

Therefore, these data can only be used to determine a lower limit to the relative efficiency of the Herzberg with respect to UV Prime. The results, based on the data which had the least amount of obscuration, are summarized in Table 1. We note that the relative efficiency at 3600 Å in Table 1 is different from the value recorded in the lab for two reasons: (1) the non-photometric sky conditions, and (2) the difference in quantum efficiencies between PHX1 and TH1 (20% versus 30%, respectively, at UV wavelengths). A somewhat surprising result is that the Herzberg spectrograph + PHX1 is more efficient than the UV Prime + RCA3 at 3100 Å. We suspect that this is due to the low quantum efficiency of RCA3. At other wavelengths the relative efficiencies of the spectrographs appear to be more-or-less comparable.

#### 4. The Bottom Line

Our experiments indicate that the Herzberg spectrograph configured with blue optics and either TH1 or PHX1 has an efficiency which is comparable to that currently obtainable with UV Prime. This situation could change if RCA3 were replaced with a higher quantum efficiency device. However, there are no plans to do this soon.

For applications which are read-noise limited the Herzberg has a significant advantage, since TH1 and PHX1 have read noises of 12/e<sup>-</sup> and 7/e<sup>-</sup> respectively, compared with 55/e<sup>-</sup> for RCA3. Consequently, we recommend that the Herzberg spectrograph be used for all UV programs where the signal is read-noise dominated. Moreover, the Herzberg should also be used for all programs concerned with wavelengths redward of 3600 Å.

Finally, we point out that the Herzberg has an arsenal of eight gratings, and many of these could be used in second or third order, where the blaze wavelengths fall in the UV. We summarize the characteristics of the gratings which could be used at UV wavelengths in Table 3.

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Table 2

Wavelength	Ratio of Efficiencies*
3100	1.1
3200	0.6
3300	0.5
3400	0.5
3500	0.6
3600	0.7
3700	0.8

\*Ratio of the number of electrons detected per wavelength interval, in the sense Herzberg/UV Prime.

Table 3

Grating	Lines/mm	Blaze Wavelength (Order)	Dispersion (Å/mm)
1	1200	4000 (I)	41
3	830	4060 (II)	22
4	600	4000 (I)	83
5	300	3750 (II)	83
6	300	4200 (I)	166
7	300	3330 (III)	55
8	150	2500 (II)	166

## Coudé Improvements

The coudé spectrograph with the f/8.2 camera is the CFHT instrument with the longest continuous service record, but that does not mean that changes have not been made to improve its overall performance. For the benefit of those coudé users who have not observed with the spectrograph recently, we shall describe some of the modifications which should make working at coudé a more pleasant experience.

1. The 1872 Reticon detector now has an 'Autofill' system that provides continuous cooling for up to 7 days without intervention by the observers. Once operating, the timer adds liquid nitrogen to the detector housing at about 06:00, 10:00, 14:00, and 18:00 hours each day. Observers are warned to avoid taking stellar exposures (or arcs or flats) at those times, since the stiffening of the hose carrying the LN2 may move the detector very slightly.
2. Also related to the 1872 Reticon cooling, the path between the LN2 dewar inside the detector housing and the detector support itself now consists of two sections of copper braid, firmly attached to the housing at each of its ends. As a result the cooling rate is very steady throughout the night, typically keeping the detector temperature constant to within 0.05 °C.
3. An XY guider handset has been installed at coudé, simplifying the process of acquiring and guiding on stars. The X- and Y-axes of the buttons on the handset are fixed with respect to the horizontal and vertical axes of the TV viewing monitors, regardless of the declination or hour angle of the telescope.
4. An HP9000 workstation has been installed permanently at the third floor coudé observing area for use with the 1872 Reticon and all CFHT CCDs. New software is now in regular use that has been especially configured for the needs of technical staff and observers using the coudé spectrograph.
5. Last but not least, a revised version of the manual for using the 1872 Reticon at Coudé has been completed. Observers scheduled to use the Reticon during the 1989II semester should receive a copy of this manual automatically prior to their observing run. Anyone else interested in obtaining a copy should contact either Mrs. S. Wood at CFHT or the undersigned (BITNET: [glaspey@uhcfht](mailto:glaspey@uhcfht), or INTERNET: [glaspey@cfht.hawaii.edu](mailto:glaspey@cfht.hawaii.edu)).

In the category of almost news, use of the autoguider at coudé was tested successfully in April, 1989. An operational version of the optical configuration is under study at CFHT, but will probably not be available for visitor use before 1990I. Tests were also carried out to determine the relative efficiencies of the three coudé mirror trains. Reduction of the data will occur over the summer months, with the results available in plenty of time to help schedule the coudé train changes needed for the 1990I observing semester.

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