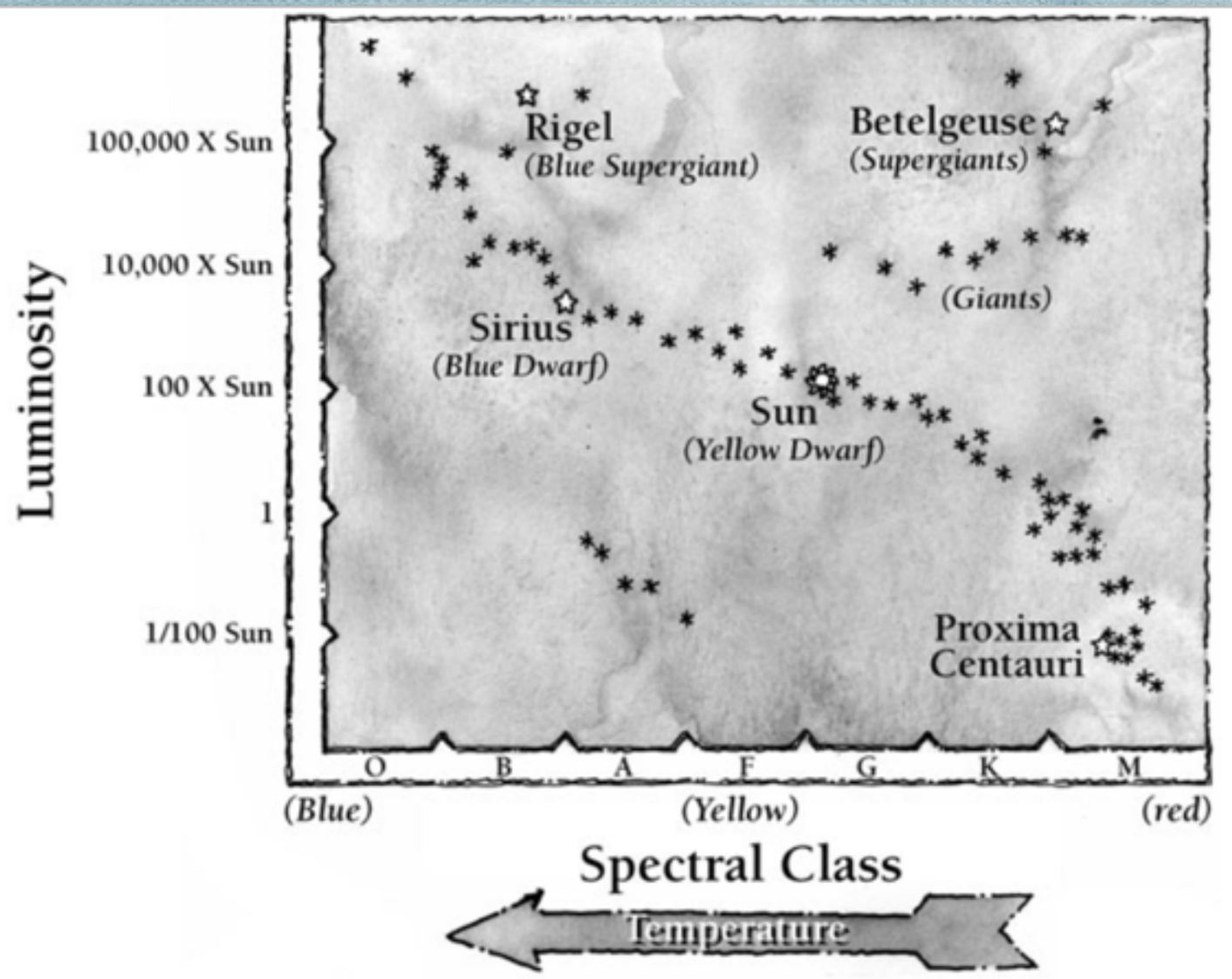


Figure 7.4 The Hertzsprung–Russell or HR diagram, showing the distribution of stars in color and luminosity. The *x* axis shows color from blue to red, or temperature decreasing to the right. The *y* axis shows the luminosity in units of the solar luminosity. Most stars have a color

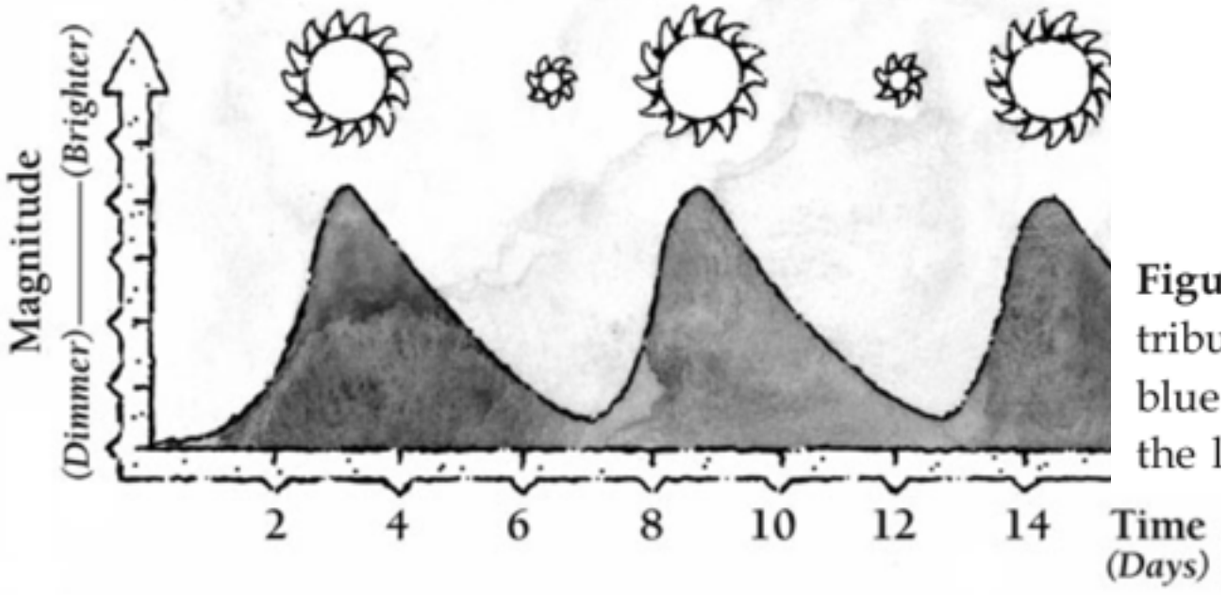
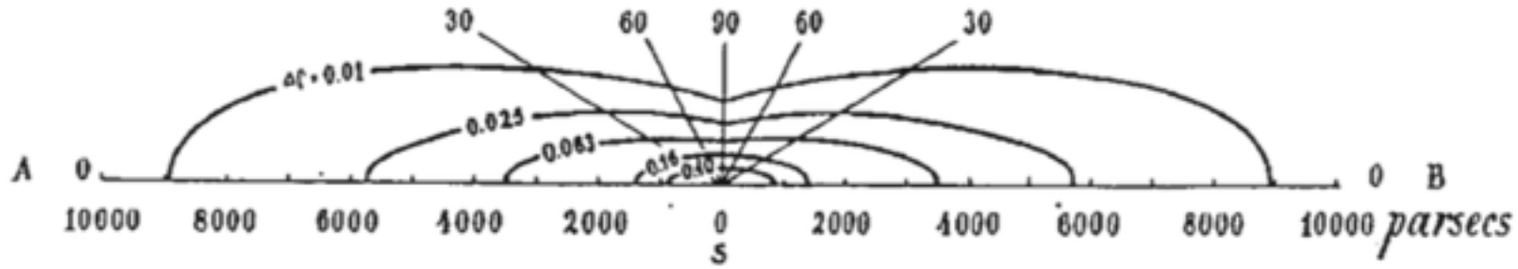


Figure 7.5 Cepheid variables. Cepheid (SEF-ee-id) variable stars, named after the prototype star exhibiting the behavior, Delta Cephei, brighten and dim in a regular pattern as they swell and shrink. At their maximum size, they have their peak brightness. The fact that the maximum brightness of a Cepheid variable is related to the period of time over which the pattern repeats has led to the use of Cepheid variables as distance indicators, as explained in the text. (Credit: Layne Lundström.)

Mapeando a Galáxia - Kapteyn



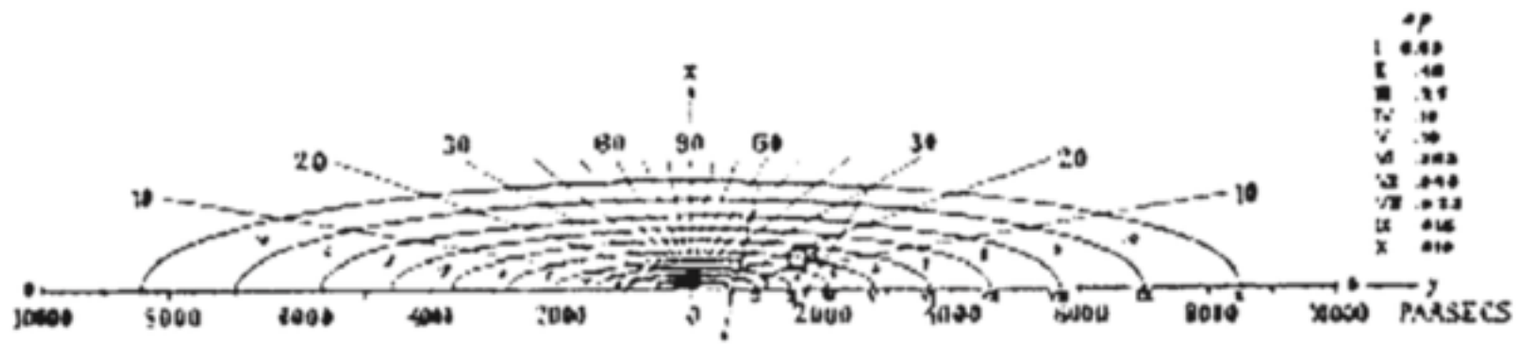


Figure 7.6 The "Kapteyn Universe." Top panel: 1920 model of the distribution of stars in our galaxy, derived by Kapteyn and his student van Rhijn from an analysis of star-counts. The system is assumed to be symmetric, so only the "top half" of the galaxy is shown. The line AB represents the plane of the Milky Way. The Sun is at S, the center of the system. Distances are given along the *x* axis in parsecs; 1 parsec is

Mapeando a Galáxia - Kapteyn

"Undoubtedly one of the greatest difficulties, if not the greatest of all, in the way of obtaining an understanding of the real distribution of stars in space, lies in our uncertainty about the amount of loss suffered by the light of the stars on its way to the observer."

J C Kapteyn, 1909

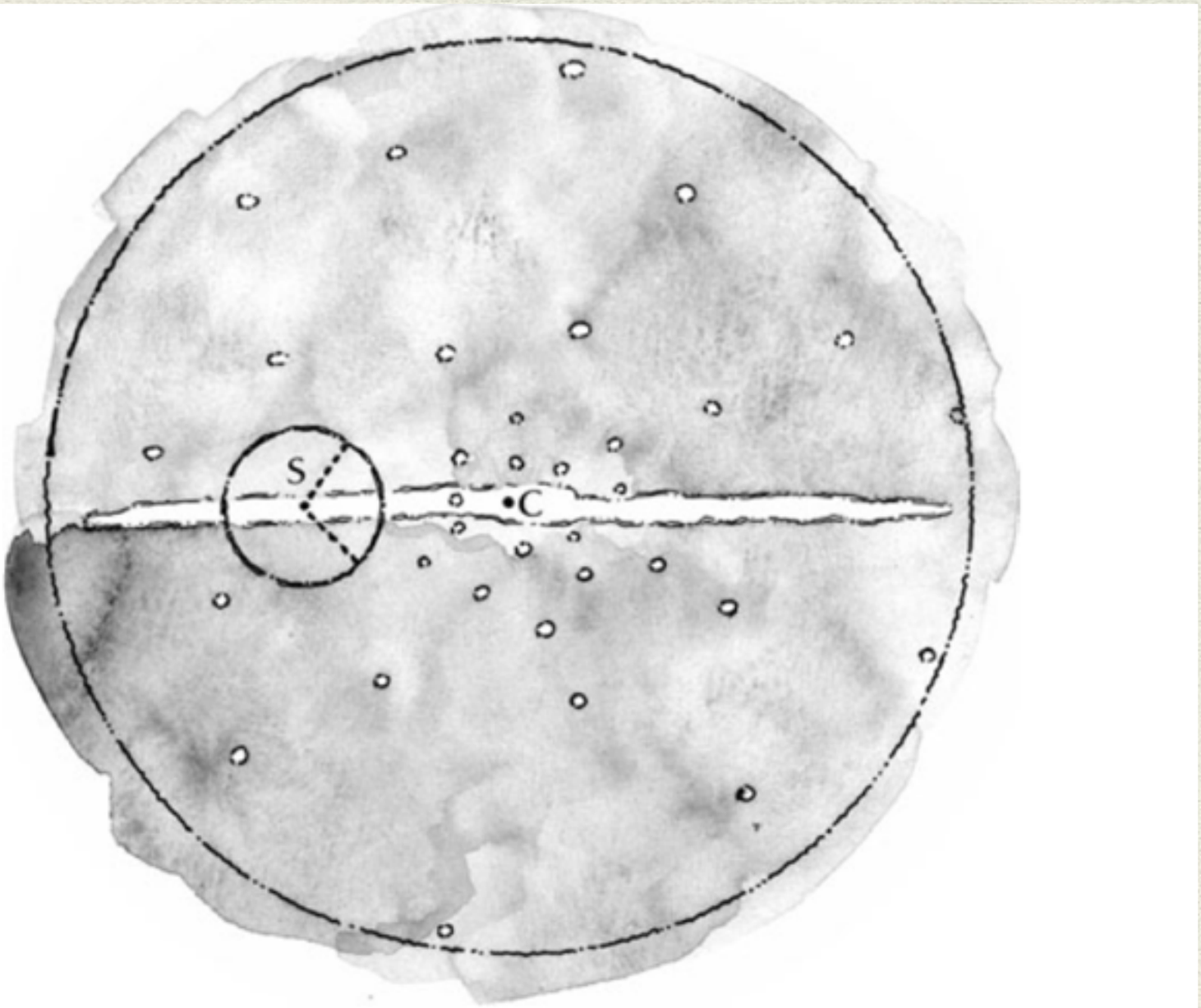


Figure 8.2 Distribution of globular clusters with respect to the Galaxy. Globular clusters fill the spherical space around the disk of our galaxy; in other words, the center of the globular cluster distribution coincides with the center of the galaxy, "C." This is the situation imagined by the Swedish astronomer Karl Bohlin, and later confirmed by an initially skeptical Harlow Shapley. As viewed from the position of the Sun

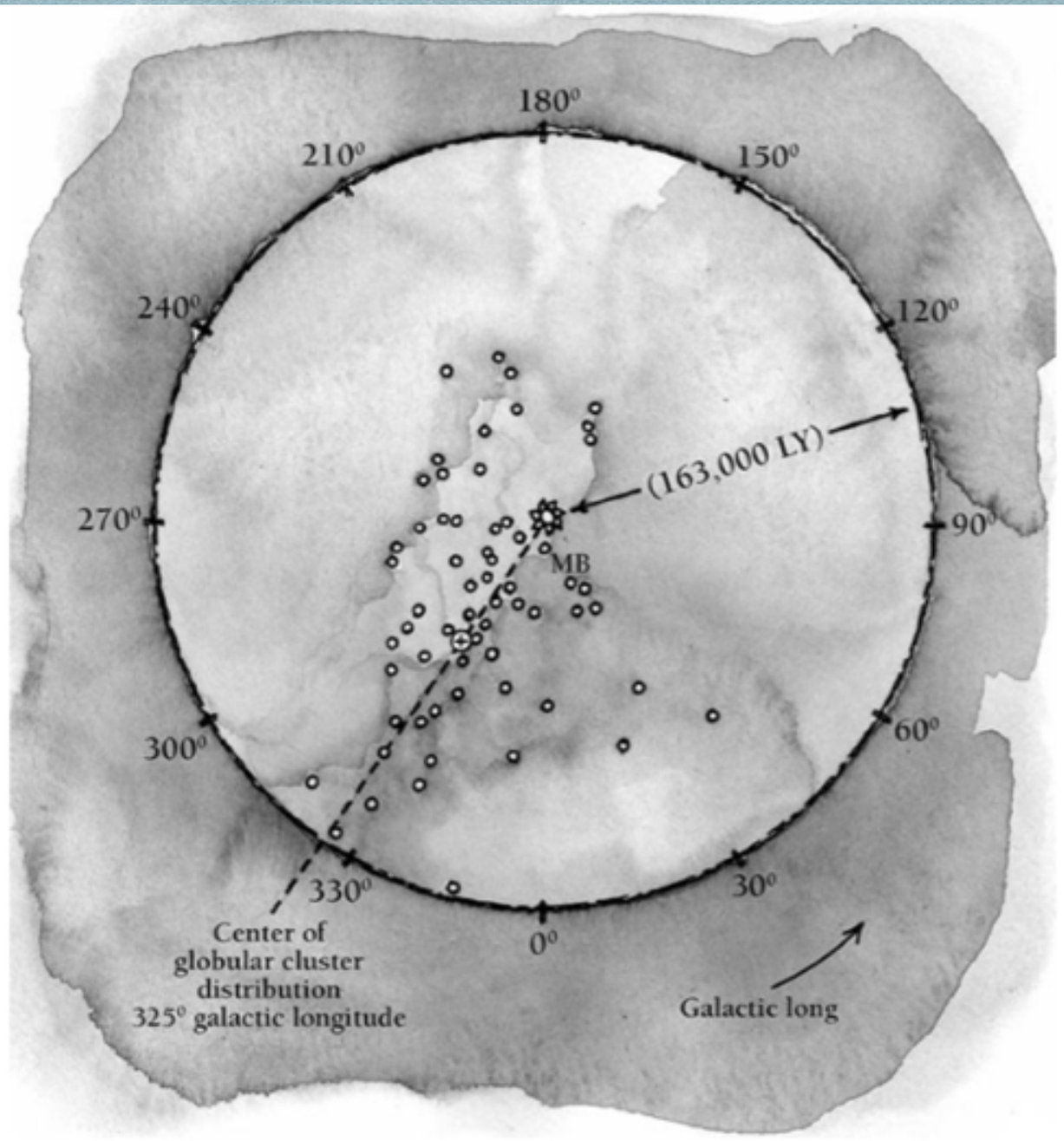


Figure 8.3 Distribution of globular clusters mapped by Shapley. The diagram is a kind of bird's-eye-view of the Galaxy, showing the globular clusters asymmetrically located in galactic longitude with respect to the sun. Shapley found that the center of the globular cluster distribution (marked by a + symbol), which he correctly assumed matched the center of the galaxy, lay tens of thousands of light-years from the Sun. (Note that the longitude system Shapley used is no longer the standard.) (Credit: Layne Lundström.)

Shapley, 1917

Distância aos aglomerados foi obtida a partir das hipótese de que a luminosidade máxima do RGB é a mesma, e que o diâmetro físico é o mesmo entre os aglomerados.

O "Grande Debate", 1920

- Entre Harlow Shapley e Heber D. Curtis
- Qual o tamanho da Galáxia e a posição do Sol dentro desta?
- Qual a natureza das “nebulosas"?

- http://atropos.as.arizona.edu/aiz/teaching/a204/shapley_curtis.html

O nascimento da Astrofísica Extragaláctica

- "You will be interested to hear that I have found a Cepheid variable in the Andromeda nebula (M31)“, Edwin Hubble, 1924

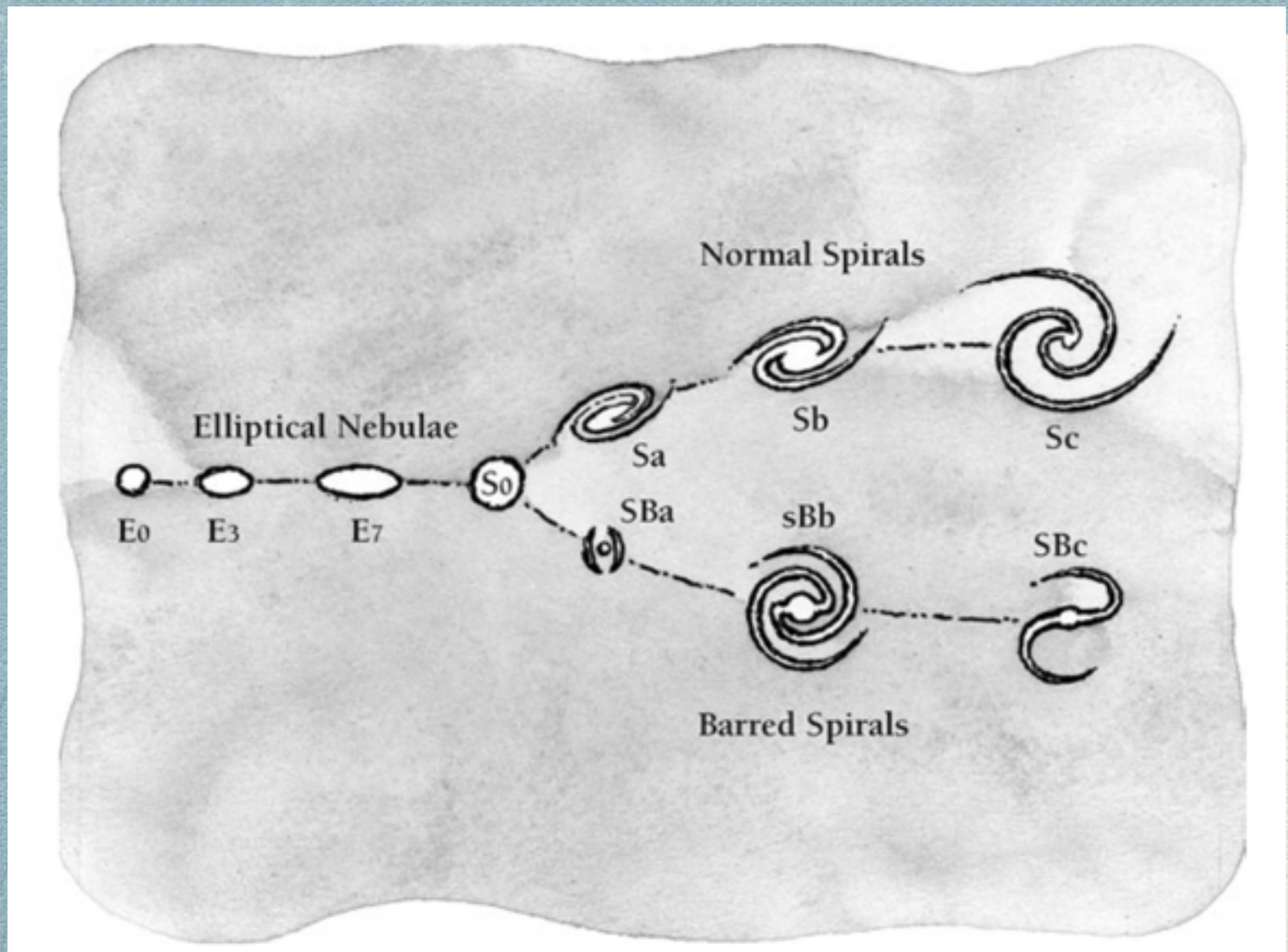


Figure 9.3 Hubble's classification of the galaxies. Hubble arranged the different types of nebulae he distinguished in a sequence, which he believed corresponded to an evolutionary sequence. At the left are the elliptical nebulae, more or less egg-shaped, without spiral structure. The more round galaxies he called E0, and the more "squashed" E7. At the right are the normal spirals (top branch) and the barred spirals, in which the spiral arms emerge not from the center of the galaxy but from a prominent bar running through the center. The spiral (S) and spiral-barred (SB) galaxies are designated also by the letters a, b or c, according to various morphological features such as the degree to which the arms appear "unwound." (Credit: Layne Lundström.)

Dados numéricos entram na Cosmologia (Hubble, 1929)

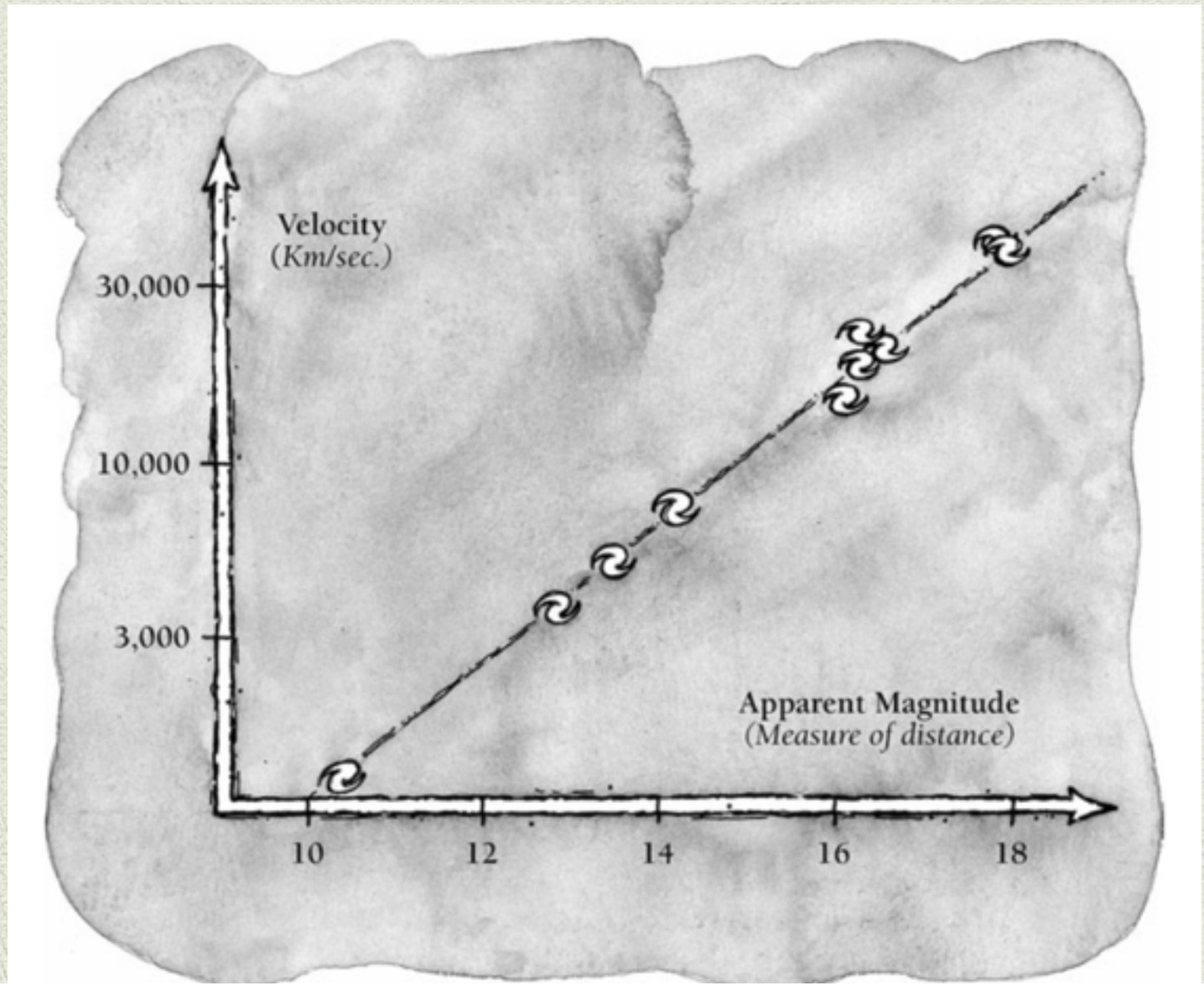


Figure 9.4 First hints of an expanding universe. Hubble plotted the velocity of galaxies (measured from the redshift of lines in the galaxies' spectra) against their apparent magnitude, an estimate of their distance.