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ABSTRACTS OF PAPERS PRESENTED

ABELL, GEORGE O. **The luminosity function of the Coma cluster of galaxies.**

A program is in progress to determine the bright end of the luminosity function of each of about 30 rich clusters of galaxies with a technique of extrafocal photographic photometry with the 48-inch Schmidt telescope of the Palomar Observatory.

Magnitudes of a number of stars in each cluster field are calibrated by photographic and/or photoelectric methods. Then magnitudes of galaxies are obtained by comparing images of galaxies with the calibrated stars on each of five plates taken at various amounts out of focus. The measures are made in two colors corresponding, approximately, to international photographic and photovisual magnitudes.

The integrated magnitude for each galaxy is obtained from the surface brightness of its images on two or more extrafocal plates through a method developed by Abell and Mihalas which utilizes a knowledge of the ellipticity and an assumed distribution of surface brightness of the galaxy.

The luminosity function has been determined completely for the first of the clusters, the Coma cluster of galaxies. Near the limit of the observations, $m_{pg} = 19.2$, the luminosity function increases rapidly. However, about two magnitudes below the bright end of the luminosity function there is a marked preliminary maximum. It is necessary to count through about the first 150 brightest galaxies to reach this maximum. About three magnitudes fainter than the brightest

cluster members there is a minimum; at still fainter magnitudes the luminosity function increases rapidly. The preliminary maximum exists in the luminosity functions of galaxies of both small (<0.4) and large color indices.

If further investigation shows that this maximum near the bright end is common to the luminosity functions of galaxies in the other rich clusters, it should provide a new, more reliable distance criterion for rich clusters of galaxies.

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CAMERON, A. G. W. **Carbon thermonuclear reactions and heavy-element formation.**

When helium is consumed at a high rate of energy generation in massive stars and in shell sources of somewhat less massive stars, the principal product is C^{12} . Following helium exhaustion, carbon thermonuclear reactions provide the next source of energy generation. In these reactions both protons and alpha-particles are produced; a theoretical estimate gives comparable yields for these two types of particles. In the earlier stages of carbon-burning, the protons are captured by C^{12} , forming C^{13} , and the alpha-particles react with the C^{13} to produce neutrons. Cross sections were calculated from experimental data or by theoretical methods for a large number of reactions which could have any important effect on the abundances; these include (α, γ) , (α, p) , (α, n) , (p, γ) , (p, α) , and (n, γ) reactions. Changes in abundances of a wide