

REPORT OF SKY WAVE TIME DELAY

LORAN RATE 2S6

UNITED STATES COAST GUARD LORAN STATION

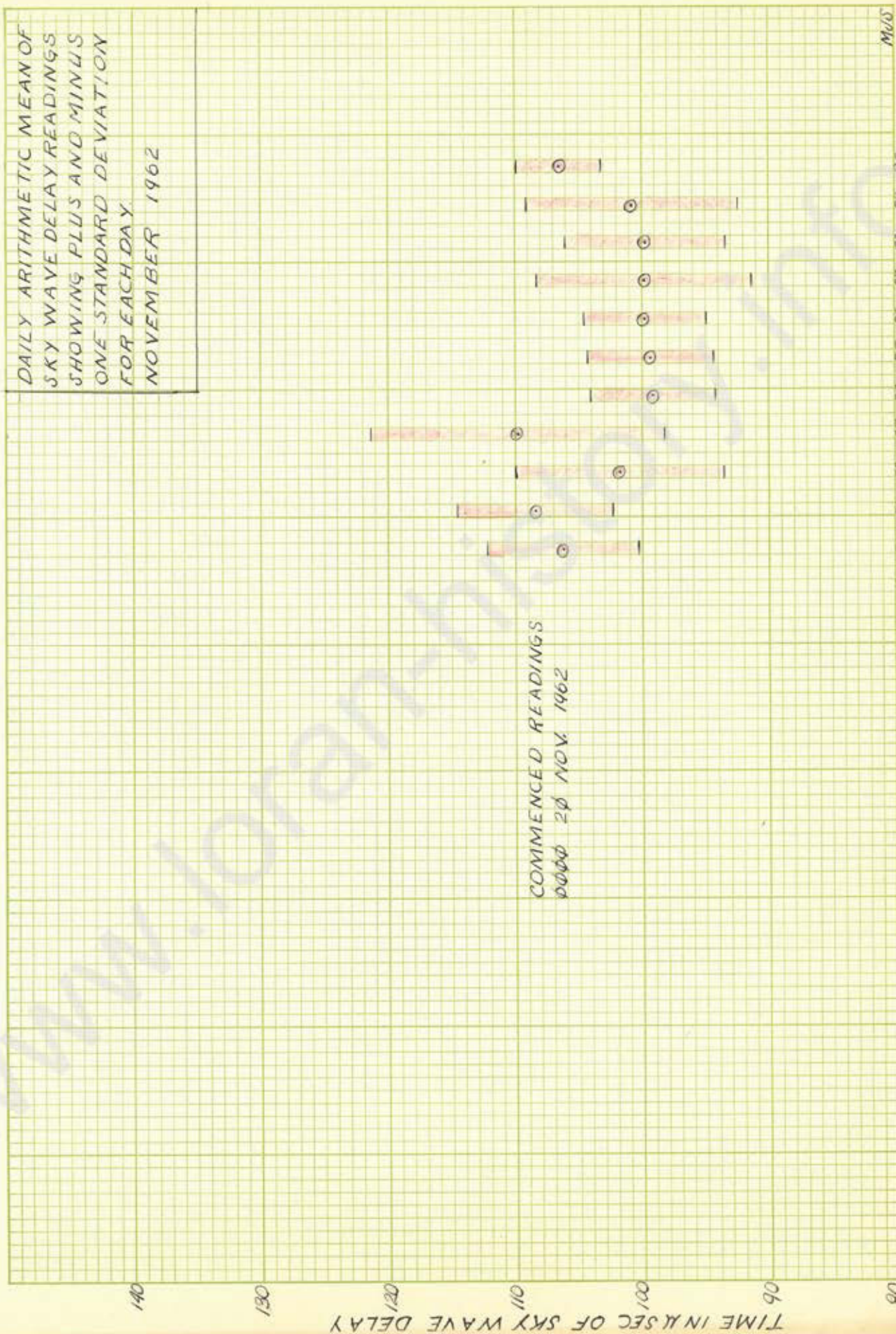
CAPE CHRISTIAN, BAFFIN ISLAND N.W.T.

GRAPHS

1. The enclosed graphs are samplings of dates taken at random and also show daily variations for the monthly periods of sky-wave delay.
2. The areas shaded in red on graphs one through six represent plus and minus one standard deviation, indicating that approximately 62% of the daily readings fell within the limits indicated.
3. The graphs vividly illustrate the radical changes and the unreliability of attempting sky-wave synchronization and also the rapidity of sky-wave delay change.
4. The monthly graphs are taken from the corresponding monthly tabulated data sheets.
5. It may appear that on certain days the standard deviation was quite small, but the factors to be taken into account are quite apparent on the tabulated results sheet. The greatest factor, which represents a truer picture, is the number of observations possible on any given date.
6. The relationship between the numbers of observations made and the possible number of observations available for a complete days represents a factor of correlation relating to the standard deviation.

DAILY ARITHMETIC MEAN OF
SKY WAVE DELAY READINGS
SHOWING PLUS AND MINUS
ONE STANDARD DEVIATION
FOR EACH DAY
NOVEMBER 1962

COMMENCED READINGS
00000 20 NOV 1962



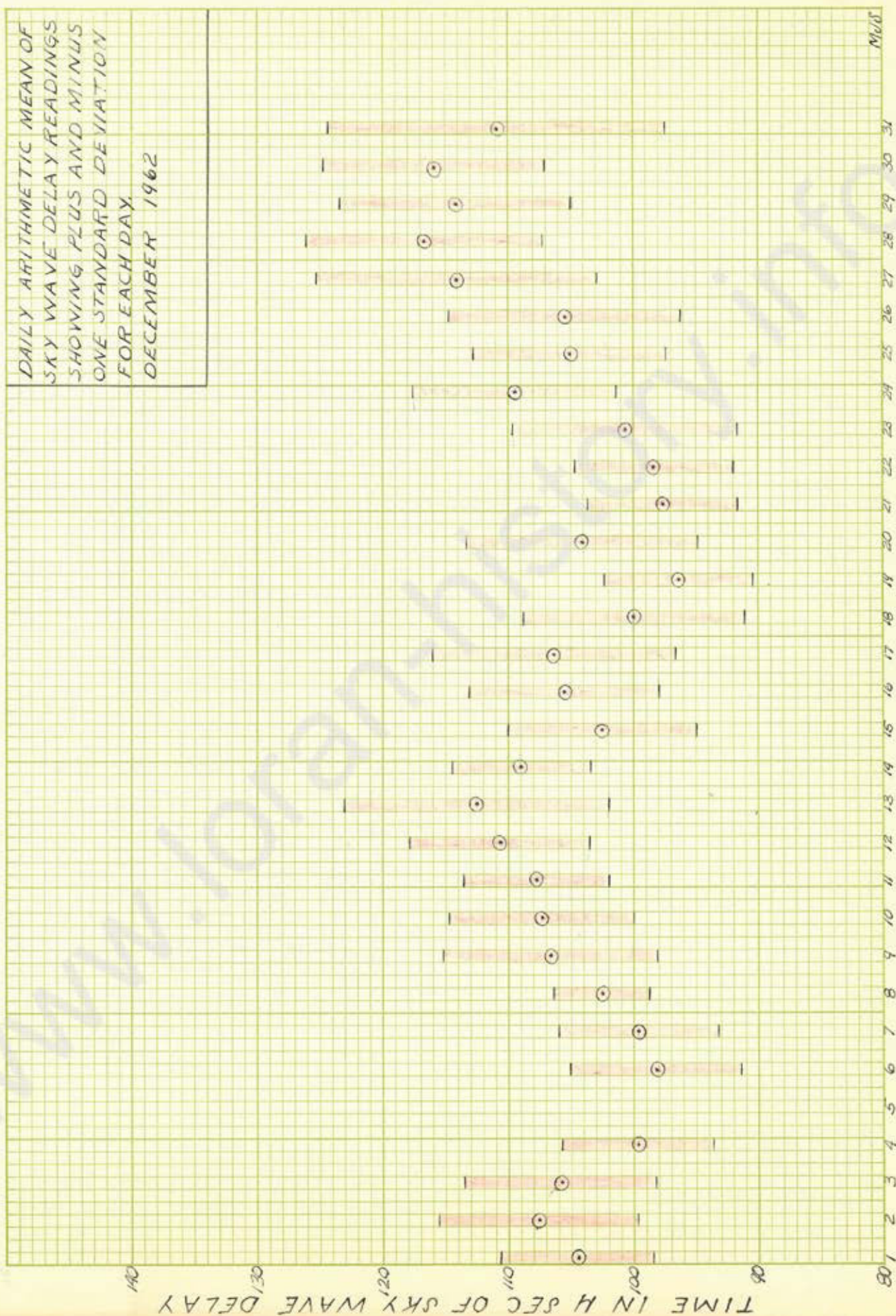
DATE IN DAYS FOR MONTH OF NOV 1962

MUS

GRAPH II

K&E 10 X 10 TO THE INCH 358-S
 KUPPEL & EBBEL CO. MADE IN U.S.A.

DAILY ARITHMETIC MEAN OF
 SKY WAVE DELAY READINGS
 SHOWING PLUS AND MINUS
 ONE STANDARD DEVIATION
 FOR EACH DAY.
 DECEMBER 1962

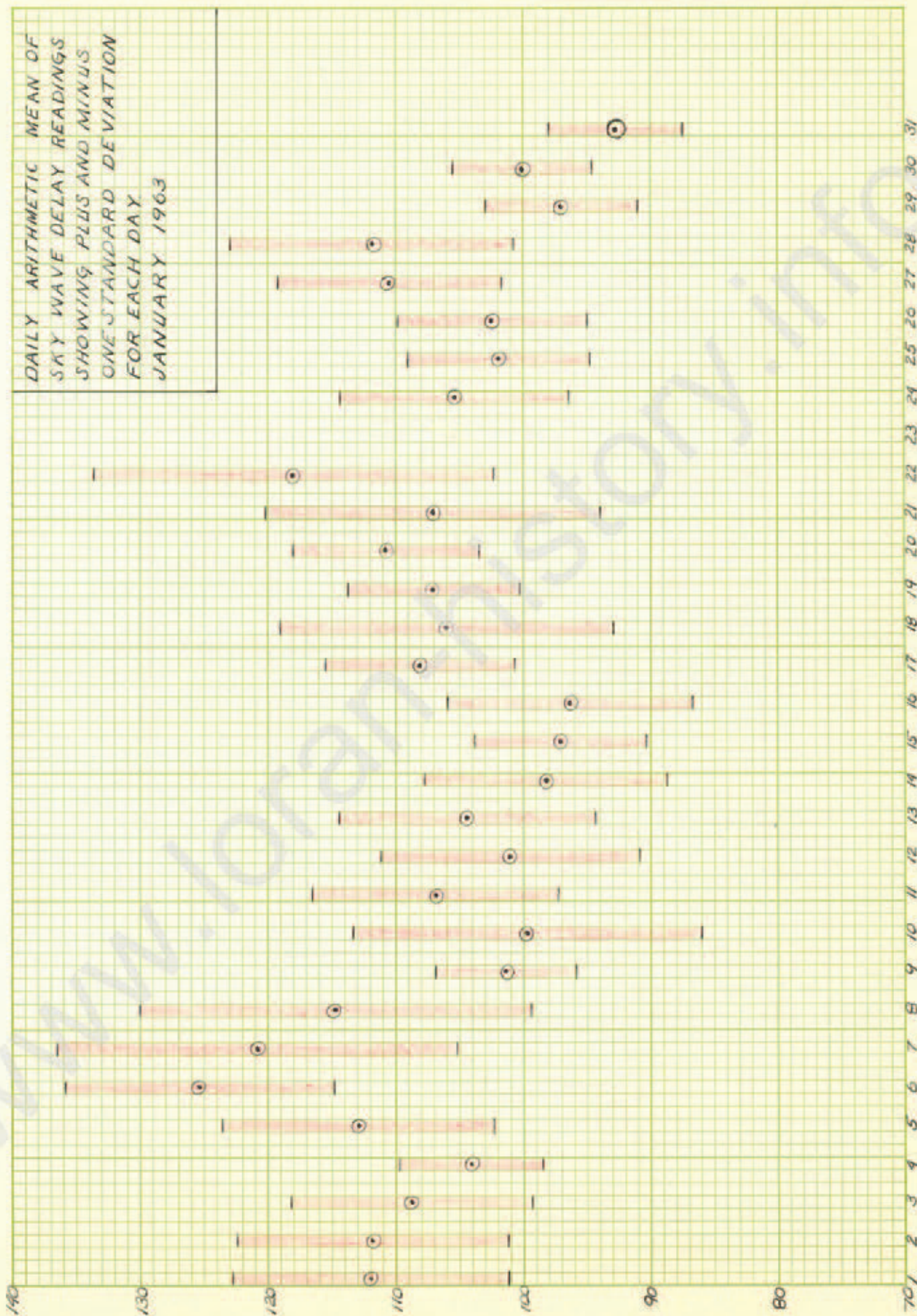


DATE IN DAYS FOR MONTH OF DEC 1962

Mid

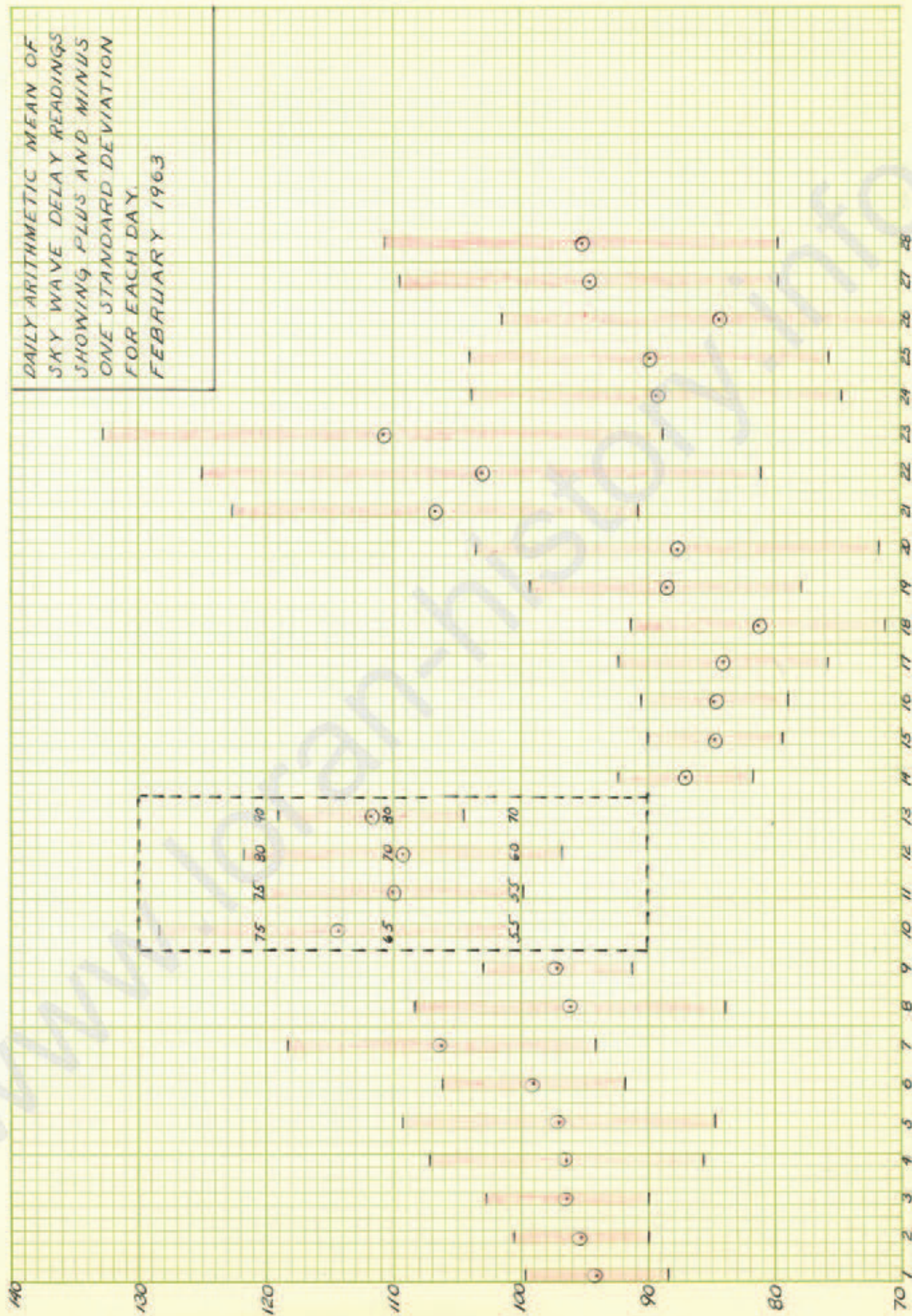
GRAPH III

DAILY ARITHMETIC MEAN OF
SKY WAVE DELAY READINGS
SHOWING PLUS AND MINUS
ONE STANDARD DEVIATION
FOR EACH DAY
JANUARY 1963



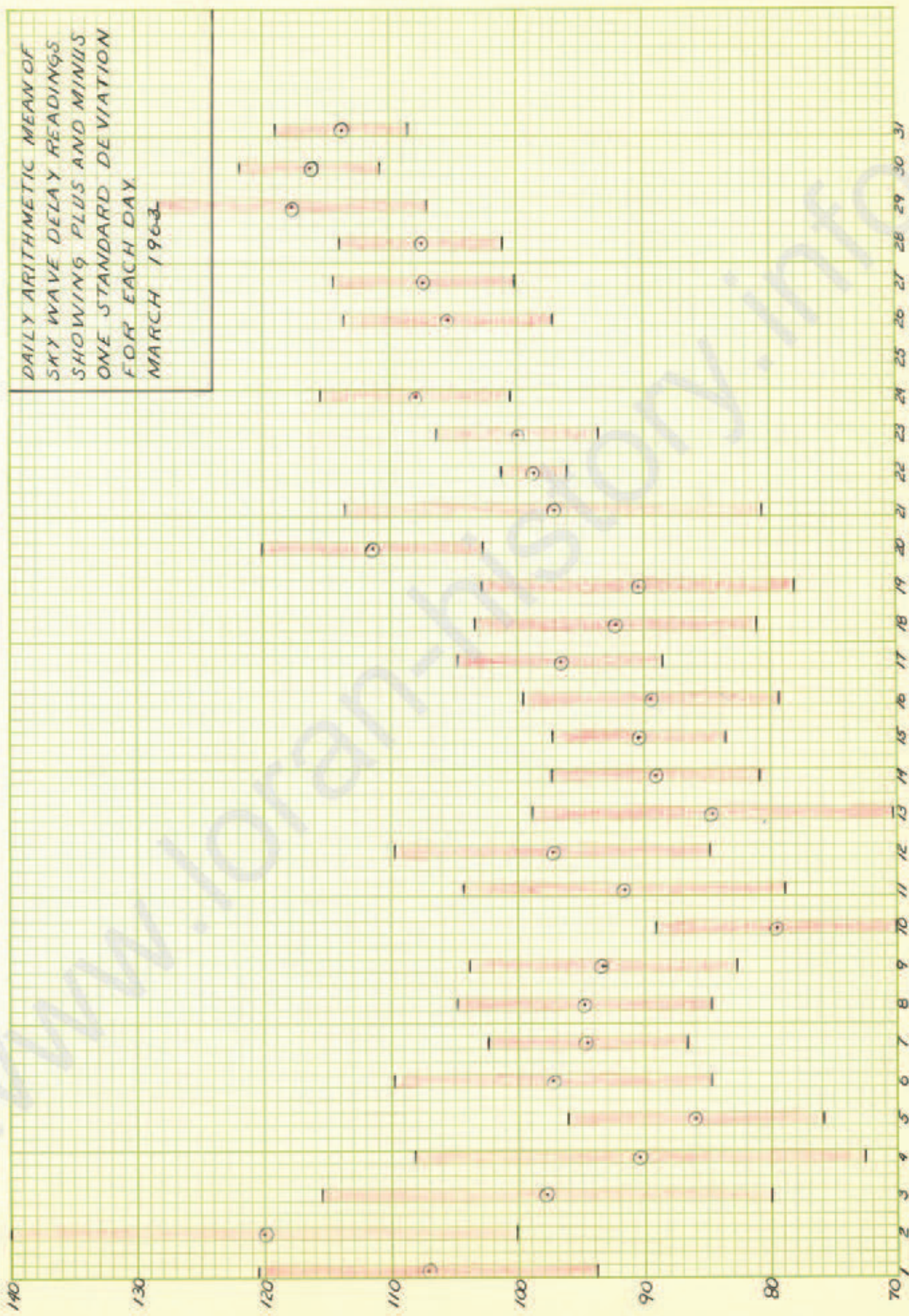
GRAPH IV

DAILY ARITHMETIC MEAN OF
 SKY WAVE DELAY READINGS
 SHOWING PLUS AND MINUS
 ONE STANDARD DEVIATION
 FOR EACH DAY.
 FEBRUARY 1963



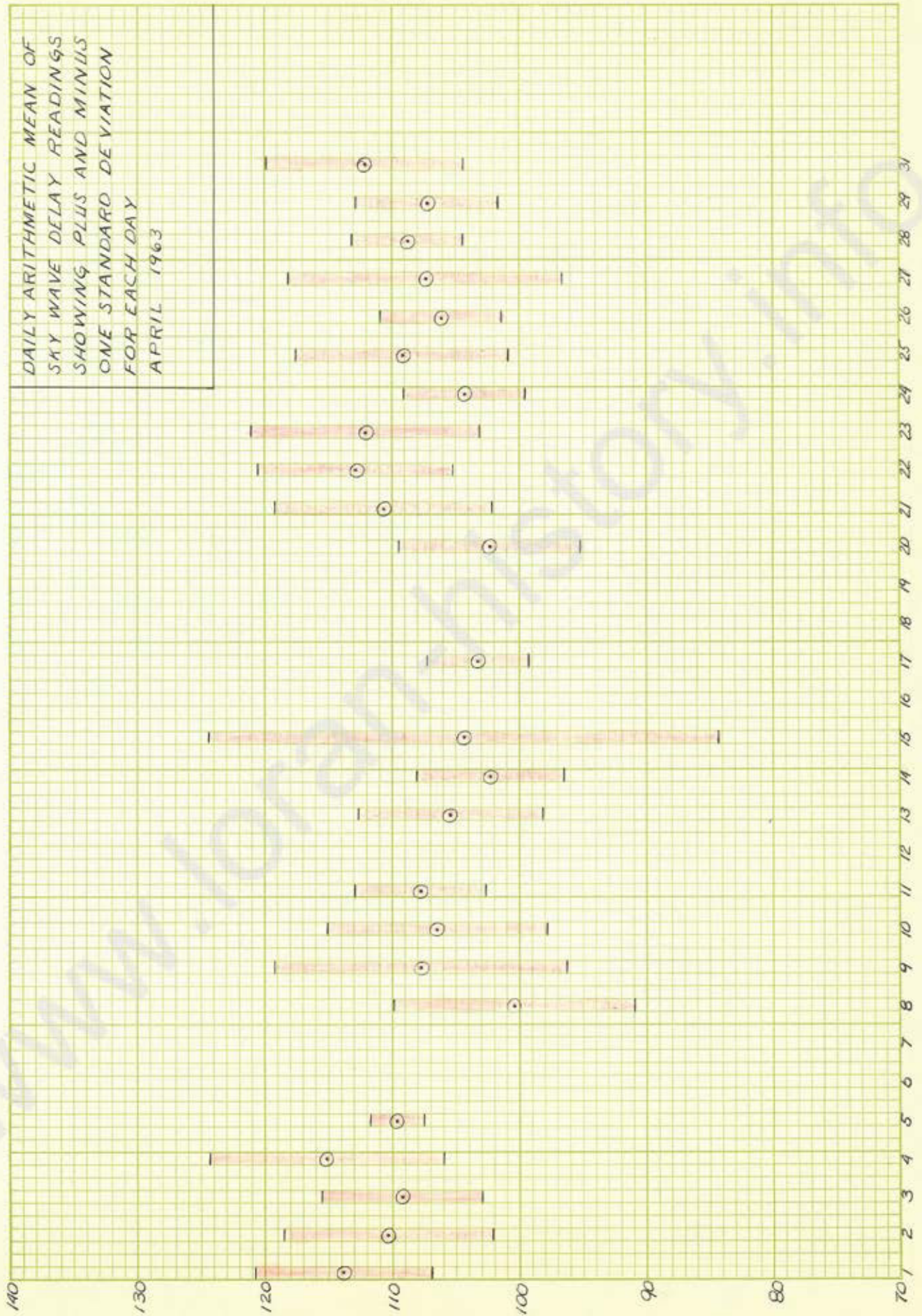
GRAPH V

DAILY ARITHMETIC MEAN OF
SKY WAVE DELAY READINGS
SHOWING PLUS AND MINUS
ONE STANDARD DEVIATION
FOR EACH DAY
MARCH 1963



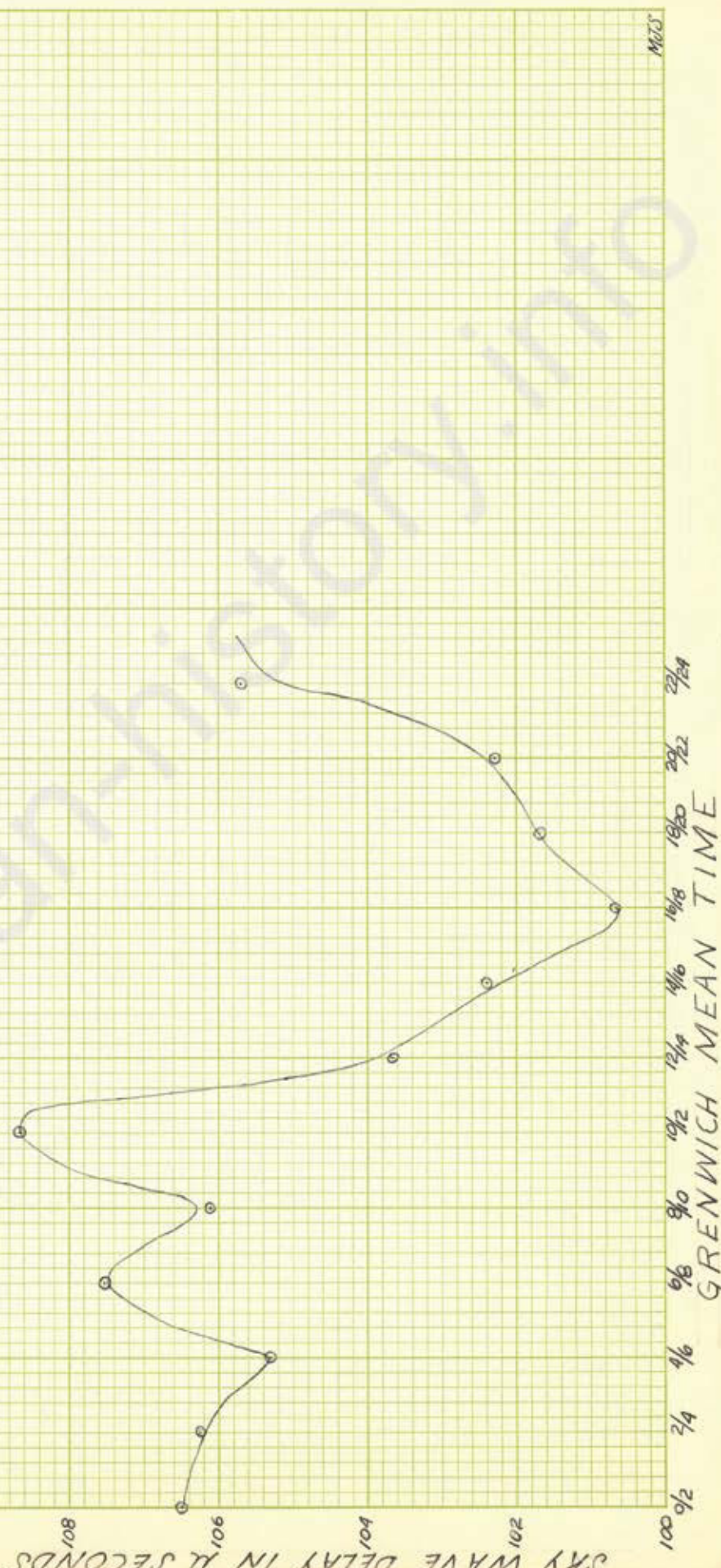
GRAPH VI

DAILY ARITHMETIC MEAN OF
 SKY WAVE DELAY READINGS
 SHOWING PLUS AND MINUS
 ONE STANDARD DEVIATION
 FOR EACH DAY
 APRIL 1963



GRAPH VII

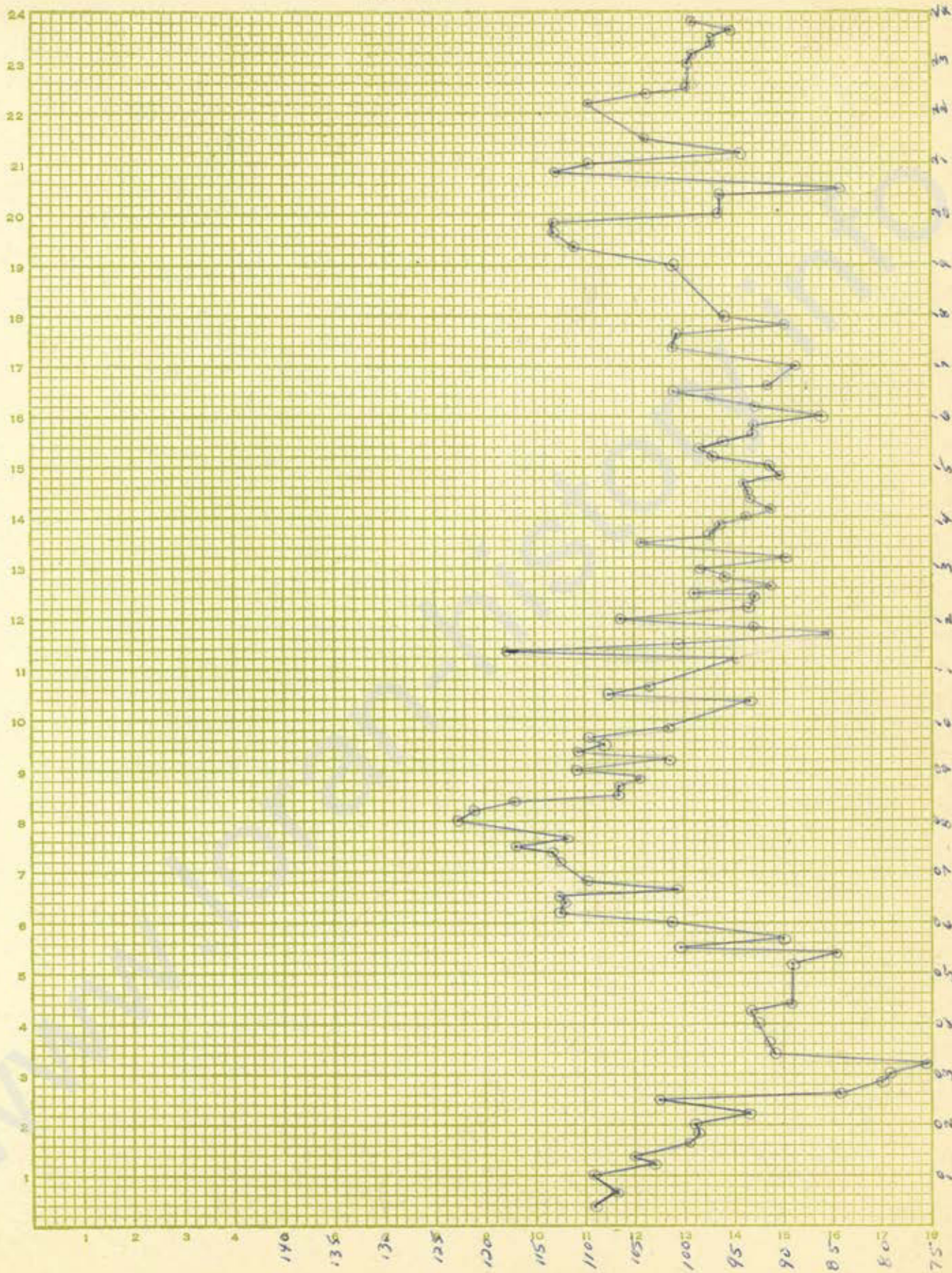
SKY WAVE TIME DELAY
 RATE 256'S
 PERIOD 12-1-62 / 12-10-62
 AVEG. SKY WAVE DELAY
 104.55 M SEC
 STANDARD DEVIATION
 7.54 M SEC



GRAPH IX

ASWD = 100 HSEC
 $\sigma = 8.92$

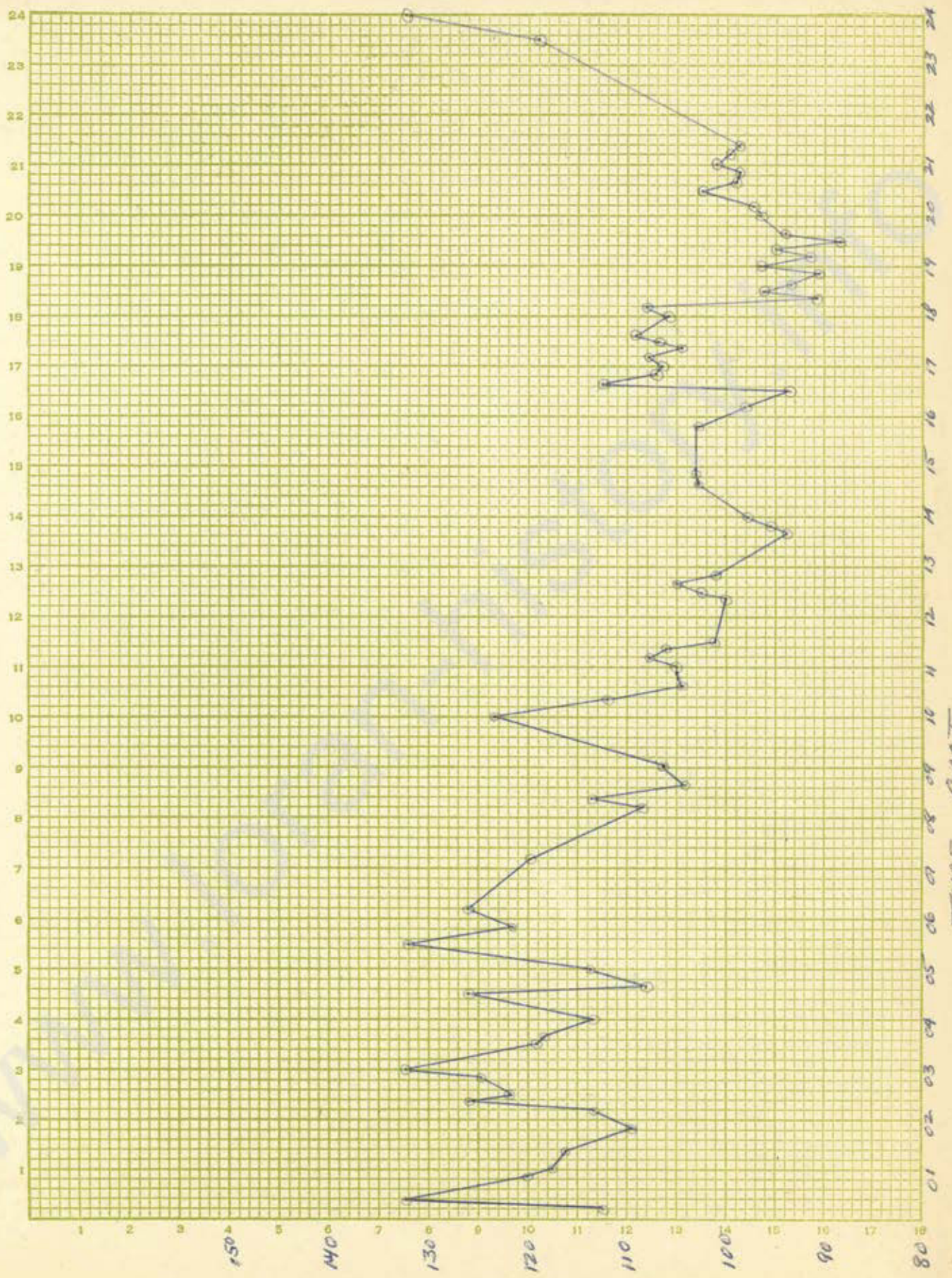
18 DEC 1962



ASWD = 106.279
 σ = 9.848

17 DEC 1962

GRAPH X



SKY WAVE DELAY IN SEC

TIME GMT

DATA SHEETS

1. The enclosed data sheets are tabulated for ease of analysis and comparison. The columns represent the Average Sky Wave Delay, Standard Deviation, Number of Observations, High, and Low readings for any and all given days during the test.
2. The Average Sky Wave Delay was determined by the Arithmetic Mean system of averaging. Although the readings are represented to the sixth significant figure there accuracy is no greater than the original data used which is correct to the nearest whole number.
3. The Standard Deviation was calculated according to ref. (a) para 1(d)b. The computations are correct to slide rule accuracy.
4. The Number of Observations column represents the number of readings that were possible to be taken during any given day with regards to usability of the sky wave signal at the time the readings were to be taken.
5. The High column and the Low column represent the high and low reading for each day. The readings are in microseconds of time difference between the Master ground wave and the Master one-hop E layer pulse.

SKY WAVE TIME DELAY DATA
NOVEMBER

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
20	106.200	6.02	95	123	95
21	108.370	6.15	65	124	94
22	101.820	8.30	94	126	94
23	109.700	11.70	81	136	90
24	98.040	4.90	99	109	90
25	98.340	4.97	64	113	91
26	99.780	4.68	64	113	92
27	99.790	8.51	40	123	87
28	99.670	6.39	43	114	88
29	100.820	8.41	67	119	86
30	106.630	3.46	43	104	90

*Note; Sky wave delay readings commenced on the 20th of November 1962.

SKY WAVE TIME DELAY DATA
DECEMBER

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
01	104.370	6.13	35	121	97
02	107.554	7.95	85	131	88
03	105.720	7.65	87	129	90
04	99.680	6.02	80	133	86
05	Commenced Master Sync. No readings taken.				
06	98.208	6.72	50	123	86
07	99.576	6.38	78	115	87
08	102.510	3.75	39	124	95
09	106.590	8.48	122	133	84
10	107.231	7.35	65	132	86
11	107.800	5.89	73	129	93
12	112.668	10.52	42	143	92
13	110.264	7.17	76	131	89
14	109.000	5.55	38	124	96
15	102.580	7.58	67	127	89
16	105.584	7.66	65	122	89
17	106.279	9.85	68	140	88
18	100.000	8.92	103	123	75
19	96.350	5.90	90	129	84
20	104.050	9.25	99	125	87
21	97.590	6.03	105	111	82
22	98.231	6.30	82	132	86
23	100.705	9.05	71	130	85
24	109.644	8.16	45	135	93
25	105.067	7.77	45	131	92
26	105.535	9.38	54	153	86
27	114.149	11.32	67	138	94
28	116.850	9.50	47	134	98
29	114.095	9.30	64	136	95
30	115.950	8.90	42	140	97
31	110.937	13.52	95	140	88

SKY WAVE TIME DELAY DATA
JANUARY

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
01	112.094	10.95	95	135	86
02	111.810	10.65	100	140	91
03	108.700	9.486	70	131	87
04	104.108	5.656	120	140	94
05	112.819	10.80	94	140	94
06	125.509	10.54	106	153	98
07	119.966	15.716	87	156	90
08	114.753	15.363	53	157	92
09	101.453	5.55	86	132	95
10	99.686	13.711	89	135	86
11	106.931	9.68	74	130	82
12	101.020	10.09	52	130	78
13	104.368	9.998	98	130	77
14	98.238	9.62	139	122	76
15	97.076	6.844	125	118	73
16	96.405	9.61	84	113	61
17	108.159	7.40	82	127	94
18	106.010	13.038	113	150	84
19	107.210	6.735	85	125	90
20	110.820	7.39	106	128	95
21	107.120	13.10	53	134	86
22	118.000	15.70	40	151	83
23	105.510	9.00	43	127	88
24	Sky wave unusable entire period				
25	102.060	7.17	82	120	85
26	102.611	7.41	95	130	78
27	110.054	8.77	55	132	93
28	111.880	11.18	67	165	88
29	97.268	5.97	45	112	87
30	100.215	5.42	79	111	88
31	92.962	5.29	105	107	82

SKY WAVE TIME DELAY DATA
FEBRUARY

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
01	94.079	5.65	88	112	83
02	95.303	5.38	99	108	73
03	96.460	6.34	39	112	83
04	96.545	10.82	88	122	74
05	97.081	12.28	99	122	69
06	99.010	7.24	91	118	82
07	106.362	12.01	88	146	82
08	96.262	12.20	81	123	61
09	97.330	5.85	91	108	77
10	69.340	14.10	100	104	43
11	65.012	10.12	116	79	42
12	69.350	12.64	120	97	45
13	81.862	7.28	109	100	57
14	87.148	5.30	115	99	69
15	84.885	5.26	87	102	70
16	84.770	5.78	127	100	72
17	84.044	8.26	113	108	60
18	81.350	9.97	108	101	50
19	88.534	10.72	46	100	58
20	87.660	16.90	80	133	50
21	106.850	17.10	59	142	57
22	103.020	22.20	42	139	72
23	110.920	22.10	69	140	53
24	89.300	14.62	67	138	61
25	89.890	14.20	45	120	63
26	84.430	17.15	44	129	65
27	94.610	14.85	80	132	73
28	95.110	15.51	48	131	69

SKY WAVE TIME DELAY DATA
MARCH

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
01	107.220	13.23	45	143	78
02	120.120	20.01	115	143	71
03	97.790	17.70	84	134	65
04	90.476	17.90	28	139	73
05	86.000	10.10	33	110	65
06	97.360	12.45	84	134	51
07	94.560	7.69	56	106	73
08	94.810	10.02	26	110	71
09	93.390	10.51	46	112	70
10	79.590	9.67	54	94	49
11	91.660	12.84	42	123	71
12	97.270	12.54	52	119	73
13	84.660	14.29	30	112	64
14	89.230	8.23	47	108	73
15	90.500	6.84	40	105	79
16	89.532	10.18	32	111	66
17	96.600	8.03	35	109	82
18	92.324	11.28	71	114	68
19	90.560	12.43	54	133	79
20	111.466	8.65	15	128	97
21	97.030	16.54	34	144	52
22	98.750	2.68	10	103	95
23	100.072	6.40	56	112	91
24	108.000	7.55	33	123	97
25	Sky wave unusable entire period				
26	105.340	8.34	6	111	87
27	107.436	7.18	39	126	91
28	107.520	6.46	46	127	96
29	117.820	10.72	29	124	97
30	116.200	5.52	25	122	105
31	113.760	5.20	46	122	101

SKY WAVE TIME DELAY DATA
APRIL

DATE	A.S.W.D.	S.D.	NR.OBS.	HIGH	LOW
01	113.930	6.84	44	122	90
02	110.429	8.21	7	130	104
03	109.433	6.26	30	124	101
04	115.228	9.30	31	149	103
05	109.750	2.05	4	112	108
06	Sky wave unusable entire period				
07	" "	" "	" "		
08	100.415	9.46	29	117	57
09	107.847	11.52	39	124	47
10	106.591	8.60	32	126	92
11	107.922	5.12	13	122	100
12	Sky wave unusable entire period				
13	105.439	7.22	41	121	88
14	102.465	5.75	56	120	93
15	104.400	20.10	10	132	52
16	Sky wave unusable entire period				
17	103.250	4.00	4	57	45
18	Sky wave unusable entire period				
19	" "	" "	" "		
20	102.388	7.09	31	118	91
21	110.678	8.60	86	159	89
22	112.940	7.79	70	152	103
23	112.095	9.04	51	136	95
24	104.354	4.88	65	118	93
25	109.100	8.38	70	129	97
26	106.149	4.78	94	122	97
27	107.343	10.75	64	136	95
28	108.795	4.31	49	123	101
29	107.271	5.66	70	126	96
30	112.095	7.78	74	136	97