ROYAL OBSERVATORY, GREENWICH.

Determinations of Time and Comparison with Wireless Time Signals

made from October 1st to November 30th,

1926

GREENWICH ASTRONOMICAL RESULTS 1926.

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Introduction.—At the meeting of the International Astronomical Union at Cambridge in July 1925 it was decided, on the initiative of General Ferrié, to carry out an extensive scheme of longitude determinations in October and November 1926. There were two principal objects of the scheme. One was to connect three stations in nearly the same latitude and at intervals of approximately 120° in longitude by means of time signals which could be heard in two or all three of the stations. In this way the earth's circumference would be covered in three steps. The stations selected for this part of the work were Algiers Observatory, Shanghai Observatory and the U.S. Naval Operating Base at San Diego in California. These three stations being at nearly the same latitude, time could be determined from a list of stars which culminated near the zenith of all three. It was arranged to use the prismatic astrolabe in addition to the transit instrument for the time determinations at these stations.

The second part of the scheme was to determine the longitudes of a large number of stations relative to the principal observatories which had been the basis of longitude determinations in the past. Observers in about 50 different observatories or astronomical stations agreed to take part. With so many stations exchange of observers is impracticable, but on account of the small personal equations of the self-registering micrometer, now largely used for time determinations, this appeared to be unnecessary.

Thirty-four series of time signals were arranged to be sent out daily from Bordeaux, Eiffel Tower, Saïgon (Indo-China), Honolulu and Washington (through Annapolis and Arlington). Signals were also available from Nauen and a few other stations. Observatories only interested in connecting with Greenwich or Paris would naturally take only the European signals, but all stations able to record distant signals would assist in the determination of long arcs. At Greenwich the principal signals received were from Eiffel Tower at $9^h\ 30^m$ and $22^h\ 30^m$, from Annapolis at $10^h\ 10^m$, $17^h\ 0^m$ and $20^h\ 10^m$, from Nauen at $12^h\ 0^m$ and from Bordeaux at $20^h\ 0^m$. These signals were received on most week days throughout October and November and in addition the evening signals on Sundays. When both time and rhythmic signals were sent out both sets of signals were recorded.

The Instrument and its Position.—At Greenwich, time determinations are usually made with the large non-reversible transit circle. This instrument however, is not the most suitable one for time determinations on account of the possibility of systematic errors, particularly in collimation. It was therefore decided in connection with this scheme to use the small reversible transit B. This instrument has been used in several longitude determinations in the past and is described in the Greenwich Volume on longitude determinations from 1882 to 1902 on pp. 6–8 while its later history is given on pp. 186–7 and 5 of that work. This transit is one of five which were made by Messrs. Troughton & Simms for the Transit of Venus Expeditions of 1874. The object glass has a clear aperture of 3 inches and a focal length of 36½ inches. The pivots are of gun metal and are 1¼ inches long and 1½ inches in diameter. Sir David Gill reported on returning the instrument to Greenwich from the Cape that the pivots had considerable errors and they were consequently reground by the makers before the observations of 1888. Level readings made with the instrument in different positions were made in connection with various longitude determinations and were repeated in 1926. They show the form of the pivots to be quite satisfactory. Two important changes have been made to the instrument since its use in the Paris longitude determination of 1902. Before its use in the observations for the determination of the longitude of Malta in 1909 a new system of illumination was introduced. A small 4-volt electric lamp is carried by a long cap over the object glass. A condensing lens sends a parallel beam to an opal reflector inclined at 45° to the axis of the telescope and this scatters light down the tube giving a very uniform illumination of the field of view. In 1921 Messrs. Cooke & Sons of York fitted the instrument with a self-registering micrometer. To balance the additional weight of the micrometer a cylindrical weight of about 2¾lbs. was attached to the tube near the object glass. The accurately divided driving screw of the micrometer has 50 threads to the inch so that one revolution corresponds to about $7^{s}\cdot5$ at the equator. The micrometer wire is hand driven. The contact wheel is made of gun metal and has three breaks, about 0·018 revolutions long, which divide the whole interval of revolution into three parts, approximately in the ratio 2 : 2 : 3.

This instrument was erected on a cast iron stand fitted with short gun metal segmental bearings. The whole was mounted on a pillar in the transit pavilion which is on the old Bradley meridian, 19 feet west and 68 feet north of the present transit circle. The time signals have been reduced to the prime meridian by application of a correction of $0^{s}\cdot020$ for longitude.

For a few nights at the beginning of this programme a tape chronograph was used but it did not run very uniformly. Afterwards the altazimuth chronograph was used. The same pen was used for observational signals and clock signals.

The Screw Value of Micrometer.—From observations made in 1921 and 1922 the screw value was determined as $7^s \cdot 489$. This was redetermined during the course of the observations by means of transits of stars of different declination, but mostly near the equator. Generally a star was observed over five or seven revolutions (15 or 21 contacts) soon after it entered the field, and over a similar number before it left the field. In the following table which gives the results the letter E or W after the name of the star indicates the position of the instrument (micrometer East or West). The revolutions given are the central ones at each end.

Date. 1926.	Star.	Revolutions. r r	Time Interval. s	Log. Screw Value.
Oct. 18	ζ Cygni E	44 , 18	224·70	·87447
...	1 Pegasi E	42 , 17	198·52	·87425
Oct. 23	γ Aquarii E	42 , 17	187·33	·87447
Oct. 26	η Cephei W	18 , 42	377·28	·87429
...	ν Cygni W	18 , 43	247·66	·87444
...	ξ Aquarii E	43 , 18	189·10	·87430
...	α Aquarii W	18 , 42	179·70	·87431
...	θ Pegasi E	38 , 22	120·41	·87421
Nov. 1	η Cephei E	42 , 19	361·65	·87440
Nov. 5	Polaris E	33·8, 28·0	2289·14	·87453
Nov. 7	α Cephei E	42 , 18	354·08	·87430
...	ε Pegasi E	42 , 18	182·24	·87439
...	,,	35 , 25	75·90	·87419
...	16 Pegasi E	42 , 18	179·20	·87417
...	,,	35 , 25	83·00	·87427
...	20 Pegasi W	20 , 41	161·20	·87427
...	,,	23 , 16	53·78	·87464
...	α Aquarii W	18 , 43	187·20	·87434
...	,,	24 , 37	97·34	·87432
Nov. 14	ξ Aquarii E	41 , 19	166·43	·87437
...	16 Pegasi W	19 , 41	182·61	·87429
			Adopted Mean	·87434

1 revolution = $7^s \cdot 4875$ at equator.

$= 112'' \cdot 313$

The Striding Level.—The level used to determine the inclination of the axis to the horizontal is one marked " c " and previously used in longitude determinations. It was overhauled by Messrs. E. R. Watts & Son, Ltd., in the early summer of 1926.

The bubble is graduated from 0^d to 40^d on the one side of the centre and from 50^d to 90^d on the other side. Readings are taken of both ends of the bubble and during the observations in October and November the readings of the two ends were generally near 10^d, 80^d. The length of the bubble and possibly also the scale value depend on the temperature. To determine the scale value the level was placed upright on the central cube of the transit circle and readings of the bubble and the six microscopes taken in various positions. The result of these observations was as follows :—

Nov. 4. Temp. 48° F.

	Bubble Readings.			Circle Readings.		
	d	d		°	′	″
1	2·8	70·0	...	89	23	8·78
2	21·9	89·0	...	89	23	34·45
3	3·2	70·1	...	89	23	8·55
4	24·1	91·0	...	89	23	36·82

1 & 2 give	d 19·05 = ″ 25·67	or d 1 = ″ 1·35
3 & 4 ,,	20·90 = 28·27	,, 1 = 1·35

Nov. 9. Temp. 48° F.

	Bubble Readings.			Circle Readings.		
	d	d		°	′	″
1	7·8	75·0	...	89	23	26·24
2	13·2	80·1	...	89	23	33·46
3	19·6	86·4	...	89	23	42·62
4	13·6	80·4	...	89	23	33·90
5	6·0	73·0	...	89	23	23·90
6	1·7	68·7	...	89	23	18·77
7	11·2	78·0	...	89	23	30·68
8	20·1	87·0	...	89	23	43·31
9	17·9	85·0	...	89	23	40·61
10	8·9	75·3	...	89	23	27·20
11	2·8	69·3	...	89	23	19·86

Means of these give the following results :

	Bubble Readings.		Circle Readings.		
	d	d	″		
6, 11	2·25	69·00	19·32	d 5·38 = ″ 6·46	d 1 = ″ 1·20
5, 1, 10	7·57	74·43	25·78	5·08 = 6·90	= 1·36
7, 2, 4	12·67	79·50	32·68	6·58 = 9·50	= 1·44
9, 3, 8	19·20	86·13	42·18		

Nov. 27. Temp. 43° F.

	Bubble Readings.			Circle Readings.		
	d	d		°	′	″
1	4·2	73·4	...	90	3	26·86
2	11·8	81·0	...	90	3	17·10
3	18·9	88·2	...	90	3	6·70
4	13·7	82·9	...	90	3	14·28
5	10·5	79·5	...	90	3	18·63
6	3·1	72·2	...	90	3	28·05
7	7·1	76·2	...	90	3	22·84
8	13·4	82·5	...	90	3	14·60
9	16·8	86·0	...	90	3	9·73
10	10·2	79·2	...	90	3	19·08
11	4·0	72·9	...	90	3	27·39

Means of these give the following results :

	Bubble Readings.		Circle Readings.		
	d	d	″		
6, 11, 1	3·77	72·83	27·43	d 5·48 = ″ 7·25	d 1 = ″ 1·32
7, 10, 5	9·27	78·30	20·18	3·77 = 4·85	= 1·29
2, 8, 4	12·97	82·13	15·33	4·93 = 7·11	= 1·44
9, 3	17·85	87·10	8·22		

1927. Jan. 22. Temp. 35° F.

	Bubble Readings.			Circle Readings.		
	d	d		°	′	″
1	5·6	76·7	...	90	3	11·62
2	1·9	73·1	...	90	3	16·36
3	19·3	90·4	...	90	2	54·07
4	17·9	89·0	...	90	2	56·19
5	10·0	81·1	...	90	3	6·83
6	3·8	75·0	...	90	3	14·29
7	0·2	71·1	...	90	3	18·38
8	8·7	79·6	...	90	3	9·01
9	11·6	82·6	...	90	3	4·94
10	15·2	82·3	...	90	2	59·70
11	16·9	88·0	...	90	2	57·34

Means of these give the following results :

	Bubble Readings.		Circle Readings.		
	d	d	″	d	″
7, 2, 6	1·97	73·07	76·34	5·15 =	6·02	1 =	1·17
1, 8	7·15	78·15	70·32	3·68 =	4·44	=	1·21
5, 9	10·80	81·85	65·88	5·28 =	7·36	=	1·39
10, 11	16·05	87·15	58·52	2·55 =	3·39	=	1·33
4, 3	18·60	89·70	55·13				

These figures indicate that the value of one division decreases very slightly as the temperature falls and that it is less for small readings than for large ones. A mean value of 1″·36 per division was adopted as the observations were always made with the bubble reading approximately 10d, 80d, and with the temperature between 40° and 50°. The value of the level error was always kept small so that any error in the value of a division would lead to little uncertainty in the level of the instrument.

The Observing Programme.—It was decided at the Cambridge Meeting of the International Astronomical Union to use the stars of the American Ephemeris with the corrections deduced by Prof. W. S. Eichelberger. In order to have stars in common with more southern observatories it was decided to observe at Greenwich stars from Dec. −10° to +40°, and stars north of +60° for determination of the azimuth. The programme for a night's observing was fixed at about 10 stars between Dec. −10° and +40° and about 8 stars north of +60°, half of these later stars being observed at upper and half at lower culmination. The stars actually observed with their adopted mean right ascensions are given in Table VIII.

A large number of observations were made with the striding level—whenever opportunity afforded between the star transits. Stars were, with few exceptions, observed in both positions of the instrument.

The field of view contains besides the moving wire, three fixed wires—one horizontal and two vertical, the latter about 2½ revolutions of the screw from the line of collimation. The method of observing for the fast moving stars was as follows. Two or three minutes before transit the two small alidades near the eye end were set—the one so that the bubble was in the middle of its scale when the telescope was

turned on the star and the other so that the bubble was in the middle of its scale when the telescope was reversed and pointed at the star. About one and a half minutes before transit the telescope was adjusted so that the star was near the horizontal wire and then the star was observed for five, six or seven revolutions up to the first fixed vertical wire. The instrument was then reversed and the star again brought near the horizontal wire. This could be done easily in 30 seconds, by which time the star was approaching the second fixed wire (this is the wire called the first wire before reversal). The star was then observed over the same number of revolutions as before reversal. In this way the star was observed over exactly the same part of the screw in the two positions of the instrument. This procedure has several advantages—collimation, screw value and its errors, distortion of the field and any effect of irregular illumination are eliminated. For slower moving stars the observations were continued to one or two revolutions past the first wire before reversal, and in general, they covered a rather smaller number of revolutions of the screw than the observations of fast moving stars. For three stars very near the pole a hand tapper was used and the position of the micrometer wire read off.

Collimation and Level Errors.—The instrument was reversed on nearly all stars so that collimation error could be eliminated directly from the observations. To check the reductions the collimation was calculated from each star. The level error was determined by readings of the striding level at frequent intervals during the observations. On nearly all nights observations of the nadir were made with a Bohnenberger eyepiece. These observations sufficed for the determination of both the collimation and the level. Two lamps, east and west, were available for illumination in making the nadir observations and it was at once obvious that while the two lamps gave nearly the same position of the line of collimation they gave level errors which differed systematically. The mean of the levels obtained from the two lamps agreed closely with that obtained from the striding level. The principal results are shown in Table I. The level error as obtained from the striding level and the nadir observations differ in the mean by $0''\cdot07$. The striding level results were judged to be much more reliable and free from systematic error. They were therefore accepted as correct: adoption of the nadir observations would place the Observatory $0^s\cdot007$ further west. The collimation from the nadir and the stars differed by $0''\cdot36$ in the mean. This would correspond to a difference of about $0^s\cdot05$ in the east and west transits—but is of no effect on the final result. The west lamp gave a level error $1''\cdot07$ larger than the east lamp, but this is of no importance The level errors as given by the separate observations are given in Table IX.

TABLE I.—*Comparison of Collimation Error obtained from Stars and Nadir Observations and of Level Error obtained from the Striding Level and Nadir Observations.*

Date 1926.	No. of Stars.	COLLIMATION. Stars.	Nadir.	Difference.	LEVEL. Striding Level.	Nadir.	Difference.	No. of Nadirs.
		r	r	r	″	″	″	
Sept. 21	5	29·6927	29·6870	+·0057	+1·28	+1·76	− ·48	2
22	13	·6923	·6857	+·0066	+1·73	+1·33	+ ·38	2
27	15	·6853	·6813	+·0040	+2·70	+3·05	− ·35	2
30	20	·7049	·7012	+·0037	+0·78	+0·46	+ ·32	2
Oct. 2	17	·7073	·7020	+·0053	+2·14	+2·56	− ·42	1
6	17	·7043	·7038	+·0005	+0·47	+0·42	+ ·05	2
7	18	·7045	·7038	+·0007	+0·63	+0·38	+ ·25	2
9	17	·7039	·7003	+·0036	+0·77	+1·11	− ·34	1
10	25	·7031	·7014	+·0017	+0·30	+0·69	− ·39	1
17	26	·7018	·7012	+·0006	+1·06	+1·21	− ·15	1
18	16	·7005	·6954	+·0051	+1·11	+1·49	− ·38	1
19	15	·6950	...	...	+1·04	...	...	...
20	17	·6962	·6931	+·0031	+1·28	+1·30	− ·02	1
21	5	·6942	·6908	+·0034	+1·77	+1·60	+ ·17	1
23	20	·6962	...	...	+1·73	...	...	...
26	15	·6951	·6914	+·0037	+2·04	+2·14	− ·10	1
27	11	·6945	·6912	+·0033	−0·58	−0·51	− ·07	1
31	23	·6939	·6914	+·0025	−0·27	−0·38	+ ·11	1
Nov. 1	16	·6932	·6945	−·0013	−0·21	−0·07	− ·14	1
2	17	·6925	·6901	+·0024	+0·40	−0·10	+ ·50	1
4	9	·6929	·6867	+·0062	−0·36	−0·53	+ ·17	1
5	23	·6920	·6855	+·0065	+0·19	+1·02	− ·83	1
7	16	·6921	·6811	+·0110	+0·21	+0·98	− ·77	1
9	14	·6920	·6855	+·0065	+0·61	+0·37	+ ·24	2
10	4	·6911	·6922	−·0011	−0·12	−0·17	+ ·05	1
12	25	·6943	·6925	+·0018	+1·50	+1·53	− ·03	1
14	16	·6926	·6908	+·0018	+0·31	+0·30	+ ·01	1
19	17	·6894	...	...	+0·84	...	...	...
20	17	·6890	·6874	+·0016	+0·50	+0·25	+ ·25	1
21	18	·6909	...	...	+0·97	...	...	...
26	12	·6908	·6886	+·0022	−1·04	−1·14	+ ·10	1
27	4	·6882	·6884	−·0002	−0·76	−0·60	− ·16	1
28	21	·6904	·6892	+·0012	−1·10	−1·00	− ·10	1
Dec. 3	12	29·6900	...	...	−0·22	...	...	...
			Mean	+·0032			″ −0·07	
				= +0″·36				

NOTES.—Sept. 28. Screws tightened. Collimation and level altered. Oct. 27 and Nov. 26 Level altered.

The Reductions.—All the contacts were read from the chronograph sheets to $0^s{\cdot}01$. Each reading was reduced to the central revolution by application of the correction for the corresponding whole number of revolutions. The taking of the means and the application of the instrumental corrections were carried out to $0^s{\cdot}001$ although the printed results are only given to $0^s{\cdot}01$. After the mean of the transits with the micrometer east and west (or one of these with collimation correction applied) had been taken the corrections for level and length of contacts and daily aberration were applied. The readings of the micrometer screw for the beginning of the contacts were :—

	r	r	r		r
For Micrometer East	·7051	·9914	1·2788	Mean	·9918
,, West.....	·7222	1·0092	1·2959		1·0091
Length of Contact	·0171	·0178	·0171		·0173

The mean of the centre of the three contacts is at $^r{\cdot}0004$ but this is of no importance except in the determination of the reading of the micrometer screw for the line of collimation for comparison of the results obtained from nadir observations and the stars. The collimation correction required on account of the beginning of all the signals having been read is therefore $\frac{1}{2} \times {}^r{\cdot}0173$ which corresponds to $0^s{\cdot}065$ at the equator. Now the value of the coefficient of daily aberration at Greenwich is $0^s{\cdot}013$. Hence the correction for length of contacts and for daily aberration is $0^s{\cdot}052 \sec\delta$ for stars at upper culmination and $^s{\cdot}078 \sec\delta$ for stars at lower culmination.

The star places were taken from the American Ephemeris by interpolation to transit at Greenwich. To these places there were then applied the corrections given on pp. 750-764 and the small correction for the lunar terms in nutation.

The residuals had then to be analysed for clock error and azimuth error. This was done by a least square method. The equations for the stars north of $+60°$ Dec. were multiplied by a factor roughly equal to $\cos\delta$, then the results for south stars, north stars at upper culmination and north stars at lower culmination were used to form three equations from which the azimuth and clock error were deduced. The azimuth correction was applied to each star and Table X shows the clock corrections from individual stars, although, of course, the stars of high declination have very little weight in the determination of the clock error apart from the azimuth error. Table II shows the mean results for each night, together with the number of stars observed, the level and azimuth corrections, the observed and finally adopted clock corrections and the difference between the observed and adopted clock corrections. These differences indicate the probable error of one night's observations to be $\pm 0^s{\cdot}011$. The final columns give the direction and velocity of the wind at the time of the observations.

TABLE II.—*Number of stars observed on each night, level and azimuth corrections, observed and adopted clock corrections referred to meridian of Transit Pavilion and meteorological data.*

Date.	Sidereal Time.	Number of Stars.			Level.	Az.	Clock Correction.			Wind.	
		S.	N.	S.P.			Observed.	Adopted.	O—A.	Direction.	Velocity in miles per hour.
	h m				″	″	s	s	s		
Sept. 21	20 10	5	2	1	+1·28	+ 1·54	−7·631	...	...	ENE	7
22	19 50	9	4	3	+1·71	+ 2·17	−7·691	...	...	NNW	6
27	20 0	9	3	3	+2·70	+ 3·50	−8·071	−8·043	−·028	NW	10
30	20 5	11	5	4	...	−41·54	−8·205	−8·217	+·012	SSW	7
Oct. 2	20 10	9	5	5	+2·14	−20·63	−8·348	−8·338	−·010	Calm	4
6	20 40	8	5	4	+0·47	− 7·59	−8·589	−8·593	+·004	S	7
7	20 35	10	4	4	+0·63	− 7·61	−8·661	−8·667	+·006	SSW	8
9	20 30	10	4	4	+0·77	− 8·03	−8·760	−8·778	+·018	WSW	30
10	20 15	10	4	4	+0·30	− 6·98	−8·869	−8·833	−·036	WSW	12
17	20 40	11	3	3	+1·06	− 8·70	−9·202	−9·219	+·017	N	10
17	23 50	8	3	3	+1·06	− 8·04	−9·219	−9·227	+·008	N	10
18	20 30	10	4	4	+1·11	− 8·54	−9·277	−9·284	+·007	NNW	5
19	20 40	8	4	4	+1·04	− 7·47	−9·353	−9·353	·000	Calm	3
20	20 25	11	4	2	+1·28	− 8·72	−9·405	−9·422	+·017	NNE	10
21	20 50	4	2	0	+1·77	− 7·52	−9·525	−9·494	−·031	NE	10
23	21 0	11	6	4	+1·73	− 8·35	−9·650	−9·628	−·022	NE	11
26	21 10	11	4	4	+2·04	− 8·45	−9·824	−9·825	+·001	NW	10
27	20 45	6	5	0	−0·58	− 0·09	−9·875	−9·890	+·015	ESE	10
31	21 40	12	5	6	−0·27	− 1·61	−10·171	−10·179	+·008	N	15
Nov. 1	21 20	8	4	5	−0·21	− 0·95	−10·256	−10·254	−·002	SSE	10
2	23 5	14	4	2	+0·40	− 0·92	−10·365	−10·342	−·023	SSE	7
4	21 50	8	2	2	−0·35	− 1·11	−0·492	−0·490	−·002	S	9
5	0 10	12	7	4	+0·19	− 2·17	−0·569	−0·569	·000	SW	19
7	21 40	11	5	4	+0·21	− 2·37	−0·663	−0·694	+·031	SSW	9
9	2 20	10	3	2	+0·61	− 1·66	−0·821	−0·819	−·002	S	14
10	21 10	2	1	1	−0·12	− 0·38	−0·887	−0·862	−·025	S	21
12	1 30	16	6	4	+1·50	− 2·57	−0·986	−0·966	−·020	SSW	10
14	22 15	10	5	3	+0·31	− 2·92	−1·027	−1·060	+·033	SW	22
19	22 15	10	5	3	+0·84	− 3·84	−1·298	−1·304	+·006	SSW	13
20	23 35	11	4	3	+0·50	− 4·09	−1·328	−1·348	+·020	SW	16
21	23 20	12	3	5	+0·97	− 3·37	−1·416	−1·389	−·027	SSW	19
26	22 10	8	4	1	−0·66	−20·98	−1·604	−1·604	·000	Var.	7
27	22 30	3	1	1	−0·76	−20·68	−1·681	−1·653	−·028	Calm	5
28	22 20	11	5	5	−1·10	−22·21	−1·696	−1·705	+·009	E	14
Dec. 3	2 40	7	3	3	−0·22	−22·35	−1·966	−1·966	·000	SW	18

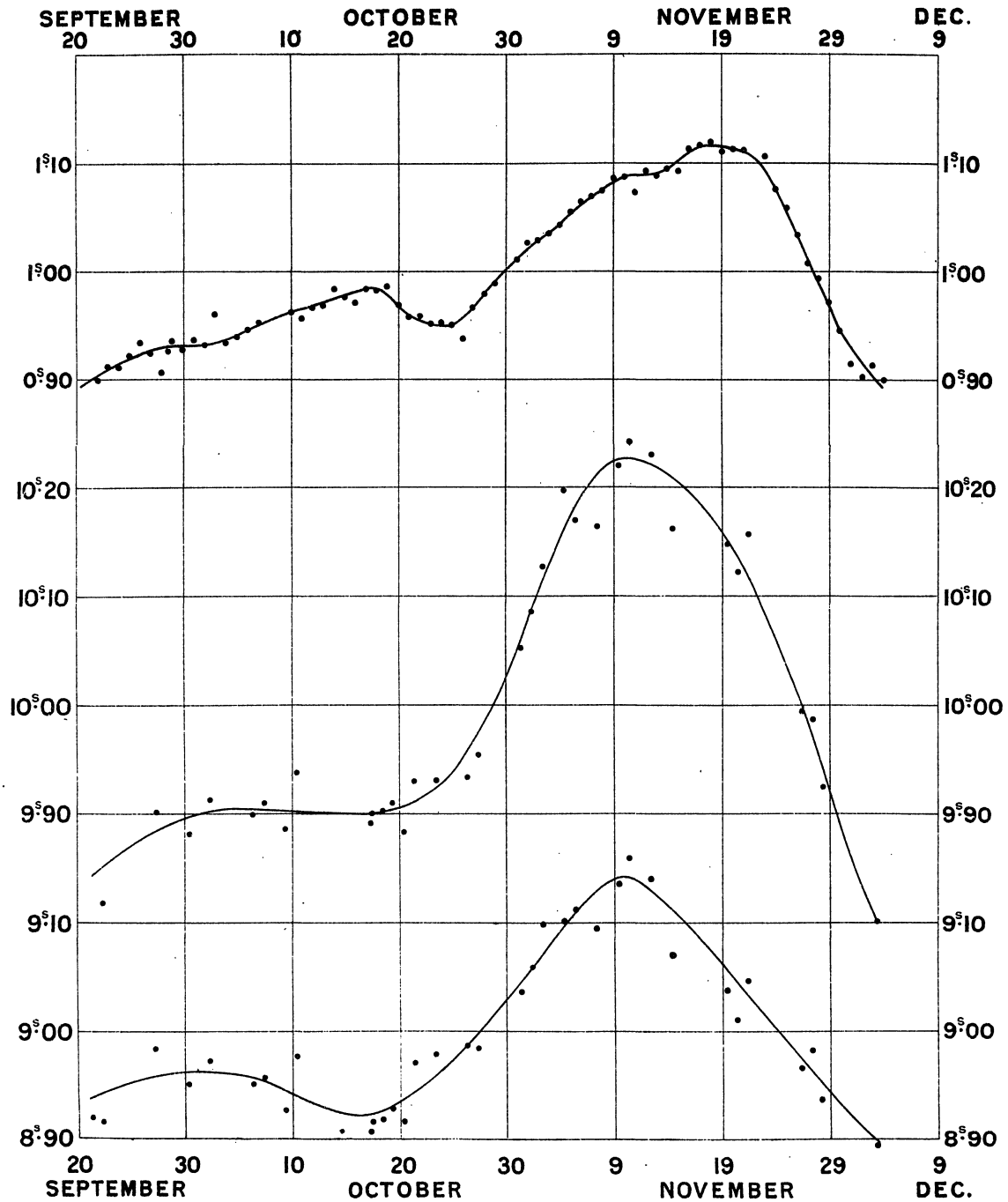
Sept. 28.—Screws tightened. Azimuth disturbed.
Sept. 30.—As there was a definite variation of level throughout the evening, the level error was adopted as varying from +0″·10 at 19ʰ 0ᵐ S.T. to +1″·62 at 21ʰ 10ᵐ S.T.
Oct. 2.—Azimuth error corrected, but support must have been under strain.
Oct. 6.—Instrument readjusted in level and azimuth.
Oct. 27.—Instrument readjusted in level and azimuth.
Nov. 26.—Level altered. Azimuth disturbed.

The Clock.—The clock used in connection with both the time signals and the time determinations was the standard sidereal clock Shortt 3 made by the Synchronome Company. This clock consists of a free pendulum mounted in a cellar in the basement of Flamsteed House and a slave clock in the clock room in the old main building. This clock was installed at the Observatory on 1924 Nov. 21, and for the next month trials were made to find variations of its rate and arc with pressure. The performance of the clock was so good that it was introduced as standard on 1925 Jan. 1. The following table shows its performance up to 1926 June 10, when it stopped. The figures refer to true sidereal time, which gives rates differing from mean sidereal time by, at most, $\pm^{s}\cdot003$.

	Daily Losing Rate.	Change in a Month.
	s	s
1925—January	+·027	
February	+·068	... +·041
March	+·106	... +·038
April	+·081	
May..	+·112	... +·031
June	+·149	... +·037
July	+·145	
August	+·191	... +·046
September	+·229	... +·038
October	+·244	... +·015
November	+·258	... +·014
December	+·268	... +·010
1926—January	+·275	... +·007
February	+·287	... +·012
March	+·299	... +·012
April	+·308	... +·009
May..	+·325	... +·017

The pressure in the clock case was 31·0 mm. at the beginning of January 1925. It gradually increased through leakage to 34·5 mm. on April 1, when it was reduced to 25·4 mm. in an attempt to reduce the rate. The pressure again increased to 27·4 mm. by the end of June, and in a further effort to reduce the rate the pressure was reduced to 10·2 mm. Thereafter the pressure was not deliberately altered, but by June 1926, it had increased to 20·0 mm.

From the table it will be seen that the daily losing rate increased by about $0^{s}\cdot04$ per month up till August, 1925, and then fell to about one-third of this amount. The reduction of the pressure by 9 mm. from 34 mm. to 25 mm. on April 1 reduced the daily rate by about $0^{s}\cdot06$. The further reduction by 17 mm. from 27 mm. to 10 mm. only produced a reduction in the rate of about $0^{s}\cdot04$. In each case the reduction of pressure resulted in an increased arc and made only a slight alteration in rate. The change of rate from 1925 July, to 1926 May, amounted to $0^{s}\cdot18$ and of this only about $0^{s}\cdot03$ could be due to leak in the clock case.



COMPARISON OF CLOCKS AND STAR OBSERVATIONS.

The horizontal unit is 10 days, the vertical unit 0s.10. The top curve is the difference between the two clocks Shortt 11 and Shortt 3. In the bottom curve the star observations referred to Shortt 3, corrected for a constant rate and reduced to mean sidereal time, are plotted. The smooth curve has been accepted as showing the error of the clock. The middle curve shows the star observations referred to Shortt 11 by a combination of the other two curves.

1931.250,95°/86,1652,520,5/28.

Malby & Sons Lith

Adoption of Clock Errors.—In view of the extreme regularity of the going of the clock it appeared that the best plan would be to adopt a smooth curve for the clock error throughout the interval covered by the observations. As the corrections are given to true sidereal time referred to the equinox affected by the short period terms in the nutation, the first step was to reduce the clock corrections to corrections to mean sidereal time. The results are shown in Table III. These corrections were then reduced to clock error referred to mean sidereal time at mean noon on Oct. 31, by means of a gaining rate of ^{s}·0586 daily, which was approximately the mean rate of the clock throughout the months of October and November. The variation from a constant of the quantities thus obtained indicate the going of the clock. It is seen at once from the figures and from the bottom curve of the diagram that there was some change in the clock rate. The rate may be practically summarized as follows :—

Oct. 1 — Oct. 18	... ...	^{s}·059 per day gaining.
Oct. 18 — Nov. 11	... ...	·069 ,, ,,
Nov. 11 — Nov. 30	... ...	·049 ,, ,,

The explanation of these changes is apparently to be found in changes of temperature. An examination of the temperature in the clock cellar showed that the temperature fell slowly from about 15·5° C. on Sept. 26 to 14·5° C. about Oct. 12. The fall then became more rapid and by Nov. 1 the temperature was 10·8° C. It remained steady at this value to Nov. 11, when electric heating controlled by a thermostat was introduced into the clock room. The temperature then rose to 12·5° C. Thereafter the mean temperature remained near this value although the control by the thermostat was not within very narrow limits.

The interpretation of these changes is complicated by the fact that there is a secular change in the clock rate. The preceding paragraph shows that between 1925 Sept. and 1926 May, this was about ^{s}·012 per day per month. This quantity has altered very little from 1926 July to 1927 February, perhaps falling to 0^{s}·010 per day per month. The effect of temperature on the rate may be a retardation of the order of 0^{s}·003 per day for a rise of a degree Centigrade. It is impossible to explain this change from the known coefficients of expansion of the material of the pendulum.

It should be added here that the change of daily rate of the clock by 0^{s}·01 in the course of a few days was larger than usual. Generally speaking, the temperature in the clock vault has been much steadier than it was in October and November 1926, and the clock rate more regular. This is shown by the mean daily rates for different months on p. C 12. From January to August, 1925, the increase of the daily rate was steady at 0^{s}·04 per month or 0^{s}·0013 per day. Thereafter it has only been about 0^{s}·0004 per day.

The clock corrections were adopted from the smooth curve of the diagram, which was reduced to true sidereal time by applying the smooth clock rate and the total nutation. These corrections, reduced to the prime meridian, are given in Table VI for noon of each day.

TABLE III.—*Observed and Adopted Clock Corrections referred to meridian of Transit Pavilion.*

Sidereal Time.				Observed Clock Correction	Reduction to Mean Sidereal Time.	Observed Correction to Mean Sidereal Time.	Reduced to Oct. 31 noon with constant rate.	Adopted Clock Correction.	Observed *minus* Adopted.	Notes.
		h	m	s	s	s	s	s	s	
Sept.	21	20	10	— 7·631	+1·036	— 6.595	—8·919			
	22	19	50	— 7·691	+1·043	— 6·648	—8·915			
	27	20	0	— 8·065	+1·056	— 7·009	—8·983	— 8·043	—·022	
	30	20	5	— 8·205	+1·053	— 7·152	—8·950	— 8·217	+·012	
Oct.	2	20	10	— 8·348	+1·057	— 7·291	—8·972	— 8·338	—·010	
	6	20	40	— 8·589	+1·085	— 7·504	—8·950	— 8·593	+·004	
	7	20	35	— 8·661	+1·093	— 7·568	—8·956	— 8·667	+·006	
	9	20	30	— 8·760	+1·104	— 7·656	—8·927	— 8·778	+·018	
	10	20	15	— 8·869	+1·106	— 7·763	—8·977	— 8·833	—·034	Definition very bad
	17	20	40	— 9·202	+1·098	— 8·104	—8·907	— 9·219	+·017	Cloudy
	17	23	50	— 9·219	+1·099	— 8·120	—8·916	— 9·227	+·012	
	18	20	30	— 9·277	+1·104	— 8·173	—8·918	— 9·284	+·007	
	19	20	40	— 9·353	+1·110	— 8·243	—8·929	— 9·353	000	
	20	20	25	— 9·405	+1·117	— 8·288	—8·917	— 9·422	+·017	Definition very bad
	21	20	50	— 9·524	+1·122	— 8·402	—8·971	— 9·494	—·030	4 South stars only
	23	21	0	— 9·650	+1·123	— 8·527	—8·979	— 9·628	—·022	Clouds passing
	26	21	10	— 9·824	+1·113	— 8·711	—8·987	— 9·825	+·001	
	27	20	45	— 9·875	+1·110	— 8·765	—8·984	— 9·890	+·015	Foggy
	31	21	40	—10·171	+1·117	— 9·054	—9·037	—10·179	+·008	
Nov.	1	21	20	—10·256	+1·122	— 9·134	—9·059	—10·254	—·002	
	2	23	5	—10·365	+1·129	— 9·236	—9·098	—10·342	—·023	
	4	21	50	— 0·492*	+1·140	— 9·352	—9·101	— 0·490	—·002	
	5	0	10	— 0·569	+1·142	— 9·427	—9·112	— 0·569	000	
	7	21	40	— 0·663	+1·141	— 9·522	—9·095	— 0·694	+·031	
	9	2	20	— 0·821	+1·131	— 9·690	—9·136	— 0·819	—·002	
	10	21	10	— 0·887	+1·124	— 9·763	—9·160	— 0·862	—·025	2 South stars only
	12	1	30	— 0·986	+1·117	— 9·869	—9·141	— 0·966	—·020	
	14	22	15	— 1·027	+1·120	— 9·907	—9·070	— 1·060	+·033	
	19	22	15	— 1·298	+1·131	—10·167	—9·038	— 1·304	+·006	
	20	23	35	— 1·328	+1·126	—10·202	—9·011	— 1·348	+·020	
	21	23	20	— 1·416	+1·120	—10·296	—9·047	— 1·389	—·027	
	26	22	10	— 1·604	+1·099	—10·505	—8·967	— 1·604	000	
	27	22	30	— 1·681	+1·101	—10·580	—8·983	— 1·653	—·028	3 South stars only
	28	22	20	— 1·696	+1·104	—10·592	—8·937	— 1·705	+·009	
Dec.	3	2	40	— 1·966	+1·113	—10·853	—8·895	— 1·966	000	

* Clock altered 10 seconds. This has been added where convenient in later colums.

Clock Shortt 11.—Throughout the time covered by the observations the standard clock Shortt 3 was compared twice daily with a similar clock Shortt 11 mounted in the same room but swinging in a plane at right angles to that of the standard. The difference between the two clocks is given in Table IV. The mean difference in the daily rates was ^{s}·0416. This was applied to find the change of the one clock relative to the other apart from a constant rate. The final result is given in the last column and shown as the top curve of the diagram.

TABLE IV.—*Comparison of Clocks, Shortt* 11 *and Shortt* 3.

Noon.	Shortt 11 *minus* Shortt 3.	Uniform Rate.	Resultant Difference.	Noon.	Shortt 11 *minus* Shortt 3.	Uniform Rate.	Resultant Difference.
	s	s			s	s	
Sept. 22 ...	+ 0·723	− 1·622	− 0·899	Oct. 29 ...	− 0·906	− 0·083	− 0·989
23 ...	0·670	1·581	0·911	30 ...	0·959	− 0·042	1·001
24 ...	0·628	1·539	0·911	31 ...	1·011	0·000	1·011
25 ...	0·577	1·498	0·921	Nov. 1 ...	1·068	+ 0·042	1·026
26 ...	0·522	1·456	0·934	2 ...	1·111	0·083	1·028
27 ...	0·490	1·414	0·924	3 ...	1·160	0·125	1·035
28 ...	0·467	1·373	0·906	4 ...	1·208	0·166	1·042
29 ...	0·396	1·331	0·935	5 ...	1·263	0·208	1·055
30 ...	0·362	1·290	0·928	6 ...	1·314	0·250	1·064
Oct. 1 ...	0·311	1·248	0·937	7 ...	1·360	0·291	1·069
2 ...	0·274	1·206	0·932	8 ...	1·407	0·333	1·074
3 ...	0·205	1·165	0·960	9 ...	1·459	0·374	1·085
4 ...	0·189	1·123	0·934	10 ...	1·503	0·416	1·087
5 ..	0·142	1·082	0·940	11 ...	1·530	0·458	1·072
6 ...	0·094	1·040	0·946	12 ...	1·591	0·499	1·092
7 ...	+ 0·045	0·998	0·953	13 ...	1·629	0·541	1·088
8 ...		0·957		14 ...	1·676	0·582	1·094
9 ...		0·915		15 ...	1·716	0·624	1·092
10 ...	− 0·088	0·874	0·962	16 ...	1·778	0·666	1·112
11 ...	0·125	0·832	0·957	17 ...	1·823	0·707	1·116
12 ...	0·177	0·790	0·967	18 ...	1·868	0·749	1·119
13 ...	0·220	0·749	0·969	19 ..	1·900	0·790	1·110
14 ...	0·277	0·707	0·984	20 ...	1·944	0·832	1·112
15 ...	0·310	0·666	0·976	21 ...	1·985	0·874	1·111
16 ...	0·347	0·624	0·971	22 ...		0·915	
17 ...	0·402	0·582	0·984	23 ..	2·063	0·957	1·106
18 ...	0·442	0·541	0·983	24 ...	2·074	0·998	1·076
19 ...	0·487	0·499	0·986	25 ...	2·099	1·040	1·059
20 ...	0·511	0·458	0·969	26 ...	2·116	1·082	1·034
21 ...	0·543	0·416	0·959	27 ...	2·132	1·123	1·009
22 ...	0·585	0·374	0·959	28 ...	2·159	1·165	0·994
23 ...	0·619	0·333	0·952	29 ...	2·177	1·206	0·971
24 ...	0·662	0·291	0·953	Nov. 30 ...	2·194	1·248	0·946
25 ...	0·701	0·250	0·951	Dec. 1 ...	2·205	1·290	0·915
26 ...	0·730	0·208	0·938	2 ...	2·233	1·331	0·902
27 ...	0·801	0·166	0·967	3 ...	2·286	1·373	0·913
28 ...	− 0·855	− 0·125	− 0·980	Dec. 4 ...	− 2·314	+ 1·414	− 0·900

The next point was to reduce the star observations to Shortt 11. This is done in Table V. The first column gives the date of the observations, the third the errors of Shortt 3 on mean sidereal time with a constant rate removed as shown in

TABLE V.—*Comparison of Clock Shortt* 11 *with the Observations.*

Date.	Sidereal Time.	Correction to Shortt 3 on a Mean Rate.	Reduction to Shortt 11	Smooth Rate s·0416.	Error of Shortt 11 on Smooth Rate.
	h m	s	s	s	s
Sept. 21	20 10	− 8·919			
22	19 50	− 8·915	+ 0·706	− 1·609	− 9·818
27	20 0	− 8·983	+ 0·483	− 1·401	− 9·901
30	20 5	− 8·950	+ 0·346	− 1·277	− 9·881
Oct. 2	20 10	− 8·972	+ 0·253	− 1·194	− 9·913
6	20 40	− 8·950	+ 0·078	− 1·027	− 9·899
7	20 35	− 8·956	+ 0·031	− 0·985	− 9·910
9	20 30	− 8·927	− 0·057	− 0·902	− 9·886
10	20 15	− 8·977	− 0·099	− 0·862	− 9·938
17	20 40	− 8·907	− 0·414	− 0·570	− 9·891
17	23 50	− 8·916	− 0·419	− 0·565	− 9·900
18	20 30	− 8·918	− 0·455	− 0·529	− 9·902
19	20 40	− 8·929	− 0·494	− 0·487	− 9·910
20	20 25	− 8·917	− 0·520	− 0·446	− 9·883
21	20 50	− 8·971	− 0·555	− 0·404	− 9·930
23	21 0	− 8·979	− 0·631	− 0·321	− 9·931
26	21 10	− 8·987	− 0·751	− 0·196	− 9·934
27	20 45	− 8·984	− 0·816	− 0·155	− 9·955
Oct. 31	21 40	− 9·037	− 1·028	+ 0·012	− 10·053
Nov. 1	21 20	− 9·059	− 1·080	+ 0·053	− 10·086
2	23 5	− 9·098	− 1·128	+ 0·098	− 10·128
4	21 50	− 9·101	− 1·224	+ 0·137	− 10·188
5	0 10	− 9·112	− 1·282	+ 0·224	− 10·170
7	21 40	− 9·095	− 1·373	+ 0·303	− 10·165
9	2 20	− 9·136	− 1·479	+ 0·394	− 10·221
10	21 10	− 9·160	− 1·511	+ 0·428	− 10·243
12	1 30	− 9·141	− 1·607	+ 0·517	− 10·231
14	22 15	− 9·070	− 1·687	+ 0·594	− 10·163
19	22 15	− 9·038	− 1·912	+ 0·802	− 10·148
20	23 35	− 9·011	− 1·957	+ 0·845	− 10·123
21	23 20	− 9·047	− 1·997	+ 0·886	− 10·158
26	22 10	− 8·967	− 2·120	+ 1·092	− 9·995
27	22 30	− 8·983	− 2·139	+ 1·134	− 9·988
Nov. 28	22 20	− 8·937	− 2·164	+ 1·175	− 9·926
Dec. 3	2 40	− 8·895	− 2·297	+ 1·390	− 9·802

the fifth column of Table III, the fourth the reduction from Shortt 3 to Shortt 11, the fifth the allowance for a smooth rate of s·0416, and the last the observed error of Shortt 11 on mean sidereal time after the taking out of a smooth rate. This is shown in the middle curve of the diagram. It will be seen that on the whole Shortt 11

behaved in the same way as Shortt 3, but that the variation shown by it was nearly twice as large as that shown by the latter. The residuals of the smooth curves from the star observations is nearly the same for both clocks and are therefore attributed to the star observations are not to short period irregularities in the clocks.

Reception of W/T Signals.—An external aerial has been employed for all time signal reception. The receiving unit consists of a loosely coupled two circuit system, with rectifying valve only. An independent heterodyne is used for continuous wave reception and when considerable interference is experienced, reaction and the use of a form of rejector circuit is employed to obtain greater selectivity.

The automatic recording unit is fed through a transformer, the primary being in series with the head-phones. The secondary of this transformer controls the grid circuit of a valve adjusted to oscillate when a signal is passing. In the anode circuit of the oscillating valve, the coils of a high resistance electro-mechanical relay are placed. The relay is adjusted so that the tongue closes a local circuit when a signal is received. The local circuit from the relay operates a low sensitivity syphon recorder used as a single pen chronograph. The standard clock energises, in the receiving room, a buzzer circuit tuned to the wavelength of the signal which is being received on the aerial. By this method the clock beat is recorded by passing through the same apparatus as the signals, and the effect of relay lag &c., is avoided.

The method of reading the tape depended on the nature of the signals. For the Time Signals and also the Annapolis Rhythmic Signals the beginning of the signal was read against the beginning of the clock tap. This made the times directly comparable with the clock errors. The number of signals read from the tape is indicated in the tables. For the rhythmic signals from Eiffel Tower, Bordeaux and Nauen a different procedure was followed. The coincidences were judged by the run of signals near the coincidence point and particularly the signals which were just clear of the clock signals in both directions. The coincidences thus referred to the middle of both clock taps and signals. This had to be reduced to the beginning of clock tap and signal tap by the application of half the difference in their lengths. The clock tap was taken as $0^s{\cdot}040$ long and the signal taps from daily measurements. The adopted lengths of the signal taps are shown in the tables giving the times of reception.

Final Clock Corrections.—Table VI gives the final clock corrections of the standard clock. These quantities have been based entirely on the observations with the small transit, but have been referred to the prime meridian by the application of the geodetic longitude difference of $^s{\cdot}020$. These corrections apply to true sidereal time defined by the equinox affected by the short period terms of nutation. The clock corrections at the times of reception of the various signals have been derived from this table by simple interpolation.

TABLE VI.—*Corrections to the Standard Clock to reduce to Greenwich Sidereal Time, for Noon on each day.*

	s		s		s		s
Oct. 1 ...	— 8·237	Oct. 16 ...	— 9·120	Oct. 31 ...	—10·136	Nov. 15 ...	— 1·078
2 ...	— 8·298	17 ...	— 9·181	Nov. 1 ...	—10·214	16 ...	— 1·131
3 ...	— 8·359	18 ...	— 9·246	2 ...	—10·294	17 ...	— 1·180
4 ...	— 8·422	19 ...	— 9·313	3 ...	— 0·373*	18 ...	— 1·228
5 ...	— 8·487	20 ...	— 9·383	4 ...	— 0·449	19 ...	— 1·272
6 ...	— 8·552	21 ...	— 9·454	5 ...	— 0·522	20 ...	— 1·315
7 ...	— 8·617	22 ...	— 9·523	6 ...	— 0·592	21 ...	— 1·356
8 ...	— 8·680	23 ...	— 9·589	7 ...	— 0·658	22 ...	— 1·397
9 ...	— 8·741	24 ...	— 9·656	8 ...	— 0·718	23 ...	— 1·439
10 ...	— 8·798	25 ...	— 9·720	9 ...	— 0·775	24 ...	— 1·481
11 ...	— 8·853	26 ...	— 9·786	10 ...	— 0·827	25 ...	— 1·525
12 ...	— 8·907	27 ...	— 9·852	11 ...	— 0·878	26 ...	— 1·572
13 ...	— 8·959	28 ...	— 9·919	12 ...	— 0·926	27 ...	— 1·620
14 ...	— 9·010	29 ...	— 9·989	13 ...	— 0·974	28 ...	— 1·672
15 ...	— 9·063	30 ...	—10·060	14 ...	— 1·025	29 ...	— 1·725
Oct. 16 ...	— 9·120	Oct. 31 ...	—10·136	Nov. 15 ...	— 1·078	Nov. 30 ...	— 1·775

* The clock dial was altered 10s on Nov. 3 at 14 hrs. Sid. Time.

TABLE VII.—*Quantities to be applied to tabulated Greenwich Sidereal Times of Signals to reduce them to an equinox not affected by the short period terms in nutation, for Noon on each day.*

	s		s		s		s
Oct. 1 ...	— ·013	Oct. 16 ...	— ·010	Oct. 31 ...	— ·010	Nov. 15 ...	— ·003
2 ...	— 13	17 ...	— 10	Nov. 1 ...	— 6	16 ...	+ 3
3 ...	— 12	18 ...	— 6	2 ...	0	17 ...	+ 8
4 ...	— 9	19 ...	— 1	3 ...	+ 6	18 ...	+ 10
5 ...	— 4	20 ...	+ 4	4 ...	+ 11	19 ...	+ 10
6 ...	+ 2	21 ...	+ 8	5 ...	+ 15	20 ...	+ 7
7 ...	+ 8	22 ...	+ 9	6 ...	+ 16	21 ...	+ 2
8 ...	+ 13	23 ...	+ 8	7 ...	+ 14	22 ...	— 4
9 ...	+ 16	24 ...	+ 4	8 ...	+ 10	23 ...	— 9
10 ...	+ 16	25 ...	— 1	9 ...	+ 4	24 ...	— 12
11 ...	+ 13	26 ...	— 6	10 ...	— 2	25 ...	— 14
12 ...	+ 9	27 ...	— 10	11 ...	— 8	26 ...	— 13
13 ...	+ 3	28 ...	— 13	12 ...	— 11	27 ...	— 11
14 ...	— 3	29 ...	— 14	13 ...	— 11	28 ...	— 7
15 ...	— 8	30 ...	— 13	14 ...	— 8	29 ...	— 2
Oct. 16 ...	— ·010	Oct. 31 ...	— ·010	Nov. 15 ...	— ·003	Nov. 30 ...	+ ·004

If it is desired to have the times of the signals referred to an equinox not affected by the short period nutation terms the quantities shown in the Table VII have to be applied to the Greenwich Sidereal Times of the reception of the signals.

The observations with the reversible transit instrument were all made by Dr. Jackson, who drew up the programme of observations and personally carried out their reduction and discussion. Mr. Bowyer was responsible for all the arrangements for the recording of the Wireless time-signals, and personally received the signals and read the chronograph tapes.

February 19, 1927. F. W. DYSON.

TABLE VIII.—*List of stars with adopted Right Ascensions for* 1926·0.

Star.	Mag.	Adopted R.A. 1926·0.	Approx. Dec.	Star.	Mag.	Adopted R.A. 1926·0.	Approx. Dept.
		h m s	° ′			h m s	° ′
ζ Aquilæ ..	3·0	19 2 0·475	+13 45	30 Piscium ..	4·7	23 58 9·882	− 6 26
δ Draconis	3·2	12 32·494	+67 32	33 Piscium ..	4·7	0 1 32·819	− 6 7
τ Draconis	4·6	16 59·108	+73 13	α Androm.	2·2	4 33·431	+28 41
δ Aquilæ ..	3·4	21 46·013	+ 2 58	γ Pegasi ..	2·9	9 25·314	+14 46
β Cygni ..	3·2	27 44·145	+27 48	ι Ceti ..	3·8	15 39·444	− 9 14
μ Aquilæ ..	4·6	30 28·406	+ 7 13	44 Piscium ..	6·0	21 36·463	+ 1 32
κ Aquilæ ..	5·0	32 54·623	− 7 12	12 Ceti ..	6·0	26 15·691	− 4 22
β Sagittæ ..	4·4	37 43·466	+17 18	ε Androm.	4·5	34 38·351	+28 55
τ Aquilæ ..	5·6	20 0 31·414	+ 7 4	δ Androm.	3·5	35 21·865	+30 27
θ Aquilæ ..	3·4	7 29·216	− 1 3	21 Cassiop ..	5·6	40 43·736	+74 35
κ Cephei ..	4·4	11 24·703	+77 29	ζ Androm.	4·3	43 24·656	+24 52
24 Vupleculæ	5·4	13 37·003	+24 27	γ Cassiop ..	2·2	52 13·559	+60 19
γ Cygni ..	2·3	19 34·274	+40 1	43 H Cephei	..	58 18·993	+85 52
θ Cephei ..	4·3	28 20·509	+62 45	β Androm.	2·4	1 5 34·881	+35 14
β Delphini..	3·7	34 4·687	+14 20	τ Piscium ..	4·7	7 34·695	+29 42
α Delphini..	3·9	36 12·000	+15 39	η Piscium ..	3·7	27 31·175	+14 58
δ Delphini..	4·5	40 0·208	+14 48	40 Cassiop ..	5·5	32 33·876	+72 40
η Cephei ..	3·6	43 47·195	+61 33	α Ursæ Min.	2·1	34 45·789	+88 54
76 Draconis	5·7	48 2·662	+82 16	ζ Ceti ..	3·9	47 48·389	−10 42
μ Aquarii ..	4·8	48 39·819	− 9 16	β Arietis ..	2·7	50 32·836	+20 27
32 Vulpeculæ	5·2	51 24·260	+27 47	50 Cassiop ..	4·1	57 4·667	+72 4
γ Cygni ..	4·0	54 24·745	+40 53	β Trianguli	3·1	2 5 7·946	+34 38
61¹ Cygni ..	5·6	21 3 34·664	+38 23	ξ¹Ceti ..	4·5	9 4·450	+ 8 30
ζ Cygni ..	3·4	9 47·089	+29 55	γ Trianguli	4·1	12 54·455	+33 30
τ Cygni ..	3·8	11 50·111	+37 44	ο Ceti ..	1·7-9·6	15 36·336	− 3 19
α Equulei ..	4·1	12 7·478	+ 4 56	ι Cassiop ..	4·6	22 56·509	+67 4
σ Cygni ..	4·3	14 30·405	+39 5	ν Ceti ..	5·0	31 59·246	+ 5 16
α Cephei ..	2·6	16 48·797	+62 16	δ Ceti ..	4·0	35 41·208	+ 0 1
τ Pegasi ..	4·2	18 39·761	+19 29	γ″Ceti ..	3·7	39 27·816	+ 2 55
β Cephei ..	3·3	27 42·690	+70 14	η Eridani ..	4·0	52 48·621	− 9 12
ξ Aquarii ..	4·8	33 48·810	− 8 11	47 H Cephei	5·7	56 10·395	+79 8
74 Cygni ..	5·1	33 58·826	+40 5	ρ Persei ..	3·4-4·2	3 0 25·585	+38 33
1 Pegasi ..	2·5	40 33·042	+ 9 32	48 H Cephei	5·5	10 52·055	+77 28
11 Cephei ..	4·8	40 50·573	+70 58	η Tauri ..	3·0	43 4·844	+23 53
16 Pegasi ..	5·0	49 41·531	+25 35				
20 Pegasi ..	5·7	57 28·955	+12 46				
α Aquarii ..	3·2	22 1 59·007	− 0 41				
20 Cephei ..	5·4	2 45·370	+62 25				
θ Pegasi ..	3·7	6 27·979	+ 5 50				
24 Cephei ..	5·0	8 23·263	+71 59				
γ Aquarii ..	4·0	17 50·063	− 1 46				
31 Pegasi ..	4·9	17 52·436	+11 56				
226 B Cephei	5·7	30 58·658	+75 51				
η Aquarii ..	4·1	31 33·225	− 0 30				
10 Lacertæ	4·9	35 56·173	+38 40				
η Pegasi ..	3·1	39 31·782	+29 50				
λ Pegasi ..	4·1	42 57·829	+23 11				
ι Cephei ..	3·7	47 2·443	+65 49				
β Pegasi ..	2·2-2·7	23 0 10·983	+27 41				
α Pegasi ..	2·6	1 4·349	+14 48				
π Cephei ..	4·6	5 32·268	+74 59				
59 Pegasi ..	5·2	7 59·913	+ 8 19				
φ Aquarii ..	4·4	10 29·412	− 6 27				
γ Piscium ..	3·8	13 19·700	+ 2 53				
ο Cephei ..	4·9	15 34·590	+67 42				
ν Pegasi ..	4·6	16 58·242	+23 20				
4 Cassiop ..	5·2	21 32·455	+61 53				
ν Pegasi ..	4·6	21 40·932	+23 0				
θ Piscium ..	4·4	24 12·781	+ 5 58				
72 Pegasi ..	5·2	30 16·623	+30 55				
ι Piscium ..	4·3	36 8·557	+ 5 14				
γ Cephei ..	3·4	36 17·551	+77 13				
41 H Cephei	5·0	44 21·528	+67 24				
φ Pegasi ..	5·2	23 48 43·197	+18 43				
Gr. 4163 ..	6·6	51 12·475	+74 0				
w Piscium ..	4·0	55 30·566	+ 6 27				

Stars Observed below Pole.

Cephei 51 ..	5·3	7 6 26·003	+87 10
Gr. 1374 ..	5·6	51 22·277	+74 7
3 H Ursæ Maj.	5·5	8 5 28·200	+68 42
Br. 1147 ..	5·7	10 17·478	+75 59
ο Ursæ Major	3·5	24 7·810	+60 58
σ²Ursæ Major	4·9	9 3 54·188	+67 26
h Ursæ Major	3·8	25 42·753	+63 23
1 H Draconis	4·6	26 40·383	+81 39
d Ursæ Major	4·6	27 58·147	+70 9
Gr. 1586 ..	6·0	51 48·315	+73 14
32 Ursæ Major	5·7	10 12 40·792	+65 29
30 H UrsæMaj.	4·9	18 48·977	+65 56
30 H Camelop	5·3	22 12·638	+82 56
α Ursæ Major	2·0	59 10·517	+62 9
λ Draconis	4·1	11 27 1·851	+69 44
3 Draconis	5·5	38 21·560	+67 9
4 H Draconis	5·1	12 8 45·124	+78 2
κ Draconis	3·9	30 20·011	+70 12
76 Ursæ Major	5·9	38 20·257	+63 7
α Draconis	3·6	14 2 23·014	+64 44
5 Ursæ Minor	4·4	27 39·479	+76 2
β Ursæ Minor	2·2	50 54·099	+74 27
γ Ursæ Minor	3·1	15 20 49·790	+72 6

TABLE IX.—*Observations with the Striding Level.*

Day.	Sidereal Time.	Position.	Level Error.	Day.	Sidereal Time.	Position.	Level Error.	Day.	Sidereal Time.	Position.	Level Error.
1926	h m		″	1926	h m		″	1926	h m		″
Sept. 21	19 35	W	+ 0·86	Oct. 9	19 0	E	+ 0·69	Oct. 21	20 20	W	+ 0·83*
	20 45	E	+ 1·71		19 32	E	+ 0·89		20 45	E	+ 2·05
	21 5	W	+ 1·74		19 58	E	+ 0·60		20 50	W	+ 1·91
					20 3	W	+ 0·91		21 25	W	+ 1·88
Sept. 22	18 35	W	+ 1·28		20 18	E	+ 0·88				
	18 35	E	+ 0·50		20 40	W	+ 0·53	Oct. 23	19 25	W	+ 1·83
	19 35	W	+ 2·32		20 53	E	+ 1·30		19 40	E	+ 1·66*
	20 15	E	+ 2·28		21 3	W	+ 0·68		20 15	E	+ 1·60*
	20 40	E	+ 2·14		21 22	W	+ 0·65		20 30	W	+ 1·63
	20 50	W	+ 1·93		21 44	E	+ 0·38		20 55	E	+ 1·92
									21 35	E	+ 1·73
				Oct. 10	19 4	W	+ 0·39		21 40	W	+ 1·83*
Sept. 27	19 0	E	+ 2·61		19 30	W	− 0·62		21 53	W	+ 1·32*
	19 5	W	+ 4·59		19 54	E	+ 0·45		22 25	E	+ 1·85
	19 35	W	+ 2·25		20 13	E	+ 0·43				
	19 57	E	+ 2·77		20 47	E	+ 0·51				
	20 5	W	+ 2·77		20 57	W	+ 0·22	Oct. 26	19 40	E	+ 1·81
	20 24	W	+ 2·09		21 17	E	+ 0·71		20 0	W	+ 1·82
	20 50	E	+ 2·75						20 15	E	+ 2·01*
	20 55	W	+ 2·89						20 30	E	+ 1·93
				Oct. 17	19 0	E	+ 0·95		21 20	W	+ 1·90
					19 20	W	+ 1·15		21 40	E	+ 2·20
Sept. 30	18 40	W	− 0·36		20 0	W	+ 0·68*		21 45	W	+ 2·26
	18 55	E	− 0·03		21 0	E	+ 0·70*		22 30	E	+ 2·28
	20 0	E	+ 0·69		21 20	E	+ 1·41		22 35	W	+ 2·37
	20 5	W	+ 0·99		21 45	W	+ 0·92				
	20 40	W	+ 1·51*		22 50	W	+ 0·99				
	21 15	W	+ 1·37		23 30	W	+ 1·12*	Oct. 27	19 50	W	− 0·10
	21 30	E	+ 1·66		23 40	E	+ 1·28*		20 15	W	− 0·97
					0 15	W	+ 0·85		20 50	E	− 0·24
					0 45	E	+ 1·46		21 20	W	− 1·25
Oct. 2	19 0	E	+ 1·85						21 40	W	− 0·46
	19 35	W	+ 1·73						21 50	W	− 0·48
	19 56	E	+ 2·06	Oct. 18	19 15	E	+ 0·22				
	20 5	W	+ 3·03		20 0	W	+ 0·69				
	20 15	E	+ 1·96		20 30	E	+ 1·11	Oct. 31	20 0	W	− 0·44
	20 56	W	+ 1·85		20 40	W	+ 1·22		20 20	E	− 0·25
	21 16	W	+ 2·19		20 55	W	+ 1·42		20 40	W	− 1·16*
	21 20	E	+ 2·60		21 30	E	+ 1·79		21 0	E	− 0·65
					21 45	W	+ 1·33		21 35	W	− 0·27
									21 45	E	− 0·17
Oct. 6	18 45	E	+ 0·54						22 25	E	+ 0·05
	19 0	W	+ 0·09	Oct. 19	19 25	W	+ 0·64		22 55	E	+ 0·18
	19 32	W	+ 0·49		19 55	E	+ 1·34		23 5	W	− 0·27
	20 0	W	+ 0·05		20 15	W	+ 1·05				
	20 5	E	+ 0·49		20 48	W	+ 1·04				
	20 58	W	+ 0·71		20 55	E	+ 1·33				
	21 05	E	+ 0·94		21 20	E	+ 1·02	Nov. 1	20 10	W	− 0·21
					21 40	E	+ 0·95		20 15	E	− 0·09
Oct. 7	19 45	E	− 0·37						20 33	W	− 0·48*
	19 50	W	− 0·28	Oct. 20	19 20	W	+ 1·09		20 50	E	− 0·15
	20 15	W	+ 0·58		19 55	E	+ 1·07		20 55	W	− 0·29
	20 24	E	+ 0·21		20 13	E	+ 1·17		21 20	W	− 0·44*
	20 59	E	+ 1·00		20 40	E	+ 1·46		21 40	W	− 0·46
	21 23	E	+ 0·79		21 0	W	+ 1·16		21 45	E	− 0·09
	21 36	W	+ 1·60		21 20	W	+ 1·26		21 55	W	− 0·07*
	21 45	E	+ 1·43		21 30	W	+ 1·40		22 30	E	− 0·02
	21 50	W	+ 0·78		21 40	E	+ 1·67		22 45	W	− 0·22

* Half weight.

TABLE IX.—*Observations with the Striding Level.*

Day.	Sidereal Time.	Position.	Level Error.	Day.	Sidereal Time.	Position.	Level Error.	Day.	Sidereal Time.	Position.	Level Error.
1926	h m		″	1926	h m		″	1926	h m		″
Nov. 2	22 0	W	+ 0·22	Nov. 9	1 35	W	+ 0·44	Nov. 29	0 20	E	+ 0·83
	22 15	E	+ 0·73*		2 20	E	+ 0·44*				
	22 25	E	+ 0·85*		2 45	E	+ 0·74				
	22 52	E	+ 0·66		2 50	W	+ 0·34*				
	23 30	E	+ 0·31		3 0	E	+ 0·88	Nov. 21	21 35	W	+ 0·82
	23 40	W	+ 0·20*						21 45	E	+ 0·76*
	23 50	W	+ 0·32*						21 55	W	+ 1·16
	0 0	W	+ 0·10*	Nov. 10	20 50	E	+ 0·01		22 15	W	+ 1·04
	0 10	E	+ 0·35		21 20	E	− 0·07		22 25	W	+ 1·08
					21 35	W	− 0·83*		22 50	W	+ 1·39*
					21 55	E	+ 0·20*		23 0	W	+ 0·83
									23 50	E	+ 0·78*
Nov. 4	20 30	W	− 0·11						0 15	W	+ 0·96
	20 45	E	− 0·40	Nov. 12	0 5	E	+ 1·48		0 45	E	+ 1·05
	21 0	W	+ 2·92		0 25	W	+ 1·34*				
	21 5	E	− 0·07*		0 45	W	+ 1·46				
	21 20	W	− 0·44		1 0	W	+ 1·21*	Nov. 26	20 40	E	− 1·22
	21 36	W	− 0·48*		1 10	E	+ 1·43		21 0	W	− 1·02
	21 45	E	− 0·14*		1 25	W	+ 1·50*		21 20	W	− 0·97
	21 50	E	− 0·21		1 40	E	+ 1·62*		21 55	E	− 0·94
	22 25	E	− 0·32		2 5	E	+ 1·90*		22 45	E	− 0·16
	22 50	W	− 0·58		2 45	E	+ 1·94		23 35	E	− 0·41
					2 55	W	+ 1·29				
Nov. 5	22 55	E	+ 0·33					Nov. 27	21 55	W	− 1·31
	23 30	W	− 0·08*	Nov. 14	21 10	E	+ 0·10		22 15	E	− 2·64
	23 40	E	+ 0·20*		21 20	W	+ 0·15*		22 30	W	− 0·99
	23 50	E	+ 0·24		21 55	W	+ 0·37*		22 40	E	− 0·34
	0 0	W	+ 0·06*		22 10	E	+ 0·31		23 0	W	− 0·32
	0 25	W	− 0·88*		22 25	W	+ 0·11		23 10	E	− 0·07
	0 45	W	+ 0·07		22 55	E	+ 0·54		23 30	E	− 0·44*
	1 15	E	+ 0·31		23 20	E	+ 0·60				
	1 30	E	+ 0·65*		23 40	W	+ 0·41				
	1 40	W	+ 0·33					Nov. 28	21 0	W	− 1·23
	1 45	E	+ 0·68*						21 20	W	− 1·55*
				Nov. 19	21 10	W	+ 0·83		21 45	E	− 0·99
					21 20	E	+ 0·51*		22 5	W	− 1·02*
Nov. 7	20 20	E	+ 0·08		21 30	W	+ 0·75*		22 15	W	− 0·82
	20 40	E	+ 0·39*		21 45	W	+ 0·44*		22 50	W	− 1·55
	20 50	W	− 0·37		21 50	E	+ 0·78*		23 30	E	− 0·75
	21 0	E	+ 0·43		22 10	W	+ 0·60				
	21 35	E	+ 0·36*		22 50	E	+ 0·92				
	21 45	E	+ 0·22*		23 20	E	+ 1·44	Dec. 3	1 15	E	− 0·29*
	21 55	W	− 0·08*						1 25	W	− 0·27*
	22 15	E	+ 0·44						1 45	W	− 0·44*
	22 30	W	+ 0·24	Nov. 20	22 0	E	+ 0·34		2 20	W	− 0·56*
	22 50	W	+ 0·44		22 20	W	+ 0·41		2 45	E	+ 0·07
					22 50	W	+ 0·49		3 0	E	0·00*
					23 35	E	+ 0·95*		3 20	E	+ 0·02
Nov. 9	21 40	E	+ 0·66		23 40	W	+ 0·20		3 45	W	− 0·52
	22 0	W	+ 0·55		0 15	W	+ 0·52				

* Half weight.

TABLE X.—*Clock Corrections from Individual Stars.*

North Stars :—Stars above the line were observed above pole.
Stars below the line were observed below pole.

Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.
1926.		s		s
Sept. 21	α Aql	− 7·68†	θ Cep	− 7·63
	γ Sgr	7·60	η Cep	− 7·61
	τ Aql	7·62		
	γ Cyg	7·64	Br. 1147	− 7·54
	β Del	− 7·60†		
Sept. 22	ζ Aql	− 7·67	δ Dra	− 7·67
	δ Aql	7·69	τ Dra	7·69†
	β Cyg	7·71	θ Cep	7·73
	μ Aql	7·73†	η Cep	− 7·68
	γ Aql	7·68		
	α Aql	7·70	Cep 51	− 9·23
	τ Aql	7·70	Gr. 1374	7·66
	γ Cyg	7·67*	Br. 1147	− 7·78
	β Del	− 7·69		
Sept. 27	δ Aql	− 8·04	δ Dra	− 8·02
	β Cyg	8·10	θ Cep	8·16
	γ Aql	8·07	η Cep	− 8·12
	α Aql	8·09		
	τ Aql	8·07	Cep 51	− 9·46
	γ Cyg	8·06	Gr. 1374	8·18
	β Del	8·03	Br. 1147	− 8·08
	α Del	8·07		
	μ Aqr	− 7·99		
Sept. 30	δ Aql	− 8·14	δ Dra	− 8·43
	β Cyg	8·19	τ Dra	8·50
	κ Aql	8·17	θ Cep	8·19
	β Sge	8·22	η Cep	8·17
	γ Aql	8·22	76 Dra	− 8·13
	α Aql	8·22		
	24 Vul	8·23	Cep 51	− 7·48
	γ Cyg	8·21	Gr. 1374	8·29
	β Del	8·17	o UMa	8·27
	α Del	8·19	σ^2UMa	− 8·32
	ζ Cyg	− 8·22		

Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.
1926		s		s
Oct. 2	β Cyg	− 8·39	θ Cep	− 8·30
	γ Aql	8·39	η Cep	8·31
	α Aql	8·40	76 Dra	8·74
	τ Aql	8·30	α Cep	− 8·34
	γ Cyg	8·34		
	β Del	8·30	Gr. 1374	− 8·33
	α Del	8·34	Br. 1147	8·26
	ζ Cyg	8·33	o UMa	8·40
	τ Cyg	− 8·35	σ^2UMa	− 8·32
Oct. 6	δ Aql	− 8·55	δ Dra	− 8·50
	β Sge	8·63	τ Dra	8·64
	γ Aql	8·62	η Cep	8·57
	α Aql	8·63	76 Dra	8·74
	γ Cyg	8·57	α Cep	− 8·63
	β Del	8·56		
	α Del	8·57	Cep 51	− 8·10
	ζ Cyg	− 8·58	Gr. 1374	8·56
			Br. 1147	8·63
			o UMa	− 8·60
Oct. 7	γ Sge	− 8·63	θ Cep	− 8·76
	τ Aql	8·67	η Cep	8·62
	γ Cyg	8·70	76 Dra	9·00
	β Del	8·67	11 Cep	− 8·48
	α Del	8·69		
	ν Cyg	8·65	3 H.UMa	− 8·53
	ζ Cyg	8·64	Br. 1147	8·44
	σ Cyg	8·61	σ^2UMa	8·82
	1 Peg	8·66	d UMa	− 8·93
	ξ Aqr	− 8·68		
Oct. 9	δ Aql	− 8·73	τ Dra	− 8·98
	β Cyg	8·76	θ Cep	8·81
	β Sge	8·79	η Cep	8·76
	γ Aql	8·80	β Cep	− 8·79
	α Agl	87·9		
	β Del	8·72	Cep 51	− 6·92
	α Del	8·75	Gr. 1374	8·92
	ξ Aqr	8·74	Br. 1147	8·85
	ε Peg	8·72	o UMa	− 8·88
	16 Peg	− 8·78		

Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.
1926		s		s
Oct. 10	δ Aql	− 8·80	δ Dra	− 9·24
	β Cyg	8·90	τ Dra	9·46
	γ Aql	8·89	θ Cep	8·85
	α Aql	8·92	η Cep	− 8·82
	γ Cyg	8·89		
	β Del	8·84	Gr. 1374	− 9·00
	α Del	8·87	3 H.UMa	8·97
	ζ Cyg	8·86	Br. 1147	8·81
	τ Cyg	8·78	o UMa	− 8·98
	σ Cyg	− 8·86		
Oct. 17 1st series	γ Aql	− 9·24	θ Cep	− 9·17
	α Aql	9·22	η Cep	9·17
	γ Cyg	9·20	11 Cep	− 9·32
	α Del	9·15		
	32 Vul	9·22	o UMa	− 9·19
	ν Cyg	9·13	σ^2UMa	9·22
	ζ Cyg	9·19	1 H.Dra	− 9·00
	τ Cyg	9·07*		
	σ Cyg	9·22		
	1 Peg	9·21		
	ξ Aqr	− 9·16		
Oct. 17 2nd series	φ Aqr	− 9·17*	π Cep	− 9·32
	γ Psc	9·15*	4 Cas	9·18*
	τ Peg	9·22	21 Cas	− 9·20
	72 Peg	9·20†		
	44 Psc	9·22	λ Dra	− 9·11
	12 Cet	9·24	3 Dra	9·25
	δ And	− 9·27	κ Dra	− 9·35
Oct. 18	κ Aql	− 9·31	κ Cep	− 9·40
	β Sge	9·34	θ Cep	9·29
	γ Aql	9·31	η Cep	9·23
	α Aql	9·33	β Cep	− 9·23
	γ Cyg	9·25		
	α Del	9·23	Gr. 1374	− 9·21
	μ Aqr	9·23	3 H.UMa	9·15
	ζ Cyg	9·24*	o UMa	9·25
	σ Cyg	9·27	σ^2UMa	− 9·36
	1 Peg	− 9·27†		

* E transit only.
† W transit only.

TABLE X.—*Clock Corrections from Individual Stars.*—Continued.

North Stars:—Stars above the line were observed above pole.
Stars below the line were observed below pole.

Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.
1926		s		s
Oct. 19	γ Aql	— 9·40	κ Cep	— 9·30
	α Aql	9·41	θ Cep	9·39
	γ Cyg	9·33	η Cep	9·33
	β Del	9·30	α Cep	— 9·34
	α Del	9·34		
	ζ Cyg	9·33	Gr. 1374	— 9·53
	σ Cyg	9·34	ο UMa	9·34
	ξ Aqr	— 9·38†	σ²UMa	9·39
			1 H.Dra	— 8·94
Oct. 20	β Cyg	— 9·44	κ Cep	— 9·46
	β Sge	9·42	θ Cep	9·42
	γ Aql	9·41	η Cep	9·40
	α Aql	9·46	α Cep	— 9·39
	θ Aql	9·35		
	γ Cyg	9·41	σ²UMa	— 9·42
	β Del	9·35	*h* UMa	— 9·42
	α Del	9·40		
	ν Cyg	9·45		
	ζ Cyg	9·43		
	τ Cyg	— 9·35		
Oct. 21	β Del	— 9·54	θ Cep	— 9·49
	α Del	9·58	α Cep	— 9·55
	ζ Cyg	9·54		
	τ Cyg	— 9·46*		
Oct. 23	γ Aql	— 9·66	η Cep	— 9·58
	α Aql	9·69	76 Dra	9·98*
	γ Sge	9·65	α Cep	9·60
	τ Aql	9·67	β Cep	9·78
	γ Cyg	9·69	20 Cep	9·57
	δ Del	9·64	24 Cep	— 9·71
	ζ Cyg	9·65		
	τ Cyg	9·57	3 H.UMa	—9·72
	16 Peg	9·69	Br. 1147	9·43
	20 Peg	9·66	ο UMa	9·64
	γ Aqr	— 9·62	σ²UMa	— 9·59
Oct. 26	γ Sge	— 9·86	κ Cep	— 9·79
	γ Cyg	9·85	η Cep	9·75
	α Del	9·80	α Cep	9·71
	ν Cyg	9·79	β Cep	— 9·84
	ζ Cyg	9·81		
	τ Cyg	9·82	ο UMa	— 9·81
	ξ Aqr	9·79	σ²UMa	9·81
	16 Peg	9·88	32 UMa	9·84
	20 Peg	9·80	30 H.Cam	—9·38
	α Aqr	9·87†		
	θ Peg	— 9·86*		
Oct. 27	θ Aql	— 9·88	κ Cep	— 9·88
	γ Cyg	9·87	θ Cep	9·86
	β Del	9·75	η Cep	9·90
	α Del	9·89	α Cep	9·84
	61¹Cyg	9·92	β Cep	— 9·93
	ζ Cyg	— 9·91		
Oct. 31	β Del	—10·14	θ Cep	—10·14
	α Del	10·16	η Cep	10·17
	ν Cyg	10·17	76 Dra	10·91
	ζ Cyg	10·19	11 Cep	10·18
	σ Cyg	10·18	ι Cep	—10·04
	1 Peg	10·20		
	20 Peg	10·14	σ²UMa	—10·22
	α Aqr	10·18	1 H.Dra	10·01
	θ Peg	10·18	Gr. 1586	10·06
	η Aqr	10·17	32 UMa.	10·22
	10 Lac	10·21	30 H.UMa	10·17
	λ Peg	—10·15	α UMa	—10·17
Nov. 1	γ Cyg	—10·24	θ Cep	—10·23
	α Del	10·22	η Cep	10·29
	ζ Cyg	10·29	α Cep	10·24
	α Equ	10·23	24 Cep	—10·29
	ξ Aqr	10·25		
	16 Peg	10·30	ο UMa	—10·37
	20 Peg	10·24	σ²UMa	10·27
	α Aqr	—10·27	1 H.Dra	9·76
			30 H.UMa	—10·23
Nov. 2	31 Peg	—10·35	24 Cep	—10·41
	η Aqr	10·36	ι Cep	10·31
	10 Lac	10·42	π Cep	10·38
	η Peg	10·34*	41 H.Cep.	—10·38
	λ Peg	10·38		
	β Peg	10·38	30 H.Cam	—10·03
	γ Psc.	10·33	λ Dra	—10·40
	τ Peg	10·37		
	υ Peg	10·36		
	ι Psc	10·36		
	φ Peg	10·34		
	ω Psc	10·36		
	30 Psc	10·38		
	α And	—10·39		
Nov. 3	10 Lac	— 0·44		
Nov. 4	ν Cyg	— 0·45	α Cep	— 0·46
	ζ Cyg	0·44	11 Cep	— 0·51
	α Equ	0·48		
	ξ Aqr	0·50	σ²UMa	— 0·48
	η Aqr.	0·54	1 H.Dra	— 0·28
	10 Lac	0·57†		
	η Peg	0·48		
	λ Peg	— 0·55†		
Nov. 5	α Peg	— 0·58	π Cep	— 0·54
	φ Aqr	0·55	4 Cas	0·52
	γ Psc	0·55	γ Cep	0·55
	τ Peg	0·56	41 H.Cep	0·51
	φ Peg	0·52	γ Cas	0·55
	30 Psc	0·55	43 H.Cep	— 1·08
	ι Cet	0·61	α UMi	+ 0·21
	44 Psc	0·60		
	ε And	0·59	λ Dra	— 0·56
	ζ And	0·59	4 H.Dra	0·60
	β And	0·55	κ Dra	0·51
	η Psc	— 0·53	76 UMa	— 0·62
Nov. 7	β Del	— 0·64	θ Cep	— 0·67
	α Del	0·66	η Cep	0·61
	ν Cyg	0·67	α Cep	0·67
	ζ Cyg	0·65	24 Cep	0·63
	ε Peg	0·69*	ι Cep	— 0·53
	16 Peg	0·73*		
	20 Peg	0·68†	ο UMa	— 0·66
	α Aqr	0·71†	σ²UMa	— 0·73
	10 Lac	0·62	1 H.Dra	+ 0·09
	η Peg	0·61	α UMa	— 0·74
	λ Peg	— 0·64		
Nov. 9	β Ari	— 0·81	α UMi	— 2·04
	β Tri	0·82†	50 Cas	0·74
	ξ¹Cet	0·81	47 H.Cep	— 0·70
	γ Tri	0·86		
	ο Cet	0·85	α Dra	— 0·81
	ν Cet	0·82	ζ UMi	— 0·77
	δ Cet	0·84		
	γ²Cet	0·84		
	η Eri	0·79		
	ρ Per	— 0·78		
Nov. 10	ζ Cyg	— 0·89	α Cep	— 0·88
	α Equ	— 0·89		
			1 H.Dra	— 0·75

* E transit only.
† W transit only.

TABLE X.—*Clock Corrections from Individual Stars.*—Continued.

North Stars:—Stars above the line were observed above pole.
Stars below the line were observed below pole.

Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.	Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.	Day.	South Stars. Name.	Clock Corr.	North Stars. Name.	Clock Corr.
1926		s		s	1926		s		s	1926		s		s
Nov. 12	γ Peg	−0·96	γ Cas	−0·98	Nov. 19	α Aqr	1·32	ο Cep	−1·23	Nov. 26	ν Cyg	−1·60†	220 H.Dra	−1·70
	44 Psc	1·02	43 H.Cep	1·82		θ Peg	1·30				ζ Cyg	1·59	α Cep	1·60
	ε And	0·96	40 Cas	0·91		10 Lac	1·26	30 H.UMa	−1·38		τ Cyg	1·54	ο Cep	1·63
	ζ And	0·99	α UMi	3·82		η Peg	1·27	30 H.Cam	0·66		α Peg	1·58	γ Cep	−1·60
	β And	0·94	50 Cas	0·87		λ Peg	1·31	α UMa	−1·30		59 Peg	1·58		
	η Psc	0·97	ι Cas	−0·88		φ Aqr	−1·26				γ Psc	1·64	σ^2UMa	−1·63
	ζ Cet	1·00									υ Peg	1·64		
	β Ari	0·94	κ Dra	−1·03							θ Psc	−1·65		
	ξ^1Cet	0·95	76 UMa	1·02										
	γ Tri	0·98	α Dra	0·94										
	ο Cet	1·02	5 UMi	−0·93	Nov. 20	λ Peg	−1·33	ι Cep	−1·29	Nov. 27	θ Peg	−1·70	γ Cep	−1·53*
	ν Cet	0·96				φ Aqr	1·28	π Cep	1·44		η Aqr	1·68		
	δ Cet	1·01				υ Peg	1·31	ο Cep	1·34		α Peg	−1·66	30 H.Cam	−1·53
	γ^2Cet	1·00				θ Psc	1·28*	γ Cep	−1·46					
	η Eri	1·09				72 Peg	1·33							
	ρ Per	−0·96				φ Peg	1·33	α UMa	−1·38	Nov. 28	ζ Cyg	−1·69	11 Cep	−1·74
						ω Psc	1·32	λ Dra	1·34		ξ Aqr	1·71	24 Cep	1·63
						30 Psc	1·35	4 H.Dra	−1·48		20 Peg	1·67	226 B.Cep	1·72
						33 Psc	1·38				α Aqr.	1·69	ι Cep	1·56
Nov. 14	ξ Aqr	−1·05*	α Cep	−1·01		α And	1·33				10 Lac	1·72	π Cep	−1·72
	16 Peg	1·04†	11 Cep	1·02		ε And	−1·33				η Peg	1·74		
	20 Peg	1·02	226 B.Cep	1·07							λ Peg	1·71	Gr. 1586	−1·61
	α Aqr	1·08	ι Cep	0·95							φ Aqr	1·66	32 UMa	1·59
	θ Peg	1·03	π Cep	−1·15							γ Psc	1·66	30 H.Cam	1·19
	10 Lac	1·02			Nov. 21	ε Peg	−1·38	24 Cep	−1·33		τ Psc	1·69	α UMa	1·75
	η Peg	1·00	1 H.Dra	−0·73		16 Peg	1·46	41 H.Cep	1·41		υ Peg	−1·74	λ Dra	−1·79
	λ Peg	1·01	30 H.UMa	1·03		20 Peg	1·42	γ Cas	−1·41					
	φ Aqr	1·01	α UMa	−1·06		α Aqr	1·46							
	γ Psc	−1·02				η Peg	1·39*	32 UMa	−1·30	Dec. 3	γ Tri	−1·98*	ι Cas	−1·93
						φ Peg	1·37	30 H.Cam	0·93†		ο Cet	1·99	47 H.Cep	1·93
						ω Psc	1·38	3 Dra	1·43		ν Cet	1·97	48 H.Cep.	−1·86
						30 Psc	1·42	4 H.Dra	1·46		δ Cet	1·98		
Nov. 19	74 Cyg	−1·27	α Cep	−1·28		33 Psc	1·43	κ Dra	−1·51		γ^2Cet	1·97	5 UMi	−1·89
	ε Peg	1·32	226 B.Cep.	1·41		α And	1·43				ρ Per	1·93*	β UMi	2·00
	16 Peg	1·35	ι Cep	1·27		44 Psc	1·43				η Tau	−1·97	γ UMi	−1·88
	20 Peg	1·31	π Cep	1·34		12 Cet	−1·42							

* E transit only.
† W transit only.

TABLE XI.

GREENWICH SIDEREAL TIMES OF RECEPTION OF WIRELESS TIME SIGNALS.

	h m	h m	PAGE
PARIS, EIFFEL TOWER, Time Signals ...	9 26	— 9 30	C 28
PARIS, EIFFEL TOWER, Rhythmic Signals	9 31	— 9 36	C 29
ANNAPOLIS, Rhythmic Signals	10 10	— 10 15	C 30
NAUEN, Time Signals	11 56	— 12 0	C 31
NAUEN, Rhythmic Signals	12 0	— 12 5	C 32
ANNAPOLIS, Time Signals	16 55	— 17 0	C 33
BORDEAUX, Time Signals	19 56	— 20 0	C 34
BORDEAUX, Rhythmic Signals	20 1	— 20 6	C 35
ANNAPOLIS, Rhythmic Signals	20 10	— 20 15	C 36
PARIS, EIFFEL TOWER, Time Signals ...	22 26	— 22 30	C 37
PARIS, EIFFEL TOWER, Rhythmic Signals	22 31	— 22 36	C 38

PARIS, EIFFEL TOWER, TIME SIGNALS, $9^h\ 26^m$—$9^h\ 30^m$ (λ 2650 *m*).

The times given are for the beginning of the signal at $9^h\ 30^m\ 0^s$.

Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.	Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.
	s	s	h m s			s	s	h m s	
Oct. 1	34·309	— 8·231	10 7 26·078	18	Nov. 1	49·458	— 10·206	12 9 39·252	22
2	30·923	8·292	11 22·631	20	2	46·102	10·286	13 35·816	8
3	...	8·353	...	...	3	42·630	10·365	17 32·265	22
4	24·230	8·415	19 15·815	33	4	29·258	0·442	21 28·816	27
5	20·810	8·480	23 12·330	33	5	25·920	0·515	25 25·405	22
6	17·354	— 8·546	27 8·808	30	6	22·477	— 0·586	29 21·891	18
7	14·020	8·611	31 5·409	25	7	...	0·652	...	...
8	10·568	8·674	35 1·894	27	8	15·754	0·712	37 15·042	25
9	7·152	8·735	38 58·417	22	9	12·292	0·770	41 11·522	27
10	...	8·792	...	...	10	8·849	0·822	45 8·027	22
11	0·350	— 8·848	46 51·502	19	11	5·556	— 0·873	49 4·683	22
12	57·026	8·902	50 48·124	22	12	2·197	0·921	53 1·276	15
13	53·348	8·954	54 44·394	21	13	58·739	0·969	12 56 57·770	22
14	50·201	9·005	10 58 41·196	27	14	...	1·020	...	...
15	46·798	9·057	11 2 37·741	22	15	51·994	1·073	13 4 50.921	22
16	43·348	— 9·114	6 34·234	27	16	48·509	— 1·126	8 47·383	25
17	...	9·175	...	...	17	45·260	1·175	12 44·085	27
18	36·714	9·239	14 27·475	22	18	41·802	1·224	16 40·578	27
19	33·319	9·306	18 24·013	27	19	38·339	1·268	20 37·071	27
20	29·923	9·376	22 20·547	22	20	35·094	1·311	24 33·783	22
21	26·706	— 9·447	26 17·259	22	21	...	— 1·352	...	...
22	23·331	9·516	30 13·815	18	22	28·303	1·393	32 26·910	27
23	...	9·582	...	...	23	24·881	1·435	36 23·446	27
24	...	9·650	...	...	24	21·658	1·477	40 20·181	22
25	...	9·713	...	...	25	18·252	1·520	44 16·732	24
26	9·755	— 9·779	45 59·976	22	26	14·708	— 1·567	48 13·141	18
27	6·428	9·845	49 56·583	27	27	11·299	1·615	13 52 9·684	22
28	2·846	9·912	53 52·934	10	28	...	1·667	...	...
29	59·573	9·982	11 57 49·591	27	29	4·454	1·720	14 0 2·734	22
30	56·203	10·052	12 1 46·151	9	30	1·088	— 1·770	14 3 59·318	22
31	...	— 10·128	...	...					

Nov. 3.—Clock dial altered 10^s.

PARIS, EIFFEL TOWER, RHYTHMIC SIGNALS, $9^h\ 31^m$—$9^h\ 36^m$ (λ 2650^m).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.
	s	s	s	h m s	m s
Oct. 1	34·506	35·328	— 8·231	10 8 26·275	13 27·097
2	31·118	31·940	8·292	12 22·826	17 23·648
3	...	...	8·353	...	...
4	24·357	25·199	8·415	20 15·942	25 16·784
5	20·953	21·763	8·480	24 12·473	29 13·283
6	17·575	18·397	— 8·546	28 9·029	33 9·851
7	14·222	15·044	8·611	32 5·611	37 6·433
8	10·796	11·626	8·674	36 2·122	41 2·952
9	7·401	8·203	8·735	39 58·666	44 59·468
10	...	...	8·792	...	...
11	0·570	1·382	— 8·848	47 51·722	52 52·534
12	57·154	58·004	8·902	51 48·252	56 49·102
13	53·766	54·588	8·954	55 44·812	0 45·634
14	50·359	51·181	9·005	10 59 41·354	4 42·176
15	46·950	47·780	9·057	11 3 37·893	8 38·723
16	43·556	44·378	— 9·114	7 34·442	12 35·264
17	...	...	9·175	...	...
18	36·834	37·656	9·239	15 27·595	20 28·417
19	33·454	34·266	9·306	19 24·148	24 24·960
20	30·136	30·958	9·376	23 20·760	28 21·582
21	26·786	27·608	— 9·447	27 17·339	32 18·161
22	23·432	24·244	9·516	31 13·916	36 14·728
23	20·046	20·868	9·582	35 10·464	40 11·286
24	...	...	9·650	...	...
25	...	...	9·713	...	...
26	9·928	10·788	— 9·779	47 0·149	52 1·009
27	6·561	7·391	9·845	50 56·716	55 57·546
28	3·135	3·957	9·912	54 53·223	59 54·045
29	59·786	0·608	9·982	11 58 49·804	3 50·626
30	56·396	57·218	10·052	12 2 46·344	7 47·166
31	...	...	—10·128	...	...

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.
	s	s	s	h m s	m s
Nov. 1	49·644	50·456	—10·206	12 10 39·438	15 40·250
2	46·261	47·091	10·286	14 35·975	19 36·805
3	42·899	43·711	10·365	18 32·534	23 33·346
4	29·521	30·343	— 0·442	22 29·079	27 29·901
5	26·123	26·960	0·515	26 25·608	31 26·445
6	22·715	23·537	— 0·586	30 22·129	35 22·951
7	...	...	0·652	...	...
8	15·929	16·751	0·712	38 15·217	43 16·039
9	12·514	13·336	0·770	42 11·744	47 12·566
10	9·117	9·939	0·822	46 8·295	51 9·117
11	5·758	6·570	— 0·873	50 4·885	55 5·697
12	2·370	3·192	0·921	54 1·449	59 2·271
13	58·953	59·775	0·969	12 57 57·984	2 58·806
14	...	...	1·020	...	...
15	52·145	52·963	1·073	13 5 51·072	10 51·890
16	48·750	49·580	— 1·126	9 47·624	14 48·454
17	45·388	46·210	1·175	13 44·213	18 45·035
18	42·014	42·836	1·224	17 40·790	22 41·612
19	38·665	39·487	1·268	21 37·397	26 38·219
20	35·277	36·107	1·311	25 33·966	30 34·796
21	...	...	— 1·352	...	...
22	28·514	29·336	1·393	33 27·121	38 27·943
23	25·112	25·930	1·435	37 23·677	42 24·495
24	21·710	22·522	1·477	41 20·233	46 21·045
25	18·309	19·131	1·520	45 16·789	50 17·611
26	14·875	15·697	— 1·567	49 13·308	54 14·130
27	11·446	12·268	1·615	13 53 9·831	58 10·653
28	...	...	1·667	...	...
29	4·652	5·474	1·720	14 1 2·932	6 3·754
30	1·262	2·092	— 1·770	14 4 59·492	10 0·322

Adopted duration of signals.

	s
Oct. 1—16,	·082.
Oct. 18—30,	·070.
Nov. 1—24,	·066.
Nov. 25—30,	·038.

Four coincidences were observed on all days except as follows :—
5 on Oct. 2, Nov. 5, 10, 15, 23.
3 on Oct. 12, 23, 28, Nov. 26, 30.
2 on Oct. 30.

Nov. 3.—Clock dial altered 10s.

ANNAPOLIS, RHYTHMIC SIGNALS, $10^h\ 10^m$—$10^h\ 15^m$ (λ 17145 m).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Signal.	Seconds of Clock. 306th Signal.	Clock Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.	Number of Signals read.	Date.	Seconds of Clock. 1st Signal.	Seconds of Clock. 306th Signal.	Clock Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.	Number of Signals read.
	s	s	s	h m s	m s			s	s	s	h m s	m s	
Oct. 1	40·890	41·711	− 8·233	10 47 32·657	52 33·478	3	Nov. 1	56·040	56·834	−10·208	12 49 45·832	54 46·626	40
2	37·509	38·331	8·293	51 29·216	56 30·038	4	2	52·592	53·424	10·288	53 42·304	58 43·136	50
3	...	...	8·354	...	...	...	3	49·243	50·075	10·367	12 57 38·876	2 39·708	50
4	30·763	31·575	8·417	10 59 22·346	4 23·158	20	4	35·841	36·677	0·443	13 1 35·398	6 36·234	40
5	27·346	28·190	8·482	11 3 18·864	8 19·708	20	5	32·478	33·300	0·517	5 31·961	10 32·783	40
6	...	...	− 8·547	...	...	...	6	29·144	29·952	− 0·587	9 28·557	14 29·365	40
7	20·578	21·400	8·612	11 11·966	16 12·788	20	7	...	...	0·653	...	...	...
8	17·197	17·951	8·675	15 8·522	20 9·276	40	8	22·367	23·175	0·714	17 21·653	22 22·461	50
9	13·759	14·603	8·737	19 5·022	24 5·866	20	9	18·981	19·817	0·771	21 18·210	26 19·046	50
10	...	...	8·794	...	...	...	10	15·611	16·433	0·823	25 14·788	30 15·610	50
11	7·025	7·903	− 8·849	26 58·176	31 59·054	30	11	12·239	13·061	− 0·874	29 11·365	34 12·187	60
12	3·687	4·495	8·903	30 54·784	35 55·592	50	12	8·807	9·629	0·922	33 7·885	38 8·707	60
13	0·309	1·127	8·955	34 51·354	39 52·172	50	13	5·393	6·229	0·970	37 4·423	42 5·259	50
14	56·821	57·665	9·006	38 47·815	43 48·659	40	14	...	...	1·021	...	...	...
15	53·565	54·317	9·059	42 44·506	47 45·258	40	15	58·637	59·473	1·074	44 57·563	49 58·399	50
16	50·047	50·875	− 9·115	46 40·932	51 41·760	40	16	55·253	56·103	− 1·127	48 54·126	53 54·976	30
17	...	...	9·176	...	...	...	17	51·850	52·672	1·176	52 50·674	57 51·496	20
18	43·274	44·092	9·241	54 34·033	59 34·851	40	18	48·436	49·286	1·224	13 56 47·212	1 48·062	60
19	39·875	40·711	9·308	11 58 30·567	3 31·403	40	19	45·081	45·903	1·269	14 0 43·812	5 44·634	60
20	36·560	37·354	9·378	12 2 27·182	7 27·976	40	20	...	...	1·312	...	...	...
21	33·112	33·930	− 9·449	6 23·663	11 24·481	30	21	...	...	1·353	...	...	...
22	29·795	30·635	9·518	10 20·277	15 21·117	50	22	34·860	35·682	− 1·394	12 33·466	17 34·288	60
23	26·461	27·289	9·584	14 16·877	19 17·705	50	23	31·455	32·277	1·436	16 30·019	21 30·841	60
24	...	...	9·651	...	...	...	24	...	...	1·478	...	...	...
25	19·669	20·491	9·715	22 9·954	27 10·776	50	25	24·607	25·417	1·521	24 23·086	29 23·896	50
26	16·293	17·115	− 9·781	26 6·512	31 7·334	40	26	...	...	− 1·568	...	...	...
27	12·855	13·665	9·847	30 3·008	35 3·818	40	27	...	...	1·616	...	...	...
28	9·509	10·331	9·914	33 59·595	39 0·417	40	28	...	...	1·668	...	...	...
29	6·096	6·946	9·984	37 56·112	42 56·962	40	29	11·048	11·898	1·721	40 9·327	45 10·177	80
30	2·743	3·565	10·054	12 41 52·689	46 53·511	40	30	7·720	8·542	− 1·771	44 5·949	49 6·771	50
31	...	...	−10·130	...	...	...							

Nov. 3.—Clock dial altered 10^s.

NAUEN, TIME SIGNALS, 11h 56m—12h 0m (λ 18060 m).

The times given are for the beginning of the signal at 12h 0m 0s.

Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.	Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.
	s	s	h m s			s	s	h m s	
Oct. 1	58·956	— 8·237	12 37 50·719	10	Nov. 1	13·864	— 10·214	14 40 3·650	9
2	55·401	8·298	41 47·103	13	2	10·538	10·294	44 0·244	10
3	...	8·359	...	...	3	57·201	0·373	47 56·828	15
4	...	8·422	...	...	4	...	0·449	...	...
5	45·409	8·487	53 36·922	12	5	50·440	0·522	55 49·918	15
6	42·155	— 8·552	12 57 33·603	12	6	47·129	— 0·592	14 59 46·537	15
7	38·688	8·617	13 1 30·071	15	7	...	0·658	...	...
8	35·187	8·680	5 26·507	15	8	40·374	0·718	15 7 39·656	10
9	31·795	8·741	9 23·054	14	9	37·026	0·775	11 36·251	10
10	...	8·798	...	...	10	33·534	0·827	15 32·707	7
11	25·027	— 8·853	17 16·174	10	11	30·142	— 0·878	19 29·264	15
12	21·623	8·907	21 12·716	9	12	26·730	0·926	23 25·804	10
13	18·163	8·959	25 9·204	19	13	23·303	0·974	27 22·329	21
14	14·740	9·010	29 5·730	10	14	...	1·025	...	...
15	11·313	9·063	33 2·250	16	15	16·479	1·078	35 15·401	15
16	7·935	— 9·120	36 58·815	9	16	13·077	— 1·131	39 11·946	10
17	...	9·181	...	...	17	9·694	1·180	43 8·514	18
18	1·128	9·246	44 51·882	13	18	6·318	1·228	47 5·090	15
19	57·683	9·313	48 48·370	9	19	2·916	1·272	51 1·644	12
20	54·340	9·383	13 52 44·957	15	20	59·530	1·315	15 54 58·215	9
21	...	— 9·454	...	...	21	...	— 1·356	...	...
22	47·568	9·523	14 0 38·045	9	22	52·789	1·397	16 2 51·392	8
23	44·228	9·589	4 34·639	12	23	49·436	1·439	6 47·997	15
24	...	9·656	...	...	24	46·040	1·481	10 44·559	19
25	37·502	9·720	12 27·782	9	25	42·689	1·525	14 41·164	15
26	34·254	— 9·786	16 24·468	15	26	39·334	— 1·572	18 37·762	21
27	31·002	9·852	20 21·150	10	27	35·895	1·620	22 34·275	21
28	27·443	9·919	24 17·524	10	28	...	1·672	...	...
29	24·028	9·989	28 14·039	9	29	29·050	1·725	30 27·325	10
30	20·635	10·060	32 10·575	10	30	25·609	— 1·775	34 23·834	9
31	...	— 10·136	...	...					

Nov. 3.—Clock dial altered 10s.

NAUEN, RHYTHMIC SIGNALS, 12h 0m—12h 5m (λ 18060 m).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 301st Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 301st Signal.	Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 301st Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 301st Signal.
	s	s	s	h m s	m s		s	s	s	h m s	m s
Oct. 1	59·353	53·243	— 8·237	12 38 51·116	43 45·006	Nov. 1	14·240	8·142	—10·214	14 41 4·026	45 57·928
2	55·789	49·667	8·298	42 47·491	47 41·369	2	10·889	4·779	10·294	45 0·595	49 54·485
3	...	...	8·359	...	...	3	57·589	51·467	0·373	48 57·216	53 51·094
4	...	...	8·422	...	...	4	...	...	0·449	...	...
5	45·792	39·670	8·487	54 37·305	59 31·183	5	50·816	44·694	0·522	14 56 50·294	1 44·172
6	42·505	36·407	— 8·552	12 58 33·953	3 27·855	6	47·462	41·370	— 0·592	15 0 46·870	5 40·778
7	39·065	32·967	8·617	13 2 30·448	7 24·350	7	...	...	0·658	...	...
8	35·560	29·450	8·680	6 26·880	11 20·770	8	40·777	34·655	0·718	8 40·059	13 33·937
9	32·139	26·017	8·741	10 23·398	15 17·276	9	37·348	31·250	0·775	12 36·573	17 30·475
10	...	...	8·798	...	...	10	33·063	26·941	0·827	16 32·236	21 26·114
11	25·384	19·262	— 8·853	18 16·531	23 10·409	11	29·684	23·574	— 0·878	20 28·806	25 22·696
12	21·966	15·856	8·907	22 13·059	27 6·949	12	27·112	21·002	0·926	24 26·186	29 20·076
13	18·554	12·432	8·959	26 9·595	31 3·473	13	22·838	16·716	0·974	28 21·864	33 15·742
14	15·112	9·002	9·010	30 6·102	34 59·992	14	...	...	1·025	...	...
15	11·651	5·565	9·063	34 2·588	38 56·502	15	15·998	9·876	1·078	36 14·920	41 8·798
16	8·325	2·215	— 9·120	37 59·205	42 53·095	16	12·603	6·481	— 1·131	40 11·472	45 5·350
17	...	...	9·181	...	...	17	10·154	4·032	1·180	44 8·974	49 2·852
18	1·484	55·386	9·246	45 52·238	50 46·140	18	6·802	0·704	1·228	48 5·574	52 59·476
19	58·085	51·975	9·313	49 48·772	54 42·662	19	3·400	57·290	1·272	52 2·128	56 56·018
20	54·692	48·570	9·383	53 45·309	58 39·187	20	0·032	53·910	1·315	15 55 58·717	0 52·595
21	51·333	45·241	— 9·454	13 57 41·879	2 35·787	21	...	...	— 1·356	...	...
22	47·970	41·864	9·523	14 1 38·447	6 32·341	22	53·256	47·134	1·397	16 3 51·859	8 45·737
23	44·574	38·464	9·589	5 34·985	10 28·875	23	49·899	43·789	1·439	7 48·460	12 42·350
24	...	...	9·656	...	...	24	46·552	40·442	1·481	11 45·071	16 38·961
25	37·899	31·789	9·720	13 28·179	18 22·069	25	43·173	37·075	1·525	15 41·648	20 35·550
26	34·626	28·516	— 9·786	17 24·840	22 18·730	26	39·769	33·659	— 1·572	19 38·197	24 32·087
27	31·344	25·222	9·852	21 21·492	26 15·370	27	36·345	30·247	1·620	23 34·725	28 28·627
28	27·839	21·681	9·919	25 17·920	30 11·762	28	...	...	1·672	...	...
29	24·424	18·316	9·989	29 14·435	34 8·327	29	29·520	23·422	1·725	31 27·795	36 21·697
30	20·762	14·556	10·060	33 10·702	38 4·496	30	26·085	19·987	— 1·775	35 24·310	40 18·212
31	...	...	—10·136	...	...						

Duration of signals—Oct. 1—Oct. 31, s. ·108.
Nov. 1—Nov. 30, ·098.

Six coincidences were observed on all days except as follows :—
7 on Nov. 20.
5 on Oct. 20, 21, 22, 29, Nov. 17.
4 on Oct. 6, 18, Nov. 9.
3 on Nov. 6, 15.
2 on Nov. 22.

Nov. 3.—Clock dial altered 10s.

ANNAPOLIS, TIME SIGNALS, 16h 55m—17h 0m (λ 17145 m).

The times given are for the beginning of the signal at 17h 0m 0s.

Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.	Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.
	s	s	h m s			s	s	h m s	
Oct. 1	48·269	— 8·250	17 38 40·019	50	Nov. 1	3·360	— 10·231	19 40 53·129	50
2	44·891	8·311	42 36·580	50	2	59·991	10·311	44 49·680	30
3	41·459	8·373	46 33·086	50	3	46·602	0·389	48 46·213	50
4	38·089	8·436	50 29·653	50	4	...	0·465	...	...
5	34·687	8·501	54 26·186	50	5	39·928	0·537	56 39·391	10
6	31·340	— 8·566	17 58 22·774	50	6	...	— 0·606	...	...
7	27·935	8·631	18 2 19·304	50	7	33·111	0·671	20 4 32·440	20
8	24·539	8·693	6 15·846	50	8	...	0·730	...	...
9	21·200	8·754	10 12·446	50	9	...	0·786	...	...
10	17·834	8·810	14 9·024	50	10	22·981	0·838	16 22·143	40
11	14·484	— 8·865	18 5·619	50	11	19·607	— 0·888	20 18·719	40
12	11·078	8·918	22 2·160	50	12	...	0·936	...	...
13	7·687	8·970	25 58·717	50	13	12·801	0·985	28 11·816	10
14	4·223	9·021	29 55·202	50	14	9·355	1·037	32 8·318	20
15	0·801	9·075	33 51·726	50	15	5·999	1·090	36 4·909	40
16	57·451	— 9·133	37 48·318	50	16	...	— 1·142	...	...
17	54·035	9·195	41 44·840	30	17	...	1·191	...	...
18	50·670	9·261	45 41·409	50	18	55·765	1·238	47 54·527	50
19	47·230	9·328	49 37·902	50	19	...	1·281	...	...
20	43·895	9·398	53 34·497	50	20	...	1·324	...	...
21	40·537	— 9·469	18 57 31·068	50	21	45·616	— 1·365	20 59 44·251	50
22	37·154	9·537	19 1 27·617	50	22	42·256	1·406	21 3 40·850	20
23	33·832	9·604	5 24·228	50	23	38·857	1·448	7 37·409	50
24	30·417	9·670	9 20·747	50	24	35·404	1·491	11 33·913	40
25	27·054	9·734	13 17·320	50	25	...	1·535	...	...
26	23·639	— 9·800	17 13·839	50	26	...	— 1·582	...	...
27	20·253	9·867	21 10·386	50	27	...	1·631	...	...
28	16·904	9·934	25 6·970	50	28	21·789	1·684	27 20·105	40
29	13·502	10·004	29 3·498	50	29	18·430	1·736	31 16·694	40
30	10·118	10·076	33 0·042	50	30	15·052	— 1·787	35 13·265	50
31	6·743	— 10·153	36 56·590	50					

There was great interference with these signals in November.

Nov. 3. Clock dial altered 10s.

BORDEAUX, TIME SIGNALS, $19^h\ 56^m$—$20^h\ 0^m$ (λ 18900 m).

The times given are for the beginning of the signal at $20^h\ 0^m\ 0^s$.

Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.	Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.
	s	s	h m s			s	s	h m s	
Oct. 1	17·827	— 8·257	20 39 9·570	33	Nov. 1	32·983	— 10·241	22 41 22·742	22
2	14·456	8·318	43 6·138	27	2	29·616	10·320	- 45 19·296	27
3	11·074	8·380	47 2·694	28	3	...	0·398	...	...
4	7·660	8·444	50 59·216	20	4	12·819	0·473	53 12·346	8
5	4·261	8·509	54 55·752	30	5	9·443	0·545	22 57 8·898	27
6	0·876	— 8·574	20 58 52·302	22	6	6·087	— 0·614	23 1 5·473	22
7	57·532	8·638	21 2 48·894	33	7	2·674	0·678	5 1·996	27
8	54·101	8·700	6 45·401	28	8	59·155	0·737	8 58·418	22
9	50·731	8·760	10 41·971	22	9	55·824	0·792	12 55·032	12
10	47·328	8·816	14 38·512	27	10	52·492	0·844	16 51·648	11
11	43·971	— 8·871	18 35·100	22	11	49·120	— 0·894	20 48·226	18
12	40·529	8·924	22 31·605	22	12	45·632	0·942	24 44·690	20
13	37·039	8·976	26 28·063	22	13	42·250	0·991	28 41·259	27
14	33·710	9·028	30 24·682	22	14	38·873	1·043	32 37·830	27
15	...	9·082	...	...	15	35·490	1·096	36 34·394	22
16	26·930	— 9·140	38 17·790	12	16	32·238	— 1·147	40 31·091	24
17	...	9·203	...	...	17	28·793	1·196	44 27·597	13
18	20·263	9·268	46 10·995	19	18	...	1·243	...	...
19	16·799	9·336	50 7·463	28	19	22·022	1·286	52 20·736	21
20	13·468	9·407	54 4·061	22	20	18·580	1·329	23 56 17·251	22
21	10·249	— 9·477	21 58 0·772	22	21	15·233	— 1·370	0 0 13·863	22
22	...	9·545	...	...	22	11·788	1·411	4 10·377	20
23	...	9·611	...	...	23	8·372	1·453	8 6·919	27
24	59·990	9·677	22 9 50·313	25	24	5·125	1·496	12 3·629	22
25	56·649	9·742	13 46·907	27	25	1·566	1·541	16 0·025	22
26	53·292	— 9·808	17 43·484	27	26	58·206	— 1·588	19 56·618	24
27	49·860	9·874	21 39·986	6	27	54·729	1·637	23 53·092	22
28	46·464	9·942	25 36·522	20	28	51·377	1·690	27 49·687	27
29	43·124	10·013	29 33·111	22	29	48·010	1·742	31 46·268	6
30	39·731	10·085	33 29·646	22	30	44·559	— 1·793	0 35 42·766	23
31	36·379	— 10·162	22 37 26·217	27					

Nov. 3—Clock dial altered 10^s.

BORDEAUX, RHYTHMIC SIGNALS, $20^h\ 1^m$—$20^h\ 6^m$ (λ 18900 *m*).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal	Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.
	s	s	s	h m s	m s		s	s	s	h m s	m s
Oct. 1	18·010	18·822	— 8·257	20 40 9·753	45 10·565	Nov. 1	33·161	33·983	—10·241	22 42 22·920	47 23·742
2	14·614	15·408	8·318	44 6·296	49 7·090	2	29·794	30·588	10·320	46 19·474	51 20·268
3	11·231	12·053	8·380	48 2·851	53 3·673	3	16·398	17·234	— 0·398	50 16·000	55 16·836
4	7·802	8·642	8·444	51 59·358	57 0·198	4	13·040	13·856	0·473	54 12·567	59 13·383
5	4·418	5·240	8·509	55 55·909	0 56·731	5	9·632	10·454	0·545	22 58 9·087	3 9·909
6	1·081	1·897	— 8·574	20 59 52·507	4 53·323	6	6·230	7·052	— 0·614	23 2 5·616	7 6·438
7	57·681	58·503	8·638	21 3 49·043	8 49·865	7	2·842	3·664	0·678	6 2·164	11 2·986
8	54·257	55·079	8·700	7 45·557	12 46·379	8	59·425	0·247	0·737	9 58·688	14 59·510
9	50·872	51·684	8·760	11 42·112	16 42·924	9	56·038	56·848	0·792	13 55·246	18 56·056
10	47·478	48·280	8·816	15 38·662	20 39·464	10	52·660	53·462	0·844	17 51·816	22 52·618
11	44·047	44·887	— 8·871	19 35·176	24 36·016	11	49·273	50·075	— 0·894	21 48·379	26 49·181
12	40·668	41·480	8·924	23 31·744	28 32·556	12	45·855	46·685	0·942	25 44·913	30 45·743
13	37·256	38·068	8·976	27 28·280	32 29·092	13	42·458	43·270	0·991	29 41·467	34 42·279
14	33·845	34·647	9·028	31 24·817	36 25·619	14	39·031	39·849	1·043	33 37·988	38 38·806
15	30·441	31·235	9·082	35 21·359	40 22·153	15	35·659	36·474	1·096	37 34·563	42 35·378
16	27·072	27·894	— 9·140	39 17·932	44 18·754	16	32·256	33·086	— 1·147	41 31·109	46 31·939
17	..	..	9·203	..	..	17	28·915	29·737	1·196	45 27·719	50 28·541
18	..	..	9·268	..	..	18	25·511	26·341	1·243	49 24·268	54 25·098
19	16·994	17·806	9·336	51 7·658	56 8·470	19	22·153	22·975	1·286	53 20·867	58 21·689
20	13·623	14·445	9·407	55 4·216	0 5·038	20	18·785	19·597	1·329	23 57 17·456	2 18·268
21	10·313	11·121	— 9·477	21 59 0·836	4 1·644	21	15·397	16·233	— 1·370	0 1 14·027	6 14·863
22	..	..	9·545	..	..	22	12·011	12·833	1·411	5 10·600	10 11·422
23	..	..	9·611	..	..	23	8·614	9·436	1·453	9 7·161	14 7·983
24	0·175	0·997	9·677	22 10 50·498	15 51·329	24	5·188	6·018	1·496	13 3·692	18 4·522
25	56·843	57·693	9·742	14 47·101	19 47·951	25	1·751	2·573	1·541	17 0·210	22 1·032
26	53·452	54·312	— 9·808	18 43·644	23 44·504	26	58·349	59·161	— 1·588	20 56·761	25 57·573
27	49·987	50·781	9·874	22 40·113	27 40·907	27	54·939	55·751	1·637	24 53·302	29 54·114
28	46·686	47·526	9·942	26 36·744	31 37·584	28	51·533	52·363	1·690	28 49·843	33 50·673
29	43·305	44·135	10·013	30 33·292	35 34·122	29	48·141	48·963	1·742	32 46·399	37 47·221
30	39·940	40·752	10·085	34 29·855	39 30·667	30	44·753	45·575	1·793	0 36 42·960	41 43·782
31	36·555	37·385	—10·162	22 38 26·393	43 27·223						

Duration of signals—Oct. 1—Oct. 20, s. ·108.
Oct. 21—Oct. 31, ·072.
Nov. 1—Nov. 30, ·086.

Four coincidences were observed on all days except as follows :—
5 on Oct. 6, Nov. 4, 14.
3 on Oct. 3, 21, 25, Nov. 3, 11, 21.
2 on Oct. 2, 20.

Nov. 3.—Clock dial altered 10^s.

ANNAPOLIS, RHYTHMIC SIGNALS, $20^h\ 10^m$—$20^h\ 15^m$ (λ 17145 *m*).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Signal.	Seconds of Clock. 306th Signal.	Clock Correction	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.	Number of Signals Read.
	s	s	s	h m s	m s	
Oct. 1	...	...	— 8·257	...	...	...
2	...	...	8.318	...	...	...
3	...	...	8·380	...	...	...
4	9·344	10·184	8·444	21 1 0·900	6 1·740	20
5	5·941	6·762	8·509	4 57·432	9 58·253	2
6	2·555	3·391	— 8·574	8 53·981	13 54·817	40
7	59·173	59·995	8·638	12 50·535	17 51·357	30
8	55·796	56·617	8·700	16 47·096	21 47·917	2
9	52·415	53·221	8·760	20 43·655	25 44·461	50
10	49·043	49·887	8·816	24 40·227	29 41·071	40
11	45·635	46·495	— 8·871	28 36·764	33 37·624	30
12	42·347	43·157	8·924	32 33·423	37 34·233	40
13	38·864	39·714	8·976	36 29·888	41 30·738	40
14	35·470	36·292	9·028	40 26·442	45 27·264	50
15	32·016	32·824	9·082	44 22·934	49 23·742	40
16	28·653	29·475	— 9·140	48 19·513	53 20·335	50
17	25·248	26·070	9·203	52 16·045	57 16·867	40
18	21·867	22·717	9·268	21 56 12·599	1 13·449	40
19	18·468	19·290	9·336	22 0 9·132	5 9·954	30
20	15·180	15·974	9·407	4 5·773	9 6·567	20
21	...	...	— 9·477	...	...	...
22	8·426	9·220	9·545	11 58·881	16 59·675	30
23	5·060	5·854	9·611	15 55·449	20 56·243	20
24	...	...	9·677	...	...	...
25	...	...	9·742	...	...	...
26	54·827	55·635	— 9·808	27 45·019	32 45·827	40
27	51·467	52·289	9·874	31 41·593	36 42·415	50
28	48·157	48·951	9·942	35 38·215	40 39·009	30
29	44·690	45·512	10·013	39 34·677	44 35·499	1
30	41·353	42·203	10·085	22 43 31·268	48 32·118	40
31	...	...	—10·162	...	...	...

Date.	Seconds of Clock. 1st Signal.	Seconds of Clock. 306th Signal.	Clock Correction	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.	Number of Signals Read.
	s	s	s	h m s	m s	
Nov. 1	34·587	35·423	—10·241	22 51 24·346	56 25·182	40
2	31·219	32·013	10·320	55 20·899	0 21·693	30
3	17·799	18·649	0·398	22 59 17·401	4 18·251	20
4	13·493	14·343	0·473	23 3 13·020	8 13·870	40
5	11·052	11·902	0·545	7 10·507	12 11·357	40
6	...	...	— 0·614	...	...	...
7	4·352	5·202	0·678	15 3·674	20 4·524	30
8	0·977	1·799	0·737	19 0·240	24 1·062	40
9	57·592	58·442	0·792	22 56·800	27 57·650	20
10	54·213	55·034	0·844	26 53·369	31 54·190	4
11	50·820	51·642	— 0·894	30 49·926	35 50·748	40
12	47·373	48·181	0·942	34 46·431	39 47·239	40
13	44·045	44·839	0·991	38 43·054	43 43·848	50
14	...	...	1·043	...	...	...
15	37·223	38·045	1·096	46 36·127	51 36·949	50
16	...	...	— 1·147	...	...	...
17	30·435	31·257	1·196	23 54 29·239	59 30·061	50
18	...	...	1·243	...	...	...
19	23·657	24·451	1·286	0 2 22·371	7 23·165	20
20	20·255	21·105	1·329	6 18·926	11 19·776	40
21	16·862	17·712	— 1·370	10 15·492	15 16·342	20
22	13·452	14·302	1·411	14 12·041	19 12·891	50
23	10·049	10·847	1·453	18 8·596	23 9·394	50
24	6·649	7·499	1·496	22 5·153	27 6·003	60
25	3·231	4·063	1·541	26 1·690	31 2·522	50
26	...	...	— 1·588	...	...	...
27	56·367	57·199	1·637	33 54·730	38 55·562	20
28	53·006	53·828	1·690	37 51·316	42 52·138	30
29	49·677	50·499	1·742	41 47·935	46 48·757	70
30	46·296	47·118	— 1·793	0 45 44·503	50 45·325	70

Nov. 3.—Clock dial altered 10^s.
Nov. 4.—Signals apparently 1^s early.

PARIS, EIFFEL TOWER, TIME SIGNALS, $22^h\ 26^m$—$22^h\ 30^m$ (λ 2650 *m*).

The times given are for the beginning of the signal at $22^h\ 30^m\ 0^s$.

Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.	Date.	Seconds of Clock.	Clock Correction.	Greenwich Sidereal Time of Signal.	Number of Signals read.
	s	s	h m s			s	s	h m s	
Oct. 1	...	— 8·264	...	...	Nov. 1	57·638	— 10·249	1 11 47·389	27
2	...	8·325	...	...	2	54·238	10·329	15 43·909	22
3	35·723	8·387	23 17 27·336	33	3	40·794	0·406	19 40·388	27
4	32·328	8·451	21 23·877	30	4	37·421	0·481	23 36·940	21
5	28·925	8·516	25 20·409	28	5	34·030	0·553	27 33·477	22
6	25·511	— 8·581	29 16·930	28	6	30·688	— 0·621	31 30·067	27
7	22·172	8·645	33 13·527	30	7	27·340	0·685	35 26·655	27
8	18·773	8·707	37 10·066	22	8	23·771	0·743	39 23·028	22
9	15·349	8·766	41 6·583	27	9	20·475	0·798	43 19·677	22
10	12·024	8·822	45 3·202	22	10	17·116	0·849	47 16·267	22
11	8·591	— 8·877	48 59·714	22	11	13·767	— 0·899	51 12·868	27
12	4·870	8·930	52 55·940	22	12	10·280	0·947	55 9·333	27
13	1·790	8·981	23 56 52·809	22	13	6·880	0·996	1 59 5·884	15
14	58·319	9·033	0 0 49·286	27	14	3·525	1·048	2 3 2·477	27
15	54·956	9·088	4 45·868	22	15	0·146	1·101	6 59·045	14
16	51·586	— 9·147	8 42·439	22	16	56·878	— 1·153	10 55·725	22
17	48·146	9·210	12 38·936	22	17	53·400	1·201	14 52·199	22
18	44·902	9·275	16 35·627	22	18	49·852	1·247	18 48·605	22
19	41·470	9·344	20 32·126	22	19	46·674	1·291	22 45·383	22
20	38·237	9·414	24 28·823	27	20	43·192	1·333	26 41·859	22
21	34·883	— 9·484	28 25·399	20	21	39·973	— 1·374	30 38·599	22
22	31·506	9·552	32 21·954	27	22	36·483	1·415	34 35·068	27
23	28·020	9·618	36 18·402	22	23	33·114	1·457	38 31·657	22
24	24·629	9·684	40 14·945	21	24	...	1·500	...	...
25	21·221	9·749	44 11·472	27	25	26·252	1·546	46 24·706	27
26	17·934	— 9·815	48 8·119	20	26	22·893	— 1·593	50 21·300	22
27	14·484	9·881	52 4·603	22	27	19·448	1·643	54 17·805	22
28	11·066	9·950	56 1·116	16	28	16·044	1·695	2 58 14·349	22
29	7·744	10·020	0 59 57·724	22	29	12·695	1·747	3 2 10·948	22
30	4·362	10·093	1 3 54·269	27	30	9·209	— 1·798	3 6 7·411	22
31	1·006	— 10·170	1 7 50·836	22					

Nov. 3.—Clock dial altered 10^s.

PARIS, EIFFEL TOWER, RHYTHMIC SIGNALS, $22^h\ 31^m$—$22^h\ 36^m$ (λ 2650 m).

The times given are for the beginning of the signals.

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.
	s	s	s	h m s	m s
Oct. 1	...	...	— 8·264	...	...
2	...	...	8·325	...	...
3	35·901	36·713	8·387	23 18 27·514	23 28·326
4	32·482	33·304	8·451	22 24·031	27 24·853
5	29·129	29·939	8·516	26 20·613	31 21·423
6	25·745	26·557	— 8·581	30 17·164	35 17·976
7	22·369	23·191	8·645	34 13·724	39 14·546
8	18·927	19·749	8·707	38 10·220	43 11·042
9	15·550	16·372	8·766	42 6·784	47 7·606
10	12·130	12·952	8·822	46 3·308	51 4·130
11	8·711	9·513	— 8·877	49 59·834	55 0·636
12	5·335	6·157	8·930	53 56·405	58 57·227
13	1·924	2·746	8·981	23 57 52·943	2 53·765
14	58·514	59·336	9·033	0 1 49·481	6 50·303
15	55·104	55·920	9·088	5 46·016	10 46·832
16	51·739	52·569	— 9·147	9 42·592	14 43·422
17	48·370	49·192	9·210	13 39·160	18 39·982
18	44·987	45·817	9·275	17 35·712	22 36·542
19	41·663	42·485	9·344	21 32·319	26 33·141
20	38·316	39·128	9·414	25 28·902	30 29·714
21	34·944	35·774	— 9·484	29 25·460	34 26·290
22	31·571	32·393	9·552	33 22·019	38 22·841
23	28·181	28·993	9·618	37 18·563	42 19·375
24	24·842	25·664	9·684	41 15·158	46 15·980
25	21·454	22·314	9·749	45 11·705	50 12·565
26	18·104	18·964	— 9·815	49 8·289	54 9·149
27	14·657	15·469	9·881	53 4·776	58 5·588
28	11·317	12·129	9·950	0 57 1·367	2 2·179
29	7·951	8·773	10·020	1 0 57·931	5 58·753
30	4·565	5·387	10·093	4 54·472	9 55·294
31	1·207	2·037	—10·170	1 8 51·037	13 51·867

Date.	Seconds of Clock. 1st Sig.	Seconds of Clock. 306th Sig.	Clock. Correction.	Greenwich Sidereal Time. 1st Signal.	Greenwich Sidereal Time. 306th Signal.
	s	s	s	h m s	m s
Nov. 1	57·798	58·628	—10·249	1 12 47·549	17 48·379
2	54·443	55·273	10·329	16 44·114	21 44·944
3	41·075	41·897	— 0·406	20 40·669	25 41·491
4	37·688	38·510	0·481	24 37·207	29 38·029
5	34·289	35·111	0·553	28 33·736	33 34·558
6	30·876	31·686	— 0·621	32 30·255	37 31·065
7	27·486	28·308	0·685	36 26·801	41 27·623
8	24·067	24·889	0·743	40 23·324	45 24·146
9	20·678	21·500	0·798	44 19·880	49 20·702
10	17·296	18·118	0·849	48 16·447	53 17·269
11	13·924	14·746	— 0·899	52 13·025	57 13·847
12	10·508	11·330	0·947	1 56 9·561	1 10·383
13	7·109	7·937	0·996	2 0 6·113	5 6·941
14	3·637	4·467	1·048	4 2·589	9 3·419
15	0·317	1·139	1·101	7 59·216	13 0·038
16	56·910	57·740	— 1·153	11 55·757	16 56·587
17	53·571	54·401	1·201	15 52·370	20 53·200
18	50·173	50·995	1·247	19 48·926	24 49·748
19	46·806	47·628	1·291	23 45·515	28 46·337
20	43·431	44·253	1·333	27 42·098	32 42·920
21	40·057	40·885	— 1·374	31 38·683	36 39·511
22	36·688	37·500	1·415	35 35·273	40 36·085
23	33·275	34·103	1·457	39 31·818	44 32·646
24	...	...	1·500	...	...
25	26·423	27·245	1·546	47 24·877	52 25·699
26	23·018	23·836	— 1·593	51 21·425	56 22·243
27	19·641	20·463	1·643	55 17·998	0 18·820
28	16·214	17·036	1·695	2 59 14·519	4 15·341
29	12·839	13·651	1·747	3 3 11·092	8 11·904
30	9·430	10·252	— 1·798	3 7 7·632	12 8·454

Duration of signals—Oct. 1—23, s ·090.
Oct. 24—Nov. 21 ·068.
Nov. 22—25, ·060.
Nov. 26—30, ·040.

Four coincidences were observed on all days except as follows :—
5 on Oct. 15, Nov. 8, 13, 21, 26.
3 on Oct. 16.

Nov. 3.—Clock dial altered 10^s.