

SPECIAL REPORT

Theoretical Solar Data for the IBP Grassland
Biome Sites in North America
Osage Site

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GRASSLAND BIOME

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PREFACE

The following pages contain tables of *theoretical* solar data for IBP Grassland Sites in North America. The data is *theoretical* because it is based on spherical geometry relating the earth's motions with respect to the sun. The data values do not account for local slope orientation and shadows. Solar energy values are for a horizontal surface at the top of the atmosphere. *Actual* solar energy received at the ground surface is determined by the transmissivity of the atmosphere, which is a function of clouds, water vapor, and atmospheric particles. *For a very general rule-of-thumb, actual solar energy (on an annual basis) is about 50% of the theoretical.*

For each month, the tables contain:

1. Hourly theoretical solar energy (langleys) with daily totals
non-leap years ... p. 2-13
leap years ... p. 19-30
2. Day length (hours) non-leap years ... p. 14
leap years ... p. 31
3. Time of sunrise (local standard time) non-leap years ... p. 15
leap years ... p. 32
4. Time of sunset (local standard time) non-leap years ... p. 16
leap years ... p. 33
5. Time of solar noon (local standard time)
non-leap years ... p. 17
leap years ... p. 34
6. Graph of theoretical solar energy (langleys)
non-leap years ... p. 18
leap years ... p. 35

These tables were generated by a program (revised February 1973) written by G. M. Furnival, W. E. Reifsnyder, E. Wyler, and T. G. Siccama of the Yale School of Forestry, New Haven, Connecticut. We express our appreciation to Dr. George M. Furnival for providing us with the program.

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

HOOR ENDING--IRJE SOLAR TIME

JAN 1970	DAY NO	12		11		10		9		8		7		6		5		4		3		2		DAILY TOTAL
		12	13	11	14	10	15	10	16	9	17	18	19	20	21	22	23	24	25	26	27	28	29	
1	1	59.6		53.6		42.0		25.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0	374.1	
2	2	59.8		53.8		42.2		25.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	375.5	
3	3	59.9		53.9		42.3		25.9		0.0		0.0		0.0		0.0		0.0		0.0		0.0	377.0	
4	4	60.1		54.1		42.5		26.1		0.0		0.0		0.0		0.0		0.0		0.0		0.0	378.6	
5	5	60.3		54.3		42.7		26.2		0.0		0.0		0.0		0.0		0.0		0.0		0.0	380.3	
6	6	60.5		54.5		42.9		26.4		0.0		0.0		0.0		0.0		0.0		0.0		0.0	382.2	
7	7	60.7		54.7		43.1		26.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0	384.2	
8	8	61.0		55.0		43.3		26.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	386.3	
9	9	61.2		55.2		43.5		27.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	388.5	
10	10	61.5		55.4		43.8		27.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0	390.6	
11	11	61.8		55.7		44.0		27.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0	393.2	
12	12	62.0		56.0		44.3		27.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	395.7	
13	13	62.3		56.3		44.6		28.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	398.4	
14	14	62.6		56.6		44.9		28.3		0.0		0.0		0.0		0.0		0.0		0.0		0.0	401.1	
15	15	63.0		56.9		45.2		28.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0	404.0	
16	16	63.3		57.2		45.5		28.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	406.9	
17	17	63.6		57.5		45.8		29.1		0.0		0.0		0.0		0.0		0.0		0.0		0.0	410.0	
18	18	64.0		57.9		46.1		29.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0	413.1	
19	19	64.3		58.2		46.4		29.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	416.4	
20	20	64.7		58.6		46.8		30.1		0.0		0.0		0.0		0.0		0.0		0.0		0.0	419.7	
21	21	65.1		59.0		47.1		30.4		0.0		0.0		0.0		0.0		0.0		0.0		0.0	423.2	
22	22	65.5		59.3		47.5		30.8		0.0		0.0		0.0		0.0		0.0		0.0		0.0	426.7	
23	23	65.9		59.7		47.9		31.1		0.0		0.0		0.0		0.0		0.0		0.0		0.0	430.4	
24	24	66.3		60.1		48.3		31.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0	434.1	
25	25	66.7		60.5		48.6		31.9		0.0		0.0		0.0		0.0		0.0		0.0		0.0	437.9	
26	26	67.1		60.9		49.0		32.2		0.0		0.0		0.0		0.0		0.0		0.0		0.0	441.8	
27	27	67.5		61.4		49.4		32.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0	445.8	
28	28	67.9		61.8		49.8		33.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	449.9	
29	29	68.4		62.2		50.3		33.4		0.0		0.0		0.0		0.0		0.0		0.0		0.0	454.1	
30	30	68.8		62.7		50.7		33.8		0.1		0.0		0.0		0.0		0.0		0.0		0.0	458.3	
31	31	69.3		63.1		51.1		34.2		0.1		0.0		0.0		0.0		0.0		0.0		0.0	462.6	

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SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

MAR 1970	DAY NO	HOOR ENDING-TIME SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	60	83.9	77.6	65.3	47.9	26.6	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	611.9
2	61	84.4	78.1	65.8	48.4	27.1	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	617.0
3	62	84.9	78.6	66.3	48.9	27.6	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	623.2
4	63	85.4	79.1	66.8	49.4	28.1	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	628.8
5	64	85.9	79.6	67.3	49.9	28.6	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	634.5
6	65	86.4	80.1	67.8	50.4	29.1	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	640.1
7	66	86.9	80.6	68.3	50.9	29.6	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	645.8
8	67	87.4	81.1	68.8	51.4	30.1	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	651.4
9	68	87.9	81.6	69.3	51.9	30.5	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	657.1
10	69	88.4	82.0	69.7	52.3	31.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.7
11	70	88.9	82.5	70.2	52.8	31.5	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	668.3
12	71	89.4	83.0	70.7	53.3	32.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	674.0
13	72	89.8	83.5	71.2	53.8	32.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	679.6
14	73	90.3	84.0	71.7	54.3	33.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	685.2
15	74	90.8	84.4	72.1	54.7	33.5	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	690.8
16	75	91.2	84.9	72.6	55.2	33.9	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	696.3
17	76	91.7	85.3	73.1	55.7	34.4	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	701.9
18	77	92.2	85.8	73.5	56.2	34.9	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	707.4
19	78	92.6	86.2	74.0	56.6	35.4	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	712.9
20	79	93.0	86.7	74.4	57.1	35.8	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	718.4
21	80	93.5	87.1	74.9	57.5	36.3	12.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	723.8
22	81	93.9	87.6	75.3	58.0	36.8	13.1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	729.2
23	82	94.3	88.0	75.7	58.4	37.2	13.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	734.6
24	83	94.7	88.4	76.2	58.9	37.7	14.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	740.0
25	84	95.2	88.8	76.6	59.3	38.1	14.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	745.3
26	85	95.6	89.2	77.0	59.8	38.6	15.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	750.6
27	86	96.0	89.6	77.4	60.2	39.0	15.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	755.9
28	87	96.4	90.0	77.9	60.6	39.5	15.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	761.1
29	88	96.7	90.4	78.3	61.0	39.9	16.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	766.3
30	89	97.1	90.8	78.7	61.4	40.4	16.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	771.5
31	90	97.5	91.2	79.1	61.9	40.8	17.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	776.6

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT OSAGE LAT - 36 57 LONG 96 33

HOOR ENDING-TRUE SOLAR TIME

APR 1970	DAY	12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24	DAILY TOTAL
1	91	97.9	91.6	79.4	62.3	41.2	17.8	.7	0.0	0.0	0.0	0.0	0.0	781.7
2	92	98.2	92.0	79.8	62.7	41.7	18.2	.8	0.0	0.0	0.0	0.0	0.0	786.7
3	93	98.6	92.3	80.2	63.1	42.1	18.7	.9	0.0	0.0	0.0	0.0	0.0	791.7
4	94	98.9	92.7	80.6	63.5	42.5	19.1	1.0	0.0	0.0	0.0	0.0	0.0	796.6
5	95	99.3	93.0	80.9	63.9	42.9	19.6	1.2	0.0	0.0	0.0	0.0	0.0	801.5
6	96	99.6	93.4	81.3	64.2	43.3	20.0	1.3	0.0	0.0	0.0	0.0	0.0	806.4
7	97	100.0	93.7	81.7	64.6	43.7	20.5	1.5	0.0	0.0	0.0	0.0	0.0	811.2
8	98	100.3	94.0	82.0	65.0	44.1	20.9	1.6	0.0	0.0	0.0	0.0	0.0	815.9
9	99	100.6	94.4	82.4	65.4	44.5	21.3	1.8	0.0	0.0	0.0	0.0	0.0	820.6
10	100	100.9	94.7	82.7	65.7	44.9	21.7	2.0	0.0	0.0	0.0	0.0	0.0	825.3
11	101	101.2	95.0	83.0	66.1	45.3	22.2	2.2	0.0	0.0	0.0	0.0	0.0	829.9
12	102	101.5	95.3	83.3	66.4	45.7	22.6	2.3	0.0	0.0	0.0	0.0	0.0	834.4
13	103	101.8	95.6	83.7	66.8	46.1	23.0	2.5	0.0	0.0	0.0	0.0	0.0	838.9
14	104	102.1	95.9	84.0	67.1	46.5	23.4	2.7	0.0	0.0	0.0	0.0	0.0	843.4
15	105	102.4	96.2	84.3	67.4	46.8	23.8	3.0	0.0	0.0	0.0	0.0	0.0	847.7
16	106	102.6	96.5	84.6	67.8	47.2	24.2	3.2	0.0	0.0	0.0	0.0	0.0	852.1
17	107	102.9	96.7	84.9	68.1	47.5	24.6	3.4	0.0	0.0	0.0	0.0	0.0	856.3
18	108	103.2	97.0	85.2	68.4	47.9	25.0	3.6	0.0	0.0	0.0	0.0	0.0	860.6
19	109	103.4	97.3	85.5	68.7	48.2	25.4	3.9	0.0	0.0	0.0	0.0	0.0	864.7
20	110	103.6	97.5	85.7	69.0	48.6	25.8	4.1	0.0	0.0	0.0	0.0	0.0	868.8
21	111	103.9	97.8	86.0	69.3	48.9	26.1	4.4	0.0	0.0	0.0	0.0	0.0	872.8
22	112	104.1	98.0	86.3	69.6	49.2	26.5	4.6	0.0	0.0	0.0	0.0	0.0	876.8
23	113	104.3	98.3	86.5	69.9	49.6	26.9	4.9	0.0	0.0	0.0	0.0	0.0	880.7
24	114	104.6	98.5	86.8	70.2	49.9	27.2	5.1	0.0	0.0	0.0	0.0	0.0	884.6
25	115	104.8	98.7	87.0	70.5	50.2	27.6	5.4	0.0	0.0	0.0	0.0	0.0	888.4
26	116	105.0	98.9	87.3	70.7	50.5	28.0	5.7	0.0	0.0	0.0	0.0	0.0	892.1
27	117	105.2	99.1	87.5	71.0	50.8	28.3	5.9	0.0	0.0	0.0	0.0	0.0	895.7
28	118	105.4	99.4	87.7	71.3	51.1	28.6	6.2	0.0	0.0	0.0	0.0	0.0	899.3
29	119	105.6	99.6	87.9	71.5	51.4	29.0	6.5	0.0	0.0	0.0	0.0	0.0	902.9
30	120	105.8	99.8	88.2	71.8	51.7	29.3	6.8	0.0	0.0	0.0	0.0	0.0	906.4

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT OSAGE LAT 36 57 LONG 96 33

HOOR ENDING-TRUE SOLAR TIME

MAY 1970	1AY 60	12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24	DAILY TOTAL
1	121	105.9	99.9	88.4	72.0	52.0	29.0	7.0	0.0	0.0	0.0	0.0	0.0	909.8
2	122	106.1	100.1	88.0	72.2	52.3	29.9	7.3	0.0	0.0	0.0	0.0	0.0	913.1
3	123	106.3	100.3	88.8	72.5	52.5	30.3	7.6	0.0	0.0	0.0	0.0	0.0	916.4
4	124	106.4	100.5	89.0	72.7	52.8	30.6	7.9	0.0	0.0	0.0	0.0	0.0	919.6
5	125	106.6	100.6	89.2	72.9	53.0	30.9	8.2	0.0	0.0	0.0	0.0	0.0	922.8
6	126	106.7	100.8	89.3	73.1	53.3	31.2	8.5	0.0	0.0	0.0	0.0	0.0	925.6
7	127	106.9	101.0	89.5	73.3	53.5	31.5	8.7	0.0	0.0	0.0	0.0	0.0	928.8
8	128	107.0	101.1	89.7	73.5	53.8	31.7	9.0	0.0	0.0	0.0	0.0	0.0	931.8
9	129	107.1	101.2	89.9	73.7	54.0	32.0	9.3	0.0	0.0	0.0	0.0	0.0	934.7
10	130	107.3	101.4	90.0	73.9	54.2	32.3	9.6	0.0	0.0	0.0	0.0	0.0	937.5
11	131	107.4	101.5	90.2	74.1	54.5	32.5	9.9	0.0	0.0	0.0	0.0	0.0	940.2
12	132	107.5	101.6	90.3	74.3	54.7	32.8	10.2	0.0	0.0	0.0	0.0	0.0	942.9
13	133	107.6	101.8	90.5	74.5	54.9	33.1	10.5	0.0	0.0	0.0	0.0	0.0	945.5
14	134	107.7	101.9	90.6	74.7	55.1	33.3	10.7	0.0	0.0	0.0	0.0	0.0	948.1
15	135	107.8	102.0	90.7	74.8	55.3	33.5	11.0	0.0	0.0	0.0	0.0	0.0	950.6
16	136	107.9	102.1	90.9	75.0	55.5	33.8	11.3	0.0	0.0	0.0	0.0	0.0	953.0
17	137	108.0	102.2	91.0	75.1	55.7	34.0	11.6	0.0	0.0	0.0	0.0	0.0	955.3
18	138	108.1	102.3	91.1	75.3	55.9	34.2	11.8	0.0	0.0	0.0	0.0	0.0	957.6
19	139	108.2	102.4	91.2	75.4	56.1	34.4	12.1	0.0	0.0	0.0	0.0	0.0	959.8
20	140	108.3	102.5	91.3	75.6	56.2	34.7	12.3	0.0	0.0	0.0	0.0	0.0	961.9
21	141	108.4	102.6	91.5	75.7	56.4	34.9	12.6	0.1	0.0	0.0	0.0	0.0	964.0
22	142	108.4	102.7	91.6	75.8	56.5	35.1	12.8	0.1	0.0	0.0	0.0	0.0	966.0
23	143	108.5	102.8	91.7	75.9	56.7	35.2	13.0	0.1	0.0	0.0	0.0	0.0	967.9
24	144	108.6	102.8	91.7	76.1	56.9	35.4	13.2	0.1	0.0	0.0	0.0	0.0	969.7
25	145	108.6	102.9	91.8	76.2	57.0	35.6	13.5	0.1	0.0	0.0	0.0	0.0	971.5
26	146	108.7	103.0	91.9	76.3	57.1	35.8	13.7	0.2	0.0	0.0	0.0	0.0	973.3
27	147	108.8	103.0	92.0	76.4	57.3	35.9	13.9	0.2	0.0	0.0	0.0	0.0	974.9
28	148	108.8	103.1	92.1	76.5	57.4	36.1	14.0	0.2	0.0	0.0	0.0	0.0	976.5
29	149	108.9	103.2	92.1	76.6	57.5	36.2	14.2	0.3	0.0	0.0	0.0	0.0	978.0
30	150	108.9	103.2	92.2	76.7	57.6	36.4	14.4	0.3	0.0	0.0	0.0	0.0	979.4
31	151	108.9	103.3	92.3	76.8	57.7	36.5	14.6	0.3	0.0	0.0	0.0	0.0	980.8

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

JUNE 1970	DAY NO	HOOR ENDING-TRUE SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	152	109.0	103.3	92.3	76.8	57.8	36.7	14.7	.4	0.0	0.0	0.0	0.0	0.0	0.0	982.1
2	153	109.0	103.3	92.4	76.9	57.9	36.8	14.9	.4	0.0	0.0	0.0	0.0	0.0	0.0	983.4
3	154	109.1	103.4	92.5	77.0	58.0	36.9	15.0	.4	0.0	0.0	0.0	0.0	0.0	0.0	984.5
4	155	109.1	103.4	92.5	77.0	58.1	37.0	15.2	.5	0.0	0.0	0.0	0.0	0.0	0.0	985.6
5	156	109.1	103.5	92.5	77.1	58.2	37.1	15.3	.5	0.0	0.0	0.0	0.0	0.0	0.0	986.6
6	157	109.1	103.5	92.6	77.2	58.3	37.2	15.4	.5	0.0	0.0	0.0	0.0	0.0	0.0	987.6
7	158	109.2	103.5	92.6	77.2	58.4	37.3	15.5	.5	0.0	0.0	0.0	0.0	0.0	0.0	988.5
8	159	109.2	103.5	92.7	77.3	58.4	37.4	15.6	.6	0.0	0.0	0.0	0.0	0.0	0.0	989.3
9	160	109.2	103.6	92.7	77.3	58.5	37.5	15.7	.6	0.0	0.0	0.0	0.0	0.0	0.0	990.0
10	161	109.2	103.6	92.7	77.4	58.5	37.5	15.8	.6	0.0	0.0	0.0	0.0	0.0	0.0	990.7
11	162	109.2	103.6	92.7	77.4	58.6	37.6	15.9	.6	0.0	0.0	0.0	0.0	0.0	0.0	991.3
12	163	109.2	103.6	92.8	77.4	58.6	37.7	16.0	.7	0.0	0.0	0.0	0.0	0.0	0.0	991.9
13	164	109.2	103.6	92.8	77.4	58.7	37.7	16.0	.7	0.0	0.0	0.0	0.0	0.0	0.0	992.3
14	165	109.2	103.6	92.8	77.5	58.7	37.8	16.1	.7	0.0	0.0	0.0	0.0	0.0	0.0	992.7
15	166	109.2	103.6	92.8	77.5	58.7	37.8	16.1	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.1
16	167	109.2	103.6	92.8	77.5	58.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.3
17	168	109.2	103.6	92.8	77.5	58.8	37.9	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.5
18	169	109.2	103.6	92.8	77.5	58.8	37.9	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.6
19	170	109.2	103.6	92.8	77.5	58.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.7
20	171	109.2	103.6	92.8	77.5	58.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.7
21	172	109.2	103.6	92.8	77.5	58.8	37.9	16.3	.8	0.0	0.0	0.0	0.0	0.0	0.0	993.6
22	173	109.2	103.6	92.8	77.5	58.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.5
23	174	109.2	103.6	92.8	77.5	58.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	0.0	993.2
24	175	109.1	103.6	92.7	77.5	58.7	37.9	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	992.9
25	176	109.1	103.5	92.7	77.4	58.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	992.6
26	177	109.1	103.5	92.7	77.4	58.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	0.0	992.2
27	178	109.1	103.5	92.7	77.4	58.6	37.8	16.1	.7	0.0	0.0	0.0	0.0	0.0	0.0	991.7
28	179	109.0	103.4	92.6	77.3	58.6	37.7	16.1	.7	0.0	0.0	0.0	0.0	0.0	0.0	991.1
29	180	109.0	103.4	92.6	77.3	58.6	37.7	16.0	.7	0.0	0.0	0.0	0.0	0.0	0.0	990.5
30	181	109.0	103.4	92.6	77.3	58.5	37.6	15.9	.7	0.0	0.0	0.0	0.0	0.0	0.0	989.8

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT OSAGE

HOOR ENDING--TRUE SOLAR TIME

JULY 1970	DAY MO	HOOR ENDING--TRUE SOLAR TIME												DAILY TOTAL
		11 14	12 13	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24	
1	182	109.0	103.3	92.5	77.2	58.4	37.5	15.9	.6	0.0	0.0	0.0	0.0	989.0
2	183	108.9	103.3	92.5	77.2	58.4	37.5	15.8	.6	0.0	0.0	0.0	0.0	988.2
3	184	108.9	103.3	92.4	77.1	58.3	37.4	15.7	.6	0.0	0.0	0.0	0.0	987.3
4	185	108.8	103.2	92.4	77.0	58.2	37.3	15.6	.6	0.0	0.0	0.0	0.0	986.3
5	186	108.8	103.2	92.3	77.0	58.2	37.2	15.5	.5	0.0	0.0	0.0	0.0	985.3
6	187	108.7	103.1	92.3	76.9	58.1	37.1	15.4	.5	0.0	0.0	0.0	0.0	984.2
7	188	108.7	103.1	92.2	76.8	58.0	37.0	15.3	.5	0.0	0.0	0.0	0.0	983.0
8	189	108.6	103.0	92.1	76.7	57.9	36.9	15.1	.5	0.0	0.0	0.0	0.0	981.8
9	190	108.6	103.0	92.1	76.7	57.8	36.8	15.0	.4	0.0	0.0	0.0	0.0	980.4
10	191	108.5	102.9	92.0	76.6	57.7	36.6	14.8	.4	0.0	0.0	0.0	0.0	979.1
11	192	108.5	102.8	91.9	76.5	57.6	36.5	14.7	.4	0.0	0.0	0.0	0.0	977.6
12	193	108.4	102.8	91.8	76.4	57.5	36.4	14.5	.3	0.0	0.0	0.0	0.0	976.1
13	194	108.3	102.7	91.7	76.3	57.5	36.2	14.4	.3	0.0	0.0	0.0	0.0	974.6
14	195	108.3	102.6	91.7	76.2	57.2	36.1	14.2	.3	0.0	0.0	0.0	0.0	972.9
15	196	108.2	102.5	91.6	76.1	57.1	35.9	14.0	.2	0.0	0.0	0.0	0.0	971.2
16	197	108.1	102.4	91.5	76.0	57.0	35.8	13.8	.2	0.0	0.0	0.0	0.0	969.5
17	198	108.0	102.4	91.4	75.8	56.8	35.6	13.6	.2	0.0	0.0	0.0	0.0	967.6
18	199	108.0	102.3	91.3	75.7	56.7	35.4	13.4	.2	0.0	0.0	0.0	0.0	965.7
19	200	107.9	102.2	91.2	75.6	56.5	35.2	13.2	.1	0.0	0.0	0.0	0.0	963.8
20	201	107.8	102.1	91.1	75.5	56.4	35.0	13.0	.1	0.0	0.0	0.0	0.0	961.7
21	202	107.7	102.0	90.9	75.3	56.2	34.9	12.8	.1	0.0	0.0	0.0	0.0	959.7
22	203	107.6	101.9	90.8	75.2	56.0	34.7	12.5	.1	0.0	0.0	0.0	0.0	957.5
23	204	107.5	101.8	90.7	75.0	55.8	34.4	12.3	.0	0.0	0.0	0.0	0.0	955.3
24	205	107.4	101.7	90.6	74.9	55.7	34.2	12.0	.0	0.0	0.0	0.0	0.0	953.0
25	206	107.3	101.5	90.4	74.7	55.5	34.0	11.8	.0	0.0	0.0	0.0	0.0	950.6
26	207	107.2	101.4	90.3	74.6	55.3	33.8	11.5	.0	0.0	0.0	0.0	0.0	948.2
27	208	107.1	101.3	90.2	74.4	55.1	33.6	11.3	.0	0.0	0.0	0.0	0.0	945.8
28	209	107.0	101.2	90.0	74.2	54.9	33.3	11.0	0.0	0.0	0.0	0.0	0.0	943.2
29	210	106.8	101.0	89.9	74.1	54.7	33.1	10.7	0.0	0.0	0.0	0.0	0.0	940.6
30	211	106.7	100.9	89.7	73.9	54.5	32.8	10.4	0.0	0.0	0.0	0.0	0.0	938.0
31	212	106.6	100.6	89.6	73.7	54.3	32.6	10.2	0.0	0.0	0.0	0.0	0.0	935.2

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

AUG 1970	DAY NO	HOUR ENDING-TRUE SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	213	106.4	100.6	89.4	73.5	54.0	32.3	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	932.4
2	214	106.3	100.5	89.2	73.3	53.6	32.1	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	929.6
3	215	106.2	100.3	89.1	73.1	53.6	31.8	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	926.7
4	216	106.0	100.2	88.9	72.9	53.3	31.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	923.7
5	217	105.9	100.0	88.7	72.7	53.1	31.2	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	920.7
6	218	105.7	99.8	88.5	72.5	52.8	30.9	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	917.6
7	219	105.5	99.7	88.3	72.3	52.6	30.7	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	914.4
8	220	105.4	99.5	88.1	72.0	52.3	30.4	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	911.2
9	221	105.2	99.3	87.9	71.8	52.1	30.1	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	907.9
10	222	105.0	99.1	87.7	71.6	51.8	29.7	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	904.6
11	223	104.8	98.9	87.5	71.3	51.5	29.4	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	901.2
12	224	104.7	98.7	87.3	71.1	51.2	29.1	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	897.8
13	225	104.5	98.5	87.1	70.8	51.0	28.8	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	894.3
14	226	104.3	98.3	86.8	70.6	50.7	28.5	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	890.7
15	227	104.1	98.1	86.6	70.3	50.4	28.1	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	887.1
16	228	103.9	97.9	86.4	70.0	50.1	27.8	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	883.4
17	229	103.6	97.7	86.1	69.8	49.8	27.4	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	879.7
18	230	103.4	97.4	85.9	69.5	49.4	27.1	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	875.9
19	231	103.2	97.2	85.6	69.2	49.1	26.7	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	872.0
20	232	103.0	97.0	85.3	68.9	48.8	26.4	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	868.1
21	233	102.7	96.7	85.1	68.6	48.5	26.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	864.2
22	234	102.5	96.5	84.8	68.3	48.2	25.6	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	860.1
23	235	102.2	96.2	84.5	68.0	47.8	25.3	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	856.1
24	236	102.0	95.9	84.2	67.7	47.5	24.9	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	852.0
25	237	101.7	95.7	84.0	67.4	47.1	24.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	847.8
26	238	101.5	95.4	83.7	67.1	46.8	24.1	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	843.6
27	239	101.2	95.1	83.4	66.8	46.4	23.7	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	839.3
28	240	100.9	94.8	83.1	66.4	46.1	23.3	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	835.0
29	241	100.6	94.5	82.8	66.1	45.7	22.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	830.6
30	242	100.3	94.2	82.4	65.8	45.3	22.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	826.2
31	243	100.0	93.9	82.1	65.4	45.0	22.1	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	821.7

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONGS 96 33

CFPT 1970	DAY	HOOR ENDING-TRUE SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	244	99.7	93.6	81.8	65.1	44.0	21.7	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	817.2
2	245	99.4	93.3	81.5	64.7	44.2	21.3	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	812.7
3	246	99.1	93.0	81.1	64.4	43.8	20.9	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	808.0
4	247	98.8	92.7	80.8	64.0	43.4	20.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	803.4
5	248	98.5	92.3	80.4	63.6	43.0	20.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	798.7
6	249	98.2	92.0	80.1	63.2	42.6	19.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	794.0
7	250	97.8	91.7	79.7	62.9	42.2	19.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	789.2
8	251	97.5	91.3	79.4	62.5	41.8	18.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	784.4
9	252	97.1	90.9	79.0	62.1	41.4	18.3	.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	779.5
10	253	96.8	90.6	78.6	61.7	41.0	17.9	.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	774.6
11	254	96.4	90.2	78.2	61.3	40.6	17.4	.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	769.7
12	255	96.1	89.9	77.9	60.9	40.2	17.0	.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	764.7
13	256	95.7	89.5	77.5	60.5	39.7	16.5	.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	759.7
14	257	95.3	89.1	77.1	60.1	39.3	16.1	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	754.7
15	258	94.9	88.7	76.7	59.7	38.9	15.6	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	749.6
16	259	94.5	88.3	76.3	59.3	38.4	15.2	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	744.5
17	260	94.2	87.9	75.9	58.8	38.0	14.7	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	739.3
18	261	93.8	87.5	75.5	58.4	37.5	14.3	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	734.2
19	262	93.4	87.1	75.1	58.0	37.1	13.8	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	729.0
20	263	92.9	86.7	74.6	57.6	36.7	13.3	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	723.7
21	264	92.5	86.3	74.2	57.1	36.2	12.9	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	718.5
22	265	92.1	85.9	73.8	56.7	35.8	12.4	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	713.2
23	266	91.7	85.4	73.3	56.2	35.3	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	707.9
24	267	91.3	85.0	72.9	55.8	34.8	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	702.6
25	268	90.8	84.6	72.5	55.3	34.4	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	697.3
26	269	90.4	84.1	72.0	54.9	33.9	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	691.9
27	270	90.0	83.7	71.6	54.4	33.5	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	686.5
28	271	89.5	83.2	71.1	54.0	33.0	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	681.1
29	272	89.1	82.8	70.7	53.5	32.5	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	675.7
30	273	88.6	82.3	70.2	53.1	32.1	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	670.3

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

OCT 1970	DAY NO	HOOR ENDING-TRUE SOLAR TIME												DAILY TOTAL		
		11 14	12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23		1 24	
1	274	88.2	81.9	69.7	52.6	31.6	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	664.9
2	275	87.7	81.4	69.3	52.1	31.1	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	659.5
3	276	87.2	80.9	68.8	51.7	30.7	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	654.0
4	277	86.8	80.5	68.3	51.2	30.2	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	648.6
5	278	86.3	80.0	67.9	50.7	29.7	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	643.1
6	279	85.8	79.5	67.4	50.2	29.2	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	637.7
7	280	85.3	79.1	66.9	49.8	28.8	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	632.2
8	281	84.9	78.6	66.4	49.3	28.3	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	626.8
9	282	84.4	78.1	66.0	48.8	27.8	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	621.3
10	283	83.9	77.6	65.5	48.3	27.3	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	615.9
11	284	83.4	77.1	65.0	47.9	26.9	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	610.4
12	285	82.9	76.6	64.5	47.4	26.4	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	605.0
13	286	82.4	76.1	64.0	46.9	25.9	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	599.6
14	287	81.9	75.7	63.5	46.4	25.4	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	594.2
15	288	81.4	75.2	63.1	45.9	25.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	588.8
16	289	80.9	74.7	62.6	45.5	24.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	583.4
17	290	80.4	74.2	62.1	45.0	24.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	578.1
18	291	79.9	73.7	61.6	44.5	23.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	572.7
19	292	79.4	73.2	61.1	44.0	23.1	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	567.4
20	293	78.9	72.7	60.6	43.5	22.6	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	562.1
21	294	78.4	72.2	60.1	43.1	22.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	556.9
22	295	77.9	71.7	59.6	42.6	21.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	551.6
23	296	77.5	71.2	59.2	42.1	21.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	546.5
24	297	77.0	70.7	58.7	41.6	20.8	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	541.3
25	298	76.5	70.2	58.2	41.2	20.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	536.2
26	299	76.0	69.7	57.7	40.7	19.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	531.1
27	300	75.5	69.3	57.2	40.2	19.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	526.0
28	301	75.0	68.8	56.8	39.8	19.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	521.0
29	302	74.5	68.3	56.3	39.3	18.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	516.1
30	303	74.0	67.8	55.8	38.9	18.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	511.1
31	304	73.5	67.3	55.3	38.4	17.7	.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	506.3

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

HOURLY EMITTING-TIME SOLAR TIME

NOV 1970	DAY NO	HOURLY EMITTING-TIME SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	305	73.0	66.9	54.9	48.0	17.2	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	501.5
2	306	72.6	66.4	54.4	37.5	16.8	.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.7
3	307	72.1	65.9	54.0	37.1	16.4	.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	492.0
4	308	71.6	65.4	53.5	36.6	16.0	.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.3
5	309	71.2	65.0	53.1	36.2	15.6	.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	482.7
6	310	70.7	64.5	52.6	35.6	15.2	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	478.2
7	311	70.2	64.1	52.2	35.4	14.8	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	473.7
8	312	69.6	63.6	51.7	34.9	14.4	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	469.3
9	313	69.3	63.2	51.3	34.5	14.0	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	465.0
10	314	68.9	62.8	50.9	34.1	13.6	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	460.7
11	315	68.5	62.3	50.5	33.7	13.2	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	456.5
12	316	68.0	61.9	50.1	33.3	12.8	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	452.4
13	317	67.6	61.5	49.7	32.9	12.5	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448.4
14	318	67.2	61.1	49.3	32.6	12.1	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	444.4
15	319	66.8	60.7	48.9	32.2	11.7	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	440.5
16	320	66.4	60.3	48.5	31.8	11.4	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	436.7
17	321	66.0	59.9	48.1	31.5	11.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	433.0
18	322	65.6	59.5	47.7	31.1	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	429.3
19	323	65.2	59.1	47.4	30.8	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	425.8
20	324	64.8	58.8	47.0	30.4	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	422.3
21	325	64.5	58.4	46.7	30.1	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	419.0
22	326	64.1	58.1	46.3	29.6	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	415.7
23	327	63.8	57.7	46.0	29.5	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	412.5
24	328	63.4	57.4	45.7	29.2	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	409.4
25	329	63.1	57.1	45.4	28.9	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	406.4
26	330	62.8	56.8	45.1	28.6	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	403.5
27	331	62.5	56.5	44.8	28.3	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	400.7
28	332	62.2	56.2	44.5	28.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	398.0
29	333	61.9	55.9	44.2	27.6	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	395.4
30	334	61.6	55.6	44.0	27.5	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	392.9

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

HOOR ENDING-TRUE SOLAR TIME

DEC 1970	DAY NO	12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24	DAILY TOTAL
1	335	61.4	55.4	43.7	27.3	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	390.5
2	336	61.1	55.1	43.5	27.1	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	388.3
3	337	60.9	54.9	43.3	26.9	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	386.1
4	338	60.7	54.7	43.1	26.7	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	384.0
5	339	60.4	54.4	42.9	26.5	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	382.1
6	340	60.2	54.2	42.7	26.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	380.3
7	341	60.0	54.1	42.5	26.1	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	378.5
8	342	59.9	53.9	42.3	25.9	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	376.9
9	343	59.7	53.7	42.1	25.8	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	375.4
10	344	59.5	53.6	42.0	25.7	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	374.0
11	345	59.4	53.4	41.9	25.5	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	372.8
12	346	59.3	53.3	41.7	25.4	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	371.6
13	347	59.2	53.2	41.6	25.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.6
14	348	59.1	53.1	41.5	25.2	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	369.7
15	349	59.0	53.0	41.5	25.1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.9
16	350	58.9	52.9	41.4	25.1	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.2
17	351	58.8	52.9	41.3	25.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.7
18	352	58.8	52.8	41.3	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.2
19	353	58.8	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.9
20	354	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.7
21	355	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.6
22	356	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.7
23	357	58.8	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.6
24	358	58.8	52.8	41.3	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.1
25	359	58.8	52.9	41.3	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.5
26	360	58.9	52.9	41.4	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.1
27	361	59.0	53.0	41.4	25.1	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.7
28	362	59.1	53.1	41.5	25.2	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	369.5
29	363	59.2	53.2	41.6	25.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.4
30	364	59.3	53.3	41.7	25.4	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	371.4
31	365	59.4	53.4	41.8	25.5	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	372.5

USAGE 1970

DAY LENGTH
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	9.41	10.22	11.23	12.36	13.43	14.32	14.39	14.02	12.59	11.49	10.39	9.49
2	9.41	10.24	11.25	12.38	13.45	14.33	14.39	14.00	12.56	11.47	10.37	9.46
3	9.42	10.26	11.27	12.41	13.47	14.34	14.38	13.57	12.52	11.42	10.33	9.46
4	9.43	10.28	11.30	12.43	13.49	14.35	14.38	13.55	12.49	11.40	10.31	9.45
5	9.44	10.30	11.32	12.45	13.51	14.35	14.37	13.53	12.47	11.37	10.29	9.44
6	9.44	10.32	11.34	12.48	13.52	14.36	14.36	13.51	12.45	11.35	10.27	9.43
7	9.45	10.34	11.37	12.50	13.54	14.37	14.35	13.49	12.43	11.33	10.25	9.43
8	9.46	10.36	11.39	12.52	13.56	14.37	14.35	13.47	12.40	11.30	10.23	9.42
9	9.47	10.38	11.42	12.55	13.58	14.38	14.34	13.47	12.38	11.28	10.21	9.41
10	9.48	10.40	11.44	12.57	14.00	14.39	14.33	13.45	12.36	11.26	10.20	9.40
11	9.49	10.42	11.46	12.59	14.02	14.39	14.32	13.43	12.36	11.26	10.20	9.40
12	9.51	10.45	11.49	13.02	14.03	14.40	14.31	13.41	12.33	11.23	10.18	9.40
13	9.52	10.47	11.51	13.04	14.05	14.40	14.30	13.39	12.31	11.21	10.16	9.39
14	9.53	10.49	11.53	13.06	14.07	14.41	14.29	13.37	12.29	11.19	10.14	9.39
15	9.54	10.51	11.56	13.08	14.09	14.41	14.27	13.35	12.26	11.16	10.12	9.39
16	9.56	10.53	11.58	13.11	14.10	14.41	14.26	13.33	12.24	11.14	10.11	9.38
17	9.57	10.55	12.01	13.13	14.12	14.42	14.25	13.31	12.22	11.12	10.09	9.38
18	9.58	10.58	12.03	13.15	14.13	14.42	14.24	13.29	12.19	11.10	10.07	9.38
19	10.00	11.00	12.05	13.17	14.15	14.42	14.22	13.27	12.17	11.07	10.06	9.37
20	10.01	11.02	12.08	13.19	14.16	14.42	14.21	13.25	12.15	11.05	10.04	9.37
21	10.03	11.04	12.10	13.22	14.18	14.42	14.20	13.23	12.12	11.03	10.02	9.37
22	10.05	11.07	12.12	13.24	14.19	14.42	14.19	13.21	12.10	11.01	10.01	9.37
23	10.06	11.09	12.15	13.26	14.21	14.42	14.17	13.18	12.08	10.58	9.59	9.37
24	10.08	11.11	12.17	13.28	14.22	14.42	14.15	13.16	12.05	10.56	9.58	9.37
25	10.10	11.14	12.20	13.30	14.23	14.42	14.14	13.14	12.03	10.54	9.57	9.38
26	10.11	11.16	12.22	13.32	14.25	14.41	14.12	13.12	12.01	10.52	9.55	9.38
27	10.13	11.18	12.24	13.34	14.26	14.41	14.11	13.10	11.58	10.50	9.54	9.38
28	10.15	11.20	12.27	13.37	14.27	14.41	14.09	13.07	11.56	10.48	9.53	9.39
29	10.17	11.22	12.29	13.39	14.28	14.40	14.07	13.05	11.54	10.46	9.51	9.39
30	10.18	11.24	12.31	13.41	14.29	14.40	14.06	13.03	11.51	10.43	9.50	9.39
31	10.20	11.26	12.34	13.44	14.31	14.40	14.04	13.01	11.49	10.41	9.48	9.40

OSAGE 1970

TIME OF SUNRISE, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	7.40	7.29	6.57	6.12	5.32	5.08	5.10	5.31	5.57	6.21	6.50	7.21
2	7.40	7.28	6.56	6.11	5.31	5.08	5.11	5.32	5.58	6.22	6.51	7.22
3	7.40	7.27	6.54	6.09	5.30	5.07	5.11	5.33	5.59	6.23	6.52	7.23
4	7.40	7.26	6.53	6.08	5.29	5.07	5.12	5.34	5.59	6.24	6.53	7.23
5	7.40	7.25	6.52	6.06	5.28	5.07	5.12	5.35	6.00	6.25	6.54	7.24
6	7.40	7.24	6.50	6.05	5.27	5.07	5.13	5.35	6.01	6.26	6.55	7.25
7	7.40	7.23	6.49	6.03	5.26	5.07	5.13	5.36	6.02	6.27	6.56	7.26
8	7.40	7.22	6.47	6.02	5.25	5.06	5.14	5.37	6.03	6.27	6.57	7.27
9	7.40	7.21	6.46	6.00	5.24	5.06	5.15	5.38	6.03	6.28	6.58	7.28
10	7.40	7.20	6.45	5.59	5.23	5.06	5.15	5.39	6.04	6.29	6.59	7.28
11	7.39	7.19	6.43	5.58	5.22	5.06	5.16	5.40	6.05	6.30	7.01	7.29
12	7.39	7.18	6.42	5.56	5.21	5.06	5.16	5.40	6.06	6.31	7.02	7.30
13	7.39	7.17	6.40	5.55	5.20	5.06	5.17	5.41	6.07	6.32	7.03	7.31
14	7.39	7.16	6.39	5.53	5.19	5.06	5.18	5.42	6.07	6.33	7.04	7.31
15	7.39	7.15	6.37	5.52	5.18	5.06	5.18	5.43	6.08	6.34	7.05	7.32
16	7.38	7.14	6.36	5.51	5.17	5.06	5.19	5.44	6.09	6.35	7.06	7.33
17	7.38	7.13	6.34	5.49	5.17	5.06	5.20	5.45	6.10	6.36	7.07	7.33
18	7.37	7.11	6.33	5.48	5.16	5.06	5.20	5.45	6.11	6.37	7.08	7.34
19	7.37	7.10	6.31	5.47	5.15	5.07	5.21	5.46	6.12	6.38	7.09	7.35
20	7.37	7.09	6.30	5.45	5.14	5.07	5.22	5.47	6.12	6.38	7.10	7.35
21	7.36	7.08	6.28	5.44	5.14	5.07	5.23	5.48	6.13	6.39	7.11	7.36
22	7.36	7.06	6.27	5.43	5.13	5.07	5.23	5.49	6.14	6.40	7.12	7.36
23	7.35	7.05	6.25	5.42	5.12	5.07	5.24	5.50	6.15	6.41	7.13	7.37
24	7.34	7.04	6.24	5.40	5.12	5.08	5.25	5.50	6.16	6.42	7.14	7.37
25	7.34	7.03	6.22	5.39	5.11	5.08	5.26	5.51	6.16	6.43	7.15	7.37
26	7.33	7.01	6.21	5.38	5.11	5.08	5.27	5.52	6.17	6.44	7.16	7.38
27	7.33	7.00	6.19	5.37	5.10	5.09	5.27	5.53	6.18	6.45	7.17	7.38
28	7.32	6.59	6.18	5.35	5.10	5.09	5.28	5.54	6.19	6.46	7.18	7.39
29	7.31		6.17	5.34	5.09	5.09	5.29	5.54	6.20	6.47	7.19	7.39
30	7.30		6.15	5.33	5.09	5.10	5.30	5.55	6.21	6.48	7.20	7.39
31	7.30		6.14		5.09		5.31	5.56		6.49		7.39

USABE 1970

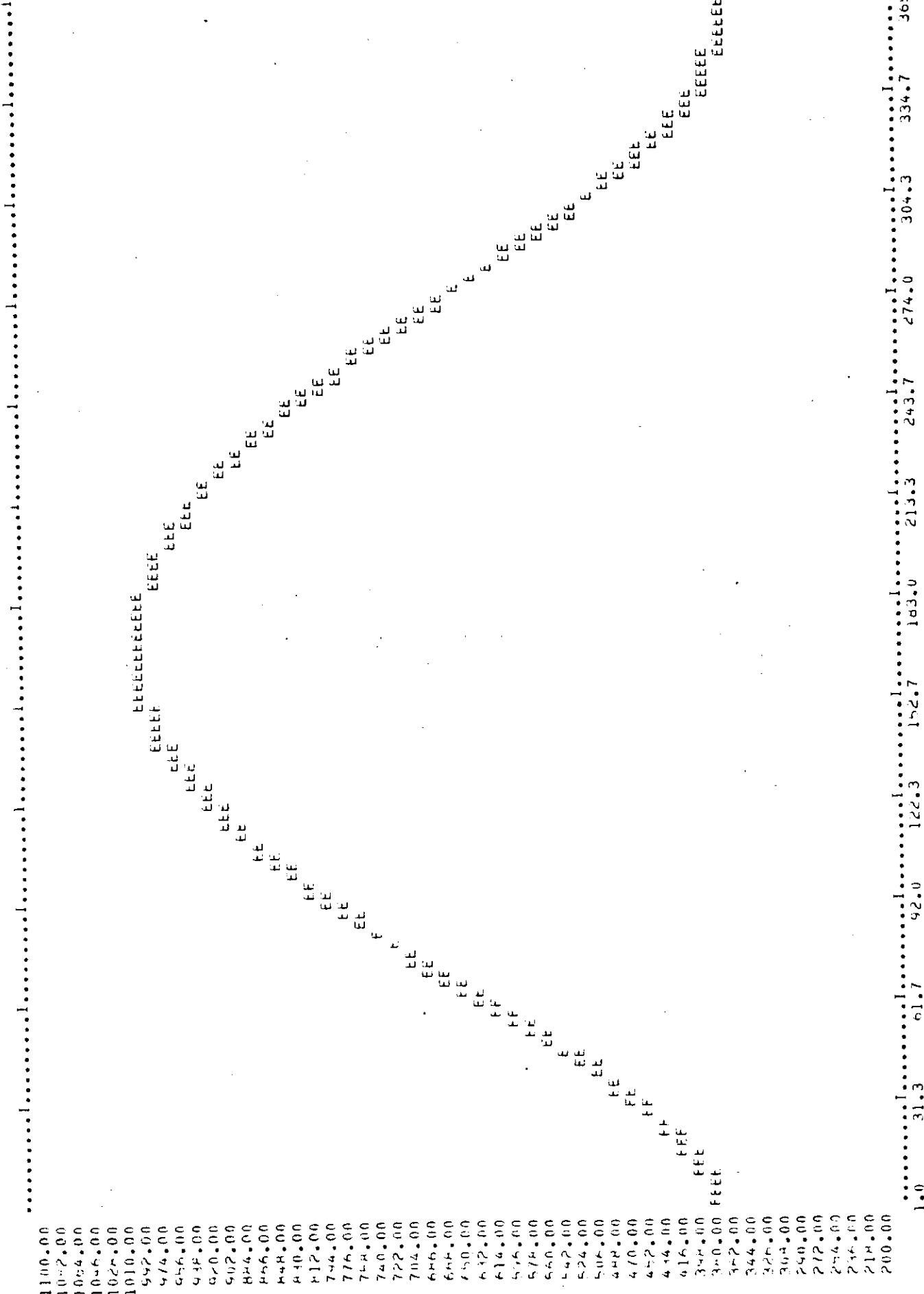
TIME OF SUNSET, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	17.20	17.51	18.20	18.48	19.15	19.40	19.50	19.34	18.55	18.10	17.29	17.10
2	17.21	17.52	18.21	18.49	19.15	19.40	19.50	19.33	18.54	18.09	17.28	17.10
3	17.22	17.53	18.22	18.50	19.16	19.41	19.49	19.32	18.53	18.07	17.27	17.10
4	17.23	17.54	18.23	18.51	19.17	19.42	19.49	19.31	18.51	18.06	17.26	17.09
5	17.23	17.55	18.24	18.52	19.18	19.42	19.49	19.30	18.50	18.04	17.25	17.09
6	17.24	17.56	18.25	18.53	19.19	19.43	19.49	19.29	18.48	18.03	17.24	17.09
7	17.25	17.57	18.26	18.53	19.20	19.43	19.49	19.28	18.47	18.01	17.23	17.09
8	17.26	17.59	18.27	18.54	19.21	19.44	19.48	19.26	18.45	18.00	17.23	17.09
9	17.27	18.00	18.28	18.55	19.22	19.44	19.48	19.25	18.44	17.59	17.22	17.09
10	17.28	18.01	18.29	18.56	19.22	19.45	19.48	19.24	18.42	17.57	17.21	17.10
11	17.29	18.02	18.29	18.57	19.23	19.45	19.47	19.23	18.41	17.56	17.20	17.10
12	17.30	18.03	18.30	18.58	19.24	19.46	19.47	19.22	18.39	17.54	17.19	17.10
13	17.31	18.04	18.31	18.59	19.25	19.46	19.47	19.21	18.38	17.53	17.18	17.10
14	17.32	18.05	18.32	19.00	19.26	19.47	19.46	19.20	18.36	17.52	17.18	17.10
15	17.33	18.06	18.33	19.00	19.27	19.47	19.46	19.18	18.35	17.50	17.17	17.11
16	17.34	18.07	18.34	19.01	19.28	19.47	19.45	19.17	18.33	17.49	17.16	17.11
17	17.35	18.08	18.35	19.02	19.28	19.46	19.45	19.16	18.32	17.48	17.16	17.11
18	17.36	18.09	18.36	19.03	19.29	19.48	19.44	19.15	18.30	17.46	17.15	17.12
19	17.37	18.10	18.37	19.04	19.30	19.48	19.44	19.13	18.28	17.45	17.14	17.12
20	17.38	18.11	18.38	19.05	19.31	19.49	19.43	19.12	18.27	17.44	17.14	17.12
21	17.39	18.12	18.38	19.06	19.32	19.49	19.42	19.11	18.25	17.42	17.13	17.13
22	17.40	18.13	18.39	19.07	19.32	19.49	19.42	19.09	18.24	17.41	17.13	17.13
23	17.41	18.14	18.40	19.07	19.33	19.49	19.41	19.08	18.22	17.40	17.12	17.14
24	17.42	18.15	18.41	19.08	19.34	19.49	19.40	19.07	18.21	17.39	17.12	17.15
25	17.43	18.16	18.42	19.09	19.35	19.49	19.40	19.05	18.19	17.37	17.12	17.15
26	17.44	18.17	18.43	19.10	19.36	19.50	19.39	19.04	18.18	17.36	17.11	17.16
27	17.46	18.18	18.44	19.11	19.36	19.50	19.38	19.03	18.16	17.35	17.11	17.16
28	17.47	18.19	18.45	19.12	19.37	19.50	19.37	19.01	18.15	17.34	17.11	17.17
29	17.48		18.46	19.13	19.38	19.50	19.36	19.00	18.13	17.33	17.10	17.18
30	17.49		18.46	19.14	19.38	19.50	19.35	18.58	18.12	17.32	17.10	17.18
31	17.50		18.47		19.39		19.34	18.57		17.31		17.19

USAGE 1970

TIME OF SOLAR NOON, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	12.30	12.40	12.39	12.30	12.23	12.24	12.30	12.32	12.26	12.16	12.10	12.15
2	12.30	12.40	12.38	12.30	12.23	12.24	12.30	12.32	12.26	12.15	12.10	12.16
3	12.31	12.40	12.38	12.30	12.23	12.24	12.30	12.32	12.26	12.15	12.10	12.16
4	12.31	12.40	12.38	12.29	12.23	12.24	12.31	12.32	12.25	12.15	12.10	12.17
5	12.32	12.40	12.38	12.29	12.23	12.25	12.31	12.32	12.25	12.15	12.10	12.17
6	12.32	12.40	12.38	12.29	12.23	12.25	12.31	12.32	12.25	12.14	12.10	12.17
7	12.33	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.18
8	12.33	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.18
9	12.33	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.19
10	12.34	12.41	12.37	12.28	12.23	12.26	12.31	12.32	12.23	12.13	12.10	12.19
11	12.34	12.41	12.36	12.27	12.23	12.26	12.32	12.31	12.23	12.13	12.10	12.19
12	12.35	12.41	12.36	12.27	12.22	12.26	12.32	12.31	12.22	12.13	12.10	12.20
13	12.35	12.40	12.36	12.27	12.22	12.26	12.32	12.31	12.22	12.12	12.11	12.20
14	12.35	12.40	12.35	12.27	12.22	12.26	12.32	12.31	12.22	12.12	12.11	12.21
15	12.36	12.40	12.35	12.26	12.22	12.27	12.32	12.31	12.21	12.12	12.11	12.21
16	12.36	12.40	12.35	12.26	12.22	12.27	12.32	12.30	12.21	12.12	12.11	12.22
17	12.36	12.40	12.35	12.26	12.23	12.27	12.32	12.30	12.21	12.12	12.11	12.22
18	12.37	12.40	12.34	12.26	12.23	12.27	12.32	12.30	12.20	12.11	12.11	12.23
19	12.37	12.40	12.34	12.25	12.23	12.27	12.32	12.30	12.20	12.11	12.12	12.23
20	12.37	12.40	12.34	12.25	12.23	12.28	12.32	12.30	12.20	12.11	12.12	12.24
21	12.38	12.40	12.33	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.12	12.24
22	12.38	12.40	12.33	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.12	12.25
23	12.38	12.40	12.33	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.13	12.25
24	12.38	12.39	12.33	12.24	12.23	12.29	12.33	12.29	12.18	12.10	12.13	12.26
25	12.39	12.39	12.32	12.24	12.23	12.29	12.33	12.28	12.18	12.10	12.13	12.26
26	12.39	12.39	12.32	12.24	12.23	12.29	12.33	12.28	12.18	12.10	12.14	12.27
27	12.39	12.39	12.32	12.24	12.23	12.29	12.33	12.28	12.17	12.10	12.14	12.27
28	12.39	12.39	12.31	12.24	12.23	12.29	12.33	12.27	12.17	12.10	12.14	12.28
29	12.39	12.39	12.31	12.24	12.24	12.30	12.33	12.27	12.17	12.10	12.15	12.28
30	12.40	12.40	12.31	12.23	12.24	12.30	12.33	12.27	12.16	12.10	12.15	12.29
31	12.40	12.40	12.30	12.24	12.24	12.27	12.33	12.27	12.10	12.10	12.15	12.29



DAILY EXTRATERRESTRIAL RADIATION VS. JULIAN DAY

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

HOURLY ENDING-TRUE SOLAR TIME

JAN 1972	DAY NO	12	13	11	14	10	15	9	16	8	17	7	18	6	19	5	20	4	21	3	22	2	23	1	DAILY TOTAL
1	1	59.5	53.5	41.9	25.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	373.4
2	2	59.7	53.7	42.1	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	374.8
3	3	59.8	53.8	42.2	25.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	376.2
4	4	60.0	54.0	42.4	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	377.6
5	5	60.2	54.2	42.6	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	379.5
6	6	60.4	54.4	42.8	26.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	381.3
7	7	60.6	54.6	43.0	26.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	383.2
8	8	60.9	54.8	43.2	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	385.2
9	9	61.1	55.1	43.4	26.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	387.4
10	10	61.4	55.3	43.7	27.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	389.6
11	11	61.6	55.6	43.9	27.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	392.0
12	12	61.9	55.9	44.2	27.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	394.5
13	13	62.2	56.1	44.4	27.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	397.1
14	14	62.5	56.4	44.7	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	399.8
15	15	62.8	56.7	45.0	28.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	402.6
16	16	63.1	57.1	45.3	28.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	405.5
17	17	63.5	57.4	45.6	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	408.5
18	18	63.8	57.7	45.9	29.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	411.6
19	19	64.2	58.1	46.3	29.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	414.8
20	20	64.5	58.4	46.6	29.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	418.1
21	21	64.9	58.8	47.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	421.5
22	22	65.3	59.2	47.3	30.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	425.0
23	23	65.7	59.5	47.7	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	428.6
24	24	66.1	59.9	48.1	31.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	432.3
25	25	66.5	60.3	48.5	31.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	436.1
26	26	66.9	60.7	48.8	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	439.9
27	27	67.3	61.1	49.2	32.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	443.9
28	28	67.7	61.6	49.7	32.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	447.9
29	29	68.2	62.0	50.1	33.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	452.1
30	30	68.6	62.4	50.5	33.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	456.3
31	31	69.1	62.9	50.9	34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	460.5

LAI 36 57 LONG 96 33

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USABE

HOOR ENDING-TRUE SOLAR TIME

FEB 1972	DAY NO	HOOR ENDING-TRUE SOLAR TIME											DAILY TOTAL			
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23		1 24		
1	32	69.5	63.3	51.4	34.4	13.7	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	464.9
2	33	70.0	63.8	51.8	34.6	14.1	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	465.3
3	34	70.5	64.2	52.2	35.3	14.5	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	473.8
4	35	70.9	64.7	52.7	35.7	14.9	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	478.4
5	36	71.4	65.2	53.2	36.1	15.3	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	483.1
6	37	71.9	65.7	53.6	36.6	15.7	.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.8
7	38	72.4	66.1	54.1	37.0	16.1	.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	492.5
8	39	72.9	66.6	54.6	37.5	16.6	.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	497.4
9	40	73.4	67.1	55.0	37.9	17.0	.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	502.3
10	41	73.9	67.6	55.5	38.4	17.4	.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	507.2
11	42	74.4	68.1	56.0	38.9	17.9	.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	512.2
12	43	74.9	68.6	56.5	39.3	18.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	517.3
13	44	75.4	69.1	57.0	39.8	18.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	522.4
14	45	75.9	69.6	57.5	40.3	19.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	527.6
15	46	76.4	70.1	58.0	40.8	19.7	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	532.8
16	47	76.9	70.6	58.5	41.2	20.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	538.0
17	48	77.5	71.1	59.0	41.7	20.6	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	543.3
18	49	78.0	71.7	59.5	42.2	21.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	548.7
19	50	78.5	72.2	60.0	42.7	21.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	554.0
20	51	79.0	72.7	60.5	43.2	22.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	559.4
21	52	79.5	73.2	61.0	43.7	22.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	564.9
22	53	80.1	73.7	61.5	44.2	23.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	570.3
23	54	80.6	74.2	62.0	44.7	23.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	575.8
24	55	81.1	74.7	62.5	45.2	24.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	581.3
25	56	81.6	75.3	63.0	45.7	24.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	586.9
26	57	82.1	75.8	63.5	46.2	24.9	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	592.4
27	58	82.6	76.3	64.0	46.7	25.4	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	598.0
28	59	83.2	76.8	64.5	47.2	25.9	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	603.6
29	60	83.7	77.3	65.0	47.7	26.4	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	609.2

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USA66

LAT 36 57 LONG 96 33

MAR 1972	DAY NO	HOOR ENDING-TRUE SOLAR TIME												1 24	DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23					
1	61	84.2	77.8	65.5	46.2	26.9	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	614.8
2	62	84.7	78.3	65.0	46.7	27.4	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	620.5
3	63	85.2	78.8	66.5	47.2	27.9	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	626.1
4	64	85.7	79.3	67.0	47.6	28.3	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	631.8
5	65	86.2	79.8	67.5	48.1	28.8	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	637.4
6	66	86.7	80.3	68.0	48.6	29.3	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	643.1
7	67	87.2	80.8	68.5	49.1	29.8	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	648.7
8	68	87.7	81.3	69.0	49.6	30.3	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	654.3
9	69	88.2	81.8	69.5	50.1	30.8	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	660.0
10	70	88.7	82.3	70.0	50.6	31.3	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	665.6
11	71	89.1	82.8	70.5	51.1	31.8	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	671.3
12	72	89.6	83.3	71.0	51.6	32.3	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	676.9
13	73	90.1	83.7	71.4	52.1	32.7	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	682.5
14	74	90.6	84.2	71.9	52.6	33.2	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	688.1
15	75	91.0	84.7	72.4	53.1	33.7	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	693.6
16	76	91.5	85.1	72.8	53.6	34.2	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	699.2
17	77	91.9	85.6	73.3	54.1	34.7	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	704.7
18	78	92.4	86.0	73.8	54.6	35.1	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	710.2
19	79	92.8	86.5	74.2	55.1	35.6	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.7
20	80	93.3	86.9	74.7	55.6	36.1	12.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	721.2
21	81	93.7	87.4	75.1	56.1	36.6	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	726.6
22	82	94.1	87.8	75.5	56.6	37.1	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	732.0
23	83	94.5	88.2	76.0	57.1	37.6	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	737.4
24	84	95.0	88.6	76.4	57.6	38.1	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	742.8
25	85	95.4	89.0	76.8	58.1	38.6	14.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	748.1
26	86	95.8	89.5	77.2	58.6	39.1	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	753.4
27	87	96.2	89.9	77.6	59.1	39.6	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	758.8
28	88	96.6	90.3	78.0	59.6	40.1	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	763.8
29	89	96.9	90.8	78.4	60.1	40.6	16.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	769.0
30	90	97.3	91.2	78.8	60.6	41.1	17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	774.2
31	91	97.7	91.6	79.2	61.1	41.6	17.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	779.2

SOLAR ENERGY IN LANGLEY'S OUTSIDE ATMOSPHERE AT OSAGE

LAT 36 57 LONG 96 33

HOOR ENJING-TRUE SOLAR TIME

APR 1972	DAY	12	11	10	9	8	7	6	5	4	3	2	1	DAILY TOTAL
	HO	13	14	15	16	17	18	19	20	21	22	23	24	
1	92	98.1	91.8	79.6	62.5	41.5	18.0	.7	0.0	0.0	0.0	0.0	0.0	784.3
2	93	98.4	92.1	80.0	62.9	41.9	18.5	.8	0.0	0.0	0.0	0.0	0.0	789.3
3	94	98.8	92.5	80.4	63.3	42.3	18.9	1.0	0.0	0.0	0.0	0.0	0.0	794.3
4	95	99.1	92.9	80.8	63.7	42.7	19.4	1.1	0.0	0.0	0.0	0.0	0.0	799.2
5	96	99.5	93.2	81.1	64.1	43.1	19.8	1.2	0.0	0.0	0.0	0.0	0.0	804.1
6	97	99.8	93.6	81.5	64.4	43.5	20.2	1.4	0.0	0.0	0.0	0.0	0.0	808.9
7	98	100.1	93.9	81.8	64.8	43.9	20.7	1.5	0.0	0.0	0.0	0.0	0.0	813.7
8	99	100.4	94.2	82.2	65.2	44.3	21.1	1.7	0.0	0.0	0.0	0.0	0.0	818.4
9	100	100.7	94.5	82.5	65.5	44.7	21.5	1.9	0.0	0.0	0.0	0.0	0.0	823.1
10	101	101.1	94.9	82.9	65.9	45.1	22.0	2.1	0.0	0.0	0.0	0.0	0.0	827.7
11	102	101.4	95.2	83.2	66.3	45.5	22.4	2.3	0.0	0.0	0.0	0.0	0.0	832.3
12	103	101.7	95.5	83.5	66.6	45.9	22.8	2.4	0.0	0.0	0.0	0.0	0.0	836.8
13	104	101.9	95.8	83.8	66.9	46.3	23.2	2.6	0.0	0.0	0.0	0.0	0.0	841.2
14	105	102.2	96.1	84.1	67.3	46.6	23.6	2.9	0.0	0.0	0.0	0.0	0.0	845.6
15	106	102.5	96.3	84.4	67.6	47.0	24.0	3.1	0.0	0.0	0.0	0.0	0.0	850.0
16	107	102.8	96.6	84.7	67.9	47.4	24.4	3.3	0.0	0.0	0.0	0.0	0.0	854.3
17	108	103.0	96.9	85.0	68.3	47.7	24.8	3.5	0.0	0.0	0.0	0.0	0.0	858.5
18	109	103.3	97.2	85.3	68.6	48.1	25.2	3.8	0.0	0.0	0.0	0.0	0.0	862.7
19	110	103.5	97.4	85.6	68.9	48.4	25.6	4.0	0.0	0.0	0.0	0.0	0.0	866.8
20	111	103.8	97.7	85.9	69.2	48.8	26.0	4.2	0.0	0.0	0.0	0.0	0.0	870.9
21	112	104.0	97.9	86.1	69.5	49.1	26.3	4.5	0.0	0.0	0.0	0.0	0.0	874.9
22	113	104.2	98.2	86.4	69.8	49.4	26.7	4.7	0.0	0.0	0.0	0.0	0.0	878.8
23	114	104.5	98.4	86.7	70.1	49.7	27.1	5.0	0.0	0.0	0.0	0.0	0.0	882.7
24	115	104.7	98.6	86.9	70.3	50.1	27.4	5.3	0.0	0.0	0.0	0.0	0.0	886.5
25	116	104.9	98.8	87.1	70.6	50.4	27.8	5.5	0.0	0.0	0.0	0.0	0.0	890.3
26	117	105.1	99.0	87.4	70.9	50.7	28.1	5.8	0.0	0.0	0.0	0.0	0.0	894.0
27	118	105.3	99.3	87.6	71.1	51.0	28.5	6.1	0.0	0.0	0.0	0.0	0.0	897.6
28	119	105.5	99.5	87.8	71.4	51.3	28.8	6.3	0.0	0.0	0.0	0.0	0.0	901.2
29	120	105.7	99.7	88.1	71.7	51.6	29.1	6.6	0.0	0.0	0.0	0.0	0.0	904.7
30	121	105.8	99.9	88.3	71.9	51.8	29.5	6.9	0.0	0.0	0.0	0.0	0.0	908.1

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

MAY 1972	DAY NO	HOUR ENDING-TRUE SOLAR TIME											DAILY TOTAL			
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23		1 24		
1	122	106.0	100.6	88.5	72.1	52.1	29.6	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	911.5
2	123	106.2	100.2	88.7	72.4	52.4	30.1	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	914.8
3	124	106.3	100.4	88.9	72.6	52.7	30.4	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	918.1
4	125	106.5	100.6	89.1	72.8	52.9	30.7	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	921.3
5	126	106.7	100.7	89.3	73.0	53.2	31.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	924.4
6	127	106.8	100.9	89.4	73.2	53.4	31.3	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	927.4
7	128	106.9	101.0	89.6	73.5	53.7	31.6	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	930.4
8	129	107.1	101.2	89.8	73.7	53.9	31.9	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	933.3
9	130	107.2	101.3	89.9	73.8	54.1	32.2	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	936.2
10	131	107.3	101.5	90.1	74.0	54.4	32.4	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	938.9
11	132	107.5	101.6	90.3	74.2	54.6	32.7	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	941.6
12	133	107.6	101.7	90.4	74.4	54.8	32.9	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	944.3
13	134	107.7	101.8	90.5	74.6	55.0	33.2	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	946.9
14	135	107.8	102.0	90.7	74.7	55.2	33.4	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	949.4
15	136	107.9	102.1	90.8	74.9	55.4	33.7	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	951.8
16	137	108.0	102.2	90.9	75.1	55.6	33.9	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	954.2
17	138	108.1	102.3	91.1	75.2	55.8	34.1	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	956.5
18	139	108.2	102.4	91.2	75.4	56.0	34.3	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	958.7
19	140	108.3	102.5	91.3	75.5	56.1	34.6	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	960.9
20	141	108.3	102.6	91.4	75.6	56.3	34.8	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	963.0
21	142	108.4	102.6	91.5	75.6	56.5	35.0	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	965.0
22	143	108.5	102.7	91.6	75.7	56.6	35.2	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	967.0
23	144	108.5	102.8	91.7	76.0	56.8	35.3	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	968.9
24	145	108.6	102.9	91.8	76.1	56.9	35.5	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	970.7
25	146	108.7	102.9	91.9	76.2	57.1	35.7	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	972.4
26	147	108.7	103.0	92.0	76.3	57.2	35.9	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	974.1
27	148	108.8	103.1	92.0	76.4	57.3	36.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	975.7
28	149	108.8	103.1	92.1	76.5	57.5	36.2	14.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	977.3
29	150	108.9	103.2	92.2	76.6	57.6	36.3	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	978.8
30	151	108.9	103.2	92.3	76.7	57.7	36.5	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	980.2
31	152	109.0	103.3	92.3	76.8	57.8	36.6	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	981.5

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT OSAGE LAT 36 57 LONG 96 33

JUNE 1972	DAY NO	HOUR ENDING-TRUE SOLAR TIME												DAILY TOTAL	
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24		
1	153	109.0	103.3	92.4	76.9	57.9	36.7	14.8	.4	0.0	0.0	0.0	0.0	0.0	782.8
2	154	109.1	103.4	92.4	76.9	56.0	36.8	15.0	.4	0.0	0.0	0.0	0.0	0.0	784.0
3	155	109.1	103.4	92.5	77.0	56.1	37.0	15.1	.4	0.0	0.0	0.0	0.0	0.0	785.1
4	156	109.1	103.4	92.5	77.1	56.2	37.1	15.2	.5	0.0	0.0	0.0	0.0	0.0	786.2
5	157	109.1	103.5	92.6	77.1	56.2	37.2	15.4	.5	0.0	0.0	0.0	0.0	0.0	787.1
6	158	109.1	103.5	92.6	77.2	56.3	37.3	15.5	.5	0.0	0.0	0.0	0.0	0.0	788.1
7	159	109.2	103.5	92.6	77.2	56.4	37.4	15.6	.6	0.0	0.0	0.0	0.0	0.0	788.9
8	160	109.2	103.6	92.7	77.3	56.5	37.4	15.7	.6	0.0	0.0	0.0	0.0	0.0	789.7
9	161	109.2	103.6	92.7	77.3	56.5	37.5	15.8	.6	0.0	0.0	0.0	0.0	0.0	790.4
10	162	109.2	103.6	92.7	77.4	56.6	37.6	15.9	.6	0.0	0.0	0.0	0.0	0.0	791.0
11	163	109.2	103.6	92.8	77.4	56.6	37.6	15.9	.6	0.0	0.0	0.0	0.0	0.0	791.6
12	164	109.2	103.6	92.8	77.4	56.6	37.7	16.0	.7	0.0	0.0	0.0	0.0	0.0	792.1
13	165	109.2	103.6	92.8	77.5	56.7	37.7	16.1	.7	0.0	0.0	0.0	0.0	0.0	792.6
14	166	109.2	103.6	92.8	77.5	56.7	37.8	16.1	.7	0.0	0.0	0.0	0.0	0.0	792.9
15	167	109.2	103.6	92.8	77.5	56.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	793.2
16	168	109.2	103.6	92.8	77.5	56.8	37.9	16.2	.7	0.0	0.0	0.0	0.0	0.0	793.4
17	169	109.2	103.6	92.8	77.5	56.8	37.9	16.2	.7	0.0	0.0	0.0	0.0	0.0	793.6
18	170	109.2	103.6	92.8	77.5	56.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.7
19	171	109.2	103.6	92.8	77.5	56.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.7
20	172	109.2	103.6	92.8	77.5	56.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.7
21	173	109.2	103.6	92.8	77.5	56.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.5
22	174	109.2	103.6	92.8	77.5	56.8	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.5
23	175	109.2	103.6	92.8	77.5	56.7	37.9	16.3	.7	0.0	0.0	0.0	0.0	0.0	793.1
24	176	109.1	103.5	92.7	77.4	56.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	792.8
25	177	109.1	103.5	92.7	77.4	56.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	792.4
26	178	109.1	103.5	92.7	77.4	56.7	37.8	16.2	.7	0.0	0.0	0.0	0.0	0.0	791.9
27	179	109.1	103.5	92.6	77.4	56.6	37.7	16.1	.7	0.0	0.0	0.0	0.0	0.0	791.4
28	180	109.0	103.4	92.6	77.3	56.6	37.7	16.0	.7	0.0	0.0	0.0	0.0	0.0	790.8
29	181	109.0	103.4	92.6	77.3	56.5	37.6	16.0	.7	0.0	0.0	0.0	0.0	0.0	790.1
30	182	109.0	103.4	92.5	77.2	56.5	37.6	15.9	.6	0.0	0.0	0.0	0.0	0.0	789.4

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

JULY 1972	DAY NO	HOUR EMPIRICAL-TRUE SOLAR TIME												DAILY TOTAL
		12	13	14	15	16	17	18	19	20	21	22	23	
1	183	108.4	103.3	92.5	77.2	58.4	37.5	15.8	.6	0.0	0.0	0.0	0.0	988.6
2	184	108.9	103.3	92.4	77.1	58.4	37.4	15.7	.6	0.0	0.0	0.0	0.0	987.7
3	185	108.9	103.2	92.4	77.1	58.3	37.3	15.6	.6	0.0	0.0	0.0	0.0	986.8
4	186	108.8	103.2	92.3	77.0	58.2	37.2	15.5	.6	0.0	0.0	0.0	0.0	985.8
5	187	108.8	103.1	92.3	76.9	58.1	37.1	15.4	.5	0.0	0.0	0.0	0.0	984.7
6	188	108.7	103.1	92.2	76.9	58.0	37.0	15.3	.5	0.0	0.0	0.0	0.0	983.6
7	189	108.7	103.0	92.2	76.8	57.9	36.9	15.2	.5	0.0	0.0	0.0	0.0	982.4
8	190	108.6	103.0	92.1	76.7	57.8	36.8	15.1	.4	0.0	0.0	0.0	0.0	981.1
9	191	108.6	102.9	92.0	76.6	57.7	36.7	14.9	.4	0.0	0.0	0.0	0.0	979.7
10	192	108.5	102.9	91.9	76.5	57.6	36.6	14.8	.4	0.0	0.0	0.0	0.0	978.3
11	193	108.4	102.8	91.9	76.4	57.5	36.4	14.6	.3	0.0	0.0	0.0	0.0	976.9
12	194	108.4	102.7	91.8	76.3	57.4	36.3	14.4	.3	0.0	0.0	0.0	0.0	975.3
13	195	108.3	102.6	91.7	76.2	57.3	36.1	14.3	.3	0.0	0.0	0.0	0.0	973.7
14	196	108.2	102.6	91.6	76.1	57.2	36.0	14.1	.3	0.0	0.0	0.0	0.0	972.1
15	197	108.2	102.5	91.5	76.0	57.0	35.8	13.9	.2	0.0	0.0	0.0	0.0	970.3
16	198	108.1	102.4	91.4	75.9	56.9	35.7	13.7	.2	0.0	0.0	0.0	0.0	968.5
17	199	108.0	102.3	91.3	75.8	56.7	35.5	13.5	.2	0.0	0.0	0.0	0.0	966.7
18	200	107.9	102.2	91.2	75.7	56.6	35.3	13.3	.1	0.0	0.0	0.0	0.0	964.7
19	201	107.8	102.1	91.1	75.5	56.4	35.1	13.1	.1	0.0	0.0	0.0	0.0	962.7
20	202	107.7	102.0	91.0	75.4	56.3	34.9	12.9	.1	0.0	0.0	0.0	0.0	960.7
21	203	107.7	101.9	90.9	75.2	56.1	34.7	12.6	.1	0.0	0.0	0.0	0.0	958.5
22	204	107.6	101.8	90.8	75.1	55.9	34.5	12.4	.0	0.0	0.0	0.0	0.0	956.4
23	205	107.5	101.7	90.6	75.0	55.8	34.3	12.2	.0	0.0	0.0	0.0	0.0	954.1
24	206	107.4	101.6	90.5	74.8	55.6	34.1	11.9	.0	0.0	0.0	0.0	0.0	951.8
25	207	107.2	101.5	90.4	74.6	55.4	33.9	11.7	.0	0.0	0.0	0.0	0.0	949.4
26	208	107.1	101.4	90.2	74.5	55.2	33.7	11.4	.0	0.0	0.0	0.0	0.0	947.0
27	209	107.0	101.2	90.1	74.3	55.0	33.4	11.1	.0	0.0	0.0	0.0	0.0	944.4
28	210	106.9	101.1	89.9	74.1	54.8	33.2	10.9	0.0	0.0	0.0	0.0	0.0	941.9
29	211	106.8	101.0	89.8	74.0	54.6	33.0	10.6	0.0	0.0	0.0	0.0	0.0	939.2
30	212	106.6	100.8	89.6	73.8	54.4	32.7	10.3	0.0	0.0	0.0	0.0	0.0	936.5
31	213	106.5	100.7	89.5	73.6	54.1	32.5	10.0	0.0	0.0	0.0	0.0	0.0	933.8

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

AUG 1972	HOUR ENDING-TRUE SOLAR TIME														DAILY TOTAL	
	11 14	12 13	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24				
1	214	106.4	100.6	89.3	73.4	53.9	32.2	9.7	0.0	0.0	0.0	0.0	0.0	931.0		
2	215	106.2	100.4	89.1	73.2	53.7	31.9	9.5	0.0	0.0	0.0	0.0	0.0	928.1		
3	216	106.1	100.2	89.0	73.0	53.5	31.7	9.2	0.0	0.0	0.0	0.0	0.0	925.1		
4	217	105.9	100.1	88.8	72.8	53.2	31.4	8.9	0.0	0.0	0.0	0.0	0.0	922.1		
5	218	105.8	99.9	88.6	72.6	53.0	31.1	8.6	0.0	0.0	0.0	0.0	0.0	919.1		
6	219	105.6	99.7	88.4	72.4	52.7	30.8	8.3	0.0	0.0	0.0	0.0	0.0	916.0		
7	220	105.5	99.6	88.2	72.1	52.5	30.5	8.0	0.0	0.0	0.0	0.0	0.0	912.8		
8	221	105.3	99.4	88.0	71.9	52.2	30.2	7.8	0.0	0.0	0.0	0.0	0.0	909.5		
9	222	105.1	99.2	87.8	71.7	51.9	29.9	7.5	0.0	0.0	0.0	0.0	0.0	906.2		
10	223	104.9	99.0	87.6	71.4	51.7	29.6	7.2	0.0	0.0	0.0	0.0	0.0	902.9		
11	224	104.7	98.8	87.4	71.2	51.4	29.3	6.9	0.0	0.0	0.0	0.0	0.0	899.4		
12	225	104.6	98.6	87.2	70.9	51.1	28.9	6.6	0.0	0.0	0.0	0.0	0.0	896.0		
13	226	104.4	98.4	86.9	70.7	50.8	28.6	6.4	0.0	0.0	0.0	0.0	0.0	892.4		
14	227	104.2	98.2	86.7	70.4	50.5	28.3	6.1	0.0	0.0	0.0	0.0	0.0	888.8		
15	228	104.0	98.0	86.5	70.2	50.2	27.9	5.8	0.0	0.0	0.0	0.0	0.0	885.2		
16	229	103.7	97.8	86.2	69.9	49.9	27.6	5.6	0.0	0.0	0.0	0.0	0.0	881.5		
17	230	103.5	97.5	86.0	69.6	49.6	27.3	5.3	0.0	0.0	0.0	0.0	0.0	877.7		
18	231	103.3	97.3	85.7	69.3	49.3	26.9	5.1	0.0	0.0	0.0	0.0	0.0	873.9		
19	232	103.1	97.1	85.5	69.1	49.0	26.6	4.8	0.0	0.0	0.0	0.0	0.0	870.0		
20	233	102.8	96.8	85.2	68.8	48.6	26.2	4.6	0.0	0.0	0.0	0.0	0.0	866.1		
21	234	102.6	96.6	84.9	68.5	48.3	25.8	4.3	0.0	0.0	0.0	0.0	0.0	862.1		
22	235	102.4	96.3	84.7	68.2	48.0	25.5	4.1	0.0	0.0	0.0	0.0	0.0	858.0		
23	236	102.1	96.1	84.4	67.9	47.6	25.1	3.8	0.0	0.0	0.0	0.0	0.0	853.9		
24	237	101.9	95.8	84.1	67.6	47.3	24.7	3.6	0.0	0.0	0.0	0.0	0.0	849.8		
25	238	101.6	95.5	83.8	67.2	46.9	24.3	3.4	0.0	0.0	0.0	0.0	0.0	845.6		
26	239	101.3	95.2	83.5	66.9	46.6	23.9	3.2	0.0	0.0	0.0	0.0	0.0	841.4		
27	240	101.0	95.0	83.2	66.6	46.2	23.5	2.9	0.0	0.0	0.0	0.0	0.0	837.1		
28	241	100.8	94.7	82.9	66.3	45.9	23.1	2.7	0.0	0.0	0.0	0.0	0.0	832.7		
29	242	100.5	94.4	82.6	66.0	45.5	22.7	2.5	0.0	0.0	0.0	0.0	0.0	828.3		
30	243	100.2	94.1	82.3	65.6	45.1	22.3	2.3	0.0	0.0	0.0	0.0	0.0	823.9		
31	244	99.9	93.8	82.0	65.2	44.6	21.9	2.1	0.0	0.0	0.0	0.0	0.0	819.4		

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

SPWT 1972	DAY	HOUR ENDING-TIME SOLAR TIME												DAILY TOTAL			
		10	11	12	13	14	15	16	17	18	19	20	21		22	23	24
1	245	59.6	93.5	81.6	64.9	44.4	21.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	814.9
2	246	95.3	93.1	81.3	64.5	44.0	21.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	810.3
3	247	99.0	92.8	81.0	64.2	43.6	20.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	805.6
4	248	98.6	92.5	80.6	63.8	43.2	20.3	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	801.0
5	249	98.3	92.2	80.3	63.4	42.8	19.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	796.3
6	250	98.0	91.8	79.9	63.1	42.4	19.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	791.5
7	251	97.6	91.5	79.5	62.7	42.0	19.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.7
8	252	97.3	91.1	79.2	62.3	41.6	18.5	.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	781.9
9	253	97.0	90.8	78.8	61.9	41.2	18.1	.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	777.0
10	254	96.6	90.4	78.4	61.5	40.8	17.7	.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	772.1
11	255	96.2	90.0	78.1	61.1	40.4	17.2	.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	767.1
12	256	95.9	89.7	77.7	60.7	39.9	16.8	.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	762.1
13	257	95.5	89.3	77.3	60.3	39.5	16.3	.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	757.1
14	258	95.1	88.9	76.9	59.9	39.1	15.9	.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	752.0
15	259	94.7	88.5	76.5	59.5	38.6	15.4	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	746.9
16	260	94.3	88.1	76.1	59.1	38.2	14.9	.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	741.8
17	261	93.9	87.7	75.7	58.6	37.8	14.5	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	736.7
18	262	93.5	87.3	75.3	58.2	37.3	14.0	.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	731.5
19	263	93.1	86.9	74.8	57.8	36.9	13.6	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	726.3
20	264	92.7	86.5	74.4	57.3	36.4	13.1	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	721.0
21	265	92.3	86.1	74.0	56.9	36.0	12.6	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	715.8
22	266	91.9	85.6	73.6	56.5	35.5	12.2	.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	710.5
23	267	91.5	85.2	73.1	56.0	35.1	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	705.2
24	268	91.0	84.8	72.7	55.6	34.6	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	699.8
25	269	90.6	84.3	72.2	55.1	34.1	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	694.5
26	270	90.2	83.9	71.8	54.7	33.7	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	689.1
27	271	89.7	83.5	71.3	54.2	33.2	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	683.7
28	272	89.3	83.0	70.9	53.7	32.8	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	678.3
29	273	88.8	82.6	70.4	53.3	32.3	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	672.9
30	274	88.4	82.1	70.0	52.8	31.8	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	667.5

SOLAR ENERGY IN LAMBLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

OCT 1972	DAY NO	HOUR ENDING-TRUE SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	275	87.9	81.6	65.5	52.4	31.3	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	662.1
2	276	87.4	81.2	64.0	51.9	30.9	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	656.6
3	277	87.0	80.7	64.6	51.4	30.4	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	651.2
4	278	86.5	80.2	62.1	50.9	29.9	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	645.7
5	279	86.0	79.8	67.6	50.5	27.5	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	640.3
6	280	85.6	79.3	67.2	50.0	29.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	634.8
7	281	85.1	78.8	66.7	49.5	28.5	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	629.4
8	282	84.6	78.3	66.2	49.0	28.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	623.9
9	283	84.1	77.8	65.7	48.5	27.5	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	618.5
10	284	83.6	77.4	65.2	48.1	27.1	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	613.0
11	285	83.1	76.9	64.7	47.6	26.6	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	607.6
12	286	82.7	76.4	64.3	47.1	26.1	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	602.2
13	287	82.2	75.9	63.8	46.6	25.7	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	596.8
14	288	81.7	75.4	63.3	46.2	25.2	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	591.4
15	289	81.2	74.9	62.8	45.7	24.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	586.0
16	290	80.7	74.4	62.3	45.2	24.2	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	580.6
17	291	80.2	73.9	61.8	44.7	23.8	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	575.3
18	292	79.7	73.4	61.3	44.2	23.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	570.0
19	293	79.2	72.9	60.9	43.8	22.8	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	564.7
20	294	78.7	72.4	60.4	43.3	22.4	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	559.4
21	295	78.2	71.9	59.9	42.8	21.9	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	554.2
22	296	77.7	71.5	59.4	42.3	21.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	549.0
23	297	77.2	71.0	58.9	41.9	21.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	543.8
24	298	76.7	70.5	58.4	41.4	20.5	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	538.6
25	299	76.2	70.0	57.9	40.9	20.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	533.5
26	300	75.7	69.5	57.5	40.5	19.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	528.3
27	301	75.2	69.0	57.0	40.0	19.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	523.4
28	302	74.7	68.5	56.5	39.5	18.7	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	518.4
29	303	74.2	68.0	56.0	39.1	18.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	513.5
30	304	73.8	67.6	55.6	38.6	17.9	.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	508.6
31	305	73.3	67.1	55.1	38.2	17.4	.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	503.8

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE LAT 36 57 LONG 96 33

HOOR ENDING-TRUE SOLAR TIME

MOY	DAY	12	11	10	9	8	7	6	5	4	3	2	1	DAILY
1972	NO	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1	306	72.8	66.6	59.8	37.7	17.0	.7	0.0	0.0	0.0	0.0	0.0	0.0	499.0
2	307	72.3	66.1	59.2	37.3	16.6	.6	0.0	0.0	0.0	0.0	0.0	0.0	494.3
3	308	71.8	65.7	58.7	36.8	16.2	.5	0.0	0.0	0.0	0.0	0.0	0.0	489.6
4	309	71.4	65.2	58.3	36.4	15.8	.4	0.0	0.0	0.0	0.0	0.0	0.0	484.9
5	310	70.9	64.7	57.8	36.0	15.3	.4	0.0	0.0	0.0	0.0	0.0	0.0	480.4
6	311	70.5	64.3	57.4	35.6	14.9	.3	0.0	0.0	0.0	0.0	0.0	0.0	475.9
7	312	70.0	63.8	57.0	35.1	14.5	.2	0.0	0.0	0.0	0.0	0.0	0.0	471.5
8	313	69.6	63.4	56.5	34.7	14.2	.2	0.0	0.0	0.0	0.0	0.0	0.0	467.1
9	314	69.1	63.0	56.1	34.3	13.8	.1	0.0	0.0	0.0	0.0	0.0	0.0	462.8
10	315	68.7	62.5	55.7	33.9	13.4	.1	0.0	0.0	0.0	0.0	0.0	0.0	458.6
11	316	68.2	62.1	55.3	33.5	13.0	.1	0.0	0.0	0.0	0.0	0.0	0.0	454.4
12	317	67.8	61.7	54.9	33.1	12.6	.0	0.0	0.0	0.0	0.0	0.0	0.0	450.3
13	318	67.4	61.3	54.5	32.7	12.3	.0	0.0	0.0	0.0	0.0	0.0	0.0	446.3
14	319	67.0	60.9	54.1	32.4	11.9	.0	0.0	0.0	0.0	0.0	0.0	0.0	442.4
15	320	66.6	60.5	53.7	32.0	11.6	.0	0.0	0.0	0.0	0.0	0.0	0.0	438.5
16	321	66.2	60.1	53.3	31.6	11.2	.0	0.0	0.0	0.0	0.0	0.0	0.0	434.8
17	322	65.8	59.7	52.9	31.3	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	431.1
18	323	65.4	59.3	52.5	30.9	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	427.5
19	324	65.0	58.9	52.2	30.6	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	424.0
20	325	64.6	58.6	51.8	30.3	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	420.6
21	326	64.3	58.2	51.5	29.9	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.2
22	327	63.9	57.9	51.2	29.6	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	414.0
23	328	63.6	57.5	50.8	29.3	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	410.9
24	329	63.3	57.2	50.5	29.0	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	407.8
25	330	62.9	56.9	50.2	28.7	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	404.9
26	331	62.6	56.6	49.9	28.4	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	402.0
27	332	62.3	56.3	49.7	28.2	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	399.3
28	333	62.0	56.0	49.4	27.9	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	396.7
29	334	61.8	55.7	49.1	27.7	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	394.1
30	335	61.5	55.5	48.9	27.4	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	391.7

SOLAR ENERGY IN LANGLEYS OUTSIDE ATMOSPHERE AT USAGE

LAT 36 57 LONG 96 33

DEC 1972	DAY NO	MOON ECLIPING-TIME SOLAR TIME												DAILY TOTAL		
		12 13	11 14	10 15	9 16	8 17	7 18	6 19	5 20	4 21	3 22	2 23	1 24			
1	336	61.2	55.2	43.0	27.2	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	389.4
2	337	61.0	55.0	43.4	27.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	387.1
3	338	60.8	54.8	43.2	26.8	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	385.6
4	339	60.5	54.5	42.9	26.6	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	383.0
5	340	60.3	54.3	42.6	26.4	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	381.1
6	341	60.1	54.1	42.6	26.2	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	379.3
7	342	60.0	54.0	42.4	26.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	377.7
8	343	59.8	53.8	42.2	25.9	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	376.1
9	344	59.6	53.6	42.1	25.7	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	374.7
10	345	59.5	53.5	41.9	25.6	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	373.4
11	346	59.3	53.4	41.8	25.5	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	372.2
12	347	59.2	53.2	41.7	25.4	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	371.1
13	348	59.1	53.1	41.6	25.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.1
14	349	59.0	53.0	41.5	25.2	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	369.3
15	350	58.9	53.0	41.4	25.1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.5
16	351	58.9	52.9	41.4	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.9
17	352	58.8	52.8	41.3	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.4
18	353	58.8	52.8	41.3	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.0
19	354	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.8
20	355	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.6
21	356	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.6
22	357	58.7	52.8	41.2	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	366.7
23	358	58.8	52.8	41.3	24.9	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.0
24	359	58.8	52.8	41.3	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.3
25	360	58.9	52.9	41.3	25.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	367.8
26	361	58.9	53.0	41.4	25.1	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	368.4
27	362	59.0	53.0	41.5	25.1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	369.1
28	363	59.1	53.1	41.6	25.2	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	369.9
29	364	59.2	53.2	41.7	25.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.9
30	365	59.4	53.4	41.8	25.4	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	371.9
31	366	59.5	53.5	41.9	25.5	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	373.1

USAREC 1972

DAY LENGTH
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	9.40	10.21	11.24	12.37	13.44	14.32	14.39	14.01	12.57	11.48	10.38	9.49
2	9.41	10.23	11.26	12.40	13.48	14.35	14.39	13.59	12.55	11.45	10.36	9.47
3	9.42	10.25	11.29	12.42	13.48	14.36	14.38	13.58	12.53	11.43	10.34	9.46
4	9.42	10.27	11.31	12.44	13.50	14.35	14.37	13.56	12.51	11.41	10.32	9.46
5	9.43	10.29	11.33	12.47	13.52	14.36	14.38	13.54	12.48	11.38	10.30	9.45
6	9.44	10.31	11.36	12.49	13.53	14.36	14.38	13.52	12.46	11.36	10.28	9.44
7	9.45	10.33	11.36	12.51	13.55	14.37	14.35	13.50	12.44	11.34	10.26	9.43
8	9.46	10.35	11.40	12.54	13.57	14.38	14.34	13.48	12.41	11.31	10.24	9.42
9	9.47	10.37	11.43	12.56	13.59	14.38	14.33	13.46	12.39	11.29	10.22	9.41
10	9.48	10.39	11.45	12.58	14.01	14.39	14.32	13.44	12.37	11.27	10.20	9.41
11	9.49	10.41	11.48	13.00	14.03	14.40	14.31	13.42	12.34	11.24	10.19	9.40
12	9.50	10.44	11.50	13.03	14.04	14.40	14.30	13.40	12.32	11.22	10.17	9.40
13	9.51	10.46	11.52	13.05	14.06	14.40	14.29	13.38	12.30	11.20	10.15	9.39
14	9.52	10.48	11.55	13.07	14.08	14.41	14.28	13.36	12.27	11.18	10.13	9.39
15	9.54	10.50	11.57	13.10	14.09	14.41	14.27	13.34	12.25	11.15	10.11	9.38
16	9.55	10.52	11.59	13.12	14.11	14.41	14.26	13.32	12.23	11.13	10.10	9.38
17	9.56	10.54	12.02	13.14	14.13	14.42	14.24	13.30	12.20	11.11	10.08	9.38
18	9.58	10.57	12.04	13.16	14.14	14.42	14.23	13.28	12.18	11.08	10.06	9.38
19	9.59	10.59	12.07	13.18	14.16	14.42	14.22	13.26	12.16	11.06	10.05	9.37
20	10.01	11.01	12.09	13.21	14.17	14.42	14.20	13.24	12.13	11.04	10.03	9.37
21	10.02	11.03	12.11	13.23	14.19	14.42	14.19	13.22	12.11	11.02	10.02	9.37
22	10.04	11.06	12.14	13.25	14.20	14.42	14.17	13.19	12.09	11.00	10.00	9.37
23	10.05	11.08	12.16	13.27	14.21	14.42	14.16	13.17	12.06	10.57	9.59	9.37
24	10.07	11.10	12.18	13.29	14.23	14.42	14.14	13.15	12.04	10.55	9.57	9.38
25	10.09	11.12	12.21	13.31	14.24	14.41	14.13	13.13	12.02	10.53	9.56	9.38
26	10.10	11.15	12.23	13.33	14.25	14.41	14.11	13.11	11.59	10.51	9.55	9.38
27	10.12	11.17	12.26	13.36	14.27	14.41	14.10	13.09	11.57	10.49	9.53	9.38
28	10.14	11.19	12.28	13.38	14.28	14.40	14.08	13.06	11.55	10.47	9.52	9.39
29	10.16	11.22	12.30	13.40	14.29	14.40	14.06	13.04	11.52	10.44	9.51	9.39
30	10.18		12.33	13.42	14.30	14.40	14.05	13.02	11.50	10.42	9.50	9.40
31	10.19		12.35		14.31		14.03	13.00		10.40		9.40

USAGT . . . 1972

TIME OF SUNRISE, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	7.39	7.29	6.57	6.11	5.31	5.08	5.11	5.32	5.57	6.22	6.51	7.21
2	7.40	7.28	6.55	6.10	5.30	5.08	5.11	5.33	5.58	6.23	6.52	7.22
3	7.40	7.27	6.54	6.08	5.29	5.07	5.11	5.33	5.59	6.24	6.53	7.23
4	7.40	7.27	6.52	6.07	5.28	5.07	5.12	5.34	6.00	6.24	6.54	7.24
5	7.40	7.26	6.51	6.05	5.27	5.07	5.13	5.35	6.01	6.25	6.55	7.25
6	7.40	7.25	6.50	6.04	5.26	5.07	5.13	5.36	6.01	6.26	6.56	7.26
7	7.40	7.24	6.48	6.03	5.25	5.06	5.14	5.37	6.02	6.27	6.57	7.26
8	7.40	7.23	6.47	6.01	5.24	5.06	5.14	5.38	6.03	6.28	6.58	7.27
9	7.40	7.22	6.45	6.00	5.23	5.06	5.15	5.38	6.04	6.29	6.59	7.28
10	7.40	7.21	6.44	5.58	5.22	5.06	5.15	5.39	6.05	6.30	7.00	7.29
11	7.40	7.20	6.42	5.57	5.21	5.06	5.16	5.40	6.05	6.31	7.01	7.30
12	7.39	7.19	6.41	5.56	5.20	5.06	5.17	5.41	6.06	6.32	7.02	7.30
13	7.39	7.18	6.39	5.54	5.19	5.06	5.17	5.42	6.07	6.32	7.03	7.31
14	7.39	7.17	6.36	5.53	5.19	5.06	5.18	5.43	6.08	6.33	7.04	7.32
15	7.39	7.15	6.37	5.51	5.18	5.06	5.19	5.43	6.09	6.34	7.05	7.32
16	7.38	7.14	6.35	5.50	5.17	5.06	5.19	5.44	6.09	6.35	7.06	7.33
17	7.38	7.13	6.34	5.49	5.16	5.06	5.20	5.45	6.10	6.36	7.07	7.34
18	7.38	7.12	6.32	5.47	5.15	5.06	5.21	5.46	6.11	6.37	7.08	7.34
19	7.37	7.11	6.31	5.46	5.15	5.07	5.22	5.47	6.12	6.38	7.09	7.35
20	7.37	7.10	6.29	5.45	5.14	5.07	5.22	5.48	6.13	6.39	7.10	7.35
21	7.36	7.08	6.26	5.43	5.13	5.07	5.23	5.48	6.14	6.40	7.11	7.36
22	7.36	7.07	6.26	5.42	5.13	5.07	5.24	5.49	6.14	6.41	7.12	7.36
23	7.35	7.06	6.25	5.41	5.12	5.08	5.25	5.50	6.15	6.42	7.13	7.37
24	7.35	7.04	6.23	5.40	5.12	5.08	5.25	5.51	6.16	6.43	7.14	7.37
25	7.34	7.03	6.22	5.38	5.11	5.08	5.26	5.52	6.17	6.44	7.15	7.38
26	7.34	7.02	6.20	5.37	5.11	5.08	5.27	5.52	6.18	6.45	7.16	7.38
27	7.33	7.01	6.19	5.36	5.10	5.09	5.28	5.53	6.19	6.46	7.17	7.38
28	7.32	6.59	6.17	5.35	5.10	5.09	5.29	5.54	6.19	6.47	7.18	7.39
29	7.31	6.58	6.16	5.34	5.09	5.10	5.29	5.55	6.20	6.48	7.19	7.39
30	7.31		6.14	5.33	5.09	5.10	5.30	5.56	6.21	6.49	7.20	7.39
31	7.30		6.13		5.08		5.31	5.57		6.50		7.39

USAGE

1972

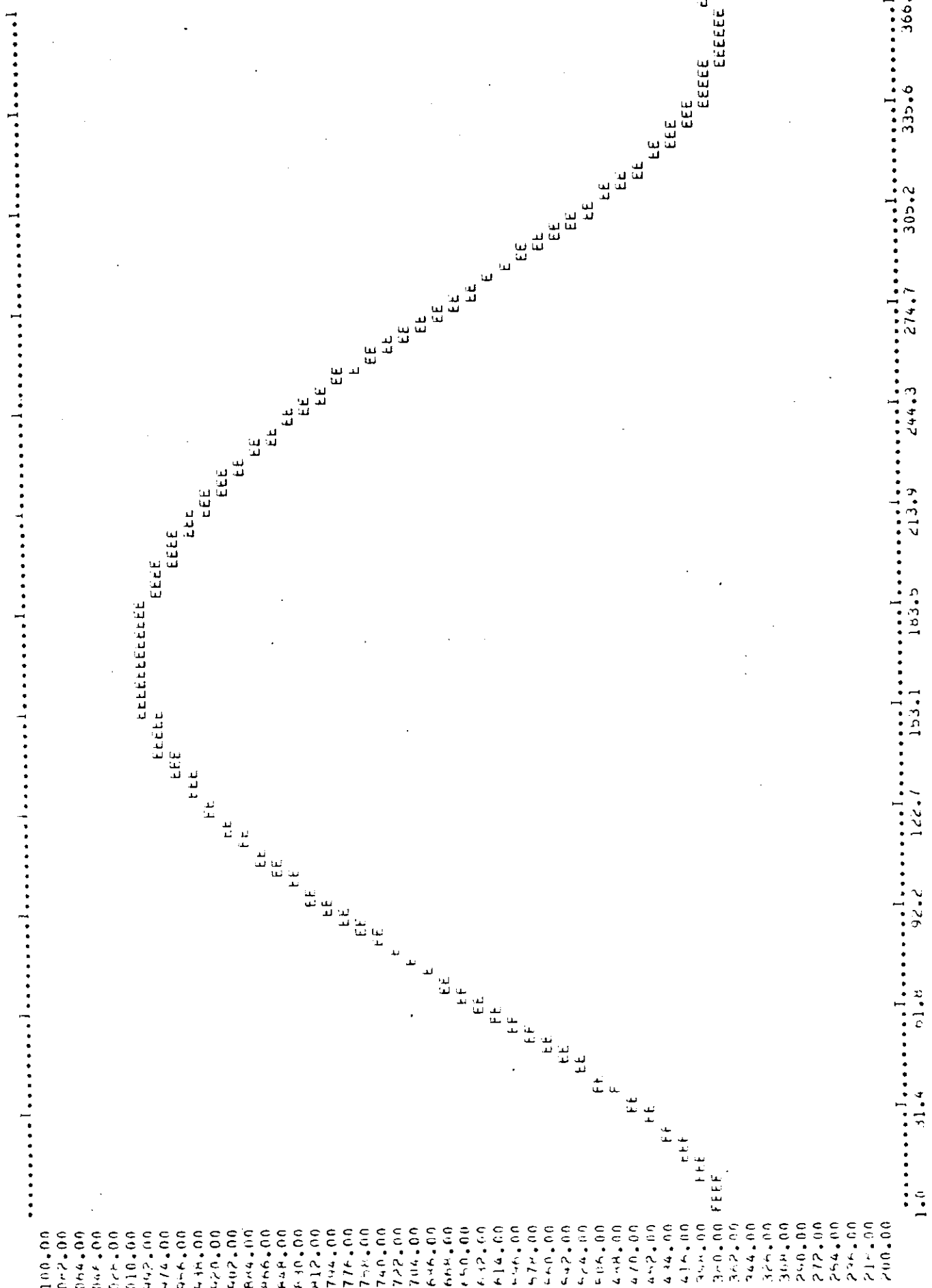
TIME OF SUNSET, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	17.20	17.50	18.21	18.49	19.15	19.40	19.50	19.33	18.55	18.10	17.29	17.10
2	17.21	17.52	18.21	18.49	19.16	19.41	19.49	19.32	18.53	18.08	17.28	17.10
3	17.21	17.53	18.22	18.50	19.17	19.41	19.49	19.31	18.52	18.07	17.27	17.09
4	17.22	17.54	18.23	18.51	19.18	19.42	19.49	19.30	18.50	18.05	17.26	17.09
5	17.23	17.55	18.24	18.52	19.19	19.43	19.49	19.29	18.49	18.04	17.25	17.09
6	17.24	17.56	18.25	18.53	19.19	19.43	19.49	19.28	18.47	18.02	17.24	17.09
7	17.25	17.57	18.26	18.54	19.20	19.44	19.49	19.27	18.46	18.01	17.23	17.09
8	17.26	17.58	18.27	18.55	19.21	19.44	19.48	19.26	18.44	17.59	17.22	17.09
9	17.27	17.59	18.28	18.56	19.22	19.45	19.48	19.25	18.43	17.58	17.21	17.10
10	17.28	18.00	18.29	18.56	19.23	19.45	19.48	19.24	18.41	17.56	17.20	17.10
11	17.28	18.01	18.30	18.57	19.24	19.46	19.47	19.22	18.40	17.55	17.20	17.10
12	17.29	18.02	18.31	18.58	19.25	19.46	19.47	19.21	18.38	17.54	17.19	17.10
13	17.30	18.03	18.32	18.59	19.25	19.46	19.46	19.20	18.37	17.52	17.18	17.10
14	17.31	18.04	18.33	19.00	19.26	19.47	19.46	19.19	18.35	17.51	17.17	17.10
15	17.32	18.05	18.34	19.01	19.27	19.47	19.46	19.18	18.34	17.50	17.17	17.11
16	17.33	18.06	18.34	19.02	19.28	19.48	19.45	19.16	18.32	17.48	17.16	17.11
17	17.34	18.07	18.35	19.03	19.29	19.48	19.44	19.15	18.31	17.47	17.15	17.11
18	17.35	18.08	18.36	19.04	19.30	19.48	19.44	19.14	18.29	17.46	17.15	17.12
19	17.36	18.10	18.37	19.04	19.30	19.48	19.43	19.13	18.28	17.44	17.14	17.12
20	17.36	18.11	18.38	19.05	19.31	19.49	19.43	19.11	18.26	17.43	17.14	17.13
21	17.39	18.12	18.39	19.06	19.32	19.49	19.42	19.10	18.25	17.42	17.13	17.13
22	17.40	18.13	18.40	19.07	19.33	19.49	19.41	19.09	18.23	17.40	17.13	17.14
23	17.41	18.14	18.41	19.08	19.34	19.49	19.41	19.07	18.22	17.39	17.12	17.14
24	17.42	18.15	18.42	19.09	19.34	19.49	19.40	19.06	18.20	17.38	17.12	17.15
25	17.43	18.16	18.42	19.10	19.35	19.50	19.39	19.05	18.19	17.37	17.11	17.15
26	17.44	18.17	18.43	19.11	19.36	19.50	19.38	19.03	18.17	17.36	17.11	17.16
27	17.45	18.18	18.44	19.12	19.37	19.50	19.36	19.02	18.16	17.34	17.11	17.17
28	17.46	18.19	18.45	19.12	19.37	19.50	19.37	19.00	18.14	17.33	17.10	17.17
29	17.47	18.20	18.46	19.13	19.38	19.50	19.36	18.59	18.13	17.32	17.10	17.18
30	17.48		18.47	19.14	19.39	19.50	19.35	18.58	18.11	17.31	17.10	17.19
31	17.49		18.48		19.39		19.34	18.56		17.30		17.20

OSAGE 1972

TIME OF SOLAR NOON, LOCAL STD TIME
IN HOURS AND MINUTES

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1	12.30	12.40	12.39	12.30	12.23	12.24	12.30	12.32	12.26	12.16	12.10	12.15
2	12.30	12.40	12.36	12.30	12.23	12.24	12.30	12.32	12.26	12.15	12.10	12.16
3	12.31	12.40	12.35	12.29	12.23	12.24	12.30	12.32	12.25	12.15	12.10	12.16
4	12.31	12.40	12.35	12.29	12.23	12.25	12.31	12.32	12.25	12.15	12.10	12.17
5	12.31	12.40	12.35	12.29	12.23	12.25	12.31	12.32	12.25	12.14	12.10	12.17
6	12.32	12.40	12.37	12.29	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.17
7	12.32	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.18
8	12.33	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.24	12.14	12.10	12.18
9	12.33	12.40	12.37	12.28	12.23	12.25	12.31	12.32	12.23	12.13	12.10	12.19
10	12.34	12.40	12.36	12.27	12.23	12.26	12.32	12.31	12.23	12.13	12.10	12.19
11	12.34	12.41	12.36	12.27	12.23	12.26	12.32	12.31	12.23	12.13	12.10	12.20
12	12.34	12.41	12.36	12.27	12.22	12.26	12.32	12.31	12.22	12.13	12.10	12.20
13	12.35	12.40	12.36	12.27	12.22	12.26	12.32	12.31	12.22	12.12	12.11	12.21
14	12.35	12.40	12.35	12.26	12.22	12.26	12.32	12.31	12.22	12.12	12.11	12.21
15	12.36	12.40	12.35	12.26	12.22	12.27	12.32	12.31	12.21	12.12	12.11	12.22
16	12.36	12.40	12.35	12.26	12.23	12.27	12.32	12.30	12.21	12.12	12.11	12.22
17	12.36	12.40	12.34	12.26	12.23	12.27	12.32	12.30	12.21	12.11	12.11	12.23
18	12.37	12.40	12.34	12.25	12.23	12.27	12.32	12.30	12.20	12.11	12.12	12.23
19	12.37	12.40	12.34	12.25	12.23	12.28	12.32	12.30	12.20	12.11	12.12	12.24
20	12.37	12.40	12.34	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.12	12.24
21	12.37	12.40	12.33	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.12	12.25
22	12.38	12.40	12.33	12.25	12.23	12.28	12.33	12.29	12.19	12.11	12.12	12.25
23	12.38	12.40	12.33	12.24	12.23	12.28	12.33	12.29	12.18	12.10	12.13	12.26
24	12.38	12.40	12.32	12.24	12.23	12.29	12.33	12.28	12.18	12.10	12.13	12.26
25	12.38	12.39	12.32	12.24	12.23	12.29	12.33	12.28	12.18	12.10	12.13	12.27
26	12.39	12.39	12.32	12.24	12.23	12.29	12.33	12.28	12.17	12.10	12.14	12.27
27	12.39	12.39	12.31	12.24	12.23	12.29	12.33	12.28	12.17	12.10	12.14	12.28
28	12.39	12.39	12.31	12.24	12.23	12.29	12.33	12.27	12.17	12.10	12.14	12.28
29	12.39	12.39	12.31	12.23	12.24	12.30	12.33	12.27	12.16	12.10	12.15	12.29
30	12.39	12.39	12.31	12.23	12.24	12.30	12.33	12.27	12.16	12.10	12.15	12.29
31	12.40		12.30		12.24		12.32	12.26		12.10		12.29



DAILY EXTRATERRESTRIAL RADIATION VS. JULIAN DAY