THE ASTRONOMICAL JOURNAL

PUBLISHED BY THE AMERICAN INSTITUTE OF PHYSICS
FOR THE AMERICAN ASTRONOMICAL SOCIETY

VOLUME 68

1963 June ~ No. 1310

NUMBER 5

Abstracts of Papers Presented at the 113th Meeting of the American Astronomical Society, held 17–20 April 1963 at the Kitt Peak National Observatory, University of Arizona, Tucson, Arizona

On the Size and Structure of the Coma Cluster of Galaxies. G. O. ABELL, *University of California, Los Angeles*.—The luminosity function has been determined for 2773 galaxies with $m_{pv} \leq 18.0$ in a 6.2 by 6.2-deg field centered on the Coma Cluster of galaxies, but outside the 2.8 by 2.8-deg region which includes the main part of the cluster itself. The cluster appears to be contained well within an oval region of dimensions 5.4 by 4.3 deg. To the accuracy of the observations the luminosity function of the 1407 galaxies outside of this region agrees with that expected for a uniform distribution of galaxies in space, and is very different from that of the cluster itself. Moreover, the surface density of these galaxies is relatively constant over the field—about 77 galaxies ($m_{pv} \leq 18.0$) per square degree. These observations are consistent with the hypothesis that the radius of the cluster is limited to about 2 deg, in qualitative agreement with the conclusion reached by Noonan (*Publ. Astron. Soc. Pacific* **73**, 212, 1961) from his analysis of galaxy counts published by Zwicky [*Morphological Astronomy* (Springer-Verlag, Berlin, 1957), pp. 137–150].

The above density of “field” galaxies is then used to determine the radial distribution of cluster galaxies of different magnitudes. Although the mass distribution in the cluster resembles, roughly, that of the isothermal polytrope, there is no clear-cut difference between the radial distributions of galaxies of different luminosities.

Stellar Radial Velocities in the Perseus Arm. HELMUT A. ABT, *Kitt Peak National Observatory*.—Published stellar radial velocities in the vicinity of η and χ Persei ($l^{\text{II}} = 130^\circ$), yield a mean that is algebraically larger by 7.4 km/sec than the 21-cm velocities of the neutral hydrogen in the center of

that arm. To investigate this discrepancy, velocities have been obtained for 45 stars in a more distant section of the Perseus Arm at $l^{\text{II}} = 100^\circ$. Twenty-four of these stars seem to have constant radial velocities and their mean velocity agrees well with the 21-cm velocity for the center of the arm. However, the mean velocity from three observations of each of the 21 variable-velocity stars exceeds that from the constant-velocity stars by 15.6 ± 3.7 (p.e.) km/sec. An explanation for this difference, involving the effect of gaseous streams on the observed stellar radial velocities, is proposed. If the velocities of the constant and variable-velocity stars are averaged together, the mean exceeds the 21-cm velocity for the center of the arm by 8.7 km/sec, which is similar to the result for the η and χ Persei region. It is therefore suggested that the velocities of many OB-type spectroscopic binaries may be systematically too large and may be unreliable for galactic-structure studies.

Contribution to the Theory of Critical Inclination of Close Earth Satellites. II. Asymmetrical Case. SHINKO AOKI, *Goddard Space Flight Center*.—The theory of motion near critical inclination is extended to include the asymmetric potential of the earth for the case of small eccentricity. If the antisymmetric terms are very small, only a slight distortion will occur, and the figure-eight characteristics would again be present. However, if the antisymmetric terms are large enough, the characteristics of the motion are totally different. The numerical example shows that in the case of the earth the latter case occurs; thus, the antisymmetric terms cannot be neglected in this respect.

In this paper we have assumed that J_n is of n th order of magnitude, supposing that the eccentricity