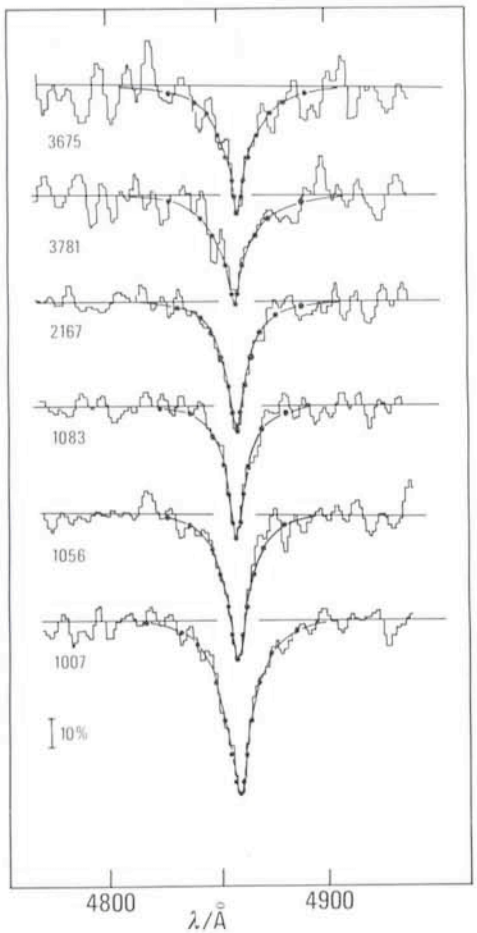

Fig. 3: *Theoretical line profiles fitted to the observed Balmer lines in hot HB members of NGC 6752. Once the effective temperature is known from IUE observations, gravity is determined through the detailed fits of Hβ (in the figure), Hγ and Hδ.*

(T_e) can be determined to within 1,500°K or less. It is a very satisfactory accuracy for these objects, especially those with V > 16, which up to now were collectively classified as having T_e about 25,000°K.

The knowledge of T_e allows now a meaningful fitting of synthetic spectra to the observed hydrogen and helium lines. This work has been done by Uli Heber and R. P. Kudritzki (Ref. 7); Figs. 3 and 4 show some of the results, which have been quite remarkable. For the first time, helium has been observed directly in Population II stars and, besides, there is convincing evidence that helium is depleted in the atmospheres of these objects. In fact, the helium abundances, Y, in the Table show a one-to-one relation with the value of surface gravity, as expected under the gravitational sedimentation hypothesis.

Star: 3–118	V: 17.76	Log G: 5.40	Y: ≤ 0.01
3781	16.96	5.14	= 0.02
2167	15.76	4.27	= 0.11
1083	15.33	4.16	= 0.14

From these observations the lower limit for helium in Population II turns out to be Y (mass fraction) = 0.14. Current estimates give a higher value for primeval helium, but we have to remember that it is likely that sedimentation is already acting in the hot (T_e = 16,000°K) and condensed star # 1083.

So once again globular clusters confirm their importance as an "observational laboratory" where to check theories – and where to get new ideas – on stellar structure and evolution.

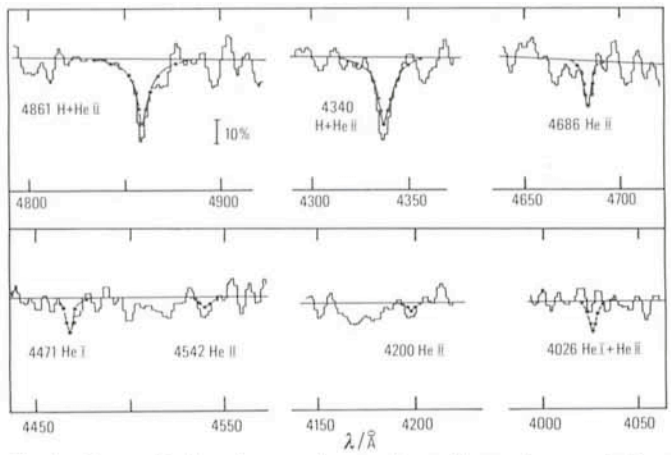

Fig. 4: *Once effective temperature and gravity are known, helium abundance is obtained from the equivalent widths of selected helium lines.*

Already observations with the instruments at our disposal, both ground and space based, are carrying us close to the heart of fundamental problems in stellar evolution; we are confident that the new technology telescopes and the Space Telescope will allow a qualitative, final jump.

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