TABLE 9 (*continued*)

J. D. Hel. − 2400000	Δm	phase	J. D. Hel. − 2400000	Δm	phase	J. D. Hel. − 2400000	Δm	phase	J. D. Hel. − 2400000	Δm	phase
d	m	P	d	m	P	d	m	P	d	m	P
31200·4632	− ·04	·032	31200·5030	− ·54	·138	31223·4849	− ·30	·043	31240·4388	+ ·38	·974
·4649	− ·11	·037	·5048	− ·61	·143	·4870	− ·38	·049	·4409	+ ·34	·979
·4667	− ·27	·042				·4890	− ·49	·054	·4430	+ ·32	·985
·4684	− ·27	·046	plate *6587*		*·107*	·4911	− ·52	·060	·4451	+ ·30	·991
·4701	− ·30	·051				·4932	− ·57	·065	·4471	+ ·19	·996
·4719	− ·38	·055	31223·4475	+ ·78	·944	·4953	− ·59	·071	·4492	+ ·18	·001
·4736	− ·38	·060	·4496	+ ·72	·950	·4974	− ·65	·077	·4513	+ ·09	·007
·4753	− ·54	·064	·4516	+ ·73	·955	·4994	− ·67	·082	·4534	+ ·06	·013
·4771	− ·53	·069	·4537	+ ·63	·961	·5015	− ·70	·087	·4555	+ ·05	·018
·4788	− ·51	·074	·4558	+ ·60	·966	·5036	− ·76	·093	·4575	− ·04	·023
·4805	− ·59	·078	·4579	+ ·50	·972	·5057	− ·74	·099	·4596	− ·13	·029
·4823	− ·66	·083	·4600	+ ·47	·977	·5077	− ·74	·104	·4617	− ·26	·035
·4840	− ·68	·087	·4620	+ ·42	·983	·5098	− ·74	·109	·4638	− ·29	·040
·4857	− ·72	·092	·4641	+ ·32	·988	·5119	− ·65	·115	·4658	− ·40	·045
·4875	− ·68	·097	·4662	+ ·29	·994	·5140	− ·70	·121	·4679	− ·46	·051
·4892	− ·70	·101	·4683	+ ·28	·999	·5161	− ·64	·126	·4700	− ·46	·057
·4909	− ·67	·106	·4703	+ ·23	·005	·5181	− ·58	·131	·4721	− ·57	·062
·4926	− ·68	·110	·4724	+ ·14	·010				·4742	− ·66	·068
·4944	− ·68	·115	·4745	+ ·06	·016	plate *6593*		*·138*	·4762	− ·60	·073
·4961	− ·68	·120	·4766	+ ·04	·021						
·4978	− ·62	·124	·4787	− ·07	·027	31240·4326	+ ·54	·957			
·4996	− ·67	·129	·4807	− ·19	·032	·4347	+ ·43	·963			
·5013	− ·57	·133	·4828	− ·24	·038	·4368	+ ·46	·969			

Note on the secondary period of AR Herculis, by *P. Th. Oosterhoff* [1]).

Observations by BALÁZS and DETRE on the steep rising branch of AR Her were used in order to derive the most probable value of the secondary period. The resulting value is $67^{P}{\cdot}28 \pm {\cdot}05$ or $31^{d}{\cdot}62 \pm {\cdot}02$ m.e.

In a very interesting paper [2]) BALÁZS and DETRE have investigated the secondary period and the variations in the light-curve of the RR Lyrae-type variable AR Herculis. BLAŽKO had already proved the existence of a secondary period of 67 main periods or of 31·5 days. In order to verify this value of the period BALÁZS and DETRE have discussed 41 epochs of maximum brightness derived from their own material and they concluded that BLAŽKO's value gives a good representation of these maxima, which do not permit a more accurate determination. Consequently they adopted this value for all further discussions.

In the case of RS Bootis [3]) the writer of this note preferred to derive the secondary period with the aid of the observations on the steep rising branch of the light-curve, which are more suitable for this purpose. The observations of AR Her of the Budapest Observatory have been treated here in the same manner.

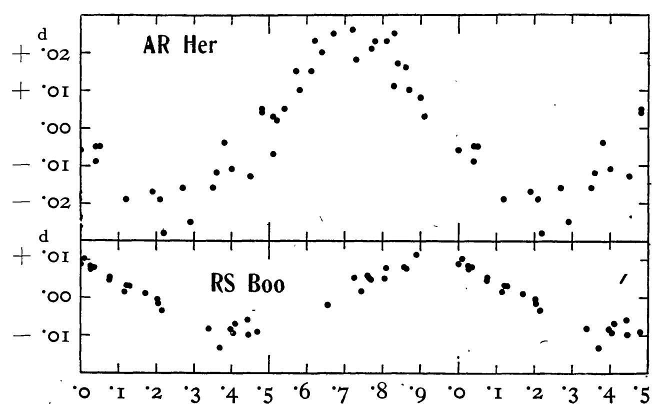
In Table 1, 39 epochs for a point of magnitude 11·20 on the rising branch are given [4]). Phases corresponding to the secondary period have been computed by means of the formula: $\psi = (P')^{-1}\, t$, where P′ is the secondary period expressed in the main period and where t is the number of periods from the second column of Table 1. This has been done for four adopted values of $(P')^{-1}$, which are shown in Table 2. Then four least squares solutions were carried out of the following type:

$$E = A + Bt + C \sin 2\pi\psi + D \cos 2\pi\psi.$$

The resulting equations are given in Table 3 and the residuals (O—C) have been tabulated in Table 1. From the sum of the squares of these residuals, which are given in the third column of Table 2 it seems evident that the third solution is the most satisfactory. The last solution practically corresponds with the value of the secondary period which has been adopted by BALÁZS and DETRE. The most probable value of the secondary period, as derived from the data of Table 2, is:

$$67^{P}{\cdot}28 \pm 5 \quad \text{or} \quad 31^{d}{\cdot}62 \pm 2 \text{ m.e.}$$

These values are so little different from those of the



1) Received in November 1945.
2) *Mitteilungen der Sternwarte Budapest-Svábhegy*, Nr 8, 1939.
3) *B.A.N.* No 369, first paper.
4) It has been assumed that the J.D. in Table 7 of the paper by BALÁZS and DETRE is heliocentric.

TABLE 1

E	t	P′ = 67·93 P ψ_1	$O-C_1$	P′ = 67·48 P ψ_2	$O-C_2$	P′ = 67·25 P ψ_3	$O-C_3$	$E-(A_3+B_3t)$	P′ = 67·02 P ψ_4	$O-C_4$
d			d		d		d	d		d
7980·525	0	·00	+ ·008	·00	+ ·007	·00	− ·003	− ·006	·00	− ·013
8021·397	87	·28	− 34	·29	− 15	·29	− 5	− 25	·30	− 2
8038·354	123	·81	+ 18	·82	0	·83	− 7	+ 11	·84	− 7
8351·393	789	·61	+ 5	·69	− 5	·73	− 4	+ 18	·77	0
8366·397	821	·09	− 9	·17	+ 1	·21	+ 3	− 19	·25	+ 1
8397·420	887	·06	− 5	·15	+ 3	·19	+ 4	− 17	·23	+ 1
8398·349	889	·09	− 18	·17	− 8	·22	− 7	− 28	·26	− 8
8662·538	1451	·36	− 4	·50	− 5	·58	− 3	+ 10	·65	+ 1
8663·483	1453	·39	− 1	·53	− 3	·61	− 1	+ 15	·68	+ 3
8664·428	1455	·42	+ 2	·56	0	·64	+ 1	+ 20	·71	+ 5
8665·373	1457	·45	+ 7	·59	+ 3	·67	+ 4	+ 25	·74	+ 8
8670·543	1468	·61	+ 13	·76	+ 9	·83	+ 7	+ 25	·90	+ 6
8671·475	1470	·64	+ 7	·79	+ 4	·86	+ 2	+ 16	·93	0
8687·427	1504	·14	− 5	·29	0	·36	+ 3	− 12	·44	+ 5
8695·452	1521	·39	+ 7	·54	+ 4	·62	+ 6	+ 23	·69	+ 10
8702·497	1536	·61	+ 6	·76	+ 1	·84	+ 1	+ 17	·92	0
8718·444	1570	·11	− 6	·27	− 2	·35	− 1	− 16	·42	+ 2
8719·396	1572	·14	+ 3	·30	+ 6	·38	+ 8	− 4	·45	+ 11
8783·312	1708	·14	− 3	·31	− 1	·40	− 1	− 11	·48	+ 1
8951·616	2066	·41	+ 10	·62	+ 5	·72	+ 5	+ 26	·82	+ 5
8953·493	2070	·47	+ 6	·68	+ 2	·78	+ 2	+ 23	·88	+ 3
8954·433	2072	·50	+ 6	·71	+ 4	·81	+ 4	+ 23	·91	+ 4
8975·565	2117	·16	+ 10	·37	+ 7	·48	+ 4	+ 4	·59	+ 2
8976·494	2119	·19	− 4	·40	− 9	·51	− 11	− 7	·62	− 13
8977·446	2121	·22	+ 5	·43	0	·54	− 3	+ 5	·65	− 5
8978·396	2123	·25	+ 12	·46	+ 5	·57	+ 3	+ 15	·68	+ 2
8993·416	2155	·72	− 6	·94	+ 3	·04	+ 3	− 5	·15	+ 3
9056·395	2289	·69	− 12	·92	− 3	·04	− 1	− 9	·15	− 1
9070·510	2319	·14	+ 14	·37	+ 8	·48	+ 5	+ 5	·60	+ 2
9071·448	2321	·17	+ 9	·40	+ 2	·51	− 1	+ 3	·63	− 4
9079·456	2338	·42	+ 5	·65	0	·77	0	+ 21	·88	0
9088·360	2357	·70	− 7	·93	+ 2	·05	+ 4	− 5	·17	+ 5
9095·400	2372	·92	+ 1	·15	+ 7	·27	+ 5	− 16	·39	+ 3
9103·408	2389	·17	+ 7	·40	+ 1	·52	− 4	+ 2	·64	− 7
9335·605	2883	·44	− 6	·73	− 7	·87	− 4	+ 10	·01	− 2
9336·543	2885	·47	− 9	·76	− 6	·90	− 3	+ 8	·04	0
9343·567	2900	·69	− 21	·98	− 4	·12	− 2	− 19	·27	− 1
9368·500	2953	·47	− 13	·76	− 11	·91	− 6	+ 3	·06	− 2
9385·404	2989	·00	− 20	·30	− 1	·45	− 9	− 13	·60	− 18

TABLE 2

phase of secondary period	secondary period		$\Sigma\,(O-C)^2$	amplitude
	P	d		d
$\psi_1 = {}$·01472 t	67·93	31·93	·004616	·0171
$\psi_2 = {}$·01482 t	67·48	31·72	·001134	·0220
$\psi_3 = {}$·01487 t	67·25	31·61	·000804	·0218
$\psi_4 = {}$·01492 t	67·02	31·50	·001372	·0210

third solution, that it did not seem worthwhile to make a final computation corresponding to this new value of the secondary period. As is seen from Table 1 the new period gives phases ψ which differ from those used by BALÁZS and DETRE by ·15 at the most. We may therefore expect that the mean light-curves derived by them for different values of ψ will not be seriously affected by the use of BLAŽKO's value for the secondary period.

In the figure the differences $E-(A+Bt)$, which are also given in Table 1, have been plotted for the third solution. In its lower half the corresponding relation is given for the epochs of a point on the rising branch of RS Boo, taken from the paper mentioned above.

TABLE 3

1 . . .	$E =$ 2427980·5333 d	+ ·4700178 t	+ ·0033 sin $2\pi\psi_1$	− ·0168 cos $2\pi\psi_1$	
		± 24	± 29	± 27	m.e.
2 . . .	$E =$ 2427980·5331	+ ·4700176 t	− ·0164 sin $2\pi\psi_2$	− ·0147 cos $2\pi\psi_2$	
		± 12	± 12	± 14	m.e.
3 . . .	$E =$ 2427980·5305	+ ·4700190 t	− ·0216 sin $2\pi\psi_3$	− ·0028 cos $2\pi\psi_3$	
		± 10	± 11	± 11	m.e.
4 . . .	$E =$ 2427980·5274	+ ·4700208 t	− ·0184 sin $2\pi\psi_4$	+ ·0102 cos $2\pi\psi_4$	
		± 13	± 14	± 15	m.e.