

## NON-CEPHEIDS IN THE INSTABILITY STRIP

William P. Bidelman  
Warner and Swasey Observatory, Case Western Reserve Univ.  
Cleveland, Ohio 44106

The question of whether non-Cepheids populate the cepheid instability strip has been the subject of much recent interest. Several investigators (see especially Fernie and Hube 1971 and Fernie 1976) have concluded that indeed there are an appreciable number of objects not presently recognized as Cepheids within the strip, though both the size and position of the strip and the placement of supergiants in the H-R diagram are subject to considerable uncertainty. In view of the interest in this matter, I have attempted to shed some light on this situation by simply considering the nature of the stars spectroscopically classified as of high luminosity in spectral classes F and G. For this one needs, of course, a complete sample of the relevant stars, which fortunately is now to some extent available.

A complete listing of all class Ib and brighter supergiants bright enough to be contained in the Henry Draper Catalogue south of  $\delta = -53^\circ$  is given by Houk, Hartoog, and Cowley (1976), the data being taken from the first volume of the Michigan spectral catalogue (Houk and Cowley 1975). This region of course, includes much of the southern Milky Way, though only a small part of the whole sky.

From Table II of Houk et al. (1976) counts have been made of all known Cepheids (not all of which are so identified in their paper) and of all non-Cepheid supergiants within two different spectral ranges. The results are as follows:

| Type         | Spectral Range |       |
|--------------|----------------|-------|
|              | F2-G5          | F5-G2 |
| Cepheids     | 18             | 13    |
| non-Cepheids | 53             | 29    |
| total        | 71             | 42    |

Though the numbers are small, the percentages of Cepheids are 25% and 31% for the two spectral ranges. The narrower range is perhaps closer to the truth since the spread in the assigned spectral types is actually quite small. In making the counts it was assumed that several controversial variable supergiants (V382 Car = HR 4337,  $0^1$  Cen, V810 Cen = 4511, and V766 Cen = HR 5171) were not Cepheids.

It is probably unwarranted to draw any very firm conclusions from these data, for at least the following reasons: First, the assignment of sim-

ilar spectral types and luminosity classes does not necessarily mean that the variables and non-variables are actually in the same positions in the H-R diagram. And, secondly, some, perhaps many small-range Cepheids may await discovery in the southern sky. Nevertheless the data taken at face value would appear to indicate that there are at least as many non-Cepheids in the instability strip as Cepheids.

Further information could be gleaned from Dr. Houk's classifications if detailed counts of somewhat intrinsically fainter normal stars were available. In the same region of the sky she has classified an additional 24 Henry Draper Catalogue Cepheids as of luminosity classes Ib-II or II--almost all among the F's--but the number of normal supergiants of these luminosity classes is also no doubt substantially larger than the number of Ib stars. It will be of interest to see the results of Dr. Houk's classifications in other parts of the sky. In the meantime detailed study of the apparently non-variable supergiants of the southern sky might be well worthwhile.

#### References

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