Provisional elements of FS Carinae, by Ejnar Hertzsprung.

The variability of this star, which is C. P. D. $-58^{\circ}2458$, was discovered by Miss Walton (*H. B.* **848**, 13; 1927), who published 8 epochs on which the star was found faint. I estimated the object on 638 Johannesburg plates of which the results are given below.

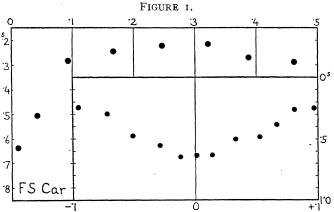
The comparison stars used are indicated on the accompanying diagram. Their brightnesses in my scale of steps are: a > 000, b < 296 and c < 663.

The phase was calculated according to the formula phase $= \frac{d^{-1}}{465874}$ (J. D. -2420000)

The minimum occurs at phase 362 or at J. D. 2424182d·165.

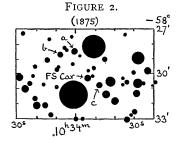
The mean results thus obtained are shown in Table I and concerning the primary minimum in the lower right part of Figure I.

The range is \$.4 or about half a magnitude. The minimum occupies about .16 of the period.



The 64 groups of 8 or 10 plates each were then arranged according to the difference in phase from the primary minimum and mean values of larger groups formed. The results thus obtained are given in Table 2 and represented graphically in the left and upper part of Figure 1. The form of the light-curve outside primary minimum indicates that the period must not be doubled, but the observations are not accurate enough to separate the effects of secondary minimum, ellipticity and reflection.

Subsequently a more accurate period was determined according to least squares including the 8



minima given by Miss WALTON. These are listed in Table 3 together with II minima found on Johannesburg plates. The resulting ephemeris is

Min. at J. D. $2422746^{-d}105 + 2^{d}\cdot146587$ (E - 3557) $\pm \cdot 008 \pm \cdot 000006$ (m. e.)

TABLE 1. F S Carinae.

The content of the										
10 '983 '21 '000 '254 10 '508 '24 '526 '236 '24 '26 '000 '254 10 '532 '24 '526 '236 '24 '26 '26 '26 '26 '26 '26 '26 '26 '26 '26 '26 '26 '27 '26 '27 '26 '27 '27 '27 '27 '27 '27 '27 '27 '28 '27 '27 '27 '28 '27 '27 '236 '28 <t< td=""><td>number of plates</td><td>phase</td><td>brightness</td><td>mean values of</td><td>larger groups</td><td>number of plates</td><td>phase</td><td>brightness</td><td>mean values of</td><td></td></t<>	number of plates	phase	brightness	mean values of	larger groups	number of plates	phase	brightness	mean values of	
10 '983 '21 10 '508 '24 '521 '26 '236 '24 '521 '26 '236 '24 '521 '26 '236 '24 '521 '26 '236 '24 '521 '26 '236 '24 '20 '21 '26 '236 '24 '20 '26 '236 '24 '26 '26 '236 '24 '26 '26 '236 '24 '26 '26 '27 '27 '26 '236 '24 '26 '27 '27 '28 '26 '27 '27 '28 '26 '27 '23 '27 '23 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '24 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '27 '236 '24 '26 '27 '26 '27 '27 '28 <td>n</td> <td></td> <td>s</td> <td>P</td> <td>s</td> <td>n</td> <td></td> <td>s</td> <td>P</td> <td>s</td>	n		s	P	s	n		s	P	s
10 .005 .30 10 .254 10 .532 .24 .25 .25 .26 .21 .20 .21 .23 .24 .20 .21 .23 .24 .20 .21 .23 .24 .20 .22 .23 .22 .23 .22 .23 .24 .20 .22 .23 .24 .20 .22 .23 .24 .27 .23 .24 .25 .23 .23 .24 .27 .23 .24 .25 .25 .25 .25 .25 .25 .25 .25 .25 .25 .25 .25 .25 .25 .26 .27 .23 .25 .26 .27 .23 .25 .26 .27 .26 .28 .26 .27 .26 .28 .22 .26 .27 .26 .28 .26 .27 .26 .28 .26 .27 .26 .28 .26 .27 .27 .26 .28 .26 .27 .27 .26 .28 .26 .27 .27 .	10	·983	·2 I			10		.24		
10	8	. 994		*000	.254		.221		.526	.236
10 '026 '19 10 '035 '20 10 '047 '19 10 '047 '19 10 '057 '19 10 '057 '19 10 '057 '19 10 '070 '22 10 '085 '18 10 '099 '21 10 '117 '25 10 '136 '21 10 '162 '21 10 '162 '22 10 '184 '26 10 '204 '23 10 '224 '23 10 '224 '23 10 '239 '33 10 '266 '25 10 '296 '28 10 '350 '65 10 '363 '64 10 '377 '63 10 '344 '49			.30	000	254		.232		320	250
10 035 20 10 047 19 10 047 19 10 057 19 10 070 22 10 085 18 10 099 21 10 117 25 10 116 21 10 136 21 10 162 22 10 184 26 10 224 23 10 224 23 10 248 28 10 239 33 10 266 25 10 290 30 10 332 25 10 350 65 10 363 64 10 377 63 10 448 36 10 448 36 10 448 36 10 448			.24				.544	.50		
10 '047 '19 041 '192 10 '583 '24 377 230 10 '057 '19 10 '595 '21 10 '610 '27 10 '624 '17 '633 '224 10 '639 '26 '633 '224 '10 '660 '19 10 '660 '19 10 '660 '19 10 '660 '19 10 '660 '19 10 '660 '19 10 '660 '22 '702 '254 10 '162 '22 '172 '233 10 '660 '19 10 '676 '22 '702 '254 10 '162 '22 '172 '233 10 '710 '29 '702 '254 10 '248 '28 10 '776 '26 '28 '702 '254 10 '290 '30 '293 '33 '253 '289 10 '770 '26 '780 '273 10 '350 '65 <		.026	.19_	١,			.228			
10				.011	192		572	.23	.577	.236
10 '070 '22 10 '085 '18 10 '099 '21 10 '117 '25 10 '117 '25 10 '136 '21 10 '162 '22 10 '184 '26 10 '204 '23 10 '228 '28 10 '229 '33 10 '239 '33 10 '266 '25 10 '290 '30 10 '332 '55 10 '350 '65 10 '363 '64 10 '377 '63 10 '377 '63 10 '389 '28 10 '377 '63 10 '444 '49 10 '448 '36 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '			.19				503		3	•
10 .085 .18 .093 .214 10 .624 .17 .633 .224 10 .197 .25 .10 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .19 .10 .660 .10 .20 .20 .20 .10 .70 .20 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .254 .70 .26 .78							595	.07		
10 .099 .21 093 214 10 .639 .26 .639 .26 .660 .19 .10 .660 .19 .10 .6660 .19 .10 .6660 .19 .10 .6660 .22 .10 .6660 .22 .10 .6660 .22 .10 .6660 .22 .10 .70 .23 .70 .254 .10 .70 .26 .28 .10 .77 .26 .28 .10 .77 .26 .28 .10 .79 .34 .78 .273 .273 .10 .824 .26 .26 .273 .28 .10 .79 .34 .26 .273 .28 .10 .79 .34 .26 .273 .273 .28 .273 .28 .273 .273 .28 .28 .273 .28 .273 .28		1070	0		•			.17		
10 '117 '25 10 '660 '19 '76 '22 '702 '254 '702 '273 '702 '254 '702 '273 '702 '273 '702 '273 '702 '273 '702 '273 '702 '27		1005		.033	.214		.620		.633	.224
10 '136 '21 10 '162 '22 10 '164 '26 10 '204 '23 10 '218 '28 10 '224 '23 10 '239 '33 10 '266 '25 10 '266 '25 10 '290 '30 10 '331 '48 10 '332 '55 10 '335 '55 10 '363 '64 10 '377 '63 10 '377 '63 10 '414 '49 10 '448 '36 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '444 '27 10 '459 '25 10 '396 '25 10 '394 '27 10 '394 '27 10 '395 '50 10 '443 '26 10 '944 '27 10 '956 '25 <td></td> <td>1117</td> <td></td> <td></td> <td></td> <td></td> <td>.660</td> <td></td> <td></td> <td></td>		1117					.660			
10 162 22 10 184 26 10 204 23 10 218 28 10 228 33 10 266 25 10 290 30 10 311 48 10 332 25 10 350 64 10 377 63 10 344 49 10 448 36 10 443 26 10 443 26 10 443 26 10 444 27 10 4459 25 10 360 25 10 394 27 10 395 50 10 444 26 10 444 26 10 394 27 10 394 27 10 394 27 10 395 50 10 443 26 10 394 27 10 395 50 10 394 27 10 395 30 <	1	1126	.21					.22		
10 '184 '26 10 '204 '23 10 '218 '28 10 '229 '33 10 '239 '33 10 '266 '25 10 '290 '30 10 '311 '48 10 '332 '55 10 '350 '65 10 '363 '64 10 '377 '63 10 '377 '63 10 '344 '49 10 '448 '36 10 '448 '36 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '444 '27 10 '459 '25 10 '956 '25 10 '956 '25 10 '396 '25 10 '396 '25 10 '396 '25 10 '956 '25		.163							1	
10 '204 '23 10 '218 '28 10 '239 '33 10 '266 '25 10 '290 '30 10 '311 '48 10 '332 '55 10 '350 '65 10 '363 '64 10 '377 '63 10 '377 '63 10 '414 '49 10 '443 '24 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '444 '27 10 '443 '26 10 '444 '27 10 '944 '27 10 '956 '25 10 '360 '28 10 '360 '29 10 '956 '25 10 '360 '29 10 '956 '25		.184	.26	172	.533			.29	.702	.254
10 '218 '28 10 '239 '33 10 '266 '25 10 '290 '30 10 '311 '48 10 '350 '65 10 '363 '64 10 '377 '63 10 '377 '63 10 '344 '49 10 '444 '49 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '443 '26 10 '459 '25 10 '360 '25 10 '966 '25 10 '360 '284		.204	.23	ļ				·28		
10 '239 '33 '253 '289 10 '770 '26 '780 '273 10 '290 '30 10 '809 '25 '34 '26 '273 10 '331 '48 '48 '10 '824 '26 '824 '26 10 '350 '65 10 '840 '33 '848 '286 10 '377 '63 10 '874 '24 '24 10 '395 '50 10 '901 '30 '907 '289 10 '444 '49 10 '926 '29 '907 '289 10 '443 '26 10 '944 '27 '956 '25 '360 '284 10 '459 '25 '467 '370 10 '956 '25 '360 '384			·28			10	.749	.25		
10 .266 .25 .253 .269 .10 .792 .34 .34 .34 .34 .36 .360 .25 .360 .25 .360 .25 .36 .36 .36 .36 .33 .36 .33 .36 .33 .36 .36 .36 .36 .37 .63 .36 .36 .36 .36 .36 .30			.33		.080	10		•26	.780	.272
10 '290 '30 10 '311 '48 10 '332 '55 10 '3350 '65 10 '363 '64 10 '377 '63 10 '3874 '24 10 '889 '28 10 '889 '28 10 '901 '30 10 '414 '49 10 '913 '29 10 '926 '29 10 '443 '26 10 '443 '26 10 '944 '27 10 '956 '25 10 '956 '25			.25	253	209	10	.792	.34	780	2/3
10 '332 '55 10 '350 '65 10 '363 '64 10 '377 '63 10 '395 '50 10 '414 '49 10 '428 '36 10 '443 '26 10 '443 '26 10 '459 '25 10 '360 '25 10 '956 '25 10 '956 '25 10 '360 '284	10	.290	.30					.52		
10 '350 '65 10 '363 '64 10 '377 '63 10 '395 '50 10 '414 '49 10 '428 '36 10 '443 '26 10 '459 '25 10 '370 '250 10 '926 '29 10 '944 '27 10 '956 '25 10 '956 '25	10		·48 [–]	1				•26		
10 '363 '64 10 '377 '63 10 '395 '50 10 '414 '49 10 '428 '36 10 '443 '26 10 '459 '25 10 '370 '29 10 '944 '27 10 '956 '25 10 '956 '25	1		.22				.840	.33	.848	.286
10 '377 '63 10 '395 '50 10 '414 '49 10 '428 '36 10 '443 '26 10 '443 '26 10 '459 '25 10 '956 '25 10 '956 '25 10 '956 '25	1		.65					.31		
10 395 50 10 414 49 10 428 36 10 443 26 10 459 25 10 966 25 10 956 25 10 966 25 10 966 25 10 966 25 10 966 25			.64				874	^{'24} -		
10 '414 '49 10 '428 '36 10 '443 '26 10 '459 '25 10 '966 '25 10 '966 '25 10 '966 '25 10 '966 '25			.03							
10 '428 '36 10 '443 '26 10 '459 '25 10 '966 '29 10 '944 '27 10 '956 '25 10 '956 '25			.20	1					.907	~289
10 '443 '26 10 '944 '27 10 '956 '25 '260 '284			·49							
10 '459 '25 '467 '250 10 '956 '25 '260 '284			36=			•				
1 457 25 .467 .250 .50 .50 .960 .284			.2°				1944	27		0
1 10 1.475 .24 1 1 10 1.000 .35	10	459	.24	.467	.220	IO	.066	.35	.960	.584
10 10 10 10 10 10 10 10			.25				975			

TABLE 2.

F S Carinae.

-	number of plates	phase	brightness		
	n	P	s		
	30	± .009	·638		
	40	.041	.504		
	70	.092	.284		
	100	.166	.246		
	100	•246	.223		
	100	.321	.216		
	98	.388	.270		
	100	·462	.288		