

DISCUSSION  
(paper by K. HENIZE)

ROUNTREE-LESH. In his talk, Dr. Henize indicated that the ultraviolet spectrum of  $\zeta$  Cas is peculiar, and that this peculiarity is also apparent in the OAO-2 data. Now the usual spectrum of  $\zeta$  Cas is entirely normal, as is the ultraviolet spectrum from Mariner 9 data. This star is an MK standard as B2 IV, as well as a photometric and line-profile standard for comparison with variable stars. Could Dr. Henize describe in what way this star is peculiar ?

HENIZE. On 5019 plates, we find that C IV absorption is significantly stronger than is expected in a B2 IV star. Its strength is roughly equivalent to that of a B0.5 star. I have noticed that this strength is confirmed by spectra of OAO-2.

DWORETSKY. Would your overall correlations with spectral types determined from ground based spectra be improved by using the types of Conti and co-workers, which are based on higher dispersions and quantitative line ratios, and not visual inspection only ?

HENIZE. I have a somewhat subjective feeling that there is a tendency in the case of several stars which stray from the expected UV regime for the Conti spectral classes to be in better agreement with the UV data. However, I have not made a detailed study to see whether one classification system or the other really fits the UV data better.

BUSCOMBE. The spectra are beautiful, and I wish more of the hot stars were so well observed.

1. Are the visual estimates from computer enhanced reproductions lacking identifications, or from original plates on which you inevitably know the region in the sky ?
2. Are you confident of the spectrophotometric calibration, which is more critical for lines as deep as Si IV & C IV than in the usual photographic spectral region ?
3. If  $\tau$  Sco is deviant, for which some unusually well-resolved lines imitate high luminosity, do other slow rotators show similar effects ?

HENIZE. The visual estimates are from the original flight film. Concerning spectrophotometric calibration, yes we have a good calibration but since these data are based mainly on eye estimates, I am not sure that it much matters. And about  $\tau$  Sco, I am sorry I haven't yet correlated our line strengths with rotation rates.

UNDERHILL. The Be and shell stars, which appear to have UV spectra corresponding to earlier types, when examined at high resolution from the ground do have earlier types than the MK type. For instance, in

1952 I showed  $\zeta$  Tau was about B1 rather than B4 as given by the MK type. The UV spectrum confirms the type B1, as shown by S. R. Heap from Copernicus and sounding-rocket high-resolution spectra.

ROSENDAHL. It should be pointed out that the behaviour of the appearance of emission in the UV resonance lines at a certain limiting bolometric magnitude is also reflected in the optical region of the spectrum by the appearance of emission at H $\alpha$  at approximately the same limiting magnitude. The behaviour of the optical emission is correlated with MK type. If it is assumed that the UV resonance lines and H $\alpha$  formed in different regions of the atmosphere, then this behaviour implies that there is a strong coupling between various regions of the atmosphere and that it does make sense to attempt to order the UV behaviour by MK type.