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The line spectrum of delta cephei

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I. INTRODUCTION

The plates used in this investigation were taken in 1929 by Professor Pannekoek during his stay at the Dominion Astrophysical Observatory in Victoria as part of a program of photographic spectrophotometry of typical stars.

The instrument used is the three-prism spectrograph described in Vol. I No. 1 of the Victoria Publications. I). The dispersion is about 10 A.U./mm near H gamma and, with sufficient exposure, the spectrum reaches from λ 4040 to λ 4960.

The plates contain, besides the star spectrum, comparison spectra of an iron arc and are carefully calibrated with a step weakener or a wedge. There are thirteen three-prism plates of delta Cephei. The following list shows the distribution over the phases. All were taken on E 40 emulsion, with a slitwidth 1.5 (i.e. 0.0015 inch).

Table 1. Delta Cephei plates.

No.	Date	M.T. Victoria	Phase (d)	Phase (P)
17765	Jul 29	1h 37m — 3h 37m	1.40	0.261
17788	Aug 2	2 20 — 3 50	0.05	0.009
17790	3	0 09 — 3 54	3.01	0.561
17805	6	20 49 — 22 09	4.82	0.898
17821	11	20 31 — 0 51	4.51	0.841
17835 *)	15	0 00 — 1 03	2.28	0.425
17865	26	23 11 — 2 01	2.49	0.464
17920	Sep 8	22 44 — 0 44	0.35	0.065
17977	16	23 05 — 2 55	2.05	0.382
17981	19	19 27 — 22 30	0.52	0.097
17982 *)	22	mean 22h 45m	3.58	0.667
17991	25	19 20 — 22 40	1.14	0.212
18021	30	18 48 — 21 58	0.75	0.140

*) excluded from the discussion.

The phases have been calculated from the formula: 2)

$$\text{Max.} = \text{J.D. } 239365.873 + 5.366395 E - 0.84 \cdot 10^{-8} E^2,$$

to which a correction of 0.14 days was added.

Two plates had to be excluded from the discussion, the stellar spectrum was too weak in one case, and was disturbed by flares of the overexposed iron arc spectrum in the other case. So there remain eleven exposures, of which the phases are rather evenly distributed, except for a gap of one and a half day near minimum.