3. For early-type stars a useful classification index can be derived from the intensities for 3550, 4030 and 4500, namely, $3550/4030 \times 4500/4030$. This index, which measures the Balmer discontinuity, gives accurate spectral classification for B2-B8 and A8-F8 stars. Around A3 the classification accuracy is not high, but here the index may serve the purpose of selecting a group of stars of relatively small spread in absolute magnitude.

4. For M stars spectral classes can be determined from the ratio 5080/5000.

All the classification indices mentioned have the property that they are very slightly affected by interstellar reddening. The three wave lengths giving the Balmer discontinuity index were selected so as to eliminate the effect of normal interstellar reddening. Even abnormal reddening such as is found in the Orion region has little effect upon the index.

The probable error of an intensity ratio was derived from observations made on different nights and found to be ± 0.008 mag. for average conditions. Under favorable photometric conditions the probable error ± 0.004 mag. was found. The rate of change with spectral class of the classification indices used was found to be 0.2 to 0.7 mag. per spectral class. The uncertainty of the spectral classes given by the photometric errors is given by probable errors of from two to four hundredths of a spectral class.

The uncertainty of the spectral classes caused by cosmical scatter has not yet been determined, but the small scatter in the comparison with Morgan's spectral classes indicates that it is less than one-tenth of a spectral class. It may well be considerably less. It is intended to study this question further through intercomparison of different classification indices, and through comparison with color indices of stars for which interstellar reddening is negligible.

The results obtained indicate that similar classification indices measuring the strength of the Balmer lines are useful, but that it would be desirable in this case to use interference filters of smaller half-widths. Filters suitable for the purpose are now being made by Bausch and Lomb. The interference filters used reduce the intensity by a factor corresponding to 4-5 mag. With large reflectors it should be possible to use the spectral classification method to at least magnitude 15.

Several applications of the method of spectral classification through photoelectric photometry

with selected interference filters suggest themselves. Among these may be mentioned accurate determinations of intrinsic colors and color excesses for F, G, and K stars that would make possible a more detailed study of the structure of the interstellar absorbing medium.

*Yerkes Observatory,
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Swann, W. F. Progress in photographic plates for astronomy.

A number of changes have been made in Kodak Spectroscopic Plates since I last reported to the AAS. In general the 103a type emulsions for long exposures to light of low intensity now have higher sensitivity. Some of the sensitizings have been slightly modified and the changes have been indicated by a number following the sensitizing letter, notably F (3), E (2), G (2), and H (2).

The fast infra-red plates have been improved slightly and the I-Q plate with maximum sensitivity between the M and the Z has been reinstated. Of particular interest among the infra-red plates is the 103-U which has high sensitivity between 7000 and 7500Å where there is a gap in the emission of the night sky.

*Eastman Kodak Co.,
Rochester, N. Y.*

Underhill, Anne B. A spectrophotometric study of the shell star ζ Tauri.

A spectrophotometric comparison of the shell spectrum of ζ Tauri in 1938 and in 1950 is made. It is shown that the spectrum of the underlying star has not changed, but that the shell spectrum shows a lower degree of ionization in 1950 than in 1938.

The spectrum of the underlying star is classified as B2n and it is shown that this star is rotating with a speed about 350 km/sec. All of the shell lines between $\lambda 3896$ and $\lambda 4923$ are measured and identified and it is shown that in 1938 absorption lines from FeII were strong and there were some lines from FeIII, whereas the lines from ionized Ti, Cr, V, Sc, etc. were weak. In 1950, the FeII lines were strong and there were many FeI lines but no FeIII lines. The lines from the spectra of the ionized metals have increased in strength. The temperature and electron pressure in the shell at each epoch is estimated and it is shown that the observed spectral changes are probably due to an increase in pressure by a factor of 50 to 100.

It is shown that there is no evidence of strati-